



**INTERNATIONAL**

# Journal of Wilderness

April 2019 | Volume 25, Number 1 | [ijw.org](http://ijw.org)

**In This Issue of **

Wilderness Conditions in Russia | River Management Professionals  
Ecological Justice in Amazonia | The Wilderness Management Research Unit

# International Journal of Wilderness

April 2019 Volume 25, Number 1

## FEATURES

EDITORIAL PERSPECTIVES

- Personal Restraint and Responsibility for Protected Areas in Crisis** 4  
ROBERT DVORAK

SOUL OF THE WILDERNESS

- Wilderness Was Not America's New Idea** 8  
*Exploring a New Wilderness Stewardship Ideal at the 2018 National Wilderness Workshop*  
LAUREN ATKINSON

## STEWARDSHIP

- Did #MakeYourSplash Make a Splash?** 18  
LISA RONALD

## SCIENCE & RESEARCH

- Wilderness Condition as a Status Indicator of Russian Flora and Fauna** 26  
*Implications for Future Protection Initiatives*  
VLADIMIR BOCHARNIKOV and FALK HUETTMMANN

- Pioneers of Wilderness Research** 42  
*The Wilderness Management Research Unit*  
DAVID N. COLE

## COMMUNICATION & EDUCATION

- #TheRiverisMyOffice** 64  
RISA SHIMODA

## INTERNATIONAL PERSPECTIVES

- Indigenous Rights and Ecological Justice in Amazonia** 76  
*Exploring Ethics of Wilderness Conservation*  
HELEN KOPNINA

## WILDERNESS DIGEST

- Book Reviews** 92-96

*Science, Conservation, and National Parks:*

EDITED BY STEVE BEISSINGER, DAVID ACKERLY, HOLLY DOREMUS, AND GARY MACHLIS

reviewed by JOHN SHULTIS

*Rescuing the Wilderness: The History of Wilderness Conservation in Australia*

GEOFF MOSLEY

reviewed by VANCE G. MARTIN

## On the Cover

Photographed on the 4th of July Trail near Eldora, Colorado, it was very clear this fox had gotten used to the thousands of hikers who walk the trail each year, barely paying us any mind as it searched for its next meal.

© Morgan Heim [www.morganheim.com](http://www.morganheim.com)

## 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](http://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*  
*John Shultis, University of Northern British Columbia, Prince George, B.C., Canada*  
*Alan Watson, 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.; David Cole, Aldo Leopold Wilderness Research Institute, Missoula, Mont.; John Daigle, University of Maine, Orono, Maine; Joseph Flood, Minnesota State University, Mankato, Minn.; Gary Green, University of Georgia, Athens, Ga.; Kari Gunderson, University of Montana, Missoula, Mont.; Yu-Fai Leung, North Carolina State University, Raleigh, N.C.; Jeffrey Marion, Virginia Polytechnic Institute, Blacksburg, Va.; Christopher Monz, Utah State University, Logan, Ut.; 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, In.; John Peden, Georgia Southern University, Statesboro, Ga.; Kevin Proescholdt, Wilderness Watch, Minneapolis, Minn.; Tina Tin, Consultant, Challes-les-Eaux, France; Keith Russell, Western Washington University, Bellingham, Wash.; Rudy Schuster, USGS, Fort Collins, Colo. 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](mailto: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](mailto: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](mailto:adam@wild.org). No print journals will be available in 2018. 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](http://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](http://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 © 2019 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 • The 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*

# Personal Restraint and Responsibility for Protected Areas in Crisis

by **ROBERT DVORAK**

In a recent article in High Country News, former National Park Service Director Jonathan B. Jarvis strongly states that it was a mistake to keep the US National Parks open to the public during the 2018–2019 federal government shutdown. He contends that leaving the parks open without essential staff and resources was “equivalent to leaving the Smithsonian museums open without any staff to protect the priceless artifacts” (Jarvis 2019, p. 1). Unfortunately, we are only beginning to understand how true Jarvis’s assertions are. Reports of vandalism in parks such as Joshua Tree National Park and Yellowstone National Park have been widely circulated in the news and across social media. Trash and human waste have accumulated at alarming rates as visitation continued during the shutdown and human use overwhelmed facilities and park resources. Cultural and historic artifacts from important battlefield parks and cultural heritage sites were impacted by greater occurrences of theft and damage. And important scientific research efforts were interrupted or impeded by lack of resources and staffing.

During the 2013 US government shutdown, national parks were closed for use and access. The public outcry from citizens unable to enjoy and visit their public lands was a political force that spurred politicians to compromise and act. However, the latest government shutdown has created a “new outcry.”



by Robert Dvorak

---

**“How can a society champion the public good in one instance, and yet willfully damage and undermine that same good in another?”**

Whereas many volunteers, advocates, and outdoor enthusiasts worked to maintain the parks and access, other individuals seized an opportunity to exhibit destructive behavior. Without oversight, enforcement, or restraint, these individuals exhibited behaviors that have irreparably harmed global natural resources. Although such depreciative behaviors and acts are not novel, the stark contrast to previous restraint raises the question, "How can a society champion the public good in one instance, and yet willfully damage and undermine that same good in another?"

Admittedly, such a question appears naive and myopic. Contradictions and ironies are found across all human behavior. However, the practical question then may be why, in this instance, were visitors unable to exercise personal restraint? What changed from their previous excursions into protected areas to remove the sense of responsibility or adherence to social norms? If parks and protected areas are "our best idea," and if we are a part of nature and need it for our existence, then why act to its detriment?

Instead of trying to answer these questions or attempting to understand the motivation for human behavior, perhaps it is better to strive for further growth and change. The public values nature, public lands, and access, but this value and understanding needs to be broadened and cultivated. Nature's role in ecosystems services, biodiversity, and climate change resilience needs to be accepted and embraced by a greater proportion of society. We must continue to educate and communicate with others about nature's existence values to make it a normative belief. Progress has been made, but as this most recent example demonstrates, efforts must continue if human restraint and personal responsibility toward the protection of nature are to be dominant human values.

In this issue of *IJW*, we explore insights from the 2018 National Wilderness Workshop. Vladimir Bocharnikov and Falk Huettmann discuss wilderness conditions as ecological indicators in Russia. David Cole documents the history and contributions of the Wilderness Management Research Unit. Finally, Helen Kopnina examines rights and ecological justice across Amazonia.

**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](mailto:dvora1rg@cmich.edu).

## Reference

Jarvis, J. B. 2019. It's a mistake to keep parks open during the shutdown. High Country News. Retrieved January 4, 2019, from [www.hcn.org/articles/national-park-service-keeping-national-parks-open-during-the-shutdown-is-a-terrible-mistake/](http://www.hcn.org/articles/national-park-service-keeping-national-parks-open-during-the-shutdown-is-a-terrible-mistake/).





At 11,000 acres, the Kansas Tallgrass Prairie National Preserve represents one of the largest intact tracts of tallgrass left in North America, only about 4 percent remains of the once great 170 million acre habitat. **Photo credit:** Morgan Heim

# Wilderness Was Not America's New Idea: Exploring a New Wilderness Stewardship Ideal at the 2018 National Wilderness Workshop

by **LAUREN ATKINSON**

*Though parts of this history might still be known to some, it is valuable for these histories to be taught, celebrated and acknowledged continuously – so we're all aware that people of color have been leading environmental efforts throughout history, and still do. (Estrada 2018)*



**Lauren Atkinson**

## **A New Lens for Wilderness Management**

On October 9, 2018, I had the privilege of sitting down with Regina Lopez-Whiteskunk, member of the Ute Mountain Ute Tribe and former co-chair of the Bears Ears Intertribal Coalition, on the deck of the High Alpine Brewery in Gunnison, Colorado, during the welcome gathering of the 2018 National Wilderness Workshop. As I listened to Lopez-Whiteskunk talk, I questioned my relationship with wilderness as primarily composed of recreational experiences in one of the nine Wilderness areas (La Garita, Powderhorn, Fossil Ridge, Raggeds, West Elk, Maroon Bells-Snowmass, Collegiate Peaks, Gunnison Gorge, and Black Canyon of the Gunnison) that have access points within one hour from where we sat. As a student of wilderness, I was humbled as I listened to Lopez-Whiteskunk articulate the thousand-year presence of her ancestors on these lands. Out of respect to her and those who

came before, I felt that the least I could do was try to view wilderness through the lens of her and other indigenous peoples whose ancestors forged relationships with wilderness long before Bob Marshall started dreaming of a law that would protect America's wildest places in perpetuity.

We both shared a high-top table with Dr. Melanie Armstrong, professor and public lands coordinator at Western Colorado University; Western Colorado University dean of the School of Environment and Sustainability, Dr. John Hausdoerffer; and Gavin Van Horn, director of cultures and conservation for the Center of Humans and Nature as well as co-editor, along with Dr. Hausdoerffer, of the book *Wildness*. The tone of the conversation was spirited for all parties in celebration of the union of the National Wilderness Workshop with the 29th Annual Headwaters Conference, a relationship that emerged out of a shared passion for wilderness stewardship and wild healing. Influenced by the 2020 Vision: Interagency Stewardship Priorities for America's National Wilderness Preservation System (2020 Vision 2014), Lopez-Whiteskunk joined other arbiters of change as the wilderness community boldly tackled the challenges that make it difficult for underrepresented cultural and economic groups to engage and be recognized in wilderness stewardship activities.

The protected area manager task of balancing a high-quality visitor experience with conservation objectives is becoming increasingly complex. The 2018 National Wilderness Workshop revealed the need for the wilderness and protected area management community to step back for a moment and call upon our interpersonal skills to tactfully develop relationships

with past and present wildland stakeholders. The National Wilderness Workshop assembles agency and nongovernment organization employees and volunteers, students, and community members in a learning environment. Specialists engage with colleagues on how to apply current issues to their work. Workshop participants attended sessions focused on culture, science, and management. The Culture Track sessions from this year were particularly memorable. They were filled with powerful messages that propelled the audience into reconsidering how to make contemporary wilderness management, partnerships, and stewardship initiatives more inclusive of cultural and economic diversity. Panel discussions occurred throughout the workshop, and it became clear through the ideas exchanged and the questions asked that the next step to take as a community of wilderness stewards is far from being defined.

## **We've "Been Outside," Where Have You Been?**

The congressionally designated wilderness areas born from the passage of the Wilderness Act of 1964 represent a wild standard that America is fortunate to steward. The foundation of the wilderness idea, however, can be traced back to the land-based livelihoods of indigenous peoples (Kosek 2006). The onset of Wilderness Character Monitoring on federal lands focuses efforts on measuring the untrammled, undeveloped, natural, and solitude or primitive and unconfined recreational qualities of wilderness, but do these metrics honor the wilderness values of the original stewards of the wild?

To truly “inspire and nurture life-long connections between people of diverse cultures and wilderness,” as directed by the 2020 Vision, it is time to consider not just who should have a seat at the table, but how to integrate needs and honor the histories of the original guardians of present-day wilderness and protected areas. The “building [of] respectful, long-term partnerships” starts from within each individual wilderness manager to redefine the lens through which protected area management is viewed.

The Culture Track kicked off with a discussion that extracted perceptions on wilderness management and barriers to engagement in wilderness activities. James Edward Mills, 2014 fellow of the Mountain and Wilderness Writing Program of the Banff Center in Alberta, Canada; Melissa Martinez, the wilderness and wild and scenic rivers fellow with the USFS and Hispanic Access Foundation; Eva Malis of the Grand Canyon Trust and the coordinator of the Uplift Climate Conference; and Lopez-Whiteskunk delivered perspectives that addressed wilderness engagement within the communities they represent. The panel brought what some would consider to be uncomfortable issues to center stage from the perspectives of multiple cultural backgrounds and generations.

Malis, 23 years old, has had an interest in working for a federal land management agency, but was deterred by the financial burden of participation in multiple internships prior to applying for an entry-level position. The United States Office of Personnel Management administers USAJOBS.gov, the federal government employment portal. The

system aims to attract qualified candidates for positions and honor the civil service tenures of applicants. Because of the high volume of applicants competing for a proportionately small number of vacancies, applicants seek internships or equivalent experiences that place them on a hiring path upon completion of service. Interns are subject to low pay and no guarantee of being hired into a paid position. Malis's story identified economic access to positions of influence in protected area management as a systemic barrier to engagement, a situation that resonated with many in the room. How can the national wilderness community culturally diversify if the opportunities favor the economically wealthy?

Barriers to engagement with protected areas are not solely economic. Martinez's work seeks to alleviate the exclusion of Latino families from interacting with wilderness and wild and scenic rivers by celebrating close-to-home forms of these features as well as nearby wild and scenic rivers. Access that is granted by permit systems and advance reservations is a barrier preventing many Latinos from interacting with protected areas. These systems work to the advantage of individuals that have predetermined work schedules with predictable income and time off. However, it is important to realize that just because a Latino family cannot commit to a river permit months ahead of time, it does not mean that wild connections are nonexistent. The wilderness ideal to some are the urban bosque, city park, or rural stretch of river. Although their embodiment of untrammelled, undeveloped, natural, and solitude or primitive unconfined recreation may not be what Howard Zahniser articulated

in the Wilderness Act of 1964, it is important to understand this perspective as the wilderness community seeks to engage diverse communities. Martinez utilizes a partnership between the Hispanic Access Foundation and the US Forest Service (USFS) to celebrate wild connections in Latino communities by creating events and content that promote inclusive and sustainable protected area stewardship and foster long-term relationships with the river.

James Edward Mills uncovered another side of this coin. Prior to engagement with National Wilderness Preservation System (NWPS) lands, Mills has a different uphill battle to fight. Mills is African American and has been camping since he was a kid, but while growing up he was told that camping was something that “black people don't do.” As an outcome of this upbringing, Mills's work has been focused on bridging the so-called adventure gap in attempts to overcome barriers imposed by society and bring courage to minority communities to get outside. As the opening panel discussion came to an end, Mills had the audience asking a different question: How can a group of minority individuals feel accepted in the wilderness community if their own culture doesn't think they should be there? The path to the answer was unclear, although exploring the historic relationship of Black, Indigenous, and people of color (BIPOC) individuals with wilderness concepts was further explored in a breakout session by Michael A. Estrada.

Minorities were some of the first wilderness locals, claims Estrada, founder of Brown Environmentalist, a media collective platform elevating the leadership of people of color in the environment. His storytelling campaign, #BeenOutside, seeks to celebrate the many ways that BIPOC individuals have spent time in the outdoors throughout history and continue to enjoy time outside today. Estrada's millennial twist on this enlightened truth is one in which Lopez-Whiteskunk and others at the workshop agreed.

## **Sharing Wisdom and Honoring Experience**

The factual anecdotes made by the workshop's speakers were powerful reminders to the wilderness and protected area managers in the room (Figure 1). They brought a new perspective to managers' role as guardians of the trust doctrine that entitles tribal members to access to their ancestral lands and ecosystems. The federal government's directive to protect the treaty rights, way of life and property of Native American populations is a fiduciary responsibility that has surfaced in recent decades as the political power of tribes has gained ground in public lands management (Long and Lake 2018). It is a trust responsibility that federal agencies carry out this task to shield tribal lands from societal intrusions (Wood 1995). The publicity of contemporary wilderness issues such as visitor use management can distract from messages about policies that exist on public lands on the basis of tribal sovereignty.

Cooperative management between federal agencies and tribes is built from common values and is inclusive of traditional knowledge of protected lands. Although I fully acknowledge this ideal, I continue to ponder how to integrate it into the contemporary wilderness management issue to which I am committed. Upon learning of my current project in the White River National



**Figure 1** – Kriste Peoples delivers the keynote address at the 2018 National Wilderness Workshop.  
Photo credit: James Edward Mills of The Joy Trip Project.

Forest on the Aspen-Sopris Ranger District of implementing a permit for overnight visits to the Maroon Bells-Snowmass Wilderness, Lopez-Whiteskunk asked what considerations I had made in recognition of the relationship of the Ute Nation to the land. Sitting within earshot, Armstrong and Hausdoerffer also sought to glean insight on the application of an agreement to public lands surrounding the home of their affiliate academic institution.

After graciously accepting my lack of knowledge of any active treaties in either area, she brought to my attention the Brunot Agreement, a treaty signed into law in 1874 between the United States and the Ute Mountain Ute and the Southern Ute as an outcome of mining exploration in the San Juan Mountains of Colorado. The agreement granted miners access to Ute land, a loss to the tribe of more than 5,000 square miles (12,950 sq. km) of reservation land in exchange for \$26,000 per year and continued access to tribal members for hunting. The 1874 agreement was renegotiated between Colorado Parks and Wildlife and the Ute Mountain and Southern Ute in 2008 to reinstate pretreaty hunting, gathering, and fishing rights through a Memorandum of Understanding. The reservation lands themselves remain the property of the current private and public landowners. Consultation and compromise took place between each party in 2008 but did not resolve the dispossession of reservation land.

The question remains, How can the wilderness community honor the rich histories of the original guardians of protected areas? One example of a federal land management agency honoring

an indigenous wilderness partnership is the return of the sacred Blue Lake area to the Taos Pueblo. After a fight that endured several decades, a 48,000-acre (19,425 ha) segment of the Blue Lake area was ceded back to the Taos Pueblo through HR 471, PL 92-550, the Blue Lake Wilderness Act, signed by President Richard M. Nixon on December 15, 1970. The act was revisited circa 1993 as the Pueblo sought to reclaim the adjacent Bottle Neck Area. Pueblo leadership sought religious claims to the Bottle Neck Area's sacred Path of Life route that entered into the Wheeler Peak Wilderness Area. Senate Bill 1509 was passed, thus redefining 764.33 acres (309.3 ha) of land within the Carson National Forest and Wheeler Peak Wilderness through its return to the Taos Pueblo.

The Taos Pueblo's battle for Blue Lake was one of the first successful cases that pinned tribal sovereignty on the basis of religious rights against a public land management agency and set the stage for other tribal nations to defend their land access rights (Hansen 2011). The Taos Pueblo is the primary steward of Blue Lake, which is managed to the same standards as a wilderness area within the NWPS overseen by the Department of the Interior and Department of Agriculture but remains closed to the public. This example of a wilderness management partnership is an attempt to maintain indigenous stewardship ideals (Hansen 2011).

The redesignation of Blue Lake and the lands ceded by the Ute Reservation under the Brunot Agreement represent opposing ends of the spectrum of partnerships that exist between indigenous groups and federal agencies. As stewards, it is our responsibility to know where our guiding policies fall on this spectrum in relation to the ideal management scheme and conduct the stewardship of protected areas accordingly. The National Wilderness Workshop continues to be an event where federal and state employees and wilderness advocates come together to synthesize new information and open new lines of communication with other industry professionals. Stewardship in "trust responsibility" is a task we bear as a community. Revisions to land management documents, such as Land and Resource Management Plans in units of the USFS, present opportunities to integrate this new stewardship ideal.

As tribes across the United States seek to regain their sovereignty and access to ancestral lands and ecosystems, we as managers can be visionary and create a management model that extends beyond a seat at the table. During the second facilitated dialogue of the Culture Track, each speaker was asked to select an ideal management model for wilderness areas. Lopez-Whiteskunk was first to respond that repossession and complete ownership would be her stewardship ideal for the lands of the Ute Mountain Ute Tribe. She noted a cooperative management model as a reasonable approach in this political climate, citing her experience in the fight for Bears Ears. "I know to choose my battles."

## From Outward Vision to Inward Reflection

Bob Marshall's vision to protect wild landscapes in perpetuity was novel. The NWPS recognizes his contemporary wilderness ideals. My experience at the workshop inspired me to add to these ideals, starting with the launch of a personal investigation into the first stewards of the wilderness areas with which I interact. I am hopeful that as a collective of wilderness and protected area managers, we can train our constituents to associate traditional and sovereign tribal relationships with wilderness with the same thoughtfulness as untrammelled, undeveloped, natural, and solitude or primitive and unconfined recreational qualities. Our task now is to create a stewardship model that honors the founding parameters of the Wilderness Act of 1964, but then to learn how to adapt wilderness management to include the original guardians of wilderness. This is a call to enhance the lens through which modern wilderness and protected area management are viewed and make it more inclusive.

To refocus our vision inward is the most impact we can have today. As the wilderness community explores how to move forward with the interagency 2020 Vision, compassion for the journey taken by the BIPOC individuals we engage with and serve is essential. Maintenance and protection of ecological integrity is a shared value for protected area managers and indigenous peoples. The potential for change lies in the motivation that brings stakeholders to the table, and managers are responsible for learning ahead of time when sensitive issues are at hand. Every question we ask on the topic of inclusion and equity has the potential to raise an emotion or a memory. We need to exercise sensitivity when addressing equity and inclusion by conducting our own research.

---


**Every question we ask on the topic of inclusion and equity has the potential to raise an emotion or a memory. We need to exercise sensitivity when addressing equity and inclusion by conducting our own research.**

---

The sustainability of wilderness and protected areas is impacted by the relationships that foster the connection to our wilderness heritage. The National Wilderness Workshop continues to be a venue for wilderness constituents to ask the tough questions and absorb new information related to the topics of culture, science, and management. The impactful conveyance of the nexus of these topics reminded participants of the symbiosis that naturally ran its course in protected areas prior to the colonization of indigenous lands.

For a conference theme originally conceived to explore how to engage underrepresented wilderness constituents, I assert that the workshop made the wilderness community realize that

we have some steps to take before making that leap. The final USFS breakout session revealed that the week had left a powerful impression on agency employees and partners. Few could put into words what we had just experienced. Then, just as Sue Spear, director of wilderness and wild and scenic rivers of the national forest system, opened the floor to questions, Anna Kistner, wilderness ranger intern with the Aspen-Sopris Ranger District, raised her hand and politely asked Spear how she planned on implementing the past week's topics in the Washington office. Spear's reply was consistent with the recommendation from our panelists: the journey must start from within. Systemic change takes time. Going back to our districts to engage colleagues in discussion as we conduct our own research is our most impactful action item.

The role of protected area managers is becoming increasingly complex, for good reason, as we strive to increase the inclusivity of current stewardship initiatives on public lands. Our return to the nexus of culture, science, and management benefits from the reintegration of tribal knowledge and values, a system that ran its course on the untrammled, undeveloped, and natural lands of indigenous ancestors. It is our individual responsibility to educate ourselves about this land use history before we sit down at the table. 

