Photo by Justin Thomas

A severely destabilized Ozark woodland system likely resulting from a history of livestock overgrazing, early twentieth century spring burning, over harvesting of timber and, more recently, an intense summer arson fire. What is left is a soilless, depauperate landscape, an abundance of weedy and generalist species and little chance of recovery to a stable state that remotely resembles the original community.

Stable Communities Require Stable Management: Chaos Breeds Chaos

by Justin Thomas

"A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise."

— Aldo Leopold

The most important variable in the formation of natural communities is time. All quality natural communities, from glades to swamps, are defined by antiquity. Stability over deep ecological time underpins the very processes by which species evolve, coevolve, shift and accumulate into complex communities. It is this complexity, one borne of time, which separates natural communities from novel communities; ecological integrity from ecological inadequacy; reverence from condemnation.

Stability, as a function of time, is crucial to the formation and persistence of complex natural systems. The longer a system is stable, the more complex it can become. From soil microbes to

keystone predators, complex communities assemble into lattice-like frameworks of interwoven, interdependent processes relative to their stability and relative to time. Anything that destabilizes a system disrupts the delicate intricacy of this lattice, sending it into alternate, often simplified, states of stasis or reassembly. In terms of biological diversity and function, this is what we strive to avoid and why we seek to preserve.

But what of the "thousand natural shocks that flesh is heir to?" After all, nature isn't all rainbows and butterflies. Natural destabilization can come from numerous sources. Any given place on earth is subject to any number of natural catastrophes at seeming random intervals of time. Examples include severe droughts, conflagrations, hurricanes, floods, etc. — not to mention an occasional meteor impact. But typically these are locally rare events, and in all cases nature recovers and reestablishes ecological complexity via the life affirming qualities of stability, succession and natural selection. But it takes significant and relative quantities of time.

Space is another major player in the complexity of natural systems. Before modern humans so thoroughly fragmented the landscape, ecological complexity could reassemble faster and in more predictable ways because of the buffering effects of large scale spatial dynamics. Unrelenting, we brutish moderns continue to subject the earth's ecological complexity to our growing appetites. We are simultaneously robbing it of its size and complexity — and thus its stability — on a global scale. Prairies once analogous to oceans have been reduced to puddles, forests once unfathomably immense and ancient have been reduced to even-aged lots, and waterways once teeming with aquatic life are now choked with sediment and poisoned with an unholy chemical cocktail of toxicity. Heavy is the brow and the heart of the field ecologist.

So here we are lost in the immensity of time, cut off from the healing forces of spatial connectivity, watching those areas we can't protect sink farther into the bottomless mouth of human-in-

A stable, highly complex, woodland community with significant species richness, floristic quality and ecological function. Only an occasional, low intensity, dormant season fire is necessary to maintain this community. Intense or frequent fire, extensive grazing or rooting by animals or soil disturbance from logging activity could easily simplify/destabilize this community.

Photo by Justin Thomas

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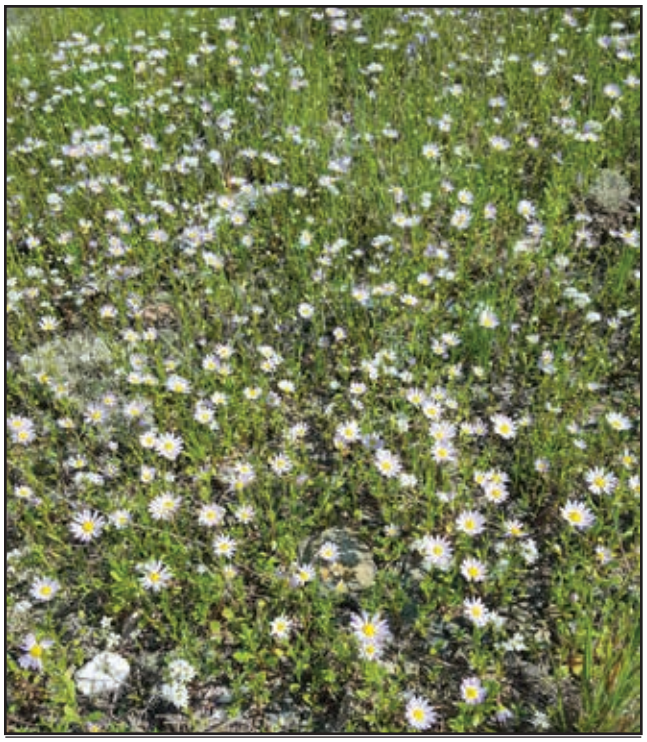
Communities that are extremely limited by nutrient and moisture availability like this severely degraded (simplified/disturbed) shale barren are especially sensitive. This example, Missouri's largest, has been completely denuded by ATV traffic.

Photo by Justin Thomas



Stable shale barren communities in Arkansas that still harbor ecological complexity are rich with conservative species such as *Astranthium ciliatum* (Western Daisy) and *Valerianella bushii* (Bush's Corn Salad).

duced degradation while desperately clinging to the few remnant natural areas that are legally protected, the sacred scraps of the natural heritage that once bedecked our state.

We are faced with the sobering fact that if we don't know precisely how to proceed we could lose everything remotely resembling natural integrity. This induces a sort of panic. This panic easily seeps into natural areas management. Examples include the prescription of non-dormant season fire, the application of intense grazing, and the aggressive chemical and mechanical removal of unwanted species — themselves often a response to poor management practices. Some sites, under the misguided philosophy of "heterogeneity in management," experience all of these in a given year. Obvious damage is often dismissed with the phrase "something will use it." These actions are often not based on tested and defendable science, but on knee-jerk reactions and an institutional culture that rewards or ignores assumptions. As guesstimates feed further guesstimates, the panic deepens and the accepted precepts of science and the advice of seasoned ecologists are regularly challenged or ignored. This leads to chaos and a lack of direction that overwhelms, frustrates and discourages the most steadfast practitioner of natural areas management. On the ground, sites become overburned, overgrazed, overharvested, trampled by heavy equipment and/or prematurely or inappropriately thinned. In essence, they become destabilized and simplified instead of stabilized and diversified. These results are antithetical to conservation and ecosystem management. This has become so rampant that in some circles there is a push to accept the degraded state of natural communities as more natural than clear examples of high ecological integrity. Clearly, even when intentions are pure, some management can do more harm than good.

The first step out of this dark labyrinth is to reinstate and communicate the simple truths, focusing on what we do know and admitting what we

do not. Quantifiable benchmarks for management based on ecological integrity and quality must be set at the site level and adhered to. These benchmarks should be established by reference sites and in such a way that monitoring results immediately feed back into management methodologies. We need to transcend speculation about what "used to happen" in natural systems and begin directly monitoring what does happen, in both the short term and the long term. This must be done at the species level; functional groups are meaningless. Once management is data based, the results need to be shared regularly for discussion and incorporation. Positive ground will be difficult to gain initially, but will come easier with practice. Only in an actively collaborative, science-based atmosphere in which the bar for ecological integrity is set at the highest level can we ensure the ecological stability, and thus continuity, of natural areas. Anything short of this is potentially damaging.

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Photo by Justin Thomas

Research botanists working hard to collect meaningful ecological data pertaining to site management.