

INTERNATIONAL

Journal *of* Wilderness

April 2022 | Volume 28, Number 1 | ijw.org

In This Issue of 

**Nature in the Anthropocene | What is Visitor Use Management?
Biodiversity: The Language of Wilderness | Oman's Wealth Beyond Oil**

International Journal of Wilderness

April 2022 Volume 28, Number 1

FEATURES

EDITORIAL PERSPECTIVES

Are We in Need of “Triage” for Wilderness? 06

ROBERT DVORAK

SOUL OF THE WILDERNESS

Nature in the Anthropocene:

*What It No Longer Is, Will Never Again Be,
and What It Can Become*

10

ROGER KAYE

STEWARDSHIP

Biodiversity:

The Language of Wilderness

18

JANET MCMAHON

SCIENCE & RESEARCH

What Is Visitor Use Management?

*Identifying Functional and Normative Postulates
of an Interdisciplinary Field of Study*

32

ZACHARY D. MILLER

COMMUNICATION & EDUCATION

**Solitude and Spiritual Importance
in an Era of Isolation**

48

PETER R. PETTENGILL, ROISIN CREEDON-CAREY,
and SAGE LALOR

INTERNATIONAL PERSPECTIVES

Tapping into Oman’s Wealth Beyond Its Oil:

*Developing Nature-Based Tourism in the
Sultanate’s Wildlands*

60

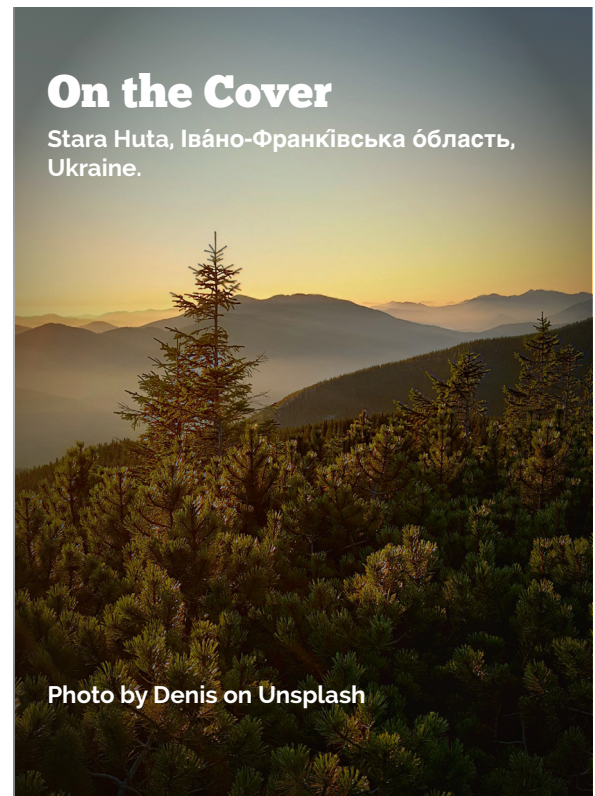
ELIZABETH E. PERRY

WILDERNESS DIGEST

Digital Reviews

72

Rewilding Earth Podcast by Jack Humphrey
reviewed by PATRICK KELLY



DISCLAIMER

The Soul of the Wilderness column and all invited and featured articles in IJW, are a forum for controversial, inspiring, or especially informative articles to renew thinking and dialogue among our readers. The views expressed in these articles are those of the authors. IJW neither endorses nor rejects them, but invites comments from our readers.—Chad P. Dawson

IJW Editor-in-Chief Emeritus



Visit WWW.IJW.ORG to view additional content only available online.

International Journal of Wilderness

The International Journal of Wilderness links wilderness professionals, scientists, educators, environmentalists, and interested citizens worldwide with a forum for reporting and discussing wilderness ideas and events; inspirational ideas; planning, management, and allocation strategies; education; and research and policy aspects of wilderness stewardship.

EDITORIAL BOARD

H. Ken Cordell, Southern Research Station, U.S. Forest Service, Athens, Ga., USA
Lisa Ronald, University of Montana, Missoula, Mont., USA
Vance G. Martin, WILD Foundation, Boulder, Colo., USA
Christopher Armatas, Aldo Leopold Wilderness Research Institute, Missoula, Mont., USA
Stephen Carver, Wildland Research Institute, School of Geography, University of Leeds, UK

EDITOR-IN-CHIEF

Robert Dvorak, Central Michigan University, Mount Pleasant, Mich., USA

EDITOR-IN-CHIEF EMERITUS

Chad P. Dawson, SUNY College of Environmental Science and Forestry, Syracuse, N.Y., USA

ASSOCIATE EDITORS

Greg Aplet, The Wilderness Society, Denver, Colo.; James Barborak, Colorado State University, Fort Collins, Colo.; Matthew T. J. Brownlee, Clemson University, Clemson, S.C.; David Cole, Aldo Leopold Wilderness Research Institute, Missoula, Mont.; John Daigle, University of Maine, Orono, Maine; Jessica Fefer, Kansas State University; Joseph Flood, Minnesota State University, Mankato, Minn.; David A. Graefe, Lock Haven University, Lock Haven, Penn.; Gary Green, University of Georgia, Athens, Georgia; Kari Gunderson, University of Montana, Missoula, Mont.; Jeffrey Hallo, Clemson University, Clemson, S.C.; Yu-Fai Leung, North Carolina State University, Raleigh, N.C.; Jeffrey Marion, Virginia Polytechnic Institute, Blacksburg, Virg.; Zach Miller, National Park Service, Logan, Utah; Christopher Monz, Utah State University, Logan, Utah; Andrew Muir, Wilderness Foundation Eastern Cape, South Africa; Rebecca Oreskes, U.S. Forest Service (retired), Gorham, N.H., USA; David Ostergren, Goshen College, Wolf Lake, Indiana; John Peden, Georgia Southern University, Statesboro, Georgia; Elizabeth E. Perry, Michigan State University, East Lansing, Mich.; Peter Pettengill, St. Lawrence University, Canton, N.Y.; Kevin Proescholdt, Wilderness Watch, Minneapolis, Minn.; William L. Rice, University of Montana, Missoula, Mont.; Keith Russell, Western Washington University, Bellingham, Wash.; Rudy Schuster, USGS, Fort Collins, Colo.; Ryan L. Sharp, Kansas State University, Manhattan, Kansas; B.Derrick Taff, Penn State University, State College, Penn.; Jennifer Thomsen, University of Montana, Missoula, Mont.; Tina Tin, Consultant, Challes-les-Eaux, France; Jeremy Wimpey, Applied Trails Research, Mount Pleasant, Mich.; Franco Zunino, Associazione Italiana per la Wilderness, Murialdo, Italy.

International Journal of Wilderness (IJW) publishes three issues per year (April, August, and December). IJW is a not-for-profit publication.

MANUSCRIPTS TO: Robert Dvorak, Dept. of Recreation, Parks and Leisure Services, Central Michigan University, Room 108 Finch Hall, Mount Pleasant, MI 48859; Telephone: (989) 774-7269. E-mail: dvora1rg@cmich.edu.

BUSINESS MANAGEMENT AND SUBSCRIPTIONS: The WILD Foundation, 717 Poplar Ave., Boulder, CO 80304, USA. Telephone: (303) 442-8811. E-mail: info@wild.org.

SUBSCRIPTION RATES (PER VOLUME CALENDAR YEAR): Subscription costs are in U.S. dollars only – Online subscriptions for individual subscribers \$30; group online subscriptions for 50 people or less \$100; group online subscription for 100 people or less \$200; for agency-wide subscriptions or group rates of 100 people or more, contact adam@wild.org. No print journals will be available in 2020. No refunds.

Individual electronic access, passwords, and IP address access are intended for the subscriber only. These means of access should not be shared, posted, or distributed without the consent of IJW.

SUBMISSIONS: Contributions pertinent to wilderness worldwide are solicited, including articles on wilderness planning, management, and allocation strategies; wilderness education, including descriptions of key programs using wilderness for personal growth, therapy, and environmental education; wilderness-related science and research from all disciplines addressing physical, biological, and social aspects of wilderness; and international perspectives describing wilderness worldwide. Articles, commentaries, letters to the editor, photos, book reviews, announcements, and information for the wilderness digest are encouraged. A complete list of manuscript submission guidelines is available from the website: www.ijw.org.

ARTWORK: Submission of artwork and photographs with captions are encouraged. Photo credits will appear in a byline; artwork may be signed by the author. Additional materials for online manuscripts are also encouraged, including videos, photo slide shows, and other media.

WEBSITE: Visit WWW.IJW.ORG to view additional content only available online

THE INTERNATIONAL JOURNAL OF WILDERNESS IS PROUDLY FACILITATED BY THE WILD FOUNDATION.

All materials printed in the International Journal of Wilderness, copyright © 2022 by the International Wilderness Leadership (WILD) Foundation. Individuals, and nonprofit libraries acting for them, are permitted to make fair use of material from the journal. ISSN # 1086-5519.

SPONSORING ORGANIZATIONS

Aldo Leopold Wilderness Research Institute · Central Michigan University, Department of Recreation, Parks and Leisure Services Administration
SUNY College of Environmental Science and Forestry · WILD Foundation · USDA Forest Service · USDI Bureau of Land Management
USDI Fish and Wildlife Service · USDI National Park Service · Wilderness Foundation (South Africa) · Wilderness Foundation Global · Wilderness Leadership School (South Africa) University of Montana, School of Forestry and Conservation; and, the Wilderness Institute





Photo credit: Alfred Kenneally on Unsplash

Are We in Need of “Triage” for Wilderness?

by **ROBERT DVORAK**

The word triage can be considered from multiple perspectives. The medical emergency context focuses on urgency and those situations that are life threatening and need immediate treatment. But we also use triage as a metaphor or process to describe situations where an allocation of resources and efforts need prioritization. Wilderness and natural resource protection require professionals to deploy limited resources across expansive landscapes, typically requiring the prioritization of actions to address complex issues.

Some wilderness areas, particularly those close to large population centers, are experiencing rapid changes. Critical impacts to both visitor experiences and ecological resources are occurring as we witness exponential day use increases and further global climate destabilization. Wilderness stewards are being challenged to address the implications of these critical impacts, and current collaborative planning strategies may not be responsive enough for urgent, emerging issues. Therefore, are we in need of “triage” for wilderness?

Dr. Christopher Armatas, research social scientist at the Aldo Leopold Wilderness Research Institute, and I further examined the concept of triage at a recent webinar offered by the National Wilderness Stewardship Alliance (<http://www.wildernessalliance.org/>) as part of an ongoing extension of the annual National Wilderness Workshop. Among an audience of wilderness managers, stewards, advocates, and professional practitioners, we considered the fol-



Robert Dvorak


lowing questions: When is short-term, immediate action needed and how do we "triage" wilderness management decisions? When such triage is needed, what practices and strategies can managers apply in these situations? And how do we ensure that short-term actions lay a foundation for continued long-term collaborative planning?

Our conceptualization of triage recognizes that different situations require different immediacy. Emergencies, such as search and rescue operations or wildland fire ignitions, provide far less decision space and need immediate action. Creating stewardship plans and long-term collaborative planning efforts often require a multidisciplinary team with a multiyear timeline. But triage and short-term actions are somewhere within these lower and upper bounds. They represent actions that address issues and critical impacts in a shorter time frame (e.g., 12–18 months potentially). Or as a participant of the webinar suggested, triage may be needed when our perception of critical impacts in each context shifts from anecdotal to measurable.

Why might triage be needed? Many of our current planning and management frameworks have developed around iterative process where we identify goals, define management directions, identify appropriate and applicable strategies, and then implement, monitor, and evaluate over time. But in a context of rapid change, shifting baselines, and varying priorities, do we need an option to be more responsive? The pandemic has shown us that on-the-ground conditions can change rapidly. Our attention can change as we focus on important values such as diversity, equity, and inclusion. And what is the original starting point if the iterative cycle no longer exists by the time we return or revisit it in the iterative process?

Therefore, we may need to further develop short-term and long-term strategies for wilderness management. This may include considering "Big D" decisions over time and space, but also "little D" decisions that are nimble and responsive. And we should strive to identify what short-term triage actions are appropriate while still maintaining public engagement and support. As part of a larger management strategy, triage actions can work with long-term planning and decision-making to provide wilderness managers and partners with the best practices necessary for wilderness stewardship.

For more on this topic, a full recording of the webinar is available and provided by the National Wilderness Stewardship Alliance at <https://youtu.be/l1zyuiRHVI>.

In this issue of *IJW*, Roger Kaye examines what nature looks like in the Anthropocene. Janet McMahon describes biodiversity as the language of wilderness. Peter Pettengill, Roisin Creedon-Carey, and Sage Lalor discuss wilderness solitude in an era of isolation. And Elizabeth Perry explores the development of nature-based tourism in Oman. 

ROBERT DVORAK is editor in chief of *IJW* and professor in the Department of Recreation, Parks, and Leisure Services Administration at Central Michigan University; email: dvora1rg@cmich.edu





Sunset at Pantai Watu Lumbung, Indonesia. **Photo credit:** Baehaki Hariri on Unsplash.

Nature in the Anthropocene: What It No Longer Is, Will Never Again Be, and What It Can Become

by **ROGER KAYE**

Nature is not about preserving old things, but about creating new ones. New Life. New Ideas.
- Gemma Malley



Roger Kaye

Ah, Nature. Its protection and perpetuation has been the heart of conservation and of US federal conservation agencies' missions since their founding. Has been – but in this emerging age wherein humans have become a dominant, disturbing, and destabilizing force upon the entire Earth system, maintaining what's "natural" is no longer a viable goal. At least not as natural has been traditionally understood. Nature changes in response to changing conditions, and so must our conception of it.

A synthesis of dictionary entries shows the traditional understanding of natural to mean "not shaped by or significantly affected by humans." Or if you prefer a more official, management-focused definition, the US Interagency Wilderness Character Monitoring Protocol defines natural as where ecological systems are substantially free from the effects of modern civilization, "where the primary goal is to allow ecological systems to evolve and change freely without human influence" (Landres et al. 2015, emphasis added).



Figure 1 - The Endangered Giant. Photo by Geran de Klerk on Unsplash.

But even now, in the early Anthropocene, there is no such place. Nowhere is free from our effects or unaffected by human influence. Our species is changing the atmosphere, hydrosphere, lithosphere, cryosphere, and biosphere – in fact, all spheres of Earth system function. From ocean depths to the stratosphere, our footprint is everywhere, expanding and accelerating.

We must move beyond the dualistic vision of humans apart from Nature, as separate entities influencing each other. They have become inseparably intertwined, entangled in a now hybrid world. That divide between what is natural and what is human, grounded in 18th-century Romanticism, is fast becoming a quixotic anachronism. There is no longer any Nature to be separate from—not on this planet anyway. The fact is that in this postnatural world, nothing remains natural by traditional definitions, and everything is natural in the new understanding – including what humans do. Our conservation laws, policies, and programs developed to protect landscapes from development, exploitation, and damaging uses, not from global-scale impacts.

More and more we hear that the increasingly problematic concept of Nature and maintaining what is "natural" is no longer a viable primary conservation goal. "Let it go," many say. Replace it with a paradigm like ecological integrity or, more commonly, biodiversity. Representative of these growing voices is Ecology Without Nature author Timothy Morton, who argues that "we must relinquish the idea of nature once and for all" (2007).

That may make sense from a biological sciences perspective. But Nature and what is natural, has never just been an objective ecological or baseline condition. Unlike biodiversity, Nature also has aesthetic, psychological, spiritual, and symbolic dimensions, and these are prominent in the public's experience, valuation, and motivation for protecting landscapes. Nature evokes a sense of beauty, sublimity, and tranquility. Interacting with Nature has been shown to enhance many aspects of well-being. Spiritually, Nature can be a medium for seeing oneself from a larger perspective, connecting to an ultimate value larger and beyond oneself. Symbolically, the concept of Nature has always carried meaning for how we should relate to the more-than-human world, and now to what has become the most critical issue of our time: human-Earth relations. Regardless of the degree to which our concept of Nature is archetypal, with roots in our evolutionary past, or socially created, an artifact of culture, it evolved to meet human needs – needs that continue and, arguably, are greater now in the Anthropocene.

It was *The End of Nature*, Bill McKibben's 1989 best seller that first brought the Nature dilemma to fore. It didn't forecast the end of the world. Rather, it warned of the end of "a certain set of ideas about the world and our place in it." "An idea, a relationship," McKibben explained, "can go extinct, just like an animal or plant" (1989).