**LAUREN ATKINSON** is a Korean adoptee and member of the National Wilderness Workshop Steering Committee. She is currently working as a resource assistant on the White River National Forest to develop a recreation permit for the Maroon Bells-Snowmass Wilderness while acquiring a master's degree in environmental management from Western Colorado University. Email: [lauren.atkinson@western.edu](mailto:lauren.atkinson@western.edu); [LaurenEAtkinson@gmail.com](mailto:LaurenEAtkinson@gmail.com).

## References

- 2020 Vision. 2014. 2020 Vision: Interagency Stewardship Priorities for America's National Wilderness Preservation System. Retrieved January 2019, from [www.wilderness.net/toolboxes/documents/50th/2020\\_Vision.pdf](http://www.wilderness.net/toolboxes/documents/50th/2020_Vision.pdf).
- Estrada, M. A. 2018, September 4. The original tree huggers. Patagonia: The Cleanest Line. Retrieved from <https://www.patagonia.com/blog/2018/09/the-original-tree-huggers/>.
- Hansen, G. 2011. Understanding and building wilderness management partnerships with indigenous peoples and communities. In Science and Stewardship to Protect and Sustain Wilderness Values: Ninth World Wilderness Congress Symposium, November 6–13, 2009, Merida, Yucatan, Mexico, comp. A. Watson, J. Murrieta-Saldivar, and B. Brooke. Proceedings RMRS-P-64. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Long, J. W., and F. K. Lake. 2018. Escaping social-ecological traps through tribal stewardship on national forest lands in the Pacific Northwest, United States of America. *Ecology and Society* 23(2): 10. doi:10.5751/ES-10041-230210.
- Kosek, J. 2006. *Understories: The Political Life of Forests*. Durham, NC: Duke University Press.
- US Senate Bill 1509. Blue Lake Territory Land Transfer as of September 30, 1993.
- Wood, M. C. 1995. Fulfilling the executive's trust responsibility toward the Native Nations on environmental issues: A partial critique of the Clinton administration's promises and performances. *Environmental Law* 25(3): 733–800.





# Did #MakeYourSplash Make a Splash?

by **LISA RONALD**

In 2018, we celebrated the 50th anniversary of the birth of our Wild and Scenic River System. Created in 1968 with only eight rivers, the system has grown to include more than 12,000 miles (19, 312 km) and over 200 protected rivers. In the wake of the Wilderness Act's 50th anniversary in 2014 and the National Park Service Centennial in 2016, one might assume that the conservation community is anniversaried-out. How big a public splash did the river anniversary make, and what are its dividends? Float on down to find out...



**Lisa Ronald**

## Smooth Sailing

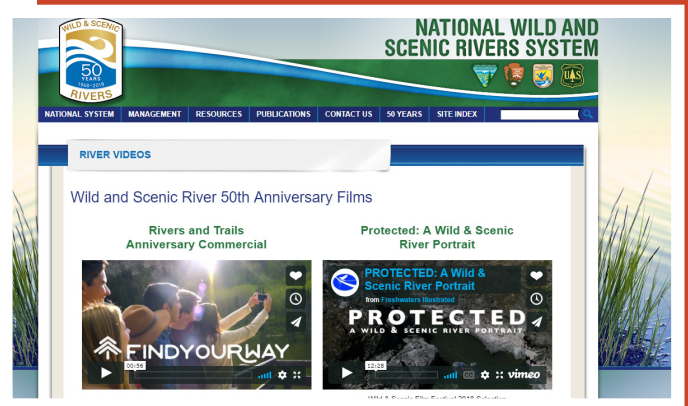
A new anniversary section of the Rivers.gov website released in early 2017 included marketing and messaging materials, event planning resources, and a national event map. Website analytics show that, overall, visitation on Rivers.gov increased 24% in 2018, and anniversary resources were viewed more than 33,000 times. Visitation directly before and during the official anniversary on October 2, 2018, was almost three times the daily average. An online press kit served to support the more than 9,100 articles published online by diverse news outlets including USA Today, Backpacker Magazine, High Country News, and Canoe & Kayak Magazine.

Of the 22 river videos created for the anniversary by various nonprofit and agency partners, four were selected for the 2018 Wild and Scenic Film Festival, which showed on-tour in nearly 60 communities throughout 2018, generating US\$70,000 to support river work by hosting organizations.

Through merchandising relationships, organizations and individuals purchased logo-themed products including pins, magnets, paddle medallions, stickers, temporary tattoos, patches, hats, T-shirts, socks, beverage cozies, water bottles, cell phone dry sacks, safety whistles, and rivers booklets (Figure 1). In total, nearly 36,000 products were sold, generating US\$48,000 in sales. Companies donating a percentage of proceeds from the sales of these items contributed, in total, more than US\$7,000 to support the anniversary. In addition to merchandise, 25,000 river Leave-No-Trace hangtags and 60,000 informational brochures with maps were produced by the agencies and distributed to the public at local river events. Announced in late 2018, the US Postal Service unveiled 12 new Forever stamps available for purchase starting May 21, 2019 and featuring photography of wild and scenic rivers.

Online event planning resources helped communities plan partnership-driven local events celebrating wild and scenic rivers and other local waterways. Overall, 250 river events took place in 164 different cities in 36 states (Figure 3). These events involved 191 community partners and 56 agency offices, and collectively engaged more than 82,000 people. Events took many forms, including film showings, speakers, conferences, commemorative beers, paddling trips, river festivals, plein air artwork, symphonies, and river races – including a triathlon (Figure 2).

Most events occurred in September, due in part to National Public Lands Day on September 22, 2018. An annual volunteer-on-public-lands-focused holiday, this year's theme was Restoration and Resilience, and sites were encouraged to focus on rivers and trails. Ultimately, 683 miles (1,099 km) of rivers and trails were maintained or cleaned up through National Public Lands Day 2018 volunteer events. A diversity-focused public lands holiday is Latino Conservation Week,



<https://www.rivers.gov/videos.php>

**Collectively, the 22 anniversary river films were viewed online around 70,000 times, and one film, Run Wild Run Free, which debuted and was streamed live online on October 2, 2018, garnered more than 20,000 views.**

**See more about Run Wild Run Free at <https://vimeo.com/290094402>.**



**Figure 1** - Lochsa Madness, an annual river festival held on Idaho's Clearwater Wild and Scenic River, included an afternoon of educational activities to engage families that included temporary river logo tattoos. Photo credit: Jimmy Gaudry, Forest Service.

which engaged Latinx communities in 2018 to experience their rivers and waterways. Overall, 54 Latino Conservation Week events in nine states were rivers-focused, with 31 centered on designated wild and scenic rivers.

Internationally, research papers were published on topics such as protection science and simultaneous management of rivers for recreation and biodiversity, as well as a river-focused edition of the *International Journal of Wilderness* (see the December 2017 issue). Scientists commissioned a worldwide assessment of rivers continent-by-continent to understand and catalog river conditions across the globe.

## Rallying Around Rivers

In addition to successes on the outreach and local engagement fronts, the wild and scenic rivers anniversary has created lasting stewardship and advocacy momentum. Two grant programs funding work in 2019 and beyond allocated nearly \$296,000 to support eight projects, including:

- *River access improvements, such as creating a new interactive map of access and recreation sites along the Eightmile Wild and Scenic River in Connecticut*
- *Designation efforts, such as protection for an additional stretch of the Yellow Dog River in Michigan*
- *River recreation, such as doubling the size of the Redwood National and State Parks free kayak tour program on the Smith Wild and Scenic River in California*



**Figure 2** - Musicians, such as those from the Landscape Music Network, created original performances in 2018 inspired by water. This chamber trio performed on September 29 in Atlanta to celebrate Georgia rivers for National Public Lands Day. Composer and musician Stephen Wood drew his inspiration from the Chattooga Wild and Scenic River. Photo credit: Stephen Wood.

American Rivers, American Whitewater, and other supporting partners launched 5000 Miles of Wild, a multiyear designation cam-



**Figure 3** - Many river festivals, such as Silver City, New Mexico's Gila River Festival, adopted the anniversary as the annual theme. The Gila River is the nation's first wilderness river but is not yet protected as a wild and scenic river. Photo credit: Jay Hemphill.

campaign to protect an additional 5,000 miles (8,047 km) of rivers as well as collect river stories from American citizens. In 2018, the campaign successfully added a new wild and scenic river, East Rosebud Creek in Montana, which was designated on August 2, 2018. This hard-fought addition to the system is the first in the state of Montana in several decades. In December, a campaign event at REI's Washington, D.C., flagship store engaged members of Congress, including Senators Maria Cantwell of Washington, Tom Udall of New Mexico, and Ron Wyden of Oregon, along with Representatives Don McEachin of Virginia and Kurt Schrader of Oregon, to build momentum for new wild and scenic designations for rivers such as the Hoh on Washington's Olympic Peninsula, the Gila in New Mexico, and those later designated in 2019 under the Natural Resources Management Act.



canoekayakmag • Follow

canoekayakmag Try to paddle in Arizona and not meet @danniekeil. It isn't possible. It seems that no river event, water release, or monsoon flow goes untouched by this local paddling guru. At age 10, paddling with her father near the family cabin in southwestern Montana is one of her earliest memories. "In one of the rapids," she recalls, "I launched on top of a boulder and somehow found a way to pin myself on top of it...Ever since then I've been hooked on paddling rivers, searching out those technical rapids and breathtaking views they take me to."

There are two W&S rivers in Arizona: a prominent section of the Verde River, and Fossil Creek, both of which are phenomena to paddle and be in. Fossil Creek has a huge piece of Dannie's heart, and will

410 likes

**"Every family should get to know at least one river." – President Lyndon Johnson, 1968**

**As part of the 5000 Miles of Wild designation campaign, Americans who love their rivers are sharing their stories, such as this one from Dannie in Arizona. She began paddling at age 10. "Ever since then," she says, "I've been hooked on paddling rivers, searching out those technical rapids and breathtaking views they take me to." To date, 5,300 stories have been collected.**

**Photo courtesy of <https://www.instagram.com/p/Bq8NNThA4vX/>**

Started in mid-2018, a Wild and Scenic Rivers Coalition of engaged nonprofit organizations formed to protect and defend existing and potential wild and scenic rivers and broaden the river conservation movement by raising awareness about their value. With capacity, advocacy, and communications goals, the emergence and formalization of this group following the anniversary has the potential to better unify the river nonprofit sector, much in the way the Interagency Wild and Scenic Rivers Coordinating Council has unified the federal river agencies for many years.

As with all public lands anniversaries, they celebrate past accomplishments and provide a temporary springboard for elevating stewardship and advocacy needs. Although the outcomes of 5000 Miles of Wild and the Wild and Scenic Rivers Coalition are uncertain in current political times, commitments to these efforts emerging from the anniversary year coupled with recent spurts of Congressional support for river conservation provide a positive outlook for future river protection. 

**LISA RONALD** served as Wild and Scenic Rivers 50th Anniversary coordinator for American Rivers, American Whitewater, Bureau of Land Management, Fish and Wildlife Service, Forest Service, National Park Service, River Network, and River Management Society during 2017 and 2018. She continues to work in rivers by coordinating the Wild and Scenic Rivers Coalition and in wilderness through the University of Montana's Wilderness Institute. email: [lisa.ronald@umontana.edu](mailto:lisa.ronald@umontana.edu).





# Wilderness Condition as a Status Indicator of Russian Flora and Fauna:

## Implications for Future Protection Initiatives

by VLADIMIR BOCHARNIKOV  
and FALK HUETTMANN

**ABSTRACT** In Russia, three large federal districts in the Asian part of the country hold the majority of the remaining large areas of undisturbed contiguous flora and fauna, totaling more than 9 million square kilometers (3,474,919 sq. miles; 54.6% of Russia). Wilderness is largely perceived as areas of untouched, or so-called virgin, nature, which in ecological terms contains relatively undisturbed natural animal and plant populations where ancient ecological processes prevail. In areas where urban lifestyles now dominate in Russia, there is a reduced likelihood of daily interactions with such nature, and this increases the need and necessity to experience such interactions.

PEER REVIEWED

Wilderness can be a place that only exists in our imagination. It's usually a place that is truly experienced by only a small fraction of society who either can afford to travel to undeveloped places, or who live there in isolated conditions (Figure 1). Although wilderness is thought of as a place, or places, today it is also a legal or zoning designation (i.e., a sociopolitical overlay) of a biophysical space. It can be recognized and legislatively protected by governments. The few remaining wilderness places of the world are increasingly sought after.



Vladimir Bocharnikov



Falk Huettmann



**Figure 1** –Young nenets girl with dog in the Yamal peninsula. Photo by Victor Slodkevich.

Wilderness is often idealized as an undisturbed, pristine space in “harmony”, a place where we can escape the pressures and spaces otherwise dominated by humans and their actions. In Western philosophical literature, concern about wilderness infringement and loss appeared almost two centuries ago in North America, when the scale of the extermination of wild animals and the transformation of their habitats by European settlers and colonists became rather obvious and of concern (Kormos et al. 2015). However, it took more than a century and a half before this concept really became ingrained in the world’s environmental community and became accepted as one of the strictest forms of protected natural areas. To protect something for wilderness character suggests maintaining the area relatively free from significant anthropogenic impact but also protected for human experiences of high-integrity nature and its ancient but ongoing and globally important ecological processes.

Although protection efforts are increasing, there is a decreasing trend in the area of such natural places on the planet. In these protected places, the unknown is protected as being more valuable than what is already familiar. Throughout the world – and to a very large extent in Russia – the Arctic, the taiga, and the high mountains and deserts are often perceived by the “Western world” as the most pristine wilderness areas on Earth (Huettmann 2012). That is usually due to their remoteness and subsequently very low level of anthropogenic influence (cf, Klein and Magomedova 2003). In this study we investigate and illustrate the low level of human influence on wilderness character of a large part of Russia, with special consideration of the Arctic (Spiridonov et al. 2012) as high priorities for additional protection.



**Figure 2** – The cold and muddy Studenya River is the only river flowing west of the volcanic Tolbachik. Tolbachik is a "volcanic complex on the Kamchatka Peninsula in the far east of Russia. It consists of two volcanoes, Plosky (flat) Tolbachik (3,085 m) and Ostry (sharp) Tolbachik (3,682 m), which as the names suggest are respectively a flat-topped shield volcano and a peaked volcano. Photo by Vladimir Bocharnikov.

## A Spatial Assessment of Wilderness Character Based on Ecosystem Integrity

Around the world, wilderness is commonly defined by the absence of permanent habitation and roads, and, most importantly, by lack of modern economic activity, which otherwise causes large-scale transformations, injury, and violation of natural ecosystems (Casson et al. 2016). There have been several global, continental, and national wilderness assessments (cf, Lesslie et al. 1988; Cao et al. 2017), but the criteria for these large-scale mapping exercises varies.

Wilderness represents areas shaped largely by natural forces in contrast to areas shaped by humans, although most areas of the world are now believed to be affected by climate-induced disturbance, as well as contaminations, noise, and invasive species and diseases, many of those are moving across borders. The traditional wilderness concept views wilderness as an objective place separate from humans, primarily shaped by natural forces and free from human inhabitants and structures (e.g., McCloskey 1966) (Figure 2). The reason for such a view is probably the

modern dominating Western culture that has been built as a human-nature (culture-nature) dichotomy; alternatives to this model exist, however. Roderick Nash (2001), for instance, suggests instead that wilderness is best understood using the conception of a spectrum of conditions or environment, ranging from the purely wild on the one end to the civilized or industrial-urban-rural surroundings on the other.

Because the modern concept of wilderness has been primarily a cultural or political one, the scientific foundation for wilderness is still being established, and is often lacking. The first step proposed here is to understand it as one part of larger landscapes of inhabitation. Wilderness instantiates a unique form of human-land relations, and wilderness "boundaries" reveal their permeable and fluid nature; it is usually a wilderness gradient. A geospatial analysis of Russian wilderness suggests that these areas are "empty," as judged by a modern economic point of view. Wildland preservation, however, tends to be motivated by a variety of ethical, biological, cultural, and recreational concerns. Rarely are efforts to protect wildlands motivated by an interest in promoting economic growth (Huettmann 2014). Those working on wildland preservation issues have often been forced to consider the issue of local economic impacts, but that's because those supporting commercial development of those wild natural landscapes emphatically assert that wildland preservation damages the local and national economies by restricting access to valuable natural resources and constraining commercial economic activity. A great deal of research in North America suggests otherwise (Christensen 2011).

Efforts described in this investigation focused on obtaining a highly generalized but realistic representation of the current degree of anthropogenic disturbance in the Russian Federation. We focus on original results from assessing the degree of anthropogenic disturbance to landscapes of the Russian Federation on the basis of geographic information systems (GIS) technology. We acknowledge that wilderness and wilderness definitions are complex and somewhat problematic across cultures, certainly on a global scale. Therefore, it may present particular difficulties for mapping and GIS, both of which depend on carefully defined attributes and discrete criteria (Carver et al. 2012).

## Methods

Using GIS software (ESRI ArcGIS10.2) and data, this assessment conducted for Russia starts with the recognition of a unified spatiotemporal continuum: one pole of which is represented by a virgin (immune from human management and impact) natural environment (wilderness), while the other pole of geographical space is considered as the cultural landscape, developed territories, and urbanized areas.

We then used widely applied geoinformation standard quantitative analyses showing (in absolute terms and as a percentage) large tracts of off-road and uninhabited (or nearly uninhabited) areas, as well as anthropogenically disturbed areas.

A "wilderness index" was calculated by the simple formula (Bocharnikov and Egidarev 2015):

$Rast = \Sigma(SPrdor + SP\lpos) * + \Sigma Znbf + \Sigma SP\lpin / OPtre$ , where:

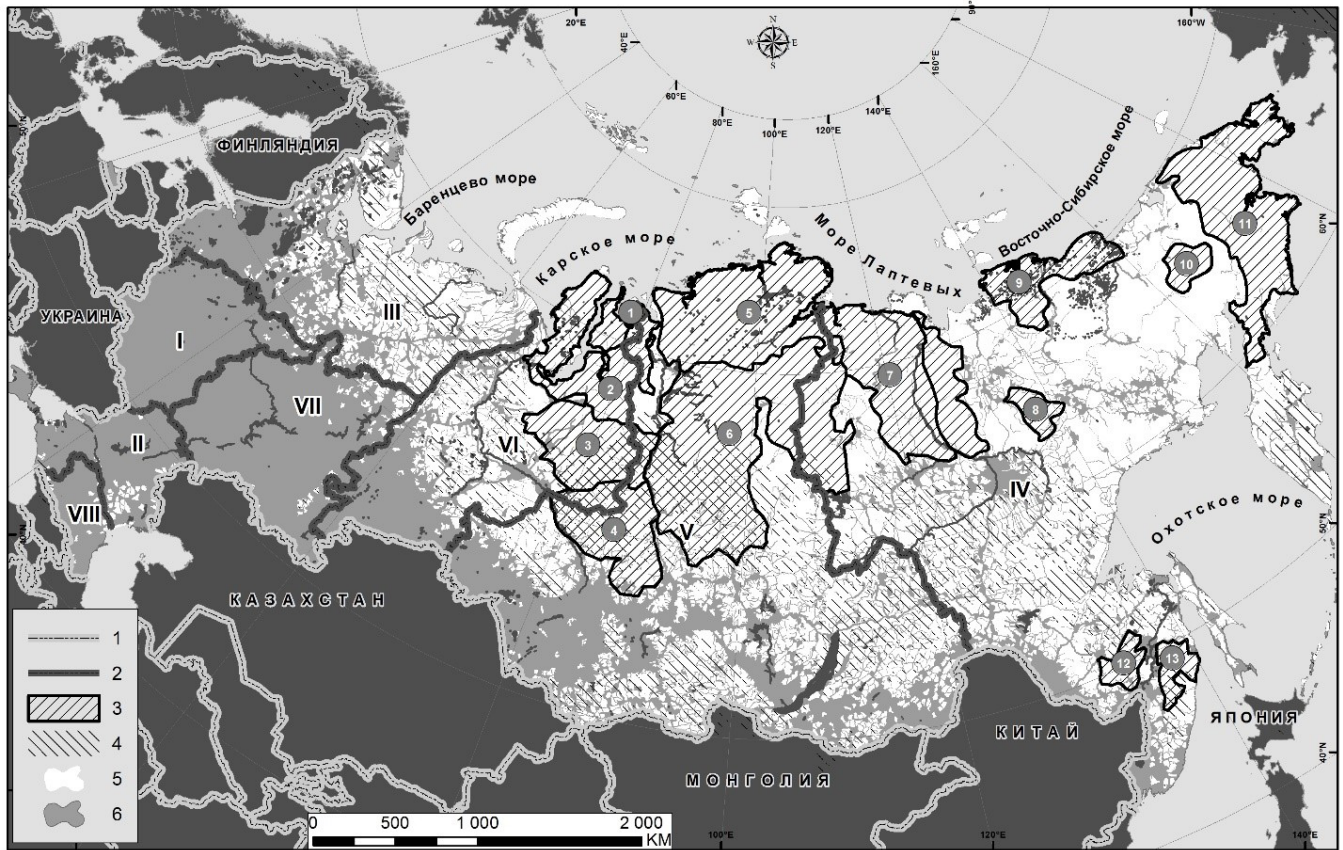
- *Rast* - the current state of the remaining large wilderness areas of the Russian Federation;
- $\Sigma SPrdor$  is the total area of the Russian "roadless areas";
- $\Sigma SP\lpos$  is the total area of the settlement of all types;
- $\Sigma Znbf$  is buffer zone, created by GIS standard buffer procedure, and ranging from 1 to 60 kilometers (62 to 37 miles) (see Bocharnikov and Egidarev 2015);
- $\Sigma SP\lpin$  is the total area of all types of industrial infrastructure and linear industrial facilities (power lines, pipelines, etc.); and
- *OPtre* is the total area of the administrative territorial unit subject or physiographic country or landscape ecological macroregion.

The working scale of our research is based on vector topographic maps of Digital Chart of the World Data (DCW) 1:1,000,000 scale pixel resolution, which was upgraded by the Russian company DATA+ in 2002. The methodological approach of work in US and European wilderness assessments has been based on the identification of five main features that are considered to be most characteristic of wilderness: (1) off-road territories, (2) officially existing protected areas, (3) spatially contiguous across our analysis area to serve as ecologically based indicators of biodiversity and/or landscape connectivity, (4) indigenous lands, and (5) recreational areas used for "primitive" recreation. For Russia, we were able to apply most of these features.

