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In This Issue

- Spiritual Dimensions
- Wilderness Stewardship
- Movement of Wildlife in Wilderness
- Botswana, South Africa

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On the Cover

FRONT: Tree branch covered in epiphytes at Baihe Nature Reserve, Sichuan. The Mountains of Southwest China hotspot includes portions of the provinces of Sichuan and Yunnan in southwest China.

INSET: Man collecting mushrooms and firewood. The growing population of the Mountains of Southwest China hotspot depends greatly on the natural resources provided by the lush high altitude forests of the region. Tacheng, Yunnan Province, China.

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

International Journal of Wilderness

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

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

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EDITORIAL PERSPECTIVES

Wilderness Is a Bipartisan Cause

BY VANCE G. MARTIN

Former President Teddy Roosevelt—TR—led and approved some of the most important achievements for land conservation. TR was a special breed, the epitome of a "conservative" that respected the land. He was responsible for creating 150 national forests, 51 federal bird reservations, four national game preserves, five national parks, 18 national monuments, and convened seven conservation conferences and commissions. His famous quotes are many, among them: "The conservation of natural resources is the fundamental problem. Unless we solve this problem it avail us little to solve all others." (1907)

Despite the considerable disappointments in environmental policy in recent years, some good news is emerging. On June 15, 2006, President George W. Bush announced the Northwestern Hawaii Islands Marine National Monument. At 140,000 sq. miles, it is more than seven times larger than all the other national marine sanctuaries combined, and 100 times larger than Yellowstone National Park. President Bush tacitly invoked the spirit of TR when he made his proclamation. This announcement has tremendous implications for the emerging concept of marine wilderness, as within five years this entire area will be off limits to commercial fishing, and dedicated to native cultural uses, recreation, species replenishment, and coral reef protection. This area has been well studied for years, making it an easy one for President Bush to approve.

There is more good news for terrestrial wilderness, too. The current 109th Congress approved, and President Bush signed, three wilderness bills designating 11,000 acres of canyon land and desert in New Mexico, 10,000 acres of rain forest in Puerto Rico, and 100,000 acres in the Cedar Mountains of Utah. Four more controversial bills are pending that, if approved, will add another 750,000 acres of wilderness in California, Idaho, Oregon, and Washington.

Hard work and tough negotiating over many years are needed to craft any wilderness bill, and the results do not always please everyone. But the hard work is continuing, and new organizations and alliances are evolving to get it done in today's political environment. One worth noting is the recent launch of the International Conservation Caucus Foundation (ICC), www.iccfoundation.us. The ICC is a bipartisan effort, one of the fastest growing caucuses on Capitol Hill, and includes important congressional leaders of both parties. It is proof that elected leaders of insight and wisdom can unite under concern for the environment.

The WILD Foundation is pleased to have helped in the early stages of creating the ICC, and to join with other ICC partners, such as Conservation International, The Nature Conservancy, World Wildlife Fund, and the Wildlife Conservation Society in launching this new effort. Conservation is a bipartisan cause, and we believe ICC will be a leader in further advancing U.S. international environmental policy.

Thank you for reading, discussing, and disseminating the *IJW*. This issue stays true to our focus—it covers the global as well as the local, the professional as well as the personal. There is something in here for everyone, just as there is in wilderness. **IJW**

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The Spiritual Dimension of Wilderness

A Secular Approach for Resource Agencies

BY ROGER KAYE

All of us have the task of making a living; but we long for something more, something that has a mental, spiritual impact on us... we must give serious attention to our mental and spiritual needs—hard to define but of greatest importance.

— Olaus Murie, 1960

These words by the preeminent field biologist and wilderness proponent Olaus Murie reflect a theme that resonates through American wilderness writing: Beyond utilitarian and commodity needs, our natural landscapes serve needs that lie at the core of the human psyche (figure 1). Yet the spiritual realm is usually relegated to the background of wilderness stewardship, often alluded to, but seldom incorporated in planning, management, and educational programs. One searches the policies of the four wilderness managing agencies in vain for any specific notion as to how spiritual values will be accommodated. Why is spirituality left as a closet value?

In part, managers' reluctance to recognize spirituality is due to its association with religion or religious doctrine—a barrier resulting from a possible misinterpretation of the First Amendment's mandate for separation of church and state. Although the Constitution prohibits the government from establishing, promoting, affiliating with, or discriminating against any religious doctrine or organization, it does not prohibit an agency from recognizing or enhancing opportunities for the nondoctrinaire aspects of spirituality (Friesen 1996).

Figure 1—Olaus and Margaret "Mardy" Murie in Alaska in 1956. Their writings expanded thinking about our species's role in the larger scheme of things. Photo by George Schaller.

Perhaps the main reason managers are squeamish about this dimension has to do with its association with something…mystical. But wilderness stewards can come to understand the spiritual orientation toward wilderness, and protect the conditions conducive it, without reference to anything supernatural or paranormal. Insights from six fields of research are particularly helpful in enabling us to understand spirituality as a secular, psychological phenomenon, as an inherited and beneficial component of our humanity with biological roots in our evolutionary past.

History

The association between wilderness and spirituality reaches back thousands of years. In Western traditions, leaders and prophets such as Jesus, Moses, Elijah, and Muhammad left their society to find their vision and inspiration in the wilds. The Buddha's remote sojourn provided spiritual insights that were influential in the East and in the formation of Thoreau's transcendentalist ideas—a foundation of the American wilderness movement. For Thoreau, wilderness was a medium for transcending the effects of socialization and conformity (figure 2), and coming to the humbling recognition that we are "an inhabitant, or part and parcel of nature"(Thoreau 1906).

A generation later, John Muir drew upon the emerging ecological and evolutionary thinking, and especially the

implications of the common origin of all life, to preach that wilderness is particularly conducive to enabling people to see themselves as "a small part of the one great union of creation" (Muir 1918). Aldo Leopold (1987) further incorporated the spiritual implications of ecological and evolutionary thinking into the emerging wilderness ethic. The wilderness movement, he wrote, was "one of the focal points of a new attitude—an intelligent humility towards man's place in nature." Even the gung-ho Bob Marshall, late in his life, came to the realization that the dominant value of wilderness was "being part of an immensity so great that the human being that looks upon it vanishes into utter insignificance" (as cited in Zahniser 1957). This diminishment of the self, the ego, and the sense of connection with something timeless and universal was the central motivation, the spiritual motivation, of Wilderness Act author Howard Zahniser, who was compelled by the belief that "we deeply need the humility to know ourselves as the dependent members of a great community of life" (Zahniser 1957).

Psychology of Religion and Comparative Religion

The unitive experience these wilderness movement leaders spoke of has a great deal in common with religious systems of thought and belief; so much can be learned from these fields. But we must keep in mind that, as research disciplines, their concern is not the object of spirituality. Rather, they are concerned with the common characteristics, benefits, and factors contributing to the spiritual experience. Whether religions are based on a God, animistic spirits, an Eastern philosophy of harmony and unity, or belief in one's embeddedness in the natural world, they share a core function: They replace the self as the "ultimate," with a sense that the self is part of a larger, more enduring reality. In the words of psychologist Mihaly Csikszentmihalyi, they all provide a sense "that one belongs to something greater and more permanent than oneself" (1997). Historically, this has been expressed as a core wilderness precept. Its psychological universality suggests an innate underpinning—that there is likely an evolutionary human predisposition for this impulse for connection to some larger, greater, encompassing ultimacy.

Figure 2—Grand Canyon of the Yellowstone by Thomas Moran, 1872. Hudson River School of Art paintings (1820–1875) gave visual expression to romantic and transcendental ideas about spiritual experience in wilderness.

Clinical and Health Psychology

Although not specific to wilderness, these fields provide empirical support for what the founders of the wilderness movement knew intuitively—that the kind of spiritual orientation many find in wilderness can be healthy. They offer functional definitions of spirituality, provide psychometric scales to measure it, and document the positive effects spirituality can have on one's physical and psychological well-being. Robert Emmons (1999) summarized research documenting that a spiritual orientation can lead to a lesser incidence of negative states, such as anxiety, stress, and depression, and can contribute to the positive states of satisfaction, optimism, and meaning and purpose of one's life.

Piedmont (2001) documented the positive correlation between such benefits and individuals whose orientation fits within this summary definition of spiritual:

> The capacity of individuals to stand outside of their immediate sense of time and place and to view life from a larger, more objective perspective. This transcendent perspective is one in which a person sees a fundamental unity.

Transcendence—rising above the narrow confines and concerns of the self—is the initial state one must pass through to find this enlarging capacity. And across research disciplines, across cultures, and throughout the foundational wilderness writings, this is what's common to the definitions and descriptions of spiritual experience.

Outdoor and Wilderness Recreation Experience

These fields provide a plethora of studies wilderness stewards can draw upon to better understand the nature of this state and the benefits of attaining it. Employing interviews, journal analysis, and a variety of survey instruments, they provide qualitative descriptions of how, for many visitors, wilderness experience contributes to personal growth, and enhanced self-identity, self-efficacy, and self-esteem. Yet although meaningful and beneficial, these self-constructs are not, in themselves, spiritual as many psychologists

Wilderness is both a place and a system of belief and feeling about our role in the larger scheme of things.

Figure 3—Wilderness provides a sense of scale and the physical and temporal isolation from reminders of the everyday world that is conducive to transcendent experience. Photo by Roger Kaye.

define spirituality. The work of Marilyn Riley and John Hendee (2001) suggests that these "self" aspects comprise an initial, or prerequisite stage through which one must pass in the *process* toward transcendence—described by psychologists Steven Kaplan and Janet Talbot (1987) as their subjects' emergent feeling of "a sense of union with something that is lasting, that is of enormous importance, and they perceive as larger than they are" (p. 195).

In examining the "wilderness effect," psychologist Robert Greenway (1995) found that for many of his subjects, a primary value of their trip was the "perceptual shift" they experienced. He found an expansion of the self, and a lessening of the ego and culturally reinforced individualistic thinking patterns. His term *perceptual shift* is worthy of attention because it lends insight into the actual nature, onset, intensity, and duration of transcendent experiences in wilderness. They are seldom sudden, intense, ecstatic, or comparable to reported religious conversion experiences. In fact, the word *experience* may be misleading if taken to mean a discrete event or episode. As Barbra McDonald et al. (1989) have noted, the term *spiritual growth* better describes the gradual change in awareness more characteristic of the phenomenon.

Csikszentmihalyi's (1990) conceptualization of the "flow" state integrates findings from recreation, religion, and mental health research to enhance understanding of how the diminishment of self-consciousness contributes to this change. The concept was so named because his subjects reported that immersion in their experience was analogous to being on a river, "carried on by the flow" (Csikszentmihalyi 1991). Immersed in the trip, they were better able to forget, or hold in abeyance, awareness of status concerns and pressure to conform to socially defined roles and norms. In short, their perception of and relationship to the surrounding environment became less affected by the filter of their self-image.

Solitude

The popular literature describes solitude as a prerequisite condition for spiritual experience in wilderness, and many studies provide useful insights into its nature and role (figure 3). Although the term *solitude* usually refers to some degree of aloneness, privacy, or isolation, it is more appropriately defined as a state of mind, or way of being, that isolation, among other factors, is conducive to.

William Hammitt's "The Psychology and Function of Wilderness Solitude" (1994) is among the psychometric studies that identify components of the experience and correlate them with the major causative factors. Characteristics of the environment his subjects reported to be particularly important were the naturalness and peacefulness of the setting and its being free of human-made intrusions. This is one example of the kind of study offering much-needed research-based rationale for protecting such conditions, and especially the last one—which begs the question…intrusions upon what? "Intrusions upon what" in psychological parlance is termed cognitive freedom. Its characteristics include the freedom to limit your attention to whatever you choose, to control your thoughts, and to be free of the expectations of others. Significantly, a characteristic of all spiritual traditions is the premise that concern with your self-image, status, and approval of others are barriers to transcendence.

Although the physical characteristics of wilderness, and the physical and temporal separation they provide, are especially conducive to attaining both solitude and spiritual experience, they are only contributing factors. The findings of Hollenhorst et al. (1994) on the most effective predictors of solitude achievement are as applicable to the more encompassing spiritual experience. It was not primarily the physical characteristics of the setting they conclude, "but rather predispositional factors that the visitor brings to the wilderness experience." Wilderness is also a symbolic environment, a socially constructed behavioral setting. Like a church, cathedral, or monument to which it is so often compared, wilderness has become invested with meanings that make it prone to support spiritual interpretation and experience.

Evolutionary Psychology and Neurophysiology

A convergence of evidence from these fields is providing a growing body of support for the idea that there are deeper predispositional factors at play than the learned beliefs, values, and expectations for spiritual experience that the visitor bring to the wilderness. They support the theme that resonates through the wilderness literary tradition, represented by Murie's reference to "attributes which we have inherited and developed through the ages…in response to an

inner urge that we still have and still do not fully understand" (1973, p.184).

For example, Newberg and D'Aquili's (2001) research on the neurological structures and processes that generate the spiritual experience provides compelling evidence that the spiritual urge is encoded in a genome that developed in synergistic evolution with the natural world. It's part of our wiring as Homo sapiens. Their findings are based on brain imaging studies of subjects in the midst of transcendent experience, described as "the absorption of the self into something larger." To grossly simplify, within the limbic system they identified specialized bundles of neurons that cause perceptions to reach one's awareness through neural pathways less affected by the filter of self-interest. Changes in the brain's left parietal lobe were observed as subjects passed through stages of quiescence and came to a state that would help "free the mind's awareness from the limiting grip of the ego." As they summarized:

> We saw evidence of a neurological process that has evolved to allow us humans to transcend material existence and acknowledge and connect with a deeper, more spiritual part of ourselves perceived of as an absolute, universal reality that connects us to all that is. (2001, p. 60)

What triggers this innate potential in some but not others? In brief summary, it's the set of beliefs and expectations one brings to a setting that, because of its physical characteristics and associated meanings, is conducive to a perceptual shift.

Conclusion

Where did this predisposition come from, and why does it persist? What "mental and spiritual needs," as Murie (1960) described, did it evolve to meet? We can only speculate as to how, through our biocultural evolution, it enhanced the fitness of our ancestors and the likelihood of their passing genes on to the future. Perhaps, as some evolutionary psychologists theorize, it emerged with the development of the brain's neocortex, serving to relieve the psychic stress associated with the existential concerns that arose with the development of conscious thought. Perhaps in enabling our ancestors to sense their brief lives as part of a larger, more enduring reality, they were better able to deal with the new realization that they, as individuals, would die.

The spiritual realm is usually relegated to the background of wilderness stewardship, often alluded to, but seldom incorporated in planning, management, and educational programs.

But as wilderness stewards, we need not concern ourselves with the question of whether or to what degree the spiritual impulse originates in evolutionary process, social construction, or perhaps, divine intervention. We need only recognize that the longing to connect to an ultimate value larger than the self is ancient and has always been central to the idea of wilderness.

Recent insights into the human mind's workings enable understanding of and provision for the spiritual dimension of wilderness in psychological (secular) terms, thus making it a legitimate concern of science-based natural resource agencies. They provide empirical understanding for what those who initiated the wilderness movement knew intuitively—the great importance of mediums such as wilderness for opening people to something within themselves that seeks relatedness to a greater meaning beyond themselves. This is the spiritual function—of wilderness, or a church, monument, memorial, shrine— of any consecrated place. An adaptive mechanism, the spiritual dimension of wilderness has evolved, is evolving, and will continue to evolve in response to changes in ourselves and our relationship to the natural world. The manifestation of spirituality in the wilderness concept both reflects the unmet needs of our urban, utilitarian, commodity-driven culture, and reveals some archetypal part of us that this culture obscures.

Wilderness is both a place and a system of belief and feeling about our role in the larger scheme of things. Geographically, wilderness is a remnant of our world that is still natural, wild, and free. Spiritually, it is a refuge for that part of ourselves that seeks connection, belonging, and rootedness within that world. **IJW**

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From WILDERNESS STEWARDSHIP on page 16

popular author addressing the theme of Managing Wilderness in a Time of Global Change. Other conferences, including the Natural Areas Conference in September 2006 (Managing Natural Areas in the Face of Global Climate Change) and the April 2007 George Wright Society Conference (Rethinking Protected Areas in a Changing World, www.georgewright.org/2007.html), also feature change as their primary theme.

the future of wilderness. As a result, at least three of the Institute's future focus areas for research include change as a significant driver. These include understanding changing relationships between humans and wilderness, stewardship of fire under changing climatic and social conditions, and global change effects on fauna (see leopold.wilderness.net).

Although wilderness ecosystems have long been recognized as dynamic entities that are continually changing, the scale of such change has generally been considered to be within the range of historic variability, and as such, part of the wilderness attributes that are to be protected. Only recently have we come to realize the magnitude of the impact of human-induced changes on wilderness ecosystems and values. The idea of wilderness as a pristine landscape that can, by simply leaving it alone, be preserved in perpetuity, is no longer compatible with the realities of today's world. It is apparent that the greatest challenge to ensuring the future sustainability of wilderness will be our ability to understand, mitigate, and adapt to the multiple facets of the changing world we live in. Meeting this challenge will require unprecedented proactive collaboration and cooperation between scientists, managers, politicians, and the general public.

Only recently have we come to realize the magnitude of the impact of human-induced changes on wilderness ecosystems and values.

During the 2005 program review of the Aldo Leopold Wilderness Institute, much was heard about the need to better understand the potential implications of changing climatic, ecologic, and social conditions for

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One Week in the Life of Wilderness Ranger Jim Leep

BY LES JOSLIN

For a dozen summers—until funding dried up—wilderness ranger Jim Leep patrolled and packed in the Three Sisters Wilderness, the second largest and most visited National Wilderness Preservation System unit in Oregon. This is the story of one week during those 12 summers of service.

