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National Park

Long-term rest in climates typical of most of the western U.S. is a biological disaster!

By Steve Rich

"If you don't use this grass, it's gonna get even wolfier and die. You dumb . . . college kid!"

Sam Judd, a cowman with 70 years experience, said that back in 1973. He was trying to save me grief and money. He was also trying to save the health of a ranch my wife and I had purchased and—on the advice of "experts"—we were going to rest the ranch until the grass came back.

The ranch had already been rested for five years, and the small amount of grass left had a thick shock of dead, gray stuff in the center of each plant. They were the "wolf tails" that earned such plants the epithet "wolfy." The so-called experts were wrong, the old cowboy right, because most of the grass died. But by then, the former had been transferred elsewhere, along with their textbooks.

Since those days, I've become a little touchy on the issue of range rest. At a recent Senate Energy and Natural Resources Committee hearing, chaired by Utah Senator Bob Bennett, in Richfield, Utah, I implored Secretary of the Interior Bruce Babbitt not to repeat my mistake on a regional level. I told him to go and look for himself. In fact, I told him exactly where to go—the national parks, recreation areas, and historical sites set aside for conservation.

In Canyonlands, Arches, Zion, Chaco Canyon, and Painted Desert, Sam Judd's prophecy is coming true. These places are dying. And Lake Powell, which lies in Arizona and Utah, provides a vivid example.

On the western shore of Lake Powell, livestock grazing has been excluded in most areas for many years. I went there on August 19, 1994, with my father to do a simple grass population dynamics transect and take some video for a documentary proposal about this phenomenon. I call it the National Park Syndrome.

THE DIFFERENCE IN GRASS PLANTS

PRIOR GRAZING LAND/ 30 YEARS REST	TOTALS	CONTINUING GRAZING LAND/ MANAGED GRAZING	TOTALS
Live (Vigor, 3.5)	25	Live (Vigor, 8)	242
Almost dead	18	Weak	18
Dead	198	Dead	23
Seedlings /Juvenile	1	Seedlings /Juvenile	168
Total live (2.2 per sq. meter)	44	Total live (20.7 per sq. meter)	414

Not wishing to violate any park service regulations or trample any protected cryptogams, I chose a spot adjacent to Page, Ariz., for our transect site. If you want to check our data, it is 70 yards north of the highway immediately north of the Page cemetery gate.

The transect consisted of a 20-meter line of one-meter square blocks, 20 meters total. Within the transect there was a total of 242 perennial grass species (adults), or 12.1 per square meter. Of the total, 198 were dead, 18 were nearly dead (less than 5 percent total mass alive during present year, no green showing), and 25 were alive (on a 10 scale, their average vigor was 3.5). There was 1 seedling/juvenile. This averages out to only 2.2 live perennial grass plants per square meter including the seedling.

An inspection of several square miles of the Wahweap area showed the ratios of live to dead plants in our transect to be typical. My brother, John Rich, Jr., who is a trained observer, spends a lot of time on the lake. He hikes often and reports a similar tragic loss of grass and the resulting erosion throughout the southwest region of the National Recreation Area.

Contrast those totals with this transect done the same day in nearby Houserock Valley, with an identical grass/shrub community and very similar rainfall and soils. However, this is an area grazed by livestock on a regular basis. There were 269 total perennial grass plants (adults), or 13.45 per square meter. Of these, 242 were alive (with an average vigor rating of 8 on a 10 scale). There were four weak plants (10 percent or less live tissue) and 168 seedling/juveniles. Only 23 were dead. This totals 20.7 live plants per square meter (see chart).

The figures shown represent an annual plant biomass difference of several hundred percent. With vastly less plant production, there are vastly fewer animals and fungi, above and below ground. Long-term rest in climates typical of most of the western U.S. is a biological disaster! And you don't have to believe me—just go and look for yourself.

It takes longer for high altitude/higher rainfall areas to desertify under rest, but even most of those are losing biodiversity. I could see the grass dying, but I never understood the reasons behind that and the associated phenomena, like the poor seedling establishment and poor seed viability, until I took courses from biologist Allan Savory.

Savory makes the distinction between what he calls brittle and non-brittle environments. A brittle environment has seasonal rainfall and a slow decay rate. That describes most of the West. Grass does not rot off at ground level during dormancy and fall to the ground in Houserock Valley, Ariz., or around Lake Powell. Both are at 7 to-9 on the brittleness scale, almost every year. So, the grass gets wolfy and dies, because the old, dead, oxidized grass chokes out, shades the growth points, and harbors parasites over winter.

