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

On the Cover

FRONT: The Caucasian Mountains, Kabardino Balkarsky (Strict Nature Reserve). Photo © Patrico Robles Gil

INSET: Eastern Caucasian Tur (*Capra cylindricornis*), Caucasian Mountains, Southern Russia (Biodiversity Hotspot). Photo © Patricio Robles Gil

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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EDITORIAL PERSPECTIVES

Wilderness Reflections

BY CHAD P. DAWSON

Man could escape danger only by renouncing adventure, by abandoning that which has given to the human condition its unique character and genius among the rest of living things.

—Rene Dubois

When people discuss large predators you can almost hear in their tone of voice the entire sweep of emotions, from fear to awe. Just the sound of the names: grizzly bear, gray wolf, mountain lion, polar bear … our ancient reptilian brain screams out a warning that should not be ignored, and yet it should not paralyze us from adventure either. Although the probability of seeing such charismatic megapredators is a once-in-a-life-time event even for many avid wilderness visitors, that sweep of emotion is always there and keeps us attuned to our surroundings. Meeting a large predator unexpectedly on the trail or when canoeing around a bend can change the experience dramatically—your level of alertness probably just increased dramatically. For it is in that sense of adventure that we become more alive to our surroundings and extend our focus from inside ourselves to the larger world.

Entering the "flow of the experience" is what psychologists tell us gives us the maximum benefit in health and well-being. For example, feeling, hearing, smelling, tasting, and seeing water flowing in a stream captures us even more as additional sensory information begins to change our frame of reference across time and space. Realizing that danger is some part of any adventure, and all of life, is one of the wilderness experiences that we bring back to our daily life and our perspectives on nature, environment, and humanity. The wild nature of large predators and their dependence on wildlands is an opportunity available only in a few wilderness areas in the U.S. outside of Alaska.

In 1995 and 1996, more than 30 wolves were reintroduced into Yellowstone and Montana, and the program was very successful, resulting in an estimated 1,000 wolves in a three-state area by 2005. Effective March 28, 2008, the Department of Interior, Fish and Wildlife Service declared the northern Rocky Mountain population of gray wolf as a distinct population, and removed protection by taking them off the federal list of endangered and threatened wildlife (50 CFR Part 17; February 27, 2008). Management of gray wolves in these areas now reverts back to state wildlife management agencies. An array of pro- and antiwolf advocates have been lining up in anticipation of this ruling—ranchers, hunters, wilderness supporters, farmers, photographers, wildlife advocates, recreationists, wildlife biologists, and others. Can they develop a collaborative plan to keep wolves a viable predator population in wilderness and wildlands in the lower 48 states? The next few years will tell the story.

Articles in *IJW* and elsewhere have speculated about the potential for changes in recreation participation in nature-based activities such as hiking, backpacking, canoeing, and other travel opportunities in wilderness. Cordell, Betz, and Green outline the available research and agency information to show that contrary to many predictions, actual participation is up across most activities and has only declined in some specific activities (e.g., hunting and fishing license sales). This issue of *IJW* offers five articles on wilderness around the world—Mexico, South Africa, Russia, and, in particular, "Wilderness Momentum in Europe," to summarize what is happening with nongovernmental organizations and governmental agencies in numerous European countries. IJW

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Wild Forests and Landscape Amnesia

BY GEORGE WUERTHNER

In most of Vermont the forest cover is nearly continuous. The Green Mountains are indeed green due to the heavy forest cover. At one point in time, however, the vistas were more pastoral; most of Vermont's hills were stripped of trees and converted into farms and pastures. Estimates suggest that up to 85% of the state was converted to farms. Even the trees on the highest and rockiest slopes were cut for timber, firewood, and charcoal, leaving only a few small (often less than a hundred acres in size) scattered tracts of virgin old growth forest in the state.

George Wuerthner getting ready to ford the Dietrich River tributary of the Middle Fork Koyukuk in the Gates of the Arctic National Park, AK. Photo courtesy of George Wuerthner.

However, with the opening of the deep fertile soils of the Midwest to settlement, those interested in farming began to leave the rocky soils of the state behind. At first only the highest, least productive farms were abandoned, and converted back to forest. Over time, many of the lower elevation forests were given back to the trees as well, so that today, farming only survives in Vermont on the best soils—primarily along the river bottomlands and gentle hills.

Despite the continuous forest cover, when I walk through these New England woodlands, I see an ecologically wounded and scarred landscape. One obvious difference is a loss of structural diversity that is characteristic of unlogged forests. In Vermont's relatively young forest stands there is an obvious deficiency of big trees (see figure 1). In presettlement forests, disturbance was rare, and usually consisted of the death and/or toppling of an individual tree or small groups of trees. Even the clearing of forests by Native Americans was concentrated in small patches near their villages. As a consequence, the vast majority of forested stands had older trees.

The trees that dominate Vermont's forests today are mere sticks and ghosts of the past glory. Ironically the largest individual trees I see in Vermont and elsewhere in New England now grace the yards of old farmhouses or urban parks where logging and/or farming hasn't occurred for centuries. Other indications of a sick, though perhaps not mortally wounded landscape, includes the lack of big old snags in the forest, limited numbers of large fallen logs on the forest floor (see figure 2), reduced microtopographic relief created when large tree root masses have been pulled from the ground when trees fall in storms to create a pit and

Figure 1—A hiker by an old growth white ash tree in Battell Old Growth area in the Green Mountains, Vermont. Photo by George Wuerthner.

mound topography, and a general shortage of big logs in streams.

Most Vermonters now believe that their forests are "recovered." In fact, some are worried that the forests are declining in health. I recently attended one public meeting convened to discuss the future of the state's woodlands where person after person advocated more management of the forests. Finally one man stood up and began to express his views. He started by asserting that Vermont's forests were facing an "old growth crisis." *Ah*, I thought to myself, *finally someone who understands the real problem*. But he disappointed me when he went on to rant that the real problem with Vermont's forests is that the trees were getting too old. Too many trees, he said, were "overmature" and "decadent."

Figure 2—Decomposing fallen tree in old growth forest of Gifford Woods State Park, Vermont. Photo by George Wuerthner.

Landscape Amnesia

One of the problems for those of us advocating wild forests is that in many places people have lost the contextual framework to appreciate and view an unmanaged forest. One could call this "landscape amnesia."

In New England, I see references to the glories of the "working forest" coming not only from the timber companies and their supporters, but even many environmental organizations. Many of these folks believe that Vermont's forests are "recovered." Few have sought out the remaining small parcels of old growth virgin forest stands (see figure 3), for if they had, they would no longer believe the myth of the working forest. They would at least realize that the working forest isn't working ecologically.

This is why some of the points of reference we find in wilderness are so important. In the East, the forests were so thoroughly harvested that we have few "controls" by which we can compare the unmanipulated landscape with lands that are managed. Wilderness, or "self-willed lands," provides the point of reference for natural landscapes and is perhaps one of its greatest values. I suspect that one reason extractive industries so often oppose wilderness designation is, in part, related to the fear that the more people see unlogged forests, the less tolerance they will have for the ecologically depauperate landscapes found in managed lands.

In the western United States, people are willing to lie down in front of logging trucks and chain themselves to trees, in part because they recognize immediately what is being lost when the forest is logged. In the East, people seem more compliant and willing to accept logging as something that may be messy for the moment, but that has no long-term ecological consequences. Anyone who has visited a truly wild forest would not believe such a thing for a moment.

Wilderness designation, along with national park designation, are among the best ways to preserve forest ecosystems—including the ecological processes that shape such forests, such as wildfire, insect attacks, windstorms, droughts, floods, and whatever else affects the landscape in any particular area (see figure 4). In the West, we still have large chunks of roadless lands that need protection that could be afforded by recent legislative proposals such as the Northern Rockies Ecosystem Protection Act, Mount Hood Wilderness proposal, Utah's Red Rock Canyons proposal, and others. These landscape-scale wilderness designations would ensure that westerners

Figure 3—A hiker stands by old growth white pine in Cambridge Pines area, Cambridge, Vermont. Photo by George Wuerthner.

Figure 4—Hiker among old growth Douglas fir forest in the Salmon Huckleberry Wilderness, Oregon. Photo by George Wuerthner.

don't fall prey to the folly so pervasive in the East, where almost everyone thinks that humans are intelligent enough, and even more importantly, wise enough to manage forest ecosystems. Anyone who has spent a lot of time in wild places knows such assertions are pure human arrogance.

One of the great attractions of the West for me is that we have wild places that act as a constant reminder of how natural ecosystems function. Even though all are under some degree of threat from human impacts such as global warming, they remain the best measure we have for comparing how the human influence does or does not affect landscapes. They provide not only an ecological reference point, but also inspiration. I only hope that Americans and their representatives in Congress finally have the insight and humility to set aside the remaining chunks of wildlands as congressionally designated wilderness so that we always have these places to learn and seek wisdom (see figure 5). IJW

> Wilderness … provides the point of reference for natural landscapes and is perhaps one of its greatest values.

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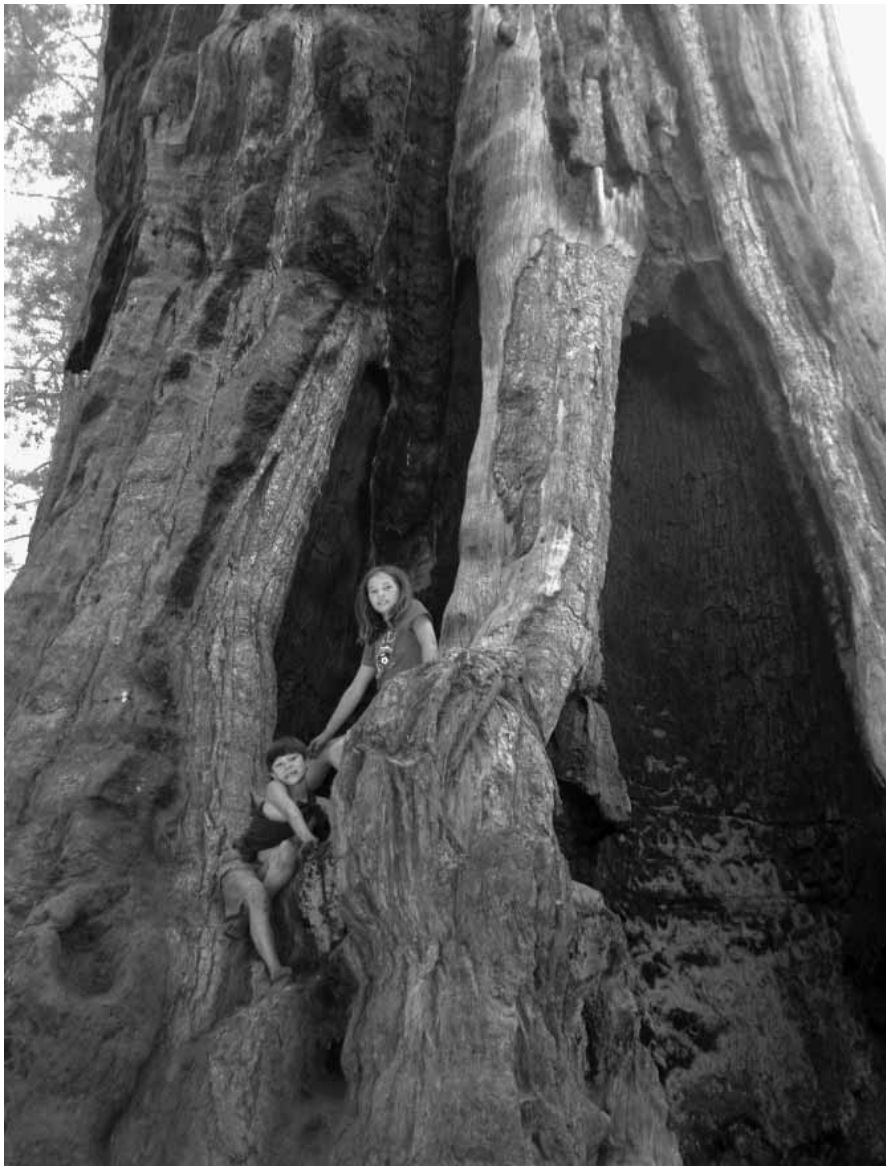

Figure 5—Children climbing on a giant sequoia tree. Photo by George Wuerthner.

Nature-based Outdoor Recreation Trends and Wilderness

BY H. KEN CORDELL, CARTER J. BETZ, and GARY T. GREEN

Wilderness and other public land management agencies, both federal and state, have been feeling a pinch. It seems this pinch may partly be in response to a growing perception, or perhaps misperception, that nature-based, especially wildland recreation, is on the decline. This perception has been getting a lot of media attention of late. Some of us who have done research about nature-based recreation trends for years wonder what the reaction to such a perception might be. We wonder especially how congressional, legislative, administrative, and other recreation and wildland protection policy and budget makers might be reacting. Might there be negative effects on funding for matching grant programs or on related federal and state wildland protection programs, such as budgets and staffing levels for wilderness management?

Especially noteworthy has been recent media attention to a paper written by Pergams and Zaradic (2008). Looking at national and state park visitation, at hunting and fishing license sales, and at camping, the authors concluded that nature-based recreation is seeing steep pervasive slides in participation, and that this slide has been underway since the 1980s. It occurred to us that this highly important dimension of demand for nature warranted closer examination to see if nature-based recreation really is in steep decline in the United States. A fairly recent national trends report, *Outdoor Recreation for 21st Century America* (Cordell et al. 2004), made a big point that the nature-based recreation activities tracked by the U.S. *National Survey on Recreation and the Environment* (NSRE) were still growing as recently as the first part of this decade. For example, almost 70 million people 16 or older reported then that they had visited a wilderness or other wildland area or went hiking in the last year. Furthermore, approximately 70 to 130 million people reported that they viewed or photographed birds or natural scenery, respectively, in the last year. Hence, we wonder if these levels have changed as we move further through this decade and into the 21st century.

H. Ken Cordell in the Okefenokee Wilderness of Georgia. Photo by Babs McDonald.

The following paragraphs summarize an analysis of several sources of data describing Americans' participation in nature-based outdoor recreation. The focus, in particular, is on wildland activities. The data sources used are widely viewed as the nation's most authoritative.

Visitation to Public Natural Lands

For many reasons, the trend in visitation to public natural lands has been unclear. The wilderness visitation trend has been especially unclear. Inconsistent count methods across time and not accounting for a large increase in visitors entering from adjoining private or other public lands are among some of the reasons. But, we look at visitation as reported for three of the major jurisdictions of public natural lands in the United States in search of visitation trend patterns. We found similar patterns; they were not pervasive declines. For state parks, national parks, and national wildlife refuges, visitation has been relatively stable since the mid-1990s, following long-term growth from the 1960s through the 1980s.

State Parks—Total visitation to state parks grew rapidly through the 1950s, 1960s, and 1970s, as Americans sought the forests, lakes, trails, and nature experiences offered by those parks. Number of visits peaked sometime around

2000, then decreased modestly through to 2006 (see table 1). But, that decrease has begun to turn around as reported visitation in 2007 rose back above the former level reported in 2001 (an increase of 0.7% (National Association of State Park Directors 2007).

Table 1. Trend in total visitation to state parks in the United States, 1975 to 2007

Year	Millions of Visits
1975	471
1985	660
1995	746
2000	767
2001	735
2003	735
2005	715
2006	711
2007	740

Source: National Association of State Park Directors, Annual Information Exchange.

National Parks—For national parks, including the wilderness the National Park Service manages, the highest recorded visitation was in 1987, with more than 287 million people (figure 1). After this high, visitation dropped somewhat through the 1990s, but rebounded in 1998 and 1999 to that previous 1987 high (National Park Service 2007). There were minor decreases in national park visitation during the early 2000s, but for the most part visitation has been stable since 2001. In 2007, visitation rose by almost 3 million above the 2006 level.

National Wildlife Refuges—Visitation at national wildlife refuges, and the wilderness in those refuges, has also shown growth for most years since the late 1990s. This increase obviously reflects people's interest in wildlife species and the natural wildland habitats protected for them. Visitation grew from about 33 million in 1998 to more than 40 million in 2007, nearly 21% total growth (Fish and Wildlife Service 2008). Instead of fishing and hunting as in previous decades, general use and native wildlife watching have especially been growing on refuges. The resulting overall trend pattern was strong growth up to the early 2000s; nearly stable visitation levels have been seen through to 2007. However, visitation for 2007 was the highest reported level in the history of the National Wildlife Refuge System.

Public Wildlands in General—Growing interest in native wildlife and bird-watching on public lands (including photography and other forms of interaction with wildlife) can be seen in results from the *National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (FHWAR). FHWAR reported substantial increases in numbers of wildlife-watching visitors to public parks and areas near their homes. In 1996 the number of visitors 16 years and older was 11.0 million; by 2006 this number had increased to 13.3 million, a 21% increase. Of the 23 million people in 2006 who traveled away from home to watch birds and wildlife, more than 80% visited a public area to do so.

Fishing, Hunting, and Other Wildlife Recreation

Perceptions of downward trends in wildland recreation have sometimes been based on reported trends in fishing and hunting. According to the FHWAR, many types of fishing and hunting participation in 2006 were, in fact, down from previous years (Fish and Wildlife Service 2006). Between 1996 and 2006 there was a drop of 5.2 million anglers and 1.5 million hunters. Pergams and Zaradic (2008) reported a drop in per capita fishing and hunting license sales. However, it is worth nothing that license sales are greatly influenced by the spread of private residences into rural areas with large areas of natural land where owners don't need hunting or fishing licenses for their own land.

Participation estimates for 1999 to 2001 to 2005 to 2008 from the NSRE may be reflecting this growing trend of at-home fishing and hunting that does not require a license. The NSRE includes nature activities at and near home, as well as activities undertaken away from home. Although the NSRE shows cold-water and saltwater fishing down, it shows warm-water and anadromous fishing up. Whereas NSRE shows small-game and migratory bird hunting down, big game hunting is up. At the same time, it appears that how people participate in wildlife recreation is shifting. From 1996 to 2006 the FHWAR survey reported that the number of people who watched or photographed wildlife increased by 8.2 million. This is so much larger than the drop in fishing and hunting reported by the Fish and

Figure 1—Young canoeist enjoying nature in the Okefenokee Wilderness of Georgia. Photo by Babs McDonald.

Wildlife Service that it represents a net gain in participants in wildlife-associated recreation of 1.5 million.

A Broad-based Picture of Trends in Nature-based Wildland Recreation

Simply looking at reported public land visitation and at traditional hunting and fishing activities tells only part of the trend story. These evidences alone are not enough to conclude very much about Americans' interests in nature and in nature-based recreation. A more complete picture can be seen by examining broad-based data sources such as the Forest Service's *National Survey on Recreation and the Environment*. The NSRE is one of the United States's official surveys of outdoor recreation. It focuses on participation levels and trends (as does the FHWAR). The NSRE has been ongoing since 1960. In addition to recreation, one of the foci of the NSRE has been wilderness values and people's interests in the National Wilderness Preservation System.