Jim Leep, who served in the Three Sisters Wilderness every summer from 1993 through 2004, is the special kind of guy it takes to succeed as a U.S. Forest Service (USFS) mounted wilderness ranger and packer (see figure 1).

Just how special Leep is became especially evident during the week of July 21 through 27, 2002. That week tested him—and the two horses and five mules he lovingly calls—"the critters"—almost to the limit. That's *almost* to the limit. Leep takes good care of his animal partners.

Sunday was fairly routine. Leep and wilderness ranger Chris Miccolis spent the day "logging out" the Corral Swamp trail. Clearing downed trees off trails—a job done with hand tools in the wilderness—is a late-spring early-summer job for wilderness rangers (see figure 2).

Monday, one of his three days off on a "four-ten" work-week schedule, found Leep tasked to pack a Deschutes County Sheriff's Office search-and-rescue team camp into the popular Green Lakes area. That was a one-horse, two-mule job. The team was continuing its search for a hiker missing on Broken Top since the previous November.

Tuesday was another day off until late morning when Leep was summoned to help a USFS scientist whose vehicle was stuck in deep pumice off a back road. Leep did the job, then returned to his administrative site near Todd Lake and to his day-off chores of caring for his stock. But this day off ended—again—when he was tapped out to help eight search-and-rescue personnel rescue an injured hiker on South Sister. On the trail up Oregon's third highest peak, Leep promised his mount, Bobby, a veteran of many rescues, a pass on the next mission in exchange for the long afternoon and evening ahead. As the daily Bend newspaper, *The Bulletin*, reported on July 25, Leep's horse was used to move the victim "to an appropriate landing zone, where Air Life of Oregon retrieved him via helicopter" and flew him to St. Charles Medical Center in Bend. Leep and Bobby got back to camp at 10:30 p.m.

Article author Les Joslin. Photo by Pat Joslin.

Wednesday was another scheduled day off on which, from 9 a.m. to 4 p.m., Leep packed the search-and-rescue camp and equipment out of the Green Lakes area. This was another one-horse, two-mule job. Bobby got his day off, but there was not much rest for Leep. Never mind, Thursday would be a day off to compensate for the three he'd missed.

Thursday, however, Leep was dispatched to the Diamond Peak Wilderness at 6:30 a.m. to pack out five smoke jumpers and their firefighting equipment. On foot and leading three mules, he beat the heat by wading icy, knee-deep Trapper Creek twice during the nine-mile round trip. Back in camp by 7:30 p.m., he cared for his stock and planned long-delayed chores for Friday.

Leep got a good start on those chores (see figure 3). Then, as reported by *The Bulletin* on July 27, hikers found human remains near the base of Broken Top on Friday afternoon. Leep was dispatched. It was a job for his best

> Stationed at a tent camp on the edge of the wilderness, he was always on call and always ready to answer the call.

animals. There could be no mistakes. He selected Bobby, along with mules Charlie and China, all rock-solid and well-rested veterans of many seasons on congested trails, for the mission. Leep and a sheriff's detective left the Green Lakes Trailhead about 4 p.m., followed by a search-and-rescue team. They packed the remains of the hiker, who'd been missing more than eight months, out of the wilderness for transportation to the state medical examiner's office in Portland. Leep and his animal partners got back to camp at 10 p.m.

Figure 1—Wilderness ranger Jim Leep and saddle mule Charlie greeted Three Sisters Wilderness visitors with a friendly face and a helping hand. Photo by Les Joslin.

Saturday found Leep, Miccolis, and three mules packing a trail crew camp and the crew's equipment into the Wickiup Plain. It had been an eventful seven days, and another week was starting. Since there were more trail crew gear and construction materials to pack in, Leep and the pack string were back on the job Sunday. There also was the possibility of another smoke jumper pack-out mission. That possibility became a reality on Monday.

Figure 2—Cutting downfall off wilderness trails with "misery whip" was just one of wilderness ranger Jim Leep's many daily duties. Photo by Les Joslin.

The pace of that July week was just a notch above routine. But the work was not especially routine. A more routine week—if there is such a thing—emphasizes visitor information and education patrol work. Wilderness rangers work with wilderness visitors to help ensure enjoyable wilderness experiences and to help protect the wilderness resource. They carry out the Wilderness Act of 1964, in which Congress set aside special places to remain wild by law, on the ground. Most patrol and work on foot. Some, like Leep, are mounted.

Jim Leep, during his 51st through 62nd summers, was a seasonal member of the Forest Service wilderness team. A retired Portland police officer, he'd run his own pack string for more than 20 years. His many skills, especially his own combination of people and packing skills, remain as rare as good pack strings these days. Each year the Deschutes National Forest hired him and his pack string to patrol and to carry the load—literally—in the Three Sisters Wilderness, elsewhere on the Deschutes National Forest, and even on the adjacent Willamette National Forest. Stationed at a tent camp on the edge of the wilderness, he was always on call and always ready to answer the call.

Hard work and low pay were the order of the day for Jim Leep who spent a dozen summers, as the Forest Service slogan says, "caring for the land and serving people." He was the epitome of the wilderness ranger. Summers in the Three Sisters Wilderness since just haven't been the same without him. **IJW**

Figure 3—Wilderness ranger Jim Leep pausing in Three Sisters Wilderness high country east of Broken Top. Leep often packed every tool needed for a day's patrol and work on one mule. Here, Charlie's load included a crosscut saw and shovel as well as Jim's chaps, rain slicker, and saddlebags containing hard hat, saw wedges, radio, first-aid kit, human and mule food, and visitor information. Photo by Les Joslin.

LES JOSLIN, a retired U.S. Navy commander and former U.S. Forest Service firefighter, served with Jim Leep in the Three Sisters Wilderness until 2003. That year he began a two-year stint as team leader for recreation, heritage, and wilderness resources on the Deschutes National Forest's million-acre Bend/Fort Rock Ranger District. Now retired, he continues to teach an Oregon State University wilderness management course, to consult, and to write from his home at 2356 N.W. Great Place, Bend, OR 97701, USA;. email: lesjoslin@aol.com.

A Backcountry Ranger in the White Mountain National Forest

BY NATHAN PETERS

I've been hiking into the Great Gulf Wilderness for several hours now and have yet to encounter another living soul. As I rock-hop across the swift water of the Peabody River, I can't help but think about the large volume of water that continually moves through this massive watershed. The sound of the raging torrent drowns out any audible sound within earshot of the river. Moving deeper into the wilderness the forest type transitions from hardwoods to that of the northern boreal forest. As the trail begins to pull away from the river, the musical banter from New England's warblers and other songbirds is immediately apparent. The lushness of the forest is almost surreal. The steep slopes and glacial cirques of the Northern Presidential mountain range rise 1,000 feet or more above me on three sides. Midslope the trees give way to the krumholtz, talus slopes, and alpine meadows characteristic of the mountains in this region.

As far as the Northeast is concerned, it can be hard to imagine that an area so spectacular and grand in scale as the Great Gulf Wilderness can be located in such close proximity to the developed metropolises to the south (see figure 1). For my five fellow rangers and I, it is something that we are able to experience on a daily basis. Each day we are able to hike into new and exciting places where new challenges await us and our senses are sure to be heightened.

As backcountry and wilderness rangers, we have the opportunity to experience amazing places on a daily basis. On our district of the White Mountain National Forest (WMNF), we routinely patrol four equally impressive mountain ranges (the Kilkennys, Mahoosucs, Carter Moriahs, and the Presidentials), two designated wilderness areas (the Great Gulf Wilderness—5,552 acres—and the Caribou-Speckled Mountain Wilderness—12,000 acres), and one area proposed to be designated as wilderness (Wild River Wilderness—23,700 acres). We patrol 386 miles of trail, with approximately 50 miles of the scenic Appalachian Trail traversing our forest and ridgelines. Our district is home to the infamous Mt. Washington, which is renowned for having the worst weather in America, with record wind speeds of 231 mph. Mt. Washington and the rest of the Presidential range encompass several large ravines. Tuckerman Ravine is best known for its steep spring skiing, and Huntington Ravine for its alpine ice and rock climbing. In addition to our spectacular mountainscapes and miles of meandering rivers, our district harbors the largest alpine ecosystem in the Northeast. With just under 4,200 acres of above tree line alpine zone on our district (see figure 2), the significance of an area so unique proves to be beneficial not only as an ecological community, but as a draw for hikers and backpackers as well (USDA Forest Service 2005). An environment that is

Nate at a campsite revegetation project on the White Mountain National Forest.

Figure 1—Great Gulf Wilderness and the Presidential Mountain range. Photo by Nate Peters.

Figure 2—View from Mt. Washington. Photo by Nate Peters.

as unique as the alpine zone brings with it specific management challenges that we, as stewards of the backcountry, deal with on a regular basis to ensure its viability for the years to come.

Backcountry rangers on the Androscoggin Ranger District are responsible for a wide variety of tasks. First and foremost, we are the eyes and ears of management in the backcountry. We are often the only WMNF employees that many of our visitors will ever see. This is especially important because it provides us the opportunity to educate backcountry users on various topics. Two programs that we heavily promote on the WMNF are Hike Safe and Leave-No-Trace (LNT), which over time have proven to be beneficial in decreasing the number of injured and lost hikers, as well as minimizing the recreational impacts on the resource. One way that we implement LNT principles is through the distribution of plastic trowels to overnight backcountry users in each of our wilderness areas and discussing the importance of properly disposing of human waste. In addition to these educational tools, our contacts with backcountry visitors also give us an opportunity to answer questions that they may have regarding weather and/or trail conditions, identifying appropriate campsites, sharing pertinent rules and regulations, or simply helping them to identify the flora and fauna of the area. These positive interactions with the public enhance the experiences that people have while visiting the backcountry, wilderness, and alpine areas of our forest. These interactions also serve as a means for us as managers of the land to determine recreational use patterns. WMNF managers benefit from our time spent in the backcountry because we are often the first to encounter many of the issues that visitors are trying to resolve, such as illegal fires and campsites, potential hazards, and trail or resource impacts.

Figure 3—Caribou-Speckled Mountain Wilderness Boundary. Photo by Nate Peters.

Some of the other duties of rangers include wilderness monitoring, enforcement of rules and regulations for situations in which education cannot mitigate the issue; administering first aid; assisting on search and rescues; helping with revegetation and rehabilitation of illegal and/or heavily impacted campsites; doing inventory and maintenance of approximately 700 trailhead and backcountry signs; maintaining backcountry tent sites and cabins; developing new tent sites; maintaining first-aid caches, and doing some minor trail maintenance (see figure 3).

Being a backcountry ranger can be an extremely rewarding experience for an individual who is very motivated and seeking an employment opportunity that will challenge on a daily basis. On any given week I will hike between 40 and 50 miles, ascend an average of 12,000 vertical feet, make 50 to 100 visitor contacts, and complete any number of the previously mentioned duties. Our office is the backcountry. We work rain or shine, which can prove to be very challenging at times. Regardless of the challenges posed by this position, I can honestly say that there isn't a position more suitable for a person such as myself. I need variety to keep things interesting, and in this position I never know what I'll see when I round the next turn in the trail. If you enjoy working alone in remote backcountry and wilderness locations, enjoy working in adverse and continually changing weather conditions, have a tolerance for swarms of vicious biting insects, enjoy strenuous exercise all day, and are passionate about stewardship of wilderness, then this might just be the job for you. See you on the trail. **IJW**

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Out of the Office and on the Ground

Eastern Sierra Wilderness Stewardship Corps

BY JAMIE ANDERSON

Offices can be a horrible place to work, unless your office is, well…outside. This summer we did just as this title suggests: we got out of the office and off the phone, we shut down the computers, ignored emails, and took our picks and shovels along with dozens of hardy volunteers to help protect a few of California's most visited and least known wilderness areas.

Why, you may ask? Well, to get out of the office of course! No…seriously. Out goal was to combat the "perfect storm" brewing in the Eastern Sierra of California with increasing visitor demand and with decreasing Forest Service and Bureau of Land Management (BLM) management capacity. Friends of the Inyo established the Eastern Sierra Wilderness Stewardship Corps through a generous grant from the National Forest Foundation.

This ongoing program develops projects and recruits volunteers to work on the public lands throughout the Eastern Sierra landscape. By actively connecting individuals and groups with ecological restoration work, resource monitoring activities, and interpretive development projects, we are working to deepen the public commitment to preserving our national natural heritage.

Friends of the Inyo is a growing grassroots conservation and nonprofit organization dedicated to preserving the public lands and wildlife of the Eastern Sierra of California through stewardship projects, natural history hikes, and public lands advocacy. Based out of Bishop, California, we work on projects from the Mojave Desert to the summit of Mount Whitney. Friends of the Inyo was organized in 1986 by a group of local conservation-minded residents. Their mission was simple and very real: to protect and help guide public land decisions regarding their backyard—the 2 million acres of surrounding public lands. The impact of Friends of the Inyo was and still is a very strong influence in conservation management decisions in the Eastern Sierra.

Jamie Anderson working with volunteers during the upper Owens headwaters restoration project. Photo by Friends of the Inyo staff.

The Inyo National Forest, located along the eastern edge of California, is one of the most heavily visited national forests in the nation. Within a five-hour drive from four of the West's major metropolitan areas—Los Angeles, San Joaquin Valley, Reno, and Las Vegas—the grand mountain and desert vistas, pristine mountain streams teeming with trout, and thousands of miles of backcountry wilderness trails through the High Sierra draw more visitors each year than Glacier, Yellowstone, and Grand Canyon National Parks combined. In 2003 nearly 160,000 hikers, anglers, climbers, and equestrians camped overnight in the Inyo National Forest's John Muir Wilderness Area alone. This number excludes day users who, to judge by the cars filling trailhead parking areas, may increase this use number by two to three times.

Over the last five years, Friends of the Inyo has led more than 700 people, from locals to visitors from South Africa and Denmark, on nearly 200 publicly noticed free natural history outings, organized numerous stewardship projects in and around locally popular recreation areas, and published numerous interpretive brochures in order to acquaint people with the stories of the plants, animals, and rocks surrounding them. We have also spent considerable time working to ensure that our public land management

Figure 1—Friends of the Inyo volunteers proud of their work in the Inyo Wilderness Area. Photo by Friends of the Inyo staff.

agencies—namely the Inyo National Forest and Bishop Field Office of the BLM—have sufficient resources to carry out their duties by assisting them in their volunteer stewardship projects regionwide. With a perennially shrinking federal budget for recreation management, it has become readily apparent that groups like Friends of the Inyo are needed now more than ever to step up with creative solutions to help solve the problems facing our public lands.

The opportunity provided by the National Forest Foundation's Wilderness Stewardship Challenge Grant allowed us to firmly establish a community of local stewardship volunteers. The stewardship portion of our work is new, but is rapidly expanding. In its first season, Friends of the Inyo volunteers contributed more than 1,800 hours of hard labor and returned more than $20,000 in volunteer time to the public lands of the Eastern Sierra. From deep wilderness trail projects and wilderness restoration patrols to restoring the creeks and rivers of the upper Owens River watershed, we had an incredible summer of stewardship in 2005.

It all seems like a blur now, with picks and shovels flying, ash- and dirt-stained clothes, long hikes, blown-out gloves, handsaws sharpened, trails restored, smiling faces, unauthorized campsites and fire rings removed, trash bags overflowing, and long days spent giving back to the public lands we all love. What a great summer, indeed. With the snowpack still holding on far into July, we had a late start, yet it seemed like every weekend we had another great project to sink our shovels into.

It all started with a glorious day in June with the restoration of an illegal road up into the Inyo Mountains Wilderness by enhancing the barricade with natural features to discourage wilderness incursions. From removing illegal fire rings in alpine Glacier Canyon to the Community Clean Up project along heavily used Bishop Creek, we made a difference.

Yet, the unsung heroes were our volunteers who sacrificed their weekends, got out of bed early on Saturday mornings, hiked all day, lifted heavy rocks, and swung their picks and shovels with a purpose to restore and rehabilitate the trails, rivers, creeks, and meadows that are so important to all of us. The creeks and critters applauded as illegal off-highway vehicle tracks were raked out and roads were closed. The meadows and lakes rejoiced with every illegal campsite rehabilitated and fire ring destroyed. In the summer of 2005, the Eastern Sierra Stewardship Corp Volunteers spoke for the things that have no voice, we spoke through our actions, and our actions were heard. Active stewardship is alive and well in the Sierra thanks to the 189 volunteers who came out to protect and preserve the public lands of the Eastern Sierra.

Inyo Mountains Wilderness

One of the areas that the Friends of Inyo work hard to protect is a remote desert gem, the Inyo Mountains Wilderness. At 205,000 acres (82,995 ha), it is one of the largest wilderness areas designated by the 1994 California Desert Bill. The Inyo Mountains Wilderness is sandwiched between Death Valley National Park, which lies to the east, and Owens Valley and the Sierra Nevada, which lie to the west. The northern third of the range is administered by the Inyo National Forest, and the southern two-thirds are under BLM administration.

The Inyo Mountains Wilderness harbor herds of bighorn sheep and mule deer, plus coyotes and the elusive mountain lion. Unexpected and rare species found in this Mojave sky island include the Inyo Mountain slender salamander (*Batrachoseps campi*), a rare species found only in six remote canyons of the Inyo Mountains. This ancient species of *Batrachoseps* is confined to desert springs along a 25-mile (40-km) section of the Inyo Mountains. In the rain shadow of the Sierra, these mountains receive only 8 inches (20.5 cm) of precipitation annually

on the lower slopes and 20 inches (51.2 cm) on the peaks. The land is high elevation desert, yet contains what is arguably one of the most fascinating botanical discoveries of all time: the ancient bristlecone pines (*Pinus longaeva*). These mountains have maintained most of their pristine character due to the sheer ruggedness of the terrain.

