INTERNATIONAL

Journal of Wilderness

In This Issue

- Conservation Photography
- Wilderness Values
- Wilderness Education
- Tanzania, Italy, Russia, Guianas

APRIL 2005 VOLUME 11, NUMBER 1

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FEATURES

STEWARDSHIP

SCIENCE AND RESEARCH

EDUCATION AND COMMUNICATION

INTERNATIONAL PERSPECTIVES

INTERNATIONAL PERSPECTIVES (continued)

WILDERNESS DIGEST

FRONT COVER A photographer's dream day at Mount McKinley, Denali National Park, Alaska. Photo by Cathy Hart.

INSET Cristina Mittermeier looking a dung beetle in the eye, Tembe Elephant Reserve, KwaZulu Natal, South Africa. Photo by Vance Martin.

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

Can We Let Wilderness Just Be Wilderness?

BY CHAD P. DAWSON

Whether you take a quick or a thorough review of the history of the human species on this planet, you may arrive at the observation that as humans we seem almost incapable of *just letting wilderness be wilderness*. We seem to have a nearly insatiable need to "improve" and manipulate everything in our environment. The field of human genetics might suggest that this drive to manage our environment has been genetically selected to ensure that we survive, thrive, and prosper as a species. Some might argue that our "successes" at manipulating the environment might also be sowing the seeds of our own environmental self-destruction.

So how do we change that which is so thoroughly embedded in humans as individuals and in our societies? Although some have mused about making wilderness sacrosanct or a sacred place in a religious sense to create a social agreement to protect wilderness areas, the most successful social experiment to date has been to use legislation that protects those special remnants of wild places and ecosystems. After accomplishing this legislative protection in some countries of the world, the designated land management agencies are left with the task of continuing to hold off the human tendency to incrementally want to "improve" or use what they rationalize as "just some small part of the wilderness." Such proposals generally argue that these activities have little or no measurable or significant impact (e.g., allowing mountain bike use or commercialized tourism use, collecting fossils for research, permitting cattle grazing). Multiple counterarguments can be made, including the cumulative impacts of such activities, the apparent and real conflicts in use, and others.

The worrisome factor is that, in spite of the legislation, humans will still go on being humans and will attempt to manipulate and use wilderness resources. This tendency and warning to managers was mentioned even by early wilderness preservationists. For example, Howard Zahniser in his essay *Wilderness Forever* tells us to be prepared to keep our support of wilderness in perpetuity, like the wilderness itself: "*We are not slowing down a force that inevitably will destroy all the wilderness there is. We are generating another force, never to be wholly spent, that, renewed generation after generation, will be always effective in preserving wilderness*" (in W. Schwartz, ed., *Voices for the Wilderness*, New York: Ballantine Books, 1969, 106).

In this issue of *IJW*, Michael Frome outlines a strong and personal case for a wilderness challenge to keep wilderness protection foremost in all designation and legislation discussions about wilderness and to avoid the compromises that can creep into political processes. The concept of environmental stewardship as a national agenda includes wilderness preservation, according to Frome, and he advocates for greater public awareness of the wilderness concept. Cristina Mittermeier articulates the value of photography in making the public aware of conservation and preservation issues. Her argument that powerful photographic imagery saved some areas in Tasmania can be echoed in the United States if one recalls the use of photography by well-known wilderness advocates such as Ansel Adams and David Brower. The use of powerful images can generate public awareness at both the conscious and subconscious levels—a kind of inner inspiration that will "elicit concern and emotion that can direct human behavior," according to Mittermeier. **IJW**

A Wilderness Challenge

BY MICHAEL FROME

The first time I read about the Wilderness Act—or the Wilderness Bill at that time—was in *The New York Times* of May 15, 1956.In the column headed "Conservation," John B. Oakes reported that Senator Hubert Humphrey of Minnesota was sponsoring legislation to establish a national wilderness preservation system. "The idea is certainly worth exploring," Oakes wrote, "if what is left of our country in a natural state is worth saving, as many of us believe it is."

Oakes outlined the problem as follows:

> This isn't just a question of city folks seeking outdoor recreation, or enjoying spectacular scenery, or breathing unpoisoned air. It goes much deeper; it springs from the inextricable relationship of man with nature, a relationship that even the most insensitive and complex civilization can never dissipate. Man needs nature; he may within limits control it, but to destroy it is to begin the destruction of man himself. We cannot live on a sterile planet, nor would we want to.

Figure 1—Arthur Carhart, a strong wilderness advocate. Photo courtesy of the U.S. Forest Service.

John Oakes stirred my conscience, and my curiosity, to learn more. I determined in due course that he was voicing a viewpoint deeply rooted in American culture and history, manifest in earlier days through the works of James Fenimore Cooper, William Cullen Bryant, John J. Audubon, Ralph Waldo Emerson, Henry David Thoreau, and John Muir. Muir felt uplifted and exalted in the wild sanctuary: Wilderness to him was an expression of God on earth—the mountains, God's temples; the forests, sacred groves. In our own era, the celebrated photographer Ansel Adams expressed the idea: "Here are worlds of experience beyond the world of aggressive man, beyond history, beyond science. The moods and qualities of nature and the relations of great art are difficult to define; we can grasp them only in the depths of our perceptive spirit."

I found such lofty expressions from political leaders too—leaders of both major political parties. One hundred years ago Charles Evans Hughes, Republican governor of New York and later chief justice of the Supreme Court, declared at the dedication of Palisades Interstate Park:

> Of what avail would be the benefits of gainful occupation, what would be the promise of prosperous communities, with wealth of products and freedom of exchange, were it not for opportunities to cultivate the love of the beautiful? The preservation of the scenery of the Hudson is the highest duty with respect to this river imposed upon those who are the trustees of its manifest benefits.

In Maine, Governor Percival Baxter, the son of a wealthy family, found in Mount Katahdin the gift he wished to give with his own money to the people of his state. By stipulating that the area "forever shall be held in its natural wild state," Governor Baxter passed on his understanding of the need for wild places in modern civilization. "The works of men are short-lived," he declared on November 30, 1941. "Monuments decay, buildings crumble and wealth vanishes, but Katahdin in its massive grandeur will forever remain the mountain of the people of Maine. Throughout the ages it will stand as an inspiration to the men and women of this State."

Attainments in preservation, as in any manifestation of ethics and idealism, do not come easily. In the case of the Wilderness Act, fruition came after eight years of discussion and debate by the Senate and House of Representatives, and after 18 separate hearings conducted by congressional committees around the country. I believe it would never have happened without the unflinching commitment of a

very broad coalition that rallied people—all kinds of people—around the wilderness cause.

Now I believe the time is at hand to review the scope and strengths of that coalition, and to renew it to meet new challenges. On one hand, Americans can be proud of the 106 million acres (42.9 million ha) safeguarded by the Wilderness Act. It defines wilderness in law and public policy and how it should be cared for and used. It does even more, encouraging us to conserve the feeling and skills of self-reliance. That we have set aside these special places is known throughout the world; wilderness preservation treats ecology as the economics of nature, in a manner directly related to the economics of humankind. Keeping biotic diversity alive, for example, is the surest means of keeping humanity alive. But conservation transcends economics—it illuminates the human condition by refusing to put a price tag on the priceless.

Reconstituting the Coalition

On the other hand, I see the wilderness concept diluted in proposal after proposal before Congress, and in management plan after management plan prepared by our resource agencies. I feel deep concern about the effects of overuse, misuse, and commercialization; about allowing motorized equipment inside wilderness, and about the willingness to accept something-less-than-wilderness in the National Wilderness Preservation System (NWPS). When you read legislation providing for "conservation, recreation, and development" in the same package, you can bet your bottom dollar that wilderness protection will come last and least.

I don't mean to target any group or individuals for blame, for we are all part of the problem. More important, we can all contribute to the solution. Reconstituting the coalition—of citizen conservationists, scientists, elected public officials, public servants in the resource agencies, writers, artists, and the media – will make it happen. We all love our country. Although we don't say it enough, that is what brings us together.

I think of the campaigners for the Wilderness Act as true patriots. Howard Zahniser, the principal author and advocate of the Wilderness Act of 1964, was studious, articulate, and compassionate. "We are not fighting progress," Zahniser said. "We are making it. We are not dealing with a vanishing wilderness. We are working for a wilderness forever." In 1956 Representative John P. Saylor of Pennsylvania introduced the Wilderness Bill in the House of Representatives. I knew Saylor as a friend and hero. In many ways he was a conservative Republican. Nevertheless, for eight years he led the bill's uphill legislative battle and never gave up. In 1961, when the going was tough, Saylor declared: "I cannot believe the American people have become so crass, so dollar-minded, so exploitation-conscious that they must develop every last little bit of wilderness that still exists."

I remember Senator Frank Church of Idaho as one of the courageous conservationists in Congress, and recall in particular the battle over reclassification of the old Idaho Primitive Area as the River of No Return Wilderness.

Figure 2—Howard Zahniser wrote the first draft of the Wilderness Bill in 1956.

When Senator Church conducted hearings in different sections of Idaho, people who had never spoken publicly before stood up and responded to him, opening their hearts in praise of an area larger and wilder than Yellowstone. The designation of this great area as the Frank Church River of No Return Wilderness certainly is a deserved recognition of Senator Church's service to his own state and the nation.

I have known and worked with able scientists, such as John and Frank Craighead, the experts on the grizzly bear, and with committed wilderness advocates in the federal agencies. To my mind, Bill Worf ranks with Arthur Carhart, Robert Marshall, and Aldo Leopold, Forest Service professionals

I see the wilderness concept diluted in proposal after proposal before Congress, and in management plan after management plan prepared by our resource agencies.

We should not allow the mismanagement of our public lands, whether classified as wilderness or not.

who led the way in wilderness awareness and management. Worf came to Washington, D.C., soon after the act was passed, to write implementing regulations for the agency. He is a public servant who never quit, establishing and leading the wonderfully constructive organization Wilderness Watch after he retired.

I've known others like him elsewhere in the Forest Service and in the other agencies as well. I think also of the late Paul Fritz. He was a feisty, stocky New Yorker, who came west to study landscape architecture at Utah State University, worked for a time for the Forest Service, then transferred to the National Park Service. In 1966 he was placed in charge of Craters of the Moon National Monument, a striking Idaho landscape of lava fields studded with cinder cones. Disregarding bureaucratic admonitions in his own agency, he gained support from local communities and environmental groups for the Craters of the Moon wilderness, established in 1970 as the first national park unit added to the NWPS.

But my favorite heroes have been my own breed, writers who were activists, such as Sigurd Olson, Richard Neuberger, Wallace Stegner, and Paul Brooks, and journalists, notably John Oakes, a champion of wilderness, civil rights, and all good causes, who rose to be editorial page editor of *The New York Times*.

Figure 3—Canoeing in the Boundary Waters Canoe Area Wilderness, managed by the U.S. Forest Service, Minnesota. Photo by Thomas Kaffine (tkaffine@fs.fed.us).

The best defense clearly is an aware, alert, and involved public. It makes things happen. It has worked in times past. It starts at the grass roots with individual citizens who care about the beauty of the earth. I will illustrate by citing a case history of defeat turned into victory. In 1966 the National Park Service chose the Great Smoky Mountains of North Carolina in Tennessee as the site of its first proposed wilderness designation under the Wilderness Act of 1964. Unfortunately, the plan was terrible, designed to destroy rather than defend wilderness. But it seemed like a done deal, with all the political power behind it.

Harvey Broome, of Knoxville, Tennessee, however, felt otherwise. He was my friend and mentor. He earned a law degree at Harvard and had a successful law practice, but he was committed to the work of the Wilderness Society, of which he was one of the founders and subsequently president. So he accepted a job as clerk to a judge with the understanding that he would be allowed time off when needs of the Wilderness Society required it. With his right-hand man, Ernie Dickerman, Harvey led in mobilizing defense of the Great Smoky Mountains. Newspapers from *The New York Times* to the *Portland Oregonian* responded with powerful editorials; thousands of citizens wrote letters demanding better stewardship from the National Park Service. It took six years, but ultimately the agency withdrew its horrendous antiwilderness plan.

Wilderness Legacy

Looking back, I remember environmental leaders of 40 or 50 years ago as missionaries. Those people gave us broad shoulders to stand on. They want us to work together through tough and trying times, to sound the alarm and to alert the public, from the grass roots to Washington, in defense of wild places.