Similar to earlier NSRE reports (e.g., Cordell et al 2004), this national survey of U.S. households is showing continued growth in interest in nature-based outdoor recreation since the mid-1990s. Both the total number of Americans and the total number of days annually in which we participate in nature-based recreation have grown since 1994. In particular, viewing, photographing, and studying nature in all its forms, for example, wildlife and birds, have grown strongly (see table 2). Other similar nature-interest activities include viewing flowers, trees, natural scenery, fish, and visiting nature exhibits. The number of days visiting wilderness and other primitive areas has increased 12% since 2000. Primitive camping and backpacking days have increased 12% and 24% respectively since 2000. For the NSRE, a day is any amount of time in a given day that the respondent reported activity participation.

Table 2. Estimated number of people participating in selected activities and total annual days of participation in the United States, 1994 to 2008

Nature-based Outdoor Recreation Activity	1994–1995		1999–2001		2005–2008	
	Millions of Participants Annually	Billions of Participants Annually	Millions of Participants Annually	Billions of Participants Annually	Millions of Participants Annually	Billions of Participants Annually
Viewing wildlife	62.8	2.3	94.6	3.6	114.8	5.3
Viewing birds	54.3	4.8	68.0	5.8	81.1	8.0
Visit a wilderness or primitive area	n/a	n/a	68.5	0.98	70.6	1.1
Primitive camping	28.1	0.26	34.0	0.28	33.3	0.34
Backpacking	15.2	0.13	22.3	0.22	22.1	0.28

Source: National Survey on Recreation and the Environment, USDA Forest Service, Athens, GA.

Not shown in table 2, but still popular and growing, are visiting beaches, gathering mushrooms and berries, driving off-road vehicles, kayaking, and snowboarding. Total number of Americans participating in any of the 42 nature activities the NSRE tracks is up more than 3% since 2000, and number of activity days is up almost 32% since 2000. Of course, the nature-based outdoor activities Americans are choosing now are different from those chosen in the past. It is true that *some* forms of hunting and fishing are declining, and that camping and swimming are growing more slowly now. In addition, some other activities have declined in popularity, for example, mountain biking, rafting, and horseback riding on trails. Overall, however, nature-based recreation has grown.

Parting Observations

Both the NSRE and the FHWAR show that participation in some nature-based activities has declined somewhat. However, many other activities seem to be continuing in popularity and some have even demonstrated rather strong popularity growth. One such activity is visiting wilderness and other primitive areas. Admittedly, new generations may not want to visit wilderness, or what they perceive to be wilderness. No one can know for sure what the future will hold for wildland visitation, or for any other nature-based activity for that matter.

There has been much speculation that young people's attachment to computers, cell phones, television, and

Americans' interest in and appreciation of nature-based recreation and wildlands is up.

Continued on page 13

Wilderness Areas for the Conservation of Elephants and Other Sensitive Species in South and Southern Africa

BY W. R. BAINBRIDGE, W. D. DENSHAM, and I. LAX

Introduction

This article provides an overview of some aspects of wilderness policy that may be relevant for the management of elephants and other wildlife species in South Africa (SA) and southern Africa that may be considered "wilderness-dependent." These species need very large home ranges, isolation, or are sensitive to human impacts or interference at certain periods of their life cycles, such as during breeding season. Wilderness is discussed exclusively as a protected area category as opposed the more generalized or colloquial usage implying simply a "wild area."

Wilderness Definitions

The National Environmental Management: Protected Areas Act, No. 57 of 2003 (NEM:PAA), the statute under which protected areas (including wilderness areas) are proclaimed in South Africa, defines a wilderness area as:

> An area designated in terms of section 22 or 26 for the purpose of retaining an intrinsically wild appearance and character, or capable of being restored to such and which is undeveloped and roadless, without permanent improvements or human habitation.

Sect. 22 and 26 of the NEM:PAA state that the designation of any national park or nature reserve, or part thereof, as a wilderness area may only be issued:

(a) to protect and maintain the natural character of the environment, biodiversity, associated natural and cultural resources and the provision of environmental goods and services;
(b) to provide outstanding opportunities for solitude;
(c) to control access which, if allowed, may only be by non-mechanized means.

NEM:PAA does not prescribe a minimum area for a wilderness area, but states (Chap. 3, Sect. 17.[a]) that one of the purposes of SA's protected areas generally is "to protect ecologically viable areas representative of South Africa's biological diversity." Accordingly, it may be inferred that individual protected areas must be of sufficient size to satisfy this requirement, although what constitutes an area of sufficient size is not specified, and has not been tested to date.

The World Conservation Union (IUCN 1994) has defined wilderness as:

> A large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent and significant habitation, which is protected and managed so as to preserve its natural condition.

Figure 1—Black rhino, a wilderness-dependent species, in the Itala Game Reserve in KwaZulu-Natal. Photo courtesy of Bill Bainbridge.

It is evident that the key defining characteristics of wilderness in the present context are large area, natural state, and lack of physical development, as discussed below.

Wilderness as a Protected Area Category

Wilderness areas (or zones) can be created in SA in a number of ways:

- by designation as a protected area or as a part thereof under NEM:PAA;
- by classification under the zonation and management regime within an existing state protected area;
- by classification under the zonation and land use management regime within a private or communal protected area; and
- by agreement and classification under special conditions registered against the title of a private protected area.

Elsewhere in southern Africa, for example in Zambia, Namibia, and Zimbabwe, wilderness occurs primarily as a zone in other protected areas. Wilderness in these locations is usually of large size and, in many instances, in excess of 150,000 ha (370,500 acres) in extent.

Differences between Wilderness and Other Protected Area Categories

In South Africa, most wilderness areas (except for those in major protected areas such as the Kruger and Kgalagadi National Parks) are relatively small in extent and appear not to be well-suited for elephant conservation. According to Owen-Smith et al. (2006), protected areas greater than 100,000 ha (247,000 acres) are more suited to meet the home range requirements of elephants than smaller areas. In contrast to other forms of protected areas that contain roads, buildings, and other forms of physical development, wilderness areas are characterized by a lack of such features. Consequently, animals are less subject to concomitant human presence and pressures, because of the lower levels of visitor or tourism use and management interventions that pertain in wilderness.

The wilderness areas (or zones) that are proposed for the Kruger National Park, and many of the existing wilderness zones of Zambia and Zimbabwe exceed this minimal area, often by a considerable margin, and are considered suitable for these purposes.

Wilderness-dependent Animals

Hendee and Mattson (2002, p. 323) suggested that a number of faunal species may be classified as wilderness-dependent are species that

> require wild habitat found in wilderness, and that are vulnerable to contact with humans, including those species whose relationship with humans is intractable because they threaten human safety or chronically damage livestock or crops. Such species require refuge from humans or the absence of human development such as roads, railways and fences. …
>
> Species that depend in some way on wilderness are the potential focus of management attention in wilderness settings, and thereby are a symbol of wilderness itself. …
>
> Polar Bears, Siberian Tigers, African Elephants and Pantanal Jaguars are examples of wilderness-dependent wildlife, although these species may, in places, lead a tenuous existence in modified environments outside wilderness.

Other megaherbivores such as the black rhinoceros, and large carnivores such as the African lion and Nile crocodile are also recognized by Hendee and Mattson (2002) as wilderness-dependent.

According to Mattson (1997), wilderness-dependent wildlife species are vulnerable to human presence, and their survival is best assured in a wilderness environment. Such species tend to be rare or endangered, are often large in size, and require seclusion from humans for their natural behavior and natural population regulation. Such species are usually not resistant to human conflict; are likely to be killed because of the threat they pose to humans; often cause damage to domestic stock and crops; are poached for their skins, tusks, or meat; or may be aggressive in behavior, which threatens humans.

It is suggested that a number of southern African wildlife species other than those listed above may also be considered wilderness-dependent, by virtue of their sensitivity in various ways to human presence or disturbance, are under threat (such as overutilization for magico-medicinal purposes), or which have very extensive home ranges. Included might be vultures (such as the white-backed vulture, in savanna systems, and cape and bearded vultures in high altitude or mountainous areas) as well as pelicans (especially the great white pelican in estuarine or other aquatic environments). Further work could well bring to light other species. As a consequence, it would seem that wilderness areas may prove to be the most suitable form of protected area for the long-term protection of such species.

African Elephant as a Wilderness-dependent Species

Some of the reasons why the African elephant may be considered as wilderness-dependent include the need for seclusion when breeding; requirements for very large home ranges by virtue of

their feeding habitats; and the problems that arise when they live in close proximity to human settlements (human–elephant conflicts, especially in the absence of buffer zones). This is not to say that elephants are not able to survive, or even to do well, outside of wilderness areas. It is common knowledge that in many instances they do. The contention is rather that elephants, and especially breeding herds, probably do best when subjected to low levels of contact with humans and their often intrusive activities, where management measures are implemented at the lowest possible level, and in the absence of infrastructural development, such as in wilderness.

Conclusions

As a protected area category, wilderness areas serve a number of important functions, including biodiversity conservation (with the provision of sanctuary for the megaherbivores such as elephants and various threatened bird species), conservation of extensive intact landscapes and ecosystems, and the associated benefits of ecosystem service delivery.

It should be noted that the function of the provision of sanctuary for species such as elephants and other species that are particularly sensitive to disturbance during breeding has not received adequate emphasis in the literature. Countries such as Zambia and Zimbabwe are well positioned for the conservation of the significant elephant populations and other sensitive species by virtue of the very large wilderness zones in a number of their national parks.

The large wilderness zones that are planned for proclamation in the Kruger National Park are also relevant in this respect. However, it should be mentioned that although many managers appear to accept that management actions are likely to be needed for large herbivores such as elephants, which have a known propensity to overutilize preferred food plants in specific locations, research has not been undertaken on the most appropriate management measures and the best means of application that should be employed in wilderness areas. Management intervention of various forms may be required. Breeding colonies of sensitive species such as the great white pelican need to be totally protected in breeding season. Hendee and Dawson (2002) provide the general guideline that in consideration of stewardship objectives for wildlife present in wilderness areas, basic principles of wilderness management should prevail. That is, when management actions are considered necessary, only the minimum tools, methods, and force should be used to meet planned area objectives. IJW

References

Hendee, J. C., and C. P. Dawson. 2002. *Wilderness Management: Stewardship and Protection of Resources and Values*, 3rd ed. Golden, CO: Fulcrum Publishing.

Hendee, J. C., and D. J. Mattson. 2002. Wildlife in wilderness: A North American and international perspective. In *Wilderness Management: Stewardship and Protection of Resources and Values*, 3rd ed., ed. J. C. Hendee and C. P. Dawson (pp. 321–49). Golden, CO: Fulcrum Publishing.

IUCN. 1994. *Guidelines for Protected Areas Management Categories*. IUCN, Cambridge, UK and Gland, Switzerland. 261pp.

Mattson, D. 1997. Wilderness-dependent wildlife: The large and the carnivorous. *International Journal of Wilderness* 3(4): 34–38.

Owen-Smith, N., G. Kerley, B. Page, R. Slotow, and R. van Aarde. 2006. A scientific perspective on the management of elephant in the Kruger National Park and elsewhere. *South African Journal of Science* 102: 389–94.

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Figures 2a and 2b—Elephants in the Zambezi Valley on the Zambia–Zimbabwe border. Photo courtesy of Bill Bainbridge.

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Continued from NATURE-BASED OUTDOOR RECREATION TRENDS, page 9

other media that keep them inside may lead to a future society in which people abandon outdoor activities, especially nature-based outdoor activities (see figure 2). For example, Richard Louv's 2005 book, *Last Child in the Woods*, speculated that children are becoming more disconnected from nature. Pergams and Zaradic speculated that there is a "fundamental and pervasive shift away from nature-based recreation." But in joining in such speculation, we should all remember that outdoor activity levels and interest in nature tend to fluctuate across generations. Changing technology, fads, costs of transportation, health care, personal fitness levels, and many other factors may intervene to turn today's disconnected youth into tomorrow's connected outdoor avid participants. Who could ever have predicted 20 years ago the boom in people moving to natural amenity–rich areas where they can see wilderness out the kitchen window. Who could have foreseen that living in these areas allows uncounted numbers to visit wilderness by walking across the backyard and into federally protected lands that used to be remote. All in all, by taking a broad view of this 21st century society, it appears to us that Americans' interest in and appreciation of nature-based recreation and wildlands is up. IJW

References

Cordell, H. Ken, et al. 2004. *Outdoor Recreation for 21st Century America.* State College, PA: Venture Publishing.

Louv, R. 2005. *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

National Association of State Park Directors. 2007. Annual Information Exchange. Terra Haute: Center for State Park Research, Indiana State University, http://www.naspd.org/research_sub.asp.

Pergams, Oliver R. W., and Patricia A. Zaradic. 2008. Evidence for a fundamental and pervasive shift away from nature-based recreation. Proceedings of the *National Academy of Sciences*, Stanford University, Palo Alto, CA.

USDA Forest Service. 2008. *National Survey on Recreation and the Environment*. Athens, GA: Southern Research Station, www.srs.fs.fed.us/trends.

USDI Fish and Wildlife Service. 2008. *Wildlife Refuge Visitation*. Washington, DC: USDI Fish and Wildlife Service, Division of Refuges, Office of Visitor Services, Visitation 1998–2007.

———. 2006. *National Survey of Fishing, Hunting and Wildlife-Associated Recreation*. Washington, DC: USDI Fish and Wildlife Service.

USDI National Park Service. 2007. *Public Use Statistics*. Washington, DC: USDI National Park Service, Public Use Statistics Office, www.nature.nps.gov/stats.

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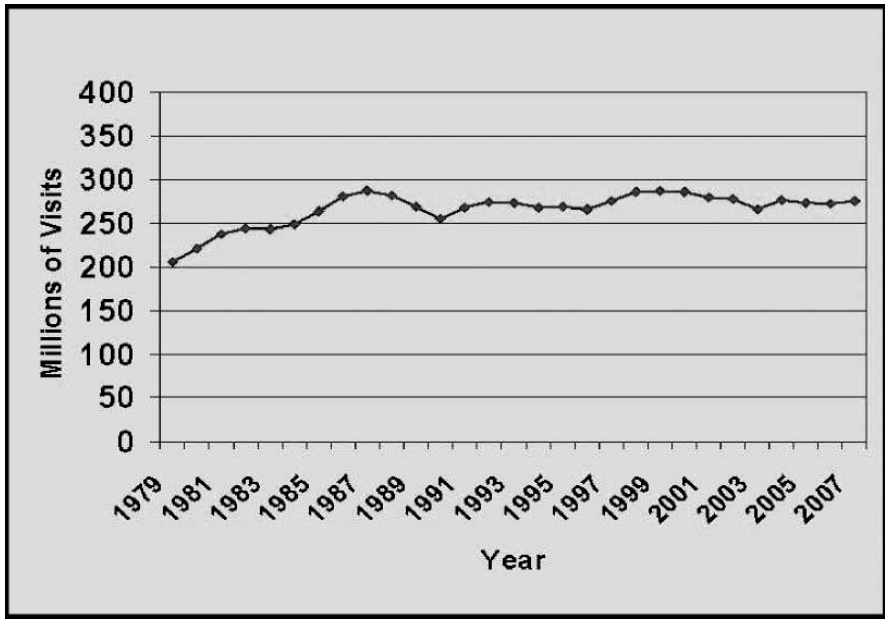

Figure 2—Trend in total visitation to national parks in the United States, 1979 to 2007
Source: www.nature.nps.gov/stats/park.cfm.

Wilderness Politics in the American West

Rural Community Perspectives on Roadless Lands

BY LAURIE YUNG, WAYNE FREIMUND, and
JOHN CHANDLER-PEPELNJAK

Abstract: Conflict over roadless public lands is a fixture of western politics, but very little is known about the views of rural residents on how to best manage these lands. Survey research on the Rocky Mountain Front in central Montana indicates that residents are evenly divided and polarized regarding whether roadless lands should be protected or developed. Views on roadless lands predict views on environmental quality, wilderness, government regulation, use of natural resources, and oil and gas development. Length of residence was not related to views on roadless lands, suggesting that current theories about in-migration resulting in "greener" public opinion may be unfounded.

Laurie Yung

Wayne Freimund

John Chandler-Pepelnjak

Wilderness Designation, Roadless Lands, and Rural Communities

Wilderness designation and the management of roadless lands are contentious issues in the American West. The National Wilderness Preservation System currently includes 107 million acres (43.3 million ha) of federal land, but conflict over 58 million acres (23.4 million ha) of roadless Forest Service lands continues. Although these roadless lands are undeveloped and eligible for wilderness designation under the Wilderness Act, such areas have not, until recently, enjoyed any legal protection as conservation areas. Although management of roadless lands has historically been determined by individual Forest Plans, such plans are amended and revised; thus, Forest Plans can adopt new priorities as personnel and national policy change (e.g., wilderness designation can change Forest Plans at any time). National Forest planning allows for considerable agency discretion, but does not provide stakeholders with much certainty or predictability regarding the long-term management of roadless lands. Even the Roadless Area Conservation Rule (36 CFR 294), adopted in 2001 to eliminate road building and logging on these lands, has been repeatedly altered by changing administrations and continued litigation, first replaced by a state petition process in 2005 and then reinstated by a federal judge in 2006.

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In a political climate that is sometimes antagonistic to wilderness, members of Congress often depend on a strong local voice for wilderness to justify additional designations. Wilderness bills currently proposed for Idaho, Utah, and California are based on agreements negotiated by diverse stakeholders at the local level in rural communities in close proximity to affected federal lands. These negotiated agreements include wilderness designation in a larger legislative package that can include land conveyances, off-road vehicle recreation areas, protection of grazing leases, and funds for local economic development (e.g., the proposed Central Idaho Economic Development and Recreation Act).

The involvement of rural communities in wilderness designation is part of a larger trend emphasizing local community participation in federal land management. The involvement of rural communities, oftentimes through collaborative multistakeholder processes, is believed to produce longer-lasting, more equitable, politically feasible solutions that are based on local knowledge, needs, and conditions (Wondollek and Yaffee 2000). However, some conservation groups oppose locally negotiated legislative proposals, arguing that the compromises involved are unacceptable and that nonlocal viewpoints are not adequately incorporated (McCloskey 1996). The underlying assumption of these critiques is that western, rural communities are less likely to support wilderness designation or protection of roadless lands when compared with their urban or nonwestern counterparts.

Recent surveys of westerners find strong support for environmental protection and for wilderness (see Durrant and Shumway 2004; Nie 1999; Rudzitis and Johansen 1991). However, there is significant disagreement regarding the environmental values of rural and urban westerners, respectively. Brunson and Steele (1996) found that urban residents were more likely to support conservation and protection of federal lands as compared with rural residents. However, Fortmann and Kusel (1990) argued that differences between rural and urban residents have been exaggerated. Fortmann and Kusel found that rural residents tend to favor environmental protection in general, but do not support wilderness as much as their urban counterparts. A more sophisticated understanding of the views of western, rural residents with regard to the development or protection of roadless public lands is critical to constructive public debate and effective policy making, and particularly important given the growing role of local collaborative processes in federal wilderness designation.

The Study Site

The Rocky Mountain Front in north-central Montana, a dramatic landscape where the Rocky Mountains meet the Great Plains (see figure 1), is a largely undeveloped area of ranches, public lands, and rural communities. In contrast to many fast growing rural counties in the American West, Teton County, the largest county in the area, has a fairly stable population of 6,400. The Lewis and Clark National Forest lies to the west and includes 365,000 acres (147,773 ha) of the Bob Marshall Wilderness Complex and 200,000 roadless acres (80,971 ha).