...untrammelled wilderness joins places and sites that throughout history and across cultures have come to embody attributed meanings. Like sacred groves, shrines, and cathedrals, to which wilderness is so often compared, untrammelled areas are especially conducive to experiencing the aesthetic, symbolic, and spiritual values associated with wilderness.

Yes, many of our venerable, mythopoetic notions of pristine Nature are headed for extinction. Lost forever is the "natural" area's causal continuity with the past, and with it the opportunity for us to experience – or imagine – them as remnants free of the effects of civilization. But considering the full dimensionality of the Nature concept, the functions it serves, and the benefits it provides, we shouldn't abandon or replace it with scientific paradigms. Rather, we should redefine Nature and natural, and operationalize them to be viable for the Anthropocene era. Protecting Nature could then take its place along with biodiversity and ecological integrity as a stewardship goal, recognizing and protecting the values they don't.

Anthropocene-Appropriate Definitions

We should adopt more Anthropocene-appropriate definitions. The Alaska US Fish and Wildlife Service Anthropocene Guiding Coalition and its subgroup, What Future for Alaska Wilderness in the Anthropocene Group, have proposed new definitions for natural, wild, and untrammelled in the Anthropocene. According to its charter, the coalition guides a transition of agency culture toward an Anthropocene aware and ready future by engaging and empowering regional employees to adopt new ways of thinking and bold innovations to meet the challenges of a new and unknown future. Roger Kaye, Ed Zahniser, and Scott Covington were the primary authors of these definitions.

Natural refers to areas free from significant intentional human alterations, developments, mechanisms, noises, and other artifacts that remind or connect one to modern civilization. Such areas are natural regardless of the degree to which their composition and ecology has changed in response to global-scale anthropogenic factors.

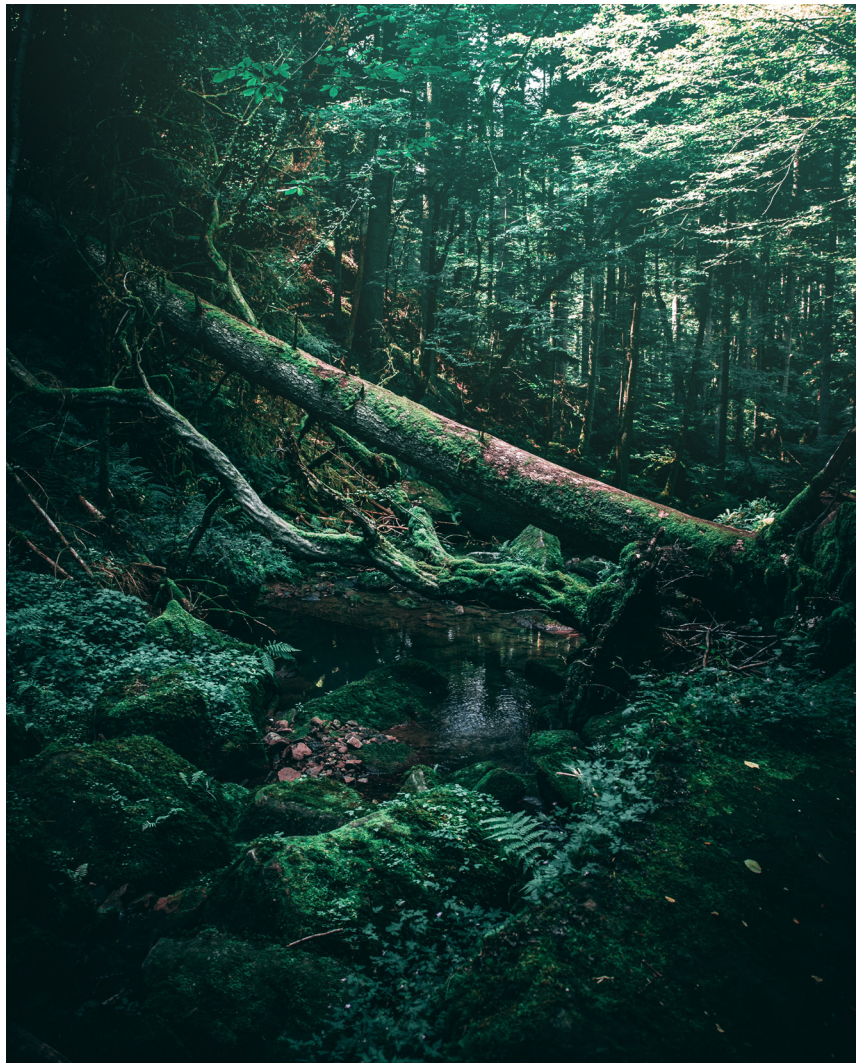


Figure 2 - Monbachschlucht Bad Liebenzell, Germany. Photo by Oliver Roos on Unsplash.


Naturalness is largely perceptual and is associated with aesthetic, experiential, symbolic, and spiritual benefits of landscapes.

Wild areas are natural and are further characterized by their freedom from the human intent to alter, control, or manipulate their components and their ecological and evolutionary processes.

Wild areas are self-willed, free to adapt and evolve as they will, in response to "natural" or global-scale anthropogenic factors. They are free from human willfulness, purpose, utility, design, or intervention that may occur in natural areas. Among other functions, wild areas serve as laboratories for understanding how ecological systems function, transition, and respond to change when left alone.

Untrammeled is at once a condition of and a relationship to the landscape. Untrammeled areas are natural and wild because, through designation, they have been conferred with intrinsic value based on respect for, restraint toward, and deference to the area's freedom from human willfulness.

Untrammeled incorporates the interrelational dimension of wilderness. It represents not just the condition of a landscape, but how we relate to it; it's about how we interact with the environment as much as the effect of that interaction. An area can be wild as when Howard Zahniser referred to "the wildness of the Universe" only because humans haven't had a reason or the means to alter or control it (yet). But an area is untrammeled when humans could so change the landscape, but through the social process of designation or consecration they have consciously, purposely decided not to, making it "a place set part." Thus, untrammeled wilderness joins places and sites that throughout history and across cultures have come to embody attributed meanings. Like sacred groves, shrines, and cathedrals, to which wilderness is so often compared, untrammeled areas are especially conducive to experiencing the aesthetic, symbolic, and spiritual values associated with wilderness.

These definitions do not suggest that we should accept human-caused change in wilderness. Quite the contrary. Developments and other actions in wilderness that are done with the intent of altering wilderness conditions or that are taken with disregard for the wilderness condition are not natural or permissible. But changes resulting from global-scale stressors are substantially different in that their intent is not to alter the wilderness area, and they do not express disregard for it. Therefore, it is argued here that these definitions are most appropriate in the Anthropocene and provide conservation agencies the best means for the protection and perpetuation of Nature. 

ROGER KAYE is the Alaska Wilderness Coordinator for the US Fish and Wilderness Service; email: roger_kaye@fws.gov. This article is based on the author's judgment, interpretation, and emphasis, and does not constitute a policy position of the author's agency.

References

- Landres, P. C. Barns, S. Boutcher, T. Devine, P. Dratch, A. Lindholm, L. Merigliano, N. Roeper, and E. Simpson. 2015. Keeping It Wild 2: An Updated Interagency Strategy to Monitor Trends in Wilderness Character across the National Wilderness Preservation System. Gen. Tech. Rep. RMRS-GTR-340. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- McKibben, B. 1989. The End of Nature. New York: Anchor Books.
- Morton, T. 2007. Ecology without Nature: Rethinking Environmental Aesthetics. Cambridge, MA: Harvard University Press.





The herbaceous understory of a forest makes up less than 1% of the biomass yet more than 90% of vascular plant diversity. **Photo credit:** Shelby Perry

Biodiversity: The Language of Wilderness

by JANET McMAHON

What We Know and What We Don't

I sometimes try to imagine what a northern forest would look like through the eyes of a black-capped chickadee. These small birds can see ultraviolet light, which means they can perceive a whole range of colors, textures, and contrasts invisible to us. They can track fast motion much better than we can, and they see small objects in more detail, with multiple focal points over a wider field of view. This allows them to see an entire universe of tiny insects, mites, spiders, beetle wings, insect eggs, larvae, and more tucked away in bark crevices, on clusters of dead leaves, and along twigs (Haskell 2012). A chickadee gleans her meals from this smorgasbord of invertebrates jabbing them under flaking bark, stored for later, and is able to remember more than 2,000 hiding places at once (Sibley 2020). The richness of a chickadee's visual world brings home how little we know about the diversity of life in northeastern US forests and the complex relationships that exist among the species living here.

Every northeastern US state has an action plan that documents the status and vulnerability of its native wildlife (defined as any living being that is part of the natural world, including



Janet McMahon

plants, animals, and fungi (Hunter 1990)). These plans focus primarily on species we can readily see and identify – vertebrates; a handful of invertebrate groups such as mussels, butterflies, and beetles; and in some states, vascular plants. We know a fair bit about vertebrates and vascular plants. Maine's 2015 plan, for example, documents 17 species of reptiles, 18 species of amphibians, 39 species of inland fish, 61 species of nonmarine mammals, 423 species of birds, and more than 2,100 species of plants (MDIFW 2015). This is impressive, but also humbling when one stops to consider that mosses, lichens, liverworts, and fungi outnumber vascular plants by more than two to one, and vertebrates account for less than 2% of the state's known wildlife species (MDIFW 2015; Gawler et al. 1996) (figure 1). Globally, the number of insect species alone – the most diverse group of organisms – exceeds the number of vertebrate species by more than a million (figure 2). While biologists in Maine are actively cataloging the distribution, status, and life histories of butterflies, dragonflies, bees, and a small handful of other orders of arthropods and mollusks, there are entire kingdoms and phyla about which almost nothing is known, such as protists, sponges, hydras and hydrozoans, flatworms, and nematodes, not to mention bacteria and other microbes. It is these largely inconspicuous species that make up the vast majority of the region's faunal diversity in terms of both species richness and biomass (Figure 1). In short, if we were to describe the region's natural history in a book, most of the chapters would be missing (Figure 2).

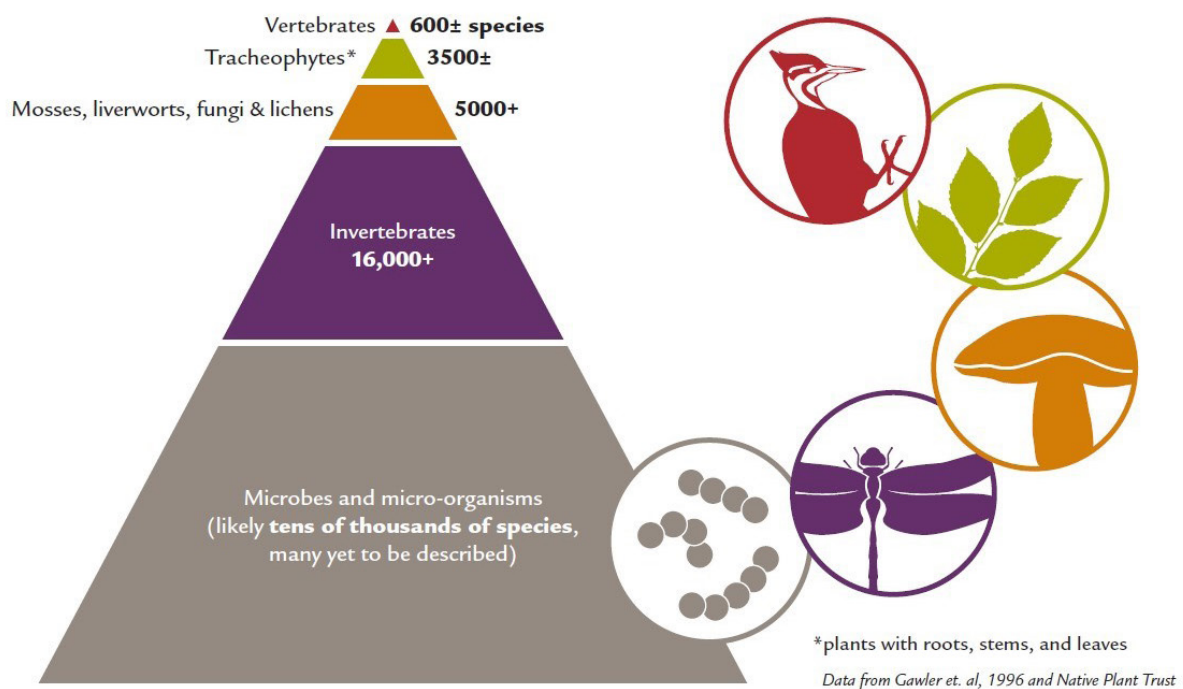


Figure 1 - Relative abundance of taxonomic groups across the Northeast.

Biologists have described more than 1.8 million species worldwide. Estimations show that the vast majority of living species still have yet to be discovered.

■ *Known*
(Hunter 2021)

■ *Estimated*
(Watson 1995)

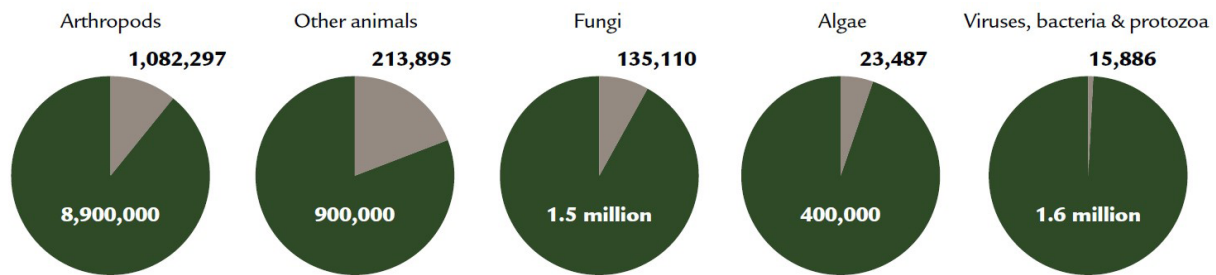


Figure 2 - Known species vs. estimated species richness.

Wilderness and Biodiversity: Disproportionate Benefits

Given how little we know, how do we ensure that the fullest extent of a region's native biodiversity is protected? It is well documented that intact wilderness areas and landscapes with a light human footprint harbor a greater variety and higher populations of native species than urban and intensively managed landscapes. This is true for lichens, mosses, salamanders, frogs, birds, bats, many herbaceous plants, and even trees (see for example, Lapin 2005; Selva 1996; Whitman and Hagan 2000; Miller et al. 2018; Haney and Schaadt 1996; Zlonis and Niemi 2014). In addition, recent research indicates that wilderness areas support more rare species globally, including those that are found nowhere else (Lapin 2005; Mittermeier et al. 2003). While wilderness areas are critically important for these reasons, they are more than places to count species. Much of the Northeast's biodiversity is tied to the complex structure of undisturbed forests. Forests that have evolved with little or no human intervention typically have taller and more ragged canopies with more large limbs up high; fewer but larger trees with more cavities and hollows; more and larger dead standing and fallen trees; a higher diversity of lichens, mosses and herbaceous plants; smaller gaps in the canopy; uneven forest floors with dry mounds and damp hollows formed from tip ups; more seeps and intermittent streams; fewer invasive species; deeper litter and humus layers; and a host of other features absent in younger forests (Lapin 2005; Haskell 2017; Maloof 2016). The variety of microclimates on a single old tree is astounding, ranging from moist moss-covered trunk to sunny windswept treetop, to cavities and deeply fissured bark – and this doesn't include the multitude of microclimates and habitats below ground (Haskell 2017) (Figure 3).

