

Journal of Wilderness



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FRONT: American bison (*Bison bison*) in snow-
covered Yellowstone National Park, United States.
Image courtesy of Patricio Robles Gil©

INSET: Dressed for the weather in Yellowstone, sur-
geon and photographer, Patricia Rojo. Image courtesy
of Patricio Robles Gil©

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—John C. Hendee, *IJW* Editor-in-Chief

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EDITORIAL PERSPECTIVES

Embracing Web 2.0 Technologies

BY LISA EIDSON

Facebook, Delicious, Twitter, Blogger, Podcast Alley, Google, MapQuest, YouTube, Flickr, Second Life, Wikipedia. These websites are Web 2.0 in practice—social networking and bookmarking, status updating, blogging, podcasting, informed searching, mapping mashups, video and image sharing, virtual worlds, and collaborative editing.

Web 2.0 is the language of the next generation. In contrast to the old Internet, Web 2.0 facilitates two-way communication, information sharing, and collaboration through the mass amateurization and “decentralization of website content, which is now generated from the ‘bottom-up,’ with many users being contributors and producers of information, as well as the traditional consumers” (Wikipedia 2009, para. 2).

Recently, the Pew Internet and American Life Project published a variety of reports quantifying the popularity of Web 2.0 technologies in society (see Jones and Fox 2009; Lenhart 2009; Lenhart and Fox 2009; Madden and Jones 2008). The findings suggest that technology use is highly uneven, with significant numbers of teens and adults 18 to 24 routinely using Web 2.0 technologies when compared to older population segments. Another striking conclusion is the rate of Web 2.0 technology adoption. For example, in May 2008, 6% of Internet users indicated they use a status updating service, such as Twitter, to share and view updates. This percentage had nearly doubled by December, 2008.

Despite their popularity, multifaceted resistance exists to employing Web 2.0 technologies in wilderness management to communicate with both the public and current and future managers. Many wilderness management veterans who began using computers and the Internet midcareer may feel uncomfortable or overwhelmed with always-present connectivity. Some may see Web 2.0 as unproven, fleeting,

or provisional. Others may be unwilling to relinquish the “command and control” government mentality required for participatory information. Still others may believe technology is in direct opposition to the principles and meaning of wilderness; effectively that embracing new technologies further minimizes the unknown, erases divisions between physical and virtual reality, and exacerbates the current trading-bedrolls-for-BlackBerries trend apparent in today’s youth.

In fact, Web 2.0 may be the best way to communicate about wilderness with those growing up in the information age. Generation Y is the generation generally touted as being the first to grow up with technology, whereas Generation Z is the first to see parents and children embrace technology together. As such, today’s 30-somethings and younger treat technology as an underlying prerequisite to life and work, not an afterthought add-on, and expect it to be prevalent in business, government, and society. Indeed, Freimund and Borrie acknowledge that “failure to provide information through dominant mediums may reduce critical awareness and constituency for the wilderness ideal ... and access to information might determine future awareness of and demand for wilderness” (1997, p. 22). Additionally, failure to incorporate the use of Web 2.0 into the wilderness management workplace may have negative implications for motivation and morale, institutional learning, and retention of institutional knowledge as younger managers replace older ones.

With the introduction of Web 2.0, society has entered an era of epochal and irreversible change. Shirky writes, “Just as everyone eventually came to treat the calculator as a ubiquitous and invisible tool, we are all coming to take our social

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Reflections on Endangered Experiences

Returning to Our Roots

BY JOSEPH W. ROGGENBUCK

Introduction

My purpose here is to reflect on a happy career as a wilderness researcher, teacher, and enthusiast, and to offer concerns, insights, and recommendations about an idea, a system of special places, and a profession that are very dear to me. This essay is organized into four parts. First, I outline my own background, and the persons, ideas, and events that spurred my lifelong excitement for wilderness. This information will help the reader make sense of and assess the value of my ideas. It is also a thanksgiving for those who have nurtured me and a plea for wilderness visionaries to stay the course. I fear the numbers of wilderness supporters, at least in academia, in the world of ideas, scholarship, and teaching, are dwindling.

Second, I discuss the vital experiences—from the broad array of valued experiences in wilderness—that I believe we as a profession have mostly overlooked. I see these experiences as deep connections with nature resulting sometimes in (or from) transcendent experiences; some would call these spiritual experiences. Related to these experiences, and perhaps facilitators of these experiences, are solitude and primitive living. We have emphasized solitude but have done little on understanding and fostering the primitive. Given broad cultural shifts and changes in leisure activities, I think these experiences of the primitive—of merging with wild nature—and perhaps transcendence are known less than in the recent past. Hence, I call these wilderness experiences endangered.

Third, I turn to the major challenges of the wilderness idea and to wilderness values that have shaken my own solace during my career. Some of these challenges trouble me still; others have fostered creative growth. The first challenge was that the American ideal of wilderness, of which we were all so proud, might not be an exemplary or even a relevant model for wildland protection of the world. The next challenge was



Joseph W. Roggenbuck receives the USDA Forest Service and *IJW* 2008 Excellence in Wilderness Stewardship Research Award. Pictured from left to right are Chris Brown, director, Wilderness and Wild and Scenic Rivers; Gail Kimbell, then chief, USDA Forest Service; the author; and Joel Holtrop, deputy chief, National Forest Systems. Photo by USDA Forest Service.

a bombshell: our wilderness idea might not be appropriate or ideal even for ourselves. Indeed, the environmental philosophers Callicott and Nelson have noted that our wilderness idea is under siege, and is “alleged to be ethnocentric, androcentric, phallogocentric, unscientific, unphilosophic, impolitic, outmoded, even genocidal” (1998, p. 2). This was a real stinger and news to me (even after I looked up all those words in my dictionary). Callicott and Nelson (1998) and Cronon (1995) go on to suggest that our wilderness idea, on which our wilderness movement and our Wilderness Act (1964) are based, might not be an ideal way for humans to relate to nature, for humans to protect or enable nature (see figure 1).

Fourth, I conclude with some concerns and suggestions about the future. I come home to where I started. For me, the wilderness is a special place; it is a special experience. It endures.

Discovering Wilderness

I was a boy on a farm in Michigan in the 1950s. The farm chores were long and often arduous. But I was born with a sense of wonder and wander. There were woodlots and creek bottoms to explore. I had a whole gaggle of brothers. When the day's work was done or after Mass on Sunday, we were off. We hunted; we fished; we built a shack in the woods. In November, we celebrated Thanksgiving by going to "deer camp" in the north woods. But, I was always different from my brothers, and my heart was never on the farm. I read *Outdoor Life* and *Field and Stream* from cover to cover. I noticed the ads in the back pages advertising guided canoe trips into the Quetico-Superior lake country of Minnesota. Such trips seemed impossible, too far away and too much money. I drifted into the world of ideas and to larger and larger questions of meaning. This journey took me to the library of the local parish priest, and then to more than six years in a Roman Catholic seminary. When this too left me searching and the walls too confining, I landed at the University of Michigan. I was a scared adolescent, but with few scars and still a sense of wonder and wander.

There, three special events occurred that profoundly shaped my life, my professional career, and my love of and commitment to wilderness. I first met professors who introduced me to ideas of the wild, and the role of the wild in shaping American culture, uplifting the human spirit, and in finding spiritual renewal. Next, I found Sigurd Olson and his books on the wilderness meanings and values of his beloved canoe country of northern Minnesota. I cherished those books and still do, even though I now recognize that Olson was quite androcentric and that Callicott (2000) singled him out of all the great wilderness writers and advocates for



Figure 1—Sunsets remain an attraction in the Boundary Waters Canoe Area Wilderness. Photo by Joseph W. Roggenbuck.

specific criticism. I read *The Singing Wilderness* (1956), *Listening Point* (1958), *The Lonely Land* (1961), *Runes of the North* (1963), and *Wilderness Days* (1972). When I read these books, I thought I had finally "come home." The spiritual connections—the oneness with nature—that Olson sought and found in his canoe country were those that I had sought for some decades of my young life. I had experienced glimpses of this rapture in meditation in the seminary chapel, but felt this more strongly in the silence of clumps of trees on seminary grounds. It rang true to me that these connections, and craving for these connections, would best be satisfied in a simple uncluttered life, in primitive conditions away from modernity. I knew from weeklong spiritual retreats in silence that these connections and insights take time. I knew less about the requirement of physical labor to achieve the sense of tranquility, peace, and beauty of which Olson spoke. I didn't know then, and still don't know, how complete a system nature must be to foster spiritual con-

nections, awe, and wonder. What I did notice and value then, and do more so now, is that Olson trusted his own intuition to act as a guide to his wilderness days, his teachings in the classroom and on the canoe trail, and to his writing. I have followed his advice, and the Boundary Waters Canoe Area Wilderness has become "my home" and my place for spiritual solace and renewal. I spend more than a month there each summer. Olson believed, and I tend to believe, that this need for wild places, for simple living, for escaping for a time to primitive conditions is deeply a part of us as humans.

The third event of my growth that shaped my wilderness career was the discovery of two papers published by Lucas (1964a; 1964b) entitled "Recreational Use of the Quetico-Superior Area" and "The Recreational Capacity of the Quetico-Superior Area." Through these papers I learned that there are scientists who actually do research on experiences in wilderness and on what shapes these experiences. I was amazed and filled with joy.

Endangered Experiences

Backes (2001) recently edited a book that summarizes the wilderness meanings contained in Olson's speeches and writings. Like all great conservation leaders and wilderness advocates, Olson used all the common experiential, economic, and ecological values of wilderness to buttress his arguments during his long career (see figure 2). But Olson most emphasized the power of wild nature to foster profound spiritual connections and inner peace.

Olson described deep communion with nature, a transcendent experience, when as a novice canoe guide he climbed to a ridge top to watch a sunset.

As I watched and listened, I became conscious of the slow, steady hum of millions of insects and through it the calling of the whitethroats and the violin notes of the hermit thrushes. But it all seemed very vague from that height and very far away, and gradually they merged one with another blending in a great enveloping softness of sound no louder, it seemed, than my breathing.

The sun was trembling now on the edge of the ridge. It was alive, almost fluid and pulsating, and as I

I think these experiences of the primitive—of merging with wild nature—and perhaps transcendence are ... endangered.

watched it sink I thought that I could feel the earth turning from it, actually feel its rotation. Overall was the silence of the wilderness, that sense of oneness which comes only when there are no distracting sights or sounds, when we feel and are awake with our entire beings rather than our senses. I thought as I sat there of the ancient admonition "Be still and know that I am God", and knew that without stillness there can be no knowing, without divorcement from outside influences man cannot know what spirit means. (Olson 1956, p. 130–31)

Over time, with more transcendent experiences and through reading such philosophers as Lewis Mumford and Pierre Teilhard de Chardin, Olson came to see humankind as progressing along an evolutionary path toward union with God (Backes 2001). This evolutionary path has long been one of deep

biological attachment to nature. Olson believed our need for wild nature is steeped in our human memory. Our subconscious knows and longs for the primitive, and going to wilderness is going home (Olson 1928). Because of our biological roots in wilderness, we can more easily know ourselves there, we can more easily find peace there, and we can more easily open ourselves to spiritual experiences there.

The experiences of transcendence, of awe, of happiness in wilderness, anchored in our very biology as humans, are the very ones I'm calling endangered. Why is this? Many intellectuals doubt the biological and philosophical arguments that form the basis for Olson's contention. Indeed, when I discussed this essay with a close university colleague, he doubted that the romanticized experiences of Olson had much relevance today. He suggested there were cultural values in preserving such experiences and demonstrating a way of life that was meaningful in our nation's history. For him, wilderness experiences might be worth valuing as a sort of living history demonstration (i.e., protecting something that is gone or almost gone).

There may be some truth in my colleague's contention. Use of our national parks is down. I suspect demand for our primitive experiences is down even more. There are practical reasons for the drop in use. The nation must focus on the large problems of war, the economy, energy, poverty, health care, and urbanization. Science, technology, and materialism, all hallmarks of modernity and defining characteristics of our culture, might be



Figure 2—Stillness, silence, and space away from outside influences foster deep connections with nature. Photo by Joseph W. Roggenbuck.

negatively affecting wilderness use rates because they promise answers, truth, the good life, wealth, entertaining gadgets, fun, and excitement. For some, there may be no need for the slow and unpredictable rhythms of nature.

Olson suggested that his transcendent experiences on the ridgetop were shaped by silence, by time alone, by time in wilderness, and by freedom from distraction of outside influences (see figure 3). Olson wrote of the need for days and days to pass (1945), the need for physical labor (1938), and the need for primitive conditions (1938) so that wilderness visitors might attain high levels of oneness with nature and spiritual uplift. But, many of these conditions don't pertain to current wilderness visitors and visits. Visits are becoming shorter and, in some wilderness areas, day use predominates. More and more technological equipment is being brought into wilderness, which permits visitors to live and play comfortably in the wilderness (e.g., electronic fish finders), create ease of travel and navigation (e.g., GPS units), provide contact with the outside world (e.g., cell phones), and provide entertainment (e.g., handheld television monitors). Managers themselves may be endangering primitive experiences, required by the Wilderness Act, when they mandate the use of latest technology backpack stoves that use exotic and nonrenewable fuels, rather than promoting cooking over a fire.

Challenges to Our Notion of Wilderness

During the first 15 years of my research career, it seemed that our wilderness idea, our wilderness places, and for the most part our wilderness management were causes of grand celebration. My first rude awakening that all was not beauty and goodness occurred at the 5th World Wilderness Congress in



Figure 3—Cooking over a fire is a favorite primitive activity in the Boundary Waters Canoe Area Wilderness. Photo by Phil Radtke.

Norway. There I happened to sit next to a Sami herdsman, and together we listened to an American bureaucrat extol the virtues of a system of protected places “where man is a visitor who does not remain” and “where the earth and its community of life are untrammelled by man” (Wilderness Act 1964). With the Sami I learned firsthand that wild places with wilderness character can and often do contain humans, and indeed, wilderness as we know it may exist largely because of present or past conservation efforts by indigenous people. Getting ours heads and hearts around this notion has been a challenging task for American professionals as we learn about including indigenous people in Alaskan wilderness management. We can learn through dialogue with people of other cultures at World Wilderness Congresses and through such journals as *IJW*. I think we can be proud of our system of wilderness places, but not in any nationalistic or imperialistic way. We must know that our way, our ideas, our definitions, and our management practices may not resonate, indeed may do much harm, if offered or applied without sensitivity to

other cultural traditions. Indeed a diversity of wilderness or wild philosophies and places will likely best serve the Earth, and its human and nonhuman populations.

The next big challenge for me came from Callicott and Nelson (1998), Cronon (1995), and Callicott (2000). They state that their criticism is directed at the “received wilderness idea,” the idea about wilderness that we have received from the great wilderness philosophers such as Thoreau, Muir, Marshall, Leopold, and Olson. Their critique is not of our wilderness places; they don't talk about wilderness management. To summarize a long story, their critique includes the following notions. The word *wilderness* only has meaning in a few northern European nations and a few of their colonies. The “received wilderness idea” idealizes nature as something that it is not—pure, pristine, and whole. It ignores and negates the existence and impacts of indigenous people, both past and present, in wild places. The wilderness idea is macho, perhaps racist and an insult to women. It separates humans from nature, both

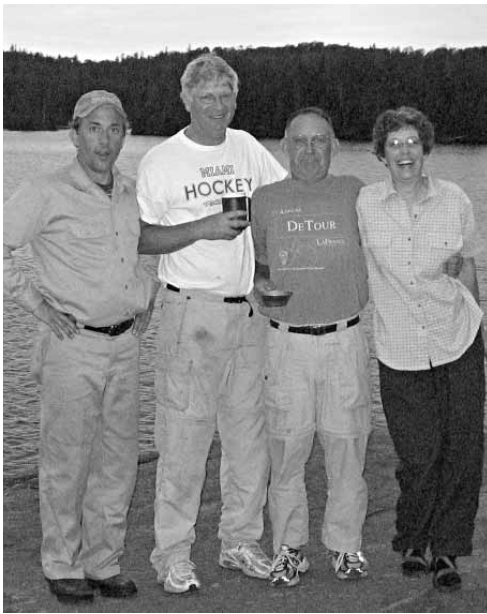


Figure 4—Wilderness adventures foster deep friendships. Photo by Susan Tomaselli.

philosophically and practically, and it is too devoted to recreation. These statements left me gasping for air, and to be perfectly honest, 10 years later at retirement I had still not regained my intellectual and philosophical traction.

How has or might the wilderness profession respond to these challenges? Well, the wilderness ecologists and conservation biologists have gained stature compared to wilderness recreation professionals. This change has been a good thing. Wilderness does have very important ecological values and may serve as biodiversity reserves. Nonhuman life on Earth has a right to exist along with humans, and some species of life are more dependent on wilderness places than are humans. It is wise to get our ecology right.