During the last 20 years, the Rocky Mountain Front has been the focus of numerous national debates about the future of oil and gas development. The Front is particularly important to conservation groups, who emphasize its unique ecological features, undeveloped nature, and large wilderness complex (see figure 2). Local and national-level conflict over the development of natural resources in the area has been continuous, contentious, and highly politicized. During the 1980s, several bills designating portions of the Rocky Mountain Front as wilderness were considered by Congress (one of these bills passed and was later vetoed). In 2006, Congress banned future oil and gas development on federal lands in the area. However, conservationists remain concerned about motorized recreation, and continue to advocate for wilderness designation of roadless lands.

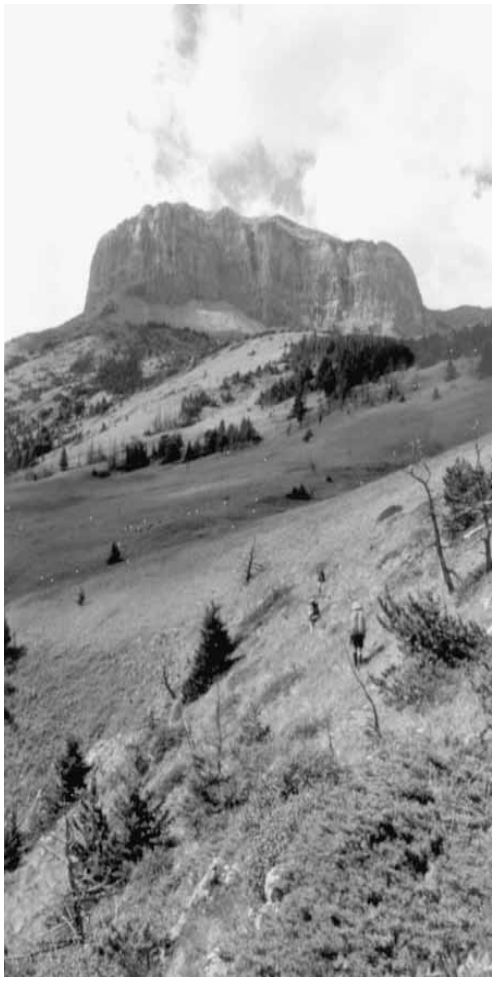


Figure 1—Hiking toward Old Man of the Hills, Rocky Mountain Front, Montana. Photo by Laurie Yung.

Methods

The Community Land Use Survey, described below, was conducted in collaboration with Teton County and the Growth Policy Citizen's Advisory Committee, a group of farmers,

Figure 2—Near North Fork of Dupuyer, Rocky Mountain Front, Montana. Photo by Laurie Yung.

ranchers, county staff, and other community leaders tasked with recommending growth management policies to Teton County commissioners. Although the overall purpose of the survey was to understand community views on rural change, private lands, and growth management, we included a number of questions about public lands, government regulation, environmental quality, and the development of natural resources. The survey was mailed to a random sample of registered voters in Teton County during January and February 2002 (approximately 80% of adult residents of Teton County are registered to vote). Surveys were completed and returned by 83% of recipients (a total of 469). Survey results, although dating from 2002, provide a window into local views in the ongoing debate over roadless lands.

Results

We examined responses to nine questions about public lands, wilderness, development of natural resources, and environmental quality to better understand local community views on development and protection of roadless lands. We also looked at the relationship between responses to these questions and five demographic variables.

Previous interviews with 74 residents indicated that the word wilderness was highly politicized and contentious. To avoid knee-jerk reactions while eliciting views about the lands eligible for wilderness designation, we worded several questions in the survey to describe the development of natural resources or protection of roadless lands without using the term wilderness. We recognize that the questions we explore below might have produced different responses had they been worded to inquire more directly about support for additional wilderness designation.

To gauge views on roadless lands, respondents were asked to agree or disagree with the following statement: Public lands on the Rocky Mountain Front should be maintained in their current roadless, undeveloped condition (we used a 6-point scale with 1 labeled as strongly disagree and 6 labeled as strongly agree). Respondents were almost evenly divided in their opinions about roadless lands and results followed a U-shaped distribution (see figure 3), with 34% of respondents falling into the pro-roadless group (defined as respondents who selected 5 or 6) and 36% falling into the pro-development group (defined as respondents who selected 1 or 2). Approximately 25% of respondents fell into the middle of this distribution (selecting 3 or 4), 3% selected don't know, and 2% skipped the question; these respondents were not included in the following analysis. We considered 3 and 4 on a 6-point scale to represent neutral views, and, thus, could not justify placing these respondents in the pro-roadless or pro-development groups.

In the following analysis, we first determined whether responses to the roadless question predict responses to other key questions, to better understand how views on roadless lands might be related to other environmental opinions. Then, using the same set of variables, we performed an analysis to determine how many clusters,

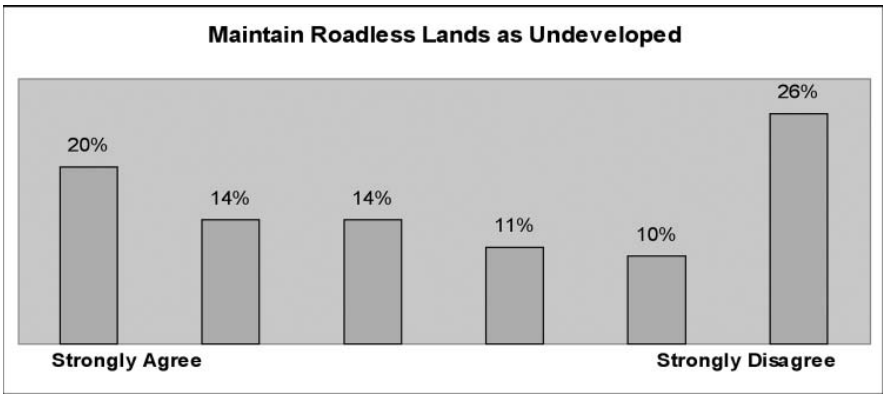


Figure 3—The distribution of agreement, as a percentage of all responses, to the statement, "Public lands on the Rocky Mountain Front should be maintained in their current roadless, undeveloped condition."

Rural communities along the Rocky Mountain Front were evenly divided and somewhat polarized in their views of roadless lands.

or groups, were present in the data, to see if the polarization of responses to the roadless question is indicative of an overall division of respondents into two groups. In the first analysis, given the absence of a normal distribution, we used permutation tests (Davison and Hinkley 2003) with two different statistics: the mean responses for the two groups and the proportion of respondents answering 5 or 6 on the question. Permutation tests answer the following question: How likely is the measured value of the test statistic if the group labels are unimportant? To answer this question, we first calculate the value of the test statistic for the data labeled correctly. We then randomly permute the labels 2,000 times, calculating the test statistics with each new permutation. At this point, we can ask how extreme the real test statistic is compared to the permutation values. The measure of this extremity is the p-value. In other words, the p-values are the answer to the following question: If there is no relationship between group membership (whether respondents fall into the pro-roadless and pro-development group) and responses to other questions (e.g., questions about government regulation or environmental quality), what is the probability of getting a test statistic as extreme or more extreme than the one observed? Because this analysis involved multiple comparisons, a Bonferroni correction was performed, multiplying the resulting p-value by the number of comparisons. The permutation test was chosen because it allowed natural choices of test statistics such as "the proportion of people who strongly agree" with a given statement.

We also performed a cluster analysis on the same variables used above using the Partitioning Around Medoids (PAM) method (Kaufman and Rousseeuw 1990) and a customized version of their distance algorithm DAISY. To determine the number of clusters we modified the gap statistic procedure described by Tibshirani et al. (2001). The cluster analysis produced two clusters that almost evenly divided the respondents. These clusters overlapped 90% with the pro-roadless and pro-development groups described above. Thus, the question about the development of roadless public lands predicted the groupings in the data found by the cluster analysis.

The pro-roadless group disagreed that natural resources should be used to fuel economic growth, that oil and gas development would be good for local communities, and that government regulation should be kept to a bare minimum (see table 1). The pro-development group generally agreed with these statements. Table 1 indicates the percentage of each group that agreed or strongly agreed with specific opinion statements. For example, 48% of pro-roadless respondents agreed or strongly agreed with the first statement (that natural resources should be used to fuel economic growth), whereas 86% of the pro-development group agreed or strongly agreed with this statement. For all but one of the opinion statements in table 1, permutation tests revealed that there is a less than 0.008 probability of getting a difference this extreme if the group labels were randomly assigned.

Furthermore, the pro-roadless group rated environmental quality and wilderness as more important, and the development of natural resources as less important when compared with the pro-development group (see table 2). However, please note that the two groups were much more divided on wilderness than on the development of natural resources. Clearly many of the pro-roadless respondents believe that

Table 1. Pro-roadless and pro-development responses to opinion statements about development, regulation, and national forest management

Statement	Proportion of Pro-roadless	Proportion of Pro-development	P-value
Natural resources should be used to fuel economic growth.	48%	86%	< 0.008
Oil and gas development would benefit local communities.	47%	87%	< 0.008
Government regulation in Teton County should be kept to a bare minimum.	56%	76%	< 0.008
There is too much government regulation in Teton County.	24%	35%	< 0.70
The Lewis and Clark National Forest does a good job managing forest lands.	45%	18%	< 0.008

the development of natural resources is important, but do not want to see such development on public roadless lands. Table 2 indicates the percentage of each group that rated a particular feature or activity as very important in guiding the future of Teton County. For example, 84% of pro-roadless respondents reported that "environmental quality" was very important, whereas only 53% of the pro-development group said that it was. For each of the features in table 2, permutation tests revealed that there is a less than 0.008 probability of getting a difference this extreme if the group labels were randomly assigned.

We also performed permutation tests on demographic variables. These tests were evaluated based on the difference between means for the two groups based on sex, age, education, length of residence in the area, size of childhood community, and whether or not the respondent used wilderness for recreation. There were no significant differences for any of these variables.

Table 2. Pro-roadless and pro-development responses to feature importance questions

Feature or Activity	Proportion of Pro-roadless	Proportion of Pro-development	P-value
Environmental quality	84%	53%	< 0.008
Wilderness	74%	27%	< 0.008
Development of natural resources	52%	82%	< 0.008

Discussion and Implications

Critics of locally negotiated legislative proposals for public lands in the West often assume that rural communities oppose wilderness designation or protection of roadless lands. In this study, we found that rural communities along the Rocky Mountain Front were evenly divided and somewhat polarized in their views of roadless lands. Furthermore, the issue of roadless lands was much more divisive than other environmental issues. In comparison, there was widespread agreement among survey respondents on the importance of controlling invasive, nonnative plants, and on the need to regulate development of private lands. Not only do residents have strong views about the future of roadless lands, opinions about roadless lands are related to views on environmental quality and development of natural resources. In short, with regard to public lands, residents along the Rocky Mountain Front are evenly divided into two groups with largely opposite views about how roadless lands should be managed into the future.

The changing demographics of the American West might seem a logical explanation of this polarization. Durrant and Shumway (2004) argue that in-migration of "greener" newcomers to the rural West may be shifting environmental values in favor of preservation. However, our findings indicate that, at least in some rural communities, length of residence does not predict support for roadless lands, since newer residents and long-term residents did not differ in their responses to this question. Furthermore, the size of community in which residents grew up was not related to support for roadless area preservation, indicating that the so-called urban–rural divide might not be as pronounced as suspected.

Public lands have been particularly contentious and politicized on the Rocky Mountain Front for the last 20 years, perhaps as a result of long-term national attention to the area (Yung et al. 2003). However, even less publicized roadless lands have long inspired local and national debate. So long as roadless lands remain in limbo, rural communities and wilderness advocates face a climate of uncertainty and conflict. Forest Plans provide a mechanism for integrating local views into management priorities, but do not provide long-term certainty regarding management direction. Although the Roadless Area Conservation Rule attempted to resolve the long-standing debate over the future of roadless areas, the rule can be changed by subsequent administrations. Administrative policy often changes as the political pendulum in Washington, D.C., swings to and fro, adding to the sense of uncertainty and further exacerbating conflict. In this context, do locally negotiated legislative proposals provide a way to move forward?

For rural residents, local proposals might provide a means to integrate local needs into a larger legislative package. On the Rocky Mountain Front, many residents who want roadless lands

In some rural communities, length of residence does not predict support for roadless lands, since newer residents and long-term residents did not differ in their responses to this question.

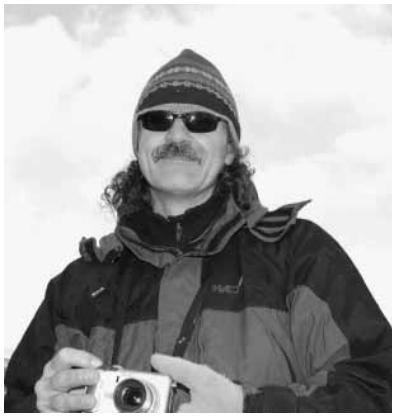
Continued on page 23

On the Outside Looking In

Fly-in Recreation Day Use Visitor Experiences in the South District of Denali National Park and Preserve

BY ALAN WATSON, KATIE KNOTEK, and NEAL CHRISTENSEN

Abstract: Denali National Park and Preserve is an American icon for wilderness. Not everyone accesses wilderness in the same way, however, or has the same experiences. Wilderness recreation experiences at Denali vary tremendously. Interviews with flightseers at the park have created a better understanding of the recreation experiences for these day users and helped us recognize glacier landings in the backcountry as unique aspects of that experience. In self-reports about their visits, day users focused heavily on the unique scale of the wilderness of the Alaska Range, seeing climbers in the park, and landing on glaciers. Many of the flightseers recognize this place as a national park, and many recognize it as wilderness, though the recreation experience they are engaging in is more likely to be described as one of "on the outside looking in," rather than as a wilderness experience.



Alan Watson. Photo courtesy of the ALWRI.

Katie Knotek studied flightseer experiences at Denali National Park and Preserve. Photo courtesy of the ALWRI.

Neal Christensen in Denali National Park and Preserve. Photo courtesy of the ALWRI.

Introduction

In Denali National Park and Preserve in Alaska, planning for backcountry management is being revisited for the first time since shortly after passage of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. Whereas the North District of the park and preserve has received a great deal of attention from research and planning staff in order to protect experiences and the resources in this, the more heavily used portion of the park, the South District, has received very little attention. The 1986 Denali National Park and Preserve General Management Plan, however, called for improved visitor services and access to the South Denali region to take advantage of the area's dramatically sculptured landscapes and mountain-oriented recreational opportunities (National Park Service 2006a). Authorities have long recognized opportunities to serve more visitor needs through some development of access and facilities in this area of low visitor use levels. Also contained within the South District, however, are many remote glaciers, often visited by fly-in visitors who sometimes congregate at frequently landed places, as well as interface

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with mountain climbers and backcountry skiers.

Glaciers at Denali have exceptional scenic value, provide access to world-renowned climbing opportunities, and are destinations for scenic airplane tours. In 2003, there were 2,009 scenic landings (9,792 visitors) on these glaciers, with approximately 90% originating out of nearby Talkeetna. The National Park Service (NPS) is charged with protection of a wide range of values, including those attached to tangible resources such as natural and historic objects, and intangible resources such as inspiration and opportunities for challenge and self-reliance (Lindholm and Tranel 2005). Section 202 of the Alaska National Interest Lands Conservation Act (P.L. 96-487) of 1980 described the purpose of Denali National Park additions and the Preserve to include "reasonable access for mountain climbing, mountaineering and other wilderness recreation activities," which includes glacier landings.

Through ANILCA, the size of Denali National Park was nearly tripled. Of the new 6-million-acre (2.4-million-ha) Denali unit, nearly 2 million acres (0.8 million ha) (most of the old park) was designated wilderness. Although ANILCA allows for motorized access to wilderness environments, aircraft landings are not currently permitted within the wilderness boundary of Denali National Park and Preserve (i.e. the old park). The Final Backcountry Management Plan (National Park Service 2006b) declared that scenic flights and glacier landings are a necessary and appropriate use of park resources.

Park staff and visitors to these backcountry areas have expressed concerns in the past about safety, the quality of visitor experiences, and aircraft impacts on natural sounds and wilderness character (Denali National Park 2003). Managers have voiced interest in management tools to enhance visitor experiences as alternatives that focus entirely on imposing visitor use limitations based on physical visitor capacity estimates.

In 2006, the park issued a Final Backcountry Management Plan and Environmental Impact Statement that will guide management decisions for the next 20 years, although it did not include decisions about backcountry day use areas, such as the glacier-landing areas (National Park Service 2006b). The South Denali Implementation Plan was also released in 2006 with a vision of focusing on quality visitor experiences while protecting resource values, enhancing recreational and access opportunities throughout the South Denali region, and preserve quality of life values for residents in nearby communities (NPS 2006a). The current study is pertinent to both of these plans and was intended to inform the future decision-making process.

The purpose of this project was to collect information from flightseers in order to better understand the experiences of these fly-in backcountry day visitors to the Ruth Amphitheater, Kahiltna Base Camp, Pika Glacier, Buckskin Glacier, and Eldridge Glacier. Although a larger research project by these authors was conducted to support this planning process, aimed broadly at day and overnight visitors, and including a study of how air taxi service providers describe influences on recreation visitor experiences (Christensen et al. 2005), this article will only address fly-in recreation day use visitors and illustrate some of the experience elements identified. Air taxi operators provided excellent cooperation in the larger study and have an interest in these findings as they relate very closely with their own interest in understanding how to serve customers and meet NPS objectives.

Methods

Interviews were conducted with a sample of fly-in day users to these backcountry locations within Denali National Park and Preserve in 2004, to understand their received experiences in meaningful detail. Sampling was purposeful rather than random, and the sample was relatively small with emphasis placed on depth of understanding rather than statistical generalizability. At the time of this study, there were seven commercial air service providers permitted to land on glaciers in the study area, with five of those based in Talkeetna. Many of the scenic flights originating from Talkeetna do not land on the glaciers, although no comprehensive record or estimate of the number of these flights is available. Customers of all of the air service companies in Talkeetna were included in this study, representing small groups and larger ones (within the limits of the aircraft used).

Information from 44 flightseers was obtained in 34 interviews, with 16 of the 34 interviews being with flightseers who did not land on a glacier. Our results describe the flightseeing experience, using the nonlanding visitors to help us differentiate the glacier landing visits from visits that did not include glacier landings. The effort here is to define the whole experience flightseers received, expecting only those landing on glaciers to report aspects of the experience dependent upon actual landing.

There were very similar objectives for the interviews with both types of flightseers for extracting their descriptions of the experiences they received. From both types of flightseers we asked for a description of their previous experience at Denali National Park and Preserve, whether they were Alaska residents, and if not where they were from.

Glaciers at Denali have exceptional scenic value, provide access to world-renowned climbing opportunities, and are destinations for scenic airplane tours.