The Inyo Mountains Wilderness Area preserves one of the most dramatic ranges in the California desert—the fault-block Inyo Mountains soar to more than 11,000 feet (3,352 m) in less than 6.5 miles, creating one of the most spectacular desert ranges in the world! Waucoba Peak, the tallest peak in the range soars to 11,123 feet (3,390 m) above sea level. Waucoba, the Paiute name for "pine," is a very appropriate name, given that ancient bristlecone, pinyon, and limber pines cling to it's the peak's windswept summit. These same towering mountains were once ancient sea floors teeming with Paleozoic creatures that are still found frozen in time in its fossilized shale layers. Researchers have recently found giant megalodon shark teeth. Three hundred twenty-five million-year-old ammonoids and pelecypods are tucked away in area canyons.

The dry climate and high altitude make this region a rare and endangered environment. The rapid changes in elevation create abrupt habitat and species changes. This factor, combined with a short growing season, results in sparse, delicate, and rare flora. Recovery from disturbance is slow—occurring on a scale of centuries, not seasons.

What about the flora? Well, the Inyos have some of the oldest and the rarest. Outcrops of seeping limestone walls and deep canyons support a number of rare plants, including: Limestone evening-primrose (*Oenothera caespitosa ssp. Crinita*), July gold, (*Dedeckera eurekensis*), and many others. Lower elevations are cloaked in creosote bush, shadscale, and big sagebrush, whereas the higher elevations have a dense forest cover of juniper, pinyon, and limber pine.

The gnarled bristlecone pines living today were seedlings when the pyramids were being constructed and are ancient patriarchs today. Bristlecones occur in only six western states, with the oldest found in the White-Inyo Range in California. The bristlecone has adjusted to places on Earth that no other tree wants to inhabit, and in these harsh environments, has flourished, free of competition.

So, if you're a desert rat looking to escape the rat race, a rare plant aficionado, a fossil hound, or an aspiring herpetologist looking for the elusive slender salamander, the Inyo Mountain Wilderness Area will certainly not disappoint. The Inyo Mountains Wilderness: where access is extremely limited and solitude is easily obtained is a true desert wilderness in the sky.

The Inyo Mountain Wilderness Area Needs Friends

Friends of the Inyo is currently working diligently with public land managers to increase protection of this incredible wilderness area by monitoring and patrolling for the increased illegal vehicular incursions, as well as providing assistance with wilderness boundary signage and the development of an educational kiosk project. Friends of the Inyo has already accomplished several wilderness projects: 62 campsites removed and rehabilitated; 0.5 miles of road removal and revegetated; 36 pounds of trash removed; 9 square meters of invasive plants removed; 12 miles of trail work completed; 82 miles of trails surveyed, toured, and scouted; 124 volunteers engaged; 131 hours on the ground and out of the office; and 1,016 volunteer hours accrued.

Figure 2—Hunter Canyon: Home to many endangered and endemic flora and fauna. Photo by Friends of the Inyo staff.

We anticipate having several stewardship projects scheduled for the spring and summer of 2006, as there is still plenty of work yet to be done to continue to protect this desert wilderness gem. We have already started working to revegetate and close old roads that off-highway vehicles were using to illegally enter the Inyo Mountains Wilderness Area. Maybe we'll see you at our next event. Until then, remember the ole' Cactus Ed slogan: "I come more and more to the conclusion that wilderness, in America or anywhere else, is the only thing left that is worth saving." **IJW**

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Friends of the Inyo is...dedicated to preserving the public lands and wildlife of the Eastern Sierra of California through stewardship projects, natural history hikes, and public lands advocacy.

PERSPECTIVES FROM THE
ALDO LEOPOLD RESEARCH INSTITUTE

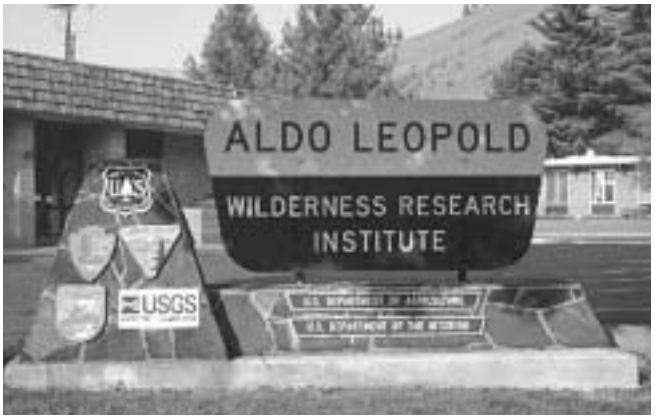
Wilderness Stewardship in an Era of Global Changes

BY DAVID J. PARSONS

It seems increasingly clear that the primary challenge to the future preservation of wild landscapes will be adapting to the rapidly changing social and biophysical environments within which such areas exist. Established in large part as islands of naturalness, where human influences are minimized, wilderness ecosystems are now threatened by myriad changes, many of which result from external human activities over which wilderness managers have no control.

Evidence of the effects of climate change, especially of a warming environment and increasingly unpredictable extreme weather events, has heightened awareness of the vulnerability of even the most natural of ecosystems. Droughts, melting glaciers, receding ice caps, algal blooms, increasingly severe wildfires, and climate-induced shifts in faunal populations have captured international attention and raised serious questions about the future of protected ecosystems and associated traditional ways of life. Ecological changes, including the spread of invasive species, increased fuels resulting from fire suppression, and the effects of expanding rural development, are causing additional stress to many wilderness ecosystems. Social change is occurring simultaneously, as expanding human populations, shifting age and ethnic demographics, and changing values and lifestyles, including an increasing reliance on technology, influence the relationships humans experience with the natural world.

Recognition of the importance of "change," whether climatic, ecologic, or social, on natural systems has become increasingly apparent to the natural resource and scientific communities as well as to the general public. The popular press has featured myriad articles on possible linkages between human activities and the occurrence and effects of severe droughts, hurricanes, floods, and fires. Recent cinematic releases have highlighted the threats posed by climate change. The *International Journal of*



Wilderness has featured a number of recent articles on the importance of change for protecting and managing wilderness (see Chapin et al., 2004, 10[3], "Wilderness in a changing Alaska"; Flood and Colistra, 2005, 11[3], "Changes in the aftermath of natural disasters"; and several articles [Miller, Kruger, and others] in the April 2006, 12[1] issue on wilderness fire policy in a changing world). These topics barely touch the surface of the ever-growing documentation of the implications of different types of change on natural ecosystems.

The 8th World Wilderness Congress (WWC) in 2005 featured change as an overriding theme. Entire tracks focused on such topics as the challenges of wilderness stewardship in a changing environment, and evolving relationships between native people and wilderness. A workshop designed to facilitate dialogue attracted a roomful of scientists and public land managers to discuss the challenges climate change poses to the management of protected areas, including the role science can play in better defining options and outcomes. The closing plenary session at the WWC featured a panel of scientists and a

Continued on page 8

The Effects of Veterinary Fences on Wildlife Populations in Okavango Delta, Botswana

BY JOSEPH E. MBAIWA and ONALETSHEPHO I. MBAIWA

Abstract: This article examines the effects of veterinary fences on wildlife populations in the Okavango Delta, Botswana. Using data from secondary data sources, findings indicate that the existence of veterinary fences in the Okavango Delta contributes to the decline of wildlife species in Botswana. Veterinary fences are erected to control the spread of livestock diseases in order to protect the European Union beef market where Botswana's beef is largely exported. Migratory wildlife species such as wildebeests, zebras, giraffes, buffalo, and tsessebes have their migratory routes blocked by veterinary fences and hence die from dehydration and entanglements in the fence. Those that get trapped by the fence often become easy kill targets for poachers. Some of the animals have been observed walking along the fence trying to cross. The erection of veterinary fences indicates that the expansion of livestock production into wildlife areas threaten the survival of wildlife in Botswana. To address the problem, an integration of wildlife production with other sectors such as agricultural development should be made a priority at national and local policy levels. This means that the principles of sustainability should be given priority in the erection of veterinary fences in wildlife areas.

Introduction

Some of the largest populations of wild animals in Africa are found in Botswana (see figure 1). These wild animals include elephants, buffalo, zebras, lions, impalas, kudu, giraffes, red lechwe, and many other small species scattered all over the country. Although Botswana's rangelands have supported a variety and abundance of wildlife resources for hundreds of years, recent studies such as those by Lomba (1991), Mordi (1991), Campbell (1995), Perkins (1996), Perkins and Ringrose (1996), and Albertson (1998) pointed out that Botswana's wildlife populations are in a constant decline (see figure 2).

Perkins and Ringrose (1996) stated that Botswana's abundant wildlife resources have been on decline since the 1960s (see table 1). Spinage (1991) also argued that

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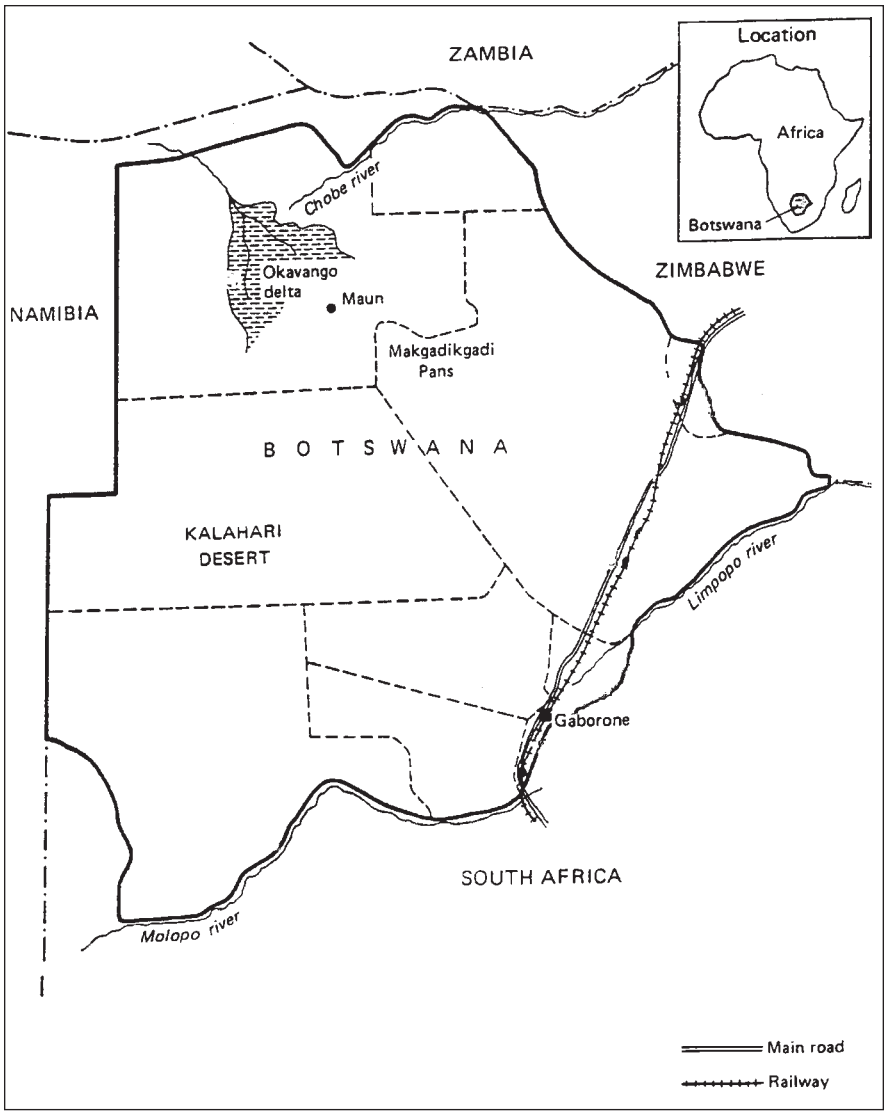

Figure 1—Map of Botswana showing the Okavango Delta (Mbaiwa 2005).

although Botswana has one of the most comprehensive game laws in Africa, there are fears about the sustainability of wildlife resource utilization, as wildlife populations are in a state of constant decline.

Figure 2—Giraffes in the Okavango Delta. Photo by J. E. Mbaiwa.

With the exception of the elephant and the gemsbok, table 1 shows that almost all other wildlife species have been declining. Species that are mostly affected include wildebeests, hartebeests, and zebras. Therefore, an investigation of factors that cause wildlife decline in Botswana is essential. Human factors such as livestock production—particularly veterinary fences—are cited as factors that contribute to the decline in wildlife populations in Botswana (Lomba 1991; Mordi 1991; Perkins and Ringrose 1996; Grag Gibson/ Environmental Investigation Agency 2004; Scott Wilson Resource Consultants 2000).

Taylor and Martin (1987) pointed out that any Third World state that aspires to export beef to international markets, especially in Europe, is required to meet high standards of veterinary hygiene and disease management. In Botswana, this is achieved through the construction of a network of veterinary cordon fences and quarantine camps that divide the country into disease control areas between which livestock movements are restricted. This strategy has resulted in Botswana being crisscrossed by a network of veterinary cordon fences. The erection of veterinary fences began in 1958 with the Kuke Fence (Perkins and Ringrose, 1996). Since then, different districts in Botswana have had veterinary fences erected one at a time over the years. This article is limited to the effects of veterinary fences on wildlife populations in the Okavango Delta region in northwestern Botswana. It discusses the effects of veterinary fences on wildlife populations based on the principles of sustainability. The aim is to analyze the role that sustainability can play in minimizing the degradation of the wildlife population in Botswana. The Okavango Delta is a classical case study because it has some of the largest concentrations of wildlife species in Botswana.

Methods

This article relied on the use of secondary data sources. Specific materials used include both published and unpublished articles and reports on veterinary fences and wildlife management in Botswana. Government policy documents on wildlife management (e.g., annual aerial wildlife surveys), consultancy reports, maps, books, and other related information on veterinary fences and wildlife populations were also used. The information obtained from these documents include wildlife statistics, the changing status

of wildlife populations, and the effects of veterinary fences on wildlife populations. Finally, data collected was analyzed qualitatively.

Results

Beef production remained Botswana's chief export product until it was relegated to second by diamond export in the late 1970s, and to third by tourism in 2004 (Mbaiwa 2005). Politicians and decision makers in Botswana consider the erection of veterinary fences necessary for the improvement of the country's economy. As a result, Botswana is being crisscrossed by a network of veterinary fences (see figure 3) to control livestock diseases. These fences are noted for having effects on migratory wildlife populations in the country.

Since this article is limited to fences in the Okavango region, it is necessary to describe wildlife migration patterns here. Wildlife migration routes are mostly between the inner (wet) and outer (dry) areas of the Okavango Delta. In wet seasons when there is water in all the parts of the Okavango, wild animals migrate to the outer parts of the wetland. In dry seasons when water becomes scarce, wild animals migrate to the permanent water source areas in the inner parts of the wetland.

The Kuke Fence

The erection of the Kuke Fence started in 1954 and was completed in 1958. It runs from the Namibian border across the northern boundary of the Central Kgalagadi Game Reserve, where the Makgadikgadi Fence joins it. The Kuke Fence has had severe impacts on the wildlife species found in the Schwelle region (i.e., the Kalahari Desert area). As DHV (1980, p. 21) put it, "The Kalahari appears to be a single system in which the Schwelle running northwest–southeast through the middle of the region forms an axis, about which are centered the greatest animal numbers." The Kuke Fence completely cuts the movement of wildlife species from northern Kgalagadi and the Schwelle region with the Northern system (Okavango Delta region). The fencing of the eastern parts of Central Kalahari Game Reserve further cuts wildlife movement from the Kgalagadi area, especially Central Kgalagadi Game Reserve and the Boteti/ Makgadikgadi system. Silberbauer (1981) stated that after the erection of the Kuke Fence, severe droughts that are endemic to Botswana, resulted in heavy wildebeest mortality and the effective exclusion of zebra from the Northern (Okavango) system. Child (1972) described the wildebeest die-offs at Lake Xau in 1964 and 1970 and the severe drought of the 1980s as attributable to the erection of the Kuke Fence. In the dry season, these wildlife species could not migrate to areas of water supply, as the fence blocked their movement.

There are, however, conflicting figures on the mortality estimates for wildebeest die-offs at Lake Xau. Owens and Owens (1980, 1983) estimate the number to be 800,000 animals, whereas Williamson and Williamson (1981), Williamson and Mbano (1988), and Mordi (1989) put the figure at 50,000 animals. According to Williamson and Williamson (1984) and Murry (1988), the wildebeest die-offs constitute a massive reduction in large herbivore biomass in the Kgalagadi system. This means the limiting effects of wildlife movement by fences, especially in drought periods when wildlife need to migrate to wet areas, negatively impacts on wildlife populations in the area.

Table 1. Changing Status of Some Wildlife Species in Botswana (Perkins and Ringrose 1996)

Species	1978	1999
Wildebeest	315,058	46,741
Hartebeest	293,462	31,114
Eland	18,832	15,163
Springbok	101,408	51,792
Ostrich	92,286	32,499
Zebra	100,295	55,406
Sable	3,636 (1987)	2,052
Roan	1,228 (1987)	884
Impala	56,773 (1987)	45,183
Sitatunga	1,541 (1987)	1,234

The Buffalo Fences

The Buffalo Fence is one of the important fences in Botswana in that it controls the spread of foot-and-mouth disease in the Okavango Delta region. The Buffalo Fence runs from the south to the north of the Okavango Delta. The fence has succeeded in keeping buffalo populations, which are known for transmitting foot-and-mouth, within the inner parts of the delta separate from cattle populations that remain in the outer parts of the country. The Buffalo Fence is divided into the Southern Buffalo Fence erected in 1982 and the Northern Buffalo Fence erected in 1996. The

Figure 3—The Southern Buffalo Fence. Photo by J. E. Mbaiwa.

