

Prairie dogs and dust storms: Managing novel ecosystems

How does global environmental change factor into appropriate local conservation or ecosystem management

By T.R. Seastedt
Sunday, April 5, 2009

We are entering an era of unprecedented change. Rapid change has happened before, but not during a time when humans were capable of causing or documenting such changes. Current environmental conditions are reorganizing communities into entities that are sufficiently different in their biotic composition from any that existed during the last millennium. Because of these changes, we can no longer passively conserve or preserve our natural areas. A more forward-looking, proactive management approach is warranted.

There's nothing new with the concept of community change. Humans have been doing this both deliberately and accidentally for centuries. Aldo Leopold wrote in 1927, "The balance of nature in any strict sense has been upset long ago ... the only option we have is to create a new balance objectively determined for each area in accordance with the intended use of that area." The difference between Aldo Leopold's world of 1927 and our current conditions involves the rates of change and the aerial extent to which these changes are occurring.

The facts for the Colorado Front Range are as follows. We now have a month-long extension of our growing season with (on average) wetter winters relative to the past. We have a history and continuing practice of fire suppression at the urban-wildlands interface accompanied with increases in atmospheric carbon dioxide and nitrogen 'fertilizer' deposition. To this we have added the accidental or deliberate additions of numerous non-native species while removing selected native species.

Finally, we have forced wildlife onto fragments of landscapes, thereby restricting natural movements.

These changes have collectively resulted in a conversion of natural areas into a mode of transitional and novel ecosystems, i.e., assemblages of biota and physical conditions that have not previously existed along the Front Range. We need to acknowledge this fact, decide what we wish to do about it, and realize that we can predict some but not all of the future changes coming our way. We also need to consider and discuss the value of many current management actions that focus primarily on getting rid of what we don't want.

We don't want beetle-killed forests, wildfires, fields of weeds, or dust storms emerging from prairie dog colonies. However, only going half-way (getting rid of what we don't want), should be viewed as an unacceptable use of limited management resources as the best science now suggests that these activities only facilitate additional changes.

This call for a more proactive management approach is upsetting to some well-intentioned conservationists and managers. The former group insists the historical systems can be maintained, which is viewed as a low-probability and expensive scenario, while the latter group sees success defined by getting rid of what we don't want, regardless of future consequences.

These views need to be presented in an open dialog so that all science dimensions are discussed. The cook book or tool box management approach developed from past decades of research has only limited value in this era of multiple sources of rapid change.

The organizational structure of our various public local, state and federal land agencies were formulated prior to the emergence of global change concerns, and a very logical question is to ask if this structure is up to the task of maintaining conservation and ecosystem services for our public lands. All management activities are impacted by change, but the outdated criteria for success (getting rid of what we don't want) must now be viewed as inadequate.

The new criteria for success involve a set of forward-looking goals identifying desirable (but not necessarily historical or relictual) conservation and restoration outcomes and the management actions required to achieve those goals. The scientific community, managers and the public need to collectively identify goals and management actions that are consistent with our attempts to mitigate global climate issues as well as be resilient and sustainable in the face of current and future environments.

Just as the dust storms of the 1930s were the results of climate-land use interactions, so too are our local 2009 dust storms resulting from the wind scour of constrained prairie dog colonies. The reoccurrence of the 1930s drought in the 1950s was not accompanied by similar storms because we developed management strategies to prevent the waste of soil resources. We are going to need some innovative management programs to deal with these and other emerging, novel landscapes.

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This dust storm was generated from a prairie dog colony upwind of the highway. (Jan. 7, 2009, photo by Richard Reynolds).