All flightseers were asked about the more physical aspects of their trip, in terms of where they went, how many people were in the group, and whether they landed on a glacier during the flight. All flightseers were asked to also describe the trip (from the time they got into the aircraft until they got back) with probing questions about what they saw, things that affected enjoyment of the flight, which parts of the trip were most memorable, and how this visit compared to other flightseeing excursions they had taken. All flightseers were asked to describe what they value about the area, whether they would describe it to a friend (who is thinking about visiting) as a national park, whether they would describe it as a wilderness and why they would describe it this way, and how it is different from other parks or wilderness areas they have visited. They were also asked whether they believe there are other places they could receive a similar experience, and if so how it would be similar. Glacier-landing visitors were asked which glacier they landed on.

All interviews were tape-recorded and transcribed. Analysis of interviews was guided by an interpretive perspective. Rather than using a "content analysis" approach where occurrences of words or phrases are counted, a hermeneutics approach, which attempts to understand the meaning and significance of words from the speaker's point of view, was utilized in the analysis process (Patterson et al. 1998).

The NVivo software program (QSR International Pty Ltd 2002) was used to facilitate interpretive analysis of the interviews. Segments of the text were assigned categorical codes representing the researchers' interpretations of the segments' meaning or significance. Multiple, iterative stages of coding resulted in a final coding scheme that was used as a framework to summarize and represent the data in this report.

Results

Analysis of visitor interviews revealed interesting descriptions of flightseeing experiences that included vivid descriptions of size and scale, seeing climbers, landing on the glacier, the flight as a national park experience, and the flight as a wilderness experience. Representative examples of interview segments are presented by these themes within the results section below. The full report (Christensen et al. 2005) contains appendices that present the additional text segments that informed the findings and conclusions about each of these themes as well as others identified: focus on the flight itself, viewing scenery, a rare and unusual experience, creating memories and taking photographs, seeing Denali (also known as Mount McKinley), and as a multiple sensory experience.

Size and scale. Flightseers often talked about unique aspects of scale and how they gained appreciation for size and scale during their flights. For instance,

> You don't [realize] the size of the mountain, you really realize when you see a tiny plane next to it and you think, wow, it's so huge. It does give some degree of scale to it. I guess, I mean, I've been to Colorado, which is somewhat comparable, and just the magnitude of the mountains here is just so much larger and you can't even imagine how big some of those mountains are.

Seeing climbers. Seeing climbers was a positive aspect of the experience for many flightseers. Respondents typically indicated that their pilot had pointed out climbers to them during their flight. It contributed somewhat to perceptions of size and scale. For example:

> He was really good. I mean, he made sure that, you know, we saw climbers which were like itsy-bitsy, tiny, little specks and stuff. Yeah, it was great.

> It's educational. I mean, the different base camps and then the different routes that they take, and it's a pretty interesting sport to admire, too. They're going through a lot up there.

Landing on the glacier. The experience of landing on the glacier itself is unique to these backcountry day visitors, but feeling isolation and experiencing the snow and ice up close all depend upon getting your sneakers planted in the snow. The landing helps bring the place to life. For example:

> But, I mean, for me I guess the whole glacier landing gave me the experience because then you're actually touching, feeling, you know, smelling if you will.

> The best part was the landing because we could get out and really experience, you know, that being on top of the world. It was like very, very nice.

The Flight as a National Park Visit. Flightseers were mixed on whether

they reported the flight as a national park experience. For example:

> I think one thinks of the national parks as being unspoiled, beautiful nature and something that will be there, that's been there for a long time and will be there afterwards, and so I guess what we saw today I would classify in all those areas.

> [The] national park experience to me is something where you go out and stay for a few days or go hiking and really, you know, get involved in the whole surroundings. But this is just a day trip from Anchorage, so a little bit different than that.

The Flight as a Wilderness Experience. Although many visitors struggled with whether or not they had a wilderness experience, most recognized the place generally as wilderness.

> We were seeing people in a wilderness experience … we were like on the outside looking in. We saw wilderness … to me a wilderness experience is when you're kind of living off the land … it's more physical activity, more going with just a few supplies and being more dependent on nature, and so I don't think it was that.

> I mean it wouldn't be something I would want to be walking around in. Flying over? Yes, yes. It's definitely wilderness up there.

Discussion and Conclusions

In spite of long-term interest in increased access and facilities to meet visitor needs in the South District of Denali National Park and Preserve, decisions have not been made about how to manage fly-in day users in the backcountry there. Some of the day users thought of their flightseeing visit to Denali as a national park visit, and some did not. Many of the day users also thought of the park as wilderness, but they were more likely to describe it as getting close to wilderness than a wilderness trip. The glacier landing was the highlight of the experience for most day users who landed there, contributing to perceptions of scale and appreciation for the wilderness character of the place and the skills of those who ventured there on foot or ski.

Insight into how people perceived their relationship with this part of the park is depicted in the quote "on the outside looking in." This might be a good way of thinking about the "wilderness recreation experiences" of day use flightseers rather than assuming application of any other wilderness research to define management objectives. Flightseers are eager to understand the unique qualities of this South District, to see people engaged in more direct interaction with wilderness qualities, and to even land at very remote locations in order to actually witness this extreme environment. But, while they commonly described it as wilderness, they described their own experiences more as tasting this place, learning about it and the other ways people visit.

Management Implications

The wilderness recreation experiences described by these day users do not require high levels of planning on their part, self-reliance, or the challenges of way-finding common to most wilderness visits, but they are dependent upon the wilderness character of the land. These flightseeing visitors tend not to be seeking solitude from other people (a commonly believed basic element of wilderness experiences in the United States) so much as they are seeking a unique experience, learning how this place is different from places with which they are more familiar, and seeing others isolated in nature. A glacier landing changes the trip, helping them grasp scale better and allowing them near climbers for a closer look on the inside.

Whereas most wilderness experiences in the United States, with either a backpack or a raft/canoe, involve gaining a sense of humility from hiking or paddling under self-power, the humility here comes from realizing the scale of this place. Planning decisions that influence these visitors to this part of the park in the future can potentially focus more specifically on evaluating how this very unique experience is influenced by changes in access, changes in services and information provided, and changes in how the glaciers and visitors are managed below. IJW

The Final Backcountry Management Plan declares that scenic flights and glacier landings are a necessary and appropriate use of park resources.

References

Christensen, N., A. Watson, and K. Kneeshaw. 2005. *Denali National Park and Preserve: Fly-in recreation visitor study—Ruth Amphitheater, Kahiltna Base Camp, Pika Glacier, Buckskin Glacier, Eldridge Glacier, and other glaciers south of Mt. McKinley*. Final Report to the National Park Service.

Denali National Park. 2003. *Draft Backcountry Management Plan*. Denali National Park, AK: National Park Service.

Lindholm, A. A., and M. J. Tranel. 2005. Legislative direction for a Conservation System Unit in Alaska: The case of Denali National Park and Preserve. *International Journal of Wilderness* 11(2): 8–10.

National Park Service. 2006a. *Record of Decision: South Denali Implementation Plan*. Denali National Park, AK: National Park Service.

———. 2006b. *Denali National Park and Preserve Final Backcountry Management Plan, General Management Plan Amendment and Environmental Impact Statement*. Denali National Park, AK: National Park Service.

Patterson, Michael E.; Watson, Alan E.; Williams, Daniel R.; Roggenbuck, Joseph R. 1998. An hermeneutic approach to studying the nature of wilderness experiences. *Journal of Leisure Research* 30(4): 423-452.

QSR International Pty Ltd. 2002. NVivo 2.0 Software for Qualitative Data Analysis. QSR International: Dorncaster, Victoria, Australia.

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Continued from WILDERNESS POLITICS IN THE AMERICAN WEST, page 18

protected support development of natural resources on other lands, a view that provides important common ground for negotiations. Wilderness advocates might be less apprehensive of locally negotiated proposals for places such as the Rocky Mountain Front with the knowledge that half of local residents support protection of roadless lands.

Even with improved understandings of local views, policy makers still face the difficult question of how to balance local, regional, and national perspectives when considering future policy options. Locally negotiated legislative proposals may offer a mechanism to meet a variety of local needs while providing certainty about the future management of roadless lands. However, local collaboration does not eliminate polarization; different views on roadless lands and wilderness will continue to exist at the local, regional, and national levels. Conflict over how to best manage roadless lands, and about who should decide their future, will undoubtedly continue to be a fixture of western and national politics. IJW

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References

Brunson, M. W., and B. S. Steele. 1996. Sources of variation in attitudes and beliefs about federal rangeland management. *Journal of Range Management* 49: 69–75.

Davison, A. C., and D. V. Hinkley. 2003. *Bootstrap Methods and Their Application* (pp. 156–60). Cambridge Series in Statistical and Probabilistic Mathematics. Cambridge, UK: Cambridge University Press.

Durrant, J. O., and J. M. Shumway. 2004. Attitudes toward wilderness study areas: A survey of six southeastern Utah counties. *Environmental Management* 33(2): 271–83.

Fortmann, L., and J. Kusel. 1990. New voices, old beliefs—Forest environmentalism among new and long-standing rural residents. *Rural Sociology* 55(2): 214–32.

Kaufman, L., and P. J. Rousseeuw. 1990. *Finding Groups in Data*. Wiley Series in Probability and Mathematical Statistics, Applied Probability and Statistics. New York: Wiley.

McCloskey, M. 1996. The skeptic: Collaboration has its limits. *High Country News* 28(9): 7.

Nie, M. 1999. Environmental opinion in the American West. *Society and Natural Resources* 12: 163–70.

Roadless Area Conservation Final Rule. 36 CFR 294. January 12, 2001.

Rudzitis, G., and H. Johansen. 1991. How important is wilderness? Results from a United States survey. *Environmental Management* 15: 227–33.

Tibshirani, R., G. Walther, and T. Hastie. 2001. Estimating the number of clusters in a data set via the Gap statistic. *Journal of the Royal Statistical Society* 63(2): 411–23.

Wondolleck, J. M., and S. L. Yaffee. 2000. *Making Collaboration Work: Lessons from Innovation in Natural Resource Management*. Washington, DC: Island Press.

Yung, L., W. Freimund, and J. Belsky. 2003. The politics of place: Understanding meaning, common ground, and political difference on the Rocky Mountain Front. *Forest Science* 49(6): 855–66.

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PERSPECTIVES FROM THE
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

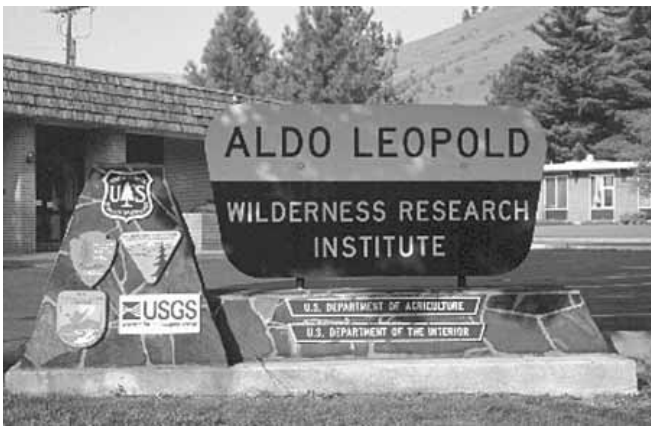
The U.S. Geological Survey and Wilderness Research

BY PAUL STEPHEN CORN

The land management agencies of the Department of the Interior (DOI), the National Park Service (NPS), U.S. Fish and Wildlife Service, and Bureau of Land Management are responsible for 51.5 million acres (20.8 million ha), or 71.5% of the nation's designated wilderness. In addition, the NPS generally manages backcountry lands not designated as wilderness for wilderness values. The U.S. Geological Survey (USGS) does not manage public lands, but is the DOI agency responsible for "providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life" (USGS, www.usgs.gov/aboutusgs, accessed February 15, 2008).

Despite DOI agencies managing the majority of wilderness lands, the USGS does not have a formal wilderness research program. There is one USGS research scientist stationed at the Aldo Leopold Wilderness Research Institute (ALWRI), and a keyword search on wilderness using the internal USGS project tracking database returned only four research projects. However, just as U.S. Forest Service (FS) scientists not affiliated with ALWRI conduct considerable wilderness research, scientists in several of the USGS disciplines conduct research important to wilderness.

The recent panel review of Forest Service wilderness research recommended that wilderness research address three broad, interconnected topics (Parsons 2007): (1) science for wilderness (to provide information necessary for management); (2) wilderness for landscape sustainability (to understand the role of wilderness in maintaining the ecological integrity of the surrounding landscape); and (3) wilderness for science (use of wilderness as an outdoor laboratory). Although it is not possible in this space to thoroughly review wilderness research in the USGS, a few examples illustrate studies that address the recommendations of the FS panel review.



Science for wilderness is the predominant theme of research conducted by Jeff Marion, a research biologist at the USGS Patuxent Wildlife Research Center, stationed at Virginia Tech University in Blacksburg. Marion's work in recreation ecology has addressed visitor impacts (campsites and trails) in protected areas, particularly national parks, and it closely parallels a core area of FS research at ALWRI. Scientists at the USGS Colorado Water Science Center in Denver, including Don Campbell, David Clow, Alisa Mast, George Ingersoll, Leora Nanus, and others, monitor alpine and subalpine watersheds for water quality, with a particular recent emphasis on atmospheric deposition of acids, nutrients, mercury, and organic contaminants. Their study areas include backcountry areas of national parks and several FS wilderness areas. A goal of understanding the hydrological processes and pathways in these systems clearly relates to wilderness in a landscape context. The USGS Amphibian Research and Monitoring Initiative (ARMI) has made extensive use of NPS wilderness and backcountry in western parks as locations for studies of amphibian population

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Wilderness—The Strategic Element in Our Response to Global Environmental Change

BY VANCE G. MARTIN

WILD 9 is under way! This conservation project spans two to three years, culminating when delegates convene during November 6 through 13, 2009, in the small, welcoming town of Mérida, in Mexico's Yucatán Peninsula, surrounded by Mayan temples, tropical forests, and the flamingos at Celestun on the coast of the Gulf of Mexico. World Wilderness Congress (WWC) founder The WILD Foundation and Mexican organizing partner, Unidos para la Conservación, are coordinating a large and diverse group of cooperators and collaborating organizations, institutions, and government agencies working on models, objectives, and results that can achieve practical conservation results through a diverse and interesting program—with a Latin rhythm!

The world community now faces one of its most serious threats ever—climate change. Evidence mounts that at least 20% of human-made carbon emissions are from degradation of wild nature, on land and sea. This is especially true of large forests, but applies also to grasslands, savannas, and marine systems. Therefore, maintaining large, intact wildlands and seas is a critical, strategic element in our global response to environmental change.

This is as much an opportunity for wilderness as it is a challenge. The WILD 9 bilingual program will place wilderness on the global political and economic agenda. Other specific outcomes are also in the works, and may include new protected areas; new wilderness laws and policies; new funding opportunities; training for local wildland, wilderness, and watershed managers; and more.

Major themes: Wilderness and Wildlands issues, models, and solutions in: Climate Change; Freshwater; Fire; Transboundary and Connectivity Issues; Managing Intact Land and Seascapes; Human Communities in Transition.

Cross-cutting topics: Law and Policy; Science and Research; Management, Training, and Capacity Building; Economic and Corporate Sustainability; Constituency Building (communications); Social and Tourism Benefits of Wilderness; Arts and Culture in Service to Conservation; Indigenous Wisdom and Practice; Religion and Spirit.

Program Structure: The seven-day program will be structured into a two-day Global Wilderness Forum, followed by the five-day Wilderness Working Sessions. There will be plenary sessions; concurrent technical, management, and poster sessions; pre- and post-ecotours; daily local tours; accredited training sessions; associated meetings of organizations and associations; and more.

Cultural Program: WILD 9 continues the WWC tradition of significant program participation by contemporary and traditional artists in folklore and fine art; music, dance, writing; and, of course, conservation photography.

WILD 9 will be productive and output oriented … and it will be fun!

Register now at www.wild9.org.

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The Wilderness Leadership School

BY CHERRYL CURRY

The Wilderness Leadership School (WLS) is a non-profit environmental education organization that spans 50 years. WLS is an exceptional program that has hosted almost 50,000 trailists (hikers in the wilderness) from all over the world.

Fifty Years of WLS

The WLS is the first organization in Africa dedicated to providing a pure wilderness experience for people of all backgrounds, races, and nationalities, steeped in a rich environmental history. The WLS was founded in 1957 by the legendary Ian Player who, together with his friend and mentor Maqgubu Ntombela, recognized the necessity for people to connect with the environment. Long before *ecology* had become a vogue catchword, the WLS foresaw the urgent need for a large body of well-informed, conservation-oriented leaders and public, capable and dedicated to the defense of our planet's irreplaceable natural resources.

The annals of the WLS glitter with the names of past trailists who all bear testament to the fact that a wilderness trail is an experience that changes lives. In the words of Sir Laurens van der Post,

> As we have become rational we have lost touch with our primitive nature, and as a result have lost touch with the sense of being known and belonging. This divide has meant a loss of meaning in our hearts and minds. This is where we stand today. This is what wilderness is all about—a crisis of meaning in a modern world.

Each trail is a journey of discovery for all who undertake it. For some it is the spiritual path that broadens the individual's ability to balance the natural experience against an inner recognition of one's primordial past. As Kunderke Kevlin, a psychologist from Britain, has written of her experience in the iMfolozi:

> I have only known deep meditation as an equally effective method for releasing self-importance; not only the self-importance of an individual but also that of the human species itself. All our arrogance, our obsessions with future goals, our fixated emotions and opinions gradually dissolve. All that remains is awareness of a vast process of nature, stars and galaxies, of animals, rivers, mountains and trees and of us humans as but small filaments in this web of life and energy. Humbling, yes … but also healing and uplifting and peaceful and utterly beautiful. We go back to our lives refreshed, invigorated and transformed, grateful for this glimpse of a vast and ancient natural world which resonates within the deep layers of our unconscious.

For others it is the freedom to experience the natural world in its wildest. Free from the constraints of time and artificially imposed order, the trailist revels in the glimpse of a retreating black rhino, shivers at the throaty utterances of the lion at full roar, experiences the stealthy gaze of the hyena through the smoke of the night-watch fire and gazes humbly at the vast stretch of starlit night—a sight only visible within the vault of a wilderness sky because by definition, the wilderness is "wild land," land unaffected by development; our nearest opportunity to appreciate life as it once was; a world of existence without human influence. Wildflowers entrance and tiny insects ignite the imagination, and overall the trailist exalts in—what is for many living at today's frenetic life pace—the first taste of freedom to enjoy nature's bounty.

Ian Player is globally and generally recognized for his enormous contribution as a ranger with the then Natal Parks Board to Operation White Rhino, the project that saved the white rhino from extinction. He acknowledges that his recognition that Africa "has a soul" led him to explore the concept of the wilderness as a resonant of the human psyche. His fierce beliefs and determination led him into bureaucratic struggle after bureaucratic struggle to have areas of the iMfolozi and St. Lucia Game Reserves set aside as wilderness areas where people could walk in the wild and where no

roads, buildings, and human artifacts would intrude.

In 1957 Ian Player conceived the idea of the WLS. The first group of trailists were boys from Ian's old school, St. Johns College. After a wilderness experience on the Eastern Shores of Lake St. Lucia during which they saw hippos, crocodiles, and pelicans, this group of schoolboys wrote letters in which they reported that this experience of the wild changed their lives. This sentiment would echo down the years, and today similar experiences are recorded by the scores of school groups and adults from all over the world who have sensed the world of the wild that a trail opens up.