Figure 4—An elephant bull walking along the northern Buffalo Fence in November 1997. The bull has been separated from the rest of the herd by the fence (Kalahari Conservation Society 2005).

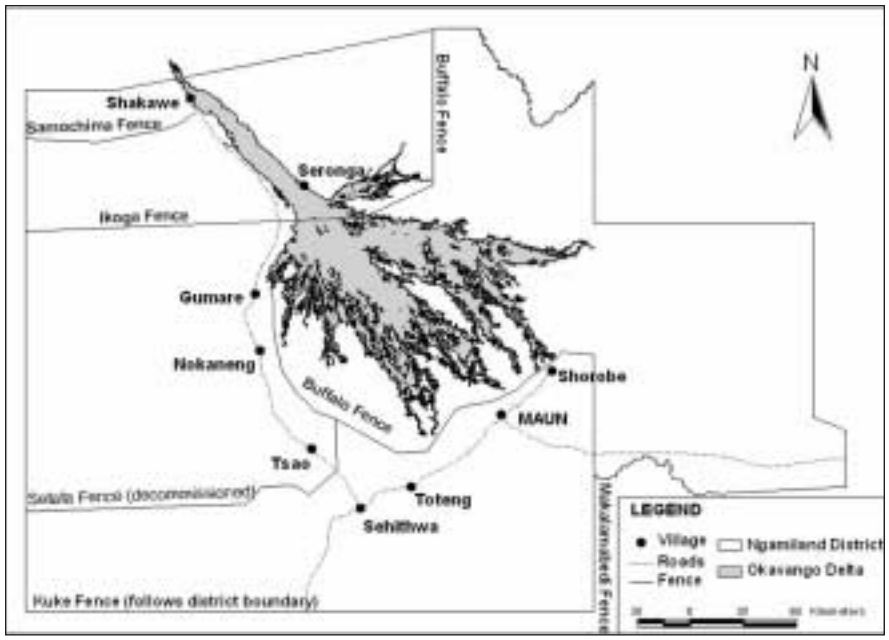

Figure 5—CBPP Fences in the Okavango Delta, Botswana (Darkoh and Mbaiwa 2005).

Buffalo Fence is reportedly one of the most destructive fences to migratory wildlife species in the region (Albertson 1998). The fence cuts across an area that is described to be a major route for migratory wildlife species to and from dry and wet (Okavango Delta) areas. Albertson (1998) stated that the Northern Buffalo Fence not only cuts off the larger migratory patterns of zebras, wildebeests, and elephants, but also fragments and restricts the movements of localized populations whose territories it bisects (see figure 4). Albertson indicated that wildlife species mostly affected are eland, roan, sables, tsessebes, and giraffes.

Veterinary fences such as the Buffalo Fence are also known for causing deaths of migratory wildlife species. Table 2 shows the deaths of wildlife species along the North Buffalo Fence in 1998. Further effects of the Northern Buffalo Fence include entanglement of species. Trapping of species and illegal poaching along the Buffalo Fence have also been reported (Scott Wilson 2000).

The CBPP Fences

The outbreak of the Contagious Bovine Pleuropneumonia (CBPP), or simply known as the cattle lung disease, in 1995 in the Okavango region led to the extension of veterinary cordon fences in the area. The CBPP is a lung disease that affects cattle and water buffalo. The disease is highly contagious, and the available vaccine is ineffective in controlling it. In fact, treated animals remain carriers of the disease. In order to control the spread of the CBPP and protect beef markets in Europe, the government erected veterinary fences that have come to be known as the CBPP Fences between 1995 and 1996. The CBPP Fences include the Northern Buffalo Fence, Setata Fence, Samochima Fence, and Ikoga Fence (see figure 5).

As the government cordoned off the whole district, about 320,000 cattle had to be destroyed as well (Scott Wilson, 2000). These measures were taken partly to assure European markets that Botswana's beef is safe and free from livestock diseases. However, CBPP Fences have proved to be destructive to migratory wildlife species, as they continue to die in large numbers along them. The visible manifestation of the fence impact is a buildup of wildlife carcasses along the fences. The fences also prevent wild animals from migrating to watering places in and outside game parks, such as Moremi Game Reserve located in the inner parts of the Okavango Delta. This limiting effect of the fence disputes the once-held belief that game parks can provide for the year-round requirements of wildlife species. As indicated earlier, migratory wildlife species generally migrate to dry parts of the Okavango during wet seasons and back into wet and inner parts of the Okavango in dry seasons.

Table 2. Wildlife Species That Died along Northern Buffalo Fence in 1998 (Albertson 1998)

Species	Number	Period
Giraffe	5	January–June 1998
Giraffe	5	July–September 1998
Buffalo	2	September 1998
Elephant (cow and calf)	2	September 1998
Roan antelope	unknown	September 1998

Table 3: Wildlife Species That died along the Caprivi Fences, 1997 (Albertson 1998)

Species	Number	Period
Kudu	5	August 1997
Eland	2	June–July 1997
Sable	1	July 1997
Roan antelope	1	July 1997
Giraffe	5	June 1997
Elephant	1	July 1997
Ostrich, duiker, steenbok	unknown	July 1997

Albertson (1998) recorded a number of wildlife species that died on other fences in the Okavango Delta area. For example, a trip along the Setata Fence on October 13, 1997, recorded the following deaths: seven giraffes, eight gemsboks, two wildebeests, two hartebeests, three ostriches, and three kudu (the Setata Fence was decommissioned and removed in 2003). As for the Ikoga Fence, a trip taken by a veterinary worker covering 20 kilometers in 1996 found the following numbers of animals killed along the fence: two kudu, one eland, and one ostrich. Table 3 shows the number of animals that were found killed along the Caprivi Fence. The Caprivi Fence is along Botswana's border with Namibia.

Albertson (1998) also records a number of wild animals that were observed either attempting to cross fences or walking along them (see figure 6). Some of the animals, particularly those that move in herds, got separated from the rest of their group by fences. Table 4 shows numbers of animals that were observed along fences either by ground or aerial observation.

Studies (e.g., Perkins 1996; Scott Wilson 1998; Albertson 1998; Grag Gibson/Environmental Investigation Agency 2004) on the impact of veterinary fences indicate that none of the fences in Botswana was erected after detailed scientific studies—particularly Environmental Impact Assessments (EIA)—were carried out. As a result, there was no prior knowledge on the part of policy makers on the possible impacts of fences on wildlife populations and wildlife habitat. Apparently, fences in Botswana are mostly erected as a reaction to some livestock disease outbreak, as was the case with CBPP in 1995–966. This reactive approach has often led to fences separating wildlife families from each other. These animals have been observed attempting to reunite with each other but are unable to do so due to fences that separate them. In addition to effects on wildlife populations, the erection of fences without EIAs has resulted in land and resource use conflicts with other stakeholders. For example, veterinary fences have become hunting areas for poachers (Scott Wilson, 2000), hence cause conflicts between wildlife managers and subsistence communities in these areas. Resource conflicts have been found to cause resource degradation (Darkoh and Mbaiwa 2001). In the case of veterinary fences, resource degradation includes the decline in wildlife populations in the Okavango Delta.

Table 4: Wildlife Species That Died along Other Fences in the Okavango Delta, 1997
(Albertson 1998, observed along different parts of the fence)

Ground Observations, Oct. 13, 1997	Aerial Observations*, Nov 9, 1997
Setata Fence 1 adult gemsbok, 1 calf (gemsbok); 4 adult hartebeests; 1 wildebeest; 4 adult ostriches; 4 adult wild dogs	4 adults (gemsboks); 7 adults, 2 calves (gemsboks); 5 adults (gemsboks); 4 adults, 1 calf (hartebeests); 3 adults (hartebeests); 1 adult (wildebeest); groups of 2–3 individual ostriches
Ikoga Fence, Oct. 21, 22, 1997 1 adult gemsbok; 1 adult ostrich	No data recorded from aerial observation.
Caprivi Fence, Oct. 24, 25, 1997 7 adults (elands), 2 adults (elands); 1 adult giraffe; 18 zebras; 2 adult kudu; 6 adult elephants, 2 subadults, 1 calf, 3 adults, 2 adult elephants	25 herds of elephants with between 2–55 animals in each observed on different parts of the fence on November 10, 1997
Northern Buffalo Fence, July 19–21, 1997 2 subadults, 1 calf (roans); 1 adult, 3 calves (roans); 3 subadult elephants, 1 adult female elephant and 1 calf; 1 adult eland and a calf; herd of 110 buffalo, herd of 62 buffaloes (July 21, 1997); herd of 50 buffalo, herd of 70 buffaloe, herd of 17 buffalo; 1 adult giraffe; 3 adult tsessebes 4 adult zebras; 1 kudu calf (Oct 1, 1997); 5 subadults, 1 adult (giraffes), 8 adults and 2 subadult giraffes (Oct. 27–30, 1997); 3 wildebeests, 2 adults wildebeest (Oct. 28, 1997); 1 adult tsessebe, 2 adult tsessebes (Oct 27, 1997); 5 adults, 2 subadults (kudu) (Oct 28, 1997)	herd of 40 buffalo, Oct. 1, 1997 herd of 20 buffalo, Oct. 1, 1997 herd of 15 zebras, Oct. 1, 1997 2 adult tsessebes, Oct. 1, 1997 several herds of elephants, Oct. 1, 1997 herd of 18 elephants, Nov. 10, 1997 herd of 30 elephants, Nov. 10, 1997 5 adult elephants, Nov. 10 ,1997 2 subadult elephants, Nov. 10, 1997 herd of 20 buffalo, Nov. 10, 1997 Herd of 18 wildebeest, Nov. 10, 1997

An integration of wildlife production with other sectors such as agricultural development should be made a priority at national and local policy levels.

The Impact of Removing Veterinary Fences on Wildlife Species

Although veterinary fences contribute to wildlife decline in Botswana, recent studies seem to suggest that a reverse in wildlife populations can be achieved if some of the fences are removed. For example, an EIA study by Scott Wilson (2000) on CBPP Fences recommended the removal of the Setata and Nxai Pan Buffalo Fences. The removal of the Setata Fence was done and completed in 2003, and the Nxai Pan Buffalo Fence was removed in 2004. Figures 7 and 8 show cables and standards from removed fences.

A recent study by the Kalahari Conservation Society (2005) indicated that "the removal of the 210 kilometer Setata Fence and the 66 kilometer portion of the Nxai Pan Buffalo Fence resulted in an immediate end to negative impacts on wildlife populations in the affected areas" (p. i). The Kalahari Conservation Society study further indicated that the removal of the Setata Fence has led to free movement of wildlife over the old fence as shown by seasonal migrations of elephants, zebras, and wildebeests. In addition, gemsbok and hartebeest populations observed in 1997 and 1998 comprised very small, scattered adults of fewer than five animals or sedentary lone adults or calves. Those herds in 2005, after the fence was removed, were typically larger and more cohesive, with numbers and age structures within normal ranges. With regard to the Nxai Pan Buffalo Fence, the study assumed that wildlife populations, particularly elephants, buffalo, and zebras, are likely to return to prefencing levels over the long term. These results indicate that wildlife populations in the Okavango Delta can be reversed if some of the veterinary fences were to be removed.

igure 6—Gemsbok between fence lines in 1998 (Kalahari Conservation Society 2005).

Discussion

Findings in this article indicate that veterinary fences have been used for livestock disease control in Botswana since the 1950s. Veterinary fences cover thousands of kilometers across Botswana, and they introduce an entirely artificial constraint upon wildlife movements that is historically unprecedented in terms of its scale, magnitude, and longevity of impact (Mbaiwa and Darkoh 2005). Migratory wildlife species depend for their survival on seasonal migration between rangelands and water sources. Veterinary fences block these migratory routes. The immediate manifestations of veterinary fences include the carcasses found along fences and the animals observed walking along it. Perkins and Ringrose (1996) stated that veterinary fences remain central to any explanation of the dramatic die-offs of migratory wildlife species that have occurred in the country in the last 20 years. Albertson (1998), Scott Wilson (2000), and Grag Gibson/ Environmental Investigation Agency (2004) argued that the effects of veterinary fences include the obstruction of wildlife migratory routes, fragmentation of wildlife populations, and the death of animals due to dehydration and entanglement on the fences. Scott Wilson Consultants stated that poaching along CBPP Fences in the Okavango is higher because of the wildlife animals that become trapped by the fences. As a result, veterinary fences have a direct negative impact on wildlife numbers in the Okavango Delta. The erection of veterinary fences in Botswana indicates that in most developing countries, immediate economic benefits for sectors such as agricultural development are often implemented to the detriment of other sectors, such as wildlife management.

The other aspect that emerges from this study is that the beef industry in Botswana is heavily subsidized

Figure 7—Cables prepared for collection (Kalahari Conservation Society 2005).

Figure 8—Standards prepared for collection (Kalahari Conservation Society 2005).

with funds by the European Union through the Cotonou Agreement (Perkins 1996; Perkins and Ringrose 1996, Grag Gibson/Environmental Investigation Agency 2004). The involvement of the European Union in Botswana's beef industry is part of globalization and international trade. Globalization and international trade are important in the economic development of any country; however, they also encourage development programs and strategies that can cause negative environmental impacts. The case of veterinary fences and wildlife decline in Botswana is one example of this phenomenon. Instead of promoting the sustainable use of Botswana's wildlife resources, globalization and international trade are thus contributing to the depletion of its wildlife resources. This problem can partly be addressed by encouraging livestock policies and programs that adhere to principles of sustainability in Botswana. This can partly be achieved through the integration of wildlife management and livestock production programs. This approach means that none of these sectors (livestock and wildlife) should be given priority to the detriment of the other, as is the case with the erection of veterinary fences.

Finally, EIA studies are essential in promoting an environmentally friendly livestock and beef sector in Botswana. This means that EIAs need to be done before the construction of any veterinary fence. EIA studies may also need to be conducted for existing fences and, where possible, some of the fences may require removal. Removing some veterinary fences has the potential of reversing wildlife populations in the Okavango Delta. The Kalahari Conservation Society (2005) study has shown that the removal of the Setata Fence and Nxai Pan Buffalo Fence has the potential of increasing wildlife populations by reducing wildlife stress, entanglements, death, and separation from each other. **IJW**

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Continued on page 41

Modeling Encounters between Backcountry Recreationists and Grizzly Bears in Glacier National Park

BY NICK SANYAL, EDWIN E. KRUMPE, and CHAD VANORMER

Abstract: The likelihood of a human–grizzly bear encounter in Glacier National Park was modeled using GIS analysis to integrate four social variables (visitor adaptive behaviors, length of time in the backcountry, visitor group size, and the proportion of visitors hiking off-trail) with biological data (numbers and distribution of grizzly bears). The model illustrates three plausible scenarios that reflect varying weights on social and biological parameters. Changes in the percent of the backcountry trail corridor that falls within each "likelihood of encounter" category show that as more importance is placed on human factors, the relative risk of encountering a grizzly bear on a backcountry trail increases.

Introduction

Using Geographic Information Systems (GIS) for spatial analysis and display of data has not been adopted extensively by recreation managers and researchers (Wing and Shelby 1999). Wing and Johnson (2001) noted that the lack of the right kinds of data and the inflexibility of traditional analyses remain obstacles to effective recreation planning. Traditionally, the results from recreation surveys have been illustrated using univariate statistics to show relationships between variables, and sometimes these patterns are generalized over large geographic areas. However, many analyses have failed to address the spatial nature of use and user characteristics; for example, some aggregated statistical descriptions of recreation use over an entire wilderness or park creates an oversimplified description that may not be very useful for on-the-ground management (Landres, Spildie, and Queen 2001; Wing and Shelby 1999).

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PEER REVIEWED

This study was designed to demonstrate how GIS can be used to integrate multiple data sources to model social, geographic, and biological data. The objective of the study was to construct an index model displaying the likelihood of encountering a grizzly bear (*Ursus arctos horribils*) in the Glacier National Park (NP) backcountry. An index model serves to evaluate the attributes of a composite dataset, calculate index values from the attributes, and to create a map based on the index values (Clarke 1999).

Methods

Glacier National Park is the central component of the Northern Continental Divide Ecosystem and is one of six brown bear recovery zones recognized under the Endangered Species Act (Servheen 1993). Glacier NP was chosen as the study area for several reasons, including the availability of data on its large population of grizzly bears, data on the numbers and distribution of backcountry recreationists, and the park's extensive system of trails and trailheads where visitors could be sampled.