That is why I feel we should not allow the mismanagement of our public lands, whether classified as wilderness or not. I believe strongly in the principle of public land ownership and in the professional agencies that administer them. I feel alarm at moves to disassemble and privatize national parks, national forests, national wildlife refuges, and areas administered by the Bureau of Land Management. I hope we will not allow it, for public lands are the last open spaces, last wildernesses, last wildlife havens.

I feel the same about charging fees for recreation on public lands. It's a terrible idea. National parks in the United States are being reduced from sanctuaries to popcorn playgrounds, managed as theme parks in the Disney mode rather than by park professionals in the public interest.

The role of government in recreation—of government at all levels—should be to support conservation, physical fitness, and healthful outdoor leisure away from a mechanized supercivilized world. A wholesome natural environment provides the foundation for a wholesome human environment. We can't have one without the other. The preservation of nature is a use in its own right—a "wise use." Gifford Pinchot, the 20th-century conservation pioneer, said it this way:

> The planned and orderly development and conservation of our natural resources is the first

> duty of the United States. It is the only form of insurance that will certainly protect us against the disasters that lack of foresight has in the past repeatedly brought down on nations since passed away. A nation deprived of liberty may win it, a nation divided may reunite, but a nation whose natural resources are destroyed must inevitably pay the penalty of poverty, degradation and decay.

Perhaps the most important role of public lands is to safeguard wilderness, nature untamed. Wilderness is at the core of a healthy society. Wilderness, above all its definitions, purposes, and uses, is sacred space, with sacred power, the heart of a moral world. Wilderness preservation is not so much a system or a tactic, but a way of understanding the sacred connection with all of life, with people, plants, animals, water, sunlight, and clouds. It's an attitude and way of life with a spiritual ecological dimension.

I remember listening to Sigurd Olson speaking at the 1967 Sierra Club Biennial Wilderness Conference in San Francisco. He hadn't started as a professional writer—he had earlier been a teacher and a guide—and didn't complete his first book until he was 55. Yet it became the first of nine, filled with his perceptions of North country water wilderness in the center of the continent. Now the Sierra Club has honored him with the John Muir Award for "the excellence of his writing and leadership in conservation that will truly make a difference a hundred years from now in the face of this land and in the mind of man [and woman]." This is what Sigurd said in accepting the award:

> Make the wilderness so important, so understandable, so clearly seen as vital to human happiness that it cannot be relegated to an insubstantial minority. If it affects everyone—and I believe it does—then we must find out how to tell the world why it affects everyone. Only when we put wilderness on that broad base will we have a good chance of saving it.

When you read legislation providing for "conservation, recreation and development" in the same package, you can bet your bottom dollar that wilderness protection will come last and least.

I thought at the time his words were a challenge meant for me. But no, they are a legacy meant for us all. **IJW**

MICHAEL FROME, author, educator, and activist, has written 18 books, including *Greenspeak, Green Ink,* and *Battle for the Wilderness.* Former U.S. Senator Gaylord Nelson of Wisconsin said of him: "No writer in America has more persistently argued for the need of a national ethic of environmental stewardship." He lives in Port Washington, Wisconsin.

From CONSERVATION PLANNING on page 30

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Conservation Photography

Art, Ethics, and Action

BY CRISTINA MITTERMEIER

Article author Cristina Mittermeier at work in Australia.

Nature photography is one of the most versatile artistic endeavors. It allows practitioners to specialize in myriad particular subjects within the natural world, from numerous different perspectives—from the journalistic documentation of a species or a landscape, to gallery-quality printed pieces of fine art depicting flora or fauna, macro- or microscale, realistic or impressionistic. The possible subjects and areas of specialization are as diverse as nature itself.

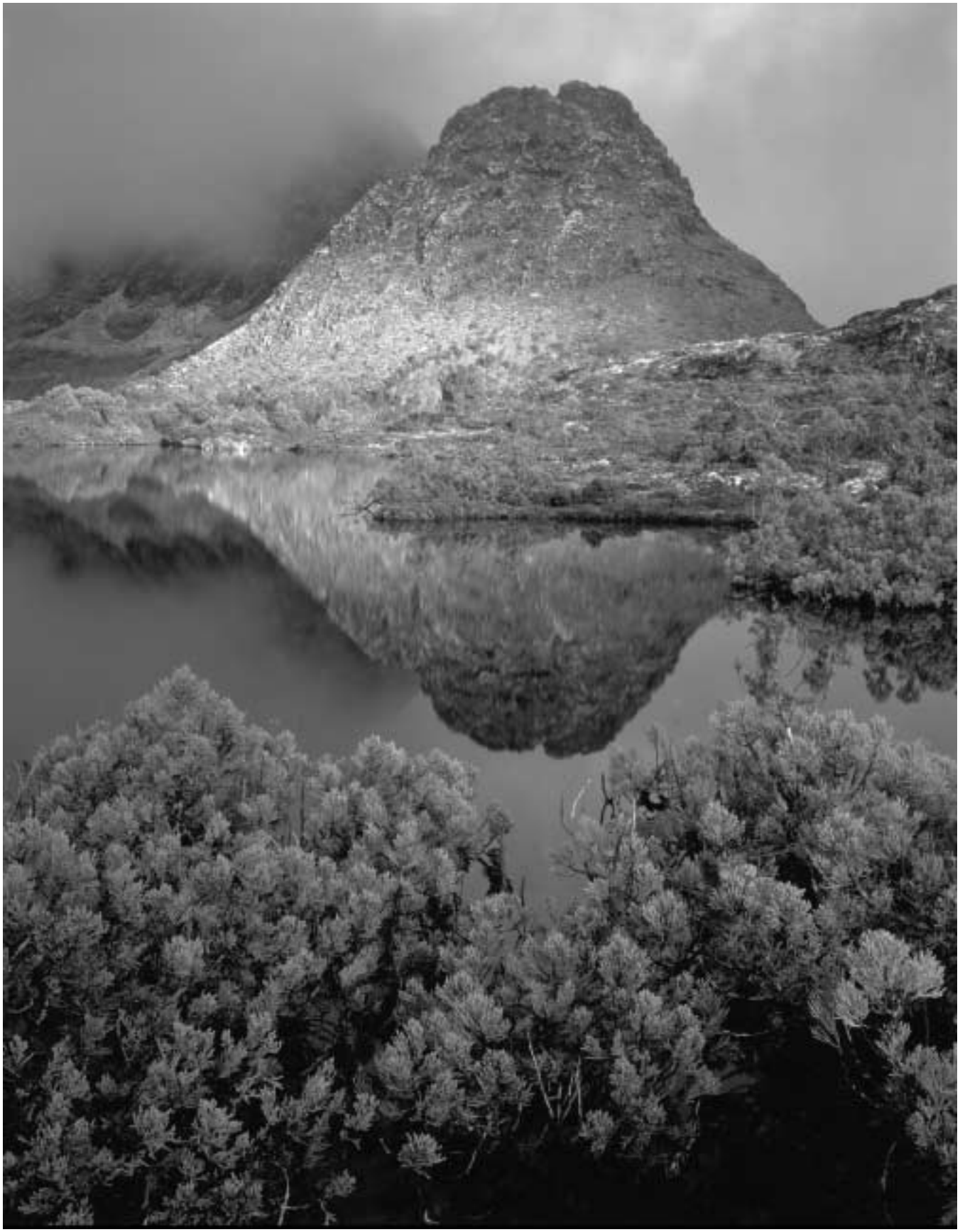
However, there is an additional step that can be taken by the nature photographer, one in which the practitioner is not just interested in documenting nature or creating works of art, but in making images that, in fact, protect the subject they depict. This is conservation photography.

Conservation photography showcases both the vanishing beauty of our planet and its disappearing spirit, and it puts the image "to work." It is the pictorial voice used by many conservation organizations to further their messages. For many purposes, amateur photos are good enough to do the job, but professional quality is needed to create images that inspire people and empower them to change behaviors and take action. Anyone can purchase the equipment, travel to interesting regions, and learn the secrets of wildlife behavior well enough to capture it on film—or in pixels. The empathy, sense of urgency, and the personal commitment necessary to create awe-inspiring images, and to discover avenues through which those images can help ensure that the wild world persists cannot be purchased. Conservation photography is the result of photographic talent combined with environmental understanding and conservation commitment.

In recognition of the importance of images for conservation and of the growing numbers of professional photographers who specialize in producing those images, the first-ever Conservation Photography symposium will convene from September 30 to October 6, 2005, in Anchorage, Alaska, during the 8th World Wilderness Congress (WWC). Conservation-minded photographers from all over the world will assemble with scientists, policy makers, government officials, lawyers, writers, indigenous leaders, and others to help craft local and global conservation solutions. The significance of this event is not only that it is the very first time nature photographers have been offered a working seat at an international conservation forum, but it will also allow photographers themselves to decide if creating a new and distinct discipline in the field of nature photography is justified.

Numerous items are on the agenda, including the critical importance of professionally executed images to achieving conservation outcomes; how to harness the market potential of the tens of thousands of amateur nature photographers around the world who are yet not involved in conservation—and need to be; and recommending that conservation organizations legitimize their reliance on images by adding line items to their budgets for the service of image professionals.

With the exception of the most technical, peer-reviewed scientific journals, photographs are a necessary and constant element of conservation communications. Be it to document, illustrate, compare, or inspire, images are an indispensable element of the conservation toolbox. Nevertheless, despite their critical importance in the crafting and delivery of messages, conservation professionals often opt for "homemade" amateur or poorly executed images, based simply on the argument of cost. The advent of easy-to-use digital cameras has exacerbated the situation by giving the impression that taking pictures is a simple undertaking.



Morning light on Little Horn, Cradle Mountain, Lake St. Clair National Park, Tasmania. Photo by Peter Dombrovskis, courtesy of Liz Dombrovskis.

The highland cultures of Papua New Guinea were not discovered by Westerners until the 1930s. Although much as changed since then, some things thankfully remain the same. This playful moment during the annual cultural sing-sing at Mt. Hagen reminds me that children are the same all around the world, even in some of the most remote regions of our planet. Photo by Cristina Mittermeier.

But learning photography is like learning a new language: amateur snapshots are the few words necessary for elemental communication, whereas the images created by gifted professionals, those that inspire and enrich our soul, are the equivalent of poetry.

Of equal concern as the poor use and selection of visual materials for conservation, is the unfair practice of requesting donated images from professionals. Too often, after a project is finished and no usable images are found on the nongovernmental organization's inaugural digital card of its brand-new camera, organizations often resort to the charity of photographers. Professional photographers justifiably feel that if everyone else has a budget line in conservation proposals, photographers—particularly given the significance of their contribution—should have one as well. Thankfully, there are a few conservation organizations leading the way that already understand the importance of photography and are serious enough to dedicate staff and resources to acquiring images and paying professional photographers. This effort is evident in the high-quality materials they produce and in the achievement of their conservation goals.

The first-ever Conservation Photography symposium will convene from September 30 to October 6, 2005, in Anchorage, Alaska, during the 8th World Wilderness Congress.

However, it is essential to acknowledge the importance of donating images, time, and talent to small grassroots conservation organizations and other environmental causes that may lack the resources to carry out large, complex projects and for whom it is much harder to find funds to hire the services of professional photographers. This is a matter of civic duty and a personal commitment to help those causes we believe in. Although the donation of images is a great way to begin on the road toward making a living as a photographer, we need to be able to aspire to make a decent living from our craft.

It is clear that much discussion on these matters will be needed at the 8th WWC. We will need to clearly articulate the irreplaceable contribution of images to achieve measurable conservation outcomes, and we will need to become active participants in the conservation process in order to create the images most relevant to the ever-evolving conservation agenda. The symposium's mission is to make the case for the recognition of our craft as an indispensable instrument in the conservation arena, not just in terms of artistic appreciation, but monetary compensation as well.

Conservation Photography in Tasmania

But how does conservation photography differ from nature photography? Although the similarities are many, the most outstanding difference lies in the fact that conservation photography is born out of purpose. From the early achievements of Ansel Adams in capturing the imagination of the American public with his well-crafted images of wild America, to the brilliantly executed images made by National Geographic's "Nick" Nichols during an epic trek across the Congo that has recently led to the

creation of an entirely new protected area system in Gabon, conservation photography has a well-established, yet seldom recognized record.

