

Science recognizes different levels of evidence and human reality.

Emotion and agreement, the foundational principles of culture, are seen by science as lower levels of evidence and reality.

Throughout human history, millions of people including educated elites and the scientists of the day who deemed enlightened, have emotionally supported and fostered support for such actions as slavery, conquest, mass murder, and terror as well as many other fallacies, including practices that create terrible environmental destruction.

The human organism can generate emotions in support of any belief.

It is very well documented that most people will readily distort their own perceptions in order to agree with a peer group or authority figure. They like to belong, they doubt themselves, and fear to disagree.

To counteract this, science has developed effective procedures to control for emotional agreement during scientific observation.

The sciences look to specific, measurable responses supported by a matrix of previously documented specific, measurable results within an ethical framework, as evidence of reality.

Overgrazing is a very ancient practice. Europe has been overgrazed for thousands of years.

In wet European climates, precipitation falls every month. The air and soil are damp. Seeds germinate in warm months and usually grow to maturity. Because of this and the fact that lawn type grasses, clovers, and some other edible plants like dandelions tolerate frequent repeated grazing well in moist fertile soils, overgrazing.

If inedible plants began to take over their pastures, or bare ground appeared, they learned to reduce the number of animals. Land damaged beyond the threshold of economic use was abandoned. Nature reclaimed it. A forest grew. In time the cycle was repeated. This was their ultimate solution.

When Europeans came to Eastern North America, they continued to practice overgrazing. Soon, only plants unused by livestock or tolerant of frequent repeated grazing remained in many areas. Eastern North America was even wetter than most of Europe, and it worked for them. Animal numbers were reduced if bare ground appeared or inedible plants took over. Land that became too badly damaged was abandoned and nature reclaimed it. The ultimate solution worked here, too.

But, when the westward migration came to the end of the tall grass prairie where the short grass began approximately on the 90<sup>th</sup> Meridian, they encountered a very different world. Seeds didn't germinate every month. They didn't germinate every year. Growing

Seasons were short, and rainfall was unpredictable. It really was another world, and it became stranger and more different the further in they went.

As the overgrazing continued, streams ran with mud. Plants became locally extinct. Livestock, wildlife, and people starved and moved away from the terrible destruction. While some learned and changed, others just stuck with the old solutions. They reduced livestock numbers in the thousands. They reduced the herds further and further. Then they reduced some more. Rural people and rural culture suffered. In many areas, they used the ultimate solution. Livestock was completely removed and human activities greatly limited. The land produced specific measurable responses. Now, after many decades of the ultimate solution, it's past time to look at these places and see how it worked.

It works in Britain and Germany.

It works in Massachusetts, Georgia, and the Pacific Northwest.

It works on irrigated lands.

It works in Rainforests.

This is not a Rainforest. It is a low rainfall rangeland with episodic seedling establishment and highly variable precipitation.

But because many people strongly agree that it works everywhere, the Ultimate Rest Solution has been applied for years to this side of the fence.

The living community has responded to this solution by collapsing.

Grass and flowers are almost all dead. Most animals have moved or died.

It takes at least 2 years for dead plants to turn grey in this climate. As you can see, no new plants have grown in that time. New plants are very rare on this side of the fence.

On the other side they are very common. Dead plants are very rare.

The other side of this fence is grazed by livestock.

It's the one with the close plant spacings and many new plants. On that side plant death is a rare event.

These ricegrass plants are the same age, in the same soils, on two sides of a fence, a few feet apart. Let's see how they responded to scientific grazing versus prolonged rest. Look at this native ricegrass plant, surrounded by its descendants. They have been grazed many times in their lives. They have deep, strong roots and lots of early spring growth.

But look how a gentle, two fingered tug breaks the roots of this ungrazed plant. It has been rested all its life. As you can see, most of the plant is dead, smothered by previous years of growth. This is the certain fate of all ungrazed grass plants in rangeland climates.

They must have their dead, former years growth removed somehow, or as time progresses, they die an early death, especially in low rainfall areas. If a mature grass plant is not covered with dead gray or black old growth, it has been grazed or it has been defoliated in some other way. Without grazing it will be dead or mostly dead within a few years. In general, healthy means properly grazed. That's all there is to it. This is a specific measurable response from most species.

Nature likes grazing here, if grazing happens by her rules. Remember, this is not a rainforest.

Title: Natural Grazing is Migratory Grazing (Formerly – Grazing: Natures' Rules)

On natural rangelands, grazers migrate. Because they migrate, they spend only a small part of the growing season in any single location.