For me, the larger question was and is, how should we as wilderness experience professionals respond to this scathing critique? Mostly we haven't responded. At an intellectual level, we have pretended the critique is irrelevant or might just be "blither and blab." And maybe we are right. I have read again what Callicott (2000) says about the

received wilderness idea as it relates to experiences in wilderness, and he doesn't say much. He complains about Teddy Roosevelt's macho attitude about wilderness and about Olson's stories of laughter among his companions in wilderness (see figure 4). He says little about Olson's descriptions of the way wilderness facilitated deeply spiritual experiences and experiences of awe, tranquility, and peace among his companions. When Callicott (2000) does describe experiences in wilderness, he points out that wilderness recreation today has become "one of the most gadget-laden and rule-bound forms of sport available" (p. 27). As I have said (Roggenbuck 2004), the trend toward dependence on modern conveniences and technologies in wilderness seems to be a problem, but it may be more of a critique of wilderness management than of the received wilderness idea. Still, I believe that Olson and the other great writers such as Muir felt that these wilderness experiences were facilitated by large tracts of relatively pristine nature. Whether or not this is the case, or whether pristine nature is relevant or even possible to define, is a question our profession should be addressing. Also, if the experiences we hold dear are dependent upon or foster the negation of the existence and rights of indigenous people, that should be a huge concern for us.

Recommendations: Returning to Our Roots

In the last 15 years, the pendulum of interests, debate, and resources devoted

to wilderness protection has swung away from experiential values and toward ecological and biodiversity values. Conservation biologists and systems ecologists now strongly influence wilderness stewardship, and we have stopped saying "nature knows best." We believe now that humans must intervene in wilderness to restore fire to its natural and historic and prehistoric role; we must reintroduce lost species, especially keystone ones, and we must remove invasive species. This pendulum shift was necessary; it has accomplished much good. But now I think the pendulum is and should be tilting back to protection of experiential values (see figure 5), values of the type that Olson, Muir, and Thoreau cherished. Scholars of human experiences in wilderness should stay this course.

First of all, I think ecologists are finding what chaos theory has suggested: that the wild systems we are attempting to understand and restore are too complex for quantitative prediction (Turner 1994). The metaphor of the world as a machine with component parts working together to accomplish some definable end may not be a very useful one. Nature may not know best, but humans may not know better. Large-scale systems may be less characterized by a machine and more characterized by wildness, vitality, and freedom (Backes 2001). Notions like these may be the reason ecologist David Cole (2005) called for some humility and for leaving some of these areas untrammelled, places where humans do not intervene even if seem-

Just as we don't want too much control
on nature in wilderness, so also we
don't want unnecessary restrictions on
people in wilderness.

ingly critical component parts of the system are missing. Learning about these wild chaotic systems might be aided by the way Olson learned about such places. He learned best by experiencing wild places firsthand and by intuition. We social scientists know the ways of experiences and intuition. We can help the ecologists.

We need to better understand the deeper experiences about which Olson has written and on which I have focused in this essay. What are these transcendent experiences? How transitory are they? Do they provide meaningful insight? Do they provide serenity and peace? Do they provide clearer understanding of natural systems and greater commitment to nature protection? And what shapes these deep experiences? Do they come from moments of near ecstasy in special spots, or are they more likely facilitated by sustained time in wild places? Do places apart, places of silence, places free of modern technology best foster this deep connection to nature? Is it better if nature is reasonably whole? Finally, and most importantly, do people find these connections in nature only if they seek them, or if their cultural and spiritual



Figure 5—Catching fish for survival is a primitive skill. Photo by Phil Radtke.

traditions prepare them (see figure 6)? Or is this longing for deeper meanings contained in our very biology as humans, as Olson contended and modern evolutionary psychology suggests (Backes 2001)?

At a more practical level, the demand for, the nature of, and the value of primitive experiences in wilderness beg for attention and study. The Wilderness Act of 1964 calls for the provision of a primitive type of recreation. We know little about what these experiences are, but with all the

modern gadgets being hauled into wildernesses, with almost no blank spots left on the map, with trails being constructed to uniform higher standards, and with campfires and cook fires discouraged or disallowed, today's experiences hardly seem primitive. The values of deep contact with nature and spiritual uplift are likely being lost if they depend upon the primitive. If current visitors don't value the primitive, do we develop a different interpretation of the Wilderness Act, or do we amend it, or do we stick with a more traditional view and forbid such modern conveniences as cell phones in wilderness? But, if we forbid modern conveniences such as cell phones, we may be driving potential or actual visitors away from wilderness. And as we consider such regulations, we must also think of the symbolic value of "untrammelled-ness" in wilderness (Cole 2005). Just as we don't want too much control on nature in wilderness, so also we don't want unnecessary restrictions on people in wilderness.

And finally, I recommend we go to wilderness. Take our children, our grandchildren, scout groups, our students, and our friends. Spend long



Figure 6—Storytelling over a cook fire reinforces wilderness connections. Photo by Joseph W. Roggenbuck.

periods of time there. We will find answers to questions asked in this essay. We will find happiness.

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Continued from WEB 2.0, page 3

tools for granted as well” (2008, p. 304). His premise is that only when Web 2.0 ceases to be novel can we truly devise appropriate, pragmatic ways to use it. It's clear that Web 2.0 is here to stay, and we in wilderness management should choose to embrace the revolution because only then can we begin to make choices about how to best use these technologies to preserve our wildernesses.

Are you ready for Web 2.0? Can you decipher this message? Cu n wldrns 2moro g2g ttyl (en.wikipedia.org/wiki/Text_messaging_abbreviations).

In this issue of *IJW*, Joseph Roggenbuck reflects on his career and expresses concerns about the decline in solitude and primitive living in wilderness and the associated spiritual and transcendent experiences of wilderness, or what he describes as some of the endangered experiences of wilderness. Seekamp and Cole report on a qualitative study of wilderness visitors near the Green Lakes, a high-use wil-

derness destination in the Three Sisters Wilderness in Oregon, and the self-described meanings of their visitor experiences. Conrad C. Lautenbacher, Jr., as undersecretary of commerce for oceans and atmosphere and a NOAA administrator, describes the need for systematic and ongoing monitoring of the Earth conditions and how that knowledge and information is related to sustaining wilderness. Meyer, Kiener, and Křenová tell the story of the cooperation between the Bavarian Forest National Park in Germany and the Šumava National Park in the Czech Republic, which has become the “Wild Heart of Europe.”

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Earth Observation and Sustaining the Wilderness

BY CONRAD C. LAUTENBACHER, JR.

Earth Observation

The observation of our environment on Earth (Earth observation) has been fundamental to the existence and sustainability of the human species from the very beginning of large brain evolution. Every species, including humans, lives in a relative comfort zone defined by environmental parameters that support and aid in maintaining their existence. Both short-term and long-term adaptation to the environment is a must; species that cannot adapt at a pace equivalent to changes in their surroundings will fail. We are built with an automatic need to observe our surroundings, and on a short-term basis, we must cope. If it is cold in the morning, we put on more warm clothes; if it is raining, we grab an umbrella and don a raincoat. Similarly, over the many thousands of years of our evolution, we have sensed or observed our surroundings, and those of us here today are the descendants of those who have coped with change.

The human species has become so adept at coping that we have learned to live and work virtually anywhere on the planet, from the tropics to the poles, and outer space to the ocean depths. We have been so successful that there are close to 7 billion of us with the promise of more. We have transformed this natural instinct for observation into the scientific method; and through science and technology, we have produced the means to alter our environment. We have dramatically improved our ability to grow food, to stay warm or cool, and to defend ourselves perhaps too successfully from every other predator on Earth. It is truly amazing what we have accomplished based on our powers of observation, and much more will be both possible and necessary in the future.

Given that you can see the connection between your life and ability to succeed is limited or enhanced by your powers of observation, it is a very short step to extrapolate the criticality of that skill to a much larger scale, that of observation of the entire planet, its ecosystems, and their fundamental relationships. We live in a technical world that depends



Conrad C. Lautenbacher, Jr., a graduate of the 1964 Naval Academy, at the South Pole. Photo courtesy of NOAA.

directly on observations, and particularly Earth observations (see figure 1). Earth observations include everything we can possibly know about our planet inclusive of all physical, chemical, and biological parameters. For example, the tracking of disease outbreaks and determining the microscopic environmental conditions under which pathogens live and prosper is as much a part of Earth observation as recording the daily air temperature in your neighborhood.

Major parts of our economy currently depend on global and regional Earth observations—so much so that without those industries the rest of the economy would be nonexistent. Activities such as agriculture, mining, energy, transportation, construction, insurance, public health, water management, and infrastructure planning are directly dependent on Earth observations. In addition to your personal daily observations of weather and road conditions, how is it that our society fulfills its needs to observe our planet and support our economy?

The best example of a currently functioning global observing system occurs in the weather franchise, a combined public and private endeavor. Those marvelous pictures of the atmosphere and computer simulations of weather

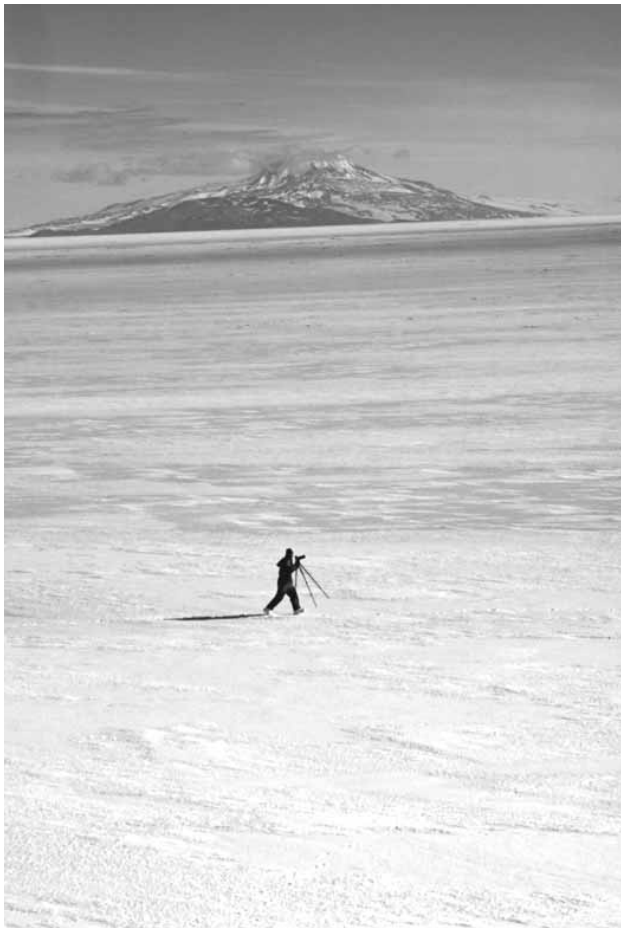


Figure 1—Scientists measure changes on Earth through remote and on-site observations. Photo courtesy of NOAA.

forecasts that we have all come to know and depend on are derived from information gathered from a global system consisting of satellites, ground stations, balloon launches, and aircraft reporting. An amazing array of technology is applied across the board, from the surface of the Earth to the upper stratosphere. Additionally, ocean sensors play a key role in forecast models that allow for ocean/atmospheric interaction.

Developed nations with space assets have invested in both geostationary and low Earth-orbiting satellites. The Earth is ringed with satellites that have continuous watch on changing weather conditions. Ground truth is critical, however. On the surface, Doppler radars and other sophisticated remote reporting instru-

ments provide temperature, wind, and humidity readings, for example, to ensure proper calibration of satellite data, and together they provide a relatively complete picture of atmospheric events (see figure 2). Nations share this data freely across political boundaries thanks to the World Meteorological Organization, a part of the United Nations system of agencies.

Other examples occur in public health where disease information under certain protocols is shared across national boundaries. A worldwide tsunami detection and reporting system is close to becoming a reality. Global seismic networks provide worldwide coverage of earthquakes.

There are many other examples of individual systems that observe and record essential information about

our planet, but until the last few years, they have been developed independently. Today, however, we have been awakened to the extraordinary value in combining the information from individual systems involving separate scientific disciplines. One simple example is the tracking and reporting of hurricanes, which requires continuous data from the atmosphere, ocean, and land.

Those of us who are fortunate to live in developed nations take Earth observing systems for granted; but without the information they provide, many more lives would be needlessly lost every year, and economic development, as well as the standard of living would suffer significantly.

The Wilderness—Land

Fortunately, despite advancing threats and challenges on all fronts, significant amounts and types of wilderness remain on Earth—essentially unspoiled areas that provide a model of how Earth systems functioned in balance before noticeable impacts of the human species. The wilderness has served as a laboratory for the study of life and how it is supported. From it we have learned many things, for example, the reality that survival is dependent upon biodiversity—the large variety of species of all biological families that serves as a hedge against natural and human-made changes (see figure 3).

For example, human life depends on a relative handful of cultivated grain species that are farmed around the world. How much more secure would we be with a much larger set of grain species should some changes in the environment lead to extinction of the small number on which we depend? Human health is dependent on natural resources for the medicines that prevent and cure disease. A smaller number of species from which to test and extract lifesaving substances for use as human medicines would again make life so much more fragile and susceptible to large-scale decimation.

The wilderness is not just about the biological world, it is also about the physical and chemical attributes on which we absolutely depend. The forests help to regenerate oxygen and maintain the chemical balance of our Earth and atmosphere. They influence regional climate regimes and hence the climate system of the Earth. They play a critical part in the water cycle, helping to generate the clouds that move fresh water across the face of the planet and purifying the water that flows into our streams.

As we look across the physical, the chemical, and the biological systems



Figure 2—Automated stations on Earth supplement satellite and human observations. Photo courtesy of NOAA.

that function on Earth, we see that they are critically interdependent, complicated, and nonlinear. Through the application of the scientific method and development of technology, we have learned a great deal about our planet; but much remains to be learned before we can fully understand the operating details of these systems, particularly in regard to forecasting the future with a reasonable degree of certainty. Global observation is the key.

The Wilderness—Ocean

When asked to define wilderness, most people immediately think of rain forests, vast expanses of grasslands, jungles, and remote mountain terrain. But I encourage you to expand your vision and consider our ocean wilderness. The ocean is more than 70% of our planet's surface. The ocean is home to a set of ecosystems at least as varied as those on the land surface (see figure 4). There are deep and shallow areas, mountainous regions, and reefs teeming with life from single-cell to large apex predators, "desert" areas with a minimal chain of life, and areas so deep that life has

formed outside the process of photosynthesis. There are vast numbers of undiscovered species remaining on the planet, and a large majority of these are in the oceans.

However, the ocean too has suffered from human intervention. Large dead zones develop off our coasts each year as excessive nutrients from fertilizers, cleansers, and sewage pour forth from our rivers. Many of the great apex predator fish have been swept from the sea with our need for food

and the efficiency of modern commercial fishing fleets. Many coral reef areas have been decimated by overfishing, coral bleaching, sediment flows, and human-generated nutrient imbalances. There are many endangered species in our oceans as well. A large portion of sea turtle species are threatened or endangered by marine debris and wild capture fisheries. Destructive fishing practices such as bottom trawling and drift nets, as well as the lack of sustainable management regimes in many parts of the world have led to more loss of species and habitat critical to natural regeneration.

While we have seen the loss of the large mammals on our continents, the same has happened in our oceans. In many parts of the world, reef apex predators, such as groupers and sharks, have been virtually eliminated. These changes have happened in a relatively short period of time compared to natural evolutionary processes. Many scientists believe that some of these changes are irreversible and that we have changed forever ocean ecosystems that have supported life on our shores and continents since the rise of humans.

The cause is not hopeless, however. In spite of the degraded state of



Figure 3—A high volcanic island in Truk Lagoon. Photo courtesy of NOAA.

much of our ocean, significant amounts remain in relatively pristine condition. These are true wilderness areas that we must preserve, study, and use to develop the science necessary to conserve what is remaining, and to restore health to areas that no longer support life as we once knew it.

Fortunately, we have such a mechanism to set aside and preserve parts of the ocean as we would a national park on land. The nation's national marine sanctuaries are administered by an organization within the National Oceanic and Atmospheric Administration (NOAA). These protected areas are once again growing, thanks to concerted actions during the administration of President George Bush. In the last four years, the amount of U.S. exclusive economic zone ocean waters coming

under protection has tripled in size with the addition of the Papahānaumokuākea Northwest Hawaiian Island Marine National Monument, as well as three other large Pacific Ocean and Island areas.

Clearly it is imperative that we preserve the 70% of our Earth's surface that provides 50% of the oxygen we breathe, all of the water we drink, and 20% of the protein consumed by the human species. Our ocean "wilderness" is clearly fundamental to life and needs continuing interest, increased support, and improved understanding. Global observation is the key.

The Wilderness— Polar (or Cryosphere)

The polar wilderness areas, both North and South, are important to life on our planet. These parts of our globe are among the most alien and perhaps most difficult to study and understand in terms of the important role they play in the balance of Earth systems.

Although we, the human species, have now made a permanent home at the South Pole, it was fewer than 100 years ago that a human actually traveled to the South Pole for the first time and marked the spot. Early expeditions took years to plan and execute, and there were many casualties along the way. But the ingenuity of the human species triumphed again. About 20 nations mount expeditions to the frozen continent, and many, such as the United States,

Earth observations include everything we can possibly know about our planet inclusive of all physical, chemical, and biological parameters.

maintain a year-round occupation of relatively small stations dedicated to science and understanding the importance of these unique areas to human survival.

