

The Rimrock Report



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The only constant is change.

The title for this article is a quote attributed to several people including the Greek philosopher Heraclitus. I am not sure what the weather was like back in his day but I am going to pull out my poetic license and say that he was inspired by the variability in rain, wind, and temperature; even in a Mediterranean climate. We all know that drought is a naturally recurring disturbance especially in the southwestern US. Herbivory is also a natural disturbance. On rangelands in many parts of the world, herbivory is often the result of livestock grazing. Ecological degradation and a long-term reduction in the ability of rangeland to produce goods and services are the results of improperly practiced grazing. The timing, duration, and distribution of livestock grazing are under the control of management. These factors affect the amount of photosynthetic and meristematic tissue available to plants with which to recover and re-grow after grazing. Well informed, flexible grazing management facilitates these processes and thus, the sustainability of rangeland livestock production.

Adaptive management (as the term applies to livestock grazing) involves calculating an initial stocking rate, implementing a grazing system, and then monitoring the response to this system over time. Many factors will affect this response. In addition to those mentioned above, the ability of management to identify and implement needed changes is one of the most significant of these factors. Determining stocking rate is a key component and seems simple in concept; however, the reality of diverse forage resources complicates the calculation of an actual, sustainable stocking rate. Adaptive, resource-based management (i.e. stock and monitor) has been applied at the ranch scale in the southwest (Figure 1). For those of you interested in applying adaptive management, the guidelines presented in Table 1 are suggested.

Short-term monitoring data are useful for making within year or next production year adjustments. Step 1 involves identifying and or beginning to collect monitoring/decision support data. Two preliminary types of data would be A) that which is publicly available on a state or regional scale, and B) that which is obtained by the manager at a management unit scale. Examples of the former include the [USDA Drought Monitor](#). These type of products will provide an overall quantitative picture for the decision making process. More pertinent information will be that collected on the management unit itself. These types of data include local precipitation, forage production, livestock water, diet quality, and body condition. See Table 2A for a summary of example monitoring data, forage/precipitation status, and management categories.

Step 2 involves the development of a multi-tiered forage and precipitation status category list. This list will be an array of “worst case” to “best case” scenarios ranging from, for example, exceptionally wet to extreme drought in seven graded levels (Table 2). In step 3, grazing management categories such as grazing system, livestock inventory and herd composition, or health and nutrition will be identified. It should be noted that in an overall ranch management plan, many such categories exist. The basis for proactive, adaptive decision making will be developed in step 4. At this stage of the process, location specific management action alternatives will be discussed and listed for each combination of forage/precipitation and management category. There may be more than one potential action for each combination and these can be prioritized.

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Drought is a naturally recurring disturbance, especially in the southwestern US.



The only constant is change, continued...

One important item here is the identification of culling priority groups and practical opportunities to gather and remove animals in the event reduced stocking is indicated. For example, at a given location the configuration of pastures, roads, or working pens and the timing of typical production activities may result in practical gathering of animals to occur only around calving, breeding, and weaning. Routine culling typically occurs at weaning and may include old or non-pregnant cows. Cows that experience dystocia may be culled at calving and cows with low body condition could be removed from the herd at breeding. In addition to these, culling priority level 1 might include cows with bad temperament or that weaned below average calves. Level 2 could be cows 1 year younger than normal culling or that calved later in the calving season. The baseline herd, that which could be economically and ecologically sustained during extreme drought, may only include the prime age and high performing cows.

Alternatively, above average conditions may indicate an opportunity for “capturing value”; i.e. stockpiling forage for later grazing, prescribed fire, improving ecological attributes, or for retaining stockers on the ranch. These pre-planned management actions, developed in a relatively “no stress” environment, will serve to support and guide adaptive decision making in real time.