A large part of the WLS ethos is to make the trail experience available to youth from disadvantaged rural and urban communities. Funding for this project is derived from donors as well as subsidized by the WLS itself. For many, this is a life-changing experience, and in its 50th year the WLS has been gratified to have facilitated a number of such experiences.

Recent WLS Collaborative Ventures

A South African national HIV prevention program for youth called loveLife was launched in September 1999, by a consortium of leading South African public health organizations in partnership with a coalition of more than 100 community-based organizations, the South African government, major South African media groups, and private foundations. The loveLife program combines a highly visible sustained national multimedia HIV education and awareness campaign with countrywide adolescent-friendly service development in government clinics, and a national network of outreach and support programs for youth providing a comprehensive, evidence-based approach to youth behavior change. This community-level outreach and support to young people (including 3,500 schools) is led by a national volunteer corps of more than 1,500 18- to 25-year-olds known as loveLife groundBreakers. A trail experience and WLS training component add an environmental dynamic to the exhaustive training given to the groundBreakers.

Another associative project, operated by The Wilderness Foundation, has been the trail experienced by the game-ranger students of the Umzi Wethu program. This social intervention program offers a gateway for vulnerable youth to access support, qualifications, and a self-sustaining job in the ecotourism industry. This training academy—offering both residential and flexible day support for a year—is a nonprofit initiative enabled through scholarships. It is equally an environmental intervention, enabling young people to access the healing qualities of nature and positive adult relationships. Every Umzi learner—regardless of their specialty training—goes "on trail," spending a part of their training time in a wilderness setting. Both through nature and skills development, the training academy aims to support citizenship—to develop long-term health, life skills, self-esteem, job competency, management potential, and a culture of generosity to others. Every student receives health care, nutrition, counseling, and mentoring, and a nurturing home environment during the year.

WLS Administration

The WLS is currently under the leadership of Alistair Rankin in the seat of executive director. Alistair has remarkable background as a guide in Botswana and in various roles within the ecotourism sector. His last post was as general manager of a five-star safari operation. After 18 months at the helm of the WLS, Alistair will be the first to tell you that he is well and truly converted to the philosophy of the wilderness in its purest form, and one of his personal goals is a mission to have proclaimed wider tracts of land set aside as wilderness areas throughout Africa. Alistair is assisted by the marketing director, Cherryl Curry, who brings to the WLS a wealth of marketing and business administration experience in the commercial sector.

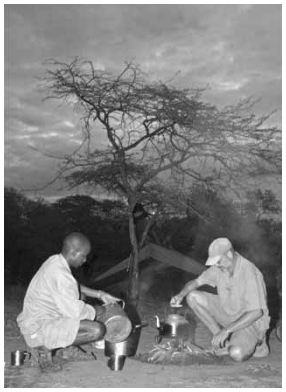

Fig. 1. On the trail in the iMfolozi. Photo by Chris Smal.

The WLS guides themselves form the nucleus of this organization. It is a testament to the WLS's rich history that many of today's guides have been with the school for many years, have mentored the younger generations of wilderness guides who have come through the ranks, and today are the benchmark for wilderness guiding in southern Africa.

The WLS is the founding organization of the WILDERNESS Network composed of The Wilderness Foundation SA, The Wilderness Foundation UK, the Magqubu Ntombela Foundation, and WILD USA. All of these organizations were founded by Ian Player. IJW

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The Water Forest of Mexico City

A Vital but Imperiled Urban Wilderness

BY BEATRIZ PADILLA, FRANCISCO J. ROMERO, FERNANDO JARAMILLO MONROY, FLORA GUERRERO GOFF, and RAÚL GARCÍA BARRIOS

Beatriz Padilla and Francisco J. Romero

Fernando Jaramillo Monroy

Flora Guerrero Goff

Raúl García Barrios

"Urban wilderness" is sometimes considered a misnomer by those who work solely with very remote wildland areas; however, it is an important and often neglected classification of wildlands that provide a range of critical and irreplaceable benefits to very large numbers of urban and near-urban residents. One of the world's most outstanding urban proximate wildernesses is the Water Forest on the southern outskirts of the rapidly expanding Mexico City, second largest city in the world. This forest is adjacent to several urban areas and is extensive in size, so that the ecological services it provides and the threats to its condition need to be considered from the perspective of several population centers.

Mexico is among the world's seven most biodiverse countries. Its Transverse Neovolcanic Axis is one of the country's two geomorphologic regions (along with the Sierras of Oaxaca) with the highest number of endemic species, including 50% of all mammalian species known to Mexico. As the transition zone of the American continent's two biogeographic regions, it harbors both Nearctic and Neotropical ecosystems and species (Velázquez and Romero 1999).

A Speck of Green in an Urban Landscape

The genus- and species-rich Water Forest lies on the central range of this Neovolcanic Axis, comprising approximately 147,000 hectares (363,245 acres) of natural area in the mountains that lie between three political entities: the Federal District (Mexico City), and the states of Mexico and Morelos.

An elevation variation of 1,800 to 3,930 meters (5,905 to 12,894 feet) above sea level creates a temperature gradient that allows for nine types of plant associations in the Water Forest, resulting in great biological diversity (Jaramillo and Aguilar 1998). The highlands are dominated by fir forests and mountain grasslands with half a dozen small lakes that used to sustain a well-represented lacustric vegetation. Pine and pine-oak forests cover the midlands along with meadow

vegetation mixed with agricultural fields. In the lowlands of the southern slopes, oak forests are intersected by volcanic shrubs that grow in the abundant basaltic litosols. Several streams provide for lotic and subhumid riparian vegetation. In spite of land-use pressures, a large area of mesophilous woods persists, officially recognized by Mexico's National Biodiversity Strategy as a threatened ecosystem and conservation priority.

Close to 2% of the world's flora and fauna biodiversity is found in the Water Forest (Velázquez 1993). Although it represents only 0.06% of the national territory, the Water Forest currently harbors an important proportion of Mexico's biodiversity: three of its six ecological zones, five of its nine types of ecosystems, 3% to 5% of its species of plants and fungii, 6% of its invertebrate species, and 7% of all vertebrate species known to Mexico (Velázquez and Romero 1999). Dozens of migratory bird species hibernate in the Water Forest. Of the region's biotic diversity, approximately 10% is endemic: a total of 325 species found nowhere else on Earth (CONABIO 1998). The area is indeed a critical, rich, and functioning biological corridor (CONABIO and UAEM 2006), even though it is now much diminished.

Ecological Services

The Water Forest provides a full range of ecosystem services to over 20 million people who live in the adjacent cities of Mexico D.F., Toluca, Cuernavaca, and other surrounding communities. The economic impact of the forest's potential reduced capacity to provide environmental services can be best understood through considering its water contributions. Although 75% of Mexico City's water is supplied from this forest, with minimal forest management costs, approximately US$120 million are spent annually to supply the other 25% of the water that Mexico City consumes. All of the water used in the city of Cuernavaca is supplied from the Water Forest. The Water Forest is on the highlands of Mexico's three most important watersheds (Mexico Valley, Balsas River, and Lerma River) and is considered as a Hydrological Priority Region and as a Conservation Priority Terrestrial Zone (CONABIO 2007).

Beyond rainwater catchment and replenishment of underground aquifers, millions of dollars more would have to be spent to restore the other environmental services provided by the Water Forest, such as erosion control, oxygen production, carbon sinks, biodiversity platforms, wildlife habitat, and air pollution buffers. On a global scale, the Water Forest is large enough to help mitigate some of the effects of climate change.

Conservation

Despite the strategic importance of this region, very few efforts have been made to conserve and manage its wildlands. Given this lack of interest in its protection, some conservationists see it as "the hole in the conservation doughnut."

Approximately 80% of the Water Forest is legally protected for conservation under various formats. However, incredibly, there is no program to monitor its natural resources, no conservation strategies and programs have been adequately implemented, and no international support for its conservation. Furthermore, areas of high biodiversity and some of its best-preserved woods are devoid of any legal protection.

Despite the tremendous human population pressures and the relative lack of conservation actions and programs, the Water Forest still harbors vigorous, healthy wild areas, haven to large mammalians such as white-tailed deer (*Odoicoleus virginianus*), coyote (*Canis latrans*), and five of the six wild felines found in Mexico: puma (*Puma concolor*), lynx (*Lynx rufus*), ocelot (*Felis pardalis*), tigrillo (*Felis weiddi*), and jaguarundi (*Felis yagouaroundi*). Although the puma was considered

The extraction of "zacatón" grass to manufacture brooms and brushes, among other products, causes irreversible damage on certain gramineous bunch grass species, causing habitat transformations that affect many other plant and animal species. Poor diversity of employment opportunities makes certain Water Forest inhabitants dependent on these resources. Photo by Alejandro Velázquez, in Velázquez, A., Romero, F. J. (1999)

Illegal hunting is widespread all over the region and preys on anything that moves or breathes. This image of a local hunter in the town of El Capulín, on the Water Forest heights, holds a Lynx recently captured for no specific reason (although they did afterwards eat it). Hunting is permanently forbidden in the Water Forest, but the lack of surveillance by the authorities only further encourages sport hunters from nearby urban centres. Photo by Jürgen Hoth, in Velázquez, A., Romero, F. J. (1999)

The endangered Furcraea bedinghausii (an agave) is endemic to the Neovolcanic Axis. Up to 8 m in height, it and is usually found in alpine grasslands of the volcanic slopes. By Jaime Rojo

extinct, there are recent anecdotal accounts of sightings by scientists working in the area, such as in 1997 by Francisco Romero who saw a juvenile puma fleeing from dogs and hunters, while doing field work in the highlands of the Water Forest (Velázquez and Romero 1999).

Threats

Human population growth has rapidly increased threats to and demands on this area's natural resources. From 1959 to 1999, Mexico City's population grew by 315% and today surpasses 20 million people (including urban sprawl into adjacent states), with an average density of 5,799 people per square kilometer (0.38 sq mi). The expansion of towns, advance of agricultural fields, deliberate and accidental forest fires, illegal logging, extraction of rocks and soil (with seeds), overgrazing, highway projects, real estate projects, and other human activities in the area are critically fragmenting, reducing, and changing the structure and composition of Water Forest ecosystems and their associated wildlife populations. From 1959 to 1999, the natural forest cover was reduced by 30%, and most surface water bodies dried up. Several animal and plant populations are restricted to relic areas of the original ecosystem. According to the Geography Institute of the National Autonomous University of Mexico, the Water Forest is disappearing at the rate of 2,400 hectares (5,928 acres) per year and could be entirely gone within 50 years.

Construction of two highways through the most natural areas of the Water Forest is scheduled to begin in 2008. On its southern slopes, the Libramiento Norponiente highway project would traverse the last woods of Cuernavaca, featuring important water springs and the best preserved forest in the state of Morelos, which includes mesophilous woods—Mexico's most threatened type of ecosystem. Most of these woods are jointly owned by *comuneros*, but companies interested in the construction of the highway and development of housing in the area have already bought much of their land. The Libramiento Norponiente highway project, as currently planned, would be very damaging to the environment. In the past three decades, 80% of forest cover in the state of Morelos was lost, and according to the Biodiversity Strategy for the state of Morelos, more than 3,000 hectares (7,410 acres) of forest are being lost every year (CONABIO and CEAMA 2003). Cuernavaca's northern forests represent nearly 90% of what forest cover is left in the state of Morelos.

On the highlands, the Lerma-Tres Marias highway would run a few meters away from the Chalchihuites central zone of the protected Ajusco-Chichinautzin Biological Corridor and through the protected Otomí-Mexica State Reserve, as well as through some very well-preserved and unprotected areas that adjoin the protected areas. The Lerma-Tres Marias highway would traverse the Water Forest's most important rain catching closed drainage basin. The highway project is motivated by commercial land developers. If this highway is built, urban sprawl would expand in this area of critical environmental importance to central Mexico.

A unique feature of the Water Forest is the Buenavista Glacis, a system of 260 ravines that originate at the Zempoala lagoons and extends south beyond the Water Forest boundaries. A glacis with these landscape characteristics is only elsewhere found in the Himalayas. A potentially serious and immediate threat is the project to build a landfill right atop the Buenavista Glacis. Given its high hydrological conductivity, fluids from the landfill would rapidly pollute the rivers of the region, damage their biodiversity, and, within two years, reach the city of Temixco's underground water reservoir, on which a human population exceeding 100,000 depends. Local communities, academics, and activists have pursued all legal avenues to dissuade Cuernavaca's authorities from placing the landfill in this area, but to no avail—even though opponents have proposed several other locations that do meet legally defined landfill requirements. The current waste-management crisis in the city is being used as an excuse to open roads into the glacis for urban development purposes.

Confronting the Threats

Although in the past four years local communities, environmentalists, and academic researchers have jointly managed to hinder the Lerma-Tres Marias and Libramiento Norponiente highway projects, governments are determined to start constructing both in 2008. Despite knowledge that these forests

are the water supply for millions of people, governments are still willing to sacrifice the Water Forest to economic development. On November 2007, opponents appealed to the International Court of Environmental Arbitration and Settlement denouncing the Lerma-Tres Marias highway project.

Scientists from several universities, supported by research information, have put forth proposals for potential corridors where vegetation cover, number of species, and importance for wildlife continuity and connectivity among wooded areas would be least affected and allow for creation of a protected area large enough for the adequate conservation of the Water Forest's wealth of species and natural resources. However, due to budgetary, bureaucratic, or political issues, the advice of academics has not been heeded nor supported and the forest continues to deteriorate.

Professor Francisco J. Romero and researchers from the Ecology and Wildlife Conservation Laboratory of the Metropolitan Autonomous University (UAMX), in collaboration with biologist Hector Magallón's Greenpeace Mexico Forest Campaign team, are developing an ecological zoning project to establish strategic guidelines for adequate Water Forest management and restoration. This research included:

- detailed geo-referenced Water Forest borders using geographical information systems and field data;
- classification and zoning of all the region's plant communities in relation to their topographical, geological, and geomorphological basis, plus geo-referenced registries of indicator flora and wildlife;
- definition under multiple criteria of where urban, agricultural, and wild areas converge;
- identification of rural populations and their areas of influence within the Water Forest;
- identification of limits officially agreed upon by the federal and local governments regarding areas with irregular human settlements;
- identification of areas that present high risks for human settlements;
- identification, with a view to restoration, of affected wildlands and abandoned agricultural fields; and
- revision and outline of areas with legal conservation status, such as: federal and local Protected Natural Areas, Ecological Conservation Soils, Forest Reserves, zones considered Historical Monuments, World Heritage areas, RAMSAR wetlands, and Farmers' Ecological Reserves.

The rainy season and high temperatures form a fine mist, providing a special mood to the water forest, and emphasizing its importance as a water catchment. By Jaime Rojo

Although this research project is due to be completed in 2008, preliminary results indicate that the total surface area of the Water Forest is more than 147,000 hectares (363,245 acres). The project's delimitation of the Water Forest only takes into account what is left of it, leaving out areas that have been claimed by urban sprawl or agriculture, yet including those that have been seriously affected, but are surrounded by wooded areas. Most (80–85%) of the Water Forest retains natural vegetation cover (e.g., forest stands, alpine and subalpine grasslands and shrublands). The rest is mostly composed of rural towns, agricultural fields, and the World Heritage site of Xochimilco. Preliminary results reveal that in the past five years, land use in the Water Forest has changed dramatically to the detriment of natural vegetation cover.

On the southern slopes, in the state of Morelos, a group of scientists from the Regional Centre of Multidisciplinary Research of the National Autonomous University of Mexico (CRIM–UNAM), has been working since 2000 to protect the Water Forest. The research team believes that the future protection of the Water Forest is best assured with good scientific information implemented through participatory processes with local residents. The team is led by Dr. Raúl García Barrios and operates in the framework of the Macro-Project for Ecosystem Management and Human Development created by several UNAM faculties and research institutes. This group has focused on promoting the following:

- creation and/or empowerment of grassroots institutions for conservation, restoration, and ecosystem damage-prevention;
- synergies among civilian groups, governments, and academic institutions;
- community-based land-use planning;
- lobbying for the environment, involving academic, legislative, political, and community stakeholders;

- training and support to local stakeholders to learn and implement new skills (e.g., use and reuse of water, adequate management of solid waste, Geographical Information Systems, how to tackle illegal logging);
- creation and management of protected areas and a wildlife corridor;
- environmental restoration of forests, soils, flora, and fauna;
- multidisciplinary research; and
- remediation of the Quila and Hueyapan lagoons.

Wilderness beyond the Biological

Ecosystem services are biological and include the increasingly important aspects of solitude, remoteness, and spiritual regeneration opportunities that are part of all wilderness areas around the world, regardless of their location. The urban wilderness of the Water Forest can provide this, but personal security is an issue, especially in the most accessible areas. Not everyone in this forest is there to experience its beauty and spiritual and recreational values. However, the forest still has virtually unvisited areas, remote ravines, and steep forested canyons that require two days or more travel by foot to access, where security and solitude are available. It is envisioned that, once the forest's potential to generate local incomes from ecotourism is tapped, and once effective conservation programs are implemented, personal safety in these beautiful woods might no longer be an issue.

Closing Remarks

More than 300 million people live at a distance of fewer than 10 kilometers (16 miles) away from protected wildlands in the world's endangered terrestrial ecoregions of highest biodiversity (Mittermeier et al. 2004). A considerable percentage of these people are the millions of neighbors who live closely adjacent to the Water Forest. The size and extent of the Water Forest provide for a varied and functioning ecosystem with ecological services that benefit several human communities, including one of the largest metropolitan areas in the world, and make it a singularly important example of urban wildlands.

Beyond ecological services rendered to humans, the wilderness value of the Water Forest is priceless. Bird populations are a clear example of the critical need to reduce the increasing threats. The relatively small surface area of this forest's mountains is haven to 211 bird species (Romero et al. 2006), 40% of which are migratory and arrive mostly from the United States and Canada. These bird species represent one-fifth of the avian species known to exist in Mexico (Velázquez and Romero 1999) and more than one-third of the bird species shared among the United States and Canada together (Romero et al. 2006). Their loss would affect Mexico's species wealth and potential, as well as impact those countries with whom we share the migratory species.

The final example is about wilderness and people. The Water Forest, being an urban wilderness, is a critical retreat area for city dwellers. A recent story is told of a jogger descending swiftly down a Water Forest ravine, at the bottom of which he leapt into the narrow creekbed, landing simultaneously with an ocelot. Stunned, both remained utterly still and, within a blink, the feline vanished. Lords of the wild such as this ocelot, although shy, secretive, and assailed by urban sprawl, are in the Water Forest. So are people. We need each other to survive our increasingly urbanized world. IJW

One of the world's most outstanding urban proximate wildernesses is the Water Forest on the southern outskirts of the rapidly expanding Mexico City.

References

CONABIO (National Commission for the Knowledge and Use of Biodiversity). 1998. *La Diversidad Biológica de México, Estudio de País*. Mexico.