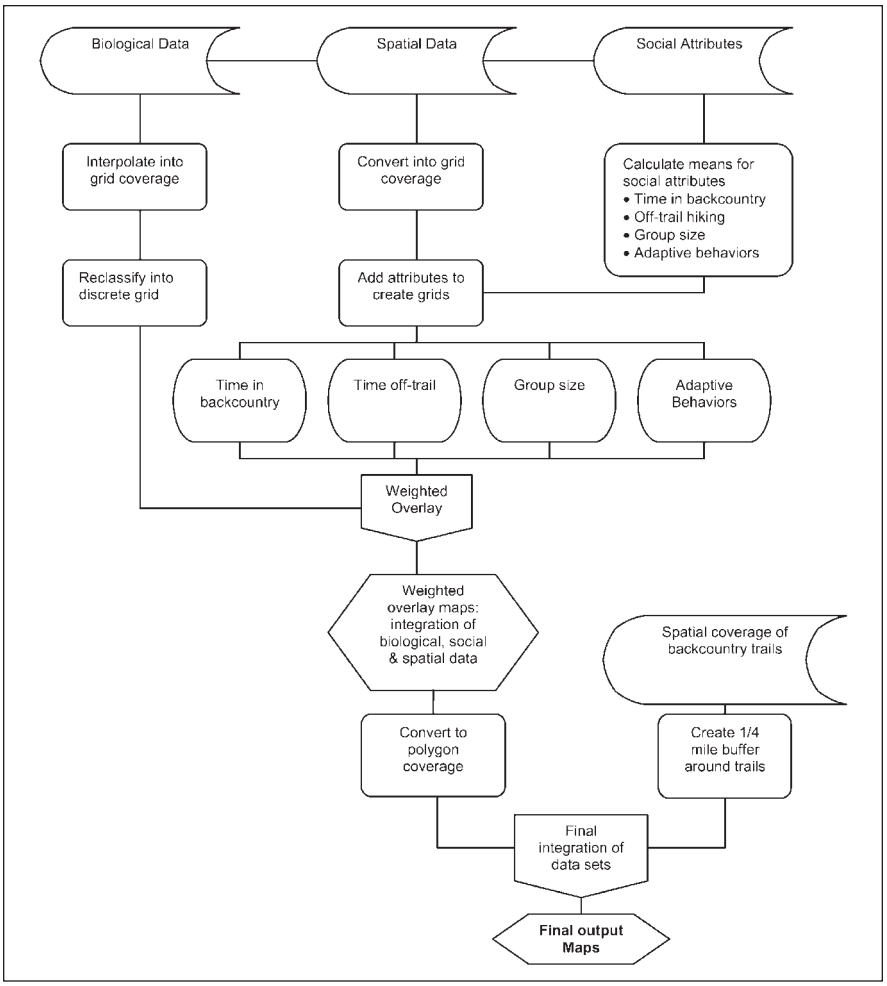

Figure 1—Steps in preparing and integrating the data sources for the grizzly-human encounter model

Biological Data Measures

Biological data, supplied by the Greater Glacier Bear DNA Project (nrmsc.usgs.gov/research/beardna.htm), included the numbers and distribution of grizzly bears in the park, which were assembled from 633 barbed wire hair traps set up throughout the Glacier backcountry. Bears were lured into hair traps where hair would snag and be left behind. Biologists then collected the hair samples and analyzed them for DNA to determine the species of bear and number of individual grizzlies at each trap (Kendall and Waits 2001). These data were prepared for this analysis as point data, where each point represented a hair trap set up in the park.

Social Data Measures

The sample consisted of day hikers (anyone who hiked more than 0.5 miles (.08 km) off the developed road system) and overnight campers (hikers who spent one or more nights at a backcountry campsite), between May 15 and September 7, 2000, 16 years or older (VanOrmer 2002). The sample was developed by using personal contacts (by handing a mailback questionnaire to participants on randomly selected days as they exited the backcountry at one of the 31 trailheads) or mail contacts (by random sampling trailhead self-registration cards at the other 41 backcountry trailheads). A questionnaire was mailed two weeks after a trip. Following Dillman's Total Design Method (Dillman 1978), there were three follow-up mailings, including a reminder postcard one week after the initial mailing and a second and third questionnaire sent to the remaining nonrespondents two and four weeks later. Compliance for the self-registration stations was estimated at 67%. Compliance was higher (mean=78%) for trails frequented by overnight campers and lower (mean=51%) for day-use trails. These figures are slightly higher than those reported by McCool, Braithwaite, and Kendall (1989) when they developed this sampling approach for the Glacier Park backcountry. Overall, our sampling design was intended to be proportional to use levels.

The questionnaire quantified the adaptive behaviors of respondents while hiking in bear country. A four-point scale (*Always, Frequently, Some of the Time, Never*) recorded the frequency at which they engaged in each behavior. This 22-item scale (see

Table 1. Frequency of Use of Adaptive Behaviors by Hikers

ADAPTIVE BEHAVIOR	Means[1]		
	Day Hikers Only (n=968)	Overnight Campers Only (n=623)	Overall (n=1,591)
Carrying out garbage	1.2	1.0	1.1
Being especially alert for grizzly bears	1.5	1.5	1.5
Making noise on the trail	2.3	1.1	1.8
Washing dishes well away from camp	—	1.8	1.8
Checking with NPS for current bear warnings	2.2	1.3	1.8
Hanging food in trees for storage	—	1.8	1.8
Sleeping in a tent	—	1.6	1.8
Cooking 300 feet away from camp	—	2.1	2.1
Wearing clean clothes while sleeping	—	2.3	2.3
Camping away from trails	—	2.3	2.3
Using odor-proof containers	2.5	2.4	2.4
Carrying bear defense spray	2.9	2.6	2.8
Cooking downhill from camp	—	2.9	2.9
Hiking in groups of four or more[2]	2.9	3.2	3.0
Using scented deodorants, soaps, cosmetics[2]	3.0	3.5	3.2
Engaging in fishing[2]	3.4	3.4	3.4
Wearing bear bells	3.4	3.5	3.5
Hiking alone[2]	3.6	3.4	3.5
Carrying a cell phone	3.5	3.7	3.6
Cooking fish or bacon for meals[2]	3.7	3.8	3.8
Hiking after dark	3.9	3.8	3.8
Carrying a firearm	3.9	3.9	3.9

[1] Where, 1=Always; 2=Frequently; 3=Some of the Time; 4=Never

[2] "Negative" behavior, that was reverse-coded prior to analysis. The means in this table reflect this change.

table 1) was enlarged from a previous list of behaviors identified by resource managers (McCool and Braithwaite 1989) to reduce the likelihood of confrontations with bears in Glacier NP. Seven of the adaptive behaviors were specific to overnight use and were not measured for day hikers. Data were also collected on the length of time each person spent in the backcountry or on the trail, the size of the hiking or camping group, and the proportion of time people engaged in off-trail hiking (see table 2).

Spatial Data Measures

Spatial data, obtained from the U.S. Geological Survey (USGS) Field Station in Glacier National Park, included a polygon coverage of Glacier NP with the eight management subdistricts and line coverage of backcountry trails.

Results

Questionnaires were administered to 2,092 backcountry users and completed responses were received from 1,591 people (76% response rate), including 968 backcountry day hikers and 623 backcountry overnight campers. Statistics for the adaptive behaviors are shown in table 1. Few significant differences were found between day and overnight users. Overnight campers were more likely than day hikers to "make noise on the trail" and "check with NPS for current bear warnings." These two behaviors were virtually always practiced by overnight campers, whereas day users only practiced them frequently, at best. Although the mean for "using scented deodorants, soaps, cosmetics" for both groups was in the "some-of-the-time" category, day hikers were more likely to report using this adaptive behavior. Because of this similarity, our model used the combined average for both day and overnight users.

An Adaptive Behavior Index was created from these 22 variables. The numeric scoring of the five "negative"

Table 2. Social Parameters Used to Create the Model

PARAMETER	JUSTIFICATION
Adaptive behavior index	The adoption of behaviors by back country visitors that increases/decreases the likelihood a bear encounter.
Length of time in the backcountry	The more time spent in the backcountry will increase the likelihood of a bear encounter
Visitor group size	The smaller the visitor group size, the greater the likelihood of a bear encounter.
Visitors hiking more than 0.5 miles off trail	The higher the proportion of visitors hiking off trail, the greater the likelihood of a bear encounter.

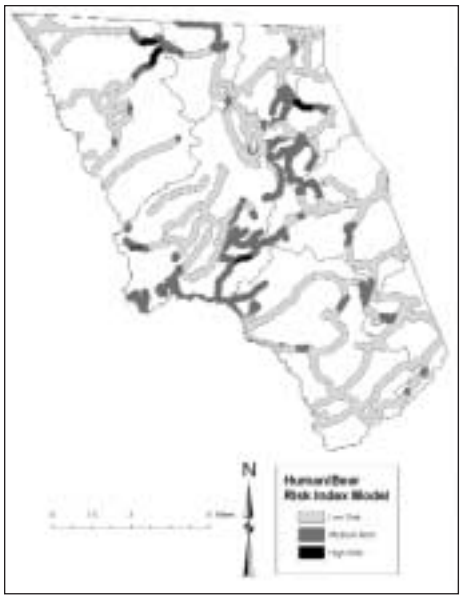

Figure 2—Final output map for Scenario 1 (75% biological weight), risk of encounters

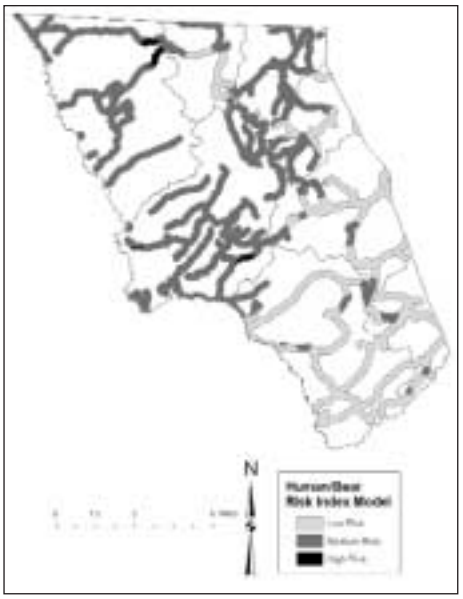

Figure 3—Final output map for Scenario 2 (50% biological weight), risk of encounters

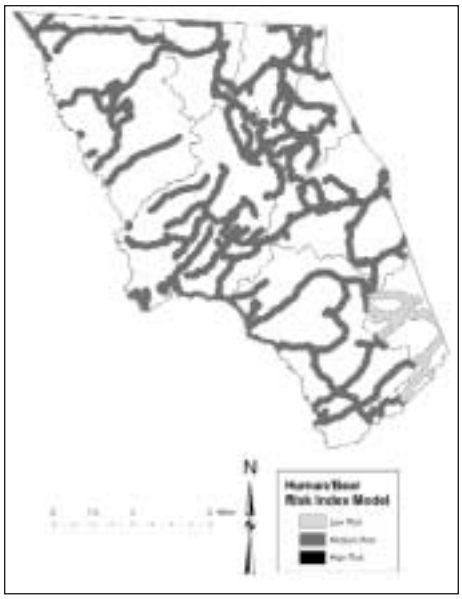

Figure 4—Final output map for Scenario 3 (25% biological weight), risk of encounters

behaviors were reversed. For example, the codes for *cooking fish or bacon for meals* and *using scented deodorants, soaps, cosmetics*, were reversed from that recorded in the questionnaire, so that a response of Never was recoded to a 1, instead of a 4. This allowed us to sum all 22 variables creating an additive scale that ranged from 22 (use of adaptive behaviors associated with a lower likelihood of attracting bears) to 88 (use of adaptive behaviors associated with a higher likelihood of attracting bears). The scale had a normal distribution with a mean of 53.3 and median of 54.0. No significant differences between day hikers and overnight campers, or between management subdistricts were found. Consequently, the aggregate scale scores were used for all respondents.

Overnight campers spent an average of three nights in the backcountry, averaging 39.8 hours on backcountry trails (see table 3). They were also twice as likely as day users to engage in off-trail hiking. Day hikers spent an average of 14.4 hours hiking. Both groups hiked in similar sized parties. Because of these differences, these social attribute data were calculated separately for day and overnight hikers.

The social data were linked to a geographic location in the park by identifying the trailhead where the questionnaire was issued or the registration card was completed by the backcountry hiker. All social data were generalized to the specific ranger subdistrict where it was collected.

Creating the Model

The first step in creating the model was to prepare the data from all sources for analysis in *ArcView* (version 3.2a) *ModelBuilder Extension*. By converting the coverage to grids coverage the social data were integrated with the spatial data. Figure 1 illustrates the data sources and the processes each had to go through for preparation of the model.

The top layer represents the three data sources used to create the index model. The biological data were used to model the density of bears throughout the park, by interpolating the points in Glacier National Park where hair from individual bears were captured, into a grid using the Inverse

Table 3. Comparison of the Characteristics of Day and Overnight Users of the Backcountry

Characteristic	Day Users (n=968)	Overnight Users (n=623)
Percent who hiked more than 0.5 miles (0.8 km) from backcountry trails	16.4%	33.7
Group size: Mean Median	3.2 2.0	2.8 2.0
Mean number of hours spent on backcountry trails	14.4	39.8
Mean number of nights in the backcountry	0	3.0

Table 4. Weights for the Three Encounter Scenarios Used with the Index Model

Variables	Weights Placed on Each Variable		
	Scenario 1	Scenario 2	Scenario 3
Grizzly bear density and distribution	75%	50%	25%
Adaptive behaviors of hikers and campers	10%	15%	20%
Length of time in the backcountry	5%	15%	20%
Visitor group size	5%	10%	20%
Visitors hiking more than 0.5 miles (0.8 km) off trail	5%	10%	15%

Distance Weighted Method (Clarke 1999). Next, the grid was converted from a continuous to a discrete grid using the Weighted Overlay process. This combined the different data sources and converted them to common values that could then be manipulated in the *ModelBuilder Extension* program.

The spatial data file contained the boundary of Glacier NP and its eight management subdistricts, and it was converted from a shapefile into a grid before importing the social attribute data. The social attribute data were statistically summarized by individual management subdistrict and added to the attribute tables of each grid coverage from the spatial data file. Finally, the data were merged into the model, and the weights (see table 4) were assigned. These weights were created by research biologists and social scientists to represent three encounter scenarios that were modeled in this analysis. The primary difference between the three scenarios is the distribution of the weights between the biological and social variables. The probability of an encounter between human and grizzly was obtained by calculating means for each variable for each of the eight management subdistricts in the park and creating a 3-point probability of encounter scale (low, medium, or high-probability of an encounter). Cut-off values for the encounter scale were set at the 33rd and 66th percentiles.

The final step of model development was to add the spatial coverage of backcountry trails. This data source was combined with the weighted overlay map of integrated social, spatial, and biological data. The coverage of backcountry trails was modified to include a 0.25 mile (0.4 km) buffer around the trails to represent the trail corridor that was merged with the weighted overlay coverage to create the final output maps. The results of applying the model scenarios are displayed as buffered trail system maps. Figure 2 illustrates scenario 1, which places 75% of the weight on the biological data. Figure 3 illustrates scenario 2, with 50% of the weight placed on the biological data, and Figure 4 shows scenario 3, where 25% of the weight is placed on biological data.

Each map provides researchers and managers with two important pieces of information that have not been available in the past. The first is that the data is spatially referenced; we can now see where potential encounters between humans and grizzlies may occur along the backcountry trail system. The second is a quantification of the area in each "likelihood of encounter" category.

Table 5 shows the changes in the percent of trail corridor that falls within each "likelihood of encounter" category. Under scenario 1 (75% of the weight assigned to biological data), 71% of the trails are in the low likelihood class, 27% in the medium likelihood class, and 2% in the high likelihood class. Under scenario 2, there is almost a halving of the percent of trails in the low likelihood category and a doubling of the medium likelihood proportion, with virtually no change in the high likelihood class. Finally, scenario 3 again shows another shift in the likelihood categories as a result of different assigned weights. These changes show that as more importance is placed on human characteristics there is an increase in the relative risk of encountering a grizzly bear on a backcountry trail.

Table 5. Percent of Trail Corridor within Each Likelihood of Encounter Category

Model	Likelihood of Encounters		
	Low	Medium	High
Scenario 1 (75% biological)	71%	27%	2%
Scenario 2 (50% biological)	37%	62%	1%
Scenario 3 (25% biological)	7%	93%	0%

Discussion

This application shows that GIS is a flexible tool that can be used to model site-specific resource conditions. It is also flexible enough that resource professionals can easily manipulate data and create scenarios

specific to resource objectives. In this case, integrating recreation characteristics and biological grizzly bear data provides insight as to where potential conflicts may occur within the park. This provides managers with more site-specific direction about where to focus management activities that will mitigate those conflicts.

GIS models show how human and biological data can be integrated to create scenarios for more informed decision making. For instance, Nielsen, Herrero, Boyce, Mace, Benn, Gibeau, and Jevons (2004) found that relatively little of the landscape was secure from human-caused grizzly bear mortality and recommended decreasing human access to grizzly-occupied areas as the remedy. Our model can help pinpoint most likely locations for human-grizzly encounters.

Increasing levels of recreation use in parks and wilderness areas can have a negative impact on wildlife species, some of which depend on the protections afforded by these designations. Information on the types, likelihood, and location of impacts can enhance our ability to find successful management solutions to such conflicts. Our model shows that changes in human behavior are more critical if one goal of backcountry management is to reduce the relative risks associated with encountering grizzly bears. By institutionalizing the adoption of adaptive behaviors, higher numbers of bears may be accommodated without reducing human use levels.

Nielsen et al. (2004) examined the hypothesis that grizzly bear mortality relates to factors describing human accessible habitats in locations that bears frequent. They developed a predictive model describing the distribution of human-caused grizzly bear mortalities for Alberta and Yoho National Parks of southern Canada, and found that landscape attributes relating to human use, such as roads and trails, correlated well with the locations of human-caused grizzly bear mortalities. They concluded that spatial models, such as presented in this article, can be used for management of humans in grizzly bear territory and for the identification of potential control sites.

Although our analysis addressed only two components of the natural environment within Glacier National Park, a major asset of GIS modeling is that other data can easily be incorporated into the model. For instance, our analysis focused only on backcountry trails, whereas there are several other potential points of human-bear conflicts that can occur within the park, such as front country campgrounds and backcountry chalets. Biological data included only data on the location and numbers of bears, but certainly, the model could include age composition, vegetation phenology, seasonality, and data on prey species and other foods.

Even though GIS modeling allows us to visualize management decisions prior to implementation, caution must be taken when developing management strategies. For instance, assigning weights to the variables is a subjective exercise. Managers at Glacier National Park may assign weights differently, basing them on more current data and managerial knowledge. However, this flexibility is what makes GIS such a useful tool for modeling and on-the-ground resource management. Because GIS models rely largely on the type of data that are entered into the system, the quality of the data input into the model should be evaluated and the models should be verified against actual bear-human encounters before basing management decisions on GIS modeling alone. This has not been done for this study.