The above steps should be repeated for medium and long term planning horizons. The usefulness of extending the planning horizon with monitoring data is that while short term conditions may not indicate the need for a change in management, medium term monitoring data may indicate a gradual trend. Long term data will also indicate trends and these may call for an even greater level of management action, e.g. brush control, water development to improve grazing distribution, or shifting to a stocker herd to provide a more “liquid” grazing plan. These decisions will of course be made in the context of the overall ranch business plan. Once the baseline data have been analyzed and the preliminary stocking/grazing plan is finalized (step 6), the plan will be implemented and real time monitoring will begin (steps 7 and 8).

Properly grazed rangelands provide many goods and services to society. Southwestern rangelands are a tough place in which to manage for the sustainable production of these goods and services. Applying adaptive management techniques will facilitate the synchronization of sustained ecosystem production with forage harvest by livestock. Well planned grazing will help promote soil stability through plant canopy cover and extensive root development as well as enhance carbon and nitrogen cycling through quantity and quality of litter and manure. Healthy rangeland will be more biodiverse and resilient to drought. So maybe a little variety is a good thing.

Table 1. At the individual ranch level, the development and implementation of adaptive management procedures will involve the following basic steps:

1. Identify types of monitoring/decision support data available or needed
2. Develop multi-tiered forage/precipitation status categories
3. Identify grazing management categories
4. Develop management action alternatives in each grazing management category for each forage/precipitation status category
5. Conduct this suite of activities for short, medium, and long-term planning horizons, at the management unit scale
6. Finalize initial stocking rate/grazing system
7. Implement stock and monitor, adaptive management plan
8. Monitor, adapt, re-plan

Figure 1.



Adaptive management involves monitoring and adjusting stocking rates and grazing plans based on site specific data.



The only constant is change, continued...

Table 2. Example decision tools for developing short-term adaptive management "triggers" and practices.

A: Public Information Indicator Sources

Precip. Category	AZ Drought Status	US Drought Monitor	Range View
	ADWR - Director	NIDIS	UA, ACE
Exceptionally Wet	NA	Extremely Moist	125 % Avg NDVI
Abnormally Wet	NA	Moderately Moist	110 % Avg NDVI
Long Term Average	> 40 percentile	Upper Mid Range	100 % Avg NDVI
Abnormally Dry	25 to 40 percentile	Lower Mid Range	90 % Avg NDVI
Moderate Drought	15 to 25 percentile	Moderate	80 % Avg NDVI
Severe Drought	5-15 percentile	Severe	70 % Avg NDVI
Extreme Drought	< 5 percentile	Extreme	60% Avg NDVI

B: Site Specific Indicator Sources

Precip. Category	Water in "X" Tank	Utilization of Key Species	FNIRS Diet Quality
	Pers. Observation	Monitoring Data	Gan Lab
Exceptionally Wet	Full to over-flowing	5%	125% of avg
Abnormally Wet	Full	15%	110% of avg
Long Term Average	90% full	25%	100% of avg
Abnormally Dry	75% full	35%	90% of avg
Moderate Drought	50% full	45%	80% of avg
Severe Drought	25% full	55%	70% of avg
Extreme Drought	dry	65%	60% of avg

C: Adaptive Management Alternatives

Precip. Category	Management Activity Category		
	Grazing System	Livestock Inventory	Other
Exceptionally Wet	Target graze annuals	Temporary short-term increase	Develop heifers on-ranch
Abnormally Wet	Rest additional pastures	Maintain, normal culling	Apply prescribed fire
Long Term Average	Proceed with planned use	Maintain, use stockers	Improve distribution
Abnormally Dry	Proceed with planned use	Slight decrease, culling group 1	Improve distribution
Moderate Drought	Proceed with planned use	Slight decrease, culling group 2	Improve distribution
Severe Drought	Alter grazing schedule	Decrease, culling group 3	Supplement as needed
Extreme Drought	Alter grazing schedule	Decrease to minimum base herd	Supplement as needed



John's Plant of the "week"

Cool Season Grass: A Two for One Proposition

It is that time of the year: cattle are "chasing green". It is also the time when ranch managers most rely on cool season plants. Filaree, an introduced annual, makes up a large portion of this green however, it is not as important as perennial cool season grasses. Cool season grasses utilize winter and spring moisture to promote their growth. Perennial plants are more reliable and better at improving soils and range sites. How important are the cool season grass species in Arizona rangelands?