CONABIO and CEAMA (Morelos' State Water and Environment Commission). 2003. *Estrategia Estatal Sobre Biodiversidad de Morelos.* Mexico: Comisión Estatal de Agua y Medio Ambiente.

CONABIO and UAEM (Morelo's State Autonomous University). 2006. *Estudio de Estado: La Diversidad Biológica en el Estado de Morelos*. Mexico: Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. CONABIO. 2007. Website: www.conabio.gob.mx.

Jaramillo, F., and S. Aguilar. 1998. Reserva de la biosfera del centro de México. In *Memorias de la Mesa Redonda: El Norte del Estado de Morelos: ¿Una Region?,* Mexico: Regional Centre for Multidisciplinary Research of Mexico's National Autonomous University (CRIM–UNAM).

Mittermeier, C. et al. 2004. *Hotspots Biodiversidad Amenazada II*. Mexico City: CEMEX, Agrupación Sierra Madre.

Romero, F. J., A. Meléndez-Herrada, A. Romero-Palacios, and S. A. Méndez. 2006. Programa de Monitoreo de Flora y Fauna Silvestre del Área Natural Protegida "Ejidos de Xochimilco y San Gregorio Atlapulco". Informe Final. Mexico City: Delegación Xochimilco/ National Autonomous University–Xochimilco campus (UAMX).

Velázquez, A. 1993. *Landscape ecology of Tláloc and Pelado Volcanoes, Mexico.* ITC Publication Number 16. Enschede, The Netherlands: International Institute for Aerospace Survey and Earth Sciences (ITC).

Velázquez, A., and F. J. and Romero. 1999. *Biodiversidad de la Región de Montaña del Sur de la Cuenca de México*. Mexico City: National Autonomous University–Xochimilco campus (UAMX).

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decline. ARMI scientists whose studies include significant backcountry work include Mike Adams (Forest and Rangelands Ecosystem Science Center, Corvallis, Oregon) Gary Fellers (Western Ecological Research Center, Point Reyes National Seashore, California), Erin Muths (Fort Collins Science Center, Colorado), and myself. Projects have included extensive monitoring of population status, attempted reintroduction of extirpated species, effects of potential stressors such as wildfire and ultraviolet radiation, and detection of pesticides in amphibian tissues in remote watersheds.

The areas of emphasis recommended by the FS panel review are not really discrete categories, and many studies will address more than one topic. The studies by the Colorado Water Science Center demonstrate this by monitoring wilderness condition (topic 1) and using wilderness as an unmanaged standard (topic 3), in addition to studying hydrology (topic 2). The Western Mountain Initiative (WMI) is a collection of independent research projects that also encompass more than one of the recommended research topics. The WMI addresses the role of climate change in mountain ecosystems in the western United States, with emphasis on disturbance (fire), vegetation, hydrology, and identifying sensitive resources and potential management responses. USGS scientists involved in the WMI include Craig Allen (Fort Collins Science Center, Bandelier National Monument, New Mexico), Jill Baron (Fort Collins Science Center, Natural Resource Ecology Laboratory, Colorado State University), Dan Fagre (Northern Rocky Mountain Science Center, Glacier National Park, Montana), and Nate Stephenson (Western Ecological Research Center, Sequoia-King's Canyon National Park, California).

The distinction between wilderness managed by the FS and by DOI agencies is also fuzzy. USGS scientists work in FS wilderness, much as FS scientists at ALWRI and elsewhere have projects that include DOI wilderness. Furthermore, research conducted in undeveloped areas of DOI protected areas is typically applicable to the management of lands designated as wilderness. The lack of clear distinctions in wilderness research indicates that the recommendations of the FS panel review are also applicable to the USGS. For example, the USGS is devoting increasing resources to global change research; therefore, the recommendation in the review to increase the integration between wilderness and global change research is especially important. This is the approach begun by the WMI and likely to be emulated by more projects as funding for global change studies increases.

A needed step is to conduct a complete review of the wilderness-related research currently being carried out by USGS.

The FS panel review dealt only with FS research and did not address USGS projects. However, a logical extension of the recommendations would be a better integration of all federal research relating to wilderness, and a needed step is to conduct a complete review of the wilderness-related research currently being carried out by the USGS. IJW

References

Parsons, D.J. 2007. An outside assessment of wilderness research in the Forest Service. *International Journal of Wilderness* 13(3): 34–35, 39.

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Wilderness Momentum in Europe

BY VANCE G. MARTIN, CYRIL F. KORMOS, FRANCO ZUNINO, TILL MEYER, ULF DOERNER, and TOBY AYKROYD


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Europe does not usually conjure up visions of expansive, unbroken wilderness landscapes or seascapes. Highly developed and populated, with intensive agriculture and heavy industry, Europe has been taming its wilderness for centuries. Nonetheless, pockets of wildness have persisted throughout the continent, primarily—although not exclusively—in forested alpine regions, and Europe's megafauna, including brown bears, wolves, lynx, and chamois persists, although in small numbers.

However, awareness of wild nature and the potential for wilderness protection are increasing, and a range of exciting new wildland conservation initiatives are emerging. This article briefly summarizes some of this fast-moving action, with more detailed reports on a few special examples in central and southern Europe.

Why Europe, Why Now?

Several developments led to new opportunities for wilderness protection in Europe. One was the fall of the iron curtain, which revealed large, intact areas in central and Eastern Europe, primarily along the east-west border, and created significant opportunities for government-protected areas. Another aspect of the fall of the iron curtain was that most Eastern Bloc countries have become, or are applying to become, European Union (EU) members. EU membership requires restitution of public land to former owners, many of whom want to sell their land. This significantly affects critical areas of intact wildlands in Romania's Carpathian Mountains. The restitution process specifically prohibits resale of land for logging, creating a significant opportunity for conservation for private investors. Unfortunately, some areas are being logged nonetheless, creating a real threat to wilderness and biodiversity, and narrowing the window of opportunity for private conservation investors (Baltzer 2007).

A second major development was the change in Europe's common agricultural policy and a decrease in farming subsidies, which made farming in marginal areas economically nonviable. As a result, in some areas there has been significant rural depopulation, followed by falling land prices. This has led to rewilding in some places, and has created a significant, but probably short-lived opportunity for conservation (Theil 2005).

These political and economic developments have been accompanied by growing interest in wilderness conservation throughout the continent. Interest is driven by factors such as awareness that very few biologically intact areas remain in Europe, heightened concern over climate change, and expanding wildlife populations. For example, predators such as wolves and lynx are returning to habitat from which they were formerly extirpated.

This new interest can be measured in many ways. One indicator is grassroots activism, and the success and increase in number of nongovernmental organizations (NGOs) explicitly and exclusively focused on wilderness awareness and protection. Another good indicator is government policy, and specifically the gradual increase in interest in wilderness as a protected area category within governmental protected area classification systems.

Figures 1 and 2—European Lynx (Lynx lynx) and Wolf (Canis lupus lupus), once on their way to extinction, are establishing new populations in numerous new areas throughout Europe. Photo by Rainer Pöhlmann.

Wilderness NGOs and Initiatives

Wilderness Foundation UK—One of the oldest continuing NGOs in Europe dedicated to wilderness awareness and protection is The Wilderness Foundation UK (www.wildernessfoundation.org.uk). A small staff has focused on the therapeutic benefits of the wilderness experience to inner-city or disadvantaged youth, and the use of the wilderness experience for conflict resolution in Ireland. They connect youth with wilderness experiences in Africa and elsewhere, focusing on building leadership and advocacy, while also advocating for wilderness policy and designation in the British Isles. An independent but allied organization, The Wilderness Foundation (Germany), is being established by colleagues in that country to raise wilderness awareness in central Europe.

PAN Parks—The PAN Parks Foundation (www.panparks.org), a joint project of World Wildlife Fund and the Dutch tourism operator Molecaten, provides an NGO certification mechanism for wilderness areas within European protected areas (see April 2008 issue of *IJW*). PAN Parks has certified approximately 530,000 acres (214,575 ha) to date.

European Green Belt Initiative—Launched in 2004, the European Greenbelt Initiative is working to implement an extensive north-south conservation corridor bisecting central Europe, and including some of the most biologically important and intact lands on the continent (www.europeangreenbelt.org/indoor.html). These lands remained in a wild state primarily because they were used as a buffer between east and west along the iron curtain during the cold war. They represent a unique opportunity for large-scale conservation, but also have deep symbolic significance. The scale of this work, combined with the fact that component parks are adopting a wilderness philosophy (see section on Germany and the Czech Republic, below) makes this work highly relevant, although it is not explicitly a wilderness initiative.

Wild Europe—Wild Europe promotes a coordinated strategy for the protection and restoration of wilderness and large natural habitat areas in Europe. Currently chaired by the director of natural environment at the European Commission (EC), it brings together representatives from the World Conservation Union; WWF; United Nations Educational, Scientific and Cultural Organization; PAN Parks Foundation; Europarc Federation; Council of Europe; and others. A resolution calling for improved protection of remaining wilderness areas is being jointly developed, to be presented to the commission as part of an approach that seeks to place wilderness and natural habitat areas more centrally in EC biodiversity strategy. The working conference on wilderness planned for Europe in spring 2009 is formally included in the schedule of the European Commission Presidency.

Rewilding

Rewilding is occurring naturally in numerous areas in Europe (Theil 2005). Wolves have crossed from Poland into Germany, and recent studies now show some 30 animals inhabiting Saxony. Wolves in France make their way across the border to Italy. Populations of European lynx are on a slight upswing and are part of a gene pool between the Czech Republic and Bavaria. Even an occasional brown bear is tracked crossing borders from Slovenia into Italy, Switzerland and Austria.

Rewilding with human assistance is occurring across the continent. One of the first (established in 1984), most successful, and ongoing such initiatives is Trees for Life in northern Scotland (www.treesforlife.org.uk), based at the Findhorn Foundation and focused on restoring 600 square miles (1,554 sq km) of the ancient the Caledonian Forest.

Another initiative is based in the Oosvardersplassen (Vera 2007), in the Netherlands, in which biologists have recast the concept of ancient wilderness in Europe, moving from a concept of vast, dark consolidated forest to one

Figure 3—Hikers crossing Retezat National Park, southern Carpathian Mountains, Romania. Photo by Vance G. Martin.

of a mosaic of primeval forest and meadows, managed by large ungulates such as the auroch (original wild cattle) and the tarpan (wild horse). Roaming the Oosvardersplassen now are herds of Heck cattle and Konik horses, the closest living relatives to their extinct predecessors, from which reintroductions are being made to wildland areas throughout Europe.

European Bison (*Bison bonasus*) or "wisents" are returning to the forests. Wisents were originally released from captive populations into Bialowieża (western Poland) in 1952, and have thrived in this ancient forest (Vera 2007). Elsewhere, in western Russia, breeding stations in the Oksky and Prioksky-Terrassny *zapovedniki* worked for several decades with various zoos to create viable herds of bison to release into other Russian *zapovedniki* (Williams 2008).

Figure 4—European brown bear (Ursus arctos arctos) in the Ticha Valley, northern Slovakia. Photo by Bruno D'Amicis.

European Wilderness Law and Policy

Only one country, Finland, currently has a federal law creating a wilderness protected area category in Europe. However, Russia's *zapovedniki*, which cover 33.7 million hectares (83.3 million acres), often function as a close analog. Turkey is currently in the process of developing wilderness legislation. Italy has also recently passed a regional wilderness designation (in northern Italy's Friuli region, see below).

Iceland's legislation does not recognize wilderness as a separate protected area category, although Iceland's Nature Conservation Act of 1999 lists wilderness as one of the key criterion for establishing new protected areas (Article 66) in the country, and wilderness is defined under the Act (Article 3). To facilitate the task of creating new wilderness areas with wilderness qualities, Iceland's Environment Agency has developed a map of wilderness areas throughout the country.

Ukraine's 2003 policy statement, The Conceptual Foundation of the Development of Nature Protection in Ukraine, which will guide protected area policy in Ukraine through 2020, introduced the concept of wilderness protected areas. Amendments have been proposed to create wilderness protected areas under the Protected Areas Fund Act of 1992, and have been approved by the Commission on Environmental Policy, but have not yet been approved by Parliament.

Norway has land use planning policies that seek to preserve "wilderness-like" countryside—defined as places that are at least 5 km (3.1 miles) away from major infrastructure developments—and areas without infrastructure development that are 1 to 5 km (0.6 to 3.1 miles) away from major infrastructure development. The Svalbard Environmental Protection Act, in force since 2002, specifically seeks to protect the archipelago's wilderness qualities.

Austria's State Forest Agency estimates that about 22% of Austria's forests are close to natural, but that only 3% of Austria's forests are in a wilderness state. The government of Lower Austria has designated the primeval Rothwald forest on Dürrenstein Mountain as the Dürrenstein Wilderness Area (Dürrenstein Wildnis-gebiet). The wilderness area is 460 hectares (1,136 acres) and is part of a larger 2,400 hectare (5,928 acre) protected complex (Jones 2006).

Sweden does not designate wilderness areas and does not have a wilderness law. However, a joint publication by the National Board of Forestry and the Swedish Environmental Protection Agency entitled *Protecting the Forests of Sweden, Legal Protection in the Form of National Parks, Nature Reserves, Habitat Protection Areas and Nature Conservation Agreements* states that 3.3 million hectares (8.2 million acres) are managed according to IUCN's Category 1b-Wilderness.

Wilderness has been under discussion in Germany and the Czech Republic, in particular with respect to a transboundary protected area shared by the two countries (see below) and plans for a Greater Bohemian Forest Ecosystem. In Slovakia, a project to protect intact valleys in the northern part of the country is called the Ticha

Figures 5 and 6—Wilderness experience programs are used by The Wilderness Foundation UK to address personal growth and social issues, for example on this trip to Ulva in the Inner Hebrides. Photo by The Wilderness Foundation UK.

Wilderness (www.tichawilderness.com). BirdLife International developed a conference in Slovakia called Biologically Important Forests: Megacorridors of the European Wilderness?, to be held in Tatra National Park in Slovakia in October 2008.

Italy

There was a great victory for wilderness preservation in Italy—and for Europe—on December 28, 2008, when the Friuli Venezia Giulia Autonomous Region in northeastern Italy approved Deliberazione n. 3304. Deliberazione n. 3304 represents the first legislative wilderness designation in Europe since Finland's landmark wilderness designations in 1991, and the first wilderness designation for a European regional government. Thanks to a previous general directive (n. 3117 of December 15, 2006) the Friuli Venezia Giulia Regional authorities have now approved eight wilderness areas for a total of 3,772 hectares (9,318 acres).

Most of the work on this project was done by the Italian Wilderness Society (Associazione Italiana per la Wilderness—AIW). AIW has worked for 25 years to develop a wilderness preservation model for Italy, and has helped establish 51 wilderness areas totaling more than 33,000 hectares (81,510 acres) on municipal lands, regional public lands, and by private organizations and philanthropic individuals.

In the executive section of the Deliberazione, the Regional Board of the Friuli Venezia Giulia Autonomous Region makes reference to the first designated wilderness area in the world (the Gila Wilderness in New Mexico), to the U.S. Wilderness Act of 1964, to the resolutions on Italy approved by the 4th and 5th World Wilderness Congresses, and to the IUCN's Category Ib—Wilderness in IUCN's protected area classification system.

This regional law or Decision (Deliberazione, in Italian) is the first time that a legislative authority has recognized a wilderness protected area in Italy. The Deliberazione is important since it recognizes a wilderness preservation concept for all regional forested lands in the public domain, opening the door for future expansion of the existing designations, and for new wilderness designations. The Deliberazione allows municipalities to designate communal lands bordering the regional wilderness.

The Deliberazione recognizes the eight other wilderness areas in the Friuli region established by the AIW, thereby giving political recognition to the larger wilderness system in the region as well. These additional eight wilderness areas include mountainous areas with beech, black pine, red and white spruce, and larch forests, with high pasture, scenic rock formations, and wild rivers. Their rich wildlife includes red dear, roe dear, chamois, golden eagle, griffon vulture, eagle owl, pygmy owl, Tengmalm's owl, capercaillie, black grouse, hazel hen, the rare three-toed woodpecker, and other alpine birds. In some cases, lynx and brown bear are also present, migrating from the nearby mountains of Slovenia. The flora includes many endemic and rare species of the Dolomite and Balkan areas.

The hope is now that all these areas may be expanded to nearby Regional and Communal wildlands, so that a real "Regional Wilderness Law" can be presented and discussed in the Regional Parliament; and that other Italian regional governments will follow with their own Deliberazione for wilderness areas.

Germany and the Czech Republic

In addition to Italy, central Europe is another region where large-scale

Figure 7—Mount Flagjel, Monte Flagjel Wilderness Area, Friuli, Italy. Photo by Claudio Bassi.

conservation is making great strides. Southern Germany and the Czech Republic share one of the largest areas of wild and semiwild forested land in central Europe, much of which is protected by adjoining reserves: the Sumava National Park in the Czech Republic and the Bavarian Forest National Park in Germany. Together these parks cover 93,280 hectares (230,500 acres), and protect populations of capercaillie (*Tetrao urogallus*—a large grouse species), lynx (*Lynx lynx*), red deer (*Cervus elaphus*), and hasel grouse (*Bonasa bonasia*). Wildlife biologists anticipate that migrating wolves and moose will eventually repopulate this area. Although this area is large, estimates are that wildlife populations must be managed within an even larger system to persist. As a result, conservationists in the region are calling for a strategy for a Greater Bohemian Forest Ecosystem, which would involve a mix of conservation and wildlife friendly land uses to ensure the sustainability of current wildlife populations.

Unfortunately, the spectacular Sumava-Bavarian Forest transboundary protected area is now under some threat from increased recreational use given that the Schengen Treaty, which came into effect December 21, 2007, allows tourists to cross the border between the two countries freely. In anticipation of significant increases in tourism as a result of this development, the directors of the Sumava and the Bavarian Forest National Parks came to together on March 13, 2008, to sign an agreement on the joint management of a core area of about 13,900 hectares (34,348 acres; 64.7% of it in the Czech Republic and 45.3% in Germany). The plan is to increase the core area under joint management to about 25,000 to 30,000 hectares (about 60,000 to 75,000 acres). The plan for the core zone includes the closure of about 40 km (24.8 miles) of trails, to be replaced by about 15 km (9.3 miles) of new trails, where public access is allowed only from July 15 to October 31. A plan will be implemented in both parks to monitor impacts from recreation.

The decision to manage this area as one transboundary complex is significant progress, particularly as the joint management agreement makes use of the term *wilderness* (Germany: *wildnis* / Czech: *divocina*) in a number of places. Although Germany does not include a formal wilderness protected area classification in its national system, the guiding philosophy for Germany's parks, developed by Hans Bibelriether, the first director of the Bavarian Forest National Park and one of the pioneers of the "National park idea" in Germany, can be summarized by the motto "let nature be nature." This motto, which has been applied to all of Germany's national parks, is usually interpreted as "protecting and maintaining extensive (as a rule) ecosystems and viable functioning ecological processes largely without human interference." Thus, Germany's management approach to its 14 national parks covering 963,835 hectares (2.3 million acres), or about 2.6% of the total area of Germany, is related to the wilderness concept.