Unlike the Arctic where the ice floats on the ocean, most of the ice at the South Pole sits on a large continent, much larger than the United States, which, if it melts, will add to the potential dangers of sea level rise. Understanding the mechanisms of ice accumulation and loss is critical to our ability to forecast potential sea level rise and to understand the consequences of climate change, particularly during a period of warming. Recent measurements show that the great ice sheets and glaciers may be melting faster than previously thought.

Melting ice can have a significant impact on the ocean. The difference in temperature and salinity between fresh melt water and salty ocean seas has the potential to alter ocean circulation patterns and modify the content of life in the ecosystems that exist in the polar regions. There are healthy and important ecosystems in both the north and south polar regions (see figure 5).

Most people are more familiar with the Arctic ecosystem, as the fate of the polar bear has received substantial worldwide publicity. A fascinating ecosystem also exists in the Antarctic in what we call the Southern Ocean.



Figure 4—Yellowtail snapper. Photo courtesy of NOAA.

Humpback whales and orcas thrive in those waters. Penguins abound and have learned to exist on the ice and in the water. Antarctic fish have evolved to the point where their blood systems produce a type of antifreeze that allows them to function in freezing waters. Life exists on land in the form of algae and other species that come alive with the melting of surface ice in the summer months, and then somehow hibernate when the water once again freezes during the winter cycle.

The conduct of science is no small task given harsh environmental conditions. Observational instruments have to endure temperatures ranging to more than 70 degrees below zero, hurricane-force winds, and months on end either in full sun or complete darkness. We are just now beginning to realize the technology to determine ice thickness from satellite information. Is the accumulation and build of new ice from precipitation sufficient to make up for any losses that are occurring in the warming areas? Global observing systems are the key!

Climate Change

The three large components of our wilderness system—terrestrial, oceanic, and polar—are connected by their dependence on other Earth systems such as heat (thermodynamics) and water. Heat from the sun accumulating in the tropical regions is transferred by the ocean and atmosphere to the much colder poles. Part of that movement depends on evaporation and precipitation of water, thus giving rise to the water cycle, which is crucial for life on Earth.

Today, another global cycle has grown in importance—the carbon cycle. We are just beginning to understand the total Earth carbon cycle, as its potential importance to our climate system is coming into focus. Carbon is



Figure 5—A young Weddell seal. Photo courtesy of NOAA.

a critical building block of life, from single cell organisms to the highest order mammals, including the human species. Carbon moves around the Earth in many forms and is transferred regularly among the Earth, atmosphere, and ocean. It appears in solid, liquid, and gaseous molecular forms and combines with a wide variety of other elements to form a large share of what we term organic molecules, the building blocks of life.

A relatively small amount of the gas, carbon dioxide, occurs in the atmosphere and is commonly termed a greenhouse gas by climate researchers because of its potential to trap heat within the atmosphere, which contributes to global warming. Reducing carbon in the atmosphere has become the subject of international negotiations, national regulations, and laws.

The U.S. Congress is seriously considering “cap and trade” legislation that will put a price on carbon and provide economic incentives to reduce the introduction of carbon into the atmosphere.

Whereas this much is well known, what is not known widely is that the world does not have a comprehensive, sustained carbon observing system. Understanding and quantifying the movement of carbon is just not possible today. How can we regulate the flow of carbon efficiently and effectively without that knowledge? And that knowledge begins with a global carbon observing system.

Beyond the observation and understanding of the carbon cycle is the development of a comprehensive global climate observing system. Scientists of all persuasions, regarding

It is from the wilderness, wherever it occurs on the planet, that we observe and determine how our natural systems operate.



Figure 6. The first image obtained from a GEOSS satellite. Photo courtesy of NOAA.

the causes of climate change, have called for the world to invest in a comprehensive climate observing system. It is a part of the United Nations Framework Convention on Climate Change. As we examine and undertake mechanisms to reduce carbon in the atmosphere to reduce the risk of future harmful climate change, let us not fail to invest in the very means of determining if we are being effective. After all, what counts is the effect on climate conditions and not the change in carbon.

Carbon, in addition to increasing in the atmosphere, has also been accumulating in the ocean. We know

from observations that ocean acidity, measured by pH, is increasing. Marine organisms comprising significant parts of the oceanic food chain depend on calcium forming processes, and a less "base" pH ocean will inhibit the normal growth of exoskeletons on marine animals. Given that 20% of the world's protein comes from the sea, reducing carbon in the atmosphere may be essential, irrespective of its effect on the climate system. Understanding and combating the buildup of carbon in our ocean is an imperative. A global observing system is the key!

Preserving a Viable Future

One of the most important developments over the past four years has been the establishment of the Group on Earth Observations (GEO), headquartered in Geneva, Switzerland, and chartered to build the Global Earth Observation System of Systems (GEOSS). The United States became a founding member and co-chairs this important organization. Approximately 80 nations and 50 international and intergovernmental groups have agreed on a 10-year plan to build, to observe, and to share the information so necessary for each nation to manage their resources and environment in an economical and sustainable way (see figure 6).

The GEO was formed to deliver essential societal and economic benefits codified in the agreements as Societal Benefit Areas, which, in brief, cover health, disasters, weather, climate, water, energy, agriculture, ecosystems, and biodiversity. GEO is dedicated to the acceleration of improvements in the economies and standard of living in the developing nations of the world. Capacity building for sustainable development worldwide is a key goal of GEO.

The GEOSS is the means essential to accelerating our understanding of the Earth's systems and enabling the application of that knowledge. Although the world has many brilliant scientists and policy makers, it is not possible for any single individual or even single nation to gather the continuous and comprehensive global data sets and process them into the information needed to answer the most difficult scientific questions and resulting policy dilemmas that face every nation. Issues such as forecasting and mitigating public health disasters

Continued on page 28

Mapping a Section of the Continental Divide Trail in Colorado's South San Juan Wilderness

BY JON J. KEDROWSKI

Introduction

The Continental Divide Trail (CDT), also called the Continental Divide National Scenic Trail (CDNST), is a single system of hiking trails crossing many wilderness areas, and extending approximately 3,100 miles (5,000 km) from the southern terminus in New Mexico at the Mexican border to the northern terminus at the Canadian border in Montana's Glacier National Park (National Trail Systems Act 1968, 1978; Bureau of Outdoor Recreation 1977). Popular continuous through-hiking of entire trail systems by individuals or group hikers is well known on trails such as the Pacific Crest or Appalachian (AT), and the CDT is gaining more attention and becoming frequented by more through-hikers every year. Although statistics are not available on the number of trail users and through-hikers on the CDT every year, the popularity may approach that of the AT because of the interest of outdoor enthusiasts to explore the CDT (Continental Divide Trail Alliance 2007; Federal Register 2007). Whereas only 61 people had through-hiked the 2,000-mile AT from 1936 to 1969, about 4,100 people had accomplished the same feat from 2000 to 2007 (Appalachian Trail Conservancy 2007).

Increased use of the CDT over the past decade has led to multiple issues in regards to the proper mapping, surveying, and defining of what is the actual CDT and where the route exists (National Trail Systems Act 1968, 1978; Bureau of Outdoor Recreation 1977). Completion of a single documented trail route for the Continental Divide Trail will be a great benefit to through-hikers and other users. In addition, this single route corridor will meet the criteria set forth by land managers, specifically the USDA Forest Service and the



Jon J. Kedrowski, West Ridge Castle Peak (14,265 ft.), Colorado.

Administration of National Scenic and National Historic Trails to create the CDNST (Federal Register 2007).

The Continental Divide Trail Alliance (CDTA) Explorer's Program organizes volunteers and consultants in conjunction with *Backpacker* magazine to explore and scout the backcountry for potential CDT routes where none exist or where the trail is on roads, is unclearly documented, or is inappropriately located. The CDTA was formed in October 1995 in Vail, Colorado, to assist the federal land management agencies in the completion, management, and protection of the trail (Continental Divide Trail Alliance 2007). The CDTA works closely with the public and the federal land managers to develop a CDNST master plan. Sixty-two percent, or 1,900 miles (3,060 km), of the proposed Continental Divide Trail route was in existence at the time the final Environmental Impact Statement was prepared (Federal Register 1981). This

plan when finalized will provide a comprehensive and consistent approach to the completion, management, and protection of the CDT and its surrounding environments. The plan will include the CDTA's recommendation of a CDNST corridor that will represent and preserve the vision for a primitive and challenging nonmotorized CDT. The strategic plan for the 3,100-mile (5,000-km) CDT was completed in 2008 in cooperation with the CDTA, USDA Forest Service, National Park Service, and the Bureau of Land Management (Federal Register 2007). The plan outlined all of the needs and costs to complete the CDT by 2008, the Trail's 30th anniversary (Continental Divide Trail Alliance 2007). The CDTA works with the federal land managers annually to implement and update this plan. The purpose of hiking and interactively mapping the section of CDT that was surveyed in this field project was twofold:

1. To contribute to the overall mission of the CDTA and add to the complete mapping survey of the 3,100-mile (5,000-km) CDT from Mexico to Canada.
2. To create an interactive map of the route traveled and post the trip profile on *Backpacker* magazine's Trimble Outdoors interactive website so that future backpackers could use the information when planning their own backcountry adventures and wilderness experiences; interactive mapping and online map usage is growing significantly, with a 33% growth in online map traffic in recent years (Mummidi and Krumm 2008).

The Study Area

The trail and route assessment for the CDT route was along a scenic 48-mile (77-km) loop, beginning and ending at the Three Forks Trailhead (TR 712)

just southwest and above Platoro Reservoir in the mountains of the 158,790-acre (64,260-ha) South San Juan Wilderness Area. The main focus was specifically on the 27 miles (43.5 km) of the CDT, which began in the south at Blue Lake and ended to the north at Elwood Pass, ranging in elevation from 10,500 feet to 12,700 feet (3,200 m to 3,900 m) (see figure 1).

The field-based survey utilized consumer-level GPS units (e.g., Garmin,

Magellan) where the team collected track and waypoint data along the CDT. The track resolution was measured at .01 of a mile (.016 km), and the waypoints were collected one or two every mile on average, depending on the terrain and features observed. The criteria for the points of interest (POIs) were to inventory trail junctions, campsites, water sources, historical settings, navigational concerns, flora and fauna, and rerouted

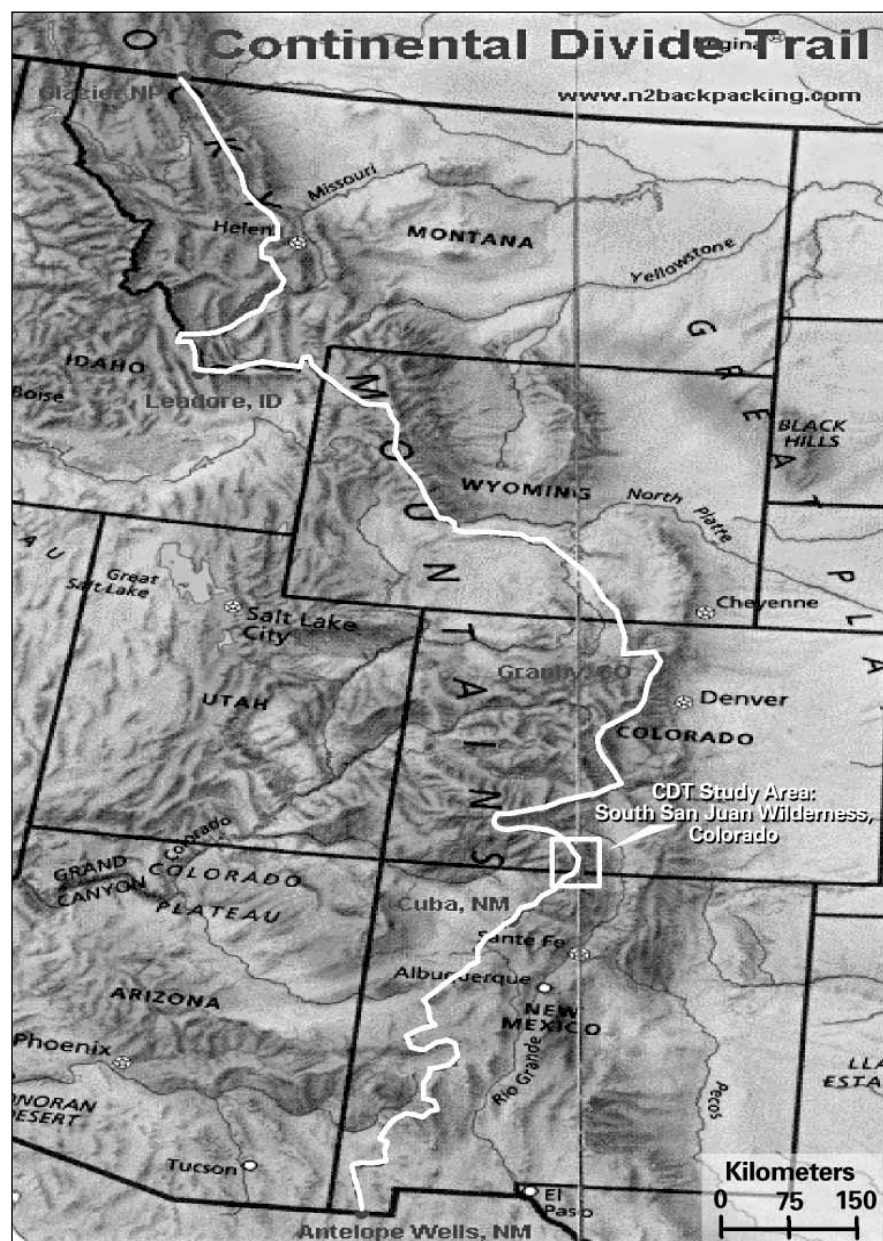


Figure 1—The study area is the Conejos Headwaters Loop in the South San Juan Wilderness of Colorado, part of the 3,100-mile (5,000-km) route of the Continental Divide Trail from Canada to Mexico. Map edited by Jon J. Kedrowski and provided courtesy of n2backpacking.com.

trail sections. Prior studies have described and used separate trail classification tools to assess trail and route conditions (Marion 1994; Cole et al. 1997; Leung and Marion 1999, 2000; Marion and Leung 2001; Leung et al. 2002; Kedrowski 2006, 2009). In this field survey, only a moderate categorical index was tabulated of the trail's status and special attributes, and was not as systematically detailed as some of the published examples. Some data points collected document the trail's important characteristics and location. For example, many sections of the route on the high ridges of the divide did not have a marked trail, some routes were marked by posts across the tundra, and other sections had no markings and the surveyors had to find a route by hiking in different directions until a trail was found or a distant route post was observed.

Once the field data were collected and the backpacking trip completed, the data were inventoried and the topographic map of the loop traveled during the trip was created. Backpacker's Trimble Outdoors Adventure Planner (v.1.53) interactive software was used to upload the GPS waypoints with the corresponding coordinates and a topographic map was produced. The trip report was uploaded to the websites backpacker.trimbleoutdoors.com/ViewTrip.aspx?tripId=40500 and bicycling.trimbleoutdoors.com/ViewTrip.aspx?tripId=40823, and the topographic map was completed following a review and analysis of the field notes, data, and trail information.

Discussion

Although 48 miles (77 km) were covered in the hiking loop and survey of side trail spurs and potential alternate routes, the actual Conejos Headwaters Loop mapped for this field project totaled only 27 miles (43.5 km).

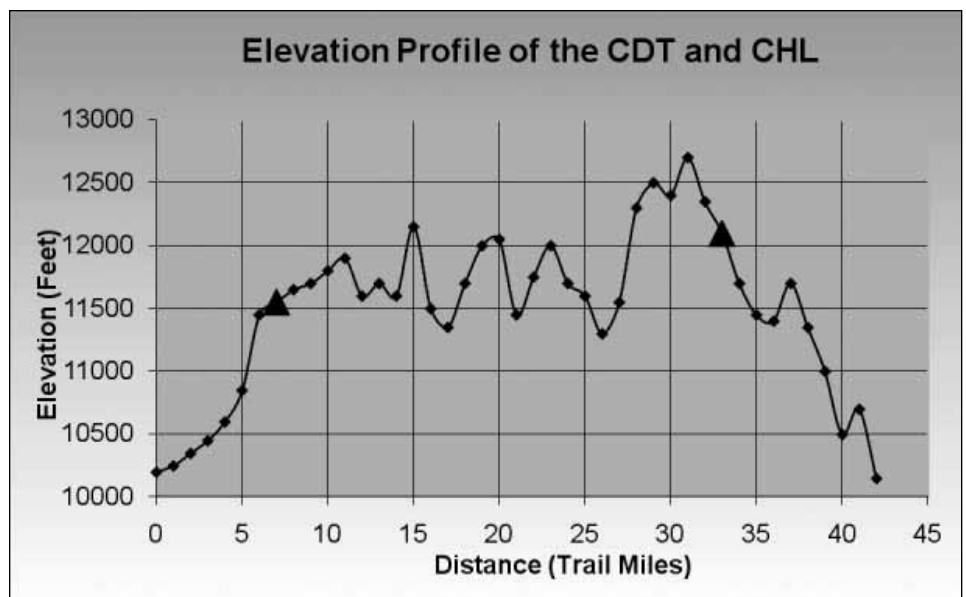


Figure 2—Elevation profile of the Conejos Headwaters Loop with the 27-mile (43.5-km) section located between the two triangles in the profile, Blue Lake on the left and Elwood Pass on the right. Profile by Jon J. Kedrowski.