The spatial analysis technology needed to make decisions that affect resources is gradually becoming easier to use and more available. It will benefit all natural resource disciplines to be able to model alternative management decisions based on integrated data prior to implementation. Integrated resource GIS modeling is an analysis tool that deserves more research attention and on-the-ground implementation. **IJW**

In this case, integrating recreation characteristics and biological grizzly bear data provides insight as to where potential conflicts may occur within the park.

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Continued on page 48

Developing Wilderness Character Monitoring

A Personal Reflection

BY PETER B. LANDRES

The 1964 U.S. Wilderness Act has one, clear mandate to the agencies that manage wilderness: preserve the wilderness character of the area. But even though the Wilderness Act went into effect 42 years ago, and all four federal agencies that manage wilderness have policies that direct managers to preserve wilderness character, the agencies can't show whether they are preserving wilderness character or not.

In part this lack of accountability is a result of the deeply intangible values and benefits that are such an important part of wilderness character. These were the cornerstones that Howard Zahniser, principal author of the Wilderness Act, strove to preserve: that people would feel their connection to and interdependence with nature, that humility would grow from being surrounded by and immersed in the community of life, that people would be inspired. Although it may be hard for the agencies to monitor these intangible benefits, the agencies should be accountable for the more tangible outcomes of management decisions that affect wilderness character.

Over the past five years, a dedicated and passionate group of wilderness managers, agency staff (mostly Forest Service but also representatives from the three other wilderness management agencies), and scientists have labored to develop a new protocol to monitor wilderness character in wildernesses managed by the U.S. Forest Service. This work began when Jerry Stokes, who was then the Forest Service national wilderness program leader, asked Steve Boutcher, the agency's wilderness information manager, and me to cochair a Forest Service Wilderness Monitoring Committee. Our task was to craft a monitoring strategy to improve wilderness stewardship. As a team we debated, we listened, and we argued respectfully while working through excruciatingly detailed discussions: What is wilderness character? How does management affect it? Would our monitoring diminish the important intangible benefits of wilderness character? Can we develop a cost-effective monitoring protocol? How will line officers and staff use the information to improve wilderness stewardship?

Peter B. Landres. Photo by Nyssa Landres.

Eventually, more than 50 people were actively engaged in developing this monitoring protocol, demonstrating close partnership between management and science staff. The protocol has been reviewed by more than 30 managers, line officers, and scientists, and it's been pilot tested in all nine Forest Service regions.

The protocol uses the statutory language of the 1964 Wilderness Act to identify four qualities of wilderness character that the agency has management responsibility for: "untrammeled," "natural," "undeveloped," and "outstanding opportunities for solitude or a primitive and unconfined type of recreation." Each quality is divided into one or more monitoring questions or goals to focus monitoring, and these are divided into one or more specific indicators. Indicators were chosen based on three criteria: They had to be meaningful across multiple scales to help improve individual unit wilderness stewardship and national wilderness policies; they needed to apply to at least half of the 407 Forest Service wildernesses; and data for the indicator had to be available within the Forest Service with no new field data collection, or available as an external national dataset. This last criterion was vital for several reasons, but most importantly because in this time of austere budgets a new monitoring program must be designed to be as cost-effective as possible. Also, using existing Forest Service data from

across the many staff areas with wilderness responsibilities, such as air quality, fish and wildlife, vegetation, engineering, range management, and recreation, helps integrate wilderness across the agency.

Monitoring wilderness character has many tangible benefits. First, it allows informed decisions about the effects of stewardship and actions on wilderness character, which is critical for about half of all line officers in the Forest Service who have responsibility for managing wilderness. Second, it provides accountability for the mandate in the Wilderness Act to "preserve wilderness character." Third, it builds internal agency integration by making information from other program areas more accessible to wilderness managers, and vice versa. Fourth, it creates an "institutional memory" about the outcomes of wilderness stewardship decisions, allowing future managers to learn from the past.

There are also tangential benefits. Describing wilderness character in terms of the four qualities is already being used as an organizing framework in several NEPA effects analyses. Management staff involved in these analyses felt that this framework helped them document potential effects more quickly and accurately than before. This new monitoring protocol was also the impetus for a workshop of scientists and managers to develop a new social science research agenda to improve understanding about how management policies, decisions, and actions affect wilderness character in general, and the outstanding opportunities quality in particular.

Monitoring wilderness character has many tangible benefits.

On a personal level, just like a wilderness journey, this work has taken me on a path of challenge and discovery, frustration, humility, and eventually deep satisfaction. I've spent years working to define, then refine, then define and refine again the big picture and hundreds of details for this monitoring; the entire time has been a wonderful challenge full of discovery. Throughout these years there certainly were frustrating moments and times where I questioned if I should be putting so much time and effort into developing this monitoring. But I knew I should continue when I'd think about how our society is increasingly separated from nature, and how wilderness character is such an important touchstone for our interdependence with nature, for fostering humility and respect, for how we grow when we're challenged.

Although I'm the one who received the award for this work, this work is not mine. The reality is that this monitoring was conceived of and developed by a team of people, both managers and scientists, who had one goal clearly in mind: to honor the letter and spirit of the Wilderness Act. I am deeply honored and humbled to have had the opportunity to work with such a wonderful group of people who could translate their years of on-the-ground experience into a tool to help managers preserve wilderness character for our children, for our future. **IJW**

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Chief's Excellence in Wilderness Research Application Award

Dr. Peter B. Landres received the 2005 Excellence in Wilderness Research Science Application Award, cosponsored by the U.S. Forest Service and IJW. His work in monitoring wilderness character based on the language in Wilderness Act was heralded by his colleagues and wilderness managers as central to a team effort—he provided both sustained leadership and the science base for this applied research effort. According to one of his colleagues,

Peter led an effort to develop a national protocol for monitoring changes in wilderness character in all 407 wildernesses managed by the Forest Service. Despite the recent 40th anniversary of the Wilderness Act, the phrase "protect wilderness character" has never been defined sufficiently for the purpose of determining whether or not, we as an agency, have been successful at managing for this core mandate of the Act.

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The monitoring protocol incorporates biophysical, social, and managerial aspects of wilderness into a cohesive assessment of wilderness character. The *IJW* Editorial Board is pleased to jointly recognize Dr. Peter Landres for this award and his leadership in developing a monitoring protocol to measure wilderness character—the heart of wilderness stewardship.

Chief's Excellence in Wilderness Stewardship Research Science Award

Dr. F. Stuart "Terry" Chapin and the Regional Resilience and Adaptation Program (RRAP) in the Institute of Arctic Biology at the University of Alaska, Fairbanks, received the 2005 Excellence in Wilderness Stewardship Research Science Award cosponsored by the U.S. Forest Service and *IJW*. As Professor and Director of the RRAP, Dr. Chapin has led the program to study resilience and vulnerability of northern regions to social and environmental change. The award recognizes their excellence and accomplishment in research that helps directly maintain the cultural and ecological qualities of wilderness. One colleague noted that "this team was so effective…that it precipitated a major theme of the 8th World Wilderness Congress to present evidence of how managers and scientists are assessing and addressing social, policy and environmental change in defining and protecting wilderness values." Some of their work has been published in *IJW* (Chapin 2004a) and challenges managers to

> manage not for a set of uniform physical attributes but for protection of a wilderness character that is difficult to define but which acknowledges the integral nature of the dynamic relationship between people and the land.(p. 11)

Dr. Chapin and coworkers are most widely known (Chapin and others 2004b, 2005) for their nationally published work on arctic tundra and boreal forests—the dominant forest in polar and subpolar regions of North America—and the social and environmental factors that are changing these ecosystems. A colleague observed that "the scientific value of study of these places as a regional system of protected areas to the global ecosystem provides a blueprint for assessing the factors that govern their sensitivity to social and environmental change."

Dr. F. Stuart Chapin

The *IJW* Editorial Board is pleased to jointly recognize Dr. F. Stuart "Terry" Chapin and the Regional Resilience and Adaptation Program for this award and their research in understanding and addressing ecological change and resilience as an important component of wilderness stewardship.

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Components of and Barriers to Building Successful Interagency Wilderness Citizen Stewardship Programs

BY CONNIE G. MYERS and DON HUNGER

Introduction

Integrity of the National Wilderness Preservation System is threatened by fire suppression, invasive species, heavy and highly concentrated use of sensitive areas, and a growing disconnect between people and wilderness. The staff, skill base, and funding needed to address these challenges continue to decline and are currently insufficient. Unless approaches for closing this staffing and funding gap are developed, the integrity of wilderness will continue to erode and, along with it, the ecologic, economic, and social benefits of wilderness to our citizens, our country, and our world.

One approach successfully employed by some units to help compensate for federal staffing and funding shortfalls is developing and deploying skilled citizen wilderness stewards. This article identifies common components of successful volunteer wilderness citizen stewardship programs as well as barriers.

Individual and group meetings were conducted during the 2004 calendar year to explore and identify intersecting circles of interest and capacity among agencies, academia, volunteers, and other partner organizations in developing and deploying citizen wilderness stewards. Specific to the Forest Service are elements of the *10-Year Wilderness Stewardship Challenge* that could successfully be addressed by citizen wilderness stewards.

Components of Successful Programs

A number of successful citizen wilderness stewardship programs were reviewed to determine what makes them work. When compared one to another, the following five common components of success surfaced.

Article co-authors Connie G. Myers and Don Hunger

1. **Agency champion—**The most successful projects included an agency employee who solidly invested in volunteer efforts by providing leadership, support, feedback, reward, and sometimes field presence.
   - Leadership—Time was taken to build and cultivate trusted relationships with volunteer organizations.
   - Support—Bunkhouse and office space, equipment and supplies, transportation, radios, training, etc. were furnished by the agency to the degree possible.
   - Feedback—Projects were evaluated from the perspective of both parties, with feedback provided to decision makers.
   - Reward—Volunteer efforts were appropriately acknowledged and rewarded.
   - Field presence—Agency employees participated in project work to the degree possible.

2. **Nongovernmental champion—**The most successful projects included a nongovernmental organization that conducted volunteer recruitment, training, outfitting, and supervision.
   - Recruitment—Conducted outreach and matched volunteer interest and skill with the project.
   - Training—Provided training to ensure appropriate skill level for the project with some agency support.

- Outfitting—Provided food, transportation, and equipment with minimal agency support.
- Supervision—Provided full-time field supervision with minimal agency support.

3. **Meaningful volunteer experiences—**The most successful projects were those inspiring connectedness and community, interesting and meaningful work with clear expectations and responsibilities, adequate training, effective supervision, and appropriate recognition.
   - Connectedness and community—Clearly connected volunteer contributions to final outcomes so volunteers could see how important their efforts were in the big picture no matter how menial the task may have been. There was a common sense of what volunteers were trying to achieve together with the agency, resulting in a strong sense of community and an incentive to return.
   - Interesting and meaningful work—Large or small, specific, place-based, discrete projects were offered having a beginning, middle, and end, on a continuum from weekend to weeklong to monthlong, that were clearly connected to making a positive difference to the resource. These projects and programs generated ownership and enthusiasm among volunteers and an incentive to return.
   - Clear expectations and responsibilities—Expectations and responsibilities were clearly defined for the agency, volunteer supervisor, and volunteers so there was no confusion about who was supposed to do what. This helped ensure a positive experience for all parties.
   - Adequate training—Volunteers were provided the training needed to do the job right. This eliminated frustration, generated mutual respect, improved safety, resulted in good work, and provided an incentive to return.
   - Effective supervision—Volunteers were supervised by highly qualified, experienced, and inspiring individuals, agency/nonagency/both, who provided guidance and opportunities for growth throughout the entire experience.
   - Appropriate recognition—Volunteers received recognition appropriate to their effort and contribution.

4. **Academic and scientific support—**Among the most successful monitoring projects were those supported by academic institutions providing training, ensuring data quality assurance and quality control, data analysis, and long-term project continuity and management.
   - Training—Provided volunteers monitoring training, use of equipment, survey instruments, etc.
   - Data quality assurance/control, analysis—Conducted built-in field checks to ensure QA/QC and analyze data, providing results to decision maker.
   - Long-term continuity—Managed long-term monitoring projects to ensure continuity over time, application to long-term global trends.

5. **Meets needs—**Successful citizen stewardship efforts meet both agency and nongovernmental organization needs.
   - Agency Needs
     - — Tie need with opportunity
     - — Think of volunteers as partners
     - — Conduct air quality monitoring
     - — Build social capacity through experience as wilderness stewards
     - — Data analysis/collection
     - — Recreation management and dispersion of people
     - — Standardized program in training, recruitment, reimbursement
     - — Identify experiences we can give people while getting work done
   - Nongovernmental Organization Needs
     - — Educate citizens for decision making
     - — Cultivate happy, healthy, connected people
     - — Provide opportunity for citizens to serve
     - — Match desired experience to project—retirees might have different needs, skills development
     - — Provide appropriate recognition of volunteers
     - — Meet organization mission
     - — Preserve access
     - — Consider volunteer objectives

Barriers to Successful Efforts

Some efforts to develop and deploy citizen wilderness stewards failed, and even successful citizen wilderness stewardship programs experienced setbacks along the way. When compared one to another, the following five common barriers preventing successful citizen stewardship programs surfaced:

1. **Insufficient agency collaboration and coordination with volunteer organizations**
   - Limited agency staff and time—There are fewer employees doing more work

who are stretched so thin that they cannot spend time cultivating relationships with volunteer organizations, preparing field projects, conducting outreach, and coordinating volunteer efforts.
- Limited knowledge and expertise—There is inconsistency in volunteer management among staff due to varying levels of awareness and knowledge about available partnership authorities.

2. Bureaucratic barriers
- Inability to reimburse—New requirements make it almost impossible to reimburse volunteers for gas, supplies, etc. This is a tremendous impediment to volunteer efforts resulting in the generation of ill will between otherwise supportive volunteers, a decline in returning volunteers, and a lack of incentive for agency employees to continue volunteer efforts.
- Inability to provide gifts—The agency cannot purchase gifts in recognition of volunteer efforts. They have to find some other organization to do this, adding to the already demanding volunteer coordination efforts.

3. Insufficient volunteer training and support
- Training—Volunteers are treated as if they were employees, so before they even get to technical training in monitoring, trail reconstruction, campsite restoration, weed identification, etc., they are required to take a considerable amount of training, including defensive driving, crosscut saw safety, horse safety, first-aid certification, field communications, etc. In some cases volunteers spend more time in training than they spend in the field, unless they are returning volunteers. Concern about liability and number of courses required frequently precludes investment in volunteer program development.
- Support—Providing bunkhouse and office space, equipment, supplies, transportation, and the inability to dedicate time with volunteers in the field are barriers.

4. Insufficient incentive
- Agency—Rather than being rewarded for accomplishing work with volunteers, some units are being penalized by having funds shifted away from their program to another program. Because they have demonstrated an ability to make do with less, even less is given. Some become a victim of their own success.
- Volunteers—Volunteers are most interested in the volunteer experience. They want interesting and meaningful work with clear responsibilities, effective supervision, and appropriate recognition. Without these incentives, they are unlikely to return.

5. Insufficient commitment
- Agency—Although there are unquestionably outstanding exceptions, agencies as a whole do not have a volunteer culture. In some cases, employees do not believe volunteers capable of doing their work. In other cases, employees are threatened because volunteers can do their work. Many employees simply don't want to or don't have time to spend coordinating volunteer efforts. Generating volunteer hours is not part of employee performance elements. Volunteers aren't free. It takes time to build a strong commitment from both parties, to do the planning to prepare a field project, and to conduct outreach. Spending time cultivating volunteer opportunities is not a priority.
- Volunteers—If volunteers don't show up, projects are canceled, resulting in lost investment and disappointment among volunteers who didn't cancel.

Successful citizen wilderness stewardship programs are partnerships—and partnerships are all about relationships, and establishing and cultivating relationships take both time and dedication.

Implications and Recommendations

Consistently, the most successful citizen wilderness stewardship programs displayed the common elements of success and avoided the barriers presented herein. The implication is that if units launching citizen wilderness stewardship efforts embrace the common elements of success and avoid the barriers, their likelihood of success will be significantly greater than those who choose to do otherwise.

Results further suggest that units would benefit tremendously from establishment of citizen wilderness

stewardship program coordinator positions to cultivate relationships with volunteer organizations, prepare field projects, conduct outreach, and coordinate volunteer efforts. Additionally, results indicate that all units considering establishing new or enhancing existing citizen stewardship programs would benefit from knowing who is interested in what types of stewardship opportunities, what opportunities are available, and how stewards can be trained. In light of these implications, the following six recommendations are offered:

1. **Embrace components of success and avoid barriers—**Ensure that units considering development of citizen wilderness stewardship programs are aware of and follow to the degree possible the identified components of success.
   - distribute electronically through wilderness mailing lists.
   - post on wilderness.net.

2. **Explore nonfederal funding in support of citizen stewardship program coordinator positions—** Given current limitations of federal funding, pursue private funding in support of these positions with organizations such as the Outdoor Industry Association.

3. **Identification—**Launch efforts to recommend a process to successfully.
   - identify organizations interested in participating in wilderness projects and they need in order to be involved.
   - identify projects to be completed and requirements for participation.
   - match projects with interested volunteer organizations.

4. **Organization and Training—** Explore methods for getting nongovernmental organizations to provide leadership in:
   - organizing, providing logistical support for, and implementing project work.
   - training volunteers.

5. **Coordination—**Provide leadership in coordination at the local, regional, and national levels by designating agency champions on each project site.