In practice, however, most of Germany's protected area system does not yet consist of "extensive ecosystems and viable functioning ecological processes." Holger Wesemüller, vice chairperson of the Protected Area NGO *Europarc Deutschland* estimates that "not much more than one percent" of Germany currently meets this standard. This number is important. In May 2008, Germany hosted the 9th Conference of the Parties to the Convention on Biological Diversity. Anticipating this event, the German Parliament developed a National Strategy for Biological Diversity, which states that Germany—along with all EU countries—will halt the loss of biodiversity by the year 2010. This paper—dated November 11, 2007—explicitly states that the target for 2020 is to protect 2% of the country as wilderness areas (*wildnisgebiete*).

Upon inquiry, a press spokeperson of the German Federal Ministry of the Environment emphasized that the term *wilderness area*s does not necessarily correspond to the matching IUCN protected area category nomenclature. Instead, the definition for wilderness areas, according to the 2007 federal paper, generally means: "large areas where nature is allowed to develop according to her own devices" or as stated above, areas where "extensive ecosystems and viable functioning ecological processes are protected largely without human interference."

Conclusion

Europeans have systematically reduced their wilderness resource for

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Personal Reflections on the Fate of Wilderness Reserves in Russia

BY KATHLEEN BRADEN

Nature is dying in Russia. Poachers or habitat loss have decimated wildlife populations such as snow leopard, argali, Asian marmot, and Amur leopard. At this moment of greatest need, the network of Russian nature reserves that saves pockets of Eurasia's threatened species has fallen on hard times. Many reserves exist on paper only; most are under siege, and all are severely understaffed.

Nature Reserves Threatened

For more than 90 years, Russia had a vision: to keep sanctuaries of wilderness alive across the biggest country on Earth. The very word in Russian for the reserves, *zapovedniki*, implied they were forbidden territory, with almost biblical sanction. Off-limits to all but either scientists or wilderness inspectors, the protected territories were not for tourism, but for conservation and research.

The light of that vision endured through times of crushing poverty, the whims of dictators, and all Russia's wars of the 20th century. But in recent times, it is growing dim, and might not survive the neglect of its own government or the attention of the outside world. New winds called "the bottom line" may soon extinguish the light entirely.

Although there had always been pressure to open the reserves for economic use, at least the Soviet government paid minimally for staff salaries, housing, and equipment. Things changed radically after the USSR ceased to exist. The *zapovedniki* were on their own with their budgets under the new Russian Federation cut by 90% (Jorgensen and Honneland 2006). Wages for inspectors stagnated while the cost of living skyrocketed. In the mid-1990s, the EcoClub (2008) website posted job announcements that told the story:

- Assistant Director S. Khokhryakov of the Lazovskiy Reserve sends word that he really needs some specialists and kind-hearted folks for temporary work, but at the present time, the reserve has no means to pay for transit documents or its full work plan.
- Central Siberian Reserve is looking for ten people from May–September for temporary work on science projects. In 1996 the reserve does not have the ability to pay transportation and salary.

Kathleen Braden at Sayano-Shushenskiy Reserve.

Slashed budgets were just the beginning of the changes in store. By the year 2000, Russian Federation president Vladimir Putin had abolished the State Committee for Environmental Protection and moved care of the territories to the Ministry of Natural Resources, the same bureaucracy responsible for determining how to draw profits from Russia's minerals and forests. The reserves were to become "self-compensating" (*samookupaemost*) as part of the effort to attract private-sector partners (Center for Russian Nature Conservation 2003; Stepanitskiy 2004).

True, reserve buffer zones had been created back in Soviet times to allow use by local people, and yes, Communist Party officials had flouted the rules and taken occasional duck shooting trips, but now the buffer zones were open for business to wealthy New Russians or any foreigner who could pay. The idea was to maintain a sustainable harvest of trophy animals and use the proceeds to fill in the funding gap for biodiversity protection.

One of the places attractive to hunters was the Altai Mountains. In 2005, I traveled there with my husband, Zhenya, who often conducted fieldwork on snow leopards in Russia. I met his friend, Volodya Yantiev, an inspector with

the Shavlinskiy reserve. Yantiev was famous with locals because he had apprehended a group of wealthy Moscow tourists who had been planning a hunting party with a helicopter that briefly touched down in the neighborhood. The pilot replied that everyone inside had legal licenses. Later, when the craft returned, Yantiev boarded and on the cabin floor found 10 dead ibex goats, including breeding females, shot from the local herd of 14 animals. He was furious and took photos. The poachers turned out to include Alexis Saurin, a figure high up in the Department of Conservation and Hunting Resources in the national Ministry of Agriculture. The local prosecutor told Volodya no action would be taken against him if he hushed up the incident. He didn't. The story and images were published in the Altai press and read with dismay by ordinary folks who had seen the cost of their hunting licenses rise far beyond what they could afford (Vitovstev 2004).

The word on biodiversity seemed to get worse every year. Illegal trade in wildlife increased thanks to open borders with China and corruption at every level. Even the extensive brown bear population was under threat by poachers who harvested the bears' gallbladders. Along the Caspian Sea, the caviar stock was threatened due to overharvest and in Kamchatka, illegal fishing had almost destroyed salmon stocks and cost an official on patrol along the Pacific his life during an encounter with poachers in 2002 (reported as brief note in *Earth Island Journal*, Dec. 22, 2002). One Siberian inspector, Alexei Novoselov, and three coworkers disappeared while on patrol, apparently at the hand of poachers, and were assumed murdered. Although bodies weren't found, poachers who came across the border from the Tyva Republic were prime suspects (Hiatt 1994). The case turned into a political hot potato between Tyva and Russia.

Figure 1—Wolf print at Sayano-Shushenskiy Reserve. Photo by Kathleen Braden.

Figure 2—Musk deer snares. Photo by E. Kashkarov.

Despite these grim reports, Zhenya occasionally heard of a bright spot from his contacts. A biologist friend, Viktor Lukarevskiy, emailed that he had found good sign of snow leopard tracks and markings in the Altai reserve. Most of the messages, though, sent Zhenya into a black mood. Musk deer, a small animal with long, curved tusks, had been common in Siberia, but populations had declined up to 80% as poachers killed males for their pods (World Wide Fund for Nature [WWF] 2004). During his fieldwork, Zhenya tried to destroy or collect every snare he encountered.

The situation was all the more infuriating given the money coming in from large international donors. Since the mid-1990s, more than $170 million from abroad entered the country for nature protection as large wildlife conservation groups stepped into the void left by the Russian government's shrinking conservation ruble (The World Bank Group 1994). A key player was the World Wide Fund for Nature (called the World Wildlife Fund in the United States and Canada and sharing the same WWF acronym), the financial supporter for nature reserves across the continent. The organization's panda symbol ("for a living planet") showed up on reserve vehicles, printed materials, Web sites, and even the Russian inspector uniforms, prompting one American conservationist to call WWF "the 500-pound panda in the closet."

When I went to Siberia in 2005, those panda people had a big plan on the table: the Altai-Sayan Ecoregion project, funded in part by World Bank money and implemented through the United Nations Development Programme and WWF. According to the documents I obtained from the World Bank, large sums were involved ($3.85 million provided by the World Bank alone), as well as plans to train local people for tourism, increase hunting near the reserves, establish new reserves in the region, and expand the boundaries of existing ones. The documents used all the words that Western funding agencies loved to hear: *sustainability, local stakeholders, integrated*

networks, flagship species (United Nations Development Programme n.d.). The plan seemed to offer innovative forms of user-fees, and these new forms of financing for the reserves were controversial in Russia. Old-timers whose management expertise dated back to the Soviet period were appalled that the reserves would turn to commerce to stay viable.

In March, I was teaching in the Siberian city of Barnaul, and observed a meeting of the region's Association of Reserves and National Parks. Knowing what I did about the World Bank proposal, I was expecting to hear a hot discussion. Instead, I witnessed a quiet clash of cultures. The WWF people, in khakis and T-shirts displaying slogans from American national parks, sat at laptops, intense and well-organized. The reserve staff in their Soviet-era suits looked uncomfortable and were easily distracted. They stood up and gave impromptu speeches, slapped each other on the back in greeting, yelled messages across the room, made drumsticks out of their pencils, and peered at articles about wildlife when they were supposed to be listening to the speakers. The WWF representative tried to get the directors focused back on the work at hand and pass resolutions to send back to the government in Moscow.

Aleksandr Rassolov stood out at the Barnaul conference. He managed the Sayano-Shushenskiy reserve in Krasnoyarsk Kray and had a reputation as one dynamite entrepreneur. Trim and well put-together in his sport jacket, Rassolov was enthusiastic about what they had achieved. "Come and see for yourself," he told my husband and me, "and you will find a *zapovednik* where the wildlife is still alive and thriving." We'd heard that Rassolov had succeeded in attracting support from a nearby aluminum company and was bringing hunting parties and tourists into the buffer zones around the reserve, moving it much further toward self-support than the other struggling *zapovedniki.* Since Rassolov's operation seemed to be the model called for in the Altai-Sayan plan, we decided to take him up on his invitation.

Sayano-Shushenskiy Reserve

On the first day in May after the ice melted on the Yenisey, Zhenya and I joined some of the reserve staff to wait for the cutter boat that would take us to the reserve. We met at a launch point behind the hydroelectric station on a dark and bone-chilling afternoon. Many of the construction team traveling out for summer work were just youngsters, happy to be employed, and the box of empty vodka bottles on the deck under the back awning suggested they had started celebrating hours before we arrived. I noticed that the boat crew was hooking up a barge and peering at the mess, I could discern lumber, food supplies, machinery, building materials, a child's bike, boxes of electronics, outdoor gear, and cheap, Chinese-made antenna dishes. There may have been a backhoe too; it was hard to tell. The cutter was packed solid, with each square inch holding supplies or a staff member's personal belongings.

Zhenya struck up a conversation with Igor Kalmykov, a big guy in camouflage fatigues, one of the reserve's inspectors. Igor was a member of the WWF-sponsored snow leopard anti-poaching brigade. As assistant director for science at the reserve, he seemed to be the leader on board.

I made my way to the back of the boat deck where the construction workers were drinking and smoking Belomorcanals. They all seemed to be simple country guys, some already missing teeth, but one named Peter was slightly older and left to nap.

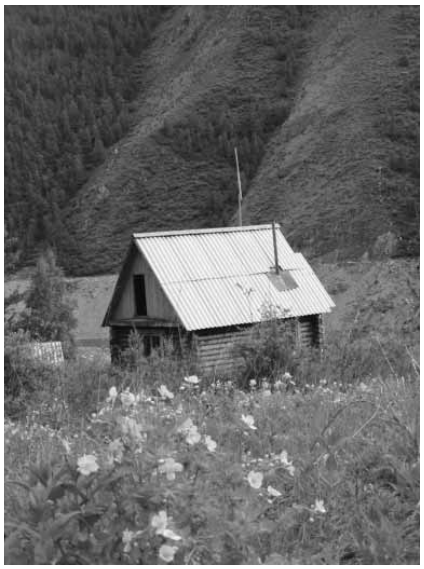

Figure 3—Science station at Maliy Uri River. Photo by Kathleen Braden.

The cutter reached Kurgol station along the banks of the reservoir. Two large houses designed to serve as a type of bed-and-breakfast for ecotourists stood partially built. A shiny boat named the *Amyl* was tied up at the shoreline, and Igor asked if we would we like to go aboard for lunch.

We were shown to a dining room on the upper deck, light filtering in through picture windows and plates of fresh greens and caviar laid out on the table. The well-heeled European passengers told us that they paid to hunt game in the buffer zone around the reserve every year. The boat was part of the infrastructure built by Rassolov to develop tourism, just like the reserve's private hotel where we had stayed in Shushenskoye two nights earlier. Someone had put careful planning into that little hotel. It was rustic, but had the same classy feel as the *Amyl.*

After lunch, our next stop was Shugur station, almost to the border with the Tyva (Tuva) Republic. Igor showed us around the outpost. In addition to the simple houses with sleeping quarters and a ham radio, there was an open-air kitchen, an outhouse, and the necessary *banya*

Figure 4—Igor Kalmykov with ibex rack. Photo by E. Kashkarov.

(bath-house). Promptly at 9 a.m. and 4 p.m., all the staff gathered around their ham radios and let everyone know they were safe, checking in with details and observations.

Our last stop of the day was a remote spot where the Bolshiye Uri River flowed into the reservoir. I didn't see a ranger station, but we pulled up to the bank and dropped off Peter, who had finally woken up. Why did one of the construction crew need to be out here, so far from everything else? Igor explained that Peter wasn't a construction worker; he was an inspector—in fact, one of their most experienced guys, who had done reserve work for 20 years. "Peter didn't need to see the scenery along the way," laughed Igor, "He's seen it all before."

Toward the end of our week in the reserve, we stopped at the science station along the Maliye Uri River. Two tidy huts faced the river and steep, green hills on the opposite bank. A small stream filled the air with water sounds and the meadows were covered by yellow wildflowers. Igor Kalmykov surveyed the shore and picked up a goat skull with horns. Most likely a wolf kill, it would be brought back to the Shushenskoye headquarters for examination.

Zhenya headed up the slopes to look for snow leopard sign, and I took a walk along the shoreline. Along the hillsides, forests were interspersed with rocky outcroppings. I followed a line of wolf tracks and then sat in the sand with my back against a log, watching a group of ibex high up above me in the sunshine. A merganser guarded her eight babies in the river nearby. It was very quiet, maybe a vision of Eden.

On our last night at the reserve, we all gathered in the hotel kitchen back in the town of Shushenskoye. The guys drank vodka and then retired to the *banya*, bottles in hand. When they emerged with steaming bodies wrapped in white towels, Igor seemed ready for one more conversation.

I told him about my wish to discern the truth of nature conservation in Russia and to understand what motivated someone to work in the *zapovedniki*. It was hard for me to picture development of ecotourism or hunting that might stay within quotas. Furthermore, I could not imagine that any amount of "sustainable alternative livelihoods" (in the jargon of the Western megafunds) could make a dent in the walls between local people and the *zapovedniki*. It was the reserve workers themselves who seemed to be the real guardians of nature in Russia. What made them keep at it despite the dangers and low pay?

Igor paused a moment before replying. "I think you might have noticed the reserve is like a big *kolkhoz* [collective farm]. It needs teams who will work together and it needs organization."

I asked, "What is it going to take to get more of these international grants to end up directly with the *zapovedniki* people?"

Igor would have none of it. "Do you really think that money is what motivates these guys? Sure, we could always use more money, better training, more equipment, but I don't imagine any of them would do very much differently just for more money." He did allow that attracting smart young trainees into the profession was a problem, and he worried about the future. "I guess we are endangered too in our own way—getting smaller in numbers and trying to keep our traditions alive."

I said that the workers still seemed like heroes to me. Once more, he challenged my argument. "Some of these people really are heroes to me too. But a lot of them are here for their own reasons. Some can't adjust too well to life and need a place to hide out. Like any group, you find all kinds. Don't idealize us."

The men were tired now and more than a little drunk, so I stopped asking questions, knowing they needed to sleep. But I was not ready for bed and tried to sort things out. Was it delusional to think the Putin government would support the reserves properly again? Were most of the Soviet-era staff just dinosaurs, stuck in a time that would never return? In the realities of the new Russia, would the only effective managers be those who could bend and sell off for tourism or hunting part of the very territory they needed to protect?

I decided to download photos of my week at Sayano-Shushenskiy. Here was one of Peter being dropped off in the rain at a little cove of the Bolshiye Uri River. In the picture, it looked like Peter was sober now, hoisting up his heavy backpack and trying to blink himself awake. The moment of that photo came back to me: it was late and he still had a three-hour hike in front of him to the Chul-Aksy hut at the far end of the reserve, the far end of planet Earth. He'd probably stay there many months before coming out again. As the boat backed up, I watched his figure grow smaller along the shoreline. I hoped he would have enough of the evening light to help him find the way.

Postscript

On January 16, 2006, the Ministry of Natural Resources issued a decree to

the reserve directors, mandating that they generate a profit of 154.5 million rubles (approximately $5.5 million dollars) that year (Ministry of Natural Resources 2006). In March 2007, new rules limited the ability of reserve inspectors to levy fines against poachers on-site, moving the function to bureaucrats in distant urban areas (Goroshkova 2007). Zoning was changed for the Sochi National Park near the Caucasus Nature Reserve to pave the way for resort development associated with Russia's 2014 Winter Olympics. Over protests of environmental groups, a new agreement with China resulted in approval for a gas pipeline to cross the Altai's Ukok Plateau, a UNESCO World Heritage Site protected territory (Braden 2007).

My husband received another email from Viktor Lukarevskiy, who had just updated his field research on snow leopards along one of the Altai mountain ranges. "How many tracks did he see this time?" I asked. Zhenya looked up from his computer screen: "None."

In May 2007, Igor Kalmykov was picked to be the director of the Altai Reserve, with a territory more than twice that of Sayano-Shushenkiy. He has recently announced plans to develop a Visitor Center to welcome tourists. IJW

References

Braden, Kathleen. 2007. Russian Olympics: Will greens see red? The Seattle Times, July 12, 2007.

Center for Russian Nature Conservation. 2003, www.wild-russia.org/archives/dec2003.htm (accessed January 20, 2008).

Ecoclub. 2008, ecoclub.nsu.ru/books/Vest_3-4/vest3-12.htm, (accessed January 20, 2008).

Goroshkova, Renata. 2007, 47 News on July 3, 2007, www.47news.ru/1/16875/ (accessed January 20 2008).

Hiatt, Fred. 1994. Without a trace: Siberian rangers vanish in disputed nature area. The Washington Post, November 16, 1994, p. A19.

Jorgensen, J., and G. Honneland. 2006. Implementing global nature protection agreements in Russia. Journal of International Wildlife Law and Policy9(1): 33-53

Ministry of Natural Resources. 2006. Biodat NGO report on new laws on financing reserves, order dated Jan. 16, 2006, www.biodat.ru/db/oopt/doc/doc82.htm (accessed January 20, 2008).

Stepanitskiy, V. B. 2004. www.biodiversity.ru/publications/zpnp/archive/n44/st08.html, Center for Protection of Wild Nature. No. 44 (accessed 2008).

The World Bank Group. 1994. Planned loans for environmental work in Russia. Press release No 95/27ECA, Russian Federation, Nov. 8.

United Nations Development Programme. N.d. Biodiversity conservation in the Russian portion of the Altai-Sayan Ecoregion—Phase I, PIMS #1685. Proposal re GEF 1177. Government of Russian Federation, Global Environment Facility.

Vitovstev, N. 2004. Newspaper Postskriptum, no. 18.

World Wide Fund for Nature. 2004. Musk deer populations dwindling in Russia and Mongolia, www.panda.org/news_facts/newsroom/news/index.cfm?uNewsID=14172, posted on July 15, 2004 (accessed January 20, 2008).

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centuries: initially out of fear of a hostile environment, then to maximize agricultural productivity, and finally, because the cultural and aesthetic values of traditional agricultural landscapes had become so highly valued that maintaining them, through heavy subsidies if necessary, became a high priority. As a result, the wilderness concept still meets considerable resistance throughout the continent. Nonetheless, the mindset is changing, and momentum for wilderness is building. In our view, we have crossed a critical threshold: building toward a European strategy for wilderness conservation is a difficult undertaking, but we believe it will happen in the foreseeable future. IJW

References

Baltzer, Mike. 2007. Private conversation, WWF Danube-Carpathian Programme Office, Romania; mbaltzer@wwfdcp.org.

