

We Need a Biologically Sound North American Conservation Plan

Aycrigg and colleagues (2016) recently called for the creation of a US national habitat conservation system. The authors correctly warn that continued economic and human population growth do not bode well for biodiversity. They are also correct that the implementation of a national plan should be focused on maintaining the integrity of the ecological and evolutionary processes that sustain biodiversity (Aycrigg et al. 2016). We applaud the authors' bold general vision, but to move beyond an unspecific vision to a habitat conservation system requires a detailed process to develop well-defined goals, targets, and mechanisms for identifying priorities, as well as implementation strategies. We point out that a number of such articulated habitat conservation system plans have been proposed before (e.g., Soulé and Terborgh 1999). Unlike many proposals before and after the 1990s, the Soulé and Terborgh (1999) guidelines were and are part of an ongoing North American-wide effort to create a connected system of reserves aimed at safeguarding, enhancing, and recovering all native species and all ecosystem types. The slow progress of this and similar efforts can be attributed to lack of political resources on the part of conservationists, soft support from many supporters and advocates, strong opposition from some sectors of society, and weak government leadership dominated by growth interests. A national vision is a necessary step toward conserving US biodiversity, but it is not a sufficient one unless accompanied by specific guidelines with respect to site selection, physical scale, connectivity, and integrity of abiotic conditions and biotic interactions.

It is now well established that even strictly protected areas inexorably lose species over time because they are too small, located in the wrong places, or have become habitat islands. Therefore, a national—or better, North American—habitat conservation system must entail more

than just protecting space; it must protect the species and processes that undergird the workings of nature. Here is where science enters the picture. A viable system for conserving North American biodiversity would have to incorporate specific conditions and criteria with the goal of maintaining and/or restoring self-sustaining ecosystems, replete with a full complement of native species supported by natural processes, the same processes that sustained biodiversity for millions of years before humans intervened and reconfigured the continent. Abiotic processes crucial to biodiversity maintenance include fires, floods, ice storms, hurricanes, and other naturally occurring disturbances. Species have evolved under characteristic disturbance regimes of varying frequency and severity, and fire regimes in particular are often maintained by positive vegetation-fire feedback systems. Human alteration of disturbance regimes typically leads to loss of biodiversity and sometimes radical shifts to alternative stable states. Among biological processes, especially important is predation. In the absence of large predators, ecosystems and the processes that sustain them unravel. Large herbivores, such as deer, increase in abundance tenfold or more, wreaking havoc with plant communities and forest regeneration. So-called mesopredators (e.g., raccoons and foxes) also increase drastically, driving local extinctions of ground-nesting birds and other small vertebrates. The impacts of hyperabundant herbivores and mesopredators are now being felt across much of the North American continent. Maintaining viable populations of all species requires large protected areas for the needs of habitat specialists and the low-density, wide-ranging species at the top of the food chain. Wide-ranging species also require connectivity on vast scales.

Remarkable victories have been won by conservationists on behalf of biodiversity that should last if we

stay alert—the many treaties and national laws that protect species, terrestrial parks, other designated lands and marine areas to various degrees. Tragically, we have also seen the very grim numbers from the 2016 Living Planet Report (World Wide Fund for Nature), including vertebrate-species populations cut by half or more in the past two human generations. The rapid loss of wilderness parallels the loss of biodiversity. These trends must be reversed, and that requires a much more effective and politically strong conservation movement. Such a movement would have a clear and bold vision, embedded in and with the strong support of broader groups. It would use insider and outsider approaches and be flexible on means without compromising on ends. It would confront the causes of biodiversity loss and persevere through thick and thin, with a good understanding of how power works and a lack of fear in using it.

DAVID JOHNS, JOHN TERBORGH,
KAREN F. BEAZLEY,
JAMES A. ESTES,
DAVID FOREMAN,
BRIAN MILLER, REED NOSS,
MICHAEL SOULÉ,
AND WILLIAM J. RIPPLE
David Johns is affiliated with the School of Government at Portland State University, in Oregon. John Terborgh is with the Department of Biology and the Florida Museum of Natural History at the University of Florida, in Gainesville. Karen F. Beazley is affiliated with the School for Resource and Environmental Studies at Dalhousie University, in Halifax, Nova Scotia, Canada. James A. Estes is with the Department of Ecology and Evolutionary Biology at the University of California, Santa Cruz. David Foreman is the president of the Rewilding Institute, in Albuquerque, New Mexico. Brian Miller is a senior fellow with the Denver Zoological Foundation, Conservation Biology, in Las Vegas, New Mexico. Reed Noss is

affiliated with the University of Central Florida, in Orlando. Michael Soulé is a professor emeritus of environmental studies at the University of California, Santa Cruz. William J. Ripple (bill.ripple@oregonstate.edu) is affiliated with the Global Trophic Cascades Program of the Department

of Forest Ecosystems and Society at Oregon State University, in Corvallis.

References cited

Aycrigg JL, et al. 2016. Completing the system: Opportunities and challenges for a national habitat conservation system. *BioScience* 66: 774–784.

Soulé ME, Terborgh J, eds. 1999. *Continental Conservation: Scientific Foundations of Regional Reserve Networks*. Island Press.

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