The plant's root system shrinks as the leaf mass declines, and instead of getting a pulse of nutrients above and below ground as plant eaters digest and excrete leaf, stem, and root material and turn it into fertilizer, it just sits there, starving, hoping for crumbs from the cryptogams.

To add insult to injury, the soil forms a crust (which most seeds cannot enter), a critical share of water is lost to runoff on crusted soil, and aeration is lousy. Many necessary soil functions do not happen without air, so the plants are further stressed.

Just this year, the National Research Council of the National Academy of Sciences published a new volume called "Rangeland Health" which provides useful ways of judging range sites. It describes an unhealthy range site

SYNDROME

as having absent or actively eroding topsoil with plants and rocks on pedestals of earth, exposed roots, many bare areas with washes, hills, and gullies present and expanding, and soil accumulating in barren deposits behind large obstructions. The plants are clumped around prominent individuals with large bare areas between clumps and very little litter. The plant community cannot stabilize the soil with roots, and there are primarily old or deteriorating plants, with most plants having distorted growth forms (wolfy). Also, soil movement and crusting inhibits most germination and seedling establishment. This describes most long-rested lands in brittle environments.

Humankind has believed for centuries that rest would heal damaged land. And it will, in Northern Europe, the northwest and eastern coastal areas of North America, rain forests, and places like that. In Washington, D.C., rest will create a forest. In Washington, Utah, years of rest will only deepen the desert. Maybe that's why bureaucrats need a western perspective. I hope (the Good Lord and the editor willing) to bring you periodic park reports, with extensive transect work for a more complete picture of what is happening.

Livestock can play a key role in rangeland health. Ranchers, in fact, with other agriculturalists, must get even better at what we do. We hold the future of the nation, and the world, in our hands. We have the only effective tool for further healing our watersheds, with all that implies, for civilization: livestock. I've seen miracles performed by skilled livestock managers, who greatly profited from the process.

I am very hopeful for the environment and the livestock industry. The truth will prevail, and the quick, slick, "rest the West" solution will go the way of other simplistic fables. We need to learn ourselves, and share the information with the environmental movement, about the effects of long-term rest. Ranchers and environmentalists are natural allies, when the truth is known. A future full of wide open, wild country is a vision both groups can share.

If the developers pave and subdivide us both under while we squabble, it would be what Sam Judd would call "a damned shame." I don't think I would want to hear his description of the intelligence of the ones who let it happen. ■

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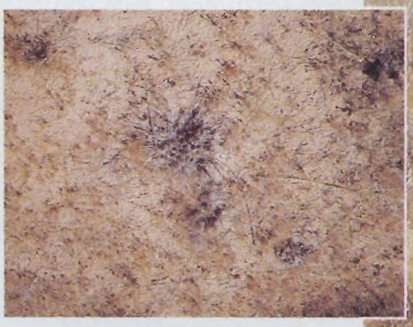
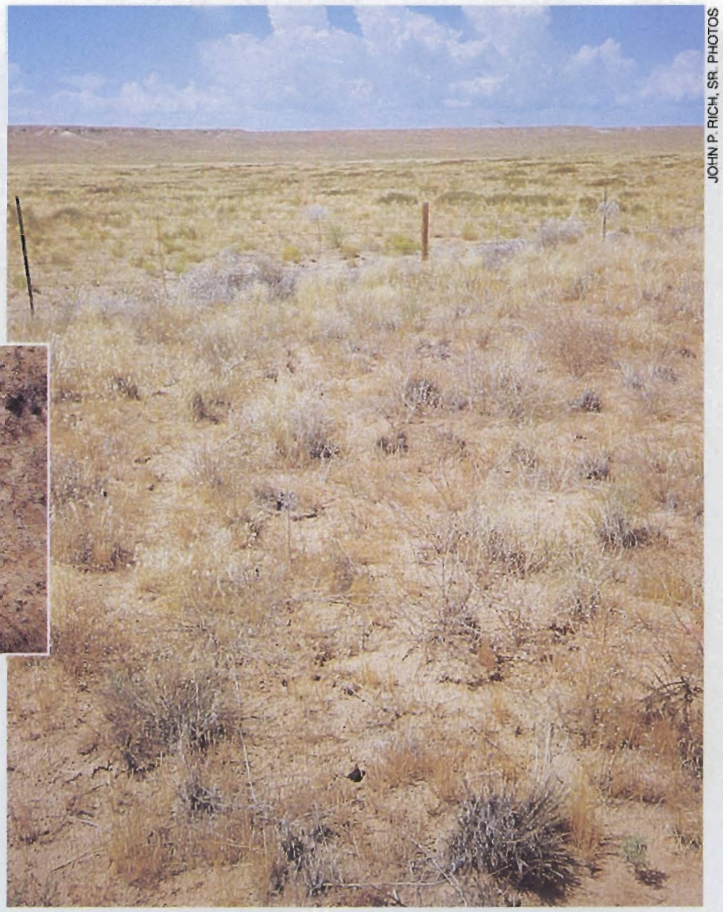
RIGHT: "Wolfy" and dead, rested grass. Note green grazing land on far side of fence, near Moencopi, on biologically similar land.