Figure 2 displays an elevation profile of the entire route mapped. For example, 22 waypoints (CHL006 to CHL027) were collected to locate the 27-mile (43.5-km) section of the CDT, beginning at the Blue Lake campsite in the south, and ending at departure of the north side of the CDT at Elwood Pass.

The most prominent trail aspect of note during the field survey was a lack of trail markers on some sections above the timberline or near creeks; most of these sections were absent, and discernable trail in tundra grasses along ridgetops or near creeks for distances of 100 to 200 yards (91 to 182 m). For example, CHL020 marks the headwaters of Adam's Fork Basin where near the crest of the Continental Divide the trail is not marked among tall tundra grasses, wildflowers, and small willows

near the junctions of TR 571 and TR 572. The CDTA standard logo that marks most of the CDT was not observed on any of the trail signs or posts along the evaluated 27-mile (43.5-km) section. Significant POIs that were mapped included observable aspects of the route such as landscape views, stream crossings, campsites, road crossings, and wildlife observed.

Backpacker's Trimble Outdoors Adventure Planner (v.1.53) interactive software not only allowed waypoints to be captured and uploaded to the Internet for the route surveyed, but the actual trip profile on the website has many features that further benefit anyone who would like to use the information for their own leisure and planning. The Conejos Headwaters Loop, highlighting the 27-mile

Completion of a single documented trail route
for the Continental Divide Trail will be a
great benefit to through-hikers and
other users.

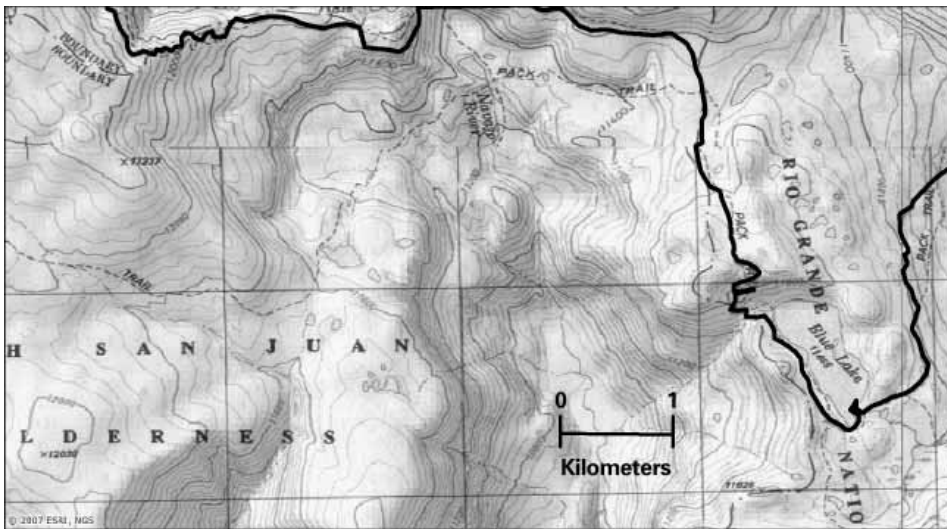


Figure 3a—A detailed view of the CDT southern segment of the study area near Blue Lake with the waypoint flags omitted for clarity. Courtesy of Trimble Outdoors Adventure Planner (v.1.53), ESRI.



Figure 3b—A photo taken from Point-of-View CHL006, indicating what is seen from that location along the route near Blue Lake. Photo by Jon J. Kedrowski.

(43.5-km) section of the CDT can be indexed on Backpacker's Trimble Outdoors website at bicycling.trimble-outdoors.com/ViewTrip.aspx?tripId=40823. The website for this project features five categories: trip summary, trip details, interactive map, higher quality maps, and elevation profile. The interactive map and higher quality maps take the actual waypoints from the route and place them on a topographic map powered by Trimble Outdoors, Google, and the U.S. Geological Survey. A person visiting

the website can zoom into specific portions of the map, click on flagged waypoint (POI) locations, pan to chronological portions of the route, and read a detailed description on an open tool window label of the waypoint POIs, which are listed below the trip report. Figures 3a and 3b demonstrate what backpackers may see and why mapping helps with examples of specific sections of the interactive map, such as near Blue Lake. All these items are displayed on the interactive mapping website to visually assist the user

with photographs and with map orienting. Figure 4a includes a section of the CDT near Elwood Pass in the north of the survey area and a photo from a location was uploaded to the interactive map and marked with a camera icon to mark the specific location of a point in that trail (see figure 4b). All these software features provide the information from the trail sections surveyed to be displayed interactively and allow a potential hiker or manager to use the website to review the information known about that trail segment.

Observations

The field project contributed to the overall mission of the CDTA in adding this CDT section to the complete mapping survey and inventory of the 3,100-mile (5,000-km) CDT trail system. An interactive topographic map was produced, and the map and trip report were posted on Backpacker's Trimble Outdoors interactive website so that future backpackers and wilderness users could benefit from the information when planning a backcountry adventure. The additional categorical data indexed within the GPS waypoints (POIs) has planning and management value to the CDTA, U.S. Forest Service, and Bureau of Land Management, for example, something as simple as marking the correct hiking route with posts having the CDT logo on this 27-mile (43.5-km) section.

The Bureau of Outdoor Recreation studied the feasibility of completing the CDT following the 1968 National Trails Systems Act, and one of their main objectives was to suggest an alignment of the proposed trail that maximizes the use of existing trails and recommends that, where necessary, the existing trails be upgraded, operated, and maintained to minimum standards consistent with environmental

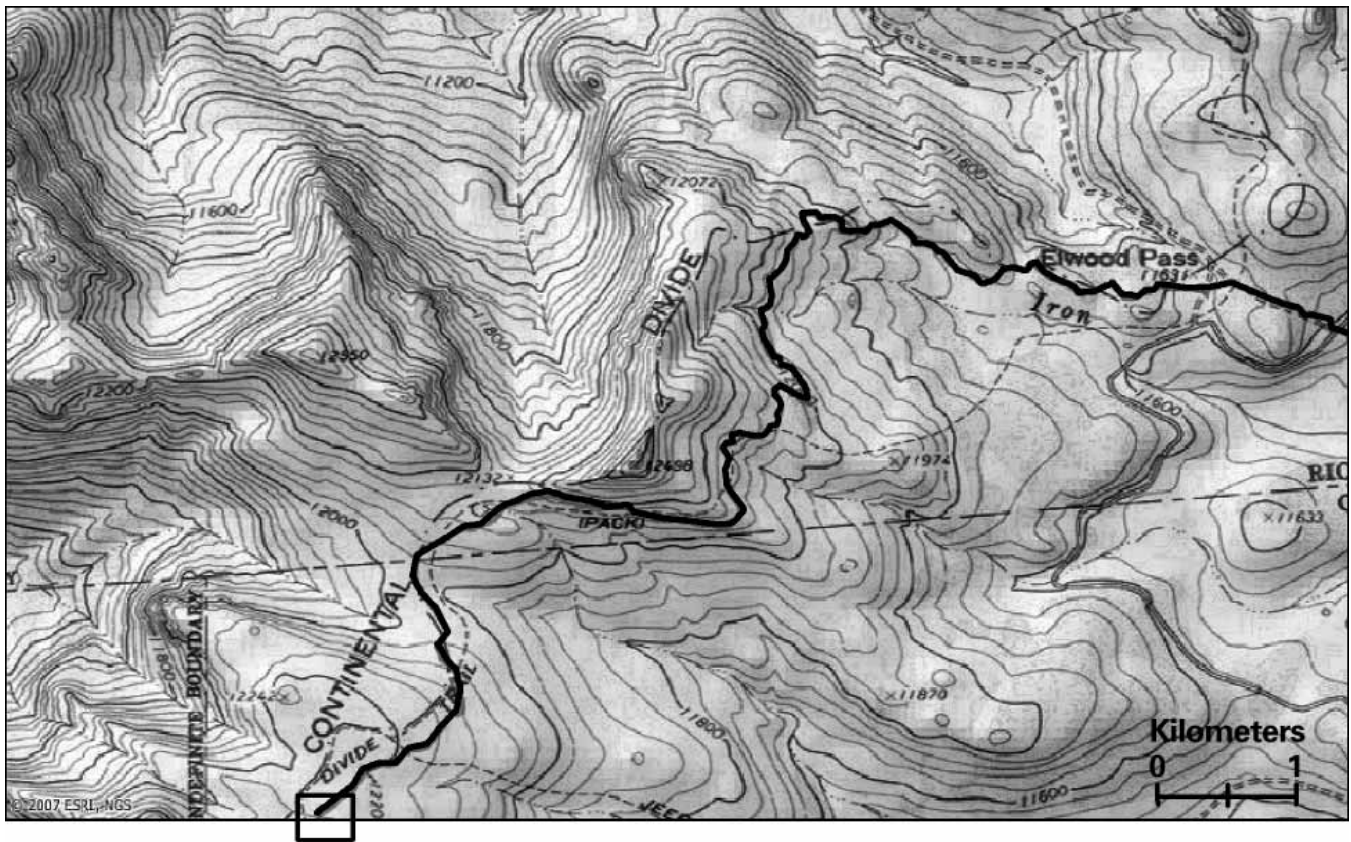


Figure 4a—A detailed view of the northern segment of the case study near Elwood Pass; the small square indicates the point-of-view location of the photo taken for figure 4b. Courtesy of Trimble Outdoors Adventure Planner (v.1.53), ESRI.

concerns (Bureau of Outdoor Recreation 1977). This particular field project demonstrates to the land managers the value this type of field survey can provide, such as locating and connecting segments of trail to help limit the amount of degradation by hikers trampling the high alpine flora in search of the trail.

One major observation of the trail that can be attributed to the isolation of the South San Juan Wilderness is that it was in excellent condition. There were very few places where erosion and degradation were negatively affecting the overall trail condition or exhibited the type of excessive width and incision documented in other studies (Cole 1983; Kedrowski 2006, 2009; Leung and Marion 2000; Marion and Leung 2001; Marion, Leung, and Nepal 2006). As popularity of the CDT increases, this may change, but further trail surveying



Figure 4b—The view located on the map in figure 4a (small square) shows high ridges on the trail in the South San Juan Wilderness. Photo by Jon J. Kedrowski.

may be able to measure and observe those changes. Little degradation of this section of the Continental Divide Trail and the South San Juan Wilderness currently exists. These field projects are

one way that future hikers can see the documentation for those low-impacted conditions and help preserve the outdoor wilderness experience for years to come.

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Deliberating the Experiential Qualities of Wilderness

Similar Meanings, but Divergent Standards

BY ERIN SEEKAMP AND DAVID N. COLE

Abstract: Debate continues about how to best provide and protect outstanding opportunities for wilderness experiences (i.e., solitude, primitive recreation, and unconfined recreation), particularly in high-use destinations. This study explores what these experiences mean to wilderness stakeholders attending facilitated deliberations about the management of a high-use destination in the Three Sisters Wilderness, Oregon. We found that similar meanings, but diverse standards, are attributed to these experiential qualities of wilderness. Opportunities for these experiences exist, but achieving any one experience is largely dependent on coping behaviors and making trade-offs between access and experience, as well as between these different experiences. Consequently, management of high-use destinations remains contentious.

Introduction

Legislation mandates that wilderness be managed to provide visitors with “outstanding opportunities for solitude or a primitive and unconfined type of recreation” (The Wilderness Act of 1964, section 2(c)). Yet, these experiential qualities are not defined within the Wilderness Act. This vagueness has been a source of contention regarding visitor management, as multiple interpretations of the terms exist. Additionally, examination of testimony that accompanied eight years of deliberation around the Act indicates that managers should provide “a complex set of experiences”, including solitude, primitive recreation, and unconfined recreation (Hendee and Dawson 2002, p. 22). Thus, managers are tasked with providing these complex experiences, necessitating an accurate understanding of how visitors perceive the terms.

Quantitative research on experiential qualities of wilderness is typical, with researchers operationalizing the terms without the input of visitors. Solitude, the focus of much research, is traditionally assessed through measures of encounters (Hammitt, McDonald, and Noe 1984; Manning 1985; Vaske, Graefe, Shelby, and Heberlien 1986), suggesting that



(L) Erin Seekamp below Johnson Falls, Boundary Waters Canoe Area Wilderness in Minnesota. Photo by Mae Davenport. (R) David Cole above the Aisek River, Glacier Bay National Park in Alaska. Photo by Bob Manning.

solitude is defined by the absence of others. Drawing on Westin's (1967) research from environmental psychology, Hammitt and colleagues (Hammitt 1982; Hammitt and Madden 1989; Hammitt and Rutlin 1995) suggest that solitude is a dimension of the construct privacy and, thus, is part

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of a process to optimize desired levels of encounters, rather than an outcome of acceptable limits of desired visitor densities. Most recently, a national effort to develop indicators of wilderness character specifies that solitude is a sense of remoteness from the sights and sounds of people within wilderness, and from occupied and modified areas outside of the wilderness (Landres et al. 2008).

Researchers typically reference the writings of Leopold, Marshall, and Olson to define primitive recreation as an opportunity to connect with the past and face the challenges of living simply and relying on personal skills (Borrie and Roggenbuck 2001; Landres et al. 2008; Shafer and Hammitt 1995). Yet Roggenbuck (2004) explains that the “immediate and deep contact with raw nature without the clutter and aid of modern conveniences” (p. 22) offered by primitive recreation experiences is complicated by the inherent value judgments related to the word *modern*, particularly in relation to mechanical and electronic equipment.

Definitions of unconfined recreation focus on behavioral freedoms and control. For example, McCool (2004) defines unconfined as possessing “the *internal locus of control*” over trip decisions (e.g., travel route, campsite, date of entry, and length of stay) (p. 16). Shafer and Hammitt (1995) operationalize the term as “feeling unconfined in your actions” (p. 269), whereas Borrie and Roggenbuck (2001)

interpret the term to mean, “allowing the human-nature transaction to unfold freely” through an immersion within nature (p. 204). Landres et al. (2008) recommend monitoring unconfined recreation on the basis of freedom (or the lack thereof) from management restrictions.

As use increases, providing complex opportunities (e.g., defining minimally acceptable conditions or standards; see Hendee and Dawson 2002) must be balanced with maintaining the natural and undeveloped qualities of wilderness (Cole 2000). Visitors use physical and psychological coping mechanisms (e.g., camping out of sight of other visitors, leaving an area, and altering desired expectations of being alone) to deal with compromised conditions when their thresholds are exceeded (Cole and Hall 2008; Hammitt and Patterson 1991). To address this issue, researchers are now asking visitors about the acceptability of trade-offs between protecting some qualities at the expense of others (e.g., restricting access to protect solitude); however, findings are mixed (Cole and Hall 2008; Lawson and Manning 2002). Therefore, it is important to understand how visitors describe these experiential terms and determine thresholds of acceptable conditions.

Using qualitative data from stakeholder deliberations about management of a high-use wilderness destination, the goals of this article are to: (1) explore the words stakeholders use to describe solitude, primitive recreation, and unconfined recreation (i.e., meanings); (2) examine their standards for achieving these experiences (i.e., thresholds); and (3) explore cognitive and behavioral responses to compromised conditions (i.e., coping strategies).

Methods

Four participatory meetings were held during the spring of 2005 in four Oregon communities to discuss management of Green Lakes (see figure 1), a high-use wilderness destination in the Three Sisters Wilderness (TSW). Each four-hour meeting included a presentation of technical information and facilitated small-group deliberations. A total of 150 individuals were contacted and asked to participate in one of the workshops through convenience, purposive, and snowball sampling strategies. They were drawn from a list of past participants in TSW public involvement processes, a list of regional wilderness survey respondents indicating a willingness to participate in additional research, a list of recreation and wilderness organizations in the area, and references made by the participants already recruited. Fifty participants attended the meetings (about 12 per meeting). Descriptive information illustrated that the participants visit other areas in the TSW, as well as the Green Lakes area (mean response categories were 11–15 visits and 3–5 visits, respectively).

Technical information was presented about the Wilderness Act, use trends, site conditions, current management policies, and the results of a recent survey of wilderness visitors.

Deliberations were value-focused (Keeney 1992). That is, trained facilitators encouraged participants to explain their understandings of the experiential terminology, why they valued the unique opportunities available in wilderness, and how important managing for each of the unique opportunities was to them. Additionally, participants ranked five hypothetical management alternatives and were led through deliberations about their preferences.

All information presentations and group deliberations were tape-

recorded, transcribed verbatim, and coded for emerging themes (i.e., thematic, open coding) (Strauss 1987). Commonality in meanings and standards was identified when text was coded for multiple participants within groups and between meetings. Multiple coders were used to increase trustworthiness of the interpretations and an inter-coder reliability rate of 92% was determined.