The significance of conservation photography was evident to me when I first saw the work of Peter Dombrovskis, a Tasmanian photographer who was instrumental in saving the Tasmanian wilderness from massive destruction wrought by proposed dam construction. Working with intuitive commitment and professional talent, his became one of the finest examples of conservation photography.

When I first encountered Dombrovskis's work, most of my own photographic education had been focused on learning the specialized techniques and endless paraphernalia photographers employed. At the time, I was making progress in technique, but I felt my images were lacking an elemental, visceral quality. The discovery of Dombrovskis's images during my first trip to Tasmania gave me a clear vision for my own career, both in terms of craft and—most importantly—in terms of mission. His philosophy was a clarion call for photographers to create technically superior, enduring images, that also demand that the wild world endure. His philosophy is the guiding principle in my photographic career, and the context in which lives the spirit of conservation photography.

I discovered Dombrovskis's genius among the tourist souvenirs of the Hobart (Tasmania) Airport gift shop. His images, like paper jewels, stood out from the surrounding Aussie paraphernalia. The perfect scene of a beautiful morning-lit outcrop in Cradle Mountain National Park was beautiful and technically perfect in and of itself, but it had something else. It contained an invisible sense of the fierce fight that had been waged just a few years before to save the jagged contours of the wild landscape it depicted. I felt it. That story, as it turned out, was just one chapter in the long history of Tasmania's environmental struggles.

Tasmania, like most European colonies, has seen its share of ecological and ethnological blunders, many of them devastating. Its first irreversible loss came in 1876 with the extermination of the last Tasmanian Aborigine—less than a century after Europeans first arrived. Its next major tragedy came in 1936 with the extinction of its largest endemic mammal, the Tasmanian tiger, which was followed by the careless introduction of hundreds of invasive species that to this day continue to threaten the delicate native flora and fauna of the island. But it was the obliteration of Lake Pedder, a magnificent and ancient glacial lake—centerpiece of a national park, and one of Tasmania's most outstanding natural wonders—that finally spurred public indignation. It has been said that had it not been destroyed, Pedder would occupy today as prominent an iconic place in Australian lore as Ayers Rock and Kakadu.

Frost on Snow Berry (*Gaultheria hispida*) leaves, Milles Track, June, Mount Wellington, Tasmania. Photo by Peter Dombrovskis, courtesy of Liz Dombrovskis.

At the center of the opposition to dam Lake Pedder was Lithuanian-born photographer and conservationist Olegas Truchanas, a man who eventually became a mentor and father figure for Peter Dombrovskis, who was himself a Latvian immigrant. Armed with photographs and films of the area, Truchanas took the fight to the government and the people. To raise public awareness, he called public meetings in the Hobart Town Hall and, in his now-famous audiovisual displays, played to capacity audiences breathtaking scenes of what was about to disappear forever. Sadly, despite an impassioned fight, the government succeeded in damming the Huon and Serpentine Rivers, and in doing so they drowned both the cries of the protesters and the exquisite beauty of the wild lake. Devastating as this defeat was, the silver lining came in the birth of a major movement to use photography for conservation.

The fight over waterpower, however, was not over. Despite being less than 1% the size of Australia as a whole, Tasmania possesses half of the country's

Beyond documenting nature as an art form, conservation photography responds to the mission of protecting nature.

hydroelectric potential, much of it from the powerful, free-flowing rivers that surge through the island's rugged western half. And so, soon after the dramatic loss of Lake Pedder, another proposal emerged to dam the Franklin River and thus flood one of the last great wilderness areas in the world. This time, however, the idea was met with a mighty opposition. At the center of the battle was a well-organized protest that took the fight to the court of international opinion, including the 2nd WWC in 1980, with the support of world-class photographs by numerous artists, including Peter Dombrovskis.

When Australian premier Robin Gray declared the wild river "a brown leech-ridden ditch," Dombrovskis—a shy, quiet man—chose to raise his camera instead of raising his voice. Despite the devastating loss of Truchanas, who had died in a kayaking accident, Dombrovskis headed out into the wilderness to illustrate his personal disagreement with the premier. He did not intend to make campaign images, but inevitably his images became the center of a massively successful public movement. He eventually remarked, "In any sort of campaign where you are trying to get people to feel for an area, to make some sort of decision about it, you need powerful images to show people, to give people an idea of what those areas are like."

Like Truchanas before him, Dombrovskis succeeded in capturing the soul of Tasmania in images. He, too, was able to show the people of Tasmania what they were about to lose. In the end, the modest beauty and tranquility reflected in his images—still published extensively even years after his death—were enough to turn public opinion.

The opposition prevailed, and the federal government compensated Tasmania for the estimated lost revenue of the hydroelectric dam, and then took it one step further by creating the Franklin–Gordon Rivers National Park. This new park became the major piece in a series of contiguous, north-south national parks that cover a major portion of Tasmania's western half.

It became clear to me that the magical quality in Dombrovskis's images came from his passion to convey a profound sense of place for an area he loved, one that was at great risk, rather than only through the flawless technical merits of his work. I also understood that it was this special mission that invested his images with "soul." Peter once said that something of the photographer himself should be evident in every image; something of how the photographer felt should leap from every photo. Otherwise, the photo is just a piece of paper. You can catch glimpses of Dombrovskis in all his photographs: the father, the naturalist, the son, the poet, the gardener, the husband, the conservationist, and, yes, the photographer. "An ethic of the land is needed because remaining wilderness is threatened by commercial exploitation that will destroy its value to future generations," wrote Dombrovskis when his beloved Tasmanian wilderness came under attack. An ethic of the land is indeed what we need as conservation challenges gather speed. Our images need to inform and galvanize to action, as well as inspire.

When asked, Peter would say about his own work: "I am not a photographer, I am just making a statement." Today other photographers, hikers, adventurers, the people of Tasmania, and those from around the world are able to enjoy the beauty of one of the most pristine Wilderness World Heritage Areas on the planet. Tasmanians also realize the benefits from an expanded and thriving nature tourism industry, and prosper from the many ecosystem services provided by the wildlands that cover most of the island. A fine statement, indeed.

Mission of Protecting Nature

Tasmania provides a clear example of the power of images for achieving conservation outcomes. Can the success of this model be replicated to protect nature and indigenous peoples in other regions? In today's interconnected global society, perhaps the Web should be the equivalent of the Hobart Town Hall, where images can alert people to what is being rapidly lost all over the world.

Beyond documenting nature as an art form, conservation photography responds to the mission of protecting nature. After Dombrovskis's death people remarked that it was not so much that he photographed in protected areas, but that protected areas were created where he photographed.

In conservation photography, the subject is conveyed by aesthetics and defined by conservation priorities. Although limited to specific places and issues, conservation photography's purpose is to elicit concern and

Full-time Pro Photographers: The Ultimate Endangered Species?

BY WENDY SHATTIL AND BOB ROZINSKI

The number of nature photographers has increased exponentially in the past decade, and the trend shows no sign of changing. Many are hobbyists who love taking pictures of the outdoors, or those who do not need to generate a substantial living from selling nature photos. This is a boon to conservation organizations with low or no budgets for photo use, but a detriment to seasoned full-time professional nature photographers whose sole source of income is through the sale of their work.

No one goes into the field of conservation photography to make a fortune, but, if the bills aren't paid, pros can't afford to keep creating images. Longtime pro photographers have the vast knowledge and field experience to document a critical species or location, and to tell a conservation story. Experienced professional photographers have the ability to communicate with all involved, from scientists to administrators, and often have the opportunity to add to the story's exposure through their long-established networks.

The rigors of freelancing make it difficult for the pro to invest the time and money in creating images that are useful to conservation groups but are of little interest to general photo buyers. An image of a rare or endangered plant may be of great value to a particular biodiversity group, but of no interest to editorial publications. With time and resources, however, a pro is capable of creating a diverse body of work that thoroughly documents that plant and its habitat, and provides an in-depth story that advances the conservation cause through higher visibility in the mainstream media.

Professional photography is a proven catalyst in creating public conservation awareness. In the 1870s the Hayden expeditions to Yellowstone hired William H. Jackson to record images that eventually influenced Congress to create America's first national park. The work of today's professionals is visible in books, magazines, and countless conservation publications, spreading the word through their photographs.

The key to protecting the environment is to motivate those who are in a position to do so. Politicians, private foundations, the general public, and corporations are impacted by great photos by great photographers. Let's make sure that the photographers can continue to do this critically important work!

WENDY SHATTIL and BOB ROZINSKI'S work can be viewed at www.dancingpelican.com. E-mail: wendy@dancingpelican.com.

emotion that can direct human behavior. Photographers also need to shoot the whole scene and not just the select pieces that we, the architects of the image, choose to show the public. We also need to work with editors and publishers to convince them to make available the layout room that may be the single most important factor in eventually saving an area or a species. In fact, conservation photography needs to have a dual strategy: on the one hand, showing the world the beauty and inspiration found in wild places and, on the other, the raw, uncompromising reality of their destruction.

As conservation challenges increase, the need is growing for images that touch people's hearts and change their minds. Photographers of great conviction have already blazed a trail for us, and it is our job to do the same for the legions of new photographers who must become an indispensable part of the conservation movement. **IJW**

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A GIS-based Inductive Study of Wilderness Values

BY GREGORY BROWN AND LILIAN ALESSA

Abstract: This study presents the results of spatial analysis of wilderness values in Alaska. Using data from two regional planning studies, perceived landscape values from inside and outside wilderness areas were compared to determine if proportionate value differences exist between wilderness and nonwilderness areas. Multiple regression analysis was used to confirm the results and determine the relative strength of general landscape values as predictors of wilderness value. Results indicate that wilderness areas reflect values associated with indirect, intangible, or deferred human uses of the landscape—life-sustaining, intrinsic, and future values—whereas landscape values outside wilderness areas reflect more direct, tangible, and immediate uses of the landscape—economic, recreation, and subsistence values.

Co-article author Gregory Brown

Introduction

One approach to measuring wilderness values in the United States has been to survey the general public as part of the National Survey on Recreation and the Environment (NSRE) (Cordell et al. 2003; Cordell et al. 1998). The 13-item Wilderness Values Scale (WVS) used in the survey measures both use and nonuse values (e.g., preservation) for wilderness in the National Wilderness Preservation System (NWPS). This national survey approach presents the NWPS as a generalized, abstract system for the general public to evaluate. The most recent results suggest that ecological and existence values are central to Americans' viewpoint on wilderness (Cordell et al. 2003) and that direct use values are generally less important than ecological, environmental quality, and off-site values (Cordell et al. 1998).

An alternative, inductive approach to examining wilderness values, and the method presented herein, is to present landscapes as tabulae rasae to the general public at both the community and regional levels, so individuals can spatially identify landscape values, including those associated with wilderness areas. Presumably, if wilderness areas possess a range of landscape values that are proportionately different from landscapes outside of wilderness areas, these value differences will emerge as a result of inductive analysis of the spatial location of values. The emergent values of wilderness areas can then be compared to those reported from national survey results.

As part of the Chugach National Forest (CNF) planning process, Brown and Reed (2000) developed a landscape values typology to provide residents of local communities with the opportunity to rank and spatially identify landscape values. The values typology, although somewhat different from the WVS, shares 9 out of 13 values with the WVS used in the NSRE (see Table 1). One of the important issues in the development of the initial values typology was whether "wilderness" value constituted a separate landscape value, or whether wilderness value was an emergent characteristic resulting from a combination of other landscape values. In the end, wilderness value was not included as a separate value in the CNF value typology.

In 2002 the authors measured landscape values for a different planning area in Alaska, the Kenai Peninsula. In this study we included wilderness value as a separately defined value in the landscape values typology. By including wilderness value as a separate landscape value, we set the stage for this study to determine which nonwilderness landscape values are predictive of wilderness values and which landscape values tend to associate with de facto or actual wilderness units in the NWPS.

Thus, the purpose of this empirical study was threefold: (1) to examine the mix of landscape values that the public identifies *inside* actual or de facto wilderness areas to compare with values identified *outside* wilderness areas in order to determine what, if any, proportional value differences exist; (2) to determine which landscape values best predict perceived wilderness values from the Kenai Peninsula study using

multiple regression, using the full range of landscape values; and (3) to compare our study results with the 2000 NSRE survey results on wilderness values (i.e., landscape values that appear disproportionately inside wilderness areas could be significant predictors of wilderness values in a regression model).