The first component of the analysis consists of the calculation of integral sites, permanently uninhabited and virtually unused by humans. Settlements, industrial areas, and infrastructure, including all forms of human development (land and inland water transport, communications of all types, power lines, pipelines, etc.) are excluded. The parameters for the calculation of the areas of obvious human influence – a buffer of the contact zones of the major transforming environment – shapes human interaction and is the prime directive. The algorithm of approximate calculation (the application of the "coarse filter" of display of the "unpopulated" territory) shows land plots within which exist no permanent settlements and lack industrial enterprises (including extracting and processing), transport, or communication infrastructure of any kind (e.g., highways and railways, power lines, oil and gas pipelines, and other large objects indicating economic activity).

The second component of the analysis is the identification of areas that have a high level of preservation of natural features. Mostly this means an area has an official federal, regional, and local protected area status. The overwhelming evidence from many case studies and reviews around the country demonstrates that wildlands and biodiversity protection is an overall positive net economic benefit to communities and to regional economies as well as contributing to an enhanced quality of life.

We are not including in our wilderness inventory of Russia some other possible criteria, such as known high biodiversity or best wildlife habitat areas, as well as indigenous lands and wilderness



**Figure 3** – The current distribution of human influence, federal districts (okrug), and large natural Russian roadless areas. Legend: 1 – border of the Russian Federation; 2 – Russia Federal District (okrug) borders (Roman numerals); 3 – large areas of wilderness (Arabic numbers in circles); 4 – high-integrity roadless areas; 5 – low-integrity human-influenced areas; 6 – hard anthropogenic-changed (human-influenced) areas.

tourism areas. That is because such accounting asks for more detailed information than was available. But more attention was given to what a wilderness area means for Russian ecosystem services and natural capital. We also consider that correct visualization of the actual socioeconomic situation of the country on the basis of the proposed integral indicator allows for a new “look” at the specifics of spatial distribution of resources, labor, services, and culture. It will help us understand the real role of Russian regions in the development of economic and ecological space (Figure 3).

For a minimal, noneconomic impact of the territory, this information comes from plots of not less than 50,000 hectares (123,553 acres), which made it possible to show a very detailed picture of economic “development” of the whole territory of Russia. The calculation of areas and drawing of contours was carried out through the use of standard software GIS functions (see Figure 3). We calculated wilderness conditions within the boundaries of official “net” administrative-territorial divisions.

## Results

Our small-scale cartographic analysis of the territory of Russia was able to describe the levels of intact landscapes and their protection. Figure 1 shows the result of our index and filter application to wilderness regions in Russia.

When mapping very large areas of wilderness, along with the impacts of the consequences of economic development, strong patterns quickly become evident. Dominating areas are found for southern Siberia and the south of the Far East, but also in central Siberia and the northeast of Russia.

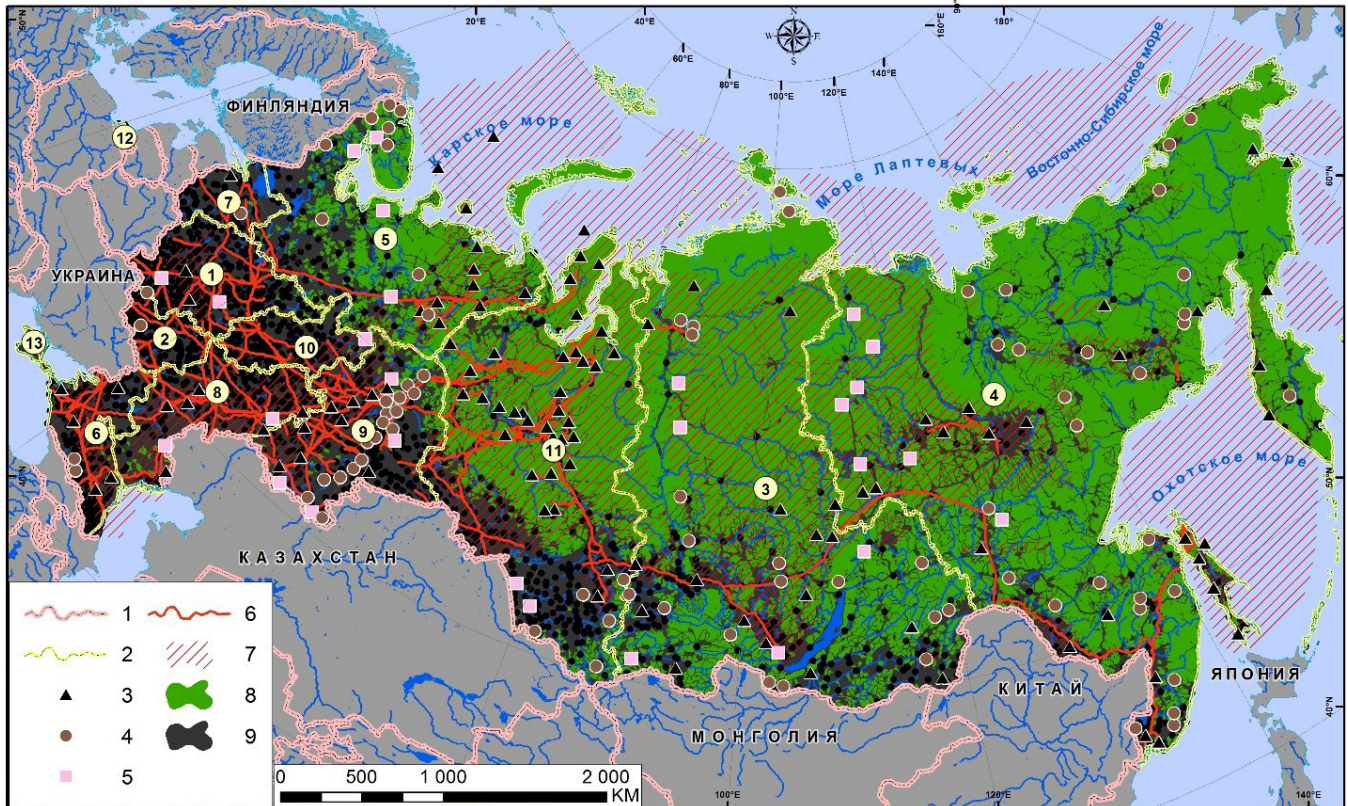
The idea of protecting wilderness character in Russian areas, to meet IUCN (International Union for the Conservation of Nature) Protected Area Category 1b requirements (Casson et al. 2016) has been expressed before. It has a long history. However, the wilderness idea has not found much popularity in Russia itself, remaining little known in most Russian scientific and conservation circles (Bocharnikov 2017). Major conservation gains could still be made, however, by effectively protecting these remote and widely unrecognized zones. Protecting these remote areas presents both unique challenges and promising opportunities. Russia has an opportunity to preserve and study the standards of nature and ecological processes, requiring minimum intervention by humans (Lavrenko et al. 1958; Zapovedniki Sovetskogo Soyuzu 1977; Shtilmark 2001).

## Discussion

Our results, as shown in Figure 3, show convincingly that human influence within Russia is far from uniform: the largest area of dense settlement is located in the European part of Russia (from 60 degrees north to the southern borders of the country), to the east (the band of intense settlement somewhat narrows toward the Urals and beyond, and widens again with more intense settlement from Novosibirsk to Tomsk, Kuzbass, and Altai, and further narrowing along the Trans-Siberian, and those industrial zones created in the last centuries). There is an obvious east-west gradient, and the Russian Far East (Huettmann and Gerasimov 2006; Huettmann 2008 for the Sea of Okhotsk), and the Arctic offers large areas of wilderness, although development corridors can be found, for example, roads and the Siberian railways (see Huettmann et al. 2011, 2012; Spiridonov et al. 2012) for Arctic shipping.

These characteristics are not commonly understood in ordinary general education maps, in educational atlases, on many thematic maps, or in reference books. We consider most important, in our calculations of Russia wilderness, the still-existing wild areas. Attention must be drawn to the fact that large wilderness areas (10,000 sq. km/3,861 sq. miles and more) exist. But mostly they are just found in the territory of Asian or "Eastern" Russia, with other very fragmented natural landscapes within the "northern territories" of the European part (Bocharnikov and Egidarev 2017).

This pattern becomes obvious even from this quick assessment and comparison of the territories that we are considering here in the wider grid of the administrative and territorial division in the federal districts. In the European part of Russia, the area of wild nature that is significant



**Figure 4** – Map of Russia illustrating differences between European and south Siberian areas with high population density and “prosperous” industrial areas. Legend: 1 – country borders; 2 – federal district (ocrug) borders; 3 – large coal deposits; 4–5 – gold and other metal deposits; 6 – main oil and gas pipelines; 7 oil and gas deposits; 8 – off-road areas; 9 – anthropogenic areas with high levels of landscape conversion. All sources for our mapping are public and can be found on site of Russian Geology Service. Map created by Vladimir Bocharnikov, GIS-specialist Eugene Egidarev

and comparable to the Asian part of the country is only located in the Northwest administrative district (Figure 4). This district has preserved almost half of its territory in a low anthropogenic impact state (48.1% of the total area), including the last large old-growth forests in the European part of the Russian Federation. In contrast, in the Central, Southern, and Privolzhsky districts – situated in the western part of Russia – only 3% remains as wilderness. In southern Russia are situated the North Caucasian and Southern Federal districts. Those – such as in the recent past a special Crimean region – contain only small biodiversity hot-spot areas with intact wilderness patches (some generally preserved in remote mountain areas) with a total of only about 1.9% and 6.7% of the total area, respectively.

Certainly this situation deserves a more accurate assessment in the near future, especially to separate remote historically populated areas from lands under agriculture during the last two centuries. We must take into account Russia as a whole as well as its federal district differences. That's because under modern economic conditions we need to know what the real value of wilderness for Russian governance with global repercussions is. For example, according to our accounts among Russian Arctic residents, the differences in the relationships and ratios between people and high-integrity nature can differ by many orders of magnitude. In Karelia there are 8.5 hectares (21 acres) of wilderness per person (in Arkhangelsk oblast, 15 ha/37 acres; Murmansk oblast, 29 acres ha; Komi Republic has 33 ha/81 acres per person). But in contrast with such

levels, on Chukotka, this ratio of wilderness per person reaches many times higher (e.g. 1,351 ha/3,338 acres per person).

We should mention here specifically that the Nenets Autonomous District is also among the Arctic leaders in intact wilderness. Accordingly, we found that each resident has 540 hectares (1,334 acres) of wilderness, whereas Yakutia has about half of that with 269 hectares (665 acres) (Figure 5), but which is still twice that in the Yamal-Nenets district, where it is only 114 hectares (282 acres) per person. And if we consider the large “middle Russia region” referred to as the Krasnoyarsk oblast, there are about 87 hectares (214 acres) of wilderness found per person (Bocharnikov and Egidarev 2016).

With a historical perspective in mind, we need to emphasize the major conservation gains achieved by the Soviet Union by effectively protecting nature reserve systems within inhabited areas. But that is not the case in these remote zones; only a few exceptions exist. The recent analysis of the existing Russian network of protected areas (Prisyazhnaya et al. 2016) shows that, despite all its undisputed merits and dignity, this network is very unevenly distributed across the country; it is also very uneven in terms of the size of the protected areas, and most have with poor infrastructure.

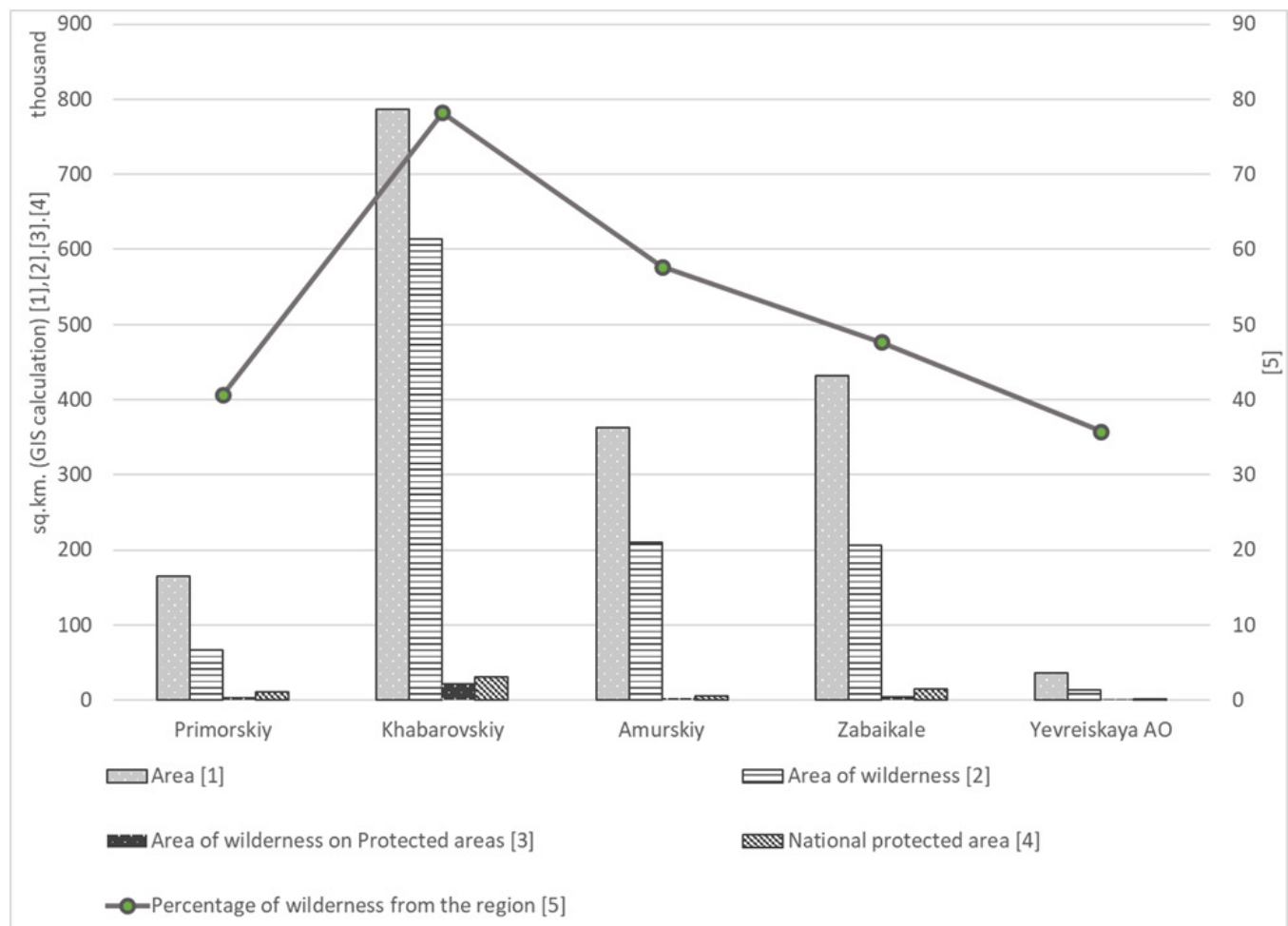
One should probably highlight that the protected areas (PA) system in Russia was designed by convenience and with a stark historic legacy, but not with modern principles and tools of stra-



**Figure 5** – The Aldan “Golden” River in the Yakutia. Photo by Vladimir Bocharnikov.

tegic conservation planning. It therefore offers itself to improvements, which is an international characteristic of most PAs worldwide, oceans included. However, besides lack of a sustainable funding scheme, the biggest flaw in Russia's existing PA system is probably its insufficient representation in both geographical representation and in regard to specific types of landscapes and soils. The preservation of nature and eternal inviolability of the territory of nature reserves were laid out and defined with a strong foundation by the Soviet Russia government decrees of 1920–1924. By 1950 there were 128 strict nature reserves in Russia; the total area was then approximately 0.56% of the country (Sokolov 2006).

However, a network of nature reserves continued to grow, and additional land areas were essentially protected simply by remoteness and lack of access, as seen in the eastern parts of Russia. But the eternal inviolability of the territories of nature reserves became gradually under pressure, and we should say that with increasingly neoliberal economic conditions many of the pragmatic environmental ideas have lost their original Russian protected-areas principles and foundation. It is important to stress here the differences between existing wilderness conditions and the extent of the official PA system (see Figure 6).



**Figure 6** – Wilderness areas and level of protection in the Russian part of the Amur River basin.



**Figure 7** – Siberian moose of western Siberia in the Yugansky Nature Reserve. Photo by Olga Strelnikova.

We should mention here that strict nature reserves (zapovednik) became a reality and justified for their limited use for the protection in the reserves of economically useful species. Obviously, further development of the network of reserves and national parks in Russia – arguably one of the largest and last wilderness areas in the world – needs a serious adjustment. That's because it serves not only Russian national interests but also global interests (Figure 7).

Another important point of our findings from Russia's wilderness assessment lies in the context of transboundary issues, which have great geopolitical importance. This is especially true in the south of the Russian Far East (see Figure 6 for details), such as within the Amur River basin. Along this great river basin (it ranks third when based on its total river length for Asia), there are state borders with four countries, including North Korea. There are no science-based comparisons yet between wilderness areas for each country, but the first step for Russia has been made, and it shows important wilderness areas in the far eastern transboundary Russian districts.


In conclusion, we have presented the first modern accounting of Russian wilderness for conservation planning, with all of Russia included. Within large regions there are many benefits from all types of nature use, including hunting, fishing, and harvesting of wild plants, as well as recreational activities and tourism. We can state that in contrast to many other countries, in Russia we can still find large wilderness areas not only in their "naturalness" state but also wildlife habitats that have been maintained without special government efforts. Really large wilderness areas, in

total about 4.8 million square kilometers (1,853,290 sq. miles) of the Far Eastern Federal okrug remains relatively intact, where the share of natural areas is 78.3% (an incredibly high number, globally speaking). Russia hosts many of the world's wilderness assets.

---

**“We can state that in contrast to many countries elsewhere, in Russia we can still find large wilderness areas not only in their ‘naturalness’ state but also wildlife habitats that have been maintained without special government efforts.”**

---

The vast territories of wild nature that are preserved in Russia for the whole planet are not so rich in resources. But they play a vital role in maintaining global ecological balance, and it's not yet recognized by Russia or the world community to its full potential. Put in context, we need to remember that the three poles concept (where the majority of ice and snow is located in the world, providing for the world's heat balance) (Huettmann 2012) suggests the globally important Arctic, Antarctic, and Himalayan Mountain areas all support the ecological balance of Eurasia and the world at large. 

**VLADIMIR BOCHARNIKOV** is a research biologist with the Pacific Institute of Geography of the Russian Academy of Sciences, Far East Division, Vladivostok; email: [vbocharnikov@mail.ru](mailto:vbocharnikov@mail.ru).

**FALK HUETTMANN** is faculty in the Biology and Wildlife Department, Institute of Arctic Biology at the University of Alaska–Fairbanks (UAF); email: [falkhuettman@alaska.edu](mailto:falkhuettman@alaska.edu).

## References

- Bocharnikov V. N. 2017. Dikaya priroda I osobo okhranyaemyye prirodnye teterritorii (OOPT) Sibiri (Wilderness and nature protected areas [PA] of Siberia). In *Voprosy geografii*. Sb. 143. Geograficheskiye osnovy zapovednogo dela (k 100-letiyu zapovednoy sistemy Rossii) (Questions of Geography. Collection of Papers. 143. Geographical Bases of the Nature Reserve Management (to the 100th Anniversary of the Russian Nature Reserve System), ed. V. M. Kotlyakov, A. A. Chibilev, and A. A. Tishkov (pp. 106–133). Moscow: Kodeks Publishing House. (In Rus).
- Bocharnikov V. N., and E. G. Egidarev. 2015. "Dikaya priroda" – novyy prirodookhrannyi indeks dlya territorii Rossii (Wilderness is new indicator for the assessment of the existing anthropogenic transformation on the territory of Russia). *Problemy regional'noy ekologii* (Problems of Regional Ecology) 5: 75–80. (In Rus).
- . 2016. *Ecologo-geographicheskoye kartographirovaniye ekonomicheskogo prostranstva Rossii na osnove technology GIS* (Ecological and geographical mapping of Russian economic regions based on GIS technologies). *Vestnik Volgogrskogo gos. un-ta. Ser. 3, Ekon. Ekol.* (Bulletin of Volgograd State University. Series.3, Economy. Ecology) 3: 163–176. (In Rus).
- . 2017. *Dikaya priroda v landshaftakh i ekoregionakh Rossii* (Wilderness in landscapes and ecoregions of Russia). *Geografiya i prirodnyye resursy* (Geography and Natural Resources) 4: 38–49. (In Rus).
- Cao, Y., Y. Long, and R. Rang. 2017. Research on the identification and spatial distribution of wilderness areas at the national scale in Mainland China. *Chinese Landscape Architecture* 33(258): 26–33.
- Carver, S., A. Comber, R. McMorrان, and S. A. Nutter. 2012. A GIS model for mapping spatial patterns and distribution of wild land in Scotland. *Landscape and Urban Planning* 104 (3/4): 395–409.
- Casson, S. A., V. G. Martin, A. Watson, A. Stringer, and C. F. Kormos. 2016. *Wilderness Protected Areas: Management guidelines for IUCN Category 1b protected areas*. IUCN World Commission on Protected Areas (WCPA). Retrieved from <http://winapps.umt.edu/winapps/media2/leopard/pubs/g30.pdf>.
- Christensen, N. 2011. Local economic importance of designated wilderness: Evidence in the literature. *International Journal of Wilderness* 17(3): 24–27.
- Huettmann, F. 2008. Marine conservation and sustainability of the Sea of Okhotsk in the Russian Far East: An overview of cumulative impacts, compiled public data, and a proposal for a UNESCO World Heritage Site. In *Ocean Yearbook 22*, ed. M. Nijhoff (pp. 353–374). Halifax, Canada.
- , ed. 2012. *Protection of the Three Poles*. Tokyo: Springer.
- . 2014. Economic growth and wildlife conservation in the North Pacific Rim. In *Peak Oil, Economic Growth, and Wildlife Conservation*, ed. E. Gates and D. Trauger (Chapter 4). Washington DC: Island Press.
- Huettmann F., Y. Artukhin, O. Gilg, and G. Humphries. 2011. Predictions of 27 Arctic pelagic seabird distributions using public environmental variables, assessed with colony data: A first digital IPY and GBIF open access synthesis platform. *Marine Biodiversity* 41: 141–179. doi 10.1007/s12526-011-0083-2.
- Huettmann, F., and Y. Gerasimov. 2006. Conservation of migratory shorebirds and their habitats in the Sea of Okhotsk, Russian Far East, in the year 2006: State-of-the-art and an outlook. *Stilt* 50: 23–33.
- Klein D. R., and M. Magomedova. 2003. Industrial development and wildlife in Arctic ecosystems. In *Social and Environmental Impacts in the North: Methods in Evaluation of Socio-Economic and Environmental Consequences of Mining and Energy Production in the Arctic and Sub-Arctic*, ed. R. O. Rasmussen and N. E. Koroleva. NATO Science Series (Series: IV: Earth and Environmental Sciences), vol. 31. Dordrecht, Netherlands: Springer.
- Kormos, C. F., B. Bertzky, T. Jaeger, Y. Shi, T. Badman, J. Hilty, B. G. Mackey, R. A. Mittermeier, H.
- Locke, E. Osipova, and J. E. M. Watson. 2015. A wilderness approach under the World Heritage Convention. *Conservation Letters*. September.
- Lavrenko E. M., V. G. Heptner, S. V. Kirikov, and A. V. Formozov. 1958. *Perspektivnyy plangeograficheskoy seti zapovednikov (proyekt)* (Perspective planning geographic network of reserves [project]). *Okhranyayemoyeprirody-izapovednoyedelo v SSSR* (Protected by nature and protected in the USSR). Bul. 3. Moscow: AN SSSR. 3–92.
- Lesslie, R. G., B. G. Mackey, and K. M. Preece. 1988. A computer based methodology for the survey of wilderness in Australia. *Environmental Conservation* 15: 225–232.
- McCloskey, M. 1966. The Wilderness Act of 1964: Its background and meaning. *Oregon Law Review* 45: 288–321.

