

COMMENTARY

# Climate change threatens wilderness integrity\*

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By David Graber

## History and culture

The Wilderness Act of 1964 was written in a time when nature was thought to be static, or at least changing at the pace of millennia. In the act, wilderness is “recognized as an area where the earth and its community of life are untrammelled by man . . . retaining its primeval character and influence . . . and managed so as to preserve its natural conditions and which . . . generally appears to have been affected primarily by the forces of nature” (Section 2c). By the 1980s, ecologists had come to realize that while ecosystems trend toward homeostasis in the absence of disruptive forces, those forces—fire, flood, drought, disease outbreaks—impinge periodically, if not frequently, on most ecosystems. In living systems, “primeval” just does not happen. Nonetheless, among wilderness managers, recreationists, and activists, nostalgia for a more primitive and stable world runs very powerfully, as it does in the national park movement. As President

Lyndon B. Johnson reportedly said upon signing the Wilderness Act in 1964: “If future generations are to remember us with gratitude rather than contempt, we must leave them more than the miracles of technology. We must leave them a glimpse of the world as it was in the beginning, not just after we got through with it.”

It is certainly true that when Congress passed the Eastern Wilderness Areas Act in 1975, it tacitly acknowledged that a *legal* wilderness could, in fact, have been subjected in the past to alteration by humans, even industrial humans. The Shenandoah Wilderness once was logged, settled, and farmed intensively. The Phillip Burton Wilderness in Point Reyes National Seashore affords a glimpse of the San Francisco skyline. However, to most people who are accustomed to backpacking or stockpacking, *wilderness* is epitomized by large (western) landscapes. According to Wilderness.net<sup>1</sup> (2011),

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<sup>1</sup>Wilderness.net is a partnership of the Wilderness Institute at the University of Montana, the Arthur Carhart National Wilderness Training Center, and the Aldo Leopold Wilderness Research Institute.

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\*The opinions expressed by the author do not necessarily reflect the policies or positions of the U.S. government.

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## *In living systems, “primeval” just does not happen.*

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“Wilderness is the land that was—wild land beyond the frontier . . . land that shaped the growth of our nation and the character of its people.”

The Wild Foundation (2011) broadly defines wilderness areas as the “most intact, undisturbed wild natural areas left on our planet—those last truly wild places that humans do not control and have not developed with roads, pipelines or other industrial infrastructure.” It goes on to state, “A wilderness area is not necessarily a place that is biologically ‘pristine.’ Very few places on earth are not in some way impacted by humans. Rather, the key is that a wilderness area be mainly biologically intact: evidence of minor human impacts, or indications of historical human activity does not disqualify an area from being considered wilderness.”

According to The Wilderness Society (2011): “Wilderness offers people solitude, inspiration, natural quiet, a place to get away. At the same time, designated wilderness protects biodiversity, the web of life. . . . Of 261 basic ecosystem types in the U.S., 157 are represented in the wilderness system. Without these large, complex areas of preserved landscape, species protection would be virtually impossible and our understanding of how natural systems work would be reduced to childish speculation.”

### Change

Climate change is going to produce a wilderness experience quite unlike these descriptions. Landscape integrity, ecosystem integrity, and landscape aesthetics will all suffer visibly. Over the decades to come, glaciers and snowfields will continue their retreat. Some perennial stream systems will become ephemeral, losing fish and other native biota. Fire seasons will lengthen and fires will become more severe. Floods and droughts will intensify and become more frequent. Individual tree and forest stand die-offs—from insects, disease, insufficient water, or excessive heat—will accelerate. Landscapes disrupted in these ways are both unhealthy and unattractive.

As microclimates move—mostly north and upslope—the plants and animals left behind will find circumstances increasingly stressful. Recruitment will decline and mortality will increase. Species that can do so, by nature of their life histories and lack of obstacles, will colonize new areas when and if these places become habitable. Notable among plant and animal species most effective at exploiting newly available habitats are the so-called weedy species. To the ecologically uninformed, some weedy species, such as French broom (*Genista monspessulana* [L.] L. Johnson), can be attractive. But the notable feature of weeds is that because they are cosmopolitan, they destroy the distinctiveness of a place by making it look more like all other places that support those same species. Local (alpha) species diversity may actually increase, but beta diversity—the differences among different places—is lost in the process.

As has been noted in the aftermath of catastrophic lethal events such as volcanic eruptions, the early decades of biological colonization do not “look right.” The places where plant species first establish tend to be random—wherever they can get a foothold—and free of the normal competition within a settled biological community that produces distinct distribution patterns on the landscape. For example, one species may best be able to compete on steep slopes, while another favors valley bottoms. Having spent time in a wilderness or other intact landscape, a visitor unconsciously expects this systematic patterning. However, because climate change will be progressive over many decades, this patterning will not have a chance to develop and the landscape will appear chaotic.

### Future

Western wildernesses may offer the best opportunities for conserving native biodiversity because they tend to be large intact ecosystems with fewer anthropogenic stressors. However, “the best” may turn out not to be good enough for many na-

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tive species. The National Park Service and other wilderness managers may feel the need to provide sanctuary for species that have lost suitable habitat elsewhere, as well as to provide ecosystem resilience and resistance through engineering. Intentional manipulation of forest stand structure, hydrologic manipulation of watersheds, and control of invasive species are examples of ways to improve ecosystem resilience and resistance to climate change; however, they clearly do not leave them either untrammelled or “with the imprint of man’s work substantially unnoticeable” (Section 2c).

The headwaters of large, economically important watersheds are frequently found at the top of mountains in wilderness, as in the cases of Rocky Mountain National Park, Olympic, and Yosemite Wildernesses. Increasingly, the need for better understanding of climate at a fine scale, and hydrologic systems in particular, has led to requests for hydro-meteorological (hydromet), snow pillow, streamflow, and soil moisture measuring installations in wilderness. Some of these requests have been approved. This is a direct challenge to the language of the Wilderness Act itself, which prohibits permanent structures, but it reflects the profound importance of water in the dry West. Pressure has been strong from the research community as well as water management agencies to install more water-measuring devices in wilderness, despite their visual intrusion on wilderness character.

When climate change begins to impose substantial hardships on society, as when water storage from mountain snowpack has been substantially lost, we can expect renewed calls for water storage and diversion projects. Some of these inevitably will involve western mountain wildernesses. Similarly, in the desert wildernesses there is a large potential to

produce wind, solar, and sometimes geothermal energy. Even if these projects can be precluded from wilderness, it may be more difficult in the future to route transmission lines away from wilderness when their placement in it could save substantial amounts of money.

As climate change disrupts the lives of millions of people, will society still place a high value on wilderness? That remains to be seen.

### References

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### About the author

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