Filaree

The Navajos, always astute observers of the natural world, called six-weeks fescue "the grass that feared the summer" due to its early and short growth cycle, going to seed before the heat of summer. According to Vorsilla L Bohrer, 1975, native people saw the value of gathering the seeds of this and other cool season grasses to help them until the first wild fruits mature in summer. She records finding Indian ricegrass, New Mexico feathergrass, bluegrass, little barley grass, Carolina canary grass, and Mutton bluegrass in native ruins in Arizona and New Mexico. Six-weeks fescue is an annual species and in the same family as Arizona fescue. According to the NRCS plants database Arizona fescue is found in five states other than Arizona. In "Grasses of the Southwestern United States", Arizona fescue is described as frequently abundant in mountain parks and meadows between 7,000 and 10,000 feet. It is highly palatable when culms and blades are green, and contributes considerable forage in some areas.

Northern grasslands are dominated by cool season grasses, here in northern Arizona the higher elevation allows these grasses to survive and in some areas thrive. The list of cool season grasses found in Arizona include bluegrasses, oat grasses, needle and thread grasses, wheat grasses, brome, Indian ricegrass, fescue, prairie junegrass, timothy and trisetum. Occurrence depends on soil type and elevation, and in some instances, whether or not they had been seeded in an attempt to improve the range site. In fact, range site "potential" may not be reached due to the lack of cool season grass presence. I often find cool season grass species are present, but sometimes hard to find. Bluegrass and squirreltail are often found in the shade of trees, where soil moisture is higher than in the sun parched areas. Under low growing tree limbs these plants find protection from grazing. Interestingly, not all cool season grasses prefer shady moist conditions.

New Mexico feather grass is very tolerant of dry conditions, often found on ridges. A University of Arizona study found that New Mexico feather grass is intolerant of crowding. It does not perform well in crowds and has found a niche in the landscape where it can thrive. Indian ricegrass prefers open, sandy plains and hills, often in juniper woodlands. High in food value, the grain of Indian ricegrass was widely used for food by native western tribes, often ground into flour to make bread.

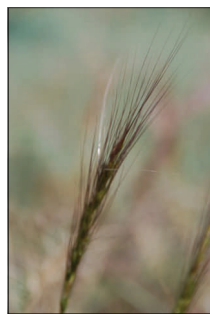


Bluegrass

Perhaps the most forgotten benefit of cool season grasses is they are not limited to one growing season. Typically spring or early summer is their primary growing time, but after the summer heat subsides, cool season grasses will green up again if adequate moisture is present. This second growth may not last as long, but adds valuable forage at a time when warm season grasses are becoming unpalatable. Two growing seasons in one year, two for one. I think cool season grasses are often dismissed due to the failure to include fall green up. Perhaps we should place greater emphasis on managing this component. Consider this: Arizona fescue, a cool season grass, is not Arizona's official state grass. Should it be?



Foxtail Barley



Squirreltail



Arizona Fescue



The view from the Rím

Rangers

The pony's flanks were heaving and the blanket's soaking wet.
There's blood upon the saddle and it hasn't dried up yet.
With nostrils flared and matted hair, his feet are hot and sore;
this tells me in the darkened house, is the man I'm looking for.

Now, I'm a Texas Ranger from the wild Nueces Strip;
a land of hell and leather that the Devil must have picked.
Through days and miles of sun and dust I've chased this outlaw band;
now just outside Uvalde I must face the final man.

I'd found him at the river with his campfire burning down.
I'd slowly crept upon him trying not to make a sound.
I fired and thought I'd missed him as he awoke and drew his gun;
in a heartbeat he was mounted, heading northward at a run.