We are only beginning to understand how essential the connections and interactions among all of a forest's inhabitants – from soil to canopy – are to a thriving forest ecosystem. One example is the keystone role of fungi. Mycorrhizal fungi control soil moisture, which in turn impacts wood decomposition rates and nutrient cycling carried out by other fungi, microbes, and insects (Simard et al. 2012; Swan and Kominoski 2012). This, in turn, supports extensive food webs, not

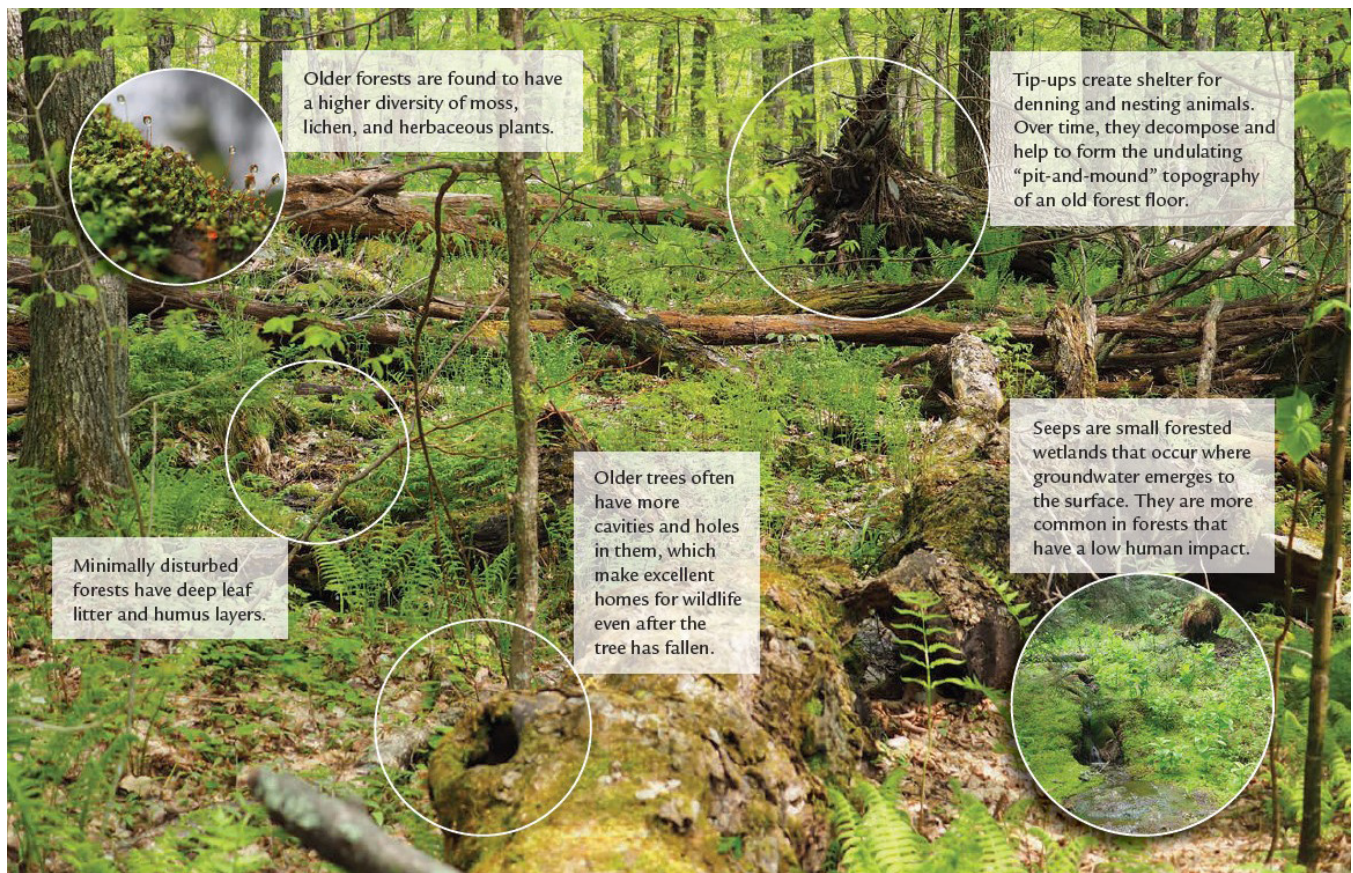


Figure 3 - Forests that are old or minimally impacted by people have a higher occurrence of the following features. Bramhall Wilderness Preserve, pictured below, is a mature forest in Vermont protected by Northeast Wilderness Trust. Photo by Shelby Perry.

only in the soil, but in the streams, lakes and wetlands within forested landscapes. Haskell (2017) emphasizes the importance of the "networked nature of trees," especially dead logs, branches, and roots. These are "focal points for thousands of relationships," providing food and shelter for more than half the species in a forest. He also notes that soils in northern forests hold more carbon than all the tree trunks, branches, lichens, and other aboveground life combined. We are learning that this intricate tapestry of relationships is a form of communication, with signals in the form of carbon, water, and other chemicals sent back and forth from birch to fir to alder, between mother trees and their offspring, between dying trees and nearby seedlings (Simard 2021).

Another example of the tightly interwoven nature of forest communities is evident in the ground layer. For example, herbaceous plants on the forest floor account for only 1% of plant biomass in temperate forests but encompass 99% of vascular plant diversity (Malooof 2016). The diversity of all other organisms in a forest, from butterflies to mammals, is more closely correlated with herbaceous plant diversity than with tree diversity, with herbs providing food for pollinators, herbivores, dispersers, and decomposers (Meier et al. 1995; Malooof 2016). Wildlands ensure that these intricate relationships are not severed, and an intact foundation is maintained. They are places where we can learn the language of forests in all its complexity and beauty.



Figure 4 - The visual world of a chickadee illustrates how vast and complex the layers of biodiversity in the northern forest are, beyond what is typically perceived by the human observer. Photo by Larry Master, www.masterimages.org.

Extinction Debt

Today, only about 0.4% of forestland in the US Northeast is old growth (Davis 1996), and in Maine— the most heavily forested state in the region – less than 4% is more than 100 years old, the age at which a stand begins to acquire the complex structure associated with older forests (Whitman and Hagan 2009; USDA Northern Research Station 2019). Before European colonization, two-thirds of the region was old growth, and 55–60% of Maine's northern forest was more than 150 years old (Lapin 2005; Lorimer 1977).

The disconnect between forests that are managed to reach "financial maturity" (typically 50 to 75 years old) and those allowed to reach biological maturity (~200 years+) has caused a profound ecological shift that we are only beginning to understand. There is growing evidence that economically efficient and intensive management of stands results in significant loss of biodiversity (Hagan and Whitman 2004). This loss may not become apparent until decades after a harvest – a phenomenon known as extinction debt (Hanski 2000). Researchers in Finland estimate that a thousand forest species will be lost there in the next two to three decades due to logging that has already happened (Hagan and Whitman 2004; Hanski 2000), and Tikkanen and others (2006) found that half of the country's documented endangered species were dependent on old growth forest conditions. The species most at risk are those that move or disperse slowly through the landscape and prefer large standing and fallen trees and deep forest interiors as their habitat. They tend to be the uncharismatic and

inconspicuous ones such as mosses, lichens, fungi, vernal forest herbs, and insects. Species loss occurs when there is not enough habitat for long-term persistence and when remaining habitat "islands" are too far apart. Once older forest elements are lost from a stand, it can take centuries for species that depend on those characteristics to return. This is because it takes time for structural features to redevelop, and once they've reappeared it takes some time for the species to find them (Hagan and Whitman 2004; Meier et al. 1995). In the face of habitat loss and change, wildlands provide ecological continuity over time. They act as refugia, retaining biological legacies that serve as source areas from which species can recolonize surrounding managed forestland (Hagan and Whitman 2004).



Figure 5 - The diversity of salamander species is greater in wilderness areas and landscapes with a light human footprint. Photo of Red Eft by David Middleton.

Ecological Amnesia

When I walk through a typical northeastern forest managed for timber or look out at a sea of trees from a mountaintop, I am usually looking at trees that are 60 or 70 years old at best. To the trained eye, it is hard not to notice what is missing. The top of the forest has essentially been taken off and the canopy that's left often doesn't close before the next harvest or grows into a dense thicket of young trees with few gaps from treefalls or other natural disturbances. There are few large standing or fallen dead trees, and supercanopy pines are rare. There is no thick moss layer under spruce and hemlock, and the seeps that used to course over the forest floor in the spring have been smoothed by repeated logging operations (Figure 3). Plants such as marginal fern, Braun's holly fern, or rattlesnake plantain – once common sights on a rich hardwood forest floor – are now rarely seen, and the forest in spring grows quieter year by year. Instead of a collection of distinct places – each different from any other in its community of plants and animals, slope, exposure, soil quality, and climate (Berry 2015) – the forests of the Northeast have become simplified and homogenized.

We tend to take the present look of things to be normal (Berry 2015). Maloof (2016) refers to this as "ecological amnesia." This shifting sense of "normal" results in a slow diminishment of forest biodiversity. Today, wilderness areas provide the only opportunities to see not only what forests were, but what they could be. Without these ecological baselines we cannot learn the full living language of forests – whether through discovery of the countless

species that live there, understanding how a healthy forest functions and responds to a changing climate, or learning how to manage forests in a truly sustainable way. Part of this amnesia stems from the Euro-American tendency to separate humans from the natural world and to compartmentalize and fragment what we study, use, and exploit. Society at large has lost the foundational understanding of interconnectedness in time and space that is a basic truth for most Indigenous peoples (Mitchell 2018).

A Way Forward

We now face a biodiversity crisis – with species going extinct at 1,000 times the "background" rate (De Vos et al. 2014). The "background" extinction rate is the average number of extinctions that naturally occur without human influence or mass-extinction events. This is often approximated at 1 extinction per million species per year, although recent research suggests the background extinction rate is likely much lower, at around 1 extinction per 10 million species per year. The International Convention on Biological Diversity is finalizing a strategy known as 30 by 30 to halt the decline and extinction of species and allow ecosystems to recover by 2050. The goal is to conserve 30% of every type of ecosystem by 2030 and continue to improve the extent, quality, representation, and resilience of natural and near-natural ecosystems until extinction rates fall to background levels (Convention on Biological Diversity 2021). Included within this goal is a net gain of at least 5% of lands protected as wilderness or ecological reserves by the end of this decade, and a



Figure 6 - Arthropods may receive less conservation attention than charismatic animals such as birds, fish, and mammals, but they are just as integral to the web of life. This six-spotted tiger beetle was seen at Northeast Wilderness Trust's Lone Mountain Wilderness Sanctuary in Maine. Photo by Shelby Perry.




Figure 7 - Rattlesnake plantain is a type of orchid. Once common across the Northeast, they are now an unusual find. This one was photographed at Northeast Wilderness Trust's Jack & Margaret Hoffman Wilderness Sanctuary in New Hampshire. Photo by Shelby Perry.

15% increase by 2050. In the United States, the Biden administration, The Nature Conservancy, Northeast Wilderness Trust, other conservation groups, and many states are embracing these goals, and are also acknowledging that the human connection to nature – especially between Indigenous people and their ancestral lands and waters – has to be restored and honored.

Understanding the complexity, richness, and resilience inherent in wildlands requires the inclusion of diverse perspectives - from the Indigenous view that humans are embedded in the natural world, not separate from it, to what science can teach us, to thinking about how a black-capped chickadee sees a forest.

Today, intact wildlands, including wilderness and ecological reserves, make up just 12% of the United States and less than 6% of the Northeast (Schlawin 2021). The US Geological Survey's Protected Areas Database classifies wilderness areas and ecological reserves as Gap Status 1 or 2 lands. Gap 1 lands have protections to keep them permanently in their natural state. Gap 2 lands are kept primarily natural, but some natural disturbances, such as wildfires or floods, may be suppressed (US Geological Survey 2015). We are losing an estimated 37,000 acres of forestland in New England each year (Olofsson et al. 2016). Currently, many ecosystem types, and their unique complements of species, are not represented in reserves or wilderness areas at all, especially in more developed parts of the Northeast. Those that are represented are often too small to maintain the ecosystem functions they were intended to protect or are not con-

nected enough to provide resilience in the face of climate change. To meet the 30 by 30 goal in the Northeast we need to protect larger and better-connected tracts of wildlands that are embedded in a matrix of sustainably managed forests, with a focus on intact and representative examples of all the region's ecosystems (Anderson et al. 2016).

The Nature Conservancy has identified the central and northern Appalachians as a conservation focus area of highest resilience in North America (Anderson et al. 2016). This focus area ranks highly because of its connected land cover, high biodiversity, the amount of carbon it sequesters, and its complex topography, which offers countless microclimates that provide opportunities for species to move. To protect the biodiversity of the Northeast, envision the Appalachians as the trunk of a tree that connects to branches of conserved landscapes throughout the region, and serves as a major movement corridor as species shift ranges in response to a warming climate. Understanding the complexity, richness, and resilience inherent in wildlands requires the inclusion of diverse perspectives – from the Indigenous view that humans are embedded in the natural world, not separate from it, to what science can teach us, to thinking about how a black-capped chickadee sees a forest. A connected network of wildlands is where we can come to the truth of our interconnectedness – a truth that is essential to sustain all lives, for generations to come (Mitchell 2018). 

JANET McMAHON is a consulting ecologist for conservation organizations, state agencies, and private landowners. She developed a blueprint for an ecological reserves system for the state of Maine and her thesis, “The Biophysical Regions of Maine,” is used as a framework for landscape-scale conservation efforts by The Nature Conservancy and others.

NORTHEAST WILDERNESS TRUST conserves forever-wild landscapes for nature and people. Founded in 2002, the Wilderness Trust works across New England and eastern New York. The Wilderness Trust owns Wilderness Preserves and Sanctuaries and protects land through legal means such as conservation easements. The organization currently safeguards more than 64,000 acres of wildlands in six states. Learn more at www.newildernesstrust.org.

“**Biodiversity: The Language of Wilderness**” is part of Northeast Wilderness Trust’s Wild Works series, which characterizes the values and benefits of wild, unmanaged landscapes.

References

- Anderson, M. G., A. Barnett, M. Clark, J. Prince, A. Olivero Sheldon, and B. Vickery. 2016. Resilient and connected landscapes for terrestrial conservation. The Nature Conservancy, Eastern Conservation Science, Eastern Regional Office, Boston, MA.
- Berry, W. 2015. *Our Only World*. Berkeley, CA: Counterpoint Press.
- Convention on Biological Diversity. 2021. A new global era framework for managing nature through 2030. First Draft Agreement. UN Environment Program, Convention on Biological Diversity.
- Davis, M. B. 1996. Extent and location. In *Eastern Old-Growth Forests: Prospects for Rediscovery and Recovery*, ed. M. B. Davis (pp. 18–32). Washington, DC: Island Press.
- De Vos, J. M., L. N. Joppa, J. L. Gittleman, P. R. Stephens, and S. L. Pimm. 2014. Estimating the normal background rate of species extinction. *Conservation Biology* 29(2):452–462.
- Gawler, S. C., J. J. Albright, P. D. Vickery, and F. C. Smith. 1996. Biological diversity in Maine: An assessment of status and trends in the terrestrial and freshwater landscape. Maine Natural Areas Program, Augusta, ME.
- Hagan, J. M., and A. A. Whitman. 2004. Late-successional forest: A disappearing age class and implications for biodiversity. FMSN-soor-2. Manomet Center for Conservation Sciences, Brunswick, ME.
- Haney, J. C., and C. P. Schaad. 1996. Functional roles of eastern old growth in promoting forest bird diversity. In *Eastern Old-Growth Forests: Prospects for Rediscovery and Recovery*, ed. M. B. Davis (pp. 76–88). Washington, DC: Island Press.
- Hanski, I. 2000. Extinction debt and species credit in boreal forests: Modeling the consequences of different approaches to biodiversity conservation. *Annales Zoologici Fennici* 37: 271–280.
- Haskell, D. G. 2012. *The Forest Unseen*. London: Viking Penguin.
- Haskell, D. G. 2017. *The Songs of Trees*. New York: Penguin Random House, LLC.
- Hunter, M. L. Jr. 1990. *Wildlife, Forests and Forestry: Principles of Managing Forests for Biological Diversity*. Englewood Cliffs, NJ: Prentice-Hall.
- Lapin, M. 2005. Old-growth forests: A literature review of the characteristics of Eastern North American Forests. Vermont Natural Resources Council, Montpelier, VT.
- Lorimer, C. G. 1977. The presettlement forest and natural disturbance cycle of northeastern Maine. *Ecology* 58: 1169–1184.
- Maloof, J. 2016. *Nature's Temples: The Complex World of Old-Growth Forests*. Portland, OR: Timber Press, Inc.
- MDIFW (Maine Department of Inland Fisheries and Wildlife). 2015. *Maine's Wildlife action plan*. Maine Department of Inland Fisheries and Wildlife, Augusta, ME.
- Meier, A. J., S. P. Bratton, and D. C. Duffy. 1995. Possible ecological mechanisms for loss of vernal-herb diversity in logged eastern deciduous forests. *Ecological Applications* 5: 935–946.
- Miller, K. M., B. J. McGill, B. R. Mitchell, J. Comiskey, F. W. Dieffenbach, E. R. Mathews, S. J. Perles, J. P. Schmit, and A. S. Weed. 2018. Eastern national parks protect greater tree species diversity than unprotected matrix forests. *Forest Ecology and Management* 414: 74–84.
- Mitchell, S. 2018. *Sacred Instructions: Indigenous Wisdom for Living Spirit-Based Change*. Berkeley, CA: North Atlantic Books.
- Mittermeier, R. A., C. G. Mittermeier, T. M. Brooks, J. D. Pilgrim, W. R. Konstant, G. A. B. da Fonseca, and C. Kormos. 2003. Wilderness and biodiversity conservation. *PNAS* (September 2) 100(18) 10309–10313.
- Olofsson, P., C. E. Holden, E. L. Bullock, and C. E. Woodcock. 2016. Time series analysis of satellite data reveals continuous deforestation of New England since the 1980s. *Environmental Research Letters*. IOP Publishing.
- Schlawin, J. 2021. Presentation to the Maine Ecological Reserves Scientific Advisory Council on draft ecological reserves section of a report assessing accomplishments and gaps in Maine land conservation. Maine Natural Areas Program, Augusta, ME.
- Selva, S. B. 1996. Using lichens to assess ecological continuity in northeastern forests. In *Eastern Old-Growth Forests: Prospects for Rediscovery and Recovery*, ed. M. B. Davis. (pp. 35–48). Washington DC: Island Press.