6. **Motivation and Accountability**
   - figure out what motivates some agency employees to continue developing volunteer programs, in spite of all the reasons they have not to do it, then institutionalize it.
   - figure out what motivates volunteer participation, and provide those incentives.
   - define accountability and build it into performance elements.
   - include "actively promoting and managing volunteers" in wilderness managers' position descriptions.
   - reward success.
   - conduct a two-way review of each project upon completion to evaluate success.

Although citizen wilderness stewardship programs will not completely compensate for federal staffing and funding shortfalls, they are one means to continue advancing wilderness programs in light of these austere times. A word of caution to those eager to launch such a program: The most successful citizen wilderness stewardship programs include a nongovernmental champion who conducts volunteer recruitment, training, outfitting, and supervision, and a solidly invested agency champion to provide leadership, support, feedback, reward, and sometimes field presence. Given these requirements for success, citizen wilderness stewardship programs are not to be entered into lightly. They most certainly cannot be thought of, or marketed as, "cheap labor." Rather, successful citizen wilderness stewardship programs are partnerships—and partnerships are all about relationships, and establishing and cultivating relationships take both time and dedication. Units unwilling or unable to dedicate time to this endeavor are discouraged from even attempting to launch citizen wilderness stewardship programs. Those units having successful citizen wilderness stewardship programs stand as a testimony to what can be achieved for wilderness. Their successes come when time is dedicated to cultivating relationships with volunteer organizations, preparing field projects, conducting outreach, and coordinating volunteer efforts. We are thankful for their inspiring examples to help ensure an enduring resource of wilderness.

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Walking with Magqubu

Adult Reflections on Boyhood Memories

BY DOUG WILLIAMSON

Introduction

In the fall of 1961, six slightly uncouth 16- to 17- year-old boys, including the author, went on a wilderness trail (walking trek) in Kwazulu/Natal. For the author, the trail was a seminal experience. In this article I try to describe the experience, then go on to discuss the physical, psychological, social, existential, and spiritual influences that are likely to have been at work in the context of the whole experience.

The Location

The trail was in the iMfolozi Game Reserve in northern KwaZulu-Natal, South Africa. The climate in this part of the country is subtropical, and annual rainfall totals about 690 mm (27 inches), with rain falling most months of the year. The iMfolozi Game Reserve has an area of around 560 km^2 (216 $miles^2$). The landscape is hilly, rugged, and intersected by river valleys. It supports a rich diversity of plant and animal life.

Magqubu Ntombela and Ian Player on trail in iMfolozi game reserve photo by Vance G. Martin.

Doug Williamson

In the 1940s the area was ravaged by the veterinary holocaust that was unleashed on game reserves in Natal (Gush 2000; Player 1997) in an ill-considered campaign to eradicate the tsetse fly by exterminating wildlife. When we visited the area in 1961, it must still have been recovering from the effects of the extermination campaign.

Boyhood Memories

Those of us going on the trail were 16- to 17-year-old boys from St John's College in Johannesburg, where Ian Player (founder of The Wilderness Leadership School, The WILD Foundation, and the World Wilderness Congress) had also been at school. Like the other boys, I hitchhiked on my own from Johannesburg to Mtubatuba in northern KwaZulu-Natal, something we thought nothing of in those days, but is now scarcely imaginable. In Mtubatuba we met up with Ian Player, who had kindly undertaken to drive us to iMfolozi, although "trailists" were normally expected to make their own way to the reserve. I remember Ian, who was then in his mid-30s, as quiet, serious, and unassuming. This meant that, although one intuitively respected him, one was not intimidated by him.

On arrival at iMfolozi, he introduced us to Hugh Dent, a lean, bearded, mild-mannered man, and to Magqubu Ntombela, a short and stocky Zulu man, with a calm, self-possessed look on his face. He was to be "the eyes and ears of the trail party" (Player 1997, p. 197), while Hugh Dent would be the interpreter, both in the

Watching Cape buffalo on the Wilderness Trail in the iMfolozi game reserve. Photo courtesy of Wilderness Leadership School.

sense of interpreting Magqubu's Zulu for us and our English for him, and in the sense of interpreting the natural world to us.

Hugh explained how the trail was organized. It was a pleasant surprise to learn that we would not have to carry our backpacks. While we were on the trail our gear, food, and tents and other gear would be carried by donkeys to the campsite selected for that night. This sounded like a splendid arrangement to me, but my clandestine hopes of a comfortable jaunt were not fulfilled.

The trip gave us quite a hard time. Of course we did stop to look at things, have a drink, or a lunch break, but most of the day we were walking steadily through the hilly and sometimes rocky country. The weather was quite hot and such was our thirst that, at one point, we did not hesitate to drink from a muddy pool, on one side of which a rhino had left skid marks as it slid down a little bank into the water.

On the trail, Hugh would stop us from time to time to point out or explain some feature of interest. He was a refined and sensitive person who had studied portrait painting in London and lectured in art at the Durban Poly-Tech College, and it was my impression that he was sometimes rather startled by the questions and responses that we delivered in our uninhibited boarding school vocabulary. Such as when he was explaining to us the significance of a rhino dung *midden*. He started by saying: "This is where the rhino comes along to have a…umm...err...", at which point we made a couple of quite robust suggestions. He politely ignored these and finally settled on: "This is where the rhino comes along to have a bog."

Having been so influenced by wild places makes me wonder, "what about them so engages and moves me?"

Magqubu was always in the lead. We learned that his eyesight was quite uncanny. When he pointed to something in the distance, say a group of rhinos, we would usually struggle to locate it, or sometimes even be unable to do so without the help of Hugh's binoculars.

We also learned about his amazing stamina. Despite the fact that he was more than 60 years old, we struggled to keep up with him. On both the nights we slept out, it started getting dark when we were still quite far from our camp for that night. In the most nonchalant way imaginable, Magqubu just started running. After a long day of walking this seemed a bit much and it elicited much moaning and cursing from us youngsters, but we would not otherwise have made it to the camp before dark.

The overnight camps were perfect—arriving at dusk to find everything ready for us, settling into the camp, sitting on the ground around the campfire, having a simple supper, chatting, being entertained by Magqubu's miming of rhinos mating and other animal behaviors, and finally, deep and well-earned sleep on the ground in small tents.

My memory that they gave us a bit of a tough time is confirmed by a note that Hugh Dent made on the Game Count Record Sheet that he filled in for this trail. He gave this sheet to my co-trailist Geoff Robinson, who recently passed it on to me, still in good condition. On it there is a note about the route of the trail which reads: "S.W. Section—Big Circle!"

A colleague who knows IMfolozi well regards the information on Hugh's Record Sheet as an important historical document because it documented that the populations of different antelope species have changed radically over time. Species that were rare in 1961 are now common, species that were common in 1961 are now rare or absent, probably because of habitat change.

Adult Reflections

It is 45 years since our wilderness trail in IMfolozi with Magqubu Ntombela and Hugh Dent, and it is my most vivid memory of that time. Having visited the Kruger National Park several times before going on this trail, it was not my first bushveld experience, but it was my first experience of seeing wildlife on foot rather than from a car. Following this IMfolozi experience, although I was not conscious it was happening, I was clearly drawn to wild and remote places.

Immediately after finishing high school at the end of 1961 the quest began—in January 1962 hitchhiking to Tanganyika, to climb Kilimanjaro; in July 1962 joining a two-week walking expedition in the Richtersveld—a spectacular arid mountain wilderness in a bend of the Gariep/Orange River near to where it enters the Atlantic. In December 1962 and January 1963, I was traveling around East Africa visiting parks, including Serengeti, Ngorongoro, Queen Elizabeth National Park, and climbing Mount Kenya.

And so the travels continued for my entire university career and early professional life as a lawyer. In addition to substantial trips, there were many weekends spent camping and walking in the bush or along the then unspoiled coast of northern Zululand or hiking and climbing in the mountains.

Overlooking the Black iMfolozi River. Photo courtesy of the Wilderness Leadership School.

Throughout this period my interest in natural history was growing and being deepened by reading widely about its multiple aspects. The culmination of all this was a decision to abandon my professional career as a lawyer and to embark on a career in conservation. This involved going back to college and eventually getting a doctorate in zoology, based on a field study of the red lechwe on the western edge of the Linyanti Swamp in northern Botswana. At the time, the area was uninhabited because of the presence of the tsetse fly and was wonderfully remote and rich in wildlife.

Wilderness Leadership School trailists in camp in the iMfolozi. Photo courtesy of the Wilderness Leadership School.

Having been so influenced by wild places makes me wonder, "what about them so engages and moves me?" Thinking about this has led me to infer that multiple influences contribute to what one experiences in wild places—only some of which can be touched on here. They include the physical characteristics of the area, specifically: "Natural character, remoteness and the absence of overt human influence are the main attributes of wild land" (Scottish National Heritage 2003).

Influences that affected us psychologically on our IMfolozi trail included the challenge of meeting the physical demands of the experience and the satisfaction of doing so; the danger of a close encounter with a black rhino, a leopard, or a really dangerous snake, such as a black mamba; and the uncertainty about how such an encounter would work out. There were also social influences

Magqubu Ntombela Zulu Enduna (chief and game scout) 1990–1993. Photo by Vance G. Martin.

arising from the composition of our group, our isolation from the mundane world, and the challenges and experiences we shared. We ended up with increased understanding of ourselves and each other.

Another influence was what, for want of a better word, one might think of as the existential component of the experience—the fact that one literally entered into a different world. One could describe this world simply as a game reserve, set aside by people to conserve wild species of animals and plants. But this is more or less the perspective of a human-dominated world in which humans enter as spectators or tourists. A richer perspective is that of human as a participant in a more-than-human world. In this world, human dominance is attenuated, and many nonhuman intelligences, in the form of myriad species of mammals, birds, reptiles, fish, and insects, are actively sustaining themselves and each experiencing the world in their own unique way (Abram 1997). By recognizing and respecting these intelligences and the animate world of trees, shrubs, grasses, herbs, mosses, and fungi, which are an expression of the land itself, we enter into this more-than-human world.

Those of us raised in an urban setting have to work to become aware of and comprehend these autonomous intelligences, but in cultures closer to the land there are individuals, hunters, and shamans, for instance, who are deeply informed about and involved with them. That Magqubu was such an individual is clear from Ian Player's descriptions of his uncanny ability to sense the proximity of unseen animals and anticipate their behavior (Player 1997).

In shamanistic societies, the shaman is primarily a mediator between the human community and the more-than-human world in which it is embedded, and only secondarily a medicinal practitioner.

> His magic is precisely this heightened receptivity to the meaningful solicitations—songs, cries, gestures—of the larger, more-than-human field. Magic...is the experience of existing in a world made up of multiple intelligences, the intuition that every form one perceives—from the swallow swooping overhead to the fly on a blade of grass, and indeed the blade of grass itself—is an *experiencing* form, an entity with its own predilections and sensations, albeit sensations that are very different from our own. (Abram 1997, pp. 6–10)

The shaman is deeply immersed in this world and is capable of, for instance, "*feeling* the flight of a raven or a falcon as if you *are* it" (Taylor 2005, p. 161).

At this level of engagement one enters the realm of spirituality, but it is not necessarily an incorporeal or supernatural spirituality. From his interactions with traditional shamans in Asia, David Abram infers "that the *spirits* of an indigenous culture are primarily those modes of intelligence or awareness that do *not* possess a human form" (1997, p. 13). In other words, the spirits are the living nonhuman members of the more-than-human world in which human communities are embedded.

In similar fashion, my own perception of human spirituality is that it is a manifestation of the animate and material more-than-human world out of which we emerged, an attribute of embodied human intelligence (Lakoff and Johnson 1999), rather than of a disembodied, incorporeal mind or spirit, caged within the body. It is primarily concerned with the values one lives by, how one relates to others, including nonhuman others, and the way in which one finds meaning and purpose in life. In this sense, a spiritual experience is one that ultimately catalyzes a change in one's values and opens new pathways to meaning and purpose. So, as I now understand it, the IMfolozi wilderness trail all those years ago was a spiritual experience, as well as an adventure, a social interaction, and an ecological education.

The way this experience worked for me was not through visions or dreams, but by engaging me with the natural, more-than-human world and by initiating the growth of an intense delight in it and an enduring

Following this IMfolozi experience, although I was not conscious it was happening, I was clearly drawn to wild and remote places.

commitment to contribute whatever I can to the struggle against its destruction. **IJW**

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DOUG WILLIAMSON was born and raised in Johannesburg, South Africa, matriculating from St John's College in 1961 and graduating from the law school of Witwatersrand University in 1966. After a brief stint of legal practice he decided to abandon the law and make a commitment to working in conservation. Having acquired appropriate academic credentials for a career in conservation, he spent a decade in Botswana, implementing research projects on the behavioural ecology of red lechwe and the ranging behaviour and habitat needs of gemsbok, springbok and wildebeest in the Kalahari, serving as the officer-in-charge of research in the Department of Wildlife and National Parks, and managing a combined cattle and game ranch in the Tuli Block. Then, after three years in the late Professor Peter Jewel's research group in Cambridge University, he spent five years managing the King Khalid Wildlife Research Centre near Riyadh in Saudi Arabia. Thereafter he spent three years as a freelance consultant before working for the Food and Agriculture Organisation of the United Nations (FAO) for ten years, firstly as a Wildlife Expert on a combined range improvement and wildlife management project in Syria, then as Forestry Officer responsible for Wildlife and Protected Area Management in the FAO's headquarters in Rome. In the course of all this experience he was exposed to problems and issues at scales ranging from the molecular (DNA analyses for taxonomic purposes) to vast ecosystems (wildebeest migration in the Kalahari) and from utterly practical problems to the most abstract policy considerations. Having reached the mandatory retirement age of the FAO, he is now once more working as a freelance consultant.

Night watch around the camp fire, wilderness trail iMfolozi game reserve. Photo courtesy of the Wilderness Leadership School.

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Announcements

WILD Office Moves to Colorado

The WILD Foundation is pleased to announce that its headquarters office is now based in Boulder, Colorado, in the foothills of the Rocky Mountains. Vance Martin, WILD's president, is enthusiastic: "This move has been under consideration by the Board of Directors for over a year, as we wanted our headquarters to be in a larger and more engaged local community, and more centrally based in the US to reduce travel time and costs. We are very mindful of using donations efficiently. The Greater Denver area—including Boulder, Golden, and Fort Collins—is perfect for us, with numerous universities, a vibrant corporate community, and a population enthusiastic about nature conservation and committed to WILD's core mission to protect and sustain wilderness, wildlife and traditional cultures worldwide." New contact details: The WILD Foundation, P.O. Box 20527, Boulder, CO 80308, USA . Phone: (303) 442-8811; fax: (303) 442-8877. Street address: 3025 47th Street Suite D-1, Boulder, CO 80301, USA. Web address: www.wild.org.

Eidson Receives Award for Work with Wilderness.net

Lisa Eidson was given a staff award for Outstanding Service to the External Community by the University of Montana. Eidson oversees Wilderness.net (www.wilderness.net), a collaborative project to provide wilderness information via the Internet to a variety of off-campus audiences. Wilderness.net

University of Montana president George M. Dennison gives Lisa Eidson an award for Outstanding Service. Photo by Alan Watson.

educates between 150,000 and 200,000 visitors each month about the value of public lands preservation. Wilderness.net provides science, policy, management, and educational resources online through a partnership with the Arthur Carhart National Wilderness Training Center and the Aldo Leopold Wilderness Research Institute, the wilderness education and research arms of the federal government, respectively. Wilderness.net is a shining example of a university–federal government collaboration serving a number of different audiences—scientists, land managers, K–12 and university-level educators, students, NGOs, policy makers, and members of the public. Laurie Yung, director of the Wilderness Institute at the University of Montana, reported that "Lisa's work on Wilderness.net has furthered the mission of the University of Montana, the College of Forestry and Conservation, and the Wilderness Institute. Her work on Wilderness.net provides an important example of how the university can serve the public." Wilderness.net has improved wilderness management, educated wilderness users, and connected wilderness researchers across the country. (Source: Laurie Yung, director, Wilderness Institute, University of Montana.)

U.S. Forest Service Names New Wildland Managers

In May of this year, U.S. Forest Service Chief Dale Bosworth named two individuals to national director positions.

Christopher Brown is the new national director for wilderness and wild and scenic rivers. Brown comes to the Forest Service from the National Park Service (NPS), where he served as acting assistant director of recreation and conservation and managed the NPS's national rivers and trails programs. He also served as chief of the rivers and watersheds division. As a contract employee with the NPS, he was chief planner on the Appalachian Trail. Prior to his NPS career, Brown worked for American Rivers, Inc., as conservation director and acting executive director. He holds a bachelor's degree in anthropology from Amherst College, a master's in elementary teaching from the University of Chicago, and a master's in forestry from Yale University's School of Forestry and Environmental Studies. In his new Forest Service position, Brown will oversee

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

management of a third of the National Wilderness Preservation System and more than 4,000 miles of the National Wild and Scenic River System. He will also lead the Forest Service's 10-Year Wilderness Stewardship Challenge, which aims to bring every Forest Service wilderness area to a minimum stewardship level by 2014.

Jim Bedwell is the Forest Service's new national director for recreation and heritage resources. He will be responsible for maintaining quality recreational opportunities within the agency's forests and grasslands, from primitive backcountry recreation to developed activities such as alpine skiing. He will also oversee programs that protect and interpret the Forest Service's many archaeological and historic sites. Bedwell was most recently forest supervisor on the Arapaho and Roosevelt National Forests and Pawnee National Grassland in northern Colorado. With a bachelor's degree in landscape architecture from the University of Arizona, he began his Forest Service career in 1979. From 1996 to 2000 Bedwell served as the agency's chief landscape architect at national headquarters. He has also worked extensively in international programs, most notably in Latin America and Jordan, where he trained local natural resource managers in public land management.