- Nash, R. 2001. *Wilderness and the American Mind*. New Haven, CT: Yale University Press.
- Prisyazhnaya A. A., O. V. Chernova, and V. V. Snakin. 2016. Razvitiye systemy osobo okhranyaemykh prirodnykh territoriy (OOPTP – osnova sokhraneniya biologicheskogo raznoobraziya prirodnykh kompleksov) (Development of nature reserved areas network: The basis of conservation of biological diversity of natural systems. *Space and time* 11(1).
- Shtilmark F. R. 2001. Absolyutnaya zapovednost' – posledniy oplot real'noy okhrany dikoy prirody (Absolute reserve – the last stronghold of real wildlife protection). *Gumanitarnyy ekologicheskiy zhurnal (Humanitarian Ecological Journal)* 3: 111–113.
- Sokolov, V. Ye. 2006. Biosfernyye zapovedniki: tseli i problemy (Biosphere reserves: Goals and problems). *Lektsii laureatov Demidovskoy premii (1993–2004) (Lectures of the winners of the Demidov Prize [1993–2004])*. Ekaterinburg, retrieved from [http://www.aif.ru/dontknows/file/zapovednaya\\_sistema\\_rossii\\_spravka](http://www.aif.ru/dontknows/file/zapovednaya_sistema_rossii_spravka) (In Rus).
- Spiridonov V., M. Gavrilova, Y. Krasnov, A. Makarov, N. Nikolaeva, L. Sergienko, A. Popov, and E. Krasnova. 2012. Towards the new role of marine and coastal protected areas in the Arctic: The Russian case. In *Protection of the Three Poles*, ed. F. Huettmann. Tokyo: Springer.
- Zapovedniki Sovetskogo Soyuz (Natural Reserves of the Soviet Union). 1977. Moscow. Lesnaya promyshlennost' Publishing House.





Photo Credit: Dan Gold

# Pioneers of Wilderness Research:

## The Wilderness Management Research Unit

by **DAVID COLE**

The year 1964 was a landmark for important legislation in the United States. Among the bills passed that year was The Wilderness Act, which created a new category of public lands. Lands designated as wilderness were to be afforded the highest level of protection, even more protection than national parks and wildlife refuges. Like parks and refuges they were to be preserved in their natural condition, but above all, they were to be managed to protect their "wilderness character." Like parks and refuges they were available for public enjoyment, as long as recreation use did not adversely affect the values for which the area was designated. They were to be used and enjoyed "as wilderness." What did it mean to be charged with protecting wilderness character and managing for uniquely wilderness experiences? And how should one go about doing that?

The new land designation "wilderness" gave federal land managers a new and unique set of management objectives. Uncertainty about what those objectives were and how to achieve them was a problem. Prior to 1964, there were administratively designated wildernesses, open and available for recreation use. Through the 1950s and particularly the 1960s, wilderness recreation increased greatly. Heavy use resulted in significant impact on the environment (e.g., eroded trails, compacted campsites, piles of litter, and human waste problems). Increasing use meant popular destinations were often



by **David Cole**

crowded and less likely to offer the outstanding opportunities for solitude that wilderness was to provide. Increasing use and impact was a cause for concern, with little clarity about the nature or seriousness of the problem and uncertainty about what to do about it.

In response to this situation, in 1966, the Senate Appropriations Committee asked the Forest Service to develop a proposal for a wilderness management research unit, within the research branch of the Forest Service (Klade 2006). Responding to this request, the Intermountain Forest and Range Experiment Station developed a 13-page proposal that documented the challenge of wilderness management and specific research questions that needed to be addressed. It laid out a program focused on (1) the wilderness visitor, (2) plant and animal ecology in

wilderness, (3) wildlife species in wilderness, and (4) insect, fire, and disease control in wilderness. It asked for an annual allocation of US\$300,000 and proposed that the research be conducted at the new Forestry Sciences Laboratory, located on the University of Montana campus, in Missoula, Montana – an ideal location given its proximity to 7.3 million acres of existing or proposed wilderness (Figure 1).

Much of the proposal was accepted. In 1967, the new wilderness management research unit was established in Missoula. However, only \$75,000 was appropriated (Lucas 1972). The first project leader was Bob Lucas, who transferred from the Lake States Forest Experiment Station in St. Paul, Minnesota. Lucas, a geographer, had conducted pioneering research on visitors to the Boundary Waters Canoe Area, a



**Figure 1** – The impacts associated with recreational use of wilderness are a primary concern of wilderness managers. In response to serious impacts, many wilderness areas limit group size and prohibit camping immediately adjacent to lakes.

large tract of wilderness in northern Minnesota. His initial tasks were to develop a problem analysis to guide the new unit's research program and to hire an additional scientist. For the latter, he selected George Stankey, a doctoral student in geography from Michigan State University.

The Wilderness Management Research Unit was the first research institution in the United States to focus intensively on wilderness management. For decades it remained the only research institution in the world to work exclusively on wilderness, as interest in wilderness exploded around the world and wilderness acreage in the United States increased from 9.1 million acres (3,682,639 ha) in 1964 to more than 100 million acres (40,468,564 ha) today. As such its influence around the world has been profound, arguably more influential than any other Forest Service research program of its size. The unit produced much of the pioneering and seminal research in the field, collaborating with and often funding other wilderness researchers. It defined much of the research agenda for the burgeoning wilderness management field and provided much of the raw material for training successive generations of wilderness scientists and managers.

To describe the work and influence of this pioneering research unit, I divide the unit's tenure into three time periods. From 1967 to 1977, Bob Lucas and George Stankey were the sole scientists in the unit. Both were social scientists, and in-house research during this period was highly focused on wilderness visitors. From 1978 to 1987, budgets increased briefly. David Cole, Randy Wash-

burne, and Margaret Petersen joined the unit and the research agenda expanded. Randy Washburne, Margaret Petersen and George Stankey left the unit in 1982, 1984, and 1987, respectively, and Bob Lucas retired in 1988. During the final period, from 1988 to 1993, the research agenda expanded further. David Cole was project leader. He was joined by Alan Watson, whom Bob Lucas hired in 1987. Alan was interested in social science issues beyond recreation visitors. Peter Landres was hired in 1992 to explore a broader range of ecological issues in wilderness. In 1993, the unit morphed into the Aldo Leopold Wilderness Research Institute (Figure 2).

## Lucas and Stankey: 1967–1977

As befits the fact that wilderness science was a brand-new field of inquiry, the initial emphasis of the unit was on descriptive stud-



**Figure 2** - Bob Lucas, the foremost pioneer of wilderness science, was an avid outdoorsman and wilderness advocate, as well as scientist. He worked from the unit's beginning in 1967 until his retirement in 1988.

ies and development of and improvement in research techniques. Because there were only two scientists – both social scientists – the emphasis was on “visitor studies, use patterns, visitor characteristics, attitudes concerning wilderness, its use and management, and, particularly on the esthetic or social carrying capacity of wilderness and on management to match use to capacity” (Lucas 1972). The emphasis on visitor studies and social carrying capacity was retained throughout the 1970s but was increasingly supplemented by research on the ecological impacts of visitors.

Much of the early work of the unit appears – from the perspective of today – to be commonsense. But the unit’s research results were new knowledge and, in many cases, counter to prevailing notions. As Lucas (1972) noted, “Experienced administrative officers working with the same Wilderness sometimes disagree as to whether the area’s main use season is summer or fall, whether half or one-fifth of the visitors’ hike, how long they stay, where they go, and their estimates as to the level of use may vary by a hundred percent or more.” Even the most descriptive information went a long way toward making management more science informed.

Bob Lucas’s earliest personal research sought to refine methods for estimating recreation use in wilderness areas. He found that use estimates from trail registers were inaccurate but could be adjusted using correction factors obtained by either observing or using automatic cameras to estimate the proportion of different user types that failed to register. Some kinds of visitors – horse users, hunters, day users and teenagers – are less likely to

register (Lucas et al. 1971). Much of Lucas’s empirical work in the early 1970s focused on a “baseline survey” of summer and fall visitors to wilderness and backcountry areas in Montana (Lucas 1980). He sought comparable data on users of these areas regarding activity patterns, visitor characteristics, and preferences for management, facilities, and use situations. Since these original surveys, similar visitor surveys – often using questions first developed by Lucas – have been conducted in wilderness and parks around the world, resulting in an ever-improving understanding of wilderness visitors and an increased ability to monitor and understand trends over time (Figure 3).

One finding of the baseline survey was that use distribution on trails and at campsites is very uneven. Certain places are much more crowded and heavily impacted than other



**Figure 3** - A wilderness visitor registers at a wilderness trailhead to receive a mail-back questionnaire – part of Bob Lucas’s early 1970s baseline study of wilderness visitors in Montana.

places. This led to a study of the degree to which users might distribute themselves more equitably if they were given information about which trails are crowded and which ones aren't. Lucas found that such an effort was unlikely to be effective unless visitors have information in the planning stages of their trip and unless information on more than just use levels is provided (Lucas 1981). This interest in use distribution and how it might change over time or be altered through management led Lucas to cooperate with scientists from Resources for the Future, Inc. to develop a simulation model of wilderness visitor flows (Lucas and Schechter 1977). With this tool, managers could simulate the effects of policies under consideration, such as limiting use at most trailheads, building a new trail, or the effect of an increase in amount of use. Without having to actually try out the change, managers could get an idea of

what the resulting use pattern would be, what would happen to the number of encounters between parties, and how crowded camping areas would be.

In 1969, George Stankey did the fieldwork for his first research project. The resulting report on visitor perceptions of wilderness recreation carrying capacity proved to be highly insightful and influential – for its conceptualization of the issue, its methodology, and its empirical results (Stankey 1973). The study aimed to understand the nature of high-quality wilderness experiences, what characteristics of use influence experience quality, and how to manage for quality experiences. Extending the work of Lucas on perceptions of Boundary Waters Canoe Area visitors, Stankey studied visitors to the Bob Marshall Wilderness in Montana, the Bridger Wilderness in Wyoming, the High Uintas Wilderness in Utah, and the Boundary Waters Canoe Area in Minnesota. Recognizing that there are many different ideas about what constitutes a wilderness experience, Stankey reasoned that experience quality should be judged – not by the average visitor – but by those he called “purists,” those visitors whose personal definitions of what is and is not desirable in wilderness most closely match the legal framework provided by the Wilderness Act. These visitors defined a high-quality wilderness experience as one with few encounters with others, in an environment where human evidence was minimal, and where it was possible to camp far from others (Figure 4).

Stankey asked visitors how they would feel about encountering an increasingly large number of other groups, in this way relating satisfaction with one's experience to

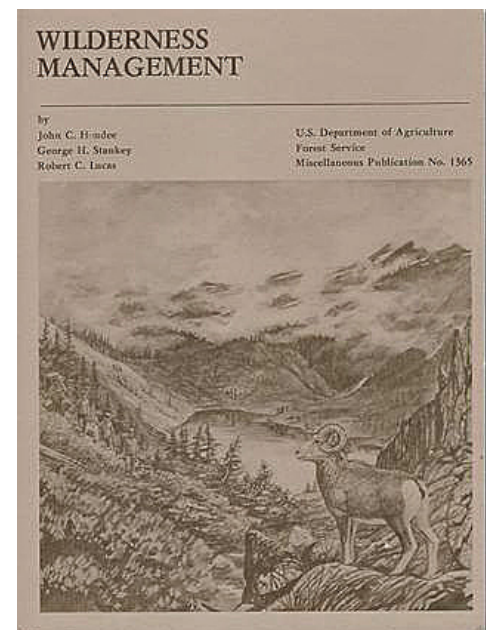


**Figure 4** - George Stankey washing up in camp during fieldwork for his 1969 study of the carrying capacity perceptions of wilderness visitors. He worked for the unit from 1969 until 1987.

level of use. He referred to widely shared preferences as norms – both regarding the number of encounters with other groups and appropriate methods of travel and group size. Hundreds of subsequent visitor studies have taken a similar approach – often referred to as a normative approach (e.g., Vaske et al. 1986; Manning 2012). Stankey found that other characteristics of the groups encountered affected satisfaction more than the number of groups encountered. From the perspective of what we know today, this might seem obvious, but at the time this finding ran counter to the perception that defining carrying capacity was the key to management, and capacity was all about the number of visitors. Stankey found that, in addition to amount of use, visitor satisfaction was affected by method of travel, group size, and where encounters occurred. He then described a range of management actions, including restricting the number of users, that might be taken to manage wilderness within its capacity and provided data on visitor opinions about the desirability of these actions.

The wilderness visitor research of Lucas and Stankey was supplemented by several studies of ecological impacts of recreation in wilderness conducted by university cooperators. Sheila Helgath studied trail deterioration in the Selway-Bitterroot Wilderness in Idaho, finding that most trail segments were stable, although a few deteriorate rapidly, and that deterioration rates are determined more by location, design, and maintenance than by the amount of use they receive (Helgath 1975). Sid Frissell developed a campsite condition monitoring technique (Frissell 1978) and applied it to campsites at popular destinations in the Spanish Peaks Primitive Area (Frissell 1973). Both of these studies innovated techniques that have been subsequently used in scores of other areas and that continue to be used today. They also discovered new knowledge that is so fundamental that few modern recreation ecologists acknowledge who first discovered it.

As important as their empirical research were Lucas's and Stankey's conceptual contributions to wilderness management (Lucas 1973) and their close cooperative work with other scientists and wilderness managers. The result was a much larger and more closely knit wilderness community than would normally have been possible given the meager investment made in the research unit. The publication of the textbook *Wilderness Management* (Hendee et al. 1978), in collaboration with fellow Forest Service scientist John Hendee, is a fitting culmination of the unit's first decade. The comprehensiveness of the book reflects Lucas's and Stankey's work organizing the field of wilderness management, developing concepts and principles as well as their empirical research. It is strengthened by the time they spent



**Figure 5** - The textbook, *Wilderness Management*, coauthored with John Hendee in 1978, represented the culmination of knowledge developed, organized, and applied during the first decade of the Wilderness Management Research Unit.

with wilderness managers and working within the larger community of wilderness scientists they helped nurture and foster. Although the first edition of the book was written when the field was barely a decade old, it is currently in its fourth edition, and 40 years later much of the book remains as originally written (Figure 5).

## Social and Ecological Science: 1978–1987

In 1978, funding for the Wilderness Management Research Unit doubled. David Cole was hired to increase the unit's capacity to work on ecological impacts in wilderness. Randy Washburne was hired to develop support for and work on several ambitious survey projects. There were also more funds available to support cooperative research on a wider array of wilderness issues. In 1980, Margaret Petersen joined the unit to assist in technology transfer and work as junior scientist. The primary research themes of an updated work unit description were visitor studies, ecological impacts of recreation, and improving wilderness management systems. Based on the prestige they developed over the preceding decade, requests for Lucas's and Stankey's time increased greatly. The wilderness concept was spreading globally. As the only research institution in the world devoted exclusively to wilderness management, international requests for guidance and visits increased along with similar domestic requests (Figure 6).

During this period, much of Bob Lucas's time went into administrative tasks. However, he continued empirical research on use measurement techniques, finding that self-issued permits provided better data than trailhead registers (Lucas and Kovalicky 1981). He oversaw research that Margaret Petersen conducted, demonstrating that trail registration compliance could be increased by locating registers up the trail and including a sign with reasons for registering

(Petersen 1985). In 1982, he repeated the survey of Bob Marshall Wilderness visitors first conducted in 1970, providing the first systematic information on trends in wilderness visitors and visits (Lucas 1985). He developed the first in-depth discussion of trends in wilderness visitation, concluding that the rate of increase in wilderness visitation has slowed and use of many areas, particularly in national parks, has declined (Lucas 1989). He also wrote and spoke about his concern for increased regulation in wilderness and its effect on freedom and spontaneity (Lucas 1982).

By this time, George Stankey had largely shifted away from empirical science. Requests for his expertise came from around the world, and, during this period, he spent two years in Australia, teaching classes and working with the New South Wales



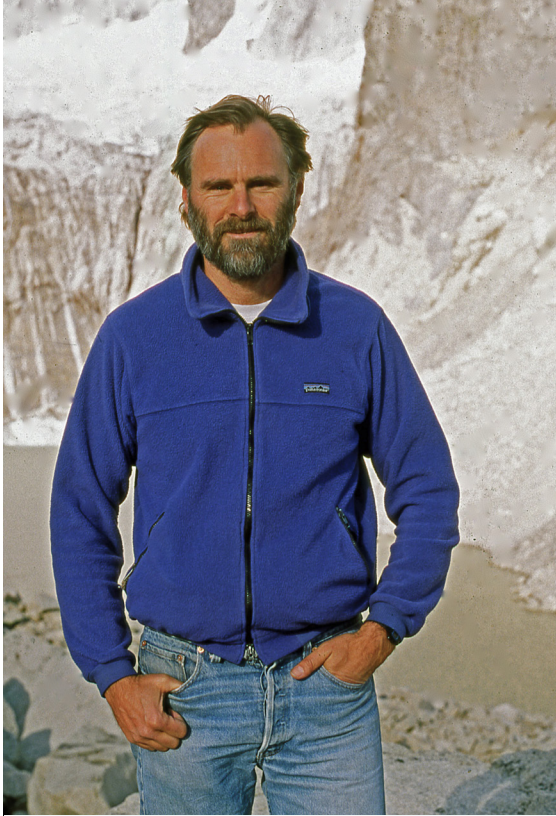
**Figure 6** - Randy Washburne, shown here measuring soil infiltration rates on campsites in the Eagle Cap Wilderness, worked for the unit from 1978 to 1982.

National Parks and Wildlife Service. When in Missoula, much of Stankey's effort went into two planning frameworks that proved to be highly influential. With Roger Clark, he expanded on the notion of the value of diversity in recreation experience to operationalize the framework referred to as the Recreation Opportunity Spectrum (Clark and Stankey 1979). Along with Sid Frissell, David Cole, Bob Lucas, Randy Washburne, and Margaret Petersen, he also worked to operationalize a process for dealing with recreational carrying capacity – a process that came to be known as Limits of Acceptable Change (LAC) (Stankey et al. 1985).

The genesis of this project was a request, in 1979, from Tom Kovalicky, deputy supervisor of the Flathead National Forest, to work with managers of the Bob Marshall Wilderness on some sort of demonstration of innovative wilderness management. At the same time, the research unit was being barraged with requests for help in dealing with carrying capacity. Managers sought something more than a list of factors to consider when grappling with the issue; they wanted a step-by-step process. Developing and applying such a process seemed a good idea for the demonstration project. The project took six years to complete and represented the largest outlay of time and resources in the history of the unit. All the scientists were involved, working to develop and publish the framework, conduct empirical studies of visitors and impacts, and work with managers on the LAC plan for the Bob Marshall Wilderness Complex. Following development of the framework, years were spent training

agency personnel in its application. The LAC framework proved to be highly influential, providing the conceptual basis for a series of similar frameworks developed both for other applications and around the world. Bob Lucas stated that by turning "what had long been referred to as carrying capacity into a practical management tool," development of LAC was the research unit's "major accomplishment" (Klade 2006, p. 109).

The addition of David Cole on temporary assignment, in 1978, allowed the unit to balance its work on wilderness visitors with work on ecological impacts. Cole's initial assignment was to develop a program of work on recreation impacts in wilderness, based on a survey of existing literature. By 1978, a number of relevant studies had been conducted, but few researchers had conducted more than one study. Existing knowledge, therefore, was disparate and unorganized; it was not cumulative and seldom applied to wilderness management problems. One of his first products was an annotated bibliography of more than 300 previous studies (Cole and Schreiner 1981). Synthesis of this information and its organization into a coherent field of recreation ecology followed, most notably in a state-of-knowledge review (Cole 1987a), the first textbook on recreation ecology, *Wildland Recreation: Ecology and Management* (Hammit and Cole 1987) and a number of book chapters, including one in the second edition of the text *Wilderness Management* (Cole 1990). Parallel to the early work of Bob Lucas on improving use measurement techniques, Cole developed monitoring techniques for campsites and trails in wilderness (Cole 1983;



**Figure 7** - David Cole, shown here in Torres del Paine National Park teaching Chilean park managers about the impacts and management of recreation use, was hired in 1978.



**Figure 8** - Margaret Petersen, shown here measuring vegetation cover on campsites in the Bob Marshall Wilderness, worked for the unit from 1980 to 1984.

Cole 1989a). Using these techniques, he documented trends in impact – in some cases over periods up to 32 years (Cole 2013) (Figure 7).