Methods

Survey Methods

The CNF planning survey was implemented in March 1998 using a modified Dillman (1978) total design survey methodology. A survey booklet, consisting of five sections, along with a color CNF map was sent to 2,766 randomly selected households in 12 communities (Anchorage, Cooper Landing, Cordova, Girdwood, Hope/Sunrise, Kenai, Moose Pass, Seward, Soldotna, Sterling, Valdez, and Whittier) in close proximity to the forest. In addition, a smaller, statewide random sample of households was selected for inclusion in the study.

Of relevance to this study was the part of the survey that asked participants to place mnemonically coded sticker dots (1/4 inch) representing 13 landscape values on the CNF map provided with the survey. Upon return, the landscape value locations were digitized onto a scanned and georectified CNF map image using ArcView GIS software. The map scale was approximately 1 inch equal to 8 miles, with the 1/4-inch diameter dot covering 2 miles across. A total of 768 maps (28% response rate) were returned, with 16,839 point locations digitized for analysis.

The Kenai Peninsula planning survey was implemented in spring 2002. A survey booklet, consisting of six sections, along with a grayscale map of the study area were sent to 2,582 randomly selected households in 12 Kenai proximate communities (Anchorage, Anchor Point, Clam Gulch, Homer, Hope, Kasilof, Kenai, Nanwalek/Port Graham, Nikiski, Ninilchik, Seldovia, and Seward).

Table 1. Value Typologies from Three Surveys Used in This Study.

Chugach National Forest study[1] (1998)	Kenai Peninsula study[2] (2002)	NSRE (2000) Wilderness Values Scale[3]
Aesthetic	Aesthetic	Scenic beauty
Economic	Economic	Tourism income
Recreation	Recreation	Recreation opportunities
Learning	Learning	Scientific study
Spiritual	Spiritual	Spiritual inspiration
Intrinsic	Intrinsic	Knowing it exists
Future	Future	Option for future generations
		Option for personal use
Life sustaining	Life sustaining	Protecting water quality
		Protecting air quality
Biological diversity	Biological diversity	Protecting wildlife habitat
		Preserving unique wild plants and animals
		Protecting rare and endangered species
Therapeutic	Therapeutic	N/A[4]
Cultural	Cultural	N/A
Subsistence	Subsistence	N/A
Historic	Historic	N/A
N/A	Wilderness	N/A

[1]See Brown and Reed (2000).
[2]See Brown et al. (2004).
[3]See Cordell et al. (2003).
[4]N/A—not available; no comparable value item included.

In addition to the same 13 landscape values included in the CNF study, the Kenai study also included three "wilderness" value sticker dots per survey. Similar to the CNF study, the dot locations were digitized onto a scanned and georectified map image. The map scale was approximately 1 inch equal to 7 miles with the 1/4-inch diameter dot covering 1.8 miles across.

One important methodological consideration is that the wilderness study area in the Chugach National Forest and the designated wilderness area in the Kenai National Wildlife Refuge were *not* identified on the maps enclosed with the surveys. We make the assumption that the survey participants, even if knowledgeable about the existence of these wilderness designations, would likely not have known actual wilderness boundaries. Thus, survey participants were "blind" to the research question—perceptions of perceived wilderness value were based on perceived landscape attributes, not wilderness boundary considerations.

Landscape Value Spatial Analysis

To determine whether the proportion of landscape values differs based on value location inside or outside a wilderness area, landscape value point locations were divided into two sets—those falling inside and those falling outside the wilderness boundary. In the CNF study, the wilderness study area defined by the Alaska National Interests Lands Conservation Act (1980) and identified as "recommended wilderness" in the 1984 Chugach Land and Resource Management Plan, was used as the wilderness

Table 2. Similarities and Differences in the Distribution of Landscape Values Inside/Outside Wilderness Areas from Two Alaska Studies.

Chugach NF study (1998)	Kenai Peninsula study (2002)
Inside[1]	
Life sustaining (16.4% vs. 9.6%)	Life sustaining (10.1% vs. 6.1%)
Intrinsic (11.3% vs. 5.4%)	Intrinsic (11.9% vs. 6.1%)
Future (13.7% vs. 9.0%)	Future (9.8% vs. 6.1%)
Spiritual (6.2% vs. 4.9%)	
	Wilderness (21.7% vs. 8.3%)
Outside	
Economic (6.5% vs. 4.2%)	Economic (8.3% vs. 2.3%)
Historic (5.5% vs. 3.2%)	Historic (6.9% vs. 3.9%)
Subsistence (7.3 vs. 4.0%)	Subsistence (7.6% vs. 4.7%)
Aesthetic (12.0% vs. 9.4%)	
Recreation (13.5% vs. 7.1%)	
No difference[2]	
Biological diversity	Biological diversity
Learning	Learning
Therapeutic	Therapeutic
Cultural	Cultural
	Recreation
	Aesthetic
	Spiritual

[1]Inside and outside classifications represent statistically significant differences in value proportions (chi-square, $p < .05$).

[2]"No difference" indicates landscape value proportions located inside vs. outside wilderness areas are not statistically significant (chi-square, $p > .05$), but the relative abundance of values located inside/outside is noted.

boundary. In the Kenai Peninsula study, the congressionally designated wilderness area within the Kenai National Wildlife Refuge was used as the wilderness boundary. Using a spatial "clip" operation on wilderness boundaries, landscape value locations were classified as either being inside or outside the wilderness boundaries.

After assigning an inside or outside wilderness attribute to each landscape value, cross-tabulations with chi-square analysis were completed in SPSS software for each landscape value to determine whether the relative proportion of values located inside the wilderness area deviated from what would be expected based on the overall proportion of landscape value locations in the study area. Large deviations between the number of observed and expected landscape values inside the wilderness boundary result in higher chi-square values and a lower probability that the distribution of values is due to chance alone.

Multiple Regression Analysis

To conduct multiple regression analysis on wilderness value in the Kenai Peninsula study, some preliminary data preparation was required. A study area polygon was established to capture most respondent-identified value locations, but to exclude obvious point outliers. The selected study area polygon consisted of the Kenai Peninsula coastline buffered to approximately 5,000 meters (3.1 miles) offshore. Each of the 14 landscape value point distributions were then converted to raster data (grids) in ArcView Spatial Analyst by calculating the density of point locations using a consistent density criteria (1,500-meter [0.9-mile] grid cell, 5,000 meter [3.1-mile] search radius). Each grid was then clipped to the study area polygon, resulting in 11,779 grid cells for analysis.

Each grid cell represents three values (x, y, z), with x and y denoting unique spatial coordinates (latitude and longitude) and z denoting the calculated landscape value density. Thus, a given grid cell would have 14 separate landscape value density attributes (including wilderness value) associated with it. The 14 value grids were exported as (x, y, z) data and imported into SPSS software for multiple regression analysis.

The purpose of the regression analysis was to determine the relative strength of the predictor variables, not to validate a wilderness values predictive model per se. With wilderness value density as the dependent variable, multiple regression was performed with the 13 other landscape value densities as independent variables. Lacking sound theoretical reasons for including or excluding predictors in the regression model, the "stepwise" method of regression was chosen to select predictors based on a purely mathematical criterion. The primary methodological concern is with the expected collinearity, which can influence the importance of predictor variables shown by the model's standardized beta coefficients. In the absence of serious collinearity problems, larger absolute values of standardized beta coefficients indicate stronger predictors of the dependent variable.

Results

A total of 880 full or partially completed surveys were returned for an aggregate response rate of 32%. A total of 561 full or partially completed surveys were returned for an aggregate response rate of 23%. A total of 497 maps (20.4% response rate) were returned, with

20,415 point locations digitized for analysis.

Landscape Values in Wilderness Areas

The relative proportion of landscape values located inside and outside wilderness areas in the two studies appears in Table 2. The similarity in landscapes values appearing inside and outside wilderness areas in the two studies is striking. In the CNF study, proportionately more life-sustaining, intrinsic, future, and spiritual values were located inside the wilderness study area (chi-square, $p < .05$), whereas proportionally more economic, aesthetic, recreation, historic, and subsistence values were located outside the wilderness study area (chi-square, $p < .05$). There was no difference in the proportion of biological diversity, learning, therapeutic, and cultural values located inside and outside the wilderness study area.

In the Kenai Peninsula study, proportionately more life-sustaining, intrinsic, and future values were located inside the wilderness study area (chi-square, $p < .05$), whereas proportionally more economic, historic, and subsistence values were located outside the wilderness area (chi-square, $p < .05$). There was no difference in the proportion of biological diversity, learning, therapeutic, cultural, recreation, aesthetic, and spiritual values located inside and outside the wilderness area. Even where the differences in proportions were not statistically significant, the relative abundance of landscape values located inside and outside the wilderness boundary was similar in the two studies.

One important result is that the proportion of wilderness values located in the Kenai National Wildlife Refuge wilderness area was significantly higher than the proportion of wilderness values located outside the wilderness area (21.7% vs. 8.3%).

Table 3. Stepwise Regression Results for Wilderness Value Density (Dependent Variable) as a Function of Landscape Value Densities (Independent Variables).

——— Model fit ———

Multiple R	.646
R^2	.417
Standard error	.02774

——— Model results ———

	df	SS	MS	F	Sig.
Regression	6.485	12	.540	702.32	.000
Residual	9.053	11766	.001		

——— Final variables in the equation ———

	Unstandardized		Standardized			Collinearity Statistics	
Variable	**B**	**SE B**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
Economic	-.202	.006	-.505	-33.016	.000	.212	4.718
Intrinsic	.395	.014	.342	27.250	.000	.314	3.182
Aesthetic	.118	.007	.332	16.344	.000	.120	8.321
Future	.316	.015	.283	20.624	.000	.264	3.790
Recreation	-.080	.008	-.194	-10.350	.000	.141	7.113
Life sustaining	.196	.013	.193	14.644	.000	.286	3.501
Subsistence	-.054	.007	-.109	-8.199	.000	.282	3.544
Historic	.047	.009	.081	5.194	.000	.203	4.924
Biological	.030	.009	.055	3.149	.002	.164	6.087
Spiritual	-.026	.010	-.031	-2.589	.010	.355	2.820
Constant	.017	.000		51.30	.000		

Prediction of Wilderness Value

The 13 values in the typology were used to predict the location of wilderness values in the Kenai Peninsula study. One value, cultural, failed to enter the regression model because the predefined tolerance level (.000) to avoid significant multicollinearity was not satisfied. Of the 12 remaining predictor variables, 10 were found to be statistically significant predictors of wilderness value through stepwise regression (see Table 3). All six variables that were statistically significant in the inside/outside analysis were also statistically significant predictors in the regression analysis model. The overall fit of the regression model was statistically significant ($R = .65$).

Whereas the inside/outside analysis measures whether landscape value associations are likely to exist, the beta coefficients from regression analysis add a second information dimension—the strength and direction of relationship between the predictor landscape values and wilderness value. The most significant predictor variables, based on the standardized beta coefficients, were economic value (negatively associated with wilderness), intrinsic value (positively associated with wilderness), aesthetic value (positively associated), future value (positively associated), recreation value (negatively associated), life sustaining (positively associated), and subsistence value (negatively associated). Economic value (ß = -.505), intrinsic value (ß = .342), and aesthetic value (ß = .332) were particularly strong predictors of wilderness value.

The two variables dropped from the regression equation were therapeutic value and scientific (knowledge) value. These results are consistent with the 2000 NSRE results that showed "science" and "recreation" values to be in the lower echelon of wilderness values.

Collinearity diagnostics on the regression suggest probable collinearity in the independent variables, but this was not unexpected, as landscape values are not presumed to be spatially independent. The collinearity diagnostics show weak independent variable dependencies, with Variance Inflation Factors (VIF) values ranging from 2.8 to 8.3, below the threshold of 10 for obvious concern (Myers 1990).

Discussion

If national surveys of Americans conclude that nonuse values of wilderness *as a system* are increasingly important, then one ought to find evidence *in specific wilderness areas* at the state or regional level. Our data from wilderness areas in Alaska indicate disproportionately more values associated with indirect, intangible, or deferred human uses of the landscape—life-sustaining, intrinsic, and future values. Values outside wilderness areas reflect disproportionately more direct, tangible, and immediate uses of the landscape—economic, recreation, and subsistence values. These results were confirmed through multiple regression analysis showing intrinsic, aesthetic, future, and life-sustaining values to be relatively strong positive predictors of wilderness value, whereas economic and recreation values were relatively strong antipodal predictors of wilderness value. These regional results from Alaska are wholly consistent with the 2000 NSRE results and reflect the historical increase in nonuse values of wilderness, particularly life-support values.