- Sibley, D. A. 2020. *What It's Like to Be a Bird*. New York: Alfred A. Knopf.
- Simard, S. W. 2021. *Finding the Mother Tree: Discovering the Wisdom of the Forest*. New York: Alfred A. Knopf.
- Simard, S. W., I. U. Beiler, M. A. Bingham, J. R. Deslippe, L. J. Philip, and F. P. Teste. 2012. Mycorrhizal networks: Mechanisms, ecology and modeling. *Fungal Biology Reviews* 26: 39–60.
- Swan, C. M., and J. S. Kominoski. 2012. Biodiversity and ecosystem function of decomposition. In eLS. Chichester, UK: John Wiley & Sons, Ltd. DOI: 10.1002/9780470015902.a0023601 (March).
- Tikkanen, O., P. Martikainen, E. Hyvarinen, K. Junninen, and J. Kouli. 2006. Red-listed boreal forest species of Finland: Associations with forest structure, tree species, and decaying wood. *Annales Zoologici Fennici* 48(4): 373–383.
- US Department of Agriculture Northern Research Station. 2019. Forest Inventory and Analysis, Maine Forest Inventory tool. <http://www.fia.fs.fed.us/tools-data/default.asp>.
- US Geological Survey. 2015. Enviro Atlas Fact Sheet. www.epa.gov/enviroatlas.
- Whitman, A. A., and J. M. Hagan. 2009. A revised rapid-assessment late-successional index for common northeastern forest types. *Forest Mosaic Science Notes #2009-1*. Manomet Center for Conservation Sciences, Brunswick, ME.
- Whitman, A. A., and J. M. Hagan. 2000. Herbaceous plant communities in upland and riparian forest remnants in western Maine. *Mosaic Science Notes #2000-3*. Manomet Center for Conservation Sciences, Brunswick, ME.
- Zlonis, E. J., and G. J. Niemi. 2014. Avian communities of managed and wilderness hemiboreal forests. *Forest Ecology and Management* 328: 26–34.

Additional References

- Department of Environmental Conservation. 2015. *New York State Wildlife Action Plan*. New York: Department of Environmental Conservation, Albany, NY.
- Johnson, E. A., and D. Smith, eds. 2006. *Legacy: Conserving New York State's Biodiversity*. American Museum of Natural History, New York State Biodiversity Research Institute, New York State Department of Environmental Conservation, New York Natural Heritage Program, and The Nature Conservancy, Albany, NY.
- Massachusetts Division of Fisheries and Wildlife. 2015. *Massachusetts State Wildlife Action Plan 2015*. Westborough, MA.
- Terwilliger Consulting Inc. 2015. *2015 Connecticut Wildlife Action Plan*. Prepared for The Nature Conservancy and the Connecticut Department of Energy and Environmental Protection, Bureau of Natural Resources.
- Terwilliger Consulting Inc. 2015. *2015 Rhode Island Wildlife Action Plan*. Prepared for The Nature Conservancy and the Rhode Island Department of Environment Management Division of Fish and Wildlife.
- Vermont Fish & Wildlife Department. 2015. *Vermont Wildlife Action Plan 2015*. Vermont Fish & Wildlife Department, Montpelier, VT. <https://vtfishandwildlife.com/node/551>.





Photo credit: Kivihug on Unsplash.

What Is Visitor Use Management? Identifying Functional and Normative Postulates of an Interdisciplinary Field of Study

by **ZACHARY D. MILLER**

In 1864, US president Abraham Lincoln unknowingly set off an international movement when he granted Yosemite Valley to the state of California for "the express conditions that the premises should be held for public use, resort, and recreation" (Yosemite Grant Act of 1864). Yellowstone National Park (Wyoming/Montana/Idaho) further underscored this idea by becoming the world's first national park, which was designated as "a pleasuring-ground for the benefit and enjoyment of the people" in 1872 (Yellowstone Park Act of 1872). By 1916 more than a dozen areas in the United States were designated as national parks and housed under the National Park Service (NPS). The enabling legislation for the NPS (Organic Act of 1916) solidified parks as places for visitor use and enjoyment. However, national parks were responsible for more than just human enjoyment, and a dual mandate of providing for visitor use and experience in a way that conserves resources unimpaired became the defining challenge for parks and other protected areas into the future (Organic Act of 1916).



Zachary D. Miller

Not long after the national park idea took root, people wondered "how large a crowd can be turned loose in a wilderness without destroying its essential qualities?" (Sumner 1936). The response to this question was delayed, but the post-World War II boom of visitation to parks and protected areas reignited interest in actively managing visitor use. Early inquiry into visitor use management started with the idea of carrying capacity (Wagar 1964), but the concept was and continues to be challenging in application to visitor use (Allen 2019; McCool and Lime 2001; McCool et al. 2014; Miller et al. 2019; Whittaker et al. 2011). Fundamentally, there is no one carrying capacity, and any assessments of capacity must consider human values in the process and evaluation of resource impacts from visitor use (Wagar 1964).

Rising to the challenges presented in early carrying capacity inquiries, numerous frameworks integrating the human value aspects of visitor use management emerged. These frameworks are generally termed Management-By-Objectives frameworks and include Limits of Acceptable Change (McCool, Clark, and Stankey 2007; Stankey, McCool, and Stokes 1984; Stankey et al. 1985), Visitor Impact Management (Graefe, Kuss, and Vaske 1990), Visitor Experience and Resource Protection (Hof and Lime 1997), and the recent Interagency Visitor Use Management Framework (IVUMF 2016). Collectively, these frameworks attempt to answer a perennial question: How much and what types of visitor use and/or resource change can be accommodated in an area before the very conditions people are seeking are unacceptably degraded? (Miller et al. 2019). Attempts to answer this question today are what is generally called visitor use management.

For more than 50 years, scientists, researchers, and other professionals have attempted to improve visitor experiences and protect biophysical resources through a field of inquiry called visitor use management. Although often thought of as a framework or a process, visitor use management can also be described as a field of study with its own set of unique axioms. In this article, normative and functional postulates are developed to define these visitor use management axioms. From this, the context from which visitor use management is approached is clearly defined and sets a stage for identifying emerging priorities and needs in a time of critical change.

Axioms of Visitor Use Management

Visitor use management is thought of as a framework or a process. However, in this article it is proposed that visitor use management is also an interdisciplinary field of inquiry. Although emergent of and related to numerous other fields of inquiry including conservation social science, tourism management, and other "human dimensions" fields (see Bennett et al. 2017), a unique set of axioms emerge from visitor use management inquiry. Like other interdisciplinary fields of inquiry, these axioms are identified through functional and normative postulates (Kareiva and Marvier 2012; Soulé 1985). Functional postulates are core principles associated with a field of inquiry, and normative postulates are core values associated with a field of inquiry. This article

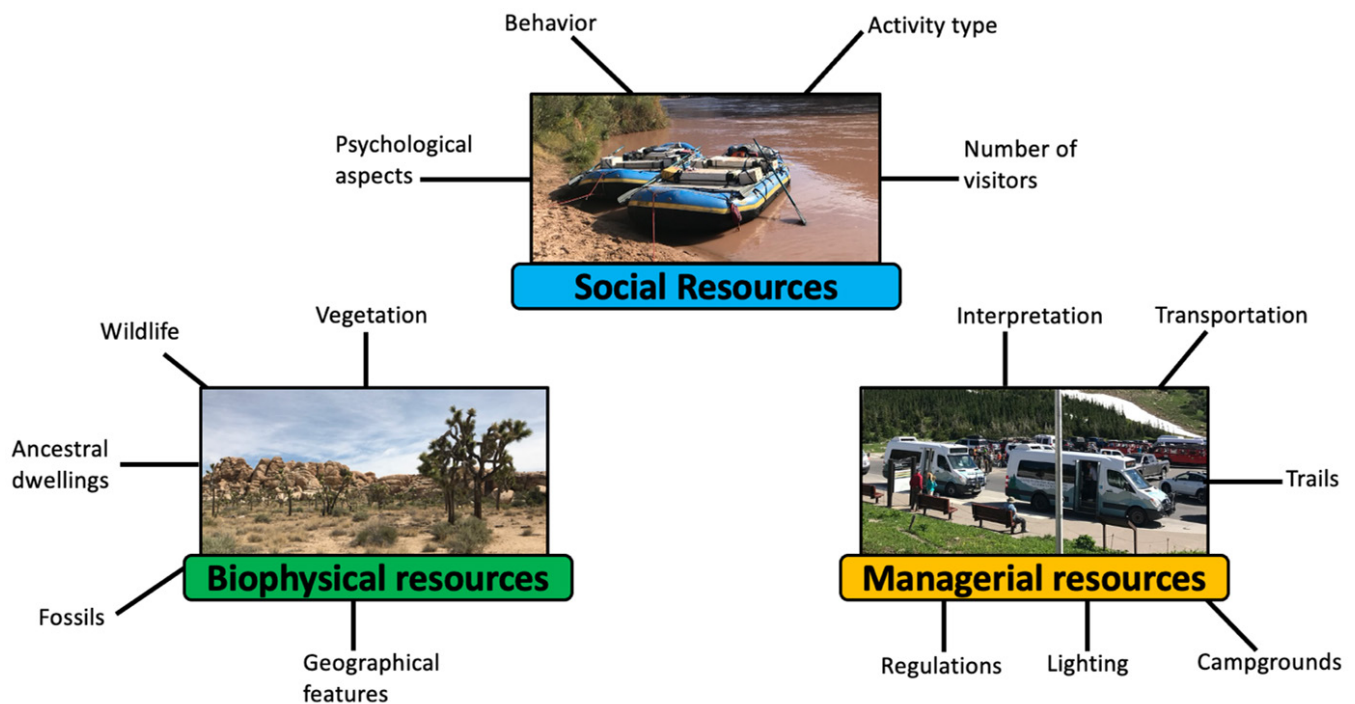


Figure 1 - Examples of social, biophysical, managerial resources involved in visitor use management.

identifies, describes, and provides evidence of the axioms from past work in the interdisciplinary field of visitor use management. Like other fields of inquiry, these axioms shape the context in which inquiry into visitor use management occurs.

Functional Postulates

Four functional postulates act as core principles for visitor use management:

1. *Visitor use management involves social, biophysical, and managerial resources.*
2. *Visitor use can affect and can be affected by change in any or all resource types (e.g., social, biophysical, and managerial).*
3. *Visitor use management involves descriptive and evaluative relationships between visitor use and resource changes.*
4. *Visitor use management can occur at all spatial and temporal scales.*

Visitor use management involves social, biophysical, and managerial resources

Because visitor experiences in parks and protected areas are emergent from the interaction among and can affect social, biophysical, and managerial resources, visitor use management involves all three of these resource types (Borrie and Roggenbuck 1998; Manning 2011). Social resources are focused on people: their psychological states, density, behaviors, and activities (Borrie and Roggenbuck 1998). Biophysical resources are traditionally called ecological resources and include things such as water features, topography, wildlife, night skies, and other

natural elements (Manning 2011). However, this should be expanded to a broader biophysical resource type, which includes cultural, historic, and paleontological resources (Miller et al. 2021; Santucci, Newman, and Taff 2016). Managerial resources include infrastructure, regulations and enforcement, site design, transportation systems, and facilities and services. Scientists and practitioners in the field of visitor use management draw from all three resource types (e.g., social, biophysical, managerial) to inform their work (Figure 1).

Visitor use can affect and can be affected by change in any or all resource types

Visitor use is often situated in complex park and protected area systems (McCool, Freimund, and Breen 2014). Further emphasizing this complexity, changes in visitor use can affect and can be affected by any or all resource types. Changes in visitor use are not solely limited to the number of visitors but also activity type, behavior, and preferences. As a single example, Levenhagen et al. (2021) implemented experimental signage in Muir Woods National Monument (California, USA) as a management action to address soundscape issues (Figure 2). This shift in managerial resources resulted in impacts to the two other resource types in that visitors became quieter (social resource change) and bird biodiversity in the area increased (biophysical resource change).

However, visitor use may also be affected by changes in each of these resource types. Visiting Figure 2 again, dashed lines and boxes describe this reciprocity. When there was a shift in biophysical resources through increased bird biodiversity, visitors reported higher levels of perceived biodiversity and improved experience quality (Levenhagen et al. 2021). Additionally, when visitors experienced quieter conditions, they supported more diverse forms of management to keep the area quiet. Although not examined in the study, an additional hypothetical link is an interpretive program focusing on birds and noise from visitors, which may lead to an additional increase in noise reduction. Collectively, this demonstrates the complex, reciprocal, and interdisciplinary nature of visitor use management.

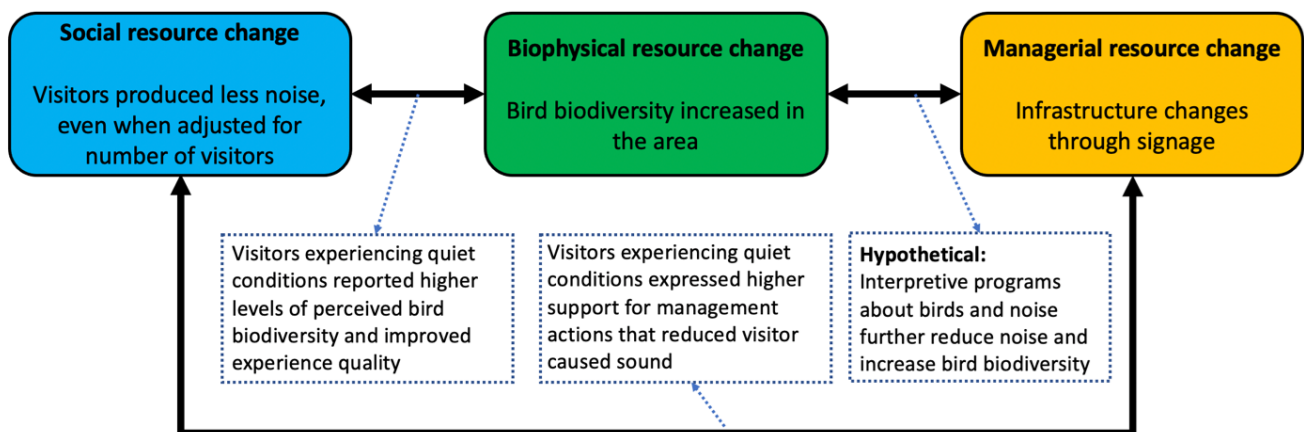


Figure 2—An example of how visitor use affects social, biophysical, and managerial resources, and can also be affected by social, biophysical, and managerial resources.

Visitor use management involves descriptive and evaluative relationships between visitor use and resource changes

Any amount of visitor use will create resource changes (Cole 2019). For instance, a single visitor will increase the number of people, the amount of sound, vegetation trampling, soil compaction, and vehicle volume in an area. All these resource changes are descriptive in nature; they simply describe relationships between visitor use and resources. These descriptive aspects of visitor use are critical to understand, particularly for unpacking system complexity and describing current conditions (IVUMC 2016; McCool et al. 2014). However, these descriptive aspects alone are seldom sufficient to make decisions about visitor use management. This is because they are devoid of associated contextual meaning (Wagar 1964). These descriptive relationships must also include an evaluative component to understand whether these changes are good or bad, or acceptable or unacceptable (Figure 3).