Results

Participants defined the experiential qualities of wilderness (i.e., solitude, primitive recreation, and unconfined recreation) in generally similar ways, using similar terms. Despite common meanings, participants diverged widely in their standards for achieving each experience. Most participants also articulated coping behaviors used to achieve specific experiential qualities when conditions are compromised.

Solitude

Solitude commonly meant the absence of other people (see table 1). Participants indicated solitude is important to them and that they know where to go to find it. However, standards for achieving solitude were widely divergent, as solitude is in the



Figure 1—Green Lakes and South Sister, Three Sisters Wilderness in Oregon. Photo by Erin Seekamp.

“eye of the beholder.” Standards for the absence of other people ranged from being completely alone to being alone in a group to encountering other groups. The temporal distribution of groups was also mentioned when defining solitude, but standards for time between encounters were disparate. For example, one participant explained that “you can be walking down a trail and you can pass someone

and as soon you are just kind of around the corner, you are back in solitude,” whereas another participant explained that “solitude starts for me about the third day I’m in an area where I haven’t seen anybody ... and it increases from there.”

Solitude was also defined by evidence of (e.g., litter, smoldering fires) and behavior of other groups. For example, one person explained, “I don’t even have to see people to sense people there.” Another explained that the only definable quality of solitude is the “absence of human-caused noise.”

An element of choice in deciding whether or not solitude would be their desired experience was present in participants’ discussions of how to deal with less than ideal social conditions. Commonly, destination selection was mentioned as an important determinant of opportunities for solitude. For example, one participant, responding to a question about whether or not solitude can be achieved if there are many other visitors, explained:

Theme	Subthemes
Being alone	Completely alone
	Alone with a group
	Time spent alone
	Subjective nature of “alone”
Encounters	Other groups
	Evidence of other groups
	Evidence of past groups
	Sound of other groups
	Behavior of other groups

When you asked about importance of solitude ... to me that is really important, but when I go to Green Lakes I know it is not going to happen, but I like the trail anyways and I know if I go on a weekend in August or September, there [are] going to be people out there but I still I like to go because it is a great trail. I would rather that there is no one there but I am not willing to make that trade-off to say that I have to get a lottery ticket three weeks in advance to be guaranteed to have low encounters. I can go someplace else like you do if I want to avoid a lot of people.

This quote illustrates that, at least for this stakeholder, freedom to access wilderness is preferred to limited entry, even if it means not experiencing solitude at that location or being displaced to another area to find solitude.

Other coping mechanisms (also forms of displacement) were mentioned in relation to the compromised opportunity for solitude at Green Lakes-South Sister, specifically visiting high-use wilderness destinations during low visitation seasons (i.e., late fall, winter, and early spring) or during low visitation days (i.e., weekdays). Although common, displacement as a coping mechanism to deal with reduced opportunities for solitude and a preference for the freedom to access wilderness was not a universally acceptable solution. Discontent with the trade-off of access over solitude was expressed, because it reflects an acceptance of compromised wilderness conditions.

Primitive Recreation

Most participants found primitive recreation difficult to define, but used similar words and concepts in their definitions. The term commonly meant absence of motorized equip-

ment, reliance on personal skills, and absence of evidence of management and other visitors, both past and present (see table 2). However, deliberations about appropriate technologies highlighted complex nuances and competing standards. Opinions about the appropriateness of specific types of technology (e.g., GPS units, air mattresses, camp stoves, and cell phones) were diverse, and there was frustration during deliberations about where to “draw the line” on what was acceptable. Ultimately, tolerance for mechanized equipment that did not infringe upon other visitors’ experiences emerged (e.g., carrying a cell phone for emergency purposes only).

Deliberations about evidence of management—particularly appropriateness of different structures in wilderness—revealed variation in opinions about acceptability. Opposition to structures (e.g., trail signs, toilets, and bridges) was identified, as structures are evidence of civilization and diminish the reliance on personal skills. Tolerance of some structures—especially in high-use areas—was also evident from discussions regarding their utility as a management tool to reduce resource damage, concentrate impacts, and increase the overall naturalness of the area. Tolerance for structures in the wilderness was also commonly associ-

ated with a preference for freedom of access to wilderness over restricting use. In a discussion about having toilets in wilderness, one participant explained:

There are lots of examples today of where there are toilet facilities in the wilderness. Mt. Rainer, you go up to Camp Muir and there are outhouses ... at 10,000 feet on Mt. Rainer. That’s facing reality. That’s dealing with the pressures on the land. And I think that is preferable [to] putting a date on a trailhead.

Again, the trade-off of compromised experiences for freedom of access was not universal, as structures diminish opportunities to rely on personal skills and escape civilization.

Unconfined Recreation

Unconfined recreation was commonly defined as unrestrained access to and freedom within wilderness (see table 3). This freedom included positively and negatively associated visitor behaviors, such as cross-country hiking (“roaming”), “skinny-dipping,” and “running amok.” A recognized need to restrict behavioral freedoms to avoid excessive social and biophysical impacts was common, but opinions about the desirability of different types of behavioral regulations varied.

Table 2—Common themes and associated subthemes for meanings of primitive recreation

Theme	Subthemes
Personal skills	Absence of mechanized equipment
	Absence of motorized equipment
	Subjectivity of acceptable equipment
Management	Regulations
	Signs
	Structures
	Subjectivity of acceptable management strategies

Table 3—Common themes and associated subthemes for meanings of unconfined recreation

Theme	Subthemes
Access	Unrestricted access to wilderness
	Freedom to roam inside wilderness
Regulations	No regulations
	Wilderness education and ethic required
	Some regulations required (subjective)

For example, one participant explained that “there is a big difference between me becoming well-versed in Leave No Trace and ... somebody handing me a list of 86 rules that I am supposed to follow while I am out there,” and a management regime that tells you when and where to camp “is a negation of wilderness.” Another participant explained the dilemma of managing for unconfined recreation by stating, “I realize it is almost impossible to have totally unconfined access without impacting the other parts of it ... solitude ... primitive recreation.” Others used the “gate” analogy to explain their preference for use limits to provide all of the experiential qualities once inside the wilderness gate. These examples illustrate a willingness to trade some degree of behavioral freedom to allow for better opportunities of solitude and primitive recreation and to minimize impacting the naturalness of the area.

Discussion and Conclusions

These wilderness stakeholders assigned similar meanings to the terms *solitude*, *primitive*, and *unconfined recreation*. Moreover, the words they used to describe these experiential qualities were consistent with definitions applied in past research, definitions that focus more on setting attributes that make it likely for each experience to occur than on internalized feelings

or experiences. For example, *solitude* was defined as the absence of other visitors (Hammit et al. 1984; Manning 1985; Vaske et al 1986), whereas definitions of primitive recreation focused on the absence of modern conveniences, structures and facilities (Borrie and Roggenbuck 2001; Landres et al. 2008; Shafer and Hammit 1995). Unconfined recreation was defined as lack of restriction and regulation (Landres et al. 2008; McCool 2004). These findings validate the appropriateness of management approaches focused on setting attributes, such as the Recreation Opportunity Spectrum and Limits of Acceptable Change.

Management of
high-use wilderness
will remain
contentious, despite
public engagement
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In contrast to the commonality of meanings, standards were variable. Variability in thresholds of acceptable conditions has been found in quantitative research (Manning and Lawson, 2002). Our qualitative data add richness to understanding variability and its causes. For example, in addition to number of encounters, timing of encounters was important to standards

for solitude. As suggested by Roggenbuck (2004), conflicting value judgments related to the word *modern* result in diverse standards for types of conveniences (i.e., equipment and structures) appropriate for primitive recreation. Although freedom was central to meanings of unconfined recreation, the type and magnitude of acceptable behavioral restrictions varied.

Consistent with past research (e.g., Hammit and Patterson 1991), participants described many coping behaviors. Maintaining freedom of choice was central to participants’ experiential aspirations and the coping mechanisms they employed. They exhibited a sophisticated awareness of the trade-offs between desirable wilderness attributes, with many stakeholders being personally conflicted about trade-offs. Most understood that opportunities for solitude may not be outstanding unless access is restricted and behaviors are confined, that some primitiveness and freedom is lost where actions are taken to mitigate biophysical impact and maintain quality experiences. However, when forced to express their support for actions (e.g., use limits) that affect solitude, primitiveness, freedom of behavior and access, opinions were often highly polarized, characterized by either strong support or strong lack of support. This suggests that management of high-use wilderness will remain contentious, despite public engagement and deliberation.

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exemplified by West Nile virus and bird flu, predicting the effects of human actions on climate, improving agricultural productivity, protecting biodiversity, developing and managing renewable sources of energy, and protecting populations from both human-made and natural disasters all require a much higher level of knowledge about the operations and connections among the Earth's physical, chemical, and biological systems.

The international stage is set; what can we do as a nation? Most important, educate our public and elected officials to support building the GEOSS as rapidly as possible. Second, support U.S. assistance to the developing nations to facilitate their entry into GEO and use of the GEOSS. Third, improve observing technology. Improvements in both the quality and

quantity of space assets; development of reliable biological sensors; and comprehensive ocean and cryosphere coverage are essential. Fourth, encourage adaptation of public and private sector organizations to use and act on the information.

One modification easily made today would be the immediate establishment of a National Climate Service within NOAA. Simpler is better and we have a model. The National Weather Service (part of NOAA today) is the operational center of the federal government for collecting and disseminating operational meteorological information internationally and nationally, both to the public and private sectors. Use of the climate information for assessment of societal impacts as well as climate research should remain resident in the appropriate agencies (public and pri-

vate), just as we operate today with the weather enterprise.

What does Earth observation have to do with the wilderness? Everything! It is from the wilderness, wherever it occurs on the planet, that we observe and determine how our natural systems operate. It forms a critical part of the model for understanding the basis of sustainable life on Earth. May we become serious in preserving, observing, and learning from our wilderness!

CONRAD C. LAUTENBACHER, JR., is undersecretary of commerce for oceans and atmosphere and a NOAA administrator and a retired vice admiral in the U.S. Navy with a long career in a broad range of operational, command, and staff assignments. Contact information: U.S. Climate Change Science Program, Suite 250, 1717 Pennsylvania Avenue NW, Washington, DC 20006, USA.

PERSPECTIVES FROM THE
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

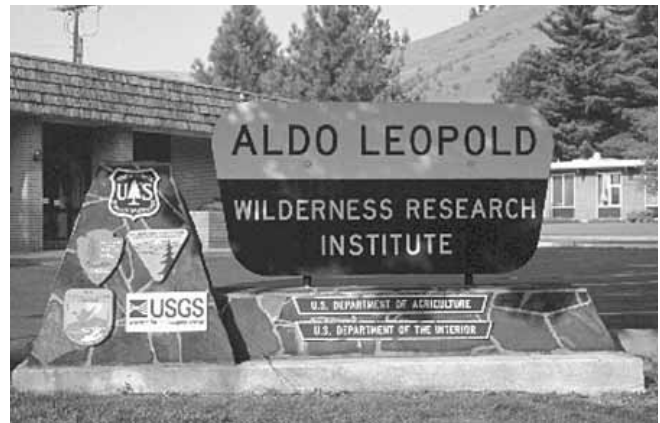
A New Tool to Evaluate Proposals for Climate Change Research in U.S. Wilderness

BY PETER LANDRES

The effects of climate change are increasingly apparent and scientists from nearly every discipline are calling for more monitoring and research. Many have suggested that wilderness would be an excellent place to conduct such work because it has escaped many of the smaller-scale anthropogenic environmental insults that occur in other areas. Also, change in the distribution of species that live in the more extreme environments of wilderness might serve as an early warning of the effects from climate change. In short, climate change research is an opportunity to use wilderness as a benchmark and as a place to understand ecological change, helping fulfill the scientific value and purpose of wilderness as stated in the 1964 Wilderness Act.

Although agreeing with the value of wilderness as a place for climate change research, others argue that these activities may not be appropriate inside wilderness because (1) they don't produce information that management agencies can practically use to preserve wilderness character; (2) there are areas outside wilderness that offer the same research opportunities; and (3) they typically require installing meteorological stations and other equipment for long periods of time, and such installations are prohibited by the 1964 Wilderness Act. In short, although there is nothing inherently incompatible about any research being conducted inside wilderness, the importance and urgency of understanding the effects of climate change do not exempt scientists from adhering to the legal requirements of 1964 Wilderness Act.

Every year the four U.S. federal agencies that manage wilderness receive hundreds of proposals for science activities inside wilderness, and the need for basic science to understand the effects of climate change will only increase this demand.



Climate change research epitomizes the acrimony that can develop between people with disparate viewpoints about conducting research in wilderness: Should scientific activities that degrade wilderness character be allowed in wilderness? How can such decisions, which often entail subjective judgments, be made in a way that is fair, transparent, and fosters better communication between managers and scientists?

To answer these questions, Leopold Institute staff worked with a team of managers to develop a framework to evaluate proposals for science activities inside wilderness (Landres et al. 2009). This framework is essentially a tool for thinking through and documenting the answers to these questions in a consistent and comprehensive way. This tool sets the stage for active discussion between managers and scientists (both inside and outside the agencies) about scientific activities that are appropriate inside wilderness when a research plan is first being developed. This framework is based on the premise that every permitted action in wilderness has both impacts and benefits—the decision to approve or deny a proposed

Upfront communication and mutual understanding ... should decrease impacts to wilderness character while allowing the use of wilderness as a source of inspiration and scientific understanding.

scientific activity depends on whether the benefits are sufficiently important to justify accepting the impacts. To balance the need for consistency with local relevance, the evaluation framework provides a logical structure within which local staffs apply specific modifications to fit local circumstances and policy requirements.

The evaluation framework is composed of four sequential filters:

- *Initial Review Filter.* This filter identifies potential red flags that could substantially influence how the proposal will be evaluated and how much time and effort will be needed. For every wilderness there will likely be a different set of red flags that need to be identified as early and as quickly as possible, such as:
 - Whether the proposal includes any activities or uses such as motorized equipment or installations that are legally prohibited by Section 4(c) of the Wilderness Act.
 - Whether the proposal degrades wilderness character even if no prohibited uses are proposed.
 - Whether the proposal poses consultation issues about listed species or cultural and heritage resources.
- *Quality of Proposal Filter.* This filter evaluates whether the proposal is sufficiently well-designed to accomplish its stated purpose and provide the intended benefits

to management or science. For proposals that require activities or uses prohibited by Section 4(c) of the Wilderness Act, or otherwise degrade wilderness character, this evaluation is imperative to assess whether the purported benefits would be sufficient to justify accepting the impacts.

- *Legal and Policy Filter.* This filter evaluates whether the proposal conforms to existing legislation and applicable agency policies in a step-by-step flow chart. The first step is whether the proposed activity is prohibited by the Wilderness Act. If so, then the filter works through the nuances and complexities of determining whether the activity may be allowed under the “necessary to meet minimum requirements for the administration of the area for the purpose of this Act” clause in the 1964 Wilderness Act.
- *Impacts and Benefits Filter.* This filter evaluates the benefits and impacts of the proposal. Impacts are described in terms of effects on wilderness character, and benefits are described in terms of benefit to management and science. Impacts and benefits are numerically assessed using a worksheet, and the results weighed against one another in a decision matrix to derive a provisional recommendation about the proposal. Finally, the proposal is evaluated for its potential cumulative impact in the context of all

the other activities that are occurring or planned within that portion of the wilderness.

Some scientists have called for redesignating wilderness because of the constraints wilderness poses on climate change and other research. Such hostility toward wilderness only adds to the many tragedies caused by rapid climate change. Scientists and wilderness managers share many values and goals centered on understanding and preserving the natural world. Scientists may feel that wilderness is the best place to conduct their research, whereas wilderness managers and advocates may feel that wilderness protection, precisely because of the pervasiveness of environmental threats, should not be compromised. Indeed, the primary mandate in the Wilderness Act to “preserve wilderness character” demands that the standard for approving scientific activities inside wilderness is higher than in other areas. One purpose of this evaluation framework is to push both scientists and managers toward upfront communication and mutual understanding—doing so should decrease impacts to wilderness character while allowing the use of wilderness as a source of inspiration and scientific understanding.

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New Wilderness Legislation in 2009

BY CHAD P. DAWSON

The Omnibus Public Land Management Act of 2009 (U.S. Public Law 111-11) is the 172nd piece of wilderness-related legislation since the passage of the Wilderness Act (U.S. Public Law 88-577) on September 3, 1964. During that 45-year period, wilderness has remained a national effort with every U.S. president, including President Barack Obama, signing one or more pieces of wilderness legislation into law. In spite of a long and convoluted path to passage the bill passed through the U.S. House of Representatives by a vote of 285 to 140 and the U.S. Senate by a vote of 77 to 20, showing the bipartisan nature of support for wilderness in the nation as members crossed political party lines to agree on wilderness legislation and provide a strong show of support.