LOWER RIGHT: Healthy Indian rice grass on grazing land transect site in Houserock Valley, Ariz. Photo taken in spring 1994 after very little rain.

BELOW: Grass plants killed by over-rest.





JOHN P. RICH, SR. PHOTOS

Savory Comment

Study your lesson

Editor's Note: This elementary botany discussion illustrates why animal grazing is necessary for plant growth.

by Allan Savory

First, let's just follow an average perennial grass plant growing in a bunched form. We'll start with a mature plant half-way through a summer growing season with no animals present. Picture this plant growing its full compliment of stalks and leaves. Being a perennial, it will have more leafstems than the more fibrous seedstems which lead to seedheads. (On annuals each stem generally leads to a seedhead.)

Toward the end of its growth cycle for the season it will form mature seedheads on the seedstalks. Substantial food reserves (energy) will go into the seeds to support the next generation. Once this process of forming mature seedheads has taken place, the plant prepares for the winter or long dry season when it will live in dormancy or relative dormancy depending on the prevailing climate.

To do this it moves energy down from the leaves and stems that have served their function for the season, and stores it in the bases of the stems or underground, depending on the climate and species. This energy sustains the plant through the dormant season. The old stems and leaves, with a major part of the energy drained from them, remain on the plant.

In a brittle environment the old stems and leaves tend to dry soon after rains and remain dry for prolonged periods as atmospheric moisture is often low when temperatures are high and thus they do not decay and break down as quickly as they do in a non-brittle environment. We are looking at a plant in a brittle environment in this scenario, so assume that leaves and stems remain on the plant and do not fall and decay quickly.

With the arrival of the right growing conditions in the following year the plant once again starts growing. To grow, it needs to form new cells and to do this it needs energy from sunlight. The plant, however, has no green leaf at this stage to convert sunlight energy. Here you see why it had to store energy at the end of the previous season — not only to keep the plant alive through dormancy but to have available energy in reserve for the initial growth of the following season. We thus say it "grows on energy reserves" the following spring.

The growth in spring takes place both above and below ground as new roots also have to explore into the soil, forming new root hairs with which to gather moisture and nutrients.

As the season progresses the plant eventually forms mature seedheads again and then once more stores energy for winter. Once more the old stems and leaves remain on the plant.

In the following spring the plant again initiates growth using its reserves of energy. Once enough new leaf surface is available, it converts new sunlight energy and continues its growth using that source. In this season, as the new growth was initiated in spring it was to some extent hampered by the accumulated old stems and leaves of the last two years that were still on the plant. This old material is beginning to crowd out new growth and in particular to adversely affect the light reaching down into the plant to the new growth.

Again at the end of the season the plant once more moves energy into its roots for storage. In the following year the new growth process is again repeated. By now there is yet another year's old growth accumulated on the plant and interfering with light and space, and the struggle of the new growth is greater.

About this time — anywhere from approximately three to five years in very brittle environments or up to 50 years in less brittle environments — the plant begins to die, usually from its center. If it is one of a community of plants which have all been going through the same rest process and which are close to each other, then not only have they had their old material hamper themselves but they have also hampered each other, and whole plants start to die off.

Clearly this is a cycle leading to self destruction and it has to be broken by removing the old material at some stage to avoid the premature death of the plant or plants. In the non-brittle environments, where the bunch form is not as prevalent and where the wetter old material decomposes at a faster rate during periods of higher temperatures and atmospheric moisture, the plants don't tend to weaken and be killed if rested.

In what ways can we remove the old material and save the plant? Occasionally weather will do it with violent hail storms, but we cannot manage these. Fire can do it, but it also tends to expose the soil which we are usually trying to keep covered in a brittle environment. Grazing animals will do it and they can do so while adding to soil cover, particularly if herding behavior persists. Technology in the form of a mower can do it, but at considerable cost. In the past, only severe weather, fire or grazing and herding wildlife must have done it with occasional cases of insects or other factors saving the plants from premature death.