The relationship between descriptive and evaluative components of resources is referred to as a threshold in visitor use management (IVUMF 2016). Critically, the evaluation of descriptive aspects of resource changes are dependent on the desired conditions of a setting. Thus, the same descriptive aspect, such as number of people, may be evaluated as positive or acceptable in one setting and negative or unacceptable in another.

An analogy for this context-dependent descriptive-evaluative relation is the application of the concept to body temperature among different animal species. As demonstrated in Figure 4, depending on the context, a descriptive temperature of 98.6° F is evaluated differently. For a high-metabolism hummingbird, this may be too cold, indicating illness. For a human, this body temperature is just right. For an ectothermic lizard, this may be too hot. The same concepts can be applied to visitor use management. A dozen encounters with other visitors may be too crowded for a multiday wilderness trip, just right for a day hike, and too sparse for a jog in the local park. The context-dependent nature of the descriptive-evaluative dimension of visitor use management is critical in the interdisciplinary field. When decisions are made simply on descriptive aspects without this context-based evaluative consideration, challenges often arise (Bacon et al. 2006). For instance, evaluating if a management action was successful can be difficult to determine without evaluative thresholds.

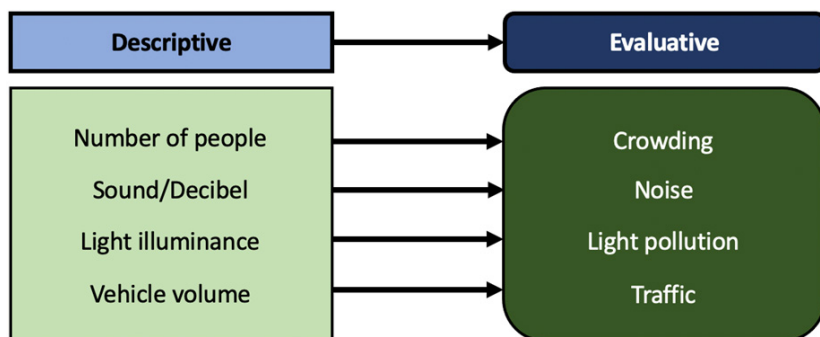


Figure 3 - Examples of descriptive and evaluative components of visitor use management.

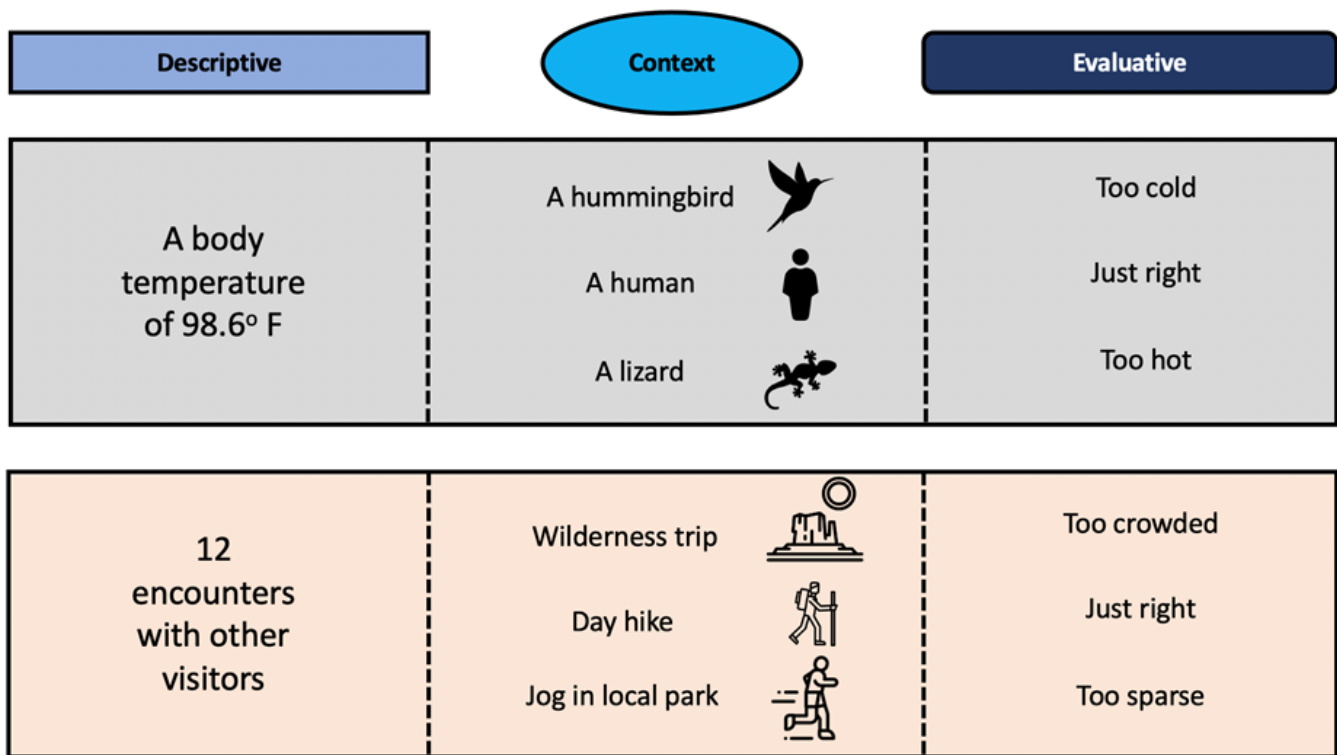


Figure 4 - Like body temperature and species, the relationship between descriptive and evaluative components of visitor use management is context dependent. Icon credit: Freepik.

Visitor use management can occur at all temporal and spatial scales

Early studies identified multiphasic components to visitor experiences (Clawson and Knetsch 1966). These temporal phases include: (1) anticipation, (2) travel to site, (3) onsite participation, (4) travel from site, and (5) recollection (Clawson and Knetsch 1966; Figure 5). Anticipation is the earliest component of the visitor experience, where people often plan, make reservations, and generally set expectations and look forward to their experience. Traveling to a site can vary greatly from type of experience (i.e., a jog at the local park is much different from an international trip) but is comparatively short in duration. Onsite participation in some type of an experience is arguably the largest focus of research into and management of visitor use. Traveling from the site is similar in duration to traveling to a site. Lastly, recollection is generally the longest component of the visitor experiences. It is where people reflect, share, and possibly make decisions about reengagement in an experience, thus starting the cycle over again at anticipation.

Although useful for thinking about the points and kind of visitor use management that can occur throughout the visitor experience, the framework described in Figure 5 masks additional nuances (Stewart 1998). For instance, the onsite participation component of visitor experience is much more dynamic and emergent than described. Even during onsite participation, the visitor experience evolves and changes (Borrie and Roggenbuck 2001). Nonetheless, this previous work shows how visitor use management can occur at different temporal scales. As an example, social media is used to help engage visitors during both the anticipation (Wilkins et al. 2018) and

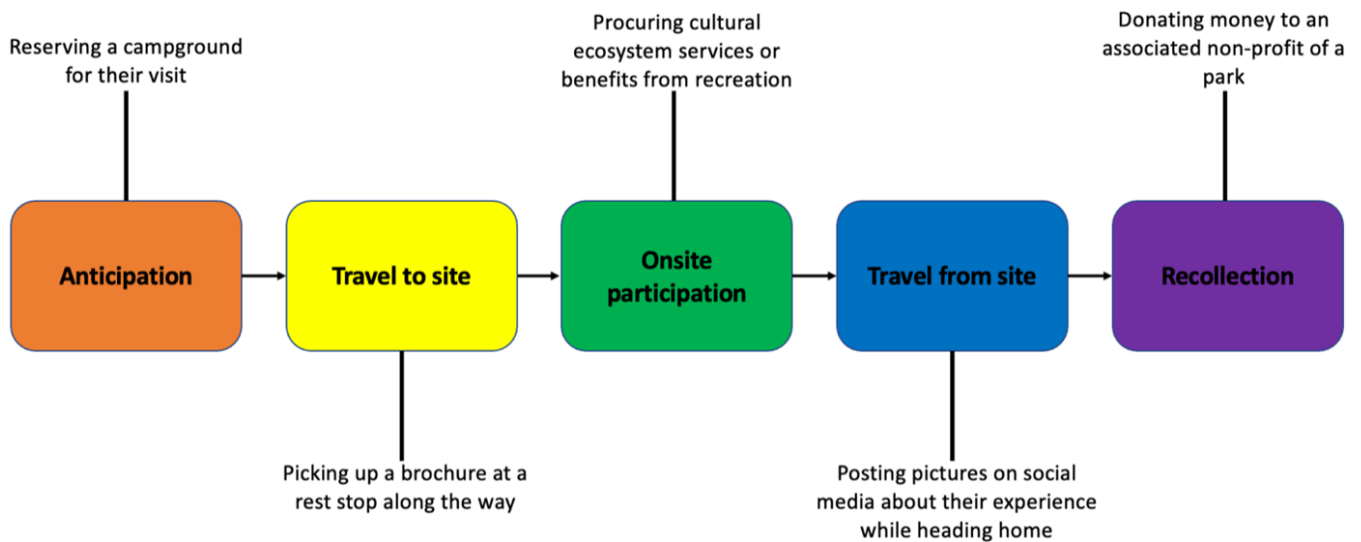


Figure 5 - Examples of visitor use across varying temporal components of the visitor experience (Clawson and Knetsch 1966).

recollection phase (Miller and Freimund 2017). During the anticipation phase, visitors could use social media to plan aspects of their trip. In the recollection phase, visitors can engage a park via social media for a continuing relationship. Additionally, visitor experiences onsite help people procure recreational ecosystem services and benefits (Rice et al. 2020). As demonstrated in these examples, visitor use management can occur at different temporal points of the recreation experience.

Visitor use management also operates across multiple spatial scales. For instance, Manning et al. (1995) provided research to inform the management of visitor crowding at a single site. Scaling up, visitor experiences related to soundscapes in Denali National Park were studied across numerous locations to provide information for front country planning (Miller, Taff, and Newman 2018). Zhang et al. (2021) examined levels of visitor use across the state of Utah to describe use levels at a landscape scale, and Pergams and Zaradic (2008) looked at per capita national park visitation across the entire country of the United States to understand long-term, nationwide shifts in visitor use. These examples demonstrate how visitor use can be managed at numerous spatial scales. Lastly, some visitor use management professionals are starting to integrate both the spatial and temporal aspects into conceptual models and management applications (Newton et al. 2017; Perry et al. 2020). As a single example, Nettles et al. (2021) examined longitudinal aspects of norms in a single spatial context.

Although these functional postulates demonstrate essential principles of visitor use management, they do not identify the core values which drive visitor use management. To understand these core values, normative postulates are described below.

Normative Postulates

Visitor use management holds four normative postulates that act as core values for the field:

1. Visitor use management should maximize benefits to people while minimizing negative biophysical impacts.
2. Research and science should be useful to managers and other professionals in decision-making about visitor use.
3. A range of different opportunities for visitors is a good thing.
4. A diversity of visitors is a good thing.

Visitor use management should minimize negative biophysical impacts while maximizing benefits to people

As detailed earlier, most parks and protected areas have a dual mandate to protect resources and provide visitor experiences (Organic Act of 1916). Although this is often described as two competing objectives, this dual mandate may be more accurately thought of as a reinforcing loop where the types and amount of use appropriate for an area are the same types and amounts of use that leave resources unimpaired (Miller et al. 2019). This is explicitly stated in frameworks that guide visitor use management among federal agencies in the United States: "Visitor use management is essential for maximizing benefits for visitors while achieving and maintaining desired resource conditions" (IVUMC 2016, p. vii). Minimizing impacts to biophysical resources is also specified in case law related to visitor use management (Greater Yellowstone Coalition v. Kempthorne 2008; Southern Utah Wilderness Alliance v. Dabney 2000). Collectively, federal laws, agency guidance, and court rulings all demonstrate this core value.

As we move further into an era of rapid change and uncertainty, the axioms of visitor use management can guide us toward a future that enriches the lives of a wide spectrum of the public while preserving our cherished resources for generations to come.

Research and science should be useful to managers and other professionals in decision-making about visitor use

Visitor use management is an applied field of study in that its purpose is to improve or maintain desired conditions related to social, biophysical, and managerial resources in parks and protected areas. Without a sound connection to a management application, visitor use management research lacks relevance and meaning. In fact, this applied aspect of visitor use management research largely defines the field, and seldom will one find a research

article related to visitor use management without a “management implications” section. Researchers and scientists in the visitor use management field often pull from numerous disciplines, including social psychology, sociology, economics, ecology, and anthropology. What distinguishes visitor use management from the fields it draws from is this shared commitment to applying the findings from research to improve decision-making about managing visitor experiences and resource impacts in parks and protected areas.

A range of opportunities for visitors is good

In general conservation science, “biodiversity is good” is a driving normative postulate (Kareiva and Marvier, 2012). Similarly, diversity in visitor opportunities is a good thing. This is perhaps best articulated as the Recreation Opportunity Spectrum (ROS) (Stankey 1977; Driver et al. 1987). However, providing a diversity of recreation opportunities was proposed early on by Arthur Carhart and Aldo Leopold in the 1920s (Driver et al. 1987). This ROS approach allows visitors to choose the experience that best suits their needs, expectations, and goals, which facilitates achievement of benefits associated with their experience (Rice et al. 2020). This range of opportunities approach is often formally represented in zoning guidelines and associated desired conditions implemented by agencies (IVUMC 2016; Manning 2011). By providing a range of opportunities, managers create an inclusive system that serves a diversity of visitors.

A diversity of visitors is good

Although many park and protected areas are challenged with immediate issues related to

high levels of visitation, per capita visitation to places such as national parks has decreased for decades (Pergams and Zaradic 2008). Even during the recent rapid increase in visitation across the National Park Service, only 4% more people nationwide reported visiting a national park between 2009 and 2019 (RSG and WYSAC 2019). Additionally, visitors to places such as our national parks are disproportionately white and non-Hispanic, and historically underrepresented races and ethnicities report more constraints and barriers in access to parks and protected areas (RSG and WYSAC, 2019). In fact, many non-white racial and ethnic groups report national parks to be unpleasant places at much higher rates than white racial groups (RSG and WYSAC, 2019). Even during the explosion of new outdoor recreationists during the COVID-19 pandemic, first time participants in outdoor recreation were more likely to be white than any other participant group (Taff et al. 2021). Additionally, people who previously participated in outdoor recreation but no longer do were significantly more ethnically diverse (Taff et al. 2021). Collectively, this data shows that although visitor use to parks and protected area is increasing, participation in outdoor recreation by a more diverse segment of the US population is not.

With a diversifying American public that is less engaged with park and protected areas, general decreasing per capita visitation, and a disconnect from nature and associated waning public relevancy, the ability for agencies to fulfill their missions becomes a “wicked problem” (Machlis and McNutt 2011). Recognizing these long-term challenges, the NPS launched several initiatives to create a vision

of a more inclusive future (NPS 2015). This includes a vision where the NPS “will fully represent our nation’s ethnically and culturally diverse communities” (NPS 2015, p. 5). Additionally, increasing visitor use to parks and protected areas among a broader swath of society could provide more ecosystem services and human well-being benefits provided by places like our national parks (Rice et al. 2020).


Conclusion

Inquiry into visitor use management has existed for more than 50 years. As time progressed, our understanding of the issues and research questions became more complex. Today, visitor use management stands as not only a framework, but a field of inquiry that is underpinned and guided by functional and normative postulates that organically emerged from the 50 years of history.

During the past decade, many US parks and protected areas have been challenged with providing high quality visitor experiences while protecting resources in the face of record-breaking visitation year after year. In this time, not only has the process of visitor use management progressed through agency investments such as the Interagency Visitor Use Management Council (IVUMC), but the interdisciplinary field of study called visitor use management has also progressed. Numerous graduate and undergraduate programs, hundreds if not thousands of peer-reviewed papers, and many dedicated people have helped advance the science of visitor use management. As we move further into an era of rapid change and uncertainty, the axioms of visitor use management can guide us toward a future that enriches the lives of a wide spectrum of the public while preserving our cherished resources for generations to come.

Acknowledgments

I am grateful to the numerous colleagues in academia, agencies, and nonprofits who continuously helped me grow and progress my own understanding. In particular, thank you to the many graduate students I have worked with over the years who have always challenged my assumptions and expanded my horizons.

The views expressed in this article are the responsibility of the authors and do not necessarily represent the opinions or policy of the National Park Service. 