On September 3, 2009, the 45th anniversary of the passage of the 1964 Wilderness Act, President Obama declared the month as National Wilderness Month and stated that the Act has been widely recognized as one of our Nation's most important conservation laws. This law and the National Wilderness Preservation System it established have served as a model for wilderness protection laws in many of our states and in countries around the world. The vision and structure established in the Wilderness Act continue to receive broad support. This pioneering law created a framework for bringing federal public lands under additional protection. (Obama 2009)

The 2009 act brought the National Wilderness Preservation System (NWPS) to more than 109 million acres (44.1 million ha) with more than 750 management units in 44 states. The 2009 act also added more than 1,000 miles (1,600 km) of new national wild and scenic river protection, new national trails, new national parks and monuments, new national heritage and conservation areas, and expanded the acreage in other units.

The 2009 Omnibus Act is a complex package of bills that require careful reading by state and land management agen-

cies to fully understand the complexity of this massive piece of legislation. There are several achievements and issues in the 2009 Omnibus Act that are worth mentioning:

- The 2.1 million acres (850,000 ha) of wilderness designated across nine states is the largest amount of land added to the NWPS since passage of the 1994 California Desert Protection Act (U.S. Public Law 103-433)
- Fifty-four new wilderness areas were designated, ranging in size from 32 acres (13 ha) in the Taylor Creek Wilderness to 267,328 acres (108,230 ha) in the Owyhee Creek Wilderness
- Twenty-four existing wilderness areas were expanded in size, ranging from 263 acres (106 ha) in the Kimberling Creek Wilderness to 79,820 additional acres (32,315 ha) in the Hoover Wilderness
- Five wilderness areas had land exchanges and boundary adjustments
- Five wilderness areas had "potential wilderness" additional acreage specified that would be added provided nonconforming uses were stopped, or, in one case, ecological restoration was achieved in areas adjoining the Kimberling Creek Wilderness in Virginia, and in another case, a land exchange was authorized between the state and federal government regarding the Izembek Wilderness in Alaska.

Probably one of the most controversial provisions was to add 34,093 acres (13,800 ha) to the Izembek Wilderness after the Alaska legislature approves a land exchange that would result in a one-lane gravel road through the wilderness that would connect two small, remote communities. The Izembek Wilderness is a 307,982-acre (124,690-ha) wilderness area in the coastal region of Alaska within the Izembek National Wildlife Refuge (see figures 1 and 2), and was designated in 1980 with the passage of the Alaska National Interest Lands Conservation Act.



Figure 1—Brown bear sow with cubs in the Joshua Green River Valley in the Izembek Wilderness. Photo courtesy of www.wilderness.net.

Like many of the previous wilderness designation bills, the 2009 Omnibus Act included many provisions and reaffirmation of rights that have evolved and been added through recent decades of wilderness legislation:

- Special provisions for management included a variety of issues important to local interests, such as allowing military training operations on lands adjoining wilderness, requiring nonmotorized recreation trail planning and construction, allowing existing competitive running events to continue, and other special management provisions
- Numerous areas with federal lands with wilderness study areas and other lands under consideration for designation, but that were not designated, were released from further consideration as wilderness
- Designation was frequently stipulated to not include buffer zones, not subject adjoining lands to wilderness management even if they included sights and sounds that affected the wilderness area,

not abrogate tribal rights, and not abrogate other rights such as water rights

- A wide variety of nonconforming but preexisting and permitted uses under the 1964 Wilderness Act were reaffirmed in various sections of the 2009 Omnibus Act, such as military overflights, equipment for climatological

data collection, grazing activities and facilities, public access to inholdings, outfitting and guide services, fire-insect-disease management, tribal rights and claims, and fish and wildlife management by states.

The 2009 Omnibus Act substantially adds to the NWPS and largely continues the legislation and policy direction that has evolved through the last 45 years since the 1964 Wilderness Act. In fact, most of the bills and designation language specifically refer to the new designations and additions as being in furtherance of the 1964 Wilderness Act and to be administered in accordance with that act.

If you are interested in understanding U.S. wilderness legislation, some resources to explore and study more about it include the law library resources at www.wilderness.net website. Also, the chronological list summarizing the 173 pieces of legislation (including the 1964 Wilderness Act) is available at the www.wild.org

Continued on page 44



Figure 2—Joshua Green River Valley in the Izembek Wilderness within the Izembek National Wildlife Refuge, Alaska. Photo courtesy of U.S. Fish and Wildlife Service.

The Wild Heart of Europe

BY TILL MEYER, HANS KIENER, and ZDENKA KRENOVA

According to Wallace Stegner, American novelist and historian, the outstanding value of wilderness lies in the “visceral satisfaction of knowing that the planet retains a strong, wild soul.” In central Europe this metaphor finds an equivalent in the motto the “Wild Heart of Europe.” This slogan was recently coined for a newly designated wilderness area, located on the border of two nations and shared by two national parks in the Bohemian Forest: the Bavarian Forest National Park in Germany and the Šumava National Park in the Czech Republic (see figure 1).

For millennia this medium-altitude mountain range has been characterized by the same ecosystems, the same habitats, and the same array of species. Then came the Cold War and with it the Iron Curtain, which divided up Europe for 45 years (1945–1990). It severed the personal and cultural lives of millions of people and also brought an end to east-west migrations of some of its wildlife, particularly large carnivores and herbivores such as lynx (*Lynx lynx*) and red deer (*Cervus elaphus*).

Most other species of wildlife—mostly animals that do not depend on large home ranges—were not impeded by human-made terrestrial obstructions. They flourished because the Cold War’s demarcation line had created a safe haven from human disturbances by leaving breeding sites undisturbed for some species for decades, such as the black stork (*Ciconia nigra*), European otter (*Lutra lutra*), corn-crake (*Crex crex*), and capercaillie (*Tetrao urogallus*).

In December 2007, the Schengen Treaty of the European Union (EU) came into effect, allowing free travel across European borders. In anticipation of the demands from local communities and tourism (see *International Journal of Wilderness*, August 2008), the directors of the Šumava (see figure 2) and the Bavarian Forest National Parks came to together on March 13, 2008, to prepare joint management guidelines for a core area of about 15,000 hectares (37,050 acres). Recently, this cooperation between the two national parks peaked, as a mutual system of wilderness trails finally was agreed upon and officially marked for public use on July 14, 2009.



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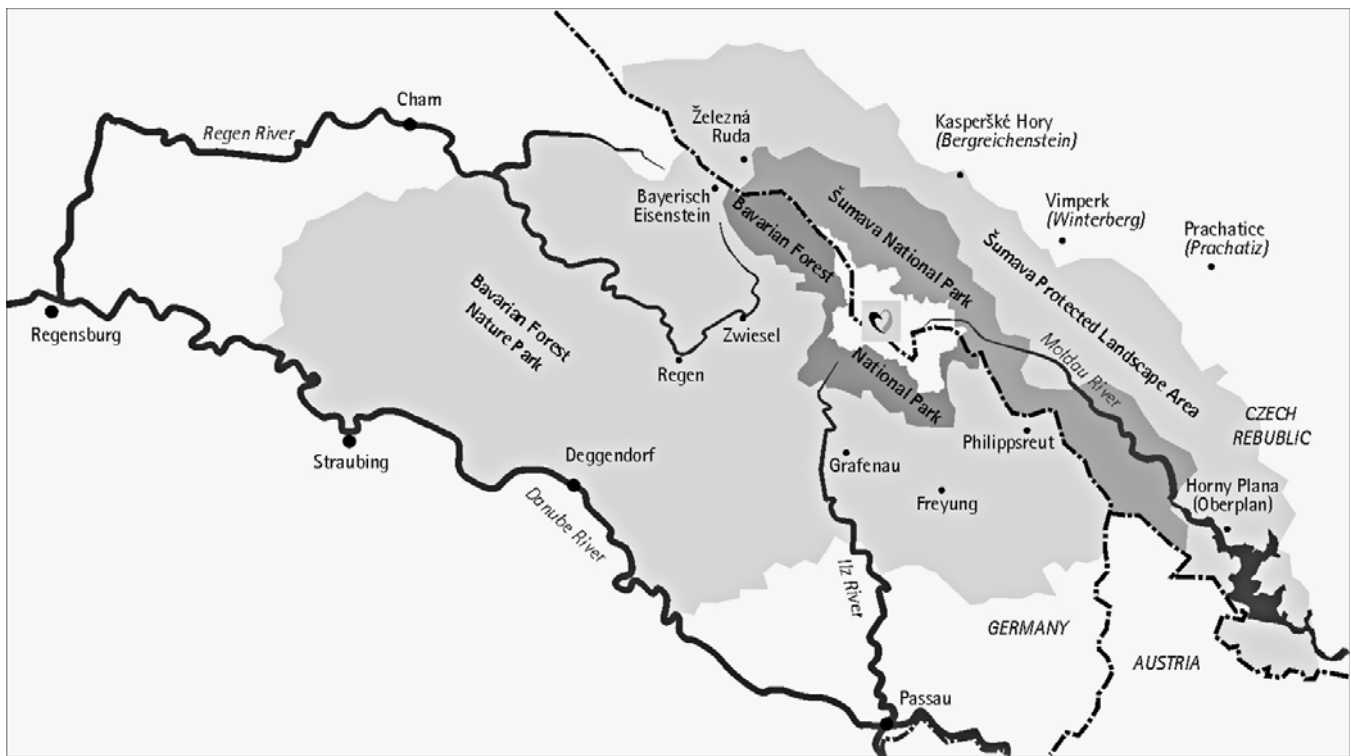


Figure 1—Map of the Bavarian Forest National Park in Germany and the Šumava National Park in the Czech Republic.

The creation of the new trans-boundary wilderness between Germany and the Czech Republic is more than a considerable conservation achievement, since it also coincides with the 20th anniversary of the end of the Cold War and gives this wilderness designation a special connotation. The challenge is not only to open nature for nature, but also to allow “natural forces and processes to predominate” (as phrased by the International Union for the Conservation of Nature [IUCN] (Dudley 2008, p. 14)) for the Protected Area Category 1b, Wilderness). At the same time wild nature needed to be made accessible for people, who should—according to the Protected Area Category 1b—have the opportunity to experience such areas. This objective makes many conservationists cringe, because the area in question holds populations of some of the rarest and most endangered species in central Europe. At the same time, local politics and business vowed that they would not tolerate rigid patronization any-

more, even if it was in the name of a good cause such as conservation.

Therefore, the designated wilderness area in the Bohemian Forest has lately become quite a political battlefield of competing interests. The mutually agreed upon German-Czech trail markings on July 14 now mark the détente between the different interest groups. The area is now seen as a special opportunity zone for the Czech Republic and Germany to demonstrate mutual responsibility for appropriate management of wilderness in Europe.

The year 2009 saw plenty of opportunities to encourage the discussions about what is meant by appropriate management of wilderness in Europe. The frequency of relevant events that took place in only 12 months was remarkable:

- The seminar “Wilderness as a Cultural Task” (December 2008), which took place in the Bavarian City of Freising—a hundred miles west of the Bohemian Forest—

summed up the cultural challenges of wilderness conservation in Germany.

- In January 2009, the congress “The Appropriateness of Non-Intervention Management For Protected Areas” in the Czech village of Srni provided many examples of the successful propagation of natural processes in different protected area situations in central Europe.
- In May 2008, in Prague, the Czech capital, the conference called “Wilderness and Large Natural Habitat Areas in Europe” was held by the European Commission and the Czech Republic during its EU presidency. This convention came up with concrete recommendations for the accommodation of wilderness in the systems of nature protection in Europe.
- In October 2009, the Bavarian Academy for Nature Conservation and Landscape Preservation hosted

a national conference, with a focus on “Wilderness and Sustainable Use in the Bavarian Forest National Park.”

Cultural Landscapes

All of this invites skepticism. To some the mere idea of wilderness in central Europe might seem a bit of a far-fetched misnomer or a blatant exaggeration. Indeed, the face of central Europe’s landscape had been shaped by civilization much longer than on some other continents. Ever since the Neolithic age our ancestors have carved their livelihoods out of their natural surroundings. Unlike in North America, this process took a long time—several thousand years—as

it gradually turned wilderness into cultural landscapes. More often than not, this cultivation created biodiversity rather than destroying it. Many species of wildlife, such as the roe deer (*Capreolus capreolus*), European hare (*Lepus europaeus*), pheasant (*Phasianus colchicus sp.*), grey partridge (*Perdix perdix*), and quail (*Coturnix coturnix*), owe their wide distribution in central Europe through the mid-20th century to the human-made opening in the tree canopy for clearings created for small-scale farming. Then, as industrialization, land use, and timber famine progressed, the relationship of central European people toward nature changed. More often than not, cultivation of land turned into exploitation.

This process found an early witness in Aldo Leopold, one of the North American pioneers of wilderness protection. At the end of his three-month study trip to Europe in 1935 he observed that: Wilderness did not only vanish from the continent’s surface but also from humans’ minds and experiences. And we can add: for hundreds of years. It was mostly due to the long and gradual process of cultivating wildlands that the idea of wilderness had largely vanished from central European consciousness—much earlier and probably more thoroughly than to the average American mind. Americans adored frontier heroes such as Daniel Boone, and even found pleasure in readings



Figure 2—Šumava National Park. Photo by Till Meyer.

authors such as John Muir, Henry David Thoreau, and Aldo Leopold. Central Europeans during the same period had no stake in true wilderness simply because they had no place of reference upon which to build a cultural relationship toward wildlands.

and gave rise to a rich variety of literature by authors such as Karel Klostermann, Josef Váchal, Adalbert Stifter, and Alfred Kubin. It was men such as these who helped central Europe retain a wilderness heritage of its own.

mighty powers and dynamics of the Moldau River as it springs from the Šumava hills and becomes a wild river and finally a mighty stream. These strong melodies could not have been created in a disenchanted world of well-tended commercial forests and regulated rivers.

The challenge is not only to open nature for nature, but also to allow natural forces and processes to predominate.

But there were exceptions: a few regions in central Europe have remained where climatic and geomorphologic conditions would always limit land use. One of these places—the most extensive outside the Alps and the Carpathians—is the Bohemian Forest, lately also termed the Greater Bohemian Forest Ecosystem by some. It encompasses an area of roughly 5,000 sq km (1,930 sq. mi.), and this landscape belongs to three nations: Germany, Austria, and the Czech Republic. Even though some farming communities and small industries (mainly glass-making) have subsisted in the area, claiming their share of logging and grazing, much of the terrain was too rough for wholesale exploitation. In the beginning of the 20th century, modern forestry took bigger areas and intensively logged parts of the area, thereby changing the composition of tree species to predominantly spruce (*Picea abies*).

However, quite a few patches of old-growth forest, peat bogs, and old meadows survived. Thanks to landowning aristocrats such as Earl August Buquoy and Prince Johann Adolf II zu Schwarzenberg a few tracts of virgin forest (*Urwald*) were set aside in 1838 and in 1858 respectively. These places always found admirers

It was not only men who defended the *Urwald* of the homeland. One outstanding representative of literate wilderness affinity for this area was Emerenz Meier, a female author and poet: “I grew up as a child of the free forest. Wild animals were my friends ... and as I embraced the bosom of the earth, I swore that I would never ever tolerate the shackles of a master ... I am the free child of the free forest!” Like many of her contemporaries during the 19th and early 20th centuries, Emerenz Meier later immigrated to the United States. The quote above identifies Emerenz Meier as a true child of her times. The 19th and early 20th centuries were to a great degree marked by repression and social and political unrest. Also, during the same period, the fascination with nature and landscape rose distinctly. Often the longing for freedom and wild nature were expressed in one breathe. It is quite plausible that the early fascination with wilderness in North America during the 19th century had some of its roots in the central Europe.

Perhaps one of the best-known pieces of art to come from this region is the brilliant composition “Vltava” (“The Moldau”) by the Czech composer Bedřich (Friedrich) Smetana. This symphonic poem describes the

Changes in Forest Vegetation

In June 2008, the authors were joined by The WILD Foundation board members Charlotte Baron and Vance Martin for hikes through the Bohemian Forest. Locations such as Höllbachspreng (Hells-Creek-Gorge) provided enchanted forest scenery with babbling waterfalls accompanied by gnarled trees, mossy rocks, and lush fern coves. Other scenes stopped somewhat short of being a fairytale idyll: large groups of dead and dying trees—bereft of all foliage and most of the bark—provided ghastly imagery at first sight. The remains of the trees were still standing with their shiny naked trunks reflecting the morning sun. Other trees were laying topsy-turvy on the ground in various stages of decay. As some of bark that still remained could easily be peeled from the trunks, it showed the telltale tracks of the Spruce bark beetle (*Ips typographus*). Evidently the beetle attacks had occurred quite a while ago, because the regeneration had set quite well with many sizable sapling trees growing on the decaying trunks (see figure 3). Not only were young spruce and an occasional silver fir (*Abies alba*) encountered, but also European beech (*Fagus sylvatica*) mountain maple (*Acer sp.*), and mountain ash (*Sorbus aucuparia*). In addition, dense thickets of blackberry (*Rubus fruticosus*), carpets of bilberry (*Vaccinium myrtillus*), and clusters of fireweed (*Epilobium angustifolium*) created a rich understory.



Figure 3—Dead trees and regeneration in the Bavarian Forest. Photo by Till Meyer.