Aside from the value of triangulating national survey results, our results suggest the potential for using perceived landscape values to complement traditional GIS-based wilderness quality assessments. The traditional approach to assessing wilderness quality—developing indicators of naturalness and remoteness—does not incorporate social values in the assessment (Lesslie and Maslen 1995). And yet there is recognition that inclusion of social and cultural criteria could improve the quality of wilderness assessment (Ananda and Herath 2002), and some research has actually mapped perceptions of wilderness conditions for integration with GIS (Kliskey and Kearsley 1993).

The challenge of integrating multiple ethnocentric definitions of wilderness into wilderness quality mapping has resulted in wilderness inventory methods that largely rely on physical landscape features to the exclusion of perceptual measures. The landscape values method reported herein suggests it may be possible to identify areas with perceived wilderness values without actually asking individuals about the specific location of wilderness. An indirect method of measuring wilderness quality that incorporates human perceptions can be highly advantageous where the wilderness concept has become bound up in political ideology, as in Alaska. If wilderness policy discourse focuses on the mix of publicly perceived landscape values that are known to correlate with wilderness quality and not the designation of wilderness per se, it may be possible to maintain or even expand de facto wilderness areas in an unfavorable political climate.

In practice, the moderate strength of the regression model indicates it may not be possible to derive a simple linear combination of landscape values that wholly describes a wilderness landscape. But the landscape values approach to mapping wilderness does appear to provide enough predictive power, and is sufficiently operational to warrant further research into its use with future GIS-based wilderness quality assessments. Future research will seek to determine how GIS-based methods that use remoteness and naturalness attributes compare to methods based on mapping perceived landscape values. **IJW**

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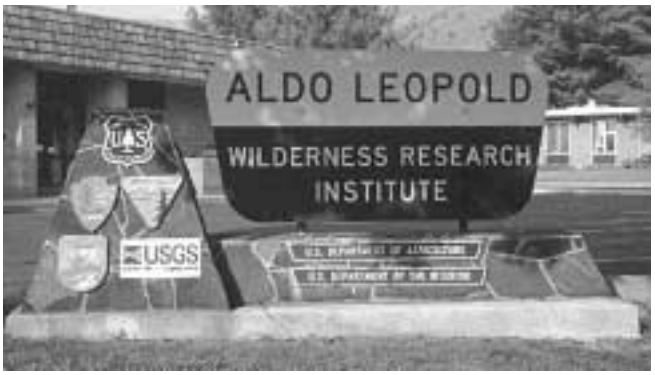
PERSPECTIVES FROM THE
ALDO LEOPOLD WILDERNESS RESEARCH INSTITUTE

The Fire Effects Planning Framework

BY ANNE BLACK

The fire lookouts began calling in at 4:30 P.M. on Saturday July 20 2004. There were several fires on Green Ridge and in Scimitar Creek on the West Fork Ranger District of the Bitterroot National Forest (BRF). The area allows Wildland Fire Use (WFU) as a management option. As part of the Wildland Fire Implementation Plan (WFIP), the Stage I analysis must be completed within two hours to determine whether to allow the fire to burn or to suppress it. Dave Campbell, district ranger, and Bart Hoag, fire behavior analyst, turned to the BRF's Fire Effect Map Library to locate the fire in relation to lynx habitat and existing whitebark pine stands. Both lynx and whitebark pine are sensitive species in the forest. The area has substantial suitable habitat, although there are no known lynx in the forest and there is woefully little foraging habitat at present. Most of the whitebark pine stands have a significant component of spruce and fir growing in them, and recruitment of young trees is low. But instead of looking to see if they needed to keep fire out of these areas, Campbell and Hoag were using the maps to provide an indication of whether the fire might actually *benefit* these species. In this case, the fire was not in the appropriate habitat, but they turned back to the library once again, this time to the fire behavior maps, to quickly assess the 24-hour-size-up potential of the fire.

During the preseason, forest fire ecologist Tonja Opperman had built both fire behavior and fire effects map libraries for each of the four ranger districts. The Forest-wide Geographic Information System datasets are housed on the BRF's computer server. District-specific hard-copy maps and associated descriptions were distributed to each ranger district. To create these maps, Opperman used the Fire Effects Planning Framework (FEPF). FEPF is an analytic framework conceived of at the Leopold Institute by the author, Carol Miller, and Peter Landres, and demonstrated by Tonja on the Bitterroot. FEPF's purpose is to help managers functionally link fire and resource management



by mapping out where fire under particular weather conditions meaningful to tactical and strategic fire management may be beneficial, neutral, or detrimental to species or other management objectives. In addition to assisting with incident planning, the maps are useful for fire management plan development and revision, as well as revision of long-range management plans.

Why FEPF?

The idea arose after review of various fire and planning procedures revealed a stubborn disconnect between fire and other resource management planning. Despite a clear biophysical link, few agency planning efforts specifically detail how fire is likely to influence the systems under their management (see Yosemite National Park's Fire Management Plan for a notable exception). The resulting characterization of fire as either categorically good (WFU zones and wilderness areas) or bad (all other lands) provides little guidance for fire managers who must decide under what strategy to manage a fire (wildland fire use, aggressive suppression, containment), and where on the landscape they should use which strategies (where to hit the fire hard, where to herd it, where to play it's natural role).

The map libraries provide fire managers with a quick, effective tool for functionally integrating their work into long-range

management goals, helping to answer the questions: should I try to influence this fire, and, if so, what areas should I attempt to keep fire away from and where should I try to encourage the fire to go? This information is integrated with knowledge of now classic "values at risk" (e.g., power lines, residences) to create a more complete picture of potential benefits and risks of fire. The map libraries provide resource staff with a means to quickly assess the impact of a fire, or a fire season, on progress toward and ability to meet management objectivess.

How Does FEPF Work?

The logic behind FEPF is straightforward: identify and map where management objectives exist on the landscape (or where their important habitats exist); identify critical fire weather threshold conditions (such as 80th, 90th, 99th percentile Energy Release Component) and map fire behavior under each of these; identify how fire under each threshold condition is likely to affect the management objective (or the habitat parameters on which it depends, such as large, early seral trees); and use this link between fire behavior and management objective to create a fire effects library. The choice of computer models to generate habitat and fire behavior is up to the user. Here in the United States, FireFamilyPlus (FF+) can be used to determine the typical fuel moisture and ambient weather conditions associated with each of the threshold conditions. FlamMap can be used to generate a wall-to-wall map of a number of fire behavior parameters (fireline intensity, crown fire potential, rate of spread, heat per unit area). Other countries may have different programs that generate similar information. Base vegetation and fuels conditions are derived from existing satellite imagery or modeled via a vegetation dynamics simulation model. The assessment of fire effects is based on species-habitat relationships and the known effects of fire on habitat parameters documented in the scientific literature or developed through expert-knowledge systems.

Where to Find More Information

As part of our Research Applications Program, we have established a website for the FEPF (http://leopold.wilderness.net/research/fprojects/F001.htm) on which we have posted fact sheets, background information, and a draft User's Guide on the FEPF. The User's Guide, which we hope to release in early 2005, provides both conceptual and detailed instructions for generating the necessary FF+ and FlamMap analysis, creating the linkages and using the output to address various planning questions. If you use FEFP, please let us know. We're interested in improving our science delivery techniques. **IJW**

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From WILDERNESS IS MORE on page 37

communes, regional forest services, and private owners. And of all 36 areas, one is designated by a regional forest service, 27 are designated and managed by communes (two of them enlarged by regional forest services), and seven are designated and managed on private properties in collaboration with the Italian Wilderness Society.

In Italy and other European countries, most of the environmentalists are not really interested in wilderness preservation; rather, they are naturalists. A very few people are really interested in wilderness preservation. The general masses of Italian environmentalists love animals such as the wolf and the bear, but not so much their habitat. They are interested in the protection of the species. They do not block the building of roads that bisect the wolf habitat, or stop the mass tourist use of its habitat, which is accepted as "ecocompatible" (for example, the Abruzzo brown bear has almost been exterminated due to this so-called "ecocompatible" tourism). These naturalists are more interested in the animal than its habitat. So, we must work to build up a real central European wilderness concept if we want to obtain some real central European wilderness areas. **IJW**

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Wilderness Education

The Ultimate Commitment to Quality Wilderness Stewardship

BY GREG HANSEN and TOM CARLSON

Introduction

Why has education become a critical tool for wilderness managers? How can you effectively plan, implement, and monitor a successful wilderness education program that will produce measurable results for your specific needs? And why will education increase in importance in the future as funding for personnel and on-the-ground wilderness management continues to be inconsistent and/or inadequate? These and other pressing questions will be discussed below in an effort to establish consistent wilderness education program standards for managers who are currently utilizing education or who desire to develop a new wilderness education program.

So what are the advantages of conducting wilderness education, you ask? Besides the obvious benefits of reducing physical impacts to the resource and receiving higher compliance with regulation, myriad other payoffs exist. Increasing visitor awareness of misunderstood wilderness programs, such as natural fire or exotic species eradication, can be achieved by blending pertinent information on such topics into more general wilderness educational programming. Promoting nonrecreational values, such as scientific research or maintaining air and watersheds, can be accomplished by integrating education messaging related to these values into other wilderness management functions—for example, in-town outreach efforts and backcountry visitor contact programs.

Furthermore, wilderness education can serve to develop and solidify quality partnerships that not only benefit wilderness but foster gains that reach far beyond the wilderness boundary. Educators can extend themselves through outreach efforts in a positive and professional manner, thus working to establish and build contact with prospective partners or maintain existing relationships with established user groups, nongovernmental organizations, and other cooperative land management agencies. If you are a proactive manager who understands the significance of building a foundation for proper land use in future users such as school children, innovative education programs can be effective in reaching young minds receptive to the new and engaging ideology of wilderness.

Article co-authors Greg Hansen (left) and Tom Carlson.

The author's combined wilderness management experience of more than 45 years supports the idea that education is invaluable in building wilderness constituency, as it provides a proactive human approach to solving problems. The indirect method of educating the public often far outweighs direct heavy-handed regulatory approaches when attempting to improve visitor behavior or make the public more aware of the purpose behind legally designating wilderness. When regulations are necessary, education helps gain compliance by explaining the necessity for restricting visitor activities to protect the wilderness resource. Although education must be supported by proficient law enforcement, at the end of the day, it is unyielding in its effectiveness if it is well laid out, implemented properly, monitored, and supported by administration. Read on to find out more about developing an education program that meets your needs and why education truly is the key to future wilderness preservation.

Program Planning

The expression "failure to plan is planning to fail" is applicable to wilderness education. These efforts require investments of staff time and some funding in order to show

Figure 1—Wilderness education planning. Photo by Greg Hansen.

results (see Figure 1). Creating, implementing, and monitoring the results of an education plan provides a method to focus limited resources and help ensure success.

Long-term Plans

The long-term, multiyear Wilderness Education Plan is typically a document that is in effect for three to five years or longer. It should be both general in scope, by looking at past efforts and results and current and foreseeable objectives, but also as specific as possible to identify issues, audiences, themes, and methodology. The plan should provide a road map for implementation of the comprehensive wilderness management plan.

Annual Action/ Implementation Plans

The Annual Action Plan is a wilderness education Program of Work for the current year that guides implementation of the long-term Wilderness Education Plan. It describes specific objectives, projects, audiences, necessary monitoring, and any required reporting, as well as personnel needs, funding requirements, and a time line for when projects will be implemented throughout the year. If a Wilderness Implementation Schedule is prepared annually, this Wilderness Education Action Plan could be a part of that broader effort.

A Wilderness Education Plan Template has been prepared as a suggested guide for preparation of a multiyear Wilderness Education Plan (see http://www.wilderness.net/toolboxes/documents/Web-Wilderness Education Plan Template.doc). This template was developed by identifying common successful items in examples of existing Wilderness Education Plans solicited from all federal land management agencies. The template is not federal agency policy, but can be used as a tool to help identify the key issues, audiences, messages, and monitoring necessary to prepare and implement successful long-term Wilderness Education Plans and annual action plans.