My pony plunged into the river, trying to give chase;
my mind was racing wildly for I'd recognized his face.
What could make a ranger turn into this kind of man?
Does he know which ranger has chased him through this land?

Indecision haunts me in the shadows by the gate.
Should I rush the door, or should I hide and watch and wait?
My mind goes back to Waco and how I dreamed when I was young,
that I'd be like my brother, and ride off into the sun.

Then he stepped from the shadows out into the pale moonlight;
I called his name out low and hoped I wouldn't have to fight.
He answered with a gunshot; soon others filled the air!
Then the night returned to silence as though no one had been there.

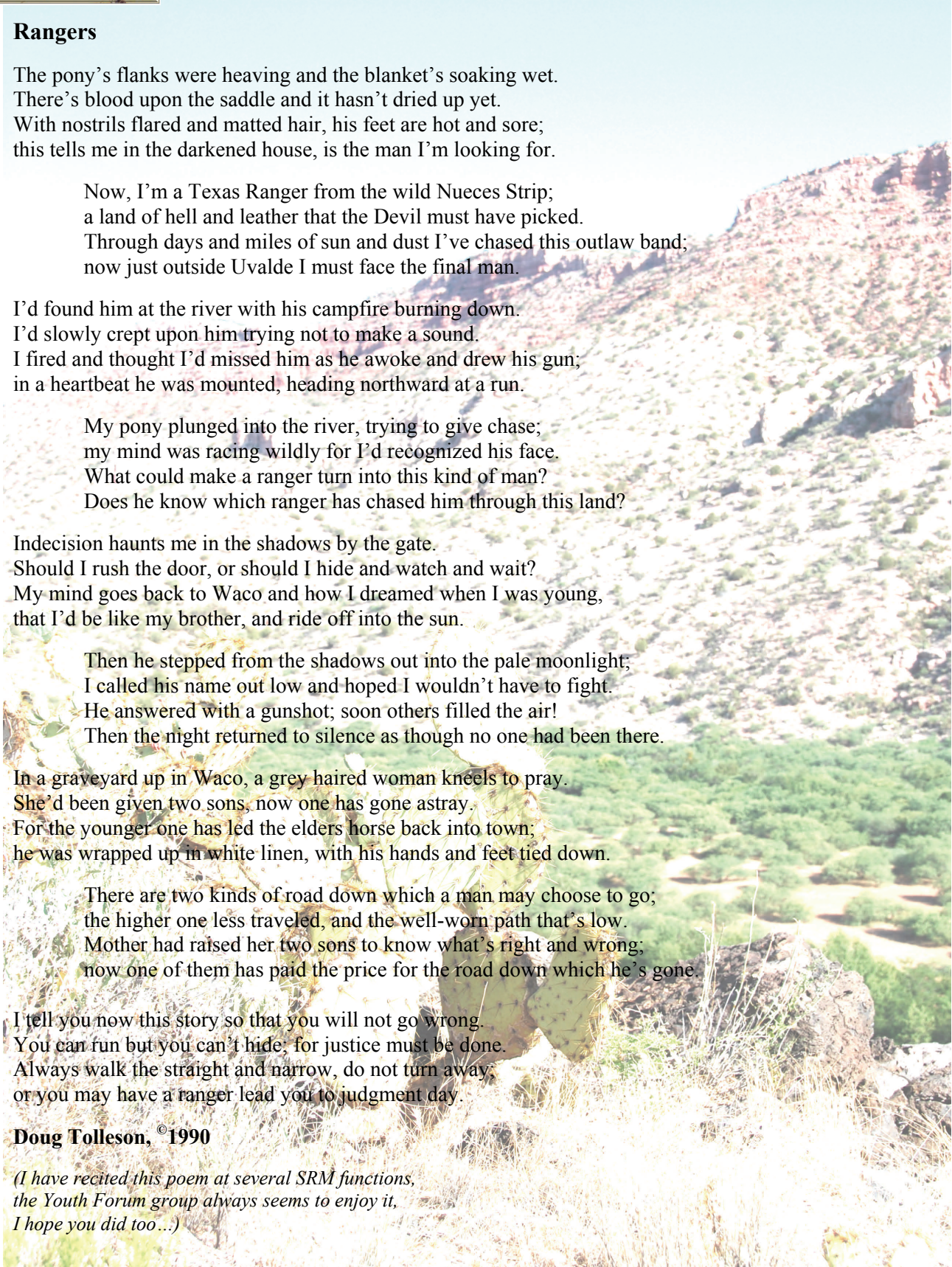
In a graveyard up in Waco, a grey haired woman kneels to pray.
She'd been given two sons, now one has gone astray.
For the younger one has led the elders horse back into town;
he was wrapped up in white linen, with his hands and feet tied down.