ZACH MILLER is the visitor use analyst for the Intermountain Region of the National Park Service; email: zach_miller@nps.gov.

References

- Allen, S. 2019. The relationship between amount of visitor use and social impacts. Contributed paper. Prepared for the Interagency Visitor Use Management Council.
- Bacon, J., J. Roche, C. Elliot, and N. Nicholas. 2006. VERP: Putting principles into practice in Yosemite National Park. *George Wright Forum* 23(2): 73–83.
- Bennett, N. J., R. Roth, S. C. Klain, K. Chan, P. Christie, D. A. Clark, G. Cullman, D. Curran, T. J. Durbin, G. Epstein, A. Greenberg, M. P. Nelson, J. Sandlos, R. Stedman, T. L. Teel, R. Thomas, D. Veríssimo, and C. Wyborn. 2017. Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation* 205: 93–108. <https://doi.org/10.1016/j.biocon.2016.10.006>.
- Borrie, W. T., and J. W. Roggenbuck. 1998. Describing the wilderness experience at Juniper Prairie Wilderness using experience sampling methods. In *Wilderness and Natural Areas in Eastern North America: Research, Management and Planning*, ed. M. H. Legg and D. L. Kulhavy (pp. 165–172). Nacogdoches, TX: Stephen F. Austin State University, Arthur Temple College of Forestry, Center for Applied Studies.
- Borrie, W. T., and J. W. Roggenbuck. 2001. The dynamic, emergent, and multi-phasic nature of on-site wilderness experiences. *Journal of Leisure Research* 33(2): 202–228.
- Clawson, M., and J. Knetsch. 1966. *Economics of Outdoor Recreation*. Baltimore, MD: Johns Hopkins University Press.
- Cole, D. N. 2019. The relationship between amount of visitor use and environmental impacts. Contributed paper. Prepared for the Interagency Visitor Use Management Council.
- Driver, B. L., P. J. Brown, G. H. Stankey, and T. J. Gregoire. 1987. The ROS planning system: Evolution, basic concepts and research needed. *Leisure Sciences* 9: 201–212.
- Graefe, A. R., F. R. Kuss, and J. J. Vaske. 1990. *Visitor Impact Management: The Planning Framework*, vol. II. Washington, DC: National Parks and Conservation Association.
- Greater Yellowstone Coalition v. Kempthorne, 577 F.Supp.2d 183, (2008). Hof, M., and D. W. Lime. 1997. Visitor experience and resource protection framework in the national park system: Rationale, current status, and future direction. In *Proceedings – Limits of Acceptable Change and Related Planning Process: Progress and Future Directions*, comp. Stephen F. McCool and David N. Cole (pp. 26–29). Ogden, UT: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- The Interagency Visitor Use Management Council. 2016. IVUMF (Interagency Visitor Use Management Framework). <http://visitorusemanagement.nps.gov>.
- Kareiva, P., and M. Marvier. 2012. What is conservation science? *BioScience* 62(11): 962–969. <https://doi.org/10.1525/bio.2012.62.11.5>.
- Levenhagen, M. J., Z. D. Miller, A. R. Petrelli, L. A. Ferguson, Y. J. Shr, D. G. E. Gomes, B. D. Taff, C. White, K. Fristrup, C. Monz, C. J. W. McClure, P. Newman, C. D. Francis, and J. R. Barber. 2021. Ecosystem services enhanced through soundscape management link people and wildlife. *People and Nature* (May): 1–14. <https://doi.org/10.1002/pan3.10156>.
- Machlis, G. E., and M. K. McNutt. 2011. Black swans, wicked problems, and science during crises. *Oceanography* 24(3): 318–320.
- Manning, R. B. 2011. *Studies in Outdoor Recreation: Search and Research for Satisfaction*, 3rd ed. Corvallis: Oregon State University Press.
- McCool, S. F., R. N. Clark, and G. H. Stankey. 2007. *An Assessment of Frameworks Useful for Public Land Recreation Planning*. Seattle, WA: US Department of Agriculture Forest Service Pacific Northwest Research Station.
- McCool, S. F., W. A. Freimund, and C. Breen. 2014. Benefiting from complexity thinking. In *Protected Area Governance and Management*, 1st ed., ed. G. L. Worboys, M. Lockwood, A. Kothari, S. Feary, and I. Pulsford (pp. 3–35). ANU Press.
- McCool, S. F., and D. W. Lime. 2001. Tourism carrying capacity: Tempting fantasy or useful reality? *Journal of Sustainable Tourism* 9(5): 372–388. <https://doi.org/10.1080/09669580108667409>.
- Miller, Z. D., and W. Freimund. 2017. Virtual visitors: Facebook users and national parks. *Journal of Park and Recreation Administration* 35(3): 136–150.

- Miller, Z. D., W. Freimund, S. A. Crabtree, and E. P. Ryan. 2021. No limits of acceptable change: A proposed research framework for informing visitor use management in the context of cultural resources. *Sustainability* 13.
- Miller, Z. D., W. L. Rice, B. D. Taff, and P. Newman. 2019. Concepts for understanding the visitor experience in sustainable tourism. In *A Research Agenda for Sustainable Tourism*, ed. S. F. McCool and K. Bosak (pp. 53–69). <https://doi.org/10.4337/9781788117104.00012>.
- Miller, Z. D., B. D. Taff, and P. Newman. 2018. Visitor experiences of wilderness soundscapes in Denali National Park and Preserve. *International Journal of Wilderness* 24(2): 32–43.
- Nettles, J. M., M. T. J. Brownlee, R. Sharp, M. P. Blacketer, and J. C. Hallo. 2021. Norm stability: Visitors' perceptions of crowding at Cumberland Island National Seashore. *Leisure Sciences*. DOI: 10.1080/01490400.2020.1855275.
- Newton, J. N., P. Newman, B. D. Taff, A. D'Antonio, and C. Monz. 2017. Spatial temporal dynamics of vehicle stopping behavior along a rustic park road. *Applied Geography* 88: 94–103.
- NPS. 2015. A call to action. https://www.nps.gov/calltoaction/PDF/C2A_2015.pdf. Organic Act of 1916. 16 U.S.C. §§ 1–4.
- Pergams, O. R. W., and P. A. Zaradic. 2008. Evidence for a fundamental and pervasive shift away from nature-based recreation. *Proceedings of the National Academy of Sciences* 105(7).
- Perry, E. E., J. M. Thomsen, A. L. D'Antonio, W. C. Morse, N. P. Reigner, Y. F. Leung, J. Wimpey, and B. D. Taff. 2020. Toward an integrated model of topical, spatial, and temporal scales of research inquiry in park visitor use management. *Sustainability* 12(15): 1–21. <https://doi.org/10.3390/su12156183>.
- Resource Systems Group (RSG) and Wyoming Survey and Analysis Center (WYSAC). 2019. National Park Service comprehensive survey of the American public: 2018 – racial and ethnic diversity of National Park System visitors and non-visitors. Natural Resource Report. NPS/NRSS/EQD/NRR—2019/2042. National Park Service. Fort Collins, CO. <https://irma.nps.gov/DataStore/Reference/Profile/2267482>.
- Rice, W. L., B. D. Taff, Z. D. Miller, P. Newman, K. Y. Zipp, B. Pan, J. N. Newton, and A. D. Antonio. 2020. Connecting motivations to outcomes: A study of park visitors' outcome attainment. *Journal of Outdoor Recreation and Tourism* 29. <https://doi.org/10.1016/j.jort.2019.100272>.
- Santucci, V. L., P. Newman, and B. D. Taff. 2016. Towards a conceptual framework for assessing the human dimensions of paleontological resources. *New Mexico Museum of Natural History and Science Bulletin*, 74: 239–248.
- Soulé, M. E. 1985. What is conservation biology? *BioScience* 35: 727–734.
- Southern Utah Wilderness Alliance v. Dabney, 222 F.3d 819, (2000).
- Stankey, G. H. 1977. Some social concepts for outdoor recreation planning. In *Outdoor Recreation: Advances in Application of Economics* (pp. 154–161). General Technical Report WO-2. Washington, DC: US Department of Agriculture Forest Service.
- Stankey, G. H., D. N. Cole, R. Lucas, M. E. Peterson, and S. S. Frissell. 1985. *The Limits of Acceptable Change (LAC) System for Wilderness Planning*. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.
- Stankey, G. H., S. F. McCool, and G. L. Stokes. 1984. Limits of acceptable change: A new framework for managing the Bob Marshall Wilderness Complex. *Western Wildlands* 10(3): 33–37.
- Stewart, W. P. 1998. Leisure as multiphase experiences: Challenging traditions. *Journal of Leisure Research* 30(4): 391.
- Sumner, E. L. 1936. *Special Report on a Wildlife Study in the High Sierra in Sequoia and Yosemite National Parks and Adjacent Territory*. Washington, DC: US National Park Service Records, National Archives.
- Taff, B. D., W. L. Rice, B. Lawhon, and P. Newman. 2021. Who started, stopped, and continued participating in outdoor recreation during the COVID-19 Pandemic in the United States? Results from a National Panel Study. *Land* 10(12): 1396. <https://doi.org/10.3390/land10121396>.
- Wagar, J. A. 1964. *The Carrying Capacity of Wild Lands for Recreation*. Washington, DC: Society of American Foresters.
- Whittaker, D., B. Shelby, R. E. Manning, D. Cole, and G. Haas. 2011. Capacity reconsidered: Finding consensus and clarifying differences. *Journal of Park and Recreation Administration* 29(1): 1–20.

- Wilkins, E. J., J. W. Smith, and R. Keane. 2018. Social media communication preferences of national park visitors. *Applied Environmental Education & Communication* 19(1): 4–18. <https://doi.org/10.1080/1533015X.2018.1486247>
- Yellowstone Park Act of 1872. 16 U.S.C. §§ 21.
- Yosemite Grant Act of 1864. 16 U.S.C. §§ 48.
- Zhang, H., D. Berkel, P. D. Van Howe, Z. D. Miller, and J. W. Smith. 2021. Using social media to measure and map visitation to public lands in Utah. *Applied Geography* (June): 102389. <https://doi.org/10.1016/j.apgeog.2021.102389>.





Adirondack Mountains during fall. **Photo credit:** Hazal Ozturk on Unsplash.

Solitude and Spiritual Importance in an Era of Isolation

by **PETER R. PETTENGILL, ROISIN CREEDON-CAREY, and SAGE LALOR**

Toward the end of February of 2020, I spoke at a public forum in Keene Valley, New York. The small rural community serves as a gateway to the High Peaks Wilderness of the Adirondack Park, and having been asked by a local citizens committee, I presented research on the topic of visitor use management. Like many protected areas, the Adirondacks perennially wrestle with the paradox of how to provide access to public land without unacceptably degrading the very resources visitors are there to enjoy. My brief talk included case studies of how national parks across the United States have, and continue to address these issues through legislative guidance, relevant environmental policy, and sound science.

Following my presentation, a civil dialogue among the audience ensued. Community members shared perspectives on issues of parking, trail degradation, search and rescue efforts, rock climbing opportunities, and especially the value of wilderness experiences. The community conversation was heartening, and I was satisfied with my ability to periodically field questions from the



Peter R. Pettengill



**Roisin
Creedon-Carey**



Sage Lalor

audience. However, there was one local resident I failed to respond to adequately.

A seasoned Adirondack citizen stood and asked for my perspective on the spiritual importance of wilderness. More specifically, what did law have to say about it and how could science quantify it? The questions were apt and appropriate, especially since the setting for the public forum was a humble valley church surrounded by mountain wilderness.

Less than a week after the forum, the first case of COVID-19 in New York State was confirmed. Nearly two years of living and teaching amidst a pandemic, and a significant amount of reflection later, I have begun to formulate a response to those unanswered questions.

Managing for Solitude in an Era of Isolation

Park and outdoor recreation management relies heavily on management objectives and associated indicators and standards of quality. Management objectives are statements about the desired conditions of outdoor recreation and are often derived from guiding legislation and policy. Indicators of quality are more specific, measurable variables that reflect the meaning or essence of management objectives and serve as quantifiable proxies or measures of management objectives. Standards, in turn, define the minimum acceptable condition of indicator variables (Manning et al. 2017). A textbook example of this relates specifically to wilderness management.

The Wilderness Act of 1964 serves as guiding legislation for management of federally designated wilderness in the United States and explicitly describes "opportunities for solitude" as a quality that wilderness areas should provide (16 US Code 1131-1136). Yet, the concept of solitude may be somewhat abstract and subjective, making it a challenge to measure and manage. Fortunately, decades of research demonstrate that the number of other visitors encountered along trails is important to wilderness visitors in defining solitude. Therefore, encounters with other groups of visitors along trails may serve as strong indicators of quality for a wilderness experience because they are measurable, manageable, and function as reasonable proxies for solitude. Research also recommends normative standards for how many trail encounters may occur before opportunities for solitude are unacceptably degraded. In fact, several studies found that no more than five encounters along trails per day were acceptable to visitors of wilderness areas (Manning 2011). And thus, a formula for managing for solitude exists.

However, as lockdowns became a new norm across the globe, I questioned the relevance of managing for solitude in an era of increasing isolation. In some ways, managing wilderness areas for specific numbers of encounters along a trail per day felt like a moot point when most of us were not leaving our homes. In other ways, it felt more applicable than ever. After all, doesn't the metric of numbers of encounters along a trail per day seem strikingly similar to social distancing by design? But at a broader scale, how important would wilderness experiences be in an increasingly isolated world? I found framing these questions under the sole metric of solitude fruitless. At the same time, unanswered questions from the Adirondack public forum

echoed in my mind. While perhaps part and parcel of solitude, what of the spiritual importance of wilderness?

During the fall of 2021 I was fortunate to teach 10 students in an experiential learning setting that St. Lawrence University refers to as the Adirondack Semester. After engaging these young minds week after week in Adirondack wilds, I was beginning to learn more about the spiritual significance of wilderness. Responses to the questions I had been pondering revealed themselves through teaching rather than research, although the process remained equally rigorous and rewarding.

The Adirondack Park and Adirondack Semester

The Adirondack Park is the largest protected area in the continental United States and is larger than the Grand Canyon, Everglades, Yellowstone, and Yosemite National Parks combined. The Adirondacks encompass a diverse range of natural environs that include more than 3,000 lakes and 30,000 miles (48,280 km) of rivers and streams. They also afford opportunities to visit old-growth forests and globally unique wetlands (Adirondack Park Agency 2022). Central to the Adirondack Park is the Forest Preserve. The de facto wilderness was established in 1885 by an act of legislature that stated, "The lands now or hereafter constituting the Forest Preserve shall be forever kept as wild forest lands. They shall not be sold, nor shall they be leased or taken by any person or corporation, public or private" (General Statutes of the State of New York Chapter 283 § 8 1885). And while the Adirondacks also include a substantive amount of private land devoted primarily to forestry, agriculture, and outdoor recreation, it is Adirondack wilderness that remains the heart of the park. It is in this spirit of wilderness that St. Lawrence University's Adirondack Semester was established.

With its inception in 1999, the fundamental purpose of the Adirondack Semester is to encourage deeper engagement with the natural world through immersion in a location with wilderness qualities, relevant coursework, and extracurricular activities. Important elements of the semester include understanding of critical environmental issues; living in a materially simple, close-knit community and in close connection to wild nature; learning the skills to recreate safely and pleasurably in wild nature; understanding elements and interrelationships of the natural world; and reflecting critically and creatively on the experiences of the semester and the many questions it raises. Logistically, this means the better part of the fall semester living in a yurt village with no running water, periodic power supplied by solar arrays, regular maintenance of composting toilets, and bathing by sponge baths in a wood-fired sauna or a refreshing dip in the lake. There are no laptops, smartphones, televisions, or radios. This is in part to encourage more meaningful engagement with and interest in the natural world but also encourages students to critically reflect on the impacts of technology on their lives and on society and the environment (St. Lawrence University 2022; Johnson and Alexander 2009). And during the fall semester of 2021, this seemed particularly pertinent.



Figure 1 - Eager students at Adirondack trailhead.

For most teachers and students, the prior academic year meant courses via Zoom or some other online format. Prerecorded lectures, dialogue by direct message or blog post, and most of all a seemingly endless amount of screen time. As higher education, and education in general, continued to struggle with an appropriate level of technology for achieving academic success, students in the Adirondack Semester had a chance to reflect on the topic. The following are two of those reflections my students and coauthors graciously agreed to share in writing.