This protects against overgrazing grass, no matter how many grazers there are. Plants and plant communities are invigorated and easily grow back from this brief pruning.

All the good things about grazing are optimized this way. Seeds are planted, nutrients and energy are cycled, plants grow closer together and hold more water, soil organisms and insect decomposers are nourished.

The risks of grazing are minimized. Plants can complete their life cycles. They are protected. This is how plants and grazing animals have co-developed for millions of years in beneficial symbiosis.

Nature's rules for rangelands are called Migratory Herdland Ecology. It works. That's how nature heals and protects rangelands.

These low rainfall rangelands have been grazed according to these principles, as winter range, for 150 years. Sometimes they were grazed severely, sometimes lightly. Sometimes they were rested.

The natural community is all here, growing where they should. Plant spacings are close. There are few non-native or invading plants. Most plants are producing and reproducing vigorously. There are very few dead plants. These are the Range Science Profession's direct indicators for health of living communities.

We see the same indicators here, and here, and here. Some are grazed as winter ranges. Some are transitional ranges. Some were also used as summer ranges.

In these next pictures, the Ultimate rest solution has been used now for decades. If it worked, we would find high health ratings in the direct indicators. These ratings measure differences from site potentials, from none on one end to extreme differences from the potential natural community on the other. Instead of health, this is the response.

Look at this site in Canyonlands National Park. Toxic invading snakeweed has replaced several structural groups of native plants (EXTREME). Dead plants are common (EXTREME), non-native plants are common (EXTREME), there is little production of foliage (EXTREME), and there is little viable native seed production (EXTREME).

These woody plants are doing well in this location, but the native grasses are gone, again several structural groups are missing (EXTREME). There is extra water here from runoff, but there is little herbaceous growth (EXTREME). Therefore little hope remains for grass and flowers coming back (EXTREME). Most ground is bare (EXTREME).

These grassland sites have lost most groups of native diversity (EXTREME). The grasses are weak and unproductive (EXTREME). Little seed is being produced (EXTREME). Invading non-natives are common (EXTREME) and dead plants are common (EXTREME). Living perennials are an average 6 ft. apart (EXTREME).

In arches national park, too many years of the Ultimate rest solution has brought the same response. Native grasses and flowers are moving towards local extinction. Native plant spacings are measured in feet rather than the normal inches or fractions of inches. Dead plants are common. Non-native Cheat Grass and Russian thistle are the most abundant non-woody plants. Most ground is bare and crusted. These collapsed communities are represented now by woody plants and non-natives. This is, again, extremely different from the potential native community. Predictably, the response is collapse.

These photographs were taken in 1991. This is the Canyonlands boundary fence, near the visitor's center. The grassy side is the ranch next door. Clearly these native grasses do well in this soil on the ranch side in accordance with documented site potentials. They do badly in the rested park. Ten years later, things have only gotten worse in the park, while these vigorous grass and shrub lands on the adjacent ranch are still thriving just across the fence. The Ultimate Rest solution is a miserable failure on rangelands in the west. This is no secret. These are excerpts from an award winning news piece by John Hollenhorst and KSL TV in Salt Lake City in 1992. It was broadcast on regional cable and public educational TV many times.

Riparian wetlands of course, like all wet places, respond well to the Ultimate Rest solution, but this is no solution for whole rangeland ecosystems. You can see this in Arches National Park. A little strip of green wetland a few feet wide winds through thousands of acres of bare ground, bushes, dead native grasses, and non-native plants with severe consequences to wildlife. It may be 40 miles to the next little green spot.

But by grazing according to Migratory Herdland Ecological Principles, beautiful riparian values are easily produced and preserved. These herdland riparian areas are surrounded by miles of healthy uplands.

Land dominated by bare ground and woody species is tragically deficient habitat for most wildlife. Most wild animals which eat woody plants do so mostly in winter or drought

situations. They can stay alive, but they cannot get in condition to reproduce. The Ultimate Rest solution, used long term on western rangelands, causes wildlife populations to crash, with no hope of recovery until changes are made.

Decades of woody plant dominance can cause downward threshold changes and lack of resilience, as illustrated by these two burn sites. This one had 135 years of migratory grazing. Look at the robust recovery. A fire one mile away on land rested for 75 years had this response. This is 3 years after the fire. Fire cannot rescue lands from decades of the wrong policy. Once below this threshold, only Migratory Herdland principles can heal these lands.