In a manner similar to Stankey's work on visitor experiences, Cole identified the use factors that influence the nature and magnitude of ecological impact: amount, type, timing, location, and geographic distribution. He systematically studied the influence of each of these factors in a variety of environmental settings across the country, using a combination of experimental techniques and examination of existing recreation sites. Most of this work was conducted on campsites, but he also worked on trails. He studied the disturbance process and the rate at which impact occurred, using experimental application of trampling and camping in previously undisturbed environments. He studied rates of recovery in places where recreation use was curtailed. Many of the fundamental principles of recreation ecology emerged from this work. Cole found that the relationship between amount of use and impact is generally curvilinear; a little use causes substantial impact, with higher levels of use having less effect (Cole 1982). He found that impact almost always occurs rapidly; recovery rates are more variable but almost always slower than rates of impact (Cole and Ranz 1983). He found that vegetation in forests was often more fragile than that in meadows, even at high elevations (Cole 1987b). He emphasized the management implications of these studies, pointing out how results were often counter to prevailing wisdom. Impacts are usually minimized by concentrating rather than dispersing use. Resting and rotating sites – allowing them to

recover – is usually a futile strategy. Recreation impacts may be more unsightly in meadows than in forests, but meadows are generally not more fragile

## **Beyond Wilderness Recreation: 1988–1993**

In 1987, George Stankey resigned from the Forest Service, returning to Australia to teach. Funding was sufficient to hire David Cole into a permanent position and to hire Alan Watson into George Stankey's position as a social scientist. Bob Lucas retired in 1988, and David Cole was appointed project leader. For a long time, Bob Lucas had been interested in information and education as an alternative to regulation. So in the mid-1980s, the unit began to devote substantial resources to low-impact education – improving the accuracy of message content and increasing the effectiveness of communication channels. Much of this was spurred by a trip organized by the National Outdoor Leadership School (NOLS) in 1985 that Bob Lucas and David Cole attended. On that trip, NOLS and the Forest Service agreed to collaborate to improve the content of low-impact educational messages and assure that they were consistent with science, a project that David Cole undertook. He collected brochures, pamphlets, articles, and other examples of recommended low-impact practices from management agencies around the country. He compared them to each other, finding they were frequently contradictory. He evaluated them in the light of existing research and distilled them into a consistent set of science-based messages. This work was summarized in a handbook on low-impact practices (Cole 1989b), a revision of the NOLS Conservation Practices, and *Soft Paths*, the first book-length treatment of what came to be called Leave-No-Trace (LNT) practices (Hampton and Cole 1988). Subsequently, a video version of *Soft Paths* was produced, containing the first version of Leave-No-Trace principles, principles that have since spread around the world, being found, for example, on hangtags on recreational equipment. Interagency brochures were produced, training sessions were held, and ultimately a nonprofit organization, Leave-No-Trace, Inc. was created to further this work (Cole 2018).

Work on communication methods was more limited, and much of it was conducted by cooperators with funding from the research unit. David Cole collaborated with Steve McCool and Tim Hammond to assess the effectiveness of posting LNT messages on trailhead bulletin boards. They found that as the number of messages increased, the attention devoted to each message declined, as did the ability to retain message content. Consequently, hikers exposed to eight messages could not identify any more of the agency-recommended practices than those exposed to only two messages (Cole et al. 1997). In a subsequent experiment, Cole (1998) found that simply asking people to take the time to read messages, in a banner above the messages, doubled the length of time they attended to the messages.

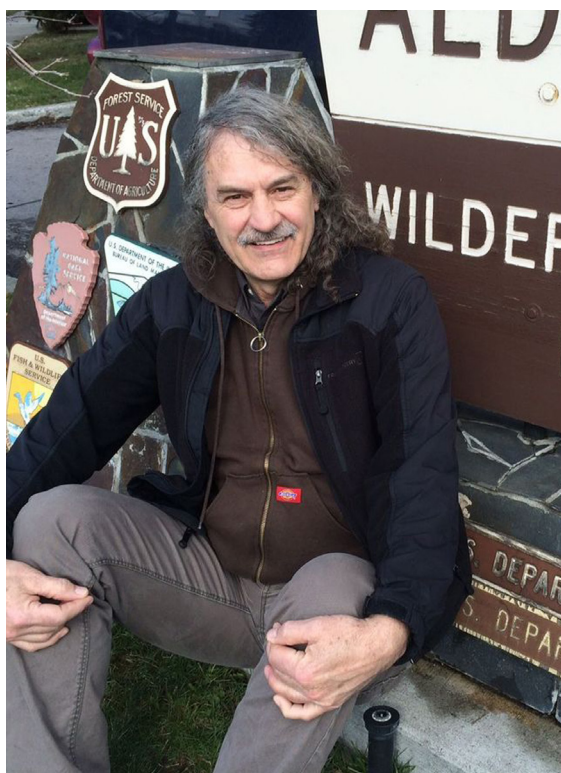
Around 1990, after the departure of Bob Lucas and with the hiring of Alan Watson, research emphases shifted again. Basic research on ecological impacts and experiential quality and the factors that influence them was to continue, but there was to be new emphasis on understand-

ing visitor conflict and on trends in visitors and impacts. The effectiveness of management techniques was to be evaluated, particularly in places that receive concentrated use, and, given widespread interest in the LAC process, research was to be conducted on appropriate indicators and standards and cost-effective techniques for monitoring them. Given the latter emphasis item, Peter Landres was hired in 1992 to increase the capacity of the unit to work on ecological issues other than recreation.

With the addition of Alan Watson, in-house empirical social science research increased dramatically. Moreover, with the retirement of Bob Lucas, there were substantial funds for extramural research. Perhaps after two decades the era of pioneering research was over, but this was a period of substantial research output by the unit. The first empirical study Watson undertook, in cooperation with Joe Roggenbuck and Dan Williams from Virginia Tech, was a study of visitors to three wildernesses in the South: Caney Creek in Arkansas, Cohutta in Georgia, and Upland Island in Texas (Watson et al. 1992). Besides collecting baseline information on visitors to wildernesses in a region and in ecosystem types that had not been studied before, a major focus of the study was to provide scientific input to the selection of indicators and standards, as part of the LAC process. Visitors were asked their opinions regarding which attributes of wilderness have the most impact on their experience. Littering and damage to trees in campsites, noise, and seeing wildlife were found to be very important influences on wilderness experiences. Less

important were the number of encounters with other people, although campsite encounters were more important than trail encounters (Roggenbuck et al. 1993). Regarding standards for acceptable wilderness conditions, there was broad agreement across wilderness areas. However, there was little shared agreement on appropriate conditions within each wilderness, suggesting the value of managing different zones within wilderness to different standards. It also suggests caution in using visitor opinions to set standards as "the task of making a numerical judgement regarding acceptable social encounter levels may be too abstract or hypothetical to result in a meaningful standard" (Williams et al. 1992, p. 755) (Figure 9).

In 1990, Watson started field studies of conflict between horse users and hikers in the John Muir and Sequoia-Kings Canyon Wildernesses in California and the Charles Deam Wilderness in Indiana. Twenty years earlier, George Stankey had found conflict



**Figure 9** - In 1988, Alan Watson was hired to continue the social science agenda of the departed George Stankey and the soon-to-retire Bob Lucas. He broadened the array of social science issues that were studied.



**Figure 10** - In early research, Alan Watson conducted detailed studies of the nature of the conflict between hiking and horse groups that George Stankey had identified 20 years before.

between horse users and hikers, with hikers being more bothered by meeting horse groups than they were meeting other hikers (Stankey 1980). Watson et al. (1993; 1994) sought to explore the nature of this conflict in more detail. They employed multiple measures of conflict, evaluations of whether encounters were disliked, and evaluations of whether one's experience goals were interfered with due to encounters. They also examined the extent to which four potential determinants of conflict (definition of place, specialization level, focus of trip/expectations, and lifestyle tolerance) predicted degree of conflict. They learned a lot, particularly about what predisposes visitors to experiencing conflict. Most fundamentally, hikers who dislike meeting horses in wilderness believe that horses are inappropriate in wilderness. They "also are not as likely to accord high status to horse users, have stronger relationships with the wilderness, and place more value on the opportunities for solitude than those who do not dislike horses" (Watson et al. 1993, p. 32) (Figure 10).

Watson and Cole collaborated on several projects. To complement handbooks on monitoring campsites and trails, a handbook on use estimation was produced (Watson et al. 2000). To extend the work on visitor trends begun by Lucas, in 1990 and 1991 visitor surveys were repeated in three wilderness areas that had initially been studied between 1969 and 1978: the Boundary Waters Canoe Area in Minnesota, Desolation Wilderness in California, and Shining Rock

Wilderness in North Carolina (Cole et al. 1995). Analysis of trends showed that characteristics of the people who visit wilderness changed more consistently than the types of trip they take, their evaluations of conditions, or their preferences for conditions and management. In particular, visitors were older, more highly educated, more likely to be female, and more likely to have visited other wildernesses. Watson utilized data from the Desolation Wilderness, where permits are required, to explore characteristics of people who entered the area without a permit (Watson 1993). He used data from the Boundary Waters to explore solitude opportunities there (Watson 1995).

The final collaborative project, which also involved Troy Hall from Virginia Tech, was a study of high-use destination areas a short distance from trailheads and close to large urban areas. Such places are generally highly crowded and impacted; they continue to have the same problems and concerns that first surfaced in the 1960s and spurred creation of the Wilderness Management Research Unit. Similar to the LAC project earlier, a major goal of the project was to bring both ecological and social science to bear on these issues, seeking increased insight into how to manage such places. Work was conducted in six lake basins in the Alpine Lakes, Mount Jefferson, and Three Sisters Wildernesses in Washington and Oregon. Recreation impacts on system trails, user-created trails, campsites, and lakeshores were quantified, as were encounters between groups –during the day and in the evening, on the trail, and at the destination. Exit interviews were conducted with visitors to explore who

they were, what they encountered, their responses to what they encountered, and their management preferences.

Not surprisingly, encounter rates in these destination areas were extremely high, clearly exceeding what most visitors preferred. Ecological impacts were also substantial, although generally not higher than has been reported elsewhere. Most visitors expected to have numerous encounters and were not bothered by their experience. They noticed impacts and reported that impacts detracted from their experience. Few visitors supported reducing use levels – the most effective means of reducing encounters – but were highly supportive of site management approaches to limiting impact (Cole et al. 1997). Study findings influenced a new wilderness recreation management strategy developed by the Forest Service – one that embraced the oft-lauded approach of internal zoning (Oye 2001) – as well as wilderness planning in the Pacific Northwest, at wildernesses such as Mt. Hood and Alpine Lakes (Figure 11).

David Cole's personal research focused on trend studies and further exploring the relationship between amount of use and amount of impact, in environments that vary in their durability. Studies indicated that trails were generally stable, although some segments are prone to rapid deterioration (Cole 1991). Most campsites – once they have been repeatedly used – are also relatively stable (Cole and Hall 1992). Campsite impact during the 1970s and 1980s often increased greatly, but more from the proliferation of new campsites than the deterioration of existing ones (Cole 1993). This work had important implications both



**Figure 11** - A major research focus for the unit in the early 1990s was management of high-use destinations in wilderness. Wilderness areas close to large urban areas experienced ever-increasing use, particularly by day visitors: informal trailing around Rampart Lakes in the Alpine Lakes Wilderness.

for wilderness management and Leave-No-Trace practices. In popular places, it is important to concentrate use on a few established sites that rangers keep as small, clean, and attractive as possible. In little-used places, use should be dispersed, places where incipient impact is apparent should be avoided, and rangers should try to eliminate evidence of use and impact.

To extend experimental methodologies, Cole worked with Neil Bayfield, the Scottish ecologist who pioneered experimental studies of recreation impact in the 1960s. They developed a standardized method for conducting trampling experiments that would facilitate the comparability of trampling experiments, studies that were increasingly common around the world (Cole and Bayfield 1993). These methods were applied to 18 vegetation types, in Washington, Montana, Colorado, New Hampshire, and North Carolina. Camping impacts were also explored experimentally by directing people to camp on previously unused sites in varied vegetation types (Cole 1995c). Results showed that vegetation types growing in close proximity to each other can vary at least 30-fold in durability (Cole 1995a). The ability to resist being damaged by trampling was often negatively correlated with the ability to recover from damage (Cole 1995b), and it was possible to predict the resistance and resilience of vegetation by examining plant morphological characteristics. These results added to knowledge about where managers should locate



**Figure 12** - Trampling experiments complemented studies of established recreation sites to better describe the relationship between use and impact, rates of impact and recovery, and how impact and recovery vary among vegetation types.



**Figure 13** - Peter Landres was hired in 1992 to expand the ecological capacity of the unit. Much of his work focused on wilderness monitoring.

facilities and what visitors should be told, in Leave-No-Trace messages, about more durable routes over which to travel and camp (Figure 12).

A quarter century after establishment of the Wilderness Management Research Unit, the program still did not have sufficient funding to work on the array of research needs identified in the 1966 proposal to Congress. Cole (1994) developed a tool, the threats matrix, to clarify the breadth of threats to wilderness that were of concern and the variety of wilderness values at risk. He worked to identify scientists who could contribute new types of expertise to wilderness management. He worked with Mitch McClaran on issues related to meadow management and packstock grazing (McClaran and Cole 1993). He recruited and funded Rick Knight at Colorado State University to synthesize knowledge about recreation impacts on wildlife, resulting in the first book on the topic (Knight and Gutzwiller 1995).

The hiring of ecologist Peter Landres in 1992 also reflected this interest in expanding the array of issues the unit could explore by expanding its skill set. Much of Landres's time during the final year the research unit existed was devoted to developing a research agenda for ecological work beyond recreation. He collaborated with David Cole on a further elaboration of threats to wilderness ecosystems (Cole and Landres 1996) and a chapter on indirect threats of recreation to wildlife (Cole and Landres 1995), ultimately focusing his work on monitoring (Figure 13).

In 1992, Congressman Bruce Vento, concerned that agencies were not giving wilderness management the attention it

deserved, introduced a Forest Service Wilderness Management Act in Congress. Among other things, the act called for creation of an interagency Aldo Leopold Wilderness Research Institute, to be located in or near Missoula, Montana. Although the bill was never enacted, Forest Service Research decided to administratively create such an institute by assimilating the Wilderness Management Research Unit, its personnel and resources, and then seeking to attract additional resources to expand the program from there. In 1993, the institute was dedicated, and 26 years after it was created, the Wilderness Management Research Unit ceased to exist.

## Legacy

Although it only existed for 26 years and usually had a staff of only two or three scientists, the legacy of the Wilderness Management Research Unit is profound. Staff scientists organized and gave structure to two fledgling disciplines – wilderness science and recreation ecology. They developed and refined sampling protocols and research methods for both these fields, protocols and methods that have been repeated in hundreds of subsequent studies. They coauthored the first textbooks in these fields, as well as the first book devoted exclusively to Leave-No-Trace practices. The science being done moved from basic observation, description, and organization to ever more sophisticated theory and hypothesis testing. With collaborators they developed two of the most important recreation planning frameworks, the Recreation Opportunity Spectrum and Limits of Acceptable Change. The arc of the unit's contributions to knowledge can be traced from the pioneering work of two social scientists, to the seminal recreation ecology work of the unit's second decade, to the increasingly diverse and productive agenda that was taken on in the final years and is being carried on by the Aldo Leopold Wilderness Research Institute.

As important as their contributions to knowledge was their attention to building and nurturing a collegial and vibrant network of wilderness scientists and managers. Staff scientists mentored young scientists, provided funding for research projects, collaborated with others, organized and attended conferences and workshops, and interacted frequently with field managers and rangers all over the country. They attended and gave talks at international wilderness conferences, expanding the collaborative network further. Most of the first few generations of wilderness scientists and recreation ecologists worked with, were funded by, or otherwise collaborated with unit scientists, leaving them profoundly influenced by those interactions. The ultimate legacy of the Wilderness Management Research Unit is this network of scientists and managers working on wilderness issues, made wiser and more informed by the work that was done by this small group of scientists. 

**DAVID N. COLE** is emeritus scientist with the Aldo Leopold Wilderness Research Institute. He retired in 2013 after a 35-year career as a wilderness scientist. Since his retirement he has been developing a History of Wilderness Science section on the Leopold Institute website, with interviews of pioneering wilderness scientists and papers documenting the history of wilderness science.

## References

- Clark, R. N., and G. H. Stankey. 1979. *The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research*. General Technical Report PNW-98. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.
- Cole, D. N. 1982. *Wilderness Campsite Impacts: Effect of Amount of Use*. Research Paper INT-284. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1983. *Assessing and Monitoring Backcountry Trail Conditions*. Research Paper INT-303. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1987a. *Research on soil and vegetation in wilderness: A state-of-knowledge review*. In *Proceedings, National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions*, comp. R. C. Lucas (pp. 135–177). USDA Forest Service General Technical Report INT-220. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1987b. *Effects of three seasons of experimental trampling on five montane forest communities and a grassland in western Montana, USA*. *Biological Conservation* 40: 219–244.
- . 1989a. *Wilderness Campsite Monitoring Methods: A Sourcebook*. General Technical Report INT-259. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1989b. *Low-Impact Recreational Practices for Wilderness and Backcountry*. General Technical Report INT-265. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1990. *Ecological impacts of wilderness recreation and their management*. In *Wilderness Management*, 2nd ed., ed. J. Hendee, G. Stankey, and R. Lucas (pp. 425–466). Golden, CO: North American Press.
- . 1991. *Changes on Trails in the Selway-Bitterroot Wilderness, Montana, 1978–89*. Research Paper INT-450. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1993. *Campsites in Three Western Wildernesses: Proliferation and Changes in Condition Over 12 to 16 Years*. Research Paper INT-463. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1994. *The Wilderness Threats Matrix: A Framework for Assessing Impacts*. Research Paper INT-475. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1995a. *Experimental trampling of vegetation. I. Relationship between trampling intensity and vegetation response*. *Journal of Applied Ecology* 32: 203–214.
- . 1995b. *Experimental trampling of vegetation. II. Predictors of resistance and resilience*. *Journal of Applied Ecology* 32: 215–224.
- . 1995c. *Disturbance of natural vegetation by camping: Experimental applications of low-level stress*. *Environmental Management* 19: 405–416.
- . 1998. *Written appeals for attention to low-impact messages on wilderness trailsides bulletin boards: Experimental evaluations of effectiveness*. *Journal of Park and Recreation Administration* 16: 65–79.
- . 2013. *Changing Conditions on Wilderness Campsites: Seven Case Studies of Trends Over 13 to 32 Years*. General Technical Report RMRP-GTR-300. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- . 2018. *Leave No Trace: How it came to be*. *International Journal of Wilderness* 24(3): 54–65.
- Cole, D. N., and N. G. Bayfield. 1993. *Recreational trampling of vegetation: Standard experimental procedures*. *Biological Conservation* 63: 209–215.
- Cole, D. N., and T. E. Hall. 1992. *Trends in Campsite Condition: Eagle Cap Wilderness, Bob Marshall Wilderness, and Grand Canyon National Park*. Research Paper INT-453. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Cole, D. N., T. P. Hammond, and S. F. McCool. 1997. *Information quantity and communication effectiveness: Low impact messages on wilderness trailsides bulletin boards*. *Leisure Sciences* 19: 59–72.
- Cole, D. N., and P. B. Landres. 1995. *Indirect effects of recreation on wildlife*. In *Wildlife and Recreationists: Coexistence Through Management and Research*, ed. R. L. Knight and J. J. Gutzwiller (pp. 183–202). Covelo, CA: Island Press.