Student Perspectives

Roisin's Story

My past two semesters on campus had resulted in severe panic attacks and major depressive spirals. I had felt abandoned in a setting I was supposed to grow in.

I knew I wanted to participate in the Adirondack Semester not solely for the academic benefits, but also because I knew that if I could live in the woods for a semester, away from technology and my typical support system, I could move back to campus in the spring and continue my college education.



Figure 2 - Adirondack semester accommodations.

At the beginning of the semester, I couldn't portage a canoe, my backpacking skills were infantile, and I was by no means a cook fit to serve a community. It took time, but I realized that everyone else I was with wasn't a master kindling cutter, I wasn't the only person who couldn't start a fire, and my academic stress would be checked by my peers.

I failed a lot. Canoes gave my portage partner a bloody nose, I learned that tofu doesn't make a great burger, and if you reverse a car in the forest you'll probably crash. But the forest protected us. The night

wrapped us up in warm blankets of stars while loons lulled us to sleep with their calls. Only to be woken up to the soft orange light nudging us to get up for the day.

As our community grew, slowly the social concerns I had slipped away. You don't have to worry about going out, there are no social pressures of having clean hair, or washed clothes. The things a depressed person typically worries about people noticing are an accepted norm in the woods.

Being released from the confines of a social norm, I found that I was experiencing nature

a different way. With the help of our course work, I realized how every part of nature interacts with one another contributing to a richer community. I found for the first time in a long time I was understanding the interconnected nature of school, community, and nature. The stress-free environment lent itself to positive learning. As the semester progressed, I got less worried about grades and more caught up in the material. Understanding the social dynamics of our backyard was far more important than getting an A in a course.

Learning about mindfulness and being part of a community allows for growth. Having a lack of some things like technology and running water created an abundance of other things like canoe trips and home-cooked meals. The semester was messy, classes were challenging, and communal living is something no one will ever figure out. However, having an experience untouched by society taught me positive lessons in self-discovery, environmentalism, and community. And for that I am forever grateful.

The Adirondack Semester gave me insight into well-being and the value behind community

“We need more wilderness. It provides opportunities for triumph during times of trauma. We need it not only for our individual selves but for our collective soul.”

Sage's Story

I have found that spending time with people outdoors has always lent itself to a different kind of personal connection; one that goes beyond posts on social media, political opinions, or even social pressures to be constantly "productive" (occupation, school, passion projects, etc.).

America, especially, has a knack for idealizing the pull yourself up by your bootstraps lifestyle. When people are in the woods, however, we are surrounded by other living things that live completely differently. The draping hemlocks and tall pines show us that there is value beyond being "productive," and I think it's something that people are subconsciously (or consciously) hankering for right now. When outside, we learn to leave space for thoughts that are fostered by a change in pace. I think that's why people tend to connect differently outside – because there is shift in energy. The trees make space for us to realize our own values.

I am thankful for having the privilege to take classes and live in the woods, during a pandemic no less. It's now more than ever that we need to be influenced by the hemlocks. I will forever be thankful for the time I am able to spend among their pace. I find it radical, and I am proud of that.



Figure 3 - Students practice their balance beam skills in a beaver pond.

The Spiritual Importance of Wilderness

I still have no definitive answer for how to measure or manage the spiritual qualities of wilderness, but I have recently gained the confidence to speak to its spiritual importance. I can do this, in part, based on hearing student perspectives such as those shared above. For example, science alone has not yet resolved issues of anxiety and depression, but the effect of time spent in wilderness certainly has an effect on the human spirit and may play a role in reducing them. The student's words above speak poignantly to this point, but she is not alone. Her words resonate with me personally, and I suspect many of us who have been fortunate enough to spend time in wilderness settings since the onset of the pandemic. As aptly expressed by the second student, the pandemic has also driven many of us to reconsider what is important in life. Do we define ourselves predominantly by our professional productivity, or is changing our pace to make time for meaningful personal connections equally, if not more, important? This student embraces a change of pace, putting people, and our place in nature, ahead of productivity. And this, she considers radical. I, for one, hope it is not radical but becomes the new normal. Both of these students' ideas are pronounced by the pandemic, but I hope they are not soon forgotten. In addition to learning from my students, my increasing confidence in speaking to the spiritual significance of wilderness comes, perhaps ironically and appropriately, through humility.


When the pandemic began, I thought the Adirondacks, and protected areas in general, might

finally receive a well-deserved break from visitor use and its commensurate environmental impacts. That lockdowns would lead to ecological recovery, and even the most heavily impacted environs would have opportunities to demonstrate their resilience. Perhaps I was naive, but not alone in this line of thinking. John Muir once declared, "How hard to pull or shake people out of town! Earthquakes cannot do it, nor even plagues. These only cause the civilized to pray and ring bells and cower in corners of bedrooms and churches" (Muir 1979). Oh, how wrong the current populace proved us!

Since the loosening of initial lockdowns in 2020, land managers and stewards of the Adirondacks report growing demand for outdoor opportunities. In Keene Valley, gateway to the High Peaks Wilderness, this has led to a pilot shuttle bus and permit system to address increasing levels of visitation. Information and education on low impact recreation practices are being emphasized from social media outlets to mountain summits, and an alternate, more sustainable trail was established to one popular high peak in the region. Long range visitor use management planning is also proposed for the future in an effort to continue accommodating our insatiable appetite for wild places (Weiss et al. 2021).

Bob Marshall, Adirondack aficionado, New York native, and founding member of The Wilderness Society, once stated, "It is only the possibility of convalescing in the wilderness which saves [lives] from being destroyed by the terrible neural tension of modern existence" (Marshall 1930). My students second this, I concur, and droves of urban denizens seeking solace in our scarce wild spaces reinforce the fact. However science may inform wilderness management in the future, and regardless of the political outcomes of park planning, there is one certainty clarified by the current pandemic. We need more wilderness. It provides opportunities for triumph during times of trauma. We need it not only for our individual selves but for our collective soul. Time spent in wilderness pushes us to ponder our paradigm of productivity and serves as a sanctuary from societal pressures. More important than answering the question of what the spiritual importance of wilderness is may be taking the time to consider the question ourselves.

Acknowledgments

The authors wish to acknowledge the Adirondack Semester students and instructors of the fall semester of 2021, with a special thanks to the semester's longest standing director, Dr. Cathy Shrady. 

PETER R. PETTENGILL is an associate professor of environmental studies at St. Lawrence University; email: ppettengill@stlawu.edu.

ROISIN CREEDON-CAREY is an environmental studies major at St. Lawrence University.

SAGE LALOR is a government major at St. Lawrence University.

References

- Adirondack Park Agency. 2022. Adirondack Park Agency website. https://apa.ny.gov/about_park/index.html.
- Johnson, B., and S. Alexander. 2009. The St. Lawrence University Adirondack Semester. *Liberal Education* 95(3): 44-49.
- Manning, R. E. 2011. *Studies in Outdoor Recreation: Search and Research for Satisfaction*, 3rd ed. Corvallis: Oregon State University Press.
- Manning, R. E., L. E. Anderson, and P. Pettengill. 2017. *Managing Outdoor Recreation: Case Studies in the National Parks*, 2nd ed. Boston: Cab International.
- Marshall, R. 1930. The problem of wilderness. *Scientific Monthly* 30(2): 141-148.
- Muir, J. 1979. *John of the Mountains: The Unpublished Journals of John Muir*. L. Wolfe, ed. Madison: University of Wisconsin Press.
- St. Lawrence University. 2022. Adirondack Semester website. <https://www.stlawu.edu/offices/adirondack-semester>.
- Weiss, J., J. Wilson, R. Aguirre, P. Nelson, C. Wise, S. Jones, T. Cheetham-Palen, J. McKenna, S. Gilliland, and S. Allen. 2021. High Peaks Advisory Group (HPAG) Final Report. https://www.dec.ny.gov/images/lands_forests_images/hpacfinalreport.pdf.





Gulf of Oman. **Photo credit:** Sajjad Amiri on Unsplash.

Tapping into Oman's Wealth Beyond Its Oil: Developing Nature-Based Tourism in the Sultanate's Wildlands

by **ELIZABETH E. PERRY**

Oman's dramatic beauty – juxtapositions of blue seas, golden deserts, marbled mountains, and verdant canyons – beckons for nature-based tourism (NBT) (Figure 1). Like many other countries, Oman is examining how to adapt to changing economies and considering how natural resources and NBT fit into this adaptation. Thus far, Oman's economy has prospered mainly from developing its petroleum reserves. However, petroleum dependency is not sustainable by the mere fact of oil's finite nature, nor does it appear to be resilient, given the global shift toward other energy sources. This presents a conundrum for Oman and other countries in a similar position of how to diversify while still upholding the quality of life that such a rich economy has provided.

For Oman and Omanis in particular, part of the answer may relate to the relative recency of petroleum exploitation and national development and include advertising the country's currently undeveloped, substantial wildlands as attractive for tourism generally and NBT in particular (Buerkert et al. 2010). The country was relatively undeveloped in infrastructure until the 1970s, when the late Sultan Qaboos deposed his father



Elizabeth E. Perry

and funneled the sultanate's treasuries and workforce into national development (Jones and Ridout 2015). Protected areas and cultural heritage sites were also established beginning at this time. Some of these are administered directly under a royalty land stewardship structure (the Diwan of the Royal Court) and others are administered by what is now the Nature Conservation Authority of the Ministry of Environment and Climate Affairs (MECA). Although cultural sites are maintained for both preservation and tourism with the Ministry of Heritage and Culture and concessionaire contracts, almost all of the 20 natural resource protected areas are maintained solely for preservation and scientific studies and without associated contracts for development or programming (Mershen 2007; MECA 2022).

At this economic-based inflection point in time, Oman is considering how to thoughtfully leverage some of these protected areas for increased NBT to the country. And, they have good reason to expect that nature-based tourists would come for these outstanding resources and experiences. Oman's current tourism slogan is "Beauty has an address – Oman," and rightly so. The country is brimming with unique environments and relatively

constrained large-scale development as compared with its neighbors in the Gulf of Arabia. For example, its waters and beaches support many of the world's migratory sea turtle species and tourists can observe – with a guide and under regulations – egg laying or hatching from these species throughout the year. Wildlife is also found throughout the country's beaches, deserts, mountains, and wadi (river canyons with seasonal/year-round water), including ibex, falcons, gazelles, oryx, and the last known populations of the Arabian leopard (*Panthera pardus nimr*). Flora include acacia, frankincense, oleander, and date palms. In all these environments, humans have had a pronounced presence historically and/or currently, and cultural resources from the Bronze Age (2300 BCE) onward are common sights. Perhaps most famously, the Omani system of falaj (singular)/aflaj (plural) or aboveground irrigation channels and community-based allocations of water in diversion systems to distribute water from mountain springs and snowpack to lower land farms, is protected and promoted under UNESCO World Heritage Site designation (Figure 2).

Also of note is the attraction of tourists themselves to Oman. With a rich seafaring



Figure 1 – A sample of Oman's dramatic and diverse natural beauty: coasts, deserts, mountains, and canyons.

and trading history, Oman has a longstanding tradition of welcoming different peoples and viewpoints, showcasing its hospitality, and encouraging cultural exchange (Jones and Ridout 2015; Subramoniam et al. 2010). During the past 10 years, tourist visitation to Oman has doubled, reaching approximately 230,000 visitors in 2019 (National Centre for Statistics and Information 2019). In that year, the Omani tourism sector generated more than 80 million Omani rial in revenue (approximately US\$200 million) on tourism experiences, accounting for nearly 5% of Oman's gross domestic product (Al-Hashim 2015; Cetin and Al-Alawi 2018; National Centre for Statistics and Information 2019). While this level of tourism represents a real contribution to the Omani economy, the Omani tourism sector remains at or below regional averages for economic size and productivity, indicating even greater potential to grow in the future (Cetin and Al-Alawi 2018). A critical enabler of the Omani tourism economy is its regional leadership in safety and security for tourists in the country, for which it is ranked first among Middle Eastern and North African countries (Cetin and Al-Alawi 2018; World Economic Forum 2019). Oman has taken a role of diplomatic neutrality amongst its more politically volatile neighbors (e.g., Yemen, Saudi Arabia, Iran) and thus is viewed as a generally safer and more stable atmosphere for tourism in the region (Stephenson and Al-Hamarneh 2017).

Tourists mainly come from the other countries within the Gulf region, especially to enjoy Oman's comparatively more temperate conditions and diverse scenery, and from countries across the Indian subcontinent (Al-Hashim 2015; Tanfeedh 2017). Smaller but growing tourism markets include Europe, Russia, and China. Tourists from other areas are fewer, although there is a niche market for tourism from US military personnel and their families stationed in Bahrain and the greater region (Stephenson and Al-Hamarneh 2017).

Complexity of Development

Despite these attractive resources and current tourists, NBT combining the two has not been an explicit focus until recently. With resources under the purview of MECA and tourism under the Ministry of Tourism (MOT), the two have diverged in goals and policy in this separation. In the current state of economic diversification and greater emphasis on promoting NBT, a critical issue has arisen:

How to work with multiple ministries and multiple goals to provide quality NBT experiences in sensitive, often wildland environments, while maintaining the quality of these environments themselves?

This question transcends contexts, but the Omani version of it has trended toward the tension of "opening up" protected areas for NBT and attracting private investment to develop tourism infrastructure and programming in and near these places. As part of a national economic diversification strategy (Tanfeedh 2017), five protected areas were identified for NBT development (Figure 3). These "pilot" protected areas for nature and adventure tourism would showcase the desert, marine, cave, wadi, wetland, and montane environs of the country; provide new destinations on travel itineraries for tourists' typically short stays in Oman; and capture a newer market



Figure 2 – Examples of falaj irrigation channels in a wadi near the source of the water (left) and within a cultivated area of date palms, fodder grasses, and citrus trees (right).

of thrill-seekers across the Gulf. The pilots are a cave system at the base of the mountains (Suhur Cave and Wadi Naheez), an immense dam and corresponding water resources (Wadi Dayqah Dam), a protected wetland in urban Muscat (Qurum Park), a rock and fossil interest site in central Oman (Al Wusta Geopark), and an acacia desert shrubland (Al-Saleel Nature Park).

Questions have arisen about Al-Saleel Nature Park, which is the pilot area that currently has the most stringent MECA protections. It is part of the Omani Nature Reserves system, which is akin to an IUCN Category Ia strict nature reserve managed mainly for science and is correspondingly wild in nature

(Dudley et al. 2013; MECA 2022). Al-Saleel is located in eastern Oman, at the western foot of the southern end of the Eastern Hajar Mountains, covering 220 square kilometers (85 square miles). It is under the jurisdiction of MECA. The park is designated to protect habitat for Arabian gazelles (*Gazella arabica*) and foster the growth and health of that population (Figure 4). It also contains the largest acacia woodlands in Oman and encompasses an important ecological transition zone between the northern and southern Sharqiyah deserts. The three main areas of the park are alluvial plains with acacia, mountains and wadis, and sparsely vegetated higher elevation hills and outcrops (Figure 5). In addition to its environ-

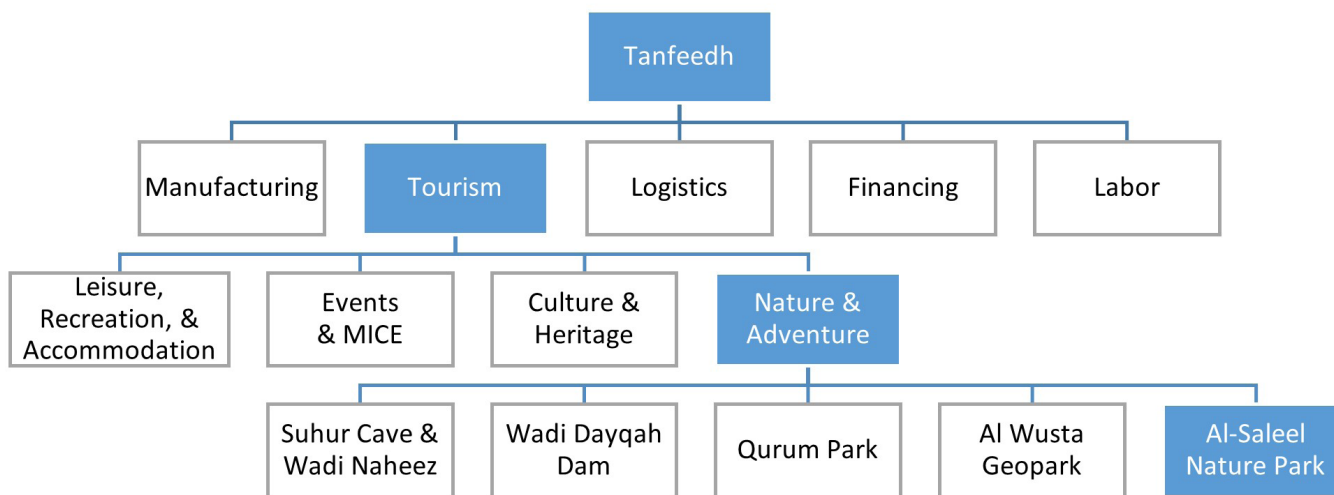


Figure 3 – Tanfeeth’s hierarchical organization of sectors, initiatives, and projects (top to bottom), as related to Al-Saleel Nature Park. MICE - Meetings, Incentives, Conferences, and Exhibits.

mental values, the reserve contains Bronze Age archaeological sites (e.g., beehive-shaped tomb structures) and seabed fossils of ancient marine life (MECA 2017).