Why would government and private policy makers keep pushing a failed policy without looking to alternatives? The reasons are complex. Among them are peer pressure, authority and professional advancement dynamics, lack of knowledge and experience in alternative methods and a failure to use a standard scientific feedback process to guide their thinking. They measured short term temporary effects, not long term response consequences. Real science requires documentation of phenomena over extended time periods. Also, they believe an old out-of-date, disproven succession theory which stretches a “one size fits all” notion over the vast complexities of nature.

Western Rangelands do not progress from fire, flood, overgrazing, or other disturbances the way Eastern wet climate lands do. Modern science recognizes a complex process of ecological thresholds, steady states, and transitional pathways.

It is not enough for public policy to just punish people or create beaurocratic convenience. Sound policy must point the way to proven healing pathways which bring both short term and long term health and diversity without exterminating rural culture.

Concentrated livestock or hoofed wildlife can provide a rapid pathway for recovering native grasses and other plants when well managed by protective, dynamic, migratory herdland ecological principles. This site looked like this for fifty years, until concentrated cattle simulating migratory wildlife, produced this change.

These studies show how it works. A multidisciplinary team of government range managers, environmentalists and ranchers, led by the Tipton family, concentrated cattle on the Marietta Wild Burro Refuge in South Central Nevada simulating the effects of migrating Bison. They increased native grasses by 133% in only one treatment. Valuable winterfat shrubs increased 160%. These were adult plants measured 3 years later. The land had achieved its natural site potential.

They followed up that study by concentrating cattle briefly on plots inside a fenced exclosure, to create seedling response. Under decades of rest, with experimental cattle and local burros fenced out, reproduction had almost stopped. When the whole exclosure was statistically sampled in ½ meter square plots, only 3% had seedlings, with none of them reaching maturity. This very inadequate seedling rate is a very typical land response to extended non-disturbance.

Hoof action, which creates millions of hoof print micro-sites which concentrate water, seeds, and nutrients combined with dung and urine alone brought a huge improvement, to 56%! An 1860% increase in population after one year. These trampling animal impacts over hay mulch, which increased nutrients and water retention, created a 2000% increase in year old seedlings. Adding 1lb of Ricegrass seed per acre to the mulch and animal impacts created a 2530% increase, and 3 lbs of seed plus animal impacts and mulch brought a 3100% increase in population and 91% frequency. Each of these responses was produced by a single brief treatment. During the following year, the rested control plot produced no seedlings at all, which again is the usual response.

Experienced managers see strong herbaceous responses to herdland animal behavior all the time. Drs. Rasmussen and Keyes of Utah State University used hay to concentrate cattle at 1 cow per 2.4 square meters for brief periods in sagebrush steppe. They increased native grass and flower production (by weight) 500%, from 200kgs to 1000kgs per hectare. Again, this occurred in just 2 growing seasons, with one treatment. Native perennial herbaceous production, which had been very low, increased 1100%, a large majority of the total.

These phenomena are not short term effects. This is the only effective way these plants have to reproduce, grow in dense stands, or develop active living soil environments. It's a permanent part of any long term healthy herdland ecosystem. The difference between long rested and herdland principle rangelands is like night and day. It's also life and death for wildlife.

Observe to the difference between the sights and sounds of a spring day on long rested land...and now, Migratory Herdland.

When land looks like this, a pair of birds couldn't feed a family for one day on several square miles. A few square feet of well managed herdland can stuff the whole bunch with bugs and seeds. As you can hear, the birds know that.

Migratory Herdland Ecology is not rigid or doctrinaire. Many combinations of grazing and rest get good results. The best results come when animals mimic natural migrations. Experienced managers and researchers know how to create these responses.

They also know that rangeland communities collapse without grazing animals. If the issue was not so angrily politicized, this knowledge, and the failure of the Ultimate Rest policy in rangeland national parks would have informed the public process as scientific feedback long ago. So would the wonderful success of Migratory Herdland Ecology. This feedback must enter the process. Vital information is being ignored.

Nature speaks to us continually. If we can tell a dead gray plant from a dormant one, we get one message. If we can tell non-native cheatgrass from dead and dying native ricegrass we get another. Here, Russian thistle is invading perennial grassland. Native bunch grasses are dying out here, in Capitol Reef National Park. Coarser galleta still persists. Look at this barren woodland and shrubland. Nearly all the native life is gone. It

only takes a few years for accumulated dead growth to kill a grass plant as a result of too much rest. Those same years can kill most of the grass in a large area and drive out wildlife. Whole valleys can die. Whole regions can die. As you can see, anyone who denies these facts knows little about western ecological processes, or they are withholding information to support an agenda.