Federal Judges Rule on Conflicting Interpretations of Wilderness Act

The U.S. Wilderness Act of 1964, which created the National Wilderness Preservation System and dictates its management, has been interpreted by some land managers and environmentalists in conflicting ways. In a possibly precedent-setting ruling, federal district court judge Anthony Ishii addressed how the "public purposes" of the Act relate to the "prohibited uses." Although section 4(b) of the Act states that wilderness areas "should be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use," the court ruled that the section 4(c) "prohibited uses" take precedence. At issue were 11 small rock and mortar dams in the Emigrant Wilderness of the Stanislaus National Forest, California. They were built between 1920 and 1951 to increase lakes' water storage capacities and to maintain late-summer stream flows—principally for the benefit of stocked trout and anglers. The Forest Service argued that the dams could be maintained and operated because they served one or more of the Act's section 4(b) "public purposes." Judge Ishii, however, found that due to the 4(c) prohibitions, the Wilderness Act expressly forbids the Forest Service from taking any action to rebuild, repair, or operate the dam structures within the Emigrant Wilderness. The plaintiff's request that the dams be removed from the wilderness was denied. (Sources: www.wildernesswatch.org; the *Stockton Record*, June 28, 2006; and *Sierra Mountain Times*, June 30, 2006.)

Two other recent rulings interpret the Wilderness Act. In Olympic National Park, Washington, the National Park Service (NPS) decided that two 1930s-era shelters that had collapsed under snow should be replaced by flying two prefabricated shelters into the Olympic Wilderness. The park administration contended that the shelters were essential for visitor safety and would enhance the area's wilderness character. U.S. district court judge Franklin Burgess disagreed. In his decision, he noted that the two shelters "had collapsed under the natural effects of weather and time, and to reconstruct the shelters and place the replicas on the sites of the original shelters by means of a helicopter is in direct contradiction of the mandate to preserve the wilderness character of the Olympic Wilderness." (Sources: www.drizzle.com/~rdpayne/opa-news.html#shelters_lawsuit, and www.wildernesswatch.org.) Another pertinent ruling was handed down by the 11th Circuit Court of Appeals. Cumberland Island National Seashore, which lies off Georgia's southeast coast, is the largest undeveloped barrier island on the eastern seaboard. The NPS contended that allowing tourists to "piggyback" along on NPS administrative trips on a preexisting one-lane dirt road through designated wilderness permitted "visitor access and interpretation" and would have "no net increase in impact." A three-judge panel ruled, however, that the regularly scheduled, motorized tours offered to park visitors "cannot be squared with the language of the Wilderness Act." The ruling is also significant for its conclusion that "the only reasonable reading of 'historical use' in the Wilderness Act refers to natural, rather than man-made, features." (Source: www.ca11.uscourts.gov/opinions/ops/200315346.pdf.)

U.S. Bureau of Land Management Decision Overturned by Appeals Board

In 1998 two individuals purchased a 60-acre (24 ha) private inholding completely surrounded by Arizona's Mount Tipton Wilderness, with the stated intention of creating a commercial horse ranch. The 31,320-acre (12,675 ha) wilderness was established in 1990 and is administered by the Bureau of Land Management (BLM). In 2002, at the landowners' request, the BLM approved the reconstruction of an old jeep track through the designated wilderness to provide access to the inholding by the landowners, construction crews, employees, and clients. Although the BLM's own environmental analysis had determined that wilderness values would be impaired "by the sights, sounds and other evidence of motorized vehicles within the wilderness," the agency contended that occasional 4-wheel-drive travel over the proposed

route prior to wilderness designation comprised "regular and continuous use," thereby providing private land owners the right to motorized access. A 2002 appeal to the Department of Interior's Board of Land Appeals by several conservation organizations resulted in a 2006 ruling that BLM's decision was "plainly unsupportable." The board noted that under BLM's Wilderness Regulations, "Once a wilderness area is created…the inholder will receive BLM's approval only for a mode of access that is 'non-motorized.'" (Sources: www.ibiadecisions.com/Ibla/Ibladecisions/168IBLA/168IBLA016.pdf, and www.wildernesswatch.org/hot%20topics/issue%20updates/tipton2.html.)

IUCN Red List Tracks Species Decline

The World Conservation Union (IUCN) has released its 2006 Red List of Threatened Species, stating that "it brings into sharp focus the ongoing decline of the earth's biodiversity and the impact mankind is having upon life on earth." It identifies 16,119 threatened species worldwide, stating that those facing extinction are joined by familiar species such as the polar bear, hippopotamus, and desert gazelle, as well as ocean sharks, freshwater fish, and Mediterranean flowers. The most dramatic declines have been suffered by freshwater fish: 56% of the 252 endemic freshwater Mediterranean fish are threatened with extinction. Marine species are proving to be just as much at risk of extinction as their land-based counterparts: "The desperate situation of many sharks and rays is just the tip of the iceberg," said Craig Hilton-Taylor of the IUCN Red List Unit. Recent success stories include the white-tailed eagle and possibly the Indian vulture. Key findings to date include (1) the number of threatened species is increasing across almost all the major taxonomic groups; (2) most threatened birds, mammals, and amphibians are located on the tropical continents that contain the tropical broadleaf forests, which harbor the majority of the earth's species; and (3) extinction rates are at least 100 to 1,000 times higher than natural background rates. (Sources: www.iucn.org/en/news/archive/2006/05/02_pr_red_list_en.htm and www.arkive.org.)

Realtors for Wilderness

The 625-member Aspen (Colorado) Board of Realtors has formed a special committee called Realtors for Wilderness to support efforts to preserve federal lands. They aim to raise funds for Wilderness Workshop, the valley's most prominent local environmental group. The committee has called on the Colorado Roadless Area Review Task Force to protect all 84 inventoried roadless areas in the White River National Forest. In a letter to the task force, Realtors for Wilderness said: "Much of the added value of real estate in our resort economy is a measure of the quality-of-life benefits of the absence of roads and development on public lands that surround our area." (Sources: www.wildernessworkshop.org/newsletters/WW_NL_may_06.pdf, and *The Aspen Times*, June 16, 2006.)

Fisherman Fined for Landing Private Helicopter in Yosemite Wilderness

A southern California–based helicopter pilot was charged in U.S. magistrate's court for violating the code of federal regulations when he landed at Mildred Lake in California's Yosemite Wilderness. Under a plea agreement on March 14, 2006, he was sentenced to serve one year's court probation, to pay a $2,000 fine, and to perform two days of unpaid community service flight time with his aircraft. At about 7 p.m. on July 1, 2005, the pilot landed adjacent to the lake, disembarked with a young boy, and then began fishing the lake. When irate wilderness users took photographs that identified the helicopter by its registration number, the pilot ran back to the aircraft and quickly took off. The visitors reported the incident to Yosemite National Park rangers, and special agents opened the investigation. (Sources: Criminal Investigation Unit, Yosemite National Park, and www.washingtonwatchdog.org/documents/cfr/title36/part2.html#2.17.)

"Videophilia" May Explain Decreasing Interest in Nature

A recent study by University of Illinois ecologist Oliver Pergams and Stroud Water Research Center ecologist Patricia Zaradic suggests that Americans are spending less time in natural surroundings because they are spending more time watching television, surfing the Internet, and playing video games. The study was commissioned by The Nature Conservancy, and was funded through a National Science Foundation grant. The ecologists found that by 2003, per-capita visitation to U.S. national parks had declined about 25% since its peak in 1987. More than two dozen possible explanations for the trend were tested, including such variables as family income and the aging of the population, but researchers found that 98% of the drop in park visits could be attributed to Internet use, video games, movie rentals, and rising fuel prices. "It's fairly stunning," Pergams said, while cautioning that correlation is not the same as causation. "We may be seeing evidence of a fundamental shift away from people's appreciation of nature to ' 'videophilia' which we here define as the new human tendency to focus on sedentary activities involving electronic media." (Sources: www.nature.org/wherewework/northamerica/states/indiana/press/press2494.html, and Reuters, June 20, 2006.)

Book Reviews

Last Great Wilderness: The Campaign to Establish the Arctic National Wildlife Refuge

By Roger Kaye. 2006. University of Alaska Press. 283 pp. $29.95 (cloth). P.O. Box 756240, Fairbanks AK 99775, USA.

The political history of the wilderness movement to establish the Arctic National Wildlife Refuge (ANWR) is carefully recounted based on extensive research, including in-depth interviews with many of those who were part of the campaign to designate ANWR. The book takes its name and environmental theme from a 1953 article by George L. Collins and Lowell Summer entitled "Northeast Arctic: The Last Great Wilderness" and about the northeast region of the territory of Alaska (*Sierra Club Bulletin* 38:13–26). The work of these two men, joined by Olaus and Margaret "Mardy" Murie, would begin and focus a modern-day movement that resulted in an executive order establishing the Arctic Wildlife Range in 1960 and followed by an expansion and redesignation as the ANWR in 1980.

The chronological approach to this history is pro-wilderness in perspective and rich with the names of many wilderness leaders in the United States. The history involves such legendary wilderness leaders as Bob Marshall, Howard Zahniser, Justice William O. Douglas, and many others. The book weaves together the chronology of the national movement with events and people in Alaska and, more specifically, the complexity of events and proponents that focus on the campaign for ANWR. Kaye thoughtfully sets the social, political, and environmental context for all major events in the story and explains that national and state settings for this controversial campaign.

Although caribou are often thought of as the keystone species to the biological and ecological arguments about preserving ANWR, Kaye points out a deeper and more complex series of values about wilderness and how the campaign for ANWR brought those into the debate and controversy. This book works on several levels, as an intriguing story about saving a special wild place, as a historic case study about advocacy for wilderness, and as an archetype of what wilderness means to an entire environmental movement. Anyone interested in the wilderness movement would benefit from reading this well-documented and illustrated story of the campaign to protect ANWR. Understanding the past of ANWR also gives the needed background on what is at stake in the current controversies of oil development in and around ANWR. This book is a "must read" for wilderness advocates who want: inspiration about the work of wilderness visionaries and movement leaders, a historic perspective on saving ANWR, or just to better understand what it is like to be an active part of the wilderness movement over recent decades. *The Last Great Wilderness* is well documented and is destined to be a classic on the political history of ANWR up to the 1980s.

Reviewed by CHAD P. DAWSON, managing editor of *IJW*; email: cpdawson@esf.edu.

Wilderness Forever: Howard Zahniser and the Path to the Wilderness Act

By Mark Harvey. 2005. University of Washington Press. 340 pp. $35.00 (cloth). P.O. Box 50096, Seattle, WA 98145-5096, USA.

Howard Zahniser doesn't have the cachet that other wilderness writers and lobbyists such as John Muir or Robert Marshall enjoy. Yet, as the brains and brawn behind the passage of the Wilderness Act, "Zahnie" (as he was nicknamed), had at least an equal impact on the development of wilderness preservation in the United States. While he didn't have the physical stamina of the previously mentioned lions of wilderness travel—a childhood illness with a bone infection and later heart problems saw to that—few could match his tireless efforts as a speaker and lobbyist dedicated to the wilderness ideal.

Zahniser began his career as an editor and public relations specialist in various federal government departments in Washington, D.C. He was asked to write a monthly column in *Nature* magazine, which whetted his boyhood appetite for nature and conservation issues. In the spring of 1944 members of The Wilderness Society, worried about administrator-editor Robert Sterling Yard's failing health, asked Zahniser to take over as executive secretary and editor of The Wilderness Society. In the early days, there were several internal battles between Zahniser and board members over his philosophy of wilderness (a very inclusive, perhaps less purist position than many other board members), his desire to expand

the membership of The Wilderness Society, and his later tireless efforts at lobbying (many board members were concerned that his efforts would lead to tax issues with the IRS., which forbade nonprofit organizations to lobby on political issues).

Despite these occasional internal skirmishes, Zahniser eventually became a full board member of The Wilderness Society; indeed, Harvey clearly notes that he became an increasingly essential leader of The Wilderness Society. Zahniser spent many days each year visiting various wilderness hotspots (e.g., Echo Park) and discussing wilderness issues with high level political appointees and bureaucrats. He managed to transform The Wilderness Society from a very small group of core members to a nationwide group of public defenders of wilderness, one that had a respected and powerful presence in the nation's capital. Perhaps his greatest asset was his cheery disposition and his innate diplomacy when dealing with others. He would need all this patience with the eight-year Wilderness Act effort!

Mark Harvey provides excellent insights into the personal background and character of Zahniser and provides a detailed historical analysis of how his personality helped shape his actions on behalf of the Wilderness Society. At first, I was somewhat disappointed that more effort at documenting the numerous drafts of the Wilderness Act was not attempted in this authoritative biography. But Harvey's decision to discuss Zahniser's other wilderness battles certainly provides a more complex and complete picture of his (and The Wilderness Society's) role in the American wilderness movement. Those interested in either the history of the wilderness movement or the Wilderness Act should not delay reading this excellent biography.

Reviewed by JOHN SHULTIS, *IJW* book editor; email: shultis@unbc.ca.

Beyond Conservation: A Wildland Strategy

By Peter Taylor. 2005. Earthscan. 297 pp. $35.00 (cloth). Macmillan Distribution Ltd, Direct Customer Services, Brunel Road, Houndmills, Basingstoke, Hampshire RG21 6XS, United Kingdom.

Rewilding efforts in the New World have proven to be extremely challenging, both on ecological and social levels. For example, deciding which species might be reintroduced, getting public support for reintroduction or restoration projects, and deciding what a restored environment should look like have proven to be another example of a "wicked" or "messy" problem.

Although still extremely difficult, several factors have allowed restoration and rewilding projects to occur. The amount of publicly owned lands and waters, the availability of existing corridors, and a relatively short history of European settlement and low population levels in the New World have all facilitated these projects. *Beyond Conservation* provides a glimpse of the extraordinary challenges facing those individuals and groups attempting to create restoration and rewilding projects in Great Britain, where public land is almost nonexistent, higher population levels and densities are the norm, and landscapes in much smaller regions have been affected by settlement for many centuries. In these three nations (Scotland, Wales, and England), little remains of the "natural" landscape and biodiversity.

Despite these and other challenges, it is impressive to read about the number of restoration and rewilding projects that are occurring in Great Britain. To me, it is the greatest strength of this book; reading about the numerous case studies and examples of rewilding and restoration projects throughout Great Britain gives hope to New World rewilding projects. Scotland seems to provide the best hope of rewilding, and the Trees For Life project, started in 1987, provided the impetus for many more recent projects. Another interesting section of the book briefly reviews the history of species introductions in Great Britain, with the author even going as far back as prehistoric elephants and hippos roaming the island. The role of current NGOs in supporting (or more correctly, often not supporting) rewilding efforts is also fascinating. Amenity rather than wilderness or biodiversity is still the main focus of environmental NGOs and government agencies in Great Britain.

This book is very different from the many books published in the New World on restoration and rewilding. Taylor notes that he went through "a personal transformation in understanding and values" while researching the book, and "departs from the normal accepted form of conservation discourse and objectivity" (p. 16). The book often reads like a neo-Romantic call to "restore something central to the human soul" (p. 16), and reverberates with a desire for humanity to acknowledge "the sacredness of nature, and its power to heal the human condition" (p. 162). The reader should not expect a scientific analysis or a state of knowledge review on rewilding/restoration; the book is a curious blend of historical analysis, current state of related projects, and personal cri de coeur for a new environmental spirituality, philosophy, and policy in Great Britain. As such, it provides an interesting, much different perspective on rewilding and restoration than New World readers will be accustomed to reading.

Reviewed by JOHN SHULTIS, *IJW* book editor, email: shultis@unbc.ca.

NOLS Wilderness Ethics: Valuing and Managing Wild Places

By Jennifer Lamb and Glenn Goodrich. 2006. Stackpole Books. 242 pp. $19.95 (paper). 5067 Ritter Road, Mechanicsburg PA 17055, USA.

This is a revised version of a book originally published as *An Introduction to Wildland Ethics and Management* by S. C. Brame and C. Henderson in 1992 by the National Outdoor Leadership Schools (NOLS). The purpose of the book remains focused on two themes: (1) an introduction to the main ethical concepts of wildland and wilderness preservation and management; and (2) the federal land management agencies and three national management systems—National Wilderness Preservation System, National Wild and Scenic Rivers System, and National Scenic Trails System.

A well-structured introduction starts the reader with a personal connection with wildlands and wilderness and then expands the scope of the presentation to define and develop a wilderness ethic based on pioneers in thought, wilderness visionaries, and current perspectives and values. The discussion on the vital importance of education to foster wilderness ethics and values is presented in a straightforward and easily understood manner. Although such a philosophy is at the heart of NOLS and its experiential programs, the material is presented in a universal tone both meant to frame the discussion around wilderness ethics and to encourage wilderness instructors, educators, and visitors to personal application.

The complexity of federal land management among the four federal agencies—Forest Service, National Park Service, Bureau of Land Management, Fish and Wildlife Service—is handled in four chapters meant to highlight the agency mission as it relates to stewardship of wildlands and wilderness in the U.S. Synoptic overviews of each agency include enough factual information to make understandable the following chapter on the three special management systems on federal lands central to the message of the book: to steward and protect wilderness, wild rivers, and scenic trails.

The final two chapters turn to emphasizing how to apply this information to improving the opportunities for wilderness education in the land management process and to increasing citizen involvement and advocacy for wilderness and wildland stewardship for present use and future generations. Overall, this book is a sound general description that is informative, easy to read, and engaging without losing the reader in too much of the nuance and complexity of federal agency management. This book is an excellent primer for outdoor recreationists, conservationists, and wilderness educators so that they can understand the complexity of wilderness and wildland stewardship and use this overview as the basis for individual and collective action to support management of these special places on federal lands.

Reviewed by CHAD P. DAWSON, managing editor of *IJW*; email: cpdawson@esf.edu.

Continued from GRIZZLY BEARS on page 29

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