- Cole, D. N., and P. B. Landres. 1996. Threats to wilderness ecosystems: Impacts and research needs. *Ecological Applications* 6: 168–184.
- Cole, D. N., and B. Ranz. 1983. Temporary campsite closures in the Selway-Bitterroot Wilderness, Montana. *Journal of Forestry* 81: 729–732.
- Cole, D. N., and E. G. Schreiner. 1981. Impacts of Backcountry Recreation: Site Management and Rehabilitation – an Annotated Bibliography. General Technical Report INT-121. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Cole, D. N., A. E. Watson, T. E. Hall, and D. R. Spildie. 1997. High-Use Destinations in Wilderness: Social and Biophysical Impacts, Visitor Responses, and Management Options. Research Paper INT-RP-496. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Cole, D. N., A. E. Watson, and J. W. Roggenbuck. 1995. Trends in Wilderness Visitors and Visits: Boundary Waters Canoe Area, Shining Rock, and Desolation Wildernesses. Research Paper INT-RP-483. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Frissell, S. S. 1973. The impact of wilderness visitors on natural ecosystems. Unpublished paper on file at USDA Forest Service, Aldo Leopold Wilderness Research Institute, Missoula MT.
- . 1978. Judging recreation impacts on wilderness campsites. *Journal of Forestry* 76: 481–483.
- Hammitt, W. E., and D. N. Cole. 1987. *Wildland Recreation: Ecology and Management*. New York: Wiley.
- Hampton, B., and D. Cole. 1988. *Soft Paths: How to Enjoy the Wilderness Without Harming It*. Harrisburg, PA: Stackpole Books.
- Helgath, S. F. 1975. Trail Deterioration in the Selway-Bitterroot Wilderness. Research Note INT-193. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Hendee, J. C., G. H. Stankey, and R. C. Lucas. 1978. *Wilderness Management*. Washington, DC: US Government Printing Office.
- Klade, R. J. 2006. Building a Research Legacy: The Intermountain Station: 1911–1997. General Technical Report RMRS-GTR-184. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- Knight, R. L., and K. J. Gutzwiller. 1995. *Wildlife and Recreationists: Coexistence Through Management and Research*. Washington DC: Island Press.
- Lucas, R. C. 1972. Forest Service wilderness research – the problem, research to date, and needed research. Unpublished paper on file at USDA Forest Service, Aldo Leopold Wilderness Research Institute, Missoula MT.
- . 1973. Wilderness: A management framework. *Journal of Soil and Water Conservation* 28: 150–154.
- . 1980. Use Patterns and Visitor Characteristics, Attitudes, and Preferences in Nine Wilderness and Other Roadless Areas. Research Paper INT-253. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1981. Redistributing Wilderness Use Through Information Supplied to Visitors. Research Paper INT-277. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1982. Recreation regulations – when are they needed? *Journal of Forestry* 80: 148–151.
- . 1985. Visitor Characteristics, Attitudes, and Use Patterns in the Bob Marshall Wilderness Complex, 1970–82. Research Paper INT-345. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1989. A look at wilderness use and users in transition. *Natural Resources Journal* 29: 41–55.
- Lucas, R. C., and T. J. Kovalicky. 1981. Self-Issued Wilderness Permits as a Use Measurement System. Research Paper INT-270. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Lucas, R. C., and M. Schechter. 1977. A recreational visitor travel simulation model as an aid to management planning. *Simulation and Games* 8: 375–384.
- Lucas, R. C., H. T. Schreuder, and G. A. James. 1971. Wilderness Use Estimation: A Pilot Test of Sampling Procedures on the Mission Mountains Primitive Area. Research Paper INT-109. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Manning, R. E. 2012. Frameworks for defining and managing the wilderness experience. In *Wilderness Visitor Experi-*

- ences: Progress in Research and Management, comp. D. N. Cole (pp. 158–176). Proceedings RMRS-P-66. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station.
- McClaran, M. P., and D. N. Cole. 1993. Packstock in Wilderness: Use, Impacts, Monitoring, and Management. General Technical Report INT-301. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Oye, G. 2001. A new wilderness recreation strategy for national forest wilderness. *International Journal of Wilderness* 7: 15–16.
- Petersen, M. E. 1985. Improving Voluntary Registration Through Location and Design of Trail Registration Stations. Research Paper INT-336. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Roggenbuck, J. W., D. R. Williams, and A. E. Watson. 1993. Defining acceptable conditions in wilderness. *Environmental Management* 17: 187–197.
- Stankey, G. H. 1973. Visitor Perception of Wilderness Recreation Carrying Capacity. Research Paper INT-142. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1980. A Comparison of Carrying Capacity Perceptions Among Visitors to Two Wildernesses. Research Paper INT-242. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Stankey, G. H., D. N. Cole, R. C. Lucas, W. E. Petersen, and S. S. Frissell. 1985. The Limits of Acceptable Change (LAC) System for Wilderness Planning. General Technical Report INT-176. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Vaske, J., B. Shelby, A. Graefe, and T. Heberlein. 1986. Backcountry encounter norms: Theory, method and empirical evidence. *Journal of Leisure Research* 18: 137–153.
- Watson, A. E. 1993. Characteristics of Visitors Without Permits Compared to Those with Permits at the Desolation Wilderness, California. Research Note INT-414. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- . 1995. Opportunities for solitude in the Boundary Waters Canoe Area Wilderness. *Northern Journal of Applied Forestry* 12: 12–18.
- Watson, A. E., D. N. Cole, D. L. Turner, and P. S. Reynolds. 2000. Wilderness Recreation Use Estimation: A Handbook of Methods and Systems. General Technical Report RMRS-GTR-56. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Watson, A. E., M. J. Niccolucci, and D. R. Williams. 1993. Hikers and Recreational Stock Users: Predicting and Managing Recreation Conflicts in Three Wildernesses. Research Paper INT-468. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Watson, A. E., M. J. Niccolucci, and D. R. Williams. 1994. The nature of conflict between hikers and recreational stock users in the John Muir Wilderness. *Journal of Leisure Research* 26: 372–385.
- Watson, A. E., D. R. Williams, J. W. Roggenbuck, and J. J. Daigle. 1992. Visitor Characteristics and Preferences for Three National Forest Wildernesses in the South. Research Paper INT-455. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Williams, D. R., J. W. Roggenbuck, M. E. Patterson, and A. E. Watson. 1992. The variability of user-based social impact standards for wilderness management. *Forest Science* 38: 738–756.







The Wild and Scenic Feather River, CA **Photo Credit:** Tim Palmer

# #TheRiverisMyOffice

by **RISA SHIMODA**

Millions of people visit rivers to wade in the water, skip a stone, fish, float, or simply walk alongside them, enjoying the view. However, how do visitors think about the role of their hosts – the river managers or park rangers from town, county, state, or federal agencies who know the river well and provide facilities and information, who make their visit easy and perhaps nearly effortless? These professionals welcome all guests, understanding that they include the enthusiasts who prepare for unanticipated weather and water levels, and the groups of friends who decide to float the river on a hot sunny day with their beverage coolers, and without life vests.

River professionals uphold ideals and values. They greet the challenge of a new or high-water stage river run with grins. They tolerate the tedium of managing regulations, counting people, monitoring invertebrates, or collecting water samples. They are knowledgeable planners whose commitment to rivers is grounded in their expertise and care necessary to manage rivers wisely. They also find joy when helping a nine-year-old cast for her first fish or take out after his first kayaking trip. They know the experience of adventure is personal and that a half-day float may inspire lifelong passion.



Risa Shimoda

---

**“You have met #theriverismyoffice river managers and others who work in river-related professions. Their stories paint a picture of a richly committed, enthusiastic group of people responsible for many aspects of the rivers on or in which we rely.”**

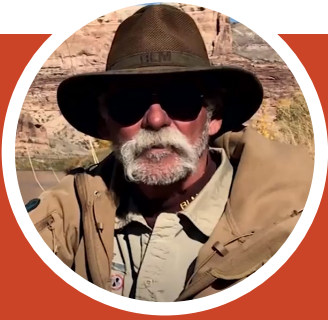
## Telling the Story

The River Management Society (RMS) is the nation's only organization dedicated to "support professionals who study, protect, and manage North America's rivers." It is rooted in the 1970s when the Interagency Whitewater Committee, river planners, and rangers from US federal river administering agencies collaborated to address the high impact on river campsites and access areas emerging from the growing popularity of river running. Since those early days, river use has continued to grow and diversify, and agency managers have continued to provide a critical interface for the public by welcoming visitors, encouraging them to learn how to run rivers safely, and providing information that teaches them how to care for the rivers they enjoy. Agencies cannot support visitation alone or identically as their missions differ in how they value recreation and river protection. It therefore "takes a village" to manage our rivers and streams, and RMS's membership and programs reflect this need for collaboration among river outfitters and guides, rangers, planners and landscape architects, environmental lawyers, geologists and fluvial geomorphologists, professors, students, researchers, and authors.

In 2017, the River Management Society decided to recognize the unheralded and, arguably, increasingly undervalued experience of river professionals. As advocates, professionals, and recreationalists ourselves, we were concerned that the role of technical river experts, entrusted with the public's safety and enjoyment on the nation's rivers, was being overlooked. To shine a light on their energy and expertise, we quite simply sought to ask river managers and stewards to share a bit about what they do to document glimpses into their day-to-day activities and to help establish how river managers, along with partners in the nonprofit sector and among stewardship-minded businesses make the positive public experience of rivers' wonders possible.

Anniversaries are markers of important events and can be superb reminders about circumstances that have evolved during ensuing years. The advent of the 50th anniversary of the Wild and Scenic Rivers Act stirred interest in the historic system among both river advocates whose efforts drove its legislative pursuit, and agencies responsible for managing the special values for which the rivers are designated. Commemoration of the act also created an opportunity to define the work of the people whose work makes rivers accessible and to help the public understand the commitment they have made to their profession, their river, and those who visit to work, study, or play.

We invited river professionals, colleagues, and friends to "hold up their phone" and record a video of themselves at work sharing what they do, why it is important, and how they would advise others considering a professional position or career in river management and protection. Participants were asked to share their "typical" day, how their efforts benefit and impact the public, and to address issues and challenges faced while managing river resources. Participants were also asked to share a more personal and intimate side of their profession. They were encouraged to describe the moment they knew they wanted to dedicate their careers to stewardship and protection, and what they wished they had known before beginning their professional journey.



## Troy Schnurr

**Meet Troy Schnurr, river ranger on the Ruby Horsethief section of the Colorado River [here](#).**

Staff from the RMS assisted potential participants by providing guidance for creating videos and uploading content. We could not predict the type and quality of responses we would receive and did not seek to limit or constrain their responses. We had hopes for the messaging we would see and hear and have been thrilled to have collected stories, which have exceeded our expectations! The RMS continues to gather, post, and share river professionals' stories to raise awareness of the people responsible for river management and the pride they have in their work. They cannot be effective if faceless, so although videos of them all cannot be collected, our efforts are to best represent them all with stories and thoughts that represent both their successes and challenges.

Early in the process, Troy Schnurr and Kathy Zerkle, river rangers for the Bureau of Land Management on the Colorado River and New River, respectively, provided strong examples of how video "selfies" could highlight the efforts and passions of river professionals. Chris Brown, the longtime face for rivers at American Rivers, the National Park Service, and USDA Forest Service, also provided an example of how river stewards and advocates can impact the public. Brown led campaigns to protect more than 1,000 river miles (1,609 km), secure US\$25 million in appropriations, and break the congressional logjam on wild and scenic river designations for American rivers in the mid-1980s.

## Rebecca Urbanczyk

**Rebecca Urbanczyk and the Clearwater River cleanup crew in the field on National Public Lands Day, 2018. Meet BLM river ranger Rebecca, [here](#).**



Many important stories needed to be told, so we proceeded to record profiles during river and paddling events. The result thus far is a compilation of more than 30 short videos featuring a diversity of themes and locations, including

- Rebecca Urbanczyk, [David Michaels, and Bob Stanley](#) addressing the protection and management of rivers such as the Clearwater River (ID) and Tuolumne River (CA).
- [Kelsey Bracewell](#), American Canoe Association, discussing the importance and value of teaching and training paddlesport instructors.
- [Lil Colby](#), co-owner of MIT Watergear, and [Phil Walczynski](#), owner of Down River Equipment, highlighting the role and partnerships with manufacturers, businesses, and managers.
- Tabitha Chlubicki and [Will Jarvis](#), Sheri Griffith River Expeditions, sharing their experiences guiding the public through river canyons such as on the Yampa River; and
- [Corita Waters](#), National Park Service, expressing the need to coordinate partnerships among river groups to expand opportunities to experience, and hopefully learn to love, rivers.

We also produced a short [compilation video](#) so of select interviews that tells the story of partnerships, efforts, and experience of river advocates, professionals, and county, state, and federal river managers better than anyone could ever script. The #TheRiverismyOffice project playlist can be found online at [#TheRiverismyOffice project playlist](#).



### Tabitha Chlubicki

**Learn from this veteran guide why showing people places is vital to their protection [here](#).**

## Why Shine This Light on Professionals?

The demand to visit outdoor spaces such as rivers and other managed public resources is growing. According to the Outdoor Foundation, whose annual outdoor participation report identifies usage trends for manufacturers of outdoor gear and the public, has shared that outdoor participation continues to grow. In their most recent report, outdoor participation increased from 48.8% of the US population in 2016 to 49.0% in 2017. Participation in human-powered watersports including canoeing, kayaking, and rafting have grown steadily for more than a decade from 7.8% of the population in 2007 to 10.5% in 2017 (Outdoor Foundation 2018). A total of US\$887 billion is spent annually to experience the outdoors, supporting 7.6 million jobs. States including Colorado, Utah, and Washington have created high-level positions charged with both supporting the outdoor industry and improving outdoor recreation opportunities.

The US Forest Service, in its long-term monitoring of recreation trends, projected in 2014 continued growth of outdoor participation through 2030. For most outdoor pursuits (excluding hunting, motorized off-road use, and motorized snow use), adult participation days of outdoor activities are projected to grow 21–34% between 2009 and 2030 (White et al. 2014). Despite these trends, available sources and designated responsibility for river management are failing within organizations. Public resource organizations have dismantled the systems that once generously invited, trained, and mentored today's staff and tomorrow's leaders. For example, the National Park Service has seen visitation increase 21% from 2013 to 2017, but at the same time, their staffing has been reduced from 27,000 to 22,000, including nearly 40% of seasonal staff who are critical for hosting surges of visitation on busy summer days (Headwater Economics 2019). The result can have dismal consequences, such as

- Visitors greeted by deteriorating buildings, or not enough staff to answer questions, process requests, or provide services.
- Managed spaces suffering without staff to keep toilets and facilities serviced, campgrounds clean and supervised, or with safety and law enforcement services in place and present.
- Visitors rarely seeing a ranger or interpreter to ask questions about the unit or river they are visiting.

Unlike in past years, field staff are called upon to attend to increased administrative duties and take on different roles, many of which were formerly assigned to administrative support staff and additional resources. Whereas generalists could address a diversity of issues and concerns in the past, staff now must attend training two to three weeks per year to certify in specialty and niche areas. Some of these areas, such as security and risk management, represent emerging and new concerns for river professionals.



**Figure 4** - Kayaking on the Clearwater River. Photo by Dave Gardner.

## The “Entry” End of Staffing

Federal agencies have been trimming staff as a percentage of the population for decades, and significant state attrition shows the trimming is not slowing. River management positions continue to decrease as a changed valuation of technical, entrepreneurial, and resourceful attributes in staff appears to be occurring across agencies. Thus, entry-level staffing exists in very few locations and has been replaced largely by collaborations with external groups and partners. These partnerships include enthusiastic young people recruited and managed by robust youth work programs. In the past, youth would be led by seasoned professionals. Too often now, these volunteers are on their own, with minimal supervision and no one to mentor them. Recruits are appreciated by agencies for providing excellent sources of low-cost labor, but few are able to remain in the agency through developed programs that allow direct hiring.

Despite these challenges, several programs continue to have a positive impact on river conservation and stewardship. The Corps Network is the National Association of Service and Conservation Corps. A total of 130 Corps operate across the country and participate in projects on public lands and in rural and urban communities. Other national organizational partners include the Student Conservation Association and AmeriCorps. Each of these partners provides opportunities for internships, field experience, and exposure to agency management and activities. In addition, the Pathways Program is a federal service program that enables managers to hire students and interns, including Presidential Management Fellows, and hire them directly for positions thereafter.


Challenges also exist with skilled seasonal staff. Seasonal employees who return each year continue to fill agency ranks, but their days are arguably numbered. For many years, individuals and partners have worked as “double seasonals,” spending summers in one park, winters in another. Working as a double seasonal has allowed them to maintain a unique professional lifestyle and enable the federal agency to staff reliable returnees. However, Rule 1039 (National Park Service 2018) implemented in 2018 deemed such employees ineligible to be rehired. Positions once staffed for six months are now eight months long. One person may not be able to work that entire time, supervisors are not going to hire two people, and the unit may be short-staffed during a period of peak visitation. Mass retirement of individuals in the baby boomer generation is leaving tremendous experience gaps. There are capacity issues related to programmed mentoring by experienced veterans, leaving glaring gaps in their representation in processes that cannot be picked up easily or learned quickly by young professionals and new practitioners. Making matters worse, retirees are being hired as consultants to plug the experience gaps created by their departure instead of being asked to train, acclimate, and mentor colleagues before their retirement from the agencies.

Each of these situations can place pressure upon up-and-coming river professionals. Many well-regarded individuals who have gathered experience are on track to grow, lead, and create success for their organizations. They are keen to shoulder responsibility, but they are asked to (1) fill positions emptied by retirees, (2) cover for underperforming or understaffed programs, (3) attend training sessions for further professional development, and (4) request to address river management responsibilities once held as high priorities but now viewed as collateral duties. For example, field offices can severely reduce seasonal positions, and can be extremely slow to replace permanent staff. One example involves a seasoned manager who was responsible for 21 seasonal staff and volunteers on one of the largest river programs in the country and decided to relocate to another organization. Following the person's departure and nearly three years later, the current program lead has similar responsibilities but is supported by only five seasonal employees. Funds freed up by the vacancy and river position reclassifications were redeployed to support other programs.

Agencies such as the National Park Service (NPS) and other river management agencies are also being asked to respond to Secretarial Order 3366 (US Department of the Interior 2018), which pushes the agencies to increase recreation opportunities on public lands and waters managed by the US Department of the Interior. In seeking feedback to identify priority issues and their capacity to meet their needs, the NPS identified human resources, staffing, ability to address maintenance needs, and the capacity to engage administrative partners as key issues. They cite having to take on significant responsibility as collateral to their primary duties and the increased reliance on volunteers as issues needing attention.

We cannot forget that those who work on the river understand their program and resource needs. As a river campground or access launch site experiences higher use levels or needs

attention due to disrepair, it is the river management professionals who are best prepared to address concerns. You have met #theriverismyoffice river managers and others who work in river-related professions. Their stories paint a picture of a richly committed, enthusiastic group of people responsible for many aspects of the rivers on or in which we rely. This awareness alone is a significant achievement. In the midst of today's movement to "support public lands," keep in mind that rivers belong to the public too and are not always included in the discussion. A river running through a county park or a national monument relies on river managers and planners working with scientists, outfitters, or community partners to serve you when you visit. Rivers provide our priceless resource. People determine whether they maintain their value and health.

This is the beginning of a discussion, and RMS seeks input on the importance of the support for professional river staff, their expertise, and their leadership as critical to the future stewardship of our rivers and their public access. We feel it is important to speak on behalf of river managers to those who are in a position to hire, mentor, and develop leadership among their currently dwindling ranks. We welcome suggestions about how best to build upon these stories, crafting of an argument supporting the protection of this profession. 

## Acknowledgments

Many people contributed their time, professional experience, and love for rivers to this conversation in addition to our video selfie contributors. Thank you to our documentary producer Nina Ignaczak and the RMS board members who have allowed me to pursue this initiative. I especially thank Ben Alexander, Herm Hoops, Patti Klein, Martin Hudson, Molly MacGregor, Gary Marsh, Bob Ratcliffe, Lynette Ripley, and Krista Sherwood, Bob Dvorak, and Patagonia for your support as we begin a journey.

**RISA SHIMODA** is a problem solver, marketer, and advocate for the programs, staff, members, and board of the River Management Society, for which she serves as the executive director. An avid whitewater paddler, Risa cofounded the Outdoor Alliance and has served on the boards of the Conservation Alliance, North American Paddlesports Association, International Whitewater Hall of Fame, and Nantahala Outdoor Center; email: [executivedirector@river-management.org](mailto:executivedirector@river-management.org).

**The RMS** is a nonprofit 501(c)3 organization that provides technical assistance and support on a variety of topics for river professionals – water trails, hydropower relicensing, the only national river recreation database in North America, interface between students and river professionals through selected colleges and universities, professional training, and management symposiums.

## References

- Headwaters Economics. 2019. Economic impact of national parks. Retrieved January 2019 from <https://headwaters-economics.org/public-lands/protected-lands/economic-impact-of-national-parks/>.
- National Park Service. 2018. Changes to temporary seasonal hiring. Retrieved January 2019 from <https://www.nps.gov/aboutus/temporary-appointment-changes.htm>.
- Outdoor Foundation. 2018. Outdoor participation report for 2018. Retrieved January 2019 from <https://outdoorindustry.org/resource/2018-outdoor-participation-report/>.
- US Department of the Interior. 2018. Secretarial Order 3366. Increasing recreational opportunities on lands and waters managed by the U.S. Department of the Interior. Retrieved January 2019 from [https://www.doi.gov/sites/doi.gov/files/uploads/so\\_recreation\\_opps.pdf](https://www.doi.gov/sites/doi.gov/files/uploads/so_recreation_opps.pdf).
- White, E. M., J. M. Bowker, A. E. Askew, L. L. Langner, J. R. Arnold, and D. B. K. English. 2014. Federal outdoor recreation trends: Effects on economic opportunities. National Center for Natural Resources Economic Research (NCNRER). NCNRER Working Paper Number 1, October. Retrieved from [https://www.fs.fed.us/research/docs/outdoor-recreation/ficor\\_2014\\_rec\\_trends\\_economic\\_opportunities.pdf](https://www.fs.fed.us/research/docs/outdoor-recreation/ficor_2014_rec_trends_economic_opportunities.pdf).







# Indigenous Rights and Ecological Justice in Amazonia:

## Exploring Ethics of Wilderness Conservation

by **HELEN KOPNINA**

Anthropologists, political ecologists, and social justice advocates working in biological conservation have mediated between discriminated communities and outsiders, particularly helping to influence public opinion and bring attention to indigenous rights through advocacy work. A less explored area is how indigenous rights relate to ecological justice in Amazonia. As social scientists rarely talk about violence against nonhumans and related wilderness destruction, this case study of conservation in Amazonia explores this new area of concern. Ethical inquiries in conservation also engage with the manifold ways through which human and nonhuman lives are entangled and emplaced within wider ecological relationships, converging in the notion of environmental justice. However, as environmental justice is often conflated with social justice in distribution of natural resources, it often fails to account for overt violence or exploitation of nonhumans (Crist 2012) (Figure 1). Noting interdependence between human and nonhuman species, anthropologist Veronica Strang (2016) observes that a “short-term focus on immediate human interests has longer-term detrimental effects on humans and non-humans alike” (p.



**Helen Kopina**



**Figure 1** – Silk floss trees (*ceiba speciosa*), native to South America, are used as material for making canoes, ropes, stuffing, wood pulp for paper, and vegetable oil. In Western societies it has been increasingly popular for flown-in shamans who serve people seeking “cleansing” and “insight” as ingredients to some versions of the hallucinogenic drink Ayahuasca.

259). Strang (2016) notes that the result of privileging exclusive social justice is only a short-term gain at the long-term expense of the nonhumans; this is not a sustainable way to achieve either social or ecological equity.

This article develops an argument that we need a more balanced theory and practice of social and ecological justice that not only recognizes the mutually constitutive processes but also human dependency on nature (Washington 2015). It supports the call for the simultaneous provision of justice for all human and nonhuman beings based on the case of conservation in Amazonia.

Recently, protest against protected areas has appeared from an unexpected corner, from academic disciplines that have “environment,” “ecology,” or “conservation” in their titles, namely environmental anthropology, political ecology, and conservation science. The emergence of the so-called critical social science and new conservation, signaled in the Future of Conservation debate (for detailed analysis of it, see Koprina et al. 2017) opened a venue of moral attacks against both the underlying ethic and practice of conservation.

This article will explore the following questions: Is the idea of ecological justice sufficiently



**Figure 2** – Local Kayapo people harvesting fish. Photo courtesy of Cristina Mittermeier

supported in conservation debate, and more pragmatically, in the Amazonian context? Can advocacy of inherent rights be applied to the case of nonhumans? Can indigenous communities still be considered as "traditional" in their treatment of nonhumans? How do human population growth and increased "modernisation" affect Amazonia? (Figure 2)

## Conservation in Amazonia

From the 1980s onward, alarming trends in deforestation and loss of biodiversity in Amazonia have become widely known (Barrett 1980). The largest and possibly most threatened tropical savanna and one of the 25 most important terrestrial hotspots in the world is the Cerrado, a region that occupies the center of South America (Myers et al. 2000). Cerrado, concentrated in an area of 1.86 million square kilometers (718,150 sq. miles), includes 10,000 plant species, 161 mammal species, 837 bird species, 120 reptile species, and 150 amphibian species (Myers et al. 2000). However, even a decade ago the situation of the Cerrado's biodiversity could be categorized as catastrophic, as only 20% of the region remained undisturbed, and only 1.2% is preserved in protected areas (Mittermeier et al. 1999; Cardoso da Silva et al. 2002). Presently, the situation has worsened due to overexploitation, climate change, and many other associated factors (Lahsen et al. 2016; Mustin et al. 2017). Other places in Amazonia face similar turmoil.