Part I of the template is the Education Plan Process. This process is a tool for identifying specific priorities for each wilderness organized by the following categories: issues, target audiences, messages, actions, and monitoring. The template prompts the user to follow a sequence of steps to identify an issue, describe why it is a problem for wilderness stewardship, select key audiences associated with the issue, and then develop the messages, actions, and monitoring necessary at each level of the managing organization.

Part II of the template is the Education Plan Format. This is a suggested format for preparing a long-term, multiyear Wilderness Education Plan. It provides a seven-part outline of a Wilderness Education Plan that begins with issues and ends with the Annual Action or Implementation Plan.

A sampling of current Wilderness Education Plans is provided in the Issues Toolbox section of Wilderness.net at www.wilderness.net/toolboxes/. The sample plans provided vary in detail, format, and length but serve to demonstrate various approaches to wilderness education planning and implementation.

Program Implementation

The primary goals for implementing wilderness education programs are to

- solve problems,
- resolve conflicts,
- improve user behavior,
- reduce physical and social impacts, and
- make the public or agency more aware of wilderness values.

Implementation Strategies

A few key concepts should be considered when implementing any type of wilderness education program. When first starting out, it is imperative to focus your educational efforts on one or two priority issues. If you are successful in resolving these first issues, move on to the next set of priorities,

as administering wilderness is a never-ending cycle of management challenges. Expect that there will be a crossover of issues that you are asked to deal with, especially if you manage an area for any length of time.

Therefore, managers must continually monitor and evaluate their education success and be able to modify their education programming in order to keep up with the inevitable reality of change. The point here is to focus in on one or two priority issues, with long-term objectives of program modification and possibly eventual expansion.

If your primary goals for implementing a wilderness education program are more generic in nature, such as making the public more aware of wilderness benefits, then a more general means of educational messaging should be instituted. Avoid falling into the trap of trying to contact the general public using a shotgun-style approach, unless this technique is truly merited, as it will result in vague and inefficient messaging, and your overall attainments will be limited.

Implementation Techniques

An endless number of techniques are available to managers who are interested in implementing a wilderness education program (Doucette and Cole 1993). Outreach or in-town education, by comparison, are substantially more efficient than all other wilderness related education methods. Educating users before they visit wilderness can help better prepare them for their trip, as these users will now have a clear understanding of what is expected of them and what to expect from the area they are visiting (see Figure 2). This effort results in higher compliance with regulations and can serve to reduce negative social and physical impressions upon the land.

Most people visit a managing agency office before entering wilderness, and this is an opportune time to educate. Although the majority of office visits do not exceed a total of five minutes, a great deal can be accomplished if front desk personnel understand both wilderness and the information they are asked to share with the public. Training office personnel to communicate the most pertinent information to visitors is well worth the effort, as these front liners can be very influential with the large numbers of people they contact.

Wilderness entry points can be used to promote responsible wilderness use, especially if an area is limited to a few main access portals, as your audience is funneled in and out of semicontrolled locations. But managers should be cautious not to force education contacts on visitors, as this can be interpreted by some as being in conflict with the very philosophy behind the ideal of primitive and unconfined wilderness recreation. If visitors are receptive to having agency personnel at road heads, or management problems exist that dictate such action, education stations can be set up throughout the year or during high-use times. Although education might be the main objective at wilderness entry points, other management duties, such as visitor use data collection and law enforcement patrol, can be accomplished simultaneously.

Information boards and signs can be used to pass educational information along to users at access points. Signs are certainly not as effective as a uniformed presence, however, as most people are in hurry to get their trip started and pass by without even stopping. Message boards that include some type of "hook," such as a cartoon or one or two well-designed color pictures, can help to draw the visitor (Cole 1998), but the amount of time actually spent reading text is fewer than five minutes, according to some research studies.

Traditionally, much of the education conducted in wilderness occurred alongside the trail or in backcountry settings, such as campsites. Although not as effective as educating visitors

Figure 2—Wilderness education implementation of a visitor kiosk. Photo by Greg Hansen.

Figure 3—Wilderness education evaluation is a necessary process. Courtesy of Greg Hansen.

in town before they arrive, backcountry education is useful and should be an integral element of any wilderness management program. In regards to education efficiency in the backcountry, trailside contacts are much more successful than speaking with users in their campsites. This is so because educators have the opportunity to discuss issues such as proper camp selection and fire restrictions before the user sets up camp and creates impacts that may be completely unintentional. Education duties can be combined with normal backcountry tasks, such as trail maintenance or resource monitoring work, by simply training all field employees to educate and by making it a formal part of their position description.

Written materials are another means of disseminating educational information. Text can be added on the back of a wilderness map, covering topics such as group size limits and other pertinent land ethic information.

Brochures that cover a few specific problem areas are most efficient, but more general pamphlets can also be developed and disseminated, while keeping in mind that these do not have the same power to change visitor behavior as issue-specific leaflets.

Today, electronic communication is an extremely useful mechanism for disseminating wilderness educational materials to a very large audience. Online wilderness education websites can take the viewer on a computerized wilderness education experience that is fun and interactive. Many wilderness areas provide education information via their agency-based website. To access these sites, go to http://www.wilderness.net/nwps/ and click on the state and wilderness area of interest. To view a quality wilderness education website, visit the National Park Service's Wilderness Views website at http://www2.nature.nps.gov/synthesis/views/#, Celebrate Wilderness's wilderness education and interpretation handbook at http://www.wilderness.nps.gov/toolbox21.cfm, and the Central Sierra Wilderness Education website at http://wildlink.wilderness.net/.

Credibility with the public is essential to any manager's success, and therefore all education efforts must be consistent. For example, if office personnel are informing the public that they must camp at least 200 feet away from any water source, but field rangers are only issuing citations to anybody camping within 100 feet of water, litigation is sure to follow. Be consistent with your information in every detail and diligent in your efforts to update educational messaging as issues and management actions change or are modified.

Wilderness education can and should be integrated into all aspects of wilderness management. However, this is a progressive process that takes time, commitment, money, and support. When implementing a wilderness education program, begin with a simple plan that focuses on priority issues, and expand only when these issues are resolved or can be managed at an acceptable level. Many wilderness education implementation techniques exist, and managers must take the most desirable and integrate these into a program that best meets their specific education program needs. By incorporating field-tested concepts and techniques, managers can realistically improve and correct user behavior, increase regulation compliance, and foster strong public support for designated wildlands—all resulting in a more pristine resource and a higher quality wilderness experience for the visiting public.

Program Evaluation

Why should managers spend time and money monitoring and evaluating education efforts?

- Evaluation offers managers a guide for achieving education goals.
- Evaluation provides feedback for the purpose of improving and revising education content and delivery.
- Evaluation allows for an objective measure of the effectiveness of

both indirect and direct methods in relation to solving management problems.
- Evaluation creates a written track record for education efforts.
- Evaluation provides documented results for gaining future funding.
- Evaluation can justify wilderness education program budgeting and personnel.
- Evaluation monitors the effectiveness of Wilderness Education Plan implementation.

The primary goal of any evaluation process is to determine the effectiveness of education and communication efforts (Meyer and Thomas 1989). Meyer and Thomas explained that the evaluation process includes an understanding of what made the program successful or not, and how the program might be improved for the future. Meyer and Thomas stated that realistic and attainable goals and objectives are essential to the evaluation process. Monitoring existing conditions prior to any education program must be completed before any form of evaluation can begin, as the manager must have a clear picture of how education changed and/or improved existing conditions.

Evaluation should be carried out during the education program and after the project has been completed. Evaluating educational success can be done in many ways, such as partnering with agency scientific stations, universities, or private research companies to develop evaluation agendas. It is also possible to develop your own evaluation process, in consultation with these types of organizations, and then implement the process utilizing your own personnel.

Quality evaluation and monitoring offers managers the chance to make updates and changes when specific aspects of the wilderness education program are deemed to be inefficient. Evaluation is a challenge to accomplish but allows managers to systematically measure their overall education effectiveness, which can be instrumental in justifying the need for education and for funding educational programming.

Reporting the results of your education program will not only show that you have taken the time to track your successes, it can also be extremely beneficial when fighting to maintain or increase budgeting for your program. Reporting can be as simple as handing in an accomplishment report at the end of the fiscal year, or as detailed as sitting down with your supervisor weekly during normal staff briefings and sharing education accomplishment results (see Figure 3). Be sure to go through the proper chain of command first, but sending education program results to upper-level offices and wilderness management leadership in your agency can help to show your unit's commitment to and success in improving wilderness conditions, thus establishing your program.

Although submitting successful wilderness education programs for recognition and awards can seem self-serving, future budgeting may depend upon your ability first to be successful, and second to show your success through formal recognition. Effective reporting and recognition of your wilderness education efforts is central both to maintaining educational funding and attaining increased funding. Reporting should be completed at the end of every primary education work season and throughout the fiscal year.

Summary and Conclusion

Throughout the past 40 years, wilderness has become a place for social relaxation and natural healing for our relentlessly fast-paced society. Wilderness education and information is a basic, fundamental, and essential part of managing wilderness for future generations. Most administrative actions implemented as part of wilderness stewardship are focused on management of human-caused impacts and providing opportunities for wilderness-dependent recreation or solitude. Without an adequate education and information program, other types of management actions (e.g., regulations, restoration, etc.) are far less likely to succeed.

> Wilderness education can and should be integrated into all aspects of wilderness management.

A complete wilderness education program will include the plans, implementation projects, and monitoring. The successful wilderness education program will be part of a comprehensive wilderness stewardship program that incorporates indicators of change from natural conditions and wilderness character, resource inventory, monitoring of program results, visitor information and contact programs, law enforcement, and partnerships with other wilderness stewardship organizations.

Wilderness education is the ultimate commitment to quality wilderness stewardship, as the future of protected wildlands will depend

Continued on page 34

Conservation Planning in the Tropics

Lessons Learned from the Guianan Ecoregion Complex

BY G. JAN SCHIPPER

Introduction

Undeveloped tropical areas retain large portions of the earth's biodiversity in relatively natural conditions and offer an opportunity for proactive resource planning to combine conservation with sustainable development goals. These areas present a number of conservation challenges (see Table 1), including huge gaps in knowledge of the biodiversity. Unlike many heavily disturbed regions, there is still time to set aside large areas for conservation while simultaneously providing opportunities for socioeconomic development. Participatory planning exercises (e.g., stakeholder and expert workshops) can be a useful tool to fill information gaps and to provide multidisciplinary input. We begin by asking the question, where do we best invest scarce resources to ensure long-term species persistence and maintenance of ecological integrity and environmental services?

Amazonia is among the largest intact tracts of undeveloped tropical forest and savanna on the planet. The Guiana Shield (see Figure 1) is a biogeographical subregion of northern Amazonia (north of the Rio Negro/Amazon), which is both faunistically and floristically distinct (Huber and Foster 2003; Mori 1991). The classification of various distinct species assemblages, and thereby subregions, in the Amazon basin is largely attributed to several biogeographic characteristics: riverine barriers (Hall and Harvey 2002), ancient ridges (crystalline arches) (Lougheed et al. 1999), and a Pleistocene/Holocene lake system (Frailey et al. 1988). However, the significance of these theories is the subject of continued debate (Gascon et al. 2000), thus I followed widely recognized ecoregional delimitations for this study (Dinerstein et al. 1995).

The ecoregions comprising the Guianan Ecoregion Complex (GEC) (see Figure 2 and Table 2) are large biogeographical units delimited at a scale appropriate for conservation planning (Olson et al. 2001). This relatively pristine area has recently received much international attention due to its "wilderness potential." While the mind's eye wanders over huge tracts of pristine rain forest and savanna enclaves, it is important to remember that dispersed tribes of Amerindians have occupied these forests for many thousands of years.

With the human population rapidly increasing and centralizing, this pristine vision is now changing. Threats are mounting as the natural resources are discovered by international mining and timber interests, among others. From a satellite image, the forest cover of the Guianas appears nearly continuous, yet just beneath the lush forest canopy are a few surprises. As human settlements increase in size and number, hunting pressures are amplified across the range of many game species. In addition, illegal small-scale gold mining in the Guiana Shield region and elsewhere has resulted in high levels of mercury and other toxins being released into the headwaters (Mol and Ouboter 2004). Although these are relatively

Figure 1—The Guianas are located in the northeastern corner of the South American continent.

minor threats to biodiversity when compared to large-scale clear-cutting, there may be reason for concern.