If one looked at a map showing the potential natural vegetation map of Europe—provided by the Federal Agency of Nature Conservation (Weber and Illmann 2008)—one can easily make out the Bohemian Forest as a speck of bluish-green interspersed with tiny dots of purple-blue. These colors stand for mountain coniferous and mixed forest. Curiously this combination of colors also occurs at the rim of the boreal forest in Scandinavia and Russia around the 60th latitude. This phenomenon is due to the fact that the altitude of the Bohemian Forest (up to 1,453 m/4,827 ft. above sea level) provides a cool to temperate climate and plant compositions that corre-

spond to the specific latitude for the forests of the European North.

On a smaller scale—provided by the EU Habitats Directive (European Union 1992) and Natura 2000 (Kiener and Hußlein 2007)—we can distinguish two dozen different habitat types covering quite a wide spectrum, ranging from natural dystrophic lakes, to ponds, bogs, grasslands, and heath, to beech-maple and spruce-fir forests as well as bog woodlands (see figure 4). As these different habitats interlace, they form one of the most threatened mixed mountain systems worldwide, according to a 2008 biodiversity assessment (Weber and Illmann 2008).

The mammals of the area, which are protected according to the EU

Habitats Directive, feature Lynx (*Lynx lynx*), European otter (*Lutra lutra*), and numerous bat species, notably barbastelle (*Barbastella barbastellus*) and Bechstein's bat (*Myotis bechsteinii*). The birds in the area, which are protected by the bird directive, include impressive species such as the black stork (*Ciconia nigra*), capercaillie (*Tetrao urogallus*), hazel grouse (*Bonasa bonasia*), black woodpecker (*Dryocopus martius*), three-toed woodpecker (*Picoides tridactylus*), and peregrine falcon (*Falco peregrinus*).

However, because the EU Habitats Directive (European Union 1992) aims to promote biodiversity by assuring the long-term survival of the EU's most valuable and threatened



Figure 4. Restored high moor where the iron curtain was removed between Bavaria and the Czech Republic. Photo by Till Meyer.

species and habitats, it differs somewhat from the intentions of wilderness! Remember that wilderness, according to the IUCN 1b, is *not* about protecting certain species. In fact it is 1b that most explicitly of all IUCN categories (Dudley 2008, p. 14) aims “to protect the long-term ecological integrity of natural areas ... where natural forces and processes predominate.” (see figure 5)

In this context it is important to note that in preparation for the 9th Meeting of the “Conference of the Parties to the Convention on Biological Diversity” (held in Bonn, Germany, May 19–30, 2009) many European countries passed a National Strategy

for Biodiversity. The German government explicitly informed their lawmakers (Gov. print 16/7082): “In Germany there will again be wilderness areas (e.g. in National Parks) with natural and undisturbed processes of development” and “Nature should develop according to her own laws on at least two percent of Germany’s territory by 2020.”

Critics of this mandate to protect processes claim that it often contradicts the EU Habitats Directive, as natural succession will eventually put an end to certain preferred habitats of the rare species. The solution to this perceived contradiction lies in the scale applied. On small and isolated

old-growth forest patches and secondary habitats it can indeed happen that rare plant and animal species disappear once regeneration takes over. Larger forests and primary habitats, however, where so called non-intervention management is practiced for a long period will meet the demands of the EU Habitats Directive and often harbor more biodiversity over time. Jörg Müller (2009), zoologist in the Bavarian Forest National Park writes, “Natural forests ... are characteristically dynamic and heterogeneous as a result of natural disturbance regimes, supplying an abundance of structures which enhance biodiversity.”

The pressure on biodiversity in forests dominated by spruce (naturally or planted) is shown in events such as the outbreak of spruce bark beetle. As these tiny insects occur in large masses, they are able to kill even healthy trees and open up the forest to a cascade of different organisms. The bark beetle is then followed (in no particular order of appearance) by invertebrates such as common beetles, moths, and ants. Also fungi, slime molds, lichens, and mosses take over and render a mosaic of structures, which in turn provide nesting cavities and a food base for bats and birds. It is important to note that decaying timber makes up a prime fertilization substrate for tree regeneration that in general is more efficient than artificial propagation in commercial forests.

As these correlations became obvious during recent years of research, the focus was extended to biodiversity and climatic change. It soon became clear that naturally occurring mountain forests, which were submitted to the benign neglect of non-intervention management for a long period, could likely provide some valuable solutions for commercial sustainable forestry in a time of change.

Non-Intervention Management

Against much protest, the Bavarian Forest National Park (founded in 1970) was the first national park in central Europe that allowed “natural forces and processes to predominate” on a greater scale. The true test for non-intervention management came in August 1983, when—within a few minutes—a hurricane took down most of the spruce trees on 175 hectares (432 acres) of the Bavarian Forest National Park. When it was decided to leave most of the timber salvage in the forest, thus making the national



Figure 5. Dark, peat enriched waters flowing through a naturally-occurring meadow, high in Sumava National Park. Photo by Vance Martin.

park susceptible to infestations of bark beetles, a storm public of protest broke loose.

Despite these protests, which mostly came from small, local NGOs, the decision was upheld steadfastly. Thanks to the courage of Hans Bibelriether, the first director of the

Bavarian Forest National Park, and the backing of the Bavarian minister of food, agriculture and forestry, Dr. Hans Eisenmann, more subsequent storm calamities in forests received the benign neglect of non-intervention management. The original idea was, in the words of Hans Eisenmann (1983),

It is our hope that the relationship between Germany and the Czech Republic finds some light but solid footing in a mutually developed concept of wilderness.

“to create a primeval forest for our children and children’s children.”

Nobody at that time could foresee the dimensions of first great rewilding experiment in central Europe. It took almost 25 years for Šumava National Park to follow the non-intervention policy of its Bavarian neighbor. When one takes into consideration the fact that Šumava National Park was founded 20 years after the Bavarian Forest National Park, it becomes clear that allowing “natural forces and processes to predominate” in national parks is not a decision that is taken lightly. For many more years it was standard practice on Šumava sites to fight bark beetles by cutting infected trees. Then, after the hurricane Kyrill hit Šumava National Park in January 2007, knocking down about 2,000 hectares (4,940 acres) of forest, the long-time discussion nationally and bilaterally about appropriate management of forests escalated. . As it turned out, the forest, which was hit hardest, was grouped around those clearings, which were created by cutting bark-beetle infested trees.

The tough lesson hit home. During the month following hurricane Kyrill, the cooperation between the two parks improved markedly as mutual management guidelines for the Wild Heart of Europe were developed. This process was accelerated by

the Schengen Treaty in December 2007, when the area suddenly became threatened by uncontrolled transboundary tourism. And there are yet more mutual challenges. One is the management of large herbivores and carnivores. Through radio and satellite tracking of red deer and lynx in particular, it became clear that these animals did not care about national borders, let alone national park borders. Lynx for instance could cover home ranges of more than 30,000 hectares (74,100 acres). Here the concept of the Greater Bohemian Forest Ecosystem suggests itself as a matrix for the formidable task of rewilding a cultural landscape.

Before taking this bigger picture into consideration, it must first be demonstrated that mutual management in the newly dedicated Czech-Bavarian wilderness area is working successfully. The Wild Heart of Europe is a very important area for research, public education, communication, and recreation. To prepare the area for the many different needs, a Wilderness Research and Training Center will be established in the village of Kvilda, only a stone’s throw away from the spring of the Moldau River and located in a former military base, where militancy and war anxiety once was bred. As this place still breathes heavily with culture and

history, it is our hope that the relationship between Germany and the Czech Republic finds some light but solid footing in a mutually developed concept of wilderness.

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Announcements

COMPILED BY GREG KROLL

Canada Declares Four New Wilderness Areas

Four new wilderness areas were declared within Canadian national parks in April 2009, encompassing parts of Nahanni National Park Reserve, Waterton Lakes National Park, Fundy National Park, and Vuntut National Park. Parks Canada consulted broadly with First Nations, stakeholders, and local communities on the declaration of the wilderness areas. Under the Canada National Parks Act, the only activities that can be authorized within a declared wilderness area must be related to:

- park administration;
- public safety;
- the provision of basic user facilities, including trails and rudimentary campsites;
- the carrying on of traditional renewable resource harvesting activities authorized in accordance with the act; or
- access by air to remote wilderness areas where there is no other means of access.

Most of Nahanni National Park Reserve has been declared wilderness, further protecting the Mackenzie Mountains Natural Region. A UNESCO World Heritage site, Nahanni was created in 1972 and features the highest mountains and largest glaciers in the Northwest Territories as well as the deepest canyons in Canada. It provides critical habitat for Dall's sheep, black and grizzly bears, caribou, wolves, golden eagles, peregrine falcons, and trumpeter swans. Under the declaration, the expansion of Nahanni makes it the largest protected area in the Yellowstone to Yukon (Y2Y) transnational corridor that extends from Yellowstone National Park through to the Canadian and Alaskan Yukon. The expansion enlarges the original Nahanni Park 600%, to some 7.5 million acres (3,035,000 ha), almost three times the size of Yellowstone.

According to Harvey Locke, The WILD Foundation's vice president for conservation strategy, it was the tireless work of the Deh Cho First Nations, the Canadian Parks and Wilderness Society, the private sector, and the government of Canada that led to the park's expansion. "With the increasing impacts on natural habitat and wildlife migrations caused by climate change, corridors linking core wildland areas are extremely important," Locke said. "In addition, the protection of large wilderness areas is a critical part of the strategy to avert or mitigate climate change."

In Fundy National Park, the wilderness declaration provides a high degree of protection for the Maritime Acadian Highlands Natural Region. The park has two major aspects: a coastal zone of mudflats, salt marshes, and tidal pools, and an inland area of shady forests and tumbling streams. The pine martin, considered rare in Canada, and a breeding population of peregrine falcons, an endangered species, have been reintroduced into the park.

In Vuntut National Park, the decree is the first to provide significant protection for the Northern Yukon Natural Region. It includes a portion of the Old Crow Flats as well as wetlands of international importance.

Finally, the declared wilderness area of Waterton Lakes National Park provides increased protection for the Rocky Mountains Natural Region. Together with Montana's Glacier National Park in the United States, the Waterton-Glacier International Peace Park was declared a UNESCO World Heritage Site in 1995. (Sources: www.pc.gc.ca/apps/cp-nr/release_e.asp?id=1290&andor1=nr; www.wild.org)

New Report: Urban Growth Threatens Public Lands

According to a new Sonoran Institute report, *Western Landscapes in the Crossfire: Urban Growth and the National Landscape Conservation System*, many of the West's most wild and scenic public lands are threatened and are being rapidly degraded by a combination of growth and development,

Submit announcements and short news articles to GREG KROLL, *IJW* Wilderness Digest editor. E-mail: wildernessamigo@yahoo.com

vandalism, poor staffing levels, and lack of oversight. The report concludes that increased federal funding is required in order to properly protect these vital and highly used public properties.

The report focuses on specific lands within the National Landscape Conservation System, which encompasses 27 million acres (11 million ha) in 11 western states, with more than 800 protected areas, designated as wilderness areas, national monuments, national conservation areas, wild and scenic rivers, and national trails. Managed by the U.S. Bureau of Land Management (BLM), the Conservation System achieved new stature this year with the formal protections provided by the Omnibus Land Management Act of 2009, signed by President Barack Obama on March 30. According to John Shepard, senior advisor for the Sonoran Institute, “The great promise of the Conservation System remains unfulfilled. Despite increased visitation and public enthusiasm for protecting these ‘crown jewel’ lands, most are underfunded and understaffed, making them highly vulnerable to vandalism, illegal off-highway driving and resource destruction.” The report states that there is only one BLM ranger assigned for every 200,000 acres (81,000 ha) of land, and that total funding in 2007 for all Conservation System units amounted to only \$2 per acre.

The 60-page Sonoran Institute report focuses on eight Conservation System units in Arizona and Nevada, including Agua Fria, Sonoran Desert, Ironwood Forest and Grand Canyon-Parashant National Monuments, and the Las Cienegas, San Pedro Riparian, Red Rock Canyon, and Sloan Canyon National Conservation Areas. Report recommendations address staff and

resource needs, budgeting clarity and accountability, protection for adjacent lands, improved land use planning, development design, and improved monitoring and enforcement.

Report co-author Sara Bates states that “the Conservation System is home to some of the most archeologically and culturally significant areas in the West, and includes vast wild and scenic landscapes that truly define this part of the country. If we are unable to dramatically increase federal funding to protect these lands and their historical significance, it is possible that their unique cultural, ecological and scientific values may disappear altogether in our lifetime.” (Source: www.sonoraninstitute.org)

New U.S. Protected Areas Database Is Online

A recently released database allows wildlife and conservation professionals to visit a single place to find comprehensive information on protected areas in the United States. The first version of the Protected Areas Database-United States (PAD-US) contains information concerning more than 22,000 highly protected areas, covering more than 347.7 million acres (140.7 million ha)—15% of the country’s total land area (including Alaska, Puerto Rico, and Hawaii). All sites meet the International Union for Conservation of Nature (IUCN) definition of “protected,” and are permanently managed to maintain biodiversity. PAD-US was developed in collaboration with the PAD-US Partnership, a public-private planning consortium composed of federal, state, and non-governmental organizations interested in the inventory and management of protected lands.

For each parcel, the database provides geographic boundaries, land

classification (federal, state, city, or private), land owner or manager, management designation, IUCN category, and a suite of reference information. One of the goals of the PAD-US Partnership is to provide a measure of management commitment for long-term biodiversity protection. The database will facilitate a variety of conservation and land-management efforts such as regional ecological assessments, strategic conservation planning by land trusts, and the identification of species and habitats that are not yet afforded adequate long-term protection. (Sources: www.usgs.gov/newsroom/article_pf.asp?ID=2201; www.protectedlands.net)

Ammonium: A Newly Identified Threat to Wildlands

In combination, hydrogen and nitrogen form ammonia. When ammonia mixes with water in the form of rain or snow, it becomes ammonium, which acts as a fertilizer when it reaches the ground, affecting everything from microscopic algae and plants to fish, frogs, and other wildlife. Air quality data indicates a significant worsening trend, and it is now found in 16 national parks, including Rocky Mountain, Yellowstone, Mt. Rainier, Olympic, Mesa Verde, and Canyonlands. Researchers at Rocky Mountain National Park, Colorado, have already observed subtle shifts in the alpine tundra, where some of the park’s wildflower species are being replaced by grass.

Ammonium is commonly associated with fertilizers, large animal feeding operations, factory emissions, and vehicle exhaust. As the result of an analysis of trends from 1998 to 2007, National Park Service (NPS) scientists have raised particular concerns about parklands in Arizona, New Mexico, Colorado, Utah, Wyoming, and

Washington State. Rocky Mountain National Park officials have said ammonium is “perhaps the most subtle, potentially the most serious, air quality threat to the park.” NPS staff, federal regulators, and Colorado officials are coordinating in an attempt to cut ammonium levels by more than half over the next 25 years. “We’re in the early stages of seeing impacts to the parks, but the longer we let it go, the harder it is to fix later,” according to Tamara Blett, an ecologist with the NPS air quality branch in Denver. (Source: Associated Press, July 21, 2009)

IUCN: Wildlife Crisis Is Worse Than Economic Crisis

Life on Earth is under serious threat, despite the commitment by world leaders to reverse the trend, according to *Wildlife in a Changing World*, a new report published by the International Union for the Conservation of Nature (IUCN). This analysis of the IUCN Red List of Threatened Species is published every four years and comes just before the deadline governments set for themselves to evaluate how successful they were in achieving a 2010 target to reduce biodiversity loss. The target will not be met. Jean-Christophe Vié, deputy head of the IUCN’s Species Programme and senior editor of the publication, states, “It’s time to recognize that nature is the largest company on earth working for the benefit of 100 percent of humankind—and it’s doing it for free. Governments should put as much effort, if not more, into saving nature as they do into saving economic and financial sectors.”

Wildlife in a Changing World analyzes 44,838 species on the IUCN Red List and presents the results by groups of species, geographical

regions, and biomes (freshwater, marine, and terrestrial). Overall, 16,928 species are threatened with extinction. Considering that only 2.7% of the 1.8 million described species have been analyzed, the report cautions that the number is a gross underestimate, but it does provide a useful snapshot of what is happening to all forms of life on Earth.

The report shows that nearly one-third of amphibians, more than one in eight birds, and nearly a quarter of mammals are threatened with extinction. For some plant groups, such as conifers and cycads, the situation is even more serious, with 28% and 52% threatened respectively. For all these groups, habitat destruction through agriculture, logging, and development is the main threat and occurs worldwide. In the case of amphibians, the fungal disease chytridiomycosis is seriously affecting an increasing number of species, complicating conservation efforts. For birds, the highest number of threatened species is found in Brazil and Indonesia, but the highest proportion of threatened or extinct birds is found on oceanic islands, where invasive species and hunting are the main threats. For mammals, unsustainable hunting is the greatest threat after habitat loss. This is having a major impact in Asia, where deforestation is occurring at a very rapid rate.