These dead and dying landscapes are not subtle messages. They are cries for help. They are extreme losses of natural health and diversity. Many of our ancestors used nineteenth century European grazing practices without a feedback loop. That still goes on in places. Nature responded by producing symptoms of distress. They were ignored.

Most of us know that continuous repeated overgrazing is very bad for community health. We now, most of us, can comprehend that we are not in Europe, the East Coast, or any wet place. We cannot graze the same way here. But it is not enough to slow down killing nature one way and start killing her another way, blind and deaf to her clear messages, certain that our alien, out of place endless rest solution will heal the damage! A feedback loop is essential to preventing and healing environmental problems.

It is not acceptable to cause terrible destruction with our stubborn blindness and just call it Natural. The Ultimate Rest solution has been tried in National Parks at rangeland elevations for 40 to 90 years. Seven species of mammals became extinct in Bryce Canyon National Park alone. They died or they left. This mistake is being applied, now, intentionally, to millions more acres. It does not work.

What does work is paying attention, adapting to the climate, weather, and native community. Where people do that, nature thrives.

We can get a big message when we watch where the wildlife goes. Various agencies, state and federal, have removed livestock from wildlife habitat in an effort to increase wildlife populations. Within a few years, state wildlife departments bring the livestock back, because the wildlife left, and went to the next ranch. Cattle and bison can live on old or coarse food, especially when supplemented with protein and other nutrients. Other wildlife can't, and they won't try. They leave and find fresh, young, green plants and full seeds.

We can't say everything in this brief film. We can, however, tell the plain truth. In Western Rangelands, nature likes grazing when it's done by her rules. Rest is a vital part of the process too, but only when it is done her way, without overdoing it. When we try to impose our rules for grazing or for rest, nature can only communicate by dying. Let's pay attention to what causes life and death. The whole life cycle must be completed for each organism for healthy communities to support wildlife. Birth, growth, reproduction, death, and decay are the life cycle. It all has to happen. If we, personally, do not have a functional knowledge of life cycle relationships in Western Rangelands, Nature would like us to talk less, listen more, and go out and learn. Uninformed opinions can create nothing but tragedy and destruction, no matter how passionately groups believe them and no matter how many people agree with them.

Look at the Rangeland National Parks in the West. When the livestock were removed, the theory was that deer, elk, and other animals would fill their places. It did not and does not happen that way. The inheritors of that old theory now say they need centuries for their ideas to play out. National Parks, already closed to livestock, are appropriate places for this experiment, but they are just theorizing against the evidence. As you can see, Migratory Herdland Ecology has proven answers in specific measurable responses, in real time, right now. It has delivered this same message for many centuries. Migratory nomadic herding peoples of many cultures in Africa and Asia, taking their pattern from wildlife, proved long ago, conclusively, that livestock can be a functional part of nature. They moved their herds through lands of wondrous abundance and diversity. Generation after generation, century after century this health and diversity remained and flourished. These lands also, like Western North America, had highly variable seasonal precipitation, episodic seedling establishment, and migrating wildlife. Why do so many of us refuse to learn from them, or the Native Americans who by their own accounts skillfully managed wild herds of Bison, elk, and other animals to achieve the same results? Because they weren't Europeans?

This makes no sense. It is wildly irrational to ignore the sustainable achievements of these successful cultures. It is also wildly irrational to assume that when old wet country grazing practices and mitigating solutions fail in the west, the European Ultimate Rest solution must be used even when it wrecks the ecosystem. That's nothing but extreme, arrogant, uninformed Eurocentrism reacting emotionally.

Emotion and agreement are powerful forces. They can be wonderfully creative. They are also extremely dangerous. Our ethical standards require us to state that no one should simply believe us. Contact us. Check the facts. Our ecological purpose will be much better served if people will. We are certain that progressive science will continue to support our experience. The question is, will we, the interested public and government officials, continue in a dilemma like the one in the old story of the Emperor's New Clothes, where everyone who actually observes specific measured responses in western rangelands can see the truth of the matter but dare not admit it to themselves or speak out?

Throughout their life cycles, creatures within communities respond to specific actions. We must learn these relationships and employ an effective feedback process. Ecological health works that way. Science works that way. And ultimately so does Democracy.