The park was only recently opened for visitation and primarily serves school and other organized groups on trips preplanned with the MECA regional and national offices. Primary facilities include an administrative office with a small collection and an exhibition of natural artifacts from the park, informal camping locations, a limited network of unimproved roads and driving routes, a gazelle breeding and care facility, and a native plant nursery. Administration of the park is headed by a park director and a cadre of rangers who patrol the reserve to monitor conditions and deter illegal activities including establishing goat grazing pens and poaching of protected wildlife (MECA 2017).

One additional reserve – Ras al Hadd Turtle Reserve – is already a tourism destination and has had to manage and adapt the balance between visitation and use (Choudri et al.

2016a). It is thus held as the model for how NBT can occur in environmentally sensitive yet economically contributory ways. In this case, visitors typically spend only a few hours at the reserve at dawn for the first glimpse of sunrise in Arabia and to see hatchlings surging toward the surf or at dusk/night to see turtles depositing their eggs into sandy nests. Limitations on visitation; guided experiences; a visitor center to constrain impacts, convey policies, and educate visitors; and a new ecolodge are all management strategies that MECA has implemented with a concessionaire and MOT guidance (Figure 6). However, there are concerns that major surges in visitation around Eid al-Fitr (the festivities marking the conclusion of Islam’s most holy month, Ramadan) and other holidays violate the limits set by MECA and favor tourism over protection. Management plans for the turtle reserve are based on the resource itself. Because tourism and its impacts were not an original consideration in the reserve but rather one in response to unmanaged conditions 10 to 15



Figure 4 – Arabian gazelles and acacia trees in Al-Saleel Nature Park.



Figure 5 – A view of the expanse of the alluvial plains with acacia trees at Al-Saleel Nature Park (top), as seen from the rocky hills and outcrops between the plain and the northern mountains (bottom). The unimproved road visible is the only route maintained in the park.

years ago, tourism is still seen as at odds with the fundamental purpose of the reserve. As the lone example of a MECA–MOT collaboration, the challenges and successes at Ras al Hadd have set the tone for discussions about considering NBT in other reserves.

The inclusion of Al-Saleel as an additional nature reserve for NBT in Tanfeedh and the assumption of Ras al Hadd as a model for such tourism development has demonstrated reoccurring obstacles. Al-Saleel began working on NBT development from the park level at the same time Tanfeedh was focusing on its OR development from the national level. These efforts developed in parallel. MECA tourism development actions that predated or were parallel to Tanfeedh tourism sector implementation include expert exchange with the US Department of Interior for technical park planning and management support and drafting of management plans that incorporate tourism as a critical area of emphasis (MECA 2017). The park's own tourism management and development efforts motivated and have supported inclusion of the Al-Saleel tourism project within Tanfeedh.



Figure 6 – Ras Al Hadd Nature Reserve experiences clockwise from top left: visitor center, ecolodges, guided night hike, and beaches, with a sea turtle depositing her eggs, illuminated by a less disturbing red light (center).

To date, at least three separate efforts have been made by MOT to initiate tourism development at Al-Saleel, none of which have advanced beyond the initial speculative stages. This pattern of consistent interest that falls short of implementation is an important contextual framing for the discussions about wildland NBT in Omani reserves. Al-Saleel has repeatedly been recognized as a priority for tourism development among Oman's protected areas and natural heritage resources. Government and private sector resources have on several occasions been committed to developing plans, yet none of these plans have been implemented. This suggests that greater system-level barriers and unreconciled points of friction may be preventing development of Al-Saleel. For example, these larger barriers include:

- Ministry-to-ministry issues such as initial and genuine interests in collaboration encountering the realities of already overcommitted staff and processes particular to each ministry, and
- Ministry-to-provider issues such as effectively marketing the financial attractiveness of nature reserves' potentially seasonal tourism to entrepreneurs and providing clear pathways for small and medium enterprises (ideally locals and Omanis) to engage in small-scale NBT ventures.

Moving Forward

The presence of such barriers and points of friction is particularly troubling within the protected area context of the park. Al-Saleel was designated as a national nature park to protect and preserve valuable, unique, and sensitive resources (e.g., gazelles, acacia) and experiences (e.g., learning about regional lifeways, connecting with Omani nature). To be successful and sustainable, NBT development in Al-Saleel must be well-coordinated and sensitive to the environmental and social constraints of the park and its surroundings. As a relatively intact ecosystem with traditional cultural uses (e.g., camel and goat grazing, honey collection), developing

Optimism remains, though, that among the dramatic beauty of such places the enduring commitment to protected areas and relatively more recent recognition of their economic appeal can help forge solutions.

a lodge or highly structured campground on the park's border and amenities in the park such as a 10k trekking/jeep safari trail (i.e., improving the road pictured in Figure 5) would impact the integrity of the resource and the villages surrounding it (MECA 2017). The national significance of the area, as expressed through its selection as a Tanfeedh project, stands at odds with the start-

and-stop nature of development efforts and raises important questions about the relevance of and proper direction for tourism development in and around Al-Saleel.

The circumstances of Al-Saleel, both its potential for sustainable tourism development and the challenges that have arisen while trying to realize this potential, are not unique to the park. They are typical of many Omani natural and cultural heritage tourism destinations and indeed of parks worldwide (Manning 2011; McCool 2016; Spiess et al. 2017). Virtually all parks and protected areas face tensions between development and protection, public and private interests, national and local values, and recreation and conservation uses. Therefore, analyzing the history, context, and alternative futures for tourism development at Al-Saleel provides a case study that will be useful for successfully and sustainably developing other Omani natural and cultural heritage resources for tourism.

Even with these similarities, Oman is unique in many respects and poised to be a leader among its petroleum-producing peers in attention to environmental concerns (Choudri et al. 2016b). As the country established its wealth and infrastructure, it also established substantial areas of cultural and environmental protection. The country participates in UNESCO designations and has demonstrated commitment to true nature reserves (IUCN Category 1a; Clarke et al. 1986). More broadly than just protected areas, it has capitalized on its appeal as a nature oasis among its relatively more arid neighbors. The question now turns to how these earlier advancements will remain and/or adapt as NBT becomes a more emphasized sector for attracting new revenue (Mershen 2007). As the existing nature reserves are preservation focused, reconciling the fundamental purpose of these places with the idea of tourism development is challenging – as seen in Ras al Hadd and Al-Saleel – and will remain a challenge as MOT and MECA bring NBT collaboration toward action. Optimism remains, though, that among the dramatic beauty of such places the enduring commitment to protected areas and relatively more recent recognition of their economic appeal can help forge solutions. This includes establishing additional types of protected areas with appropriate tourism development considered at the onset and encouraging small seasonal NBT providers. 

ELIZABETH (BESS) PERRY is an assistant professor of protected areas and natural resources recreation management in the Department of Community Sustainability at Michigan State University. Dr. Perry is a social scientist who researches and teaches about parks, outdoor recreation, and related tourism. Her work addresses vital issues for managers, visitors, and communities, such as relevance, sustainability, collaboration, inclusion, and scales of impact. She was the 2018 Sultan Qaboos Cultural Center Research Fellow to the Sultanate of Oman, where she focused on issues of sustainable nature-based tourism development in Omani protected areas.

References

- Al-Hashim, A. 2015. Embracing sustainable tourism in Oman: Case study of Mirbat settlement. *International Journal of Cultural and Digital Tourism* 2(2): 8–16.
- Buerkert, A., E. Luedeling, U. Dickhoefer, K. Lohrer, B. Mershen, W. Schaeper, M. Nagieb, and E. Schlecht. 2010. Prospects of mountain ecotourism in Oman: The example of As Sawjarah on Al Jabal al Akhdar. *Journal of Ecotourism* 9(2): 104–116.
- Cetin, I., and A. N. Al-Alawi. 2018. Economic diversity and contribution of tourism to Oman economy. *International Journal of Tourism, Economics and Business Sciences (IJTEBS)* E-ISSN: 2602-4411 2(2): 444-449. <https://doi.org/10.9790/487X-1906040912>.
- Choudri, B. S., M. Baawain, and A. Mushtaque. 2016a. An overview of coastal and marine resources and their management in Sultanate of Oman. *Journal of Environmental Management & Tourism* 7.1(13): 21–26.
- Choudri, B. S., M. Baawain, A. Al-Sidairi, H. Al-Nadabi, and K. Al-Zeidi. 2016b. Perception, knowledge, and attitude towards environmental issues and management among residents of Al-Suwaiq Wilayat, Sultanate of Oman. *International Journal of Sustainable Development & World Ecology* 23(5).
- Clarke, J. E., F. M. S. Al Lamki, V. C. Anderlini, and C. Sheppard. 1986. Sultanate of Oman: Proposals for a system of nature conservation areas. International Union for Conservation of Nature. IUCN-Rep-1986-Clar-001. Gland, Switzerland World Conservation Centre.
- Dudley, N., P. Shadie, and S. Stolton. 2013. Guidelines for applying protected area management categories including IUCN WCPA best practice guidance on recognising protected areas and assigning management categories and governance types. IUCN Best Practice Protected Area Guidelines Series, 21. <https://portals.iucn.org/library/sites/library/files/documents/PAG-021.pdf>.
- Jones, J., and N. Ridout. 2015. *A History of Modern Oman*. Cambridge, UK: Cambridge University Press.
- Manning, R. E. 2011. *Studies in Outdoor Recreation*. Corvallis: Oregon State University Press.
- McCool, S. F. 2016. Tourism in protected areas: Frameworks for working through the challenges in an era of change, complexity, and uncertainty. In *Reframing Sustainable Tourism*. Springer: Netherlands.
- Mershen, B. 2007. Development of community-based tourism in Oman: Challenges and opportunities. In *Tourism in the Middle East: Continuity, Change, and Transformation*, ed. R. F. Daher (pp. 188–214). Clevedon, UK: Channel View Publications.
- Ministry of Environment and Climate Affairs. 2017. Nature based tourism plan, Al Saleel Nature Park. Muscat: Sultanate of Oman Ministry of Environment and Climate Affairs, Nature Conservation Section.
- Ministry of Environment and Climate Affairs. 2022. Authority mandates: Natural reserves. <https://www.ea.gov.om/en/the-authority/authority-mandates/nature-conservation/natural-reserves/?csrf=4929670947643238547>. accessed February 8, 2022.
- National Centre for Statistics and Information. 2019. Annual number of visitors – Expatriate/non-Omani. Muscat: Sultanate of Oman (in Arabic). <https://www.ncsi.gov.om/Pages/AllIndicators.aspx>.
- National Program for Enhancing Economic Diversification (Tanfeedh). 2017. *Tanfeedh Handbook*. Muscat: Sultanate of Oman National Program for Enhancing Economic Diversification.
- Spiess, A., F. Al-Mubarak, and A. S. Weber, eds. 2017. *Tourism Development in the GCC States: Reconciling Economic Growth, Conservation, and Sustainable Development*. New York: Springer-Verlag.
- Stephenson, M. L., and A. Al-Hamarneh, eds. 2017. *International Tourism Development and the Gulf Cooperation Council States: Challenges and Opportunities*. Contemporary Geography of Leisure, Tourism, and Mobility series. Abingdon, UK: Routledge.
- Subramoniam, S., N. Al-Essai, S. Ali, A. Al-Marashadi, and A. Al-Kindi. 2010. SWOT analysis on Oman tourism: A case study. *Journal of Economic Development, Management, I.T., Finance, and Marketing* 2(2): 1–22.
- Tanfeedh/National Program for Enhancing Economic Diversification. 2017. *Tanfeedh Handbook*. Muscat: Sultanate of Oman National Program for Enhancing Economic Diversification.
- World Economic Forum. 2019. *The Travel and Tourism Competitiveness Report 2019: Travel and Tourism at a Tipping Point*. Geneva: http://www3.weforum.org/docs/WEF_TTCR_2019.pdf





Photo Credit: Larry George II on Unsplash

WILDERNESS DIGEST

Digital Reviews:

Patrick Kelly, Media And Book Review Editor

REWILDING EARTH PODCAST

Hosted by Jack Humphrey. Available on Apple Podcasts, Spotify, and Amazon Music.

<https://rewilding.org/rewilding-earth-podcast/>.




The world of podcasting has exploded in the last 15 years and today there are shows on nearly any topic imaginable. Podcasts are convenient, often free, and offer a great way to learn more about something of interest to listeners. Fortunately, this powerful and relatively new medium is being utilized more and more within the wilderness and conservation community. Continuing a review of some of the quality options available, this issue of IJW takes a dive into the Rewilding Earth Podcast, hosted by Jack Humphrey and produced by the Rewilding Institute.

The Rewilding Institute thinks big, and its globally focused mission to "advance continental-scale conservation in North America and beyond" is refreshingly ambitious. Positioning itself as an "essential source of information" for the integration of wildlands conservation and the science of conservation biology, the institute serves this purpose well through its utilization of the podcast format.

Hosted by longtime wildlands advocate Jack Humphrey, the Rewilding Earth Podcast draws from a deep well of experience, research, and expertise across a multitude of conservation-related fields. The stated goal of the podcast is to "highlight the work of the people involved in saving nature's building blocks." Produced in a long-form interview style, the show consists of in-depth conversations with scientists, activists, artists, journalists, and authors who each offer up unique and engaging perspectives on a wide range of topics. From rewilding efforts underway in Namibia (episode 73), to a discussion about the implications of the pandemic for conservation (episode 48), the breadth of topics and geographic areas covered is impressive.

Of the many strengths of the Rewilding Earth Podcast, its frequent focus on places not often viewed as candidates for rewilding is particularly powerful. Episode 78 discusses the prospect of rewilding the state of Iowa, one of the most domesticated landscapes in the United States, while episode 60 envisions the upper Midwest containing a giant 33,000 square mile (85,469 sq. km) wildlands network. For listeners who appreciate and understand the need for bold, landscape-scale thinking to address the twin threats of climate change and the extinction crisis, episodes such as this offer tangible, well-developed visions for a wilder, more biodiverse future.

Complemented by Humphrey's knowledgeable and engaging interview style, the Rewilding Earth Podcast offers a great resource for those working on wilderness and conservation issues. Episodes are often timely and topical, addressing contemporary developments in conservation policy, practice, and law. Multiple episodes have been devoted to current debate (or recent passage) of wilderness bills in Congress (episodes 19 and 75). With further episodes on issues such as Colorado wolf reintroduction and the removal of dams on the Lower Snake River, the podcast provides expert background information and analysis of some of the most pressing environmental issues of the day.

Whether you find yourself with time to kill on a long road trip, or you're simply cooking up a meal in your kitchen, it is worth the time to cue up an episode of the Rewilding Earth Podcast. 

REVIEWED BY Patrick Kelly, IJW media and book review editor; email: Patrick.ram.kelly@gmail.com.

Facilitated by



717 Poplar Avenue
Boulder, CO 80304 USA

► WWW.WILD.ORG

International Journal of Wilderness

April 2022 Volume 28, Number 1



Visit WWW.IJW.ORG to view additional content only available online.



SPONSORING ORGANIZATIONS

Aldo Leopold Wilderness Research Institute
Central Michigan University, Department of Recreation,
Parks and Leisure Services Administration
SUNY College of Environmental Science and Forestry
The WILD® Foundation
USDA Forest Service
U.S. Department of the Interior
USDI Bureau of Land Management
USDI Fish and Wildlife Service
USDI National Park Service
Wilderness Foundation (South Africa)
Wilderness Foundation Global
Wilderness Leadership School (South Africa)
University of Montana, School of Forestry and Conservation;
and, the Wilderness Institute