Jones, Wendy. 2006. LIFE and European forests, European Commission, pp. 42–43. http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/forest_lr.pdf (accessed 2008).

Theil, Stefan. 2005. Into the woods: Economics and declining birthrates are pushing large swaths of Europe back to their primeval state, with wolves taking the place of people. Newsweek, July 4, 2005.

Vera, Frans, and Frans Buissink. 2007. *Wilderness in Europe*. The Netherlands: Tirion Publishers.

Williams, Laura Lynne. 2008. *The Stork's Nest*. Golden, CO: Fulcrum Publishing.

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Announcements

Compiled by Greg Kroll

NPS Chief of Wilderness Stewardship and Recreation Management

Garry Oye has been named chief of the National Park Service's Wilderness Stewardship and Recreation Management Division in Washington, D.C. "Garry comes to us with a distinguished career in public land management," said Karen Taylor-Goodrich, associate director for Visitor and Resource Protection. "Along with his strong background in field operations, he has provided solution-based leadership on significant Forest Service and interagency wilderness and recreation management issues over the years, and I am delighted that he is joining our team." Garry's public land management career has included a broad range of field and leadership assignments in Idaho, Montana, Colorado, Wyoming, Utah, California, and Washington, D.C. His accomplishments include a key role in the development of the Forest Service's Wilderness Recreation Strategy and the Chief's National Wilderness Advisory Group, as well as providing regional leadership for the Pacific Crest National Scenic Trail and designated wilderness areas in the Pacific Southwest Region. Garry is also a recipient of the Bob Marshall–National Wilderness Champion Award. "I am honored to be selected for this national leadership position. I feel fortunate to have lived and worked in the Eastern Sierra," said Garry, who has been on the Inyo National Forest since 2002. "I have enjoyed working with the Inyo Forest employees, numerous partners and government agencies, and with local citizens. As I look back on our efforts, I am very proud of the progress we made together. The Inyo National Forest is truly a gem of this nation and I am so thankful for the time I spent here. I'll be back." (Source: *USDA Forest Service Inyo National Forest* newsletter, March 24, 2008)

BLM Senior Wilderness Specialist

Dave Harmon has been named the new senior wilderness specialist in the Washington Office for the wilderness program, a component of the National Landscape Conservation System, in the Bureau of Land Management (BLM). Dave was working in the Oregon State BLM Office responsible for wilderness. Dave's experience in the wilderness program extends back to the early days of wilderness policy development. Dave was raised in western Oregon and graduated from Oregon State University (OSU) with a BS in forest management–recreation in 1970, and received a master of forestry degree from OSU in 1971. Dave lived in the Black Hills of South Dakota and Colorado, and then moved to Oregon when his father was transferred to the Regional Office of the Forest Service. Dave grew up working in the woods on the family tree farm in Clackamas County, Oregon. A summer in 1968 in the John Muir Wilderness as a wilderness ranger provided him with a strong interest in the management of wilderness. His master's degree work focused on the challenges of wilderness management, and he followed that with some teaching assignments at Oregon State University and Western Washington State University (then Western Washington State College), where he taught the first wilderness management classes offered at those institutions in the

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early 1970s. He transferred from the Forest Service in Idaho to the Nevada State Office of the BLM in Reno in 1978, where he coordinated the statewide wilderness inventory and study process dictated by the new wilderness provisions of the Federal Land Policy and Management Act. In 1987 he transferred to BLM's Oregon State Office where he served as the wilderness program leader and forester in charge of the public domain forestry program for Oregon and Washington. (Source: BLM and Dave Harmon)

Handbook on International Wilderness Law and Policy Now Available

A Handbook on International Wilderness Law and Policy, the first comprehensive guide to wilderness laws and policies around the world, has recently been published by The WILD Foundation (Boulder, Colorado, USA) and Fulcrum Publishing (Golden, Colorado, USA). This book provides a detailed "how-to" guide for conservation professionals interested in developing new wilderness laws or policies in their countries. It also offers the most current information to practitioners in countries where wilderness laws and policies are already in place, but who are interested in learning from other approaches and experiences. In addition to case studies written by leading conservationists from 12 countries and one indigenous group (Montana's Confederated Salish and Kootenai), the book provides a matrix allowing for easy comparison of the different wilderness definitions in use around the world. Edited by Cyril Kormos, WILD's vice president for policy (cyril@wild.org), the handbook is now available from Fulcrum Publishing in Golden, Colorado: www.fulcrumbooks.com/index.cfm. It includes a preface by Vance Martin, president of The WILD Foundation, and Ian Player, founder of The WILD Foundation and the World Wilderness Congress. The foreword is authored by Karen Taylor-Goodrich (deputy director, National Park Service) and Elena Daly (deputy director, Bureau of Land Management), chair and vice-chair, respectively, of the U.S. government's Interagency Wilderness Policy Council.

WILD 9 Planning Is Underway

WILD 9, the 9th World Wilderness Congress (WWC), will convene November 6 to 13, 2009, in Mérida, in the heart of the Yucatán, México, Mesoamérica, a diverse ecoregion steeped in the history of ancient Mayan culture. One of the planners' first steps was to engage friends in the communications and media sectors, on a pro bono basis, to create a plan to reach out to Latinos. Organizers at The WILD Foundation wanted a fresh look and feel that transcends the normal institutional language that can constrain wider public involvement in conservation. Thus they agreed on the tagline: Feel, Think, Act; in Spanish: Siente, Piensa, Actúa.

The next step was a logo competition coordinated by El Ingenio, a Mexico City–based marketing firm. Six Mexican designers responded, each with logos representing the four key communication elements of WILD 9: the tagline; the word *wild* (as *wilderness* does not easily translate into Spanish); the WWC emphasis on wild nature and people; and a strong call-to-action. From the designs submitted, the powerful logo by Felipe Romano Tapia was selected (see the color version on the back cover of *IJW*). Tapia's design uses a strong Mayan character to represent humans' place in nature, accented with a scarlet macaw headdress, the emblem of the rain forests in Latin America. The number 9 is symbolized by the *virgula de la palabra*, an element seen in Mayan codices and glyph stones, representing communication. (For more details, see www.wild9.org.)

First Legislated Wilderness Areas Protected in Italy

Thanks to a 25-year effort by the Italian Wilderness Society (Associazione Italiana per la Wilderness–AIW), the regional board of the Friuli Venezia Giulia Autonomous Region has established eight wilderness areas encompassing a total of 9,315 acres (3,770 ha). This is the first time a legislative authority has recognized protected wilderness in Italy. The law also provides a wilderness preservation concept for all regional forested lands in the public domain, opening the door for the establishment of new wilderness areas. (Source: Frank Zunino; wilderness.italia@libero.it). (For more details, see the article entitled "Wilderness Momentum in Europe" in this issue of *IJW*.)

Kiribati Creates World's Largest Marine Protected Area

The Pacific island nation of Kiribati (pronounced "Kiribas") has created the world's largest protected marine reserve. The California-sized Phoenix Islands Protected Area lies near the equator about halfway between Fiji and Hawaii. At 158,500 square miles (410,500 sq. km), it is home to one of the richest marine feeding and spawning grounds in the world, and encompasses a coral archipelago, two submerged reef systems, and underwater mountains. Although islanders will be able to continue subsistence fishing in the reserve, commercial fishing will be banned.

Research expeditions from the New England Aquarium have documented more than 120 species of coral and 520 species of fish, some new to science. Nesting seabirds and the presence of both sea turtles and marine mammals indicate the reserve is an important migration route for marine species. In creating the protected area, this impoverished nation of 100,000 will relinquish millions of dollars in annual commercial fishing licenses, but Kiribati officials hope to make up for some of the lost revenue through increased tourism.

U.S.-based Conservation International is helping the Kiribati government develop a management and funding plan for the protected area. Tebwe Ietaake, secretary of Kiribati's environment ministry, said "a major part of the operational cost is surveillance and we have a patrol boat donated by Australia. We are also looking at the cooperation of Australia and New Zealand in aerial surveillance flights over the region." The Phoenix Islands reserve is slightly larger than the Papahanaumokuakea Marine National Monument in Hawaii. Although 12% of the Earth's land surface is under some form of environmental protection, only 0.5% of the world's oceans are similarly protected. (Sources: Reuters, February 14, 2008; *The Telegraph* (U.K.), March 30, 2006; and www.conservation.org/FMG/Articles/Pages/kiribati-worlds-largest-marine-protected-area.aspx)

BLM Approves Multiple Helicopter Landings in Wilderness

In a Finding of No Significant Impact (FONSI), the U.S. Bureau of Land Management (BLM) has approved multiple helicopter landings in Nevada's La Madre Mountain and Rainbow Mountain Wilderness Areas. At the request of the Las Vegas Metropolitan Police Department (LVMPD), which conducts search-and-rescue operations on behalf of the BLM-administered Red Rock Canyon National Conservation Area, helicopter pilot training and search-and-rescue crew training will be permitted within the two wilderness areas.

According to the Environmental Assessment (EA) dated October 30, 2007, the National Conservation Area's "combination of cliffs and visitors" results in occasional injury accidents from falls and disorientation for some users who, during the course of exploring, find themselves stranded on remote ledges. Approximately 15 to 20 rescues occur each year within the two wilderness areas, and all rescues are supported by helicopter and ground crews, most utilizing high angle rescue techniques. Although helicopter landings are generally prohibited under Section 4(c) of the Wilderness Act of 1964, the BLM has determined that for training purposes the landings are the minimum necessary for the administration of the areas as wilderness.

The BLM states that the agency's "goal is to provide a challenging and safe recreation experience for the average visitor. When visitors injure themselves, they expect to be rescued in a timely manner." The LVMPD's Search and Rescue Unit has identified 24 training sites within the two wilderness areas, claiming that there are no other areas within Clark County that have the same terrain and weather patterns. The EA also states that an element in identifying training sites is proximity to the city of Las Vegas and "ease of access for members of the team."

Although Alternative "A" of the EA would limit training landings to two calendar days a year, the approved alternative authorizes the landing of helicopters in designated wilderness for a total of 48 hours in a calendar year. No limitation is placed upon the number of days during which training can occur. Due to the FONSI, BLM has determined that an environmental impact statement is not required. Source: BLM, Las Vegas, Nevada, field office.

President Bush Orders Agencies to Promote Hunting

By way of a presidential executive order, U.S. president George W. Bush has directed land management agencies to "expand and enhance hunting opportunities" on federal lands. The president has ordered the interior and agriculture secretaries to work with the Sporting Conservation Council to develop "a comprehensive recreational hunting and wildlife conservation plan" as well as a 10-year agenda for fulfilling the executive order. The Sporting Conservation Council was created by then interior secretary Gale Norton, just before her resignation in 2006, and includes representatives of the National Rifle Association, Safari Club International, Rocky Mountain Elk Foundation, Ducks Unlimited, Boone and Crocket Club, and the International Association of Fish and Wildlife Agencies, among other organizations.

The executive order, dated August 16, 2007, mandates that federal land managers "manage wildlife and wildlife habitats on public lands in a manner that expands and enhances hunting opportunities, including through the use of hunting in wildlife management"; defer to "private property rights and State management authority over wildlife resources"; and foster "productive populations of game species and appropriate opportunities for the public to hunt those species." Although the order explicitly covers national forests, wildlife refuges, and rangelands, it also applies to all federal agencies "that have a measurable effect

on land management," such as military bases. These federal agencies must now "evaluate the effect of [their] actions on trends in hunting participation [and] consider the economic and recreational value of hunting in agency actions."

The executive order coincides with a recent U.S. Fish and Wildlife survey concluding that American hunters have declined by 7% in the past five years. Jeff Ruch, executive director of Public Employees for Environmental Responsibility (PEER), says that while the order does not overturn any conservation laws, it establishes a preference for hunting at the expense of all other activities in the administration of federal lands. (Sources: for the executive order: http://www.whitehouse.gov/news/releases/2007/08/20070817.html; www.peer.org/news/news_id.php?row_id=907; *Casper Star-Tribune*, August 23, 2007)

Wild Europe 2008 Tour

In spite of its ancient cultures and manicured landscapes, central Europe can still boast of wilderness and wildlife. More than half a century of conservation has brought wildness back to many regions. Advances in wildlife management have returned red deer to the mountainsides, and even wolves, bears, and lynx make occasional appearances. From September 27 through October 7, the Wild Europe 2008 excursion will visit four national parks in four countries (Germany, Switzerland, Italy, and the Czech Republic), accompanied by wilderness and wildlife experts. There will be an opportunity to hike in a newly designated transboundary wilderness area on the Czech-Bavarian border. And in addition to a visit to Prague, there will be the truly wild opportunity to participate in the original Oktoberfest in Munich. (For details, go to www.eco-voyage.de/wild-europe-tour.)

Colorado Peace Officers to Enforce Federal Regulations on Off-road Vehicle Use

In an unprecedented move, Colorado governor Bill Ritter signed into law a bill that puts in place an agreement allowing state peace officers to enforce federal regulations. According to the *Montrose Daily*, House Bill 1069, which went into effect on July 1, 2008, "prohibits motor vehicle use on public areas unless the land is marked accessible by the controlling land management agency; makes a violation of the law a misdemeanor and establishes a fine of $100, and a penalty of 10 hunting license suspension points, to violators who were also hunting, fishing or trapping; [and] if [the] violation occurs in federal wilderness areas, a penalty of 15 hunting license suspension points (where applicable) and a fine of $200 for violations is assessed."

The law reverses the long-standing practice of allowing motor vehicle travel except where restricted. Instead, it prohibits such travel unless it is explicitly authorized by maps, signs, or route markers. The legislation arose from concerns that federal land management agencies lack the necessary law enforcement personnel to deal with off-road and off-trail use. According to the *Montrose Daily*, the bill had broad support across a spectrum of groups, including off-road vehicle users, environmentalists, and wildlife conservationists. The law expires in July 2013. (Source: *Montrose Daily* [Colorado], March 21, 2008)

Book Reviews

The Gentle Subversive: Rachel Carson, Silent Spring, and the Rise of the Environmental Movement

By Mark H. Lytle. 2007. Oxford, UK: Oxford University Press. 288 pp. $16.95 (paperback).

The basic story of Rachel Carson's classic *Silent Spring* is well known: it introduced public awareness and concern on the indiscriminate use of pesticides. Perhaps less well known, although two biographies of Rachel Carson already exist, is the story of Rachel Carson herself. Lytle focuses his attention on Carson as a writer, highlighting her struggle with cancer and family responsibilities while she was writing her swan song, *Silent Spring*, and the book's impact on the nascent environmental movement.

The phrase "gentle subversive" is used primarily to reflect Carson's impact on the American public, who had always trusted industry and government to protect its citizens. However, it also describes Carson's personal life. Carson's mother was her main role model, one of a line of powerful women who shaped Carson; from the teachers who gave her the confidence to write—she was only 11 when her first article was published—and to those who encouraged her education and career in biology. She never married, and adopted her sister's illegitimate child when her sister died: both choices were subversive in the 1950s. From her childhood, Carson dreamed of being a writer, and used her love of nature to complete a

Master's in biology and begin a civil service career. There she honed her skills as a scientist and a gifted writer to transform scientific articles into documents suitable for a broader audience.

The article "Undersea" published in the *Atlantic Monthly* magazine in 1937 was turned into the book *Under the Sea-Wind* in 1941. The critical acclaim of this book was considerable, but paled in comparison to her next book, *The Sea Around Us*, which became an international best-seller in 1951. Even before the latter book was published, Carson became interested in writing about the impacts of pesticides. As her knowledge grew, so did her moral outrage, as "she believed that the arrogance of humankind created a deadly irony: in their determination to control nature, human beings posed a growing threat to all life on earth, including their own" (p. 133). This was the central message of the "poison book," as she called it, which took her four years to write. During this time, she struggled mightily with family turmoil and radiation treatment for cancer; the disease took her in 1964, only two years after the publication of *Silent Spring*.

Lytle provides a very tender portrait of Rachel Carson's life, particularly the long completion of *Silent Spring*. Just as Carson portrayed the environment as an organic, interconnected whole—another gently subversive idea at the time—Lytle ties together Carson's personality and life with the wider contemporary social forces in America. Although Carson's beloved nature was poisoned from the hubris of an unquestioned use of powerful chemicals, Carson herself was being poisoned by family traumas and illness. Her completion of *Silent Spring* vindicated the criticism directed at those brave enough to challenge the status quo in the early 1960s.

Review by John Shultis, ***IJW*** book editor

Adaptive Co-Management: Collaboration, Learning, and Multi-Level Governance

Edited by Derek Armitage, Fikret Berkes, and Nancy Doubleday. 2007. Vancouver, BC: University of British Columbia Press. 350 pp. $90.00 (hardcover).

New paradigms bring new tools. The shift in conceptualizing nature—from a steady state, reductionist perspective to viewing nature as primarily driven by disturbance, creating nonlinear processes with limited cause-and-effect relationships—has already led to many changes in how resource managers both view and manage resources. The concept of adaptive management was created in the 1980s to provide a "learning-by-doing" approach to management, one that embraced the uncertainty and complexity contained in the new paradigm. Interest in co-management—where traditional government resource agencies shared power to varying degrees with local communities and groups—began at the same time. Adaptive co-management is a new, combined management tool "whereby institutional arrangements and ecological knowledge are tested and revised in an ongoing, self-organized, and dynamic process of learning-by-doing" (p. 328).

Adaptive Co-Management provides an excellent review of the foundations of both adaptive management and co-management, reviews why and how they have been combined to form adaptive co-management, and examines lessons learned from a variety of case studies. These case studies are mainly drawn from Canadian locations, as are the editors and many of the authors, although examples and authors are also found from Central America, the United States, and Scandinavia. The first few chapters deal with the theory behind adaptive co-management, followed by a case study section, an examination of the challenges of adaptive co-management (also through case studies), and a discussion of the tools both required and created by adaptive co-management.

The need for such a new tool occurs because of the realities created by the paradigm shift. The authors suggest that "problems are complex, values are in dispute, facts are uncertain, and predictions are possible only in a limited sense. The scientific system that underlies resource management is facing a crisis of confidence in legitimacy and power. Top-down resource management does not work for a multitude of reasons, and the era of expert-knows-best decision making is all but over" (p. 308). This vision is informed by postmodernism, and as such "traditional" managers may be shocked at the new paradigm of resource management outlined here. The research also follows recent attempts, particularly by Berkes and associates, to better link the multiscale, complex, nonlinear, and self-organizing natural and social worlds; that is, both nature and society are conceived as sharing these characteristics.

Adaptive Co-Management, however, goes beyond outlining the boundaries of the new paradigm of resource management by outlining the characteristics and challenges of the new concept of adaptive co-management. The use of adaptive co-management to reexamine traditional problems of shared decision making in a highly uncertain and complex world has provided many important new insights, and the authors and editors clearly identify both the promises and pitfalls of this approach, as well as highlight the lessons learned from existing research for managers. This a highly recommended book for those wishing to understand both the new paradigm and adaptive co-management's potential impact on resource management.

Review by John Shultis, ***IJW*** book editor