Conservation of Amazonian habitats (Ter Steege et al. 2015) and creation of protected areas

has recently helped preserve biodiversity (Watson et al. 2014), including Amazonian endangered species (Pimm et al. 2014) such as giant otter, South American tapir, and red-faced uakari monkey. Strict conservation in the Amazon region prohibiting all economic activities other than very limited "traditional" subsistence activities have been shown to be most effective in Peru (Bodmer and Puertas 2007; Nunez-Iturri et al. 2008; Dourojeanni 2015) and Brazil (Turner 1993; Nepstad et al. 2006; Hahn et al. 2014; Lahsen et al. 2016). Bruner et al. (2001), Nepstad et al. (2006), and Nunez-Iturri et al. (2008) provide evidence that banning all hunting in Amazon protected areas has greatly contributed to biodiversity protection. In Peru, results of animal censuses in the Samiria River basin show a general increase in animal densities of the white-lipped peccary, howler monkey, woolly monkey, lowland tapir, giant river otter, Amazon manatees, and black caimans and agouti between the period of strict control and the period of local community involvement (Bodmer and Puertas 2007).

## Indigenous People and Conservation

Indigenous lands occupy one-fifth of the Brazilian Amazon – five times the area under protection in parks (Nepstad et al. 2006). When assessing success of conservation in terms of biodiversity protection, a question of indigenous participation and compensation remains ambiguous.

On the one hand, the indigenous people are seen as the "noble savages" living "in harmony with nature" (Koot 2016) and "natural" protectors of the forests against the encroachment of extractive industries (McSweeney 2005; Orta-Martínez and Finer 2010). Modern forest-dependent indigenous communities are seen as ecologically wise based on the traditional knowledge of their ancestors, and it is assumed that local beliefs and practices that influence the use of biodiversity are essential for understanding sustainable use and conservation policies (Van Vliet et al. 2018). Examples of indigenous communities protecting their forest are well-known, including in Ecuador, where the government allows the exploitation of underground resources in national parks and where oil development has been unsuccessfully but persistently opposed



**Figure 3** – A pet macaw in local Kayapo village. Photo courtesy of Cristina Mittermeier

by both indigenous peoples and conservationists (Chicchón 2009). Also, conservation, indigenous rights, and poverty reduction are often seen to go hand in hand. Win-win scenarios in conservation and poverty reduction are often discussed (e.g., Adams et al. 2004; Naughton-Treves et al. 2005). Jane Goodall (2015) reports the results of the TACARE case study, whereby environmental degradation was due to a local community's strife for survival. Goodall mentions that "ranger forces are underpaid and poorly equipped, making them vulnerable to bribes from poachers" (p. 24). Effectively, a program for poverty alleviation was enacted. Goodall (2015) certainly makes a strong case in favor of the environment and civil actions necessary to keep up the environment and also discusses the economic benefit from nature. (Figure 3)

In describing conservation alliances with local communities, Schwartzman and Zimmerman (2005) note that local support is crucial for conservation, and typically both conservation and indigenous people benefit. As Chicchón (2009) notes in the case of Latin America, the magnitude of the displacement by infrastructure and industrial development in natural areas is much greater than displacement due to the creation of protected areas. In many cases, protected areas have benefited indigenous people because they have established alliances that have brought more national attention to their situations (Chicchón 2009).

On the other hand, due to expanding populations and the use of "modern" weapons by indigenous communities (Jerozolimski and Peres 2003), the "traditional" sustainable

relationship with the environment has been scrutinized (Turner 1993). Indeed, indigenous fertility is high, and with the introduction of "modern" medicines, infant mortality is low with populations correspondingly young (Holt et al. 2004; McSweeney 2005).

Although indigenous groups have historically evolved without endangering native flora and fauna, the assumption that they still "live in harmony with nature" is now questioned (Koot 2016; Shoreman-Ouimet and Kopnina 2016). This is due to population expansion and growing needs readily satisfied by food, logging, and mining industries. Indeed, in most parts of the world, indigenous populations are growing (Kirkup 2017), while indigenous populations of nonhumans are declining. Although it is argued that "indigenous population growth need not inevitably lead to resource degradation" (McSweeney 2005, p. 1375), this position discounts the fact that humans, indigenous or not, as large apex predators, have a very significant effect on local ecosystems (Turner 1993). It also assumes that only humans can be indigenous in their habitats. In the Amazon, and elsewhere, deforestation for subsistence agriculture and fuel, or rampant "bush-meat" consumption leads to the "empty forest syndrome" (Crist and Cafaro 2012).

In some situations, "local," "Native," and "indigenous" people (as these definitions are not always clear) were involved in conservation-based, income-generating activities (Chicchón 2009). "Traditional" nonmonetary economies have typically collapsed under the influence of industrial development, with protected areas becoming fragmented. Larger reserves without any human interference have

greatly increased the efficacy of conservation for endangered species and reduced deforestation (Laurance 2005; Peres 2005). Compromise positions allow habitation and traditional indigenous activities combined with some form of financial compensation for protection of some species from hunting.

The most successful anti-deforestation strategy has been strict protection, allowing neither direct (commercial) or indirect (limited) use of the area (e.g., Boucher et al. 2013; Dourojeanni 2015). There is evidence that human-free zones have been most effective in preserving biodiversity (Bruner et al. 2001; Laurance 2005; Peres 2005). For example, in unfragmented forests of southeastern Peru, which are not strictly protected, regular hunting with firearms rather than traditional weapons for 30 to 40 years, have led to significant reduction of primates compared with protected forests (Nunez-Iturri et al. 2008). Empirical evidence shows that biodiversity thrives in habitats minimally disturbed by humans (Jerozolinski and Peres 2003; Buttler 2017).

Although the amount of conserved land in Amazonia has nominally increased recently, there is also sustained resistance to effectively securing protected areas from economic activities (Watson et al. 2014). Part of this shortfall is the predictable resistance by major corporate and political players (Laurance et al. 2004; Ter Steege et al. 2015). The less obvious resistance comes from the critique of conservation itself.

Despite reported success of integrating indigenous and biodiversity interests under the banner of protecting biocultural diversity, this relative success of conservation has not been met with heavy resistance. To understand this resistance, we shall consider below two ethical “camps”—anthropocentrism and ecocentrism.

## **Two Main Schools of Thought in Conservation**

Biological conservation, environmental anthropology, political ecology and social geography address sources of legitimacy and indigenous land rights in connection to conservation practice. Conservation is often discussed in the context of two main ethical standpoints: the preservation of natural resources for human use (an anthropocentric position that supports biodiversity protection for utilitarian reasons), and the protection of nature for its own sake (an ecocentric position that recognizes intrinsic value of nature).

These standpoints are illustrated in the context of Amazonia and its deforestation. Deforestation of Amazonian region has accelerated significantly between 1991 and the present, closely followed by associated loss of biodiversity. In 2004, the forest loss rate of 27,423 square kilometers (10,588 sq. miles) gained international attention, both in the media and in academic publications (Laurance et al. 2004; Fearnside 2015). Accelerations in deforestation were witnessed in 2008, 2013, and in 2017 (Buttler 2017). The major cause of deforestation is illegal logging, but state-sponsored “legal” timber operations (Hahn et al. 2014), cattle and soya farming (Nepstad et al. 2014), road building (Fearnside 2015), and climate change all contribute as well.



**Figure 4** – A Kayapo overlooking the rainforest. Photo courtesy of Cristina Mittermeier

### ***Anthropocentric Position***

Although biological conservation was originally intended to preserve wilderness and protect wildlife, protected areas are now expected to achieve an increasingly diverse set of social and economic objectives (Watson et al. 2014), including poverty alleviation (Adams et al. 2004; Goodall 2015) and addressing the needs of vulnerable communities (Naughton-Treves et al. 2005). Some conservationists and critical social scientists have argued that the aim of conservation should be solely the enhancement of human well-being (e.g., Kareiva et al. 2011; Marvier 2014; Büscher 2015; Fletcher and Büscher 2016). Environmental justice in this case refers to equitable distribution of environmental goods such as natural resources and clean air and water among human populations (Schlosberg 2004; Kopnina 2014).

The anthropocentric position is exemplified by the "new conservation" biologists (e.g., Kareiva et al. 2011; Marvier 2014); social scientists, specifically anthropologists and human ecologists that claim that conservation should only protect the interests of vulnerable human communities (e.g., Kalland 2009; Büscher 2015; Fletcher and Büscher 2016); and academics working in the field of economic development (e.g., Baviskar 2013). These authors place the moral focus on vulnerable, poor communities rather than biodiversity (see detailed discussion in Kopnina et al. 2017). These scholars see violence as originating from capitalist elites (industrial developers but also conservation NGOs) directed against poor poachers and indigenous ways of life. Practically, this has led to the assumption that conservation's highest value is to contribute to the people's well-being (e.g., Kareiva et al. 2011; Marvier 2014).

Recently, anticonservation as well as a movement against protected areas has appeared not just from corrupt governments, industrial lobbies, timber, mining, and energy industries but also from organizations such as Cultural Survival and several "justice"-focused organizations. They blame a generalized group of "environmentalists" for endangering poor people's livelihoods, for violating human rights by persecuting poachers, and by imposing their own Western and elitist views. Critical social scientists and new conservationists have argued that environmentalists entrench economic inequality as they marginalize local communities (e.g., Baviskar 2013; Büscher 2015). Generally, entitlements to the benefits derived from the exploitation of wildlife are ethically unquestioned as long as local, vulnerable, or poor communities profit from them.

### ***Ecocentric Position***

Others have argued in favor of preserving biodiversity for its own sake (Cafaro and Primack 2014; Miller et al. 2014; Batavia and Nelson 2017; Cafaro et al. 2017). This position is based on ecological justice or justice between human and nonhuman species (Baxter 2005), with erasure of natural habitats seen as a violation of justice (White 2013). The ecocentric perspective, instructed by land ethics (Leopold 1949) and deep ecology (Naess 1973), considers biodiversity loss as a moral wrong (Cafaro 2015). This position is represented by conservation biologists (Cafaro and Primack 2014; Miller et al. 2014; Washington 2015; Cafaro et al. 2017) and by social scientists (Crist 2012; Kopnina 2016a and 2016b; Mathews 2016), among others. The ecocentric position is based on the recognition of the intrinsic value of ecosystems (e.g., Curry 2011; Batavia and Nelson 2017; Piccolo et al. 2018; Washington et al. 2018).

## **Discussion**

These two positions differentiate on who needs justice, who is being abused, who is getting protected, and who profits from conservation: endangered habitats, endangered species, or indigenous communities. In ecological justice, the "right" to exploit living beings as objects rather than as indigenous nonhumans needs to be ethically considered (Cafaro and Primack 2014; Miller et al. 2014; Cafaro et al. 2017).

Increasingly, deciding on the rights of access to "natural resources" becomes an ethical rather than scientific discussion based on optimal territory needed for preservation of biodiversity. The assumption that only human species have rights to resources (Crist 2012), and that these rights become even more inalienable in the case of indigenous communities, overrides the possibility that conservation should guarantee an abundance of species and not just bare survival (Mathews 2016).

One needs to be careful not to equate "indigenous" with "traditional harmony with nature." The inhibitory effect of indigenous land ownership on deforestation was not correlated with indigenous population density and the use of modern transport and hunting weapons (Jerozolimski and Peres 2003; Nepstad et al. 2006; Nunez-Iturri et al. 2008). In today's practice "traditional sustainable use" can mean hunting, logging, grazing, and so forth (Cafaro et al. 2017; Kopnina et

al. 2017). As indigenous populations and their economic activities have expanded, the rights of access cannot be treated as ethically normative for any human group.

Besides, the concept of exclusive rights simultaneously idealizes and denigrates indigenous people as premodern "noble savages" (Koot 2016). Anthropologists such as Koot have correctly problematized the question of who in today's world can we call local, ethnic, or indigenous. Can we still refer to people who moved to cities or intermarried as indigenous? Are we ourselves not in some way indigenous? Although local support remains crucial for the success of conservation, the trade-offs between the needs of indigenous communities and the dire predicament of endangered species need to be carefully weighed (Cheung and Sumaila 2008; McShane et al. 2011; Shoreman-Ouimet and Kopnina 2015).

## Points of Reconciliation

The deep ecology was largely derived from the ideas of indigenous traditions of animistic spirituality that incorporate humanity into nature and fostering natural protection (Devall 1980) as well realization that industrial development is the enemy of both cultural traditions and biodiversity (Crist and Kopnina 2014). The united call for preservation of biocultural diversity in Amazonia using indigenous traditional knowledge provides one of the points of reconciliation between human and biodiversity interests (Van Vliet et al. 2018).

There is evidence that biodiversity-motivated conservation is compatible with rights of indigenous groups (Doak et al. 2015). Initiatives such as Roots and Shoots provide a good example of an integrated approach to poverty alleviation while simultaneously conserving forests by providing education and participatory activities within local communities (Goodall 2015). However, these examples are also often place-specific, and caution should be used when applying integrating policies in different Amazonia contexts. If treated as normative, poverty alleviation may serve as a euphemism for a transition to an industrial economy (Crist 2012) without contributing to preservation of biocultural diversity. Thus, one of the areas of reconciliation of social justice and ecological justice is in addressing neoliberal economic assumptions (Shoreman-Ouimet and Kopnina 2015; 2016).

Strang (2016) has argued that prioritizing justice for people over justice for the environment is self-defeating, as we are interconnected with natural habitats, and the cultural survival of indigenous peoples and the physical survival of biodiverse habitats are intimately interlinked. Yet, anthropocentric motivation is not enough. Indeed, "giving humankind priority in the provision of justice leads down a path that is morally questionable, carries high risks, and is intellectually problematic" (Strang 2016, p. 259). The call for justice should be a joint plea for human rights combined with the rights of other species to exist and flourish (Shoreman-Ouimet and Kopnina 2015; 2016). Yet, in line with Corrigan et al. (2018), more research is needed in order to provide causal explanations of how and why indigenous- and community-led conservation could help protect biodiversity in socially sustainable and ecologically just ways. (Figure 5)



Figure 5 – Collecting Brazil nuts within the forest.

---

**“Whereas proponents of indigenous rights rightly argue for the need to include the voices of the powerless, the ‘voices’ of billions of non-humans (or at least their human proxies) are not currently involved in this debate.”**

---

## Conclusion

In the anthropocentric discourse, the growing populations and the use of “modern” tools and weapons by indigenous communities is not discussed. Although supporting indigenous rights, this article argues for the need to consider how indigenous rights can be balanced with ecological justice. Although recognition of the need for social justice is widespread, equal commitment to justice for wilderness is lacking. Whereas proponents of indigenous rights rightly argue for the need to include the voices of the powerless, the “voices” of billions of non-humans (or at least their human proxies) are not currently involved in this debate. What is important to advance for both social and ecological justice is the ability to determine how environmental and human

values overlap, conflict, and where the opportunity for reconciliation lies. To reconcile social and ecological justice, a number of conditions need to be met, as supported by Strang (2016). First, we need recognition that humans and nature are interdependent, and that disruption for any of the participants has potentially major impacts on the others, as exploitative systems are functionally unsustainable. Second, to be morally reconcilable, the social justice movement needs to be empathetic with a disenfranchised silent nonhuman majority. In the case of Amazonia, the white-lipped peccary, howler monkey, woolly monkey, lowland tapir, giant river otter, Amazon manatee, black caiman, agouti, and millions of nonhuman others need to be considered as living agents worthy of moral consideration and legal protection. This requires protection of large natural areas characterized by biological cores, corridors, and carnivores (Noss and Cooperrider 1994; Peres 2005; Noss et al. 2013). In order to have any chance of preserving vulnerable habitats and endangered species, increased recognition, funding, effective management, planning, and enforcement are urgently needed (Watson et al. 2014).

As a result of human population growth, along with commercialization of the economy, indigenous communities cannot be assumed to be unconditionally benign in their relationship to the environment. Exploitation of environment is "driven by the life-ways of both the world's rich and poor, and most especially by their Faustian economic partnerships" (Crist 2012, p. 145). This Faustian relationship between the global North's demand and global South's supply (and increasing demand as middle classes grow everywhere) reflects on the fate of Amazon biodiversity. According to the ecocentric school of thought, international consumers are collectively responsible for demand, which is readily satisfied by the timber and mining companies, and indigenous rights need to be balanced with nonhuman rights and ecological justice. Practical and scientific aspects of conservation cannot be decoupled from ethics and justice in Amazonian conservation.

**DR. HELEN KOPNINA** (PhD Cambridge University, 2002) is currently employed at The Hague University of Applied Science in The Netherlands, coordinating the Sustainable Business program and conducting research within three main areas: environmental sustainability, environmental education, and biological conservation. Kopnina is the author of more than 90 peer-reviewed articles and (co)author and (co)editor of 15 books; email: [h.kopnina@hhs.nl](mailto:h.kopnina@hhs.nl).

## References

- Adams, W. M. et al. 2004. Biodiversity conservation and the eradication of poverty. *Science* 306: 1146–1149.
- Barrett, S. W. 1980. Conservation in Amazonia. *Biological Conservation* 18(3): 209–235.
- Batavia, C., and M. P. Nelson. 2017. For goodness sake! What is intrinsic value and why should we care? *Biological Conservation* 209: 366–376.
- Baviskar, A. 2013. Plenary debate, 'Justice for people should come before justice for environment. World Anthropology Congress. ASA-IUAES conference, Manchester, UK, August 5–10, 2013.
- Baxter, B. 2005. *A Theory of Ecological Justice*. New York: Routledge.
- Bodmer, R. E., and P. Puertas. 2007. Impacts of displacement in the Pacaya-Samiria National Reserve, Peru. In *Protected Areas and Human Displacement: A Conservation Perspective*, ed. K. H. Redford and E. Fearn. WCS Working Papers 29: 29–33.
- Boucher, D., S. Roquemore, and E. Fitzhugh. 2013. Brazil's success in reducing deforestation. *Tropical Conservation Science* 6(3): 426–445.
- Bruner, A. G., R. Gullison, E. Rice, and G. A. B. da Fonseca. 2001. Effectiveness of parks in protecting tropical biodiversity. *Science* 291(5501): 125–128.
- Büscher, B. 2015. "Rhino poaching is out of control!" Violence, heroes and the politics of hysteria in online conservation. Paper presented at the British International Studies Association, June 16–19, London, UK.
- Buttler, R. 2017. Calculating deforestation figures for the Amazon. Retrieved from [https://rainforests.mongabay.com/amazon/deforestation\\_calculations.html](https://rainforests.mongabay.com/amazon/deforestation_calculations.html).
- Cafaro, P. 2015. Three ways to think about the sixth mass extinction. *Biological Conservation* 192: 387–393.
- Cafaro, P., T. Butler, E. Crist, P. Cryer, E. Dinerstein, H. Kopnina, R. Noss, J. Piccolo, B. Taylor, C. Vynne, and H. Washington. 2017. If we want a whole Earth, nature needs half. A reply to half-Earth or whole Earth? *Radical ideas for conservation, and their implications*. *Oryx* 51(3): 400.
- Cafaro, P., and R. Primack. 2014. Species extinction is a great moral wrong. *Biological Conservation* 170: 1–2.
- Cardoso da Silva, J. M., and J. M. Bates. 2002. Biogeographic patterns and conservation in the South American Cerro: A tropical savanna hotspot. *AIBS Bulletin* 52(3): 225–234.
- Cheung, W. L., and U. R. Sumaila. 2008. Trade-offs between conservation and socio-economic objectives in managing a tropical marine ecosystem. *Ecological Economics* 66(1): 193–210.
- Chicchón, A. 2009. Working with indigenous peoples to conserve nature: Examples from Latin America. *Conservation and Society* 7(1): 15.
- Corrigan, C., H. Bingham, Y. Shi, E. Lewis, A. Chauvenet, and N. Kingston. 2018. Quantifying the contribution to biodiversity conservation of protected areas governed by indigenous peoples and local communities. *Biological Conservation* 227: 403–412.
- Crist, E. 2012. Abundant Earth and population. In *Life on the Brink: Environmentalists Confront Overpopulation*, ed. P. Cafaro and E. Crist (pp. 141–153). Athens: University of Georgia Press.
- Crist, E., and P. Cafaro, eds. 2012. Human Population Growth as if the Rest of Life Mattered. In *Life on the Brink: Environmentalists Confront Overpopulation*, ed. P. Cafaro and E. Crist (pp. 3–15). Athens: University of Georgia Press.
- Crist, E., and H. Kopnina. 2014. Unsettling Anthropocentrism. *Dialectical Anthropology* 38: 387–396.
- Curry, P. 2011. *Ecological Ethics*. Cambridge, UK; Oxford, UK; and New York: Polity Press.
- Devall, B. 1980. The deep ecology movement. *Natural Resources Journal* 20: 299–322.
- Doak, D. F., V. J. Bakker, B. E. Goldstein, and B. Hale. 2015. What is the future of conservation? In *Protecting the Wild: Parks and Wilderness*, The Foundation for Conservation, ed. G. Wuerthner, E. Crist, and T. Butler (pp. 27–35). Washington, DC, and London: The Island Press.
- Dourojeanni, M. J. 2015. Human impact on protected areas of the Peruvian Amazon. In *Protecting the Wild: Parks and Wilderness*, The Foundation for Conservation, ed. G. Wuerthner, E. Crist, and T. Butler (pp. 215–225). Washington, DC, and London: The Island Press.
- Fearnside, P. M. 2015. Highway construction as a force in destruction of the Amazon forest. In *Handbook of Road Ecology*, ed. R. van der Ree, D. J. Smith, and C. Grilo (pp. 414–424). Hoboken, NJ: Wiley-Blackwell.
- Fletcher, R., and B. Büscher. 2016. Why E. O. Wilson is wrong about how to save the Earth. Retrieved from <https://aeon.co/opinions/why-e-o-wilson-is-wrong-about-how-to-save-the-earth>.