There is a growing body of literature describing systematic conservation planning versus ad hoc reserve design (Margules and Pressey 2000) and the need to involve stakeholders at all stages of the planning process (Cowling and Pressey 2003). Reserve selection algorithms (Pressey and Cowling 2001) are simply tools for translating the current state of knowledge for a region into a systematic context from which data can be analyzed and iteratively modeled for representing biodiversity (Margules et al 2002). Pearce et al. (2001) described a process for mapping vegetation with expert opinion, and readers are referred to Faith et al. (2003), Ferrier (2002), and Pressey et al. (1999, 2000, and 2003) for further discussions on methods and examples of systematic conservation planning.

Table 1. Challenges to Reserve Design and Conservation Planning in Undeveloped Tropical Areas.

1. Data deficiency: As a general rule, few scientists have explored these regions and thus there is very little data on even presence or absence of biodiversity features.
2. Human diversity: Areas are often multinational, multicultural, and multilingual.
3. Human interests: Many large tracts of forest are either inhabited by Amerindians, set aside as concessions, or otherwise accounted for in national development goals.
4. Area-sensitivity: Many of the megacharismatic species have large home ranges and require large intact habitats to maintain populations.
5. Seamless maps: National land cover and infrastructure maps exist at a coarse resolution, but classifications are different in each country and cannot be merged.
6. Vegetation classification: Few maps distinguish between the different types of "moist forest" in lowland tropics.
7. Species distribution: Extent of occurrence for most species can be modeled, but area of occupancy at a landscape scale is not known.

Table 2. Ecoregions of the Guianan Ecoregion Complex.

1. Guianan Moist Forest: Lowland moist forests (rain forest) extending from patches along the coast to the Tumucumaque and Acarai Mountains to the south.
2. Guianan Savannas: Patches of savanna mixed with forest enclaves and riparian gallery forest. Predominantly three regions: the Sipaliwini, Rupununi, and Gran Sabana.
3. Guianan Highlands Moist Forests: Moist forest above 500 meters (1,640 feet) elevation, predominantly occurring in the western ecoregions complex (Pakaraima Mts.) but along ridges and peaks moving east.
4. Pantepuis: These small disparate regions consist of high granitic flat-top mountains (tepuis), with steep cliff faces and montane floral elements on the peaks.
5. Guianan Mangroves: Coastal zone strip extending in patches up to 5 km (3.1 miles) or more inland and along river mouths.
6. Guianan Freshwater Swamp Forest: Inland coastal zone strip of seasonally and permanently flooded forests.

Challenges and Opportunities

The great diversity of habitat types and associated species and processes that occur in the GEC present a number of daunting challenges for conservation priority setting. These challenges are confounded not only by the complexity of the habitat associations present but also by the complexity of geopolitical units (Venezuela, Brazil, Guyana, Suriname, and La Guyane), each with different policy mechanisms, unique decision-making processes and legal systems, varying priorities and economic security, five different languages, and a great diversity of cultural and ethnic realities. At the scale of ecoregion-based conservation, this complexity presents a daunting task to both biological and social scientists and managers. Moreover, the species and ecological processes unique to this region do not recognize these boundaries, thus if we are to achieve large-scale conservation planning based on habitat representation, we must learn to think across political borders. This issue is further complicated by various disputes between political boundaries, but that discussion is beyond the scope of this article.

The conservation planning process for the GEC rapidly becomes an issue of scale. When an ecoregion is considered the framework for conservation planning (as opposed to a continent, country, or protected area), there must be consideration of the trade-off between social and economic realities and biogeographic and ecological processes (Faith and Walker 2002). The two must then be reconciled into a

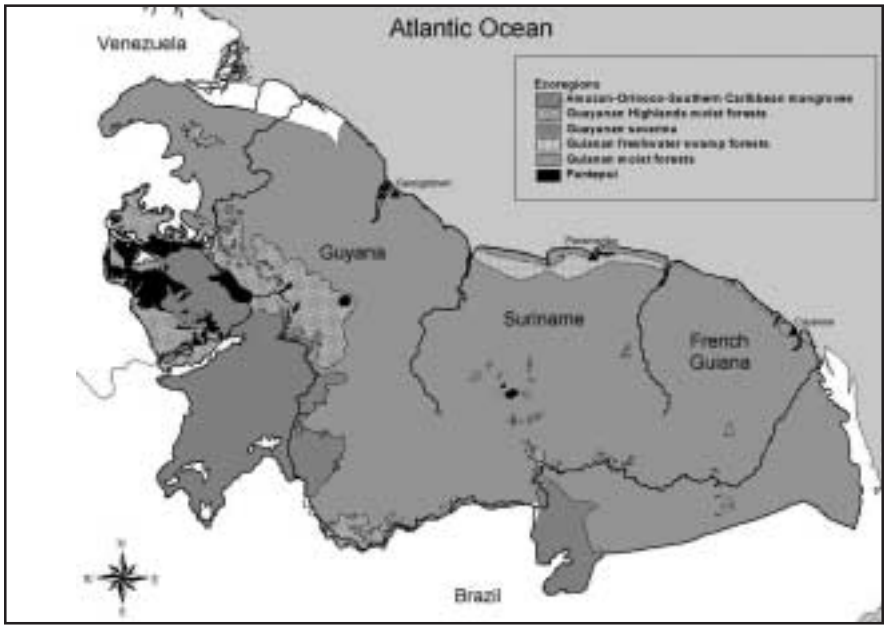

Figure 2—The Guianas biogeographical region consists of a mosaic of six ecoregions, which when merged together form the Guianan Ecoregion Complex (GEC).

cohesive conservation portfolio, with consideration of scale at each stage of the process. This approach ensures that any support of decision making is made with biological and social consideration, and can be framed at a policy scale.

There is great need and opportunity for conservation in the GEC, including the designation of wilderness and other protected areas. The region represents among the last areas in Latin America to be opened to logging and mining. The numerous navigable rivers have served as highways for merchants and settlers for centuries. As a result, road systems are extremely limited, and roadless areas are extensive.

The relatively intact ecosystems of the region thus lend an unusual twist to conservation priority setting. Planners don't have to focus on crisis management and reactive planning. Opportunity exists to create a dynamic conservation strategy that can be implemented and changed as new information becomes available. In this sense we are able to take the limited information we have, make the best decisions possible, and give alternative scenarios to planners—while maintaining the option to continuously improve the process as biological, social, and economic considerations fluctuate over time. By not having to rush to save every piece of remaining habitat, which is costly both financially and politically, we can greatly reduce costs of implementation and develop a long-term conservation vision and action plan for the Guianas with the full participation and collaboration of a wide variety of stakeholders.

Because multiple large-scale threats are not the driving force in large parts of the GEC, biological targets and priorities can be addressed in a cohesive manner. This allows for in-depth examination of specific threats to both freshwater and terrestrial biological priorities, as in the case of illegal gold mining. Small-scale illegal gold mining is a terrestrial-based threat with many freshwater consequences (Mol and Ouboter 2004). Although in and of itself gold mining has a small effect on forests, it dramatically increases the ambient mercury level in the watershed. Because these activities are often conducted in the mountainous headwaters, the effects can be detected across many watersheds and with as yet unmeasured effects to stream and human health.

Ecosystem processes have rarely been quantified, financially or ecologically, to an extent that is useful in long-term planning for conservation or development. Given the relatively intact ecosystems of the GEC, opportunity exists to mitigate development in areas where ecological process and subsequent ecosystem service is maintained. For instance, since the majority of human impact occurs along the coast in the GEC, there is a disproportionate amount of threat placed on freshwater swamp, the white sand savanna belt, and ~~on~~ mangrove habitats. By using a habitat representation approach, this problem can be address by looking at the irreplaceability of such unique landscape features. In other words, where there are threatened and unique biological representation units, the degree of threat to each can be examined and addressed in the larger conservation portfolio. Designation of wilderness and other strict protected area classifications may be suitable in high priority areas where development pressure remains small, whereas other conservation tools may be used in areas more attractive for development.

Furthermore, the opportunity exists to collaborate with a full range of the stakeholders in the ecoregion complex to develop a succinct and cohesive plan, with buy-in from the various biological, social, and economic interest groups. Rarely is there such an opportunity to develop a multidisciplinary action plan for both conservation and development of a region. This challenge embodies the scale of consideration in planning within an ecoregion complex, allowing for a holistic approach to conservation planning and for

developing a strategy that embodies compromise, understanding, and sacrifice from all perspectives. This presents the possibility of mitigating conflict between conservation and development, such that the two can be implemented together.

Lessons Learned from the GEC

The first stumbling block to conservation in many undeveloped intact ecoregions is the overall lack of biological information. To overcome this obstacle, conservation organizations often seek expert opinion and knowledge to fill in the gaps in the available literature and current understanding of the ecoregion. In the GEC, an expert workshop was held in Paramaribo, Suriname, in 2002 (Huber and Foster 2003) in which biological and social science experts convened in various thematic and regional groups to compile what is known of the greater GEC. The integrated result was a broad-scale priority-setting map, with fairly coarse polygons, representing an overlap of priorities presented by the various thematic working groups. This "first cut" at priority setting has the advantage of expert consensus, but the disadvantage of lacking policy-oriented recommendations at a scale that can be useful. In the end, the maps produced from this endeavor are very useful in identifying gaps in the current knowledge of the region, but they are difficult to interpret at a scale useful to the establishment of an action plan for policy makers.

The success of the 2002 workshop was largely the result of combining the social and biological expert opinions on one map, with clear (albeit broad-scale) priority areas ranked to degree of threat and biological importance. However, what remained was the challenge of how to apply these results on the ground. To address this task, a second workshop was arranged between a subset of the major stakeholders at the ecoregion complex scale. Thus the scale of consideration for this workshop was narrowed to the GEC, and members of the prominent decision-making and planning organizations were invited to participate. This stakeholder workshop was convened in March 2003 to evaluate and refine the expert workshop information such that the results could be scaled down to the policy level. Although Brazil and Venezuela were not present, the countries of the Guianas met to discuss planning issues both within and between political boundaries. By combining social and biological priority-setting goals across country boundaries, participants were able to identify key factors for moving the process forward to a policy scale.

In 2004 a series of national expert workshops were conducted to increase the resolution of this exercise and develop seamless maps of biological and socioeconomic features. These national workshops culminated in an international stakeholder workshop in Paramaribo, Suriname (March 2004). The focus of this workshop was to refine the scale of analysis to individual conservation landscapes, species, and focal elements using expert opinion combined with spatial decision-support software (MARXAN, http://www.ecology.uq.edu.au/marxan.htm) to provide an objective and systematic approach using the best available knowledge. Using this approach, scientists were able to begin developing seamless maps of species area of occupancy, vegetation, cost, and opportunity.

A gap analysis was conducted for all focal species (defined by endemism and threat) and all vegetation types, both to take stock of their representation within the current reserve network and to identify areas that are a priority for protected area designation in the future. An algorithm was derived for weighting focal species representation in the software analysis based on range size, degree of endemism, and the results of gap analysis. Experts from national working groups were asked to modify the criteria used in the software analysis, and a variety of scenarios were derived based on scaled representation targets for focal species and vegetation types. Finally, experts were invited to participate in a yearlong project to finalize the datasets—specifically the seamless maps, weighting of the focal species algorithm, and a systematic review of criteria for landscape selection.

The results of the national working groups described above were presented in Paramaribo (March 2004) to the broader international stakeholder group, with the experts also present. The result was a cohesive draft and first iteration of the biodiversity vision presented for review by implementing agencies, such that their input could be taken into account for finalizing the draft vision and action plan.

By maintaining a transparent process and by using systematic software it was possible to capture the attention of stakeholders otherwise suspicious of a presumed bias in expert opinion. For example, mining and logging companies seemed more apt to buy into a process when it isolated the opinions

Amazonia is among the largest intact tracts of undeveloped tropical forest and savanna on the planet.

of scientists from the data. A constant challenge when working with experts is to encourage them to focus on the big picture and not simply their study sites. This is especially challenging in an area as data-poor as the Guianas, where expert opinion ultimately is the only source of knowledge.