There are two kinds of road down which a man may choose to go;
the higher one less traveled, and the well-worn path that's low.
Mother had raised her two sons to know what's right and wrong;
now one of them has paid the price for the road down which he's gone.

I tell you now this story so that you will not go wrong.
You can run but you can't hide; for justice must be done.
Always walk the straight and narrow, do not turn away;
or you may have a ranger lead you to judgment day.

Doug Tolleson, ©1990

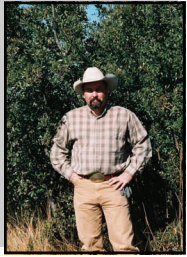
*(I have recited this poem at several SRM functions,
the Youth Forum group always seems to enjoy it,
I hope you did too...)*



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Note: Please email me if you would like to be added to the "mailing" list for this newsletter.

Just me talking...



Well, we have been doing these newsletters for a year now and so far we have hit our deadlines. Honestly, with schedules being what they are I am a little surprised. But I can credit Lisa, Deb, and John with helping me stay on task. Since January, we have attended the Arizona section SRM winter meeting in Sierra Vista and the national SRM meeting in Albuquerque. Both were a big success in my estimation. As usual, it was good to get out and see people and hear what they have been doing on the range. We had some productive discussions with the USFS and Texas A&M regarding the Burning Risk Assessment Support System for Grasslands (Brass-G) project. You may recall from previous newsletters that we at the V Bar V spent a good part of last summer conducting transects on this project designed to provide landscape-scale fire fuel modeling products. For a preliminary view of what these will look like, visit the [Brass-G](#) website. We will also be able to get forage mapping from this effort, so this cooperative project will give us a lot of "bang for our buck". We should be continuing work on Brass-G on several new forests in Arizona and New Mexico in 2009. Another exciting development related to this particular project is the use of a ruggedized tablet PC to collect vegetation transect data. In the photo from this issues main article, you can see one of these tablets in use for monitoring as part of the Reading the Range program. Del Despain from Arizona Cooperative Extension has developed a great software package for the tablets and this really facilitates monitoring. I also attended the Arizona Wildland Fire and Incident Management Academy in Prescott during spring break. Hopefully this training will allow me to gather data on fires and connect the dots between the predicted fuel mapping and actual fire behavior. We have also continued to participate in the Range Livestock Nutrition Workshop series, held this spring on the San Carlos Apache and the Hualapai nations. At the recent Range 101 Workshop in Camp Verde. I was privileged to present the section on drought management. March Madness was a mixed emotion thing around the Tolleson house. We were excited for the Aggies and Wildcats to get the chance to dance, but would have liked a little longer run... Oh well, high school wrestling was good this spring. Mingus Union won its fourth straight 4A state title, and a certain 135 lb'er placed second in his bracket at the AZ state freshmen tournament.

Till next time... Doug



Links to the website references in this publication:

USDA Drought Monitor: <http://drought.unl.edu/dm/monitor.html>

Brass-G: <http://dev.tamu.edu/brass/>