- Goodall, J. 2015. Caring for people and valuing forests in Africa. In *Protecting the Wild: Parks and Wilderness, The Foundation for Conservation*, ed. G. Wuerthner, E. Crist, and T. Butler (pp. 21–26). Washington, DC, and London: The Island Press.
- Hahn, M. B., R. E. Gangnon, C. Barcellos, G. P. Asner, and J. A. Patz. 2014. Influence of deforestation, logging, and fire on malaria in the Brazilian Amazon. *PLoS One* (9)1: e85725.
- Holt, F. L., R. E. Bilsborrow, and A. I. Oña. 2004. Demography, household economics, and land and resource use of five indigenous populations in the northern Ecuadorian Amazon: A summary of ethnographic research. Occasional Paper, Carolina Population Center. Chapel Hill: University of North Carolina.
- Jerozolinski, A., and C. A. Peres. 2003. Bringing home the biggest bacon: A cross-site analysis of the structure of hunter-kill profiles in Neotropical forests. *Biological Conservation* 111(3): 415–425.
- Kalland, A. 2009. *Unveiling the Whale: Discourses on Whales and Whaling*. Studies in Environmental Anthropology and Ethnobiology Series. New York: Berghahn Books.
- Kareiva, P., R. Lalasz, and M. Marvier. 2011. Conservation in the Anthropocene: Beyond solitude and fragility. *Breakthrough Journal* (Fall): 29–27.
- Kirkup, K. 2017. Canada's indigenous population growing 4 times faster than rest of country. *The Canadian News*. Retrieved January 2019 from <https://globalnews.ca/news/3823772/canadas-growing-indigenous-population/>.
- Koot, S. 2016. *Namibian Bushmen and two contradictions of capitalism*. Routledge Handbook of Environmental Anthropology. UK: Taylor and Francis.
- Kopnina, H. 2014. Environmental justice and biospheric egalitarianism: Reflecting on a normative-philosophical view of human-nature relationship. *Earth Perspectives* 1: 8.
- . 2016a. Half the Earth for people (or more)? Addressing ethical questions in conservation. *Biological Conservation* 203(2016): 176–185.
- . 2016b. Wild animals and justice: The case of the dead elephant in the room. *Journal of International Wildlife Law & Policy* 19(3): 219–235.
- Kopnina, H., H. Washington, J. Gray, and B. Taylor. 2017. The "future of conservation" debate: Defending ecocentrism and the Nature Needs Half movement. *Biological Conservation* 217 (2018):140–148.
- Lahsen, M., M. M. Bustamante, and E. L. Dalla-Nora. 2016. Undervaluing and overexploiting the Brazilian Cerrado at our peril. *Environment: Science and Policy for Sustainable Development* 58(6): 4–15.
- Laurance, W. F. 2005. When bigger is better: The need for Amazonian mega-reserves. *Trends in Ecology and Evolution* 20: 645–648.
- Laurance, W. F., A. K. Albernaz, P. M. Fearnside, H. L. Vasconcelos, and L. V. Ferreira. 2004. Deforestation in Amazonia. *Science* 304(5674): 1109–1111.
- Leopold, A. 1949/1987. *A Sand County Almanac and Sketches Here and There*. New York: Oxford University Press.
- Marvier, M. 2014. A call for ecumenical conservation. *Animal Conservation* 17(6): 518–519.
- Mathews, F. 2016. From biodiversity-based conservation to an ethic of bio-proportionality. *Biological Conservation* 200: 140–148.
- McShane, T. O., P. D. Hirsch, T. C. Trung, A. N. Songorwa, A. Kinzig, B. Monteferri, D. Mutekanga, H. Van Thang, J. L. Dammert, M. Pulgar-Vidal, and M. Welch-Devine. 2011. Hard choices: Making trade-offs between biodiversity conservation and human well-being. *Biological Conservation* 144(3): 966–972.
- McSweeney, K. 2005. Indigenous population growth in the lowland Neotropics: Social science insights for biodiversity conservation. *Conservation Biology* 19(5): 1375–1384.
- Miller, B., M. E. Soulé, and J. Terborgh. 2014. "New conservation" or surrender to development? *Animal Conservation* 17(6): 509–515.
- Mittermeier, R. A., N. Myers, C. G. Mittermeier, and G. Robles. 1999. *Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. CEMEX, SA, Agrupación Sierra Madre, SC.
- Mustin, K., W. D. Carvalho, R. R. Hilário, S. V. Costa-Neto, C. Silva, I. M. Vasconcelos, J. J. Castro, V. Eilers, É. E. Kauano, R. N. Mendes-Junior, and C. Funi. 2017. Biodiversity, threats and conservation challenges in the Cerrado of Amapá, an Amazonian savanna. *Nature Conservation* 22: 107.

- Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. Da Fonseca, and J. Kent. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403(6772): 853–858.
- Naess, A. 1973. The shallow and the deep: Long-range ecology movement. A summary. *Inquiry* 16: 95–99.
- Naughton-Treves, L. et al. 2005. Role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annual Review of Environment and Resources* 30: 219–C-211.
- Nepstad, D., D. McGrath, C. Stickler, A. Alencar, A. Azevedo, B. Swette, ... and E. Armijo. 2014. Slowing Amazon deforestation through public policy and interventions in beef and soy supply chains. *Science* 344(6188): 1118–1123.
- Nepstad, D., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, et al. 2006. Inhibition of Amazon deforestation and fire by parks and indigenous lands. *Conservation Biology* 20(1): 65–73.
- Noss, R., and A. Cooperrider. 1994. *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Washington, DC: Island Press.
- Noss, R., R. Nash, P. Paquet, and M. Soulé. 2013. Humanity's domination of Nature is part of the problem: A response to Kareiva and Marvier. *BioScience* 63(4): 241–242.
- Nunez-Iturri, G., O. Olsson, and H. F. Howe. 2008. Hunting reduces recruitment of primate-dispersed trees in Amazonian Peru. *Biological Conservation* 141(6): 1536–1546.
- Orta-Martínez, M., and M. Finer. 2010. Oil frontiers and indigenous resistance in the Peruvian Amazon. *Ecological Economics* 70(2): 207–218.
- Peres, C. A. 2005. Why we need megareserves in Amazonia. *Conservation Biology* 19: 728–733.
- Piccolo, J., H. Washington, H. Kopnina, and B. Taylor. 2018. Back to the future: Why conservation biologists should re-embrace their ecocentric roots. *Conservation Biology* 32(4): 959–961.
- Pimm, S. L., C. N. Jenkins, R. Abell, T. M. Brooks, J. L. Gittleman, L. N. Joppa, P. H. Raven, C. M. Roberts, and J. O. Sexton. 2014. The biodiversity of species and their rates of extinction, distribution, and protection. *Science* 344(6187): 1246752.
- Schlosberg, D. 2004. Reconceiving environmental justice: Global movements and political theories. *Environmental Politics* 13(3): 517–540.
- Schwartzman, S., and B. Zimmerman. 2005. Conservation alliances with indigenous peoples of the Amazon. *Conservation Biology* 19(3): 721–727.
- Shoreman-Ouimet, E. and H. Kopnina. 2015. Reconciling ecological and social justice to promote biodiversity conservation. *Biological Conservation* 184: 320–326.
- . 2016. *Culture and Conservation: Beyond Anthropocentrism*. New York: Routledge.
- Strang, V. 2016. Justice for all: Inconvenient truths and reconciliation in human-non-human relations. In *Routledge Handbook of Environmental Anthropology*, ed. H. Kopnina and E. Shoreman-Ouimet (pp. 263–278). New York: Routledge.
- Ter Steege, H., N. C. Pitman, T. J. Killeen, W. F. Laurance, C. A. Peres, J. E. Guevara, ... and L. de Souza Coelho. 2015. Estimating the global conservation status of more than 15,000 Amazonian tree species. *Science Advances* 1(10): e1500936.
- Turner, T. 1993. The role of indigenous peoples in the environmental crisis: The example of the Kayapo of the Brazilian Amazon. *Perspectives in Biology and Medicine* 36(3): 526–545.
- Van Vliet, N., L. L'haridon, J. Gomez, L. Vanegas, F. Sandrin, and R. Nasi. 2018. The use of traditional ecological knowledge in the context of participatory wildlife management: Examples from indigenous communities in Puerto Nariño, Amazonas-Colombia. In *Ethnozoology: Animals in Our Lives*, ed. R. Alves (pp. 497–512). Oxford, UK; Academic Press, Elsevier.
- Washington, H. 2015. Is "sustainability" the same as "sustainable development"? In *Sustainability: Key Issues*, ed. H. Kopnina and E. Shoreman-Ouimet (pp. 359–377). New York: Routledge.
- Washington, H., J. Piccolo, G. Chapron, J. Gray, H. Kopnina, and P. Curry. 2018. Foregrounding ecojustice in conservation. *Biological Conservation* 228: 367–374.
- Watson, J. E., N. Dudley, D. B. Segan, and M. Hockings, 2014. The performance and potential of protected areas. *Nature* 515(7525): 67–73.
- White, R. 2013. *Crimes Against Nature: Environmental Criminology and Ecological Justice*. New York: Routledge.





View from Pebble Creek in Yellowstone National Park. **Photo credit:** Melanie Hill

---

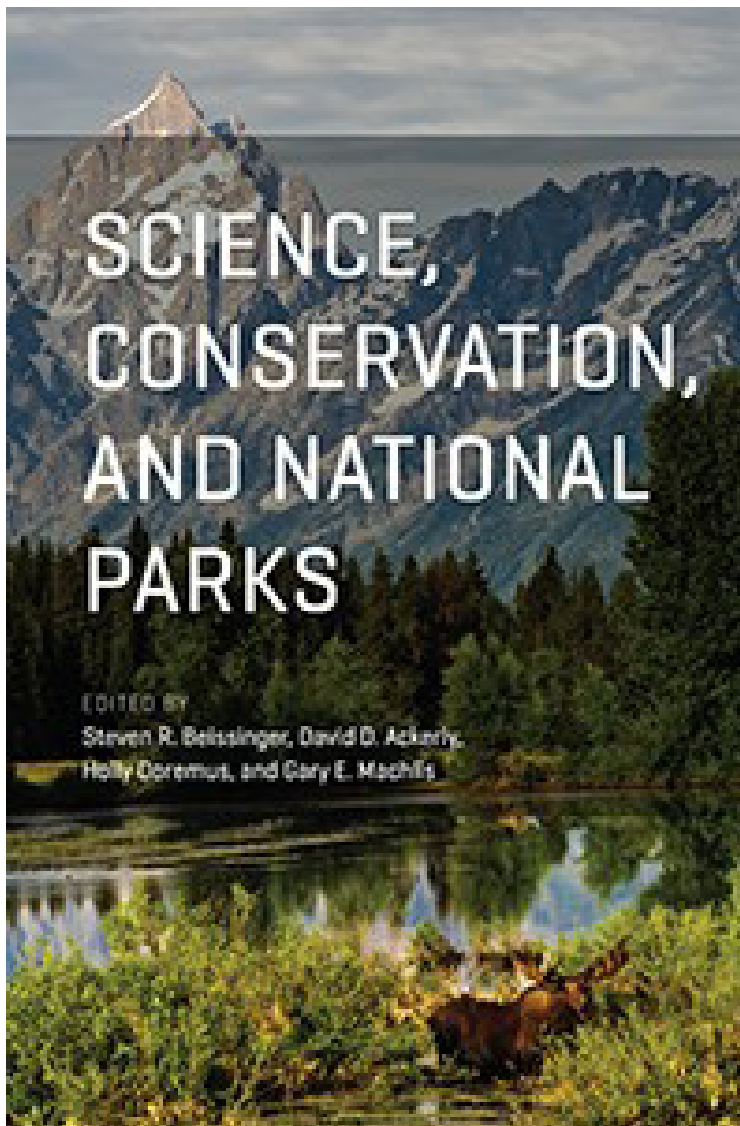
WILDERNESS DIGEST

# Book Review:

**John Shultis, Book Review Editor**

SCIENCE, CONSERVATION, AND NATIONAL PARKS

edited by Steven Beissinger, David Ackerly, Holly Doremus, and Gary Machlis. 2017. University of Chicago Press. 416 pp. US\$45.00 (pb).




The genesis of this book was the 2015 Science for Parks, Parks for Science conference in celebration of the 2016 centennial of the National Park Service. This history is reflected in the use of both written chapters and several "strategic conversations" that have been transcribed from moderated discussions during the conference.

The relationship between park agencies and scientific research is complex and mutable. Perhaps the current era, with the emerging concepts of post-truth and fake news phenomena, which both lead to decreasing public trust in science, exhibits the greatest challenge to the use of science in park and wilderness management. As Berger cautions, science "is but a single currency, and rarely is it the final arbiter in decision-making" (p. 207).

One theme in this book is the idea that the diverse and sometimes contradictory missions of land management agencies create conflict for these agencies and thus make the use of science more difficult. Thomas Dietz's chapter also suggests that conflict is created in part by the ever-present battle between altruism (e.g., the need for a commons) versus self-interest (e.g., the focus on private property rights). In many nations, the role of the federal versus regional (e.g., state) control of natural resources development and conservation is also a consistent source of conflict.

A second theme is that contemporary social and ecological change (e.g., climate change) are major disruptive forces for park agencies and their use of science. Indeed, Beissinger and Ackerly state that "change is a constant theme that resonates through most of the contributions in this book – biological, cultural, and technological change" (p. 374). Issues such as climate change are inherently saddled with a high level of uncertainty, which further restricts the integration of science in decision-making. The current lack of meaningful political will to address climate change suggests that the role of science faces a murky, contested future.

Echoing the past and present dominance of natural science in protected area planning and management, most of the chapters in this book focus on ecological sciences, although one of the four sections fully comprises social science topics. The role of the original 1963 Leopold report as well as the 2011 Revisiting Leopold report are discussed in several chapters. The conflict between the original report's focus on the national parks' need to reflect a "vignette of primitive America" versus the 2011 report's suggestion to "steward NPS resources for continuous change that is not yet fully understood" (p. 359) reflects the recent changes in thinking about protected areas.

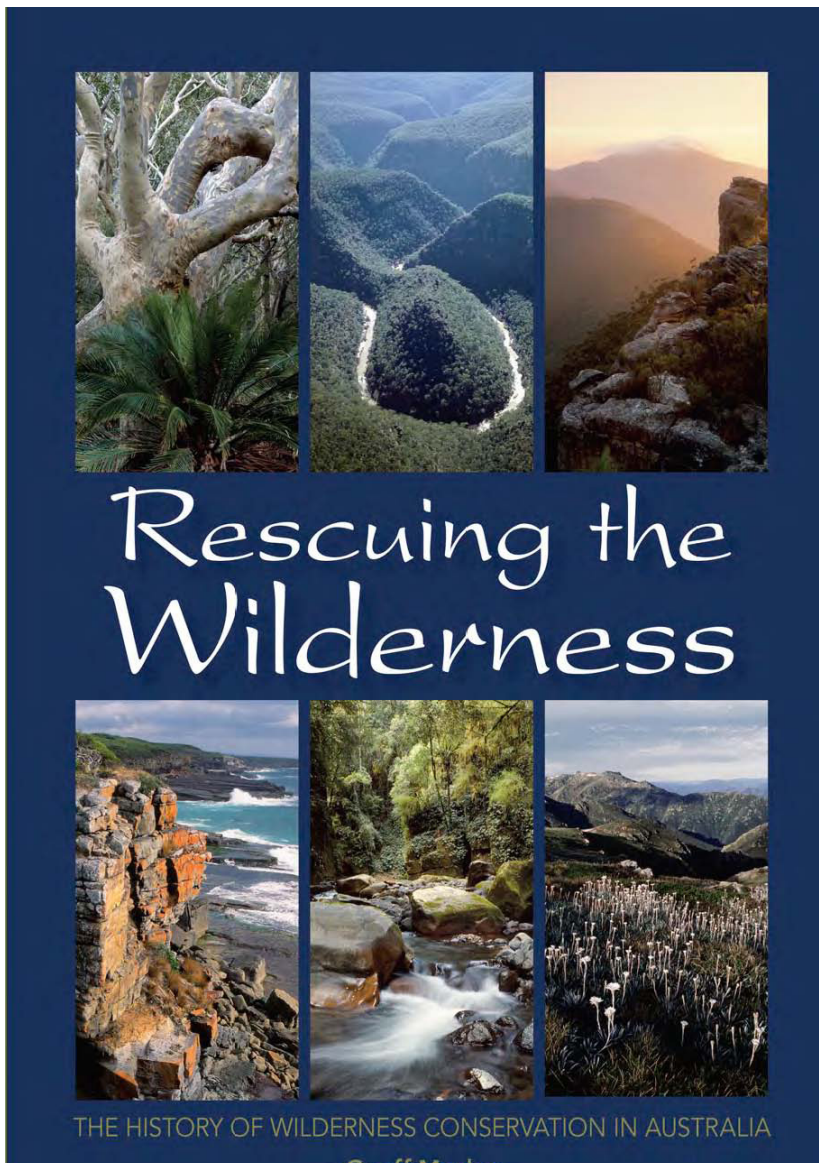
In sum, this book is a thoughtful, insightful snapshot of the many challenges facing protected area agencies and the constantly changing role of science in helping address these issues. It would be valuable for upper-level college students, conservation scholars, and global practitioners. 

Reviewed by **JOHN SHULTIS**, book review editor of the IJW and associate professor at the University of Northern BC, Canada; email: [john.shultis@unbc.ca](mailto:john.shultis@unbc.ca).

# Book Review:

**John Shultis, Book Review Editor**

RESCUING THE WILDERNESS: THE HISTORY OF WILDERNESS CONSERVATION IN AUSTRALIA  
by Geoff Mosley. Colong Foundation for Wilderness. \$30 AUD (pb).



Australia has played a seminal role in developing the concept of wilderness as a distinct protected area, worthy of special recognition, designation, and management. The development and deployment of a wilderness concept across this vast and unique island continent has been the subject of many papers, popular articles, and innumerable conversations around the campfire while the billy was boiling. It has never been fully documented, however, until now.

In his scholarly yet personal narrative, *Rescuing The Wilderness*, Geoff Mosley adds a valuable, interesting, readable, and reliable tome to the wilderness literature. Although the modern concept of wilderness as a distinct protected area started in the United States with John Muir, followed by Aldo Leopold and others as the 20th century rolled out, the movement began in Australia just a few years later, around 1920. This makes Australia's wilderness story valuable for both global and national reasons, hence adding additional significance to Mosley's work. It is important for us to know this history, and to become acquainted with the pioneers who drove this issue – their personalities and strategies, the lessons they learned, the many challenges they faced, and how they adapted the modern wilderness concept to an ancient and diverse continent that had been thoroughly inhabited for some 70,000 years before the white settlers arrived.

*Rescuing The Wilderness* is a highly detailed account of the wilderness concept in Australia from 1946 to present. The earlier years (prior to 1946) were well-documented by Mosley in his previous book, *Battle for the Bush: The Blue Mountains, the Australian Alps and the Origins of The Wilderness Movement* (1999). Conveniently, the first chapter of this current book summarizes much of that early history, making it a valuable, stand-alone reference. In addition to the historical record and veracity of *Rescuing The Wilderness*, there are three reasons I recommend it to you.

First, it is readable. I love the opening paragraph, the tone of which is carried through the book:


*In a world in which humans swarm like locusts, devouring resources as though there were no tomorrow, the movement to keep some areas in their wild state forever is a bold one and a sign of hope for the future. Wilderness is a concept and a reality that turns on its head many of the ideas that have driven human history. A long walk in the wilderness is equivalent to returning to the way the world was through most of the millions of years of evolution that led humans to where they are today. As one of my grandchildren put it wilderness is "the real world."*

Second, the book reads as much like a memoir as it does a scholarly reference. Mosley is writing about a concept that is thoroughly embedded in his life, and he has the professional experience and reputation to tell both the practical story as well as present its relevance to human culture and modern development. He has also been an important part of the global wilderness movement and, for full disclosure, has been a valuable ally for me and the WILD Foundation since we first met at the 2nd World Wilderness Congress in Australia in 1980. He is also a member of our Wilderness Specialist Group (World Commission on Protected Areas, IUCN).

Third, the author readily addresses the challenges presented by the wilderness concept, details we all need to know so that our own work is more informed, effective, and efficient. The way in which this is presented in *Rescuing The Wilderness* reminded me of something I was often told by Ian Player (founder of the World Wilderness Congress and pioneer of the wilderness concept in South Africa).

Ian was adamant that his best tool for deploying the highly contentious wilderness concept in South Africa in the 1960s and 1970s would be the transcripts of the US Senate hearings that were mailed to him by Howard Zahniser, author of the US Wilderness Act of 1964. As a game ranger in the iMfolozi Game reserve, Ian carried those transcripts in his backpack as he patrolled what would soon become Africa's first declared wilderness area. He read those transcripts every night by light of the campfire, accompanied by the sounds of the African night, and, as a result, "I knew every argument that could be made against the wilderness concept, and therefore how to deal with the immense opposition I knew I would face in the years ahead of me."

One of the most difficult issues encountered by the modern wilderness concept, wherever it is deployed, is the issue of the First Peoples whose cultures developed in wild nature so thoroughly, and were still inseparable from it, that they often have no equivalent to the word *wilderness* as we know it. Adding to this inescapable reality is the fact that the early pioneers of the wilderness concept were Anglos, of colonial descent, almost all of whom created an overramped veneer of elite recreation to the concept. Despite the almost universal element of spirituality of – or, at least, respect for – nature, wilderness still came off as something for the white, elite bushwalkers. This created a major issue with original indigenous stewards of the land and seas, as well as ample fuel for our adversaries, those who want to destroy the concept so that no lands are sacred and closed to human development. Mosley addresses these issues head-on, acknowledging mistakes made and honest attempts to resolve them – in the case of working with indigenous peoples – or in fighting and winning the inevitable battles – when dealing with developers and recalcitrant politicians.

*Rescuing The Wilderness* deserves a place on your bookshelf, in a folder in your computer, and on a shelf in your local library. 

Reviewed by **VANCE G. MARTIN**, president of the WILD Foundation, cochair of the Wilderness Specialist Group (IUCN) and editorial board of IJW; [email: vance@wild.org](mailto:vance@wild.org)



Facilitated by



717 Poplar Avenue  
Boulder, CO 80304 USA

▶ [WWW.WILD.ORG](http://WWW.WILD.ORG)

# International Journal of Wilderness

**April 2019** Volume 25, Number 1



Visit [WWW.IJW.ORG](http://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