Conclusions

The initial goal of this planning process was to develop a document that (1) is representative of all important biodiversity features, (2) incorporates socioeconomic data, (3) requires less financial resources over the long term, (4) overcomes unwieldy information gaps, and (5) is developed across disciplines to maximize efficiency and stakeholder buy-in. In achieving representation I found that weighted algorithms have proved useful in setting variable targets for species and vegetation scaled by threat, extent of occurrence, and results of gap analysis. I found that socioeconomic data became most useful as seamless maps of conservation cost and opportunity. The relative lack of imminent threat allowed for a proactive approach that greatly reduced costs in both the planning and implementation stage. I found that using a combination of expert opinion and systematic planning tools, such as spatial decision support systems (e.g., MARXAN, C-Plan, SPOT) provides the most usable knowledge in a data-deficient area. These same software systems have provided an unbiased approach and are useful in defining conservation landscapes only when there is a consensus concerning the targets being used (i.e., representation percentages). Because this is an iterative process that produces various scenarios suited to the decision makers, the data input layers can be progressively improved over time to more exactly answer the question, where to best invest scarce conservation resources to ensure long-term species persistence and maintenance of ecological integrity and environmental services.

The process and lessons detailed above use a theoretical framework developed to work at multiple scales, in a region with poor biological data coverage and to facilitate expert and stakeholder collaboration with systematic planning tools such as software. After years of trial and error, I see this as a way to accomplish the goals of conservation planning set forth in the context of sustainable development for a wilderness area. It is essential to recognize here the importance of defining these goals clearly from the outset and then modifying them as feasibility becomes clearer during scenario development. The Guianas have been an excellent case study in applying these techniques, and I continue to improve them as new information and conceptual models take form. I have tried to move beyond ad hoc planning and have found that integrating multidisciplinary data through expert knowledge via a software mechanism presents a great number of challenges. However, the process of working through these challenges has been the cornerstone to successful buy-in and has put us on the path to developing iterative scenarios to help decision makers translate biological data into policy. I recommend conservation planners explore a process by which transparency is maintained between all stakeholders such that designing conservation landscapes can complement national development goals to provide options for a sustainable future.

Acknowledgments

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Continued on page 7

The Ruaha National Park, Tanzania

BY SUE STOLBERGER

Editors Note: *This is the second of two articles concerning the Ruaha National Park (RNP), located in south-central Tanzania, and describes how a local nongovernmental organization (NGO) can work with the local parks authority toward achieving common goals in a challenging environment, using wilderness as a common denominator. The first article, written by Mr. MGG Mtahiko, chief warden of the park, appeared in the December 2004 issue of IJW. RNP is still an exceptionally wild, undisturbed area. The Wilderness Zone in Ruaha National Park comprises 6,022 square kilometers (2,325 sq. mi.). Within this area lies a seldom-visited and remote wilderness core known as the Isunkaviula Plateau. The WILD Foundation and the Sierra Club have supported the preparation of a wilderness management plan for the Isunkaviula area. The Friends of Ruaha Society (FORS), a local NGO, works closely with Tanzania National Parks (TANAPA) inside RNP to facilitate its wilderness agenda. Outside RNP, FORS works with local communities to develop environmental education programs at 10 local schools and to assist in local community wildlife management programs operating in surrounding buffer zones. FORS also has consistently sounded alarm bells concerning the drying up of the Great Ruaha River that runs through the park, caused by upstream irrigation projects.*

The Friends of the Ruaha Society

The first written record of the Ruaha area was in 1877, when it was noted by early explorers as a wildlife haven. In 1912 the Germans established it as a game reserve. Later, it was enlarged by the British, and finally, in 1964, the Tanzanian government declared the area to be a national park encompassing more than 10,200 square kilometers (3,938 sq. mi.). Subsequently, several game reserves were added to the north, east, and west so that today, the whole ecosystem is more than 45,000 square kilometers (17,375 sq. mi.).

In the early years, the park was underfunded and underresourced, tourists were extremely few, and the park struggled. In 1984 the Fox family, who had recently built a lodge in Ruaha National Park (RNP), gathered together a group of interested people in Tanzania and formed the Friends of Ruaha Society (FORS) to support those responsible for protecting Ruaha's wildlife. Funds were raised locally to buy boots and water bottles for patrols and diesel fuel and spare parts for vehicles and machinery. The group helped with antipoaching patrols through use of the FORS plane, a Cessna 182 (largely funded by the Tusk Trust in the UK), and implemented myriad other ideas to help create incentives for the park's game rangers.

Artist Sue Stolberger shares a digital image with the park botanist, Gladys Ng'umbi. Photo by Michael Sweatman.

Figure 1—Looking up the escarpment into the wilderness area, Ruaha National Park. Photo by Michael Sweatman

By the early 1990s, due to the considerable increase in tourist revenue, Tanzania National Parks (TANAPA) became better able to support its many parks and staff. The role of FORS began to alter. In 1994, instead of buying the nuts and bolts needed for the park, the society shifted its focus to ways to promote the park and to tackle environmental issues. Initially they produced a color leaflet on RNP that TANAPA still uses for publicity purposes. FORS also highlighted the ecological disaster that occurred when the Great Ruaha River dried up in 1993, due to excessive agricultural use of water upstream.

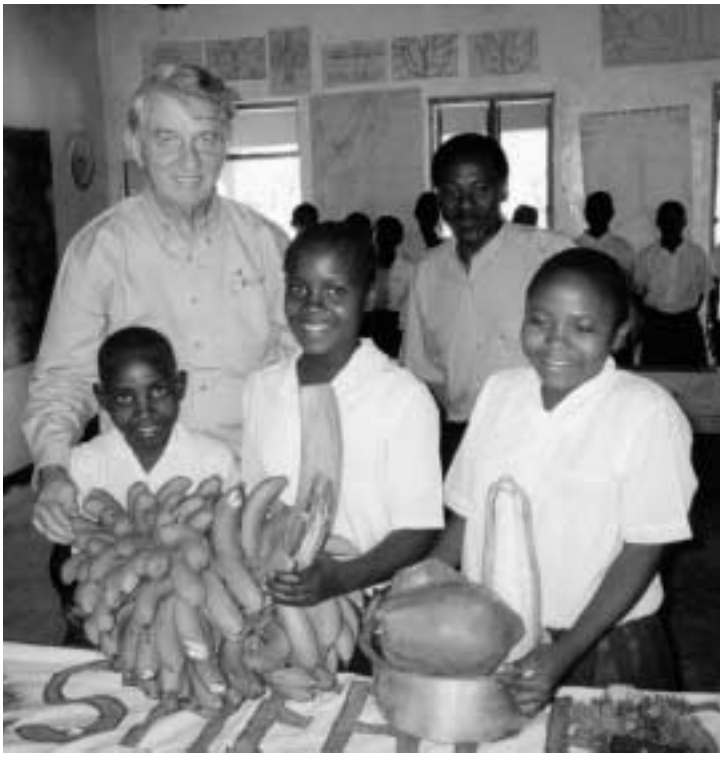

Figure 2—Michael Sweatman from The WILD Foundation, presented with gifts by local students. Photo by FORS

Meanwhile, FORS continued to fly the antipoaching patrols over the vast protected area. In addition, FORS put considerable effort into protecting the southern buffer zone of the park by employing and equipping village rangers, working closely with the new Wildlife Management Areas (WMA) established by a project funded by the British government to reallocate hunting revenues back to the communities living in the WMA. FORS continued to assist the park in any way it could, such as by installing VHF radios in all the ranger posts and vehicles, donating the HF radio link e-mail system for park headquarters, upgrading the clinic, and equipping the ranger posts with rechargeable flashlights.

In 1999 FORS was approached by Dr. Dulle, a Tanzanian veterinarian working for the government. Interested in the need to protect wilderness areas, he realized the urgency in educating his fellow Tanzanians on the importance of looking after its rich natural heritage. Within a short space of time FORS and Dr. Dulle devised an environmental education project that served the primary schools in the areas surrounding the Ruaha National Park.

As a result, FORS established environmental education programs in 10 schools. At first, FORS used educational extension officers to introduce the program into the schools. Now, two full-time education program officers, Anna Marie Malya from Tanzania and Sarah Vatland from the United States, have been employed. When new topics are introduced into each program, each school undertakes training. After four to six weeks, follow-up visits by FORS staff address problems and obtain feedback. Initial results are very encouraging, and FORS is considering preparing a comprehensive guide that will be easily replicable at schools throughout Tanzania.

Other small income-generating projects have also been started in the villages, such as growing vegetables suitable for use by the camps and a lodge situated in the RNP. The production of honey and other food items for use by the camps and lodges are other

examples of small industries emerging due to FORS's efforts.

FORS continues to assist the park in many ways. As funds become available, the Idodi Secondary School will receive the environmental education program. FORS also hopes to soon stimulate interest in nature guiding courses and other tourist-related matters, incorporating local knowledge and traditions into the program as much as possible.

Ruaha Wilderness Zone

Ruaha is an exceptional area, situated in the convergence zone of northern and southern species and habitats (in the eastern African context). The park is composed of an area of Rift Valley floor, where the Great Ruaha River meanders for 150 kilometers (93 m.), with mainly mixed acacia/combretum/baobab woodlands and open areas. This vast area is mainly brachystegia woodland (commonly known as *miombo*). The river valley area rises to form the escarpment edge of the Rift.

In the remote western corner of the park, the Isunkaviula Plateau rises to more than 1,800 meters (5,900 ft.) and is regarded as the core wilderness zone. Due to difficult access, this ecologically important area has not been studied in detail and forms an extremely valuable part of the Ruaha Park resource. Initial research indicates that high altitude and isolation over a very long period have formed an extremely important niche of biodiversity. Furthermore, the species in the Isunkaviula Plateau appear to be affiliated with western species rather than with those in Africa's Eastern Arc. Therefore, RNP may well be the convergence zone of both northern and southern species, plus the eastern and western species (in the African context).

Figure 3—TANAPA Game Ranger Jonathon Simbeye on guard duty in Ruaha. Photo by Michael Sweatman

Wilderness Management Issues

Unfortunately, the plateau area is used by poachers as an access route to other areas of the park. Well-used bicycle trails are encountered. On inspection of these tracks, there are obvious signs that the bicycles are heavily laden on the return trip, probably with dried meat from poaching camps located in other remote, inaccessible areas of RNP. In order for these poachers to make easier access routes for themselves, they light many fires that continue to destroy the remaining forests, with much damage evident. This is a critical issue as the remaining stands of this ancient forest area are very small. This area is in urgent need of protection. However, with the RNP already struggling to keep up the required standards needed in the areas used by tourists, areas such as Isunkaviula are very

Figure 4—Curriculum feedback session, local teachers with Friends of Ruaha Society staff, Sarah Votland and Anna Marie Malya. Photo by Michael Sweatman

Initial research indicates that high altitude and isolation over a very long period have formed an extremely important niche of biodiversity.

vulnerable as funds and resources are limited.

Looking after wilderness areas is a delicate balancing act. It requires extremely careful handling with low impact development, such as walking trails and remote camping areas accessible only by foot. Although the Isunkaviula Plateau would be a magnificent addition to Ruaha's already stunning array of wildland experiences, it will require funding. FORS has been collaborating with the chief park warden, Mr. MGG Mtahiko, to see how they could assist with protecting this very special and unique area from destruction. A start has been made with the WILD Foundation and Sierra Club supporting the creation of an easier, peripheral access route for the antipoaching patrols along the western boundary. Soon a temporary ranger post will be established that will enable the rangers to be based closer to this unique area.

The people who live around the peripheral areas of the park are hunter-gatherers by tradition, with intimate local knowledge of nature handed down from generation to generation. FORS is anxious to keep these very valuable skills alive. The group aims to start by establishing a program, using the Idodi Secondary School as a base for the training of guides, using as much local "bush craft" as possible.

When walking one day with one of our village scouts, we stopped to listen to a red chested cuckoo that was calling for the first time. When the bird was finished, the scout turned to me and said, "When that bird starts to call, the village people know that the rain will come very soon, and that it is now time to plant their crops." I asked him: "How can you be so sure that the birds are right?" The reply came swiftly, without hesitation. "They know: these birds talk to the rain."

FORS's challenge is to honor and help maintain these natural and human-made systems in an effort to keep the balance of Ruaha as it has always been—using local knowledge, folklore, and tradition to form an integral part of the Ruaha experience. **IJW**

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From WILDERNESS EDUCATION on page 25

upon the manager's ability to educate the public on how to responsibly enjoy wilderness while understanding the many benefits this unique resource provides to all people. **IJW**

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Wilderness Is More Than "Nature"

BY FRANCO ZUNINO