According to the report, climate change is not currently the main threat to wildlife, but this may soon change. After examining the biological characteristics of 17,000 species of birds, amphibians, and reef-building corals, the report found that a significant proportion of species that are currently not threatened with extinction are susceptible to climate change. This includes 30% of nontreated birds, 51% of nontreated corals, and

41% of nontreated amphibians, which all have traits that make them susceptible to a changing climate. But there is also some good news. A few species have recovered through concerted conservation efforts. In 2008, 37 improvements in status were recorded for mammals, and an estimated 16 bird species avoided extinction over the last 15 years due to conservation programs. (Source: data. iucn.org/dbtw-wpd/edocs/RL-2009-001.pdf)

A Wilderness Gets Its River Back

At the conclusion of a 36-year fight in state and federal courts, Colorado’s Black Canyon of the Gunnison National Park has finally obtained a water right for the Gunnison River. Within the park, the 15,600-acre (6,300-ha) Black Canyon of the Gunnison Wilderness extends from canyon rim to canyon rim, 2,400 feet (730 m) above the river—the deepest narrow canyon in the United States. Water right negotiations involved the National Park Service, the state of Colorado, hydropower agencies, farmers, communities within the Gunnison watershed, and the federal Bureau of Reclamation, which operates three upstream dams. “This was bitterly fought and had more opposition than any other [Colorado] water right,” said Trout Unlimited attorney Drew Peternell. “It was unparalleled. It was contentious.”

Historically, the average peak flow of the Gunnison River in the Black Canyon was 6,000 cubic feet per second (cfs). Since 1963, when upriver dam construction was initiated, peak flows dropped to roughly 1,700 cfs. Now, with new upstream water releases, the flow will occasionally return to the 6,000 cfs level, scouring the riverbed of sediment,

washing away box elders that have built up on the banks, and breaking up small dams and riffle pools. "This is the beginning of a return to a more natural river," said Ken Stahlnecker, chief of resource stewardship for the park. "This is a step toward keeping it wild." Leslie James, executive director of the Colorado River Energy Distributors Association, has a different take on the agreement. "We lose some of a resource," she said. "I hope the park is getting what it needs because this is having a lot of impacts." (Sources: *The Denver Post*, May 8, 2009; www.wilderness.net)

Aerial Spraying of Herbicides in Badlands National Park

The National Park Service sprayed the herbicide Milestone from a helicopter over the wilderness areas of Badlands National Park, South Dakota, in July 2009, stating that "other mechanical methods of weed management and herbicide application are restricted" in wilderness areas. In an attempt to eradicate nonnative Canada thistle, a Bell 47 Soloy helicopter applied the herbicide from a

height of 10 to 15 feet (3 to 5 m). Approximately 5,000 acres (2,025 ha) of scattered Canada thistle patches were sprayed within the 64,000-acre (26,000-ha) wilderness.

According to a National Park Service (NPS) press release, Milestone is a relatively new herbicide that provides effective control of the thistle without damaging native grasses "and with little damage to native forbs, trees and shrubs. It is considered practically non-toxic to aquatic organisms, fish, and birds, breaks down to natural soil components and is non-volatile." The NPS goes on to state, "We recognize that a helicopter will be an intrusion into visitors' wilderness experience, but we feel the need to control Canada thistle and reduce its impacts on the park's native prairie warrant the intrusion." (Source: www.nps.gov/badl/parknews/managing-canada-thistle.htm)

U.S. Forest Service Embraces Wilderness Expansion with Positive Attitude

When the Omnibus Land Management Act of 2009 granted wilderness protection to 37,000 addi-

tional acres (15,000 ha) of Monongahela National Forest (NF) lands in West Virginia, the U.S. Forest Service immediately switched gears, swapping chainsaws and motor-powered weed-eaters for crosscut saws and weed whips, in compliance with the dictates of the Wilderness Act. Eric Sandeno, the recreation and wilderness program coordinator for the Monongahela NF, said, "I'd rather carry a crosscut saw than a chain saw and fuel. It's a wonderful tool, once you get in reasonably good shape. But they're hard to find, since no one's been making them since the 1950s." Diane Artale, an AmeriCorps volunteer working on the Gauley Ranger District of the Monongahela NF, agrees with the change in policy. "I hate weed-eaters—the noise, the smell," she said. One of the first tasks facing Sandeno is what to do with the remnants of 7 miles of former roads located in the new wilderness. An environmental review is underway to determine whether they should be left alone, ripped and seeded, or undergo some other treatment. (Source: *The Charleston Gazette* [West Virginia], June 25, 2009)

Continued from NEW WILDERNESS LEGISLATION IN 2009, page 32

website to support readers of the new 4th edition of *Wilderness Management: Stewardship and Protection of Resources and Values* (Dawson and Hendee 2009).

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The 2009 act brought the National Wilderness Preservation System (NWPS) to more than 109 million acres (44.1 million ha) with more than 750 management units in 44 states.

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Book Reviews

***Wildlife and Society:
The Science of Human Dimensions***

Edited by Michael Manfredo, Jerry Vaske, Perry Brown, Daniel Decker, and Esther Duke. 2008. Island Press. 368 pages. \$49.50 (paperback).

The lure of viewing wildlife for many outdoor recreationists and tourists is well documented. Watching animals, especially charismatic megafauna, in their natural habitat is an important goal and benefit for many visitors to natural areas. The number of people participating in viewing wildlife is increasing as the number of people pursuing consumptive recreation (e.g., hunting and fishing) is dropping, suggesting there may be an ongoing shift in Western attitudes toward a less exploitive relationship with wildlife.

Wildlife and Society, edited and written by many of the key authors in the small but growing field of human dimensions research of wildlife, provides an interesting and timely overview of some of the major issues arising from recent research in this area. The book is divided into four sections. After the first chapter provides a history of human dimensions research in fish and wildlife, the remainder of Part 1 identifies social issues that are generating change in fish and wildlife conservation: demographic trends and changing participation rates in relevant outdoor recreation activities, societal attitudes and values toward fish and wildlife, the role of NGOs in global wildlife conservation efforts, and climate change.

Part 2 reviews some of the issues that allow or block human dimensions research in wildlife management. The continued difficulty of convincing natural scientists and policymakers of the need to incorporate human dimensions research in wildlife management is a common thread throughout the book. The related difficulty of incorporating human dimensions research in wildlife conservation and management in developing nations is another overarching topic.

Part 3 addresses the legal and institutional factors that affect fish and wildlife management. Recent court decisions are reviewed, the public trust doctrine is described, the impact of institutional structures and changing agency mandates are noted, and the recent drop in revenues from fishing and hunting licenses are discussed.

Part 4 of the book reviews a range of social perspectives on contemporary fish and wildlife management issues. The issues include urban wildlife management, conflicts with wildlife in protected areas, market approaches to fish management, human-wildlife diseases, the privatization of wildlife, and managing wildlife in tropical forests. The final chapter identifies future issues, research requirements, and policy needs and provides a definition of wildlife management that incorporates human dimensions approaches.

The breadth of topics in this collection is impressive, and reflects the wide range of research approaches and topics in this emerging field. The challenge of incorporating this “new” approach in traditional fish and wildlife management agencies and institutions continues to be a key issue, as is finding consistent approaches that can “fit” a huge range of nations, institutions, and communities. The editors have provided an excellent overview of human dimensions research on fish and wildlife, one that reflects its inherent complexity, the “wicked” nature of many issues, and the interdisciplinary nature of the research.

Reviewed by JOHN SHULTIS
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The Dominant Animal: Human Evolution and the Environment

By Paul and Anne Ehrlich. 2008. Island Press. 440 pages. \$35.00 (hardcover)/ \$25.00 (paperback).

Paul and Anne Ehrlich are no strangers to environmentalists. *The Population Bomb*, published in 1968, was a seminal work that focused media and public attention on overpopulation. In hindsight, although some of Paul Ehrlich's specific predictions in this book (e.g., increases in food prices and decreases in life expectancy) were false, the basic premise of the level and impact of population growth outlined in *The Population Bomb* have certainly come to pass.

The Dominant Animal is a continuation of the Ehrlich's interest in this important global issue. As the thorny problem of overpopulation is now well known, the Ehrlich's approach in this book is not to generate awareness through making alarmist predictions, but rather to provide a more multifaceted assessment of how humans have become the planet's dominant species, and the resultant impacts that our species has had on the Earth.

The book has two distinct, perhaps too distinct, components: the first half reviews the long evolution of the human species on Earth, and documents the role of our genetic makeup on cultural evolution. In this section, it becomes quite clear that the Ehrlich's are *not* supporters of the idea that genes determine human behavior. Rather, they believe cultural evolution is much more important than genetic evolution. For example, the authors note that "the most serious threats now faced by humanity are slow, deleterious changes in the environmental background itself, changes our perceptual systems have evolved to encourage us to ignore" (p. 127).

The second half of the book reviews various global issues related to overpopulation and human destruction of the environment, including climate change, loss of biodiversity, consumption, and energy issues. The authors advocate the economic valuation of the Earth's "natural capital" to help create change in humanity's relationship with the natural world: "The goal is to align economic forces with conservation—to develop new scientific methods, new financial instruments and new corporate and government policies to make preservation of natural capital as conventional as preservation of human-made and human capital is now" (p. 324). They also suggest that although protected areas "are crucial to the success of conservation, they are not—and cannot be—sufficient to preserve either species or population diversity on their own" (p. 318) because of their limited size, connectivity, location, and changing plant and animal distributions due to climate change.

The Dominant Animal succeeds in outlining the myriad ways in which humans have modified the natural environment, and remind us that "we have utterly changed our world; now we'll have to see if we can change our ways" (p. 362). Shaped by our idiosyncratic genetic and cultural evolution, the Ehrlich's note that humans need to change the way we view issues we perceive to be far away or in the future, restructure our decision-making institutions, reallocate power in global society, and rethink our expectation that new technology will "fix" our problems in the future.

Reviewed by JOHN SHULTIS,
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Wilderness Management: Stewardship and Protection of Resources and Values, 4th edition

Chad Dawson and John Hendee. 2009. Fulcrum Publishing. 525 pages. \$65.00 (paperback).

More than 30 years ago (1978), the U.S. Forest Service published the first edition of *Wilderness Management*, co-authored and edited by John Hendee, George Stankey, and Robert Lucas. Subsequent editions (1990 and 2002) rewrote and expanded the text to incorporate new changes and materials under the broader framework embodied by the book's subtitle in the third and fourth editions. The new, fourth edition of this classic text on wilderness management offers readers an updated and somewhat slimmer version of the latest knowledge, challenges, and applications of wilderness management.

The co-author order has been reversed in the 4th edition, with Dr. Chad Dawson assuming senior authorship in this new version. Dawson is well suited for the task. He is a professor and former chair of the Department of Forest and Natural Resources Management in the College of Environmental Science and Forestry at the State University of New York in Syracuse. He is also the managing editor of the *International Journal of Wilderness*. Dr. John Hendee continued his involvement as co-author of all four editions of *Wilderness Management*. Hendee is professor emeritus and retired dean of the College of Natural Resources at the University of Idaho, and is a founder and editor-in-chief of the *International Journal of Wilderness*.

The fourth edition continues the overall organization of the third edition, with 17 chapters divided into six main sections. The new edition is

shorter than the third version by more than 100 pages. The co-authors stated that they hoped the new edition would be less encyclopedic than the earlier version, and that accounts for the paring down in the overall text length. Each chapter was revised, reviewed, and edited, with new material added and other material deleted. The co-authors tried to embrace current literature, experience, research, and emerging events. The new edition also contains an index, a glossary, a listing of abbreviations and acronyms, many photos and other illustrations, as well as two appendices that contain the text of the 1964 Wilderness Act, and a chronological listing of all 171 pieces wilderness legislation from 1964 to 2007.

Chapter 13, for example, is entitled “Potential Threats to Wilderness Resources and Values.” The third edition listed and discussed 17 such threats, including fragmentation and isolation of wilderness as ecological islands; increasing commercial and public recreational use; nonnative species; administrative access, facilities, and intrusive management; adjacent land-management and use; motorized and mechanical equipment trespass and legal use; and lack of political and financial support for wilderness protection and management. To that lengthy list, the fourth edition adds and discusses two more needed categories: global climate change, and legislation designating areas with compromised wilderness conditions. Perhaps the next edition can add even more threats, such as lack of agency understanding of and support for wilderness.

This new edition of *Wilderness Management: Stewardship and Protection of Resources and Values*, like the earlier editions, will continue to be a must-read for agency managers,

teachers and students, citizens and conservationists, researchers, and wilderness visitors.

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The Wilderness Debate Rages On: Continuing the Great New Wilderness Debate

Edited by Michael P. Nelson and J. Baird Callicott. 2008. University of Georgia Press. 723 pages. \$34.95 (paperback). This review is based on a longer review published in *Ecological Restoration*, Volume 27, pages 364–367, 2009.

The Wilderness Debate Rages On is a collection of mostly previously published papers about the meaning, value, and role of wilderness in our society, and continues the discussion that was propelled by the editors' previous book *The Great New Wilderness Debate* published in 1998. The “debate” in both titles is between those who think that the idea of wilderness is an anachronism that is no longer valid or appropriate in today's world, and those who continue to defend the idea of wilderness.

The book is divided into four major sections. Part One, “The unreceived wilderness idea: the road not taken”, offers 13 papers to reinforce the idea that wildernesses are important for their ecological value (the “unreceived” idea) and not merely for recreation (the “received” idea). Part Two, “Race, class, culture, and wilderness”, offers eight papers that for the most part criticize the wilderness idea from the perspectives of indigenous peoples worldwide. “The wilderness idea roundly criticized and defended

... again,” (Part Three) offers 11 papers that defend and criticize the wilderness idea, mostly from a philosophical perspective. Part Four, “Thinking through the wilderness idea”, offers an eclectic selection of nine papers that “rethink, remedy, rehabilitate, or move beyond the received wilderness idea” (p. 13).

The back cover states that “the book gathers both critiques and defenses of the idea of wilderness from a wide variety of perspectives and voices” and the Introduction frames the book as an intellectual inquiry that clarifies concepts and reveals “muddled or flawed thinking” (p. 15). Instead, the book seems designed to strengthen the editors' earlier critique of the wilderness idea rather than offering full and fair voice to other views or forging new insights that advance our understanding of the relationship between wilderness and humanity. For example, the selection of papers seems markedly biased: by my tally, 30 papers criticize the wilderness idea and six papers support it (I couldn't categorize five chapters). In five of the six supporting chapters, the editors disregard the chapter with little or no explanation, such as the dismissive statement that “sometimes good-old-time-wilderness-religion zealots draw suspect analogies premised upon sophomoric logical fallacies” (p. 2) applied to Dave Foreman's chapter. In contrast, the Introduction offers substantial discussion that is critical of the idea of wilderness.

In addition, the editors' introductory chapter, their brief introductions to the first nine papers, and their selection of papers seem intended to keep this debate in “either-or” terms: wilderness is either an idea or a place and wilderness is preserved either for recreational or ecological values—never both. For example, in their brief description preceding Leopold's paper, “Wilderness as a Land Laboratory,” the

editors state that Leopold's justification for wilderness preservation moved from "arguments focused on the recreational values ... to a focus on the value of wilderness for science" (p. 93). In fact, Leopold clearly makes the case that both the scientific and recreational values of wilderness are important, a view reinforced by Lutz Warren's historical analysis chapter of Leopold's wilderness efforts.

Following the editors' professed desire for intellectual inquiry, I would expect interpretations based not on select sentences but on overall content. For example, the editors devote considerable space in their Introduction to discussing Robinson's "Wilderness" paper, based on her statement that "I think we must surrender the idea of wilderness" (p. 570). In fact, Robinson's paper is a profound and wide-ranging essay on many of the ills that society places on the environment and people, focusing on the social injustice of weapons production, slavery, and global environmental governance, among others. It appears that she is using the term "wilderness" not in reference to Congressionally designated protected areas, but instead to

rural areas of several western U.S. states where military weapons are produced and tested. That the editors ignore this context and instead frame Robinson's paper only in terms of her rejection of "wilderness" is, at best, disconcerting.

The editors did include several papers that are remarkable for their coherent and novel syntheses. Jill Belsky's paper, "Changing Human Relationships with Nature" forges common understanding across those who criticize the wilderness idea and those who defend it. Importantly, she crafts this melding within a social and cultural context, and offers five highly useful "consequences" of this integrated perspective for wilderness management and policy. Wayne Ouderkirk's "On Wilderness and People" sets a new standard for insight and integration of wilderness as both an idea and place. Kimberly Smith's "What is Africa to Me? Wilderness in Black Thought, 1860–1930," offers a rich and insightful essay on the contribution of black American thought, philosophy, and psychology to American, and by extension, world conservation.

In summary, I was disappointed that *The Wilderness Debate Rages On* doesn't offer a balanced set of papers that examine the depths and nuances of the wilderness debate. For this reason, I don't think this book would be appropriate as a text for academics or students, and managers will find little of practical use in this collection. Most importantly, the either-or framing of this complex issue doesn't help us forge a clearer or better understanding of ourselves in the context of nature in general and wilderness in particular, or move us to ask better questions about these relationships. However, the papers by Adams, Lutz Warren, and Turner offer a rich historical framing of wilderness, and the papers by Belsky, Ouderkirk, and Smith are gems that deserve to be widely read by anyone interested in understanding our complex and vital relationship to the idea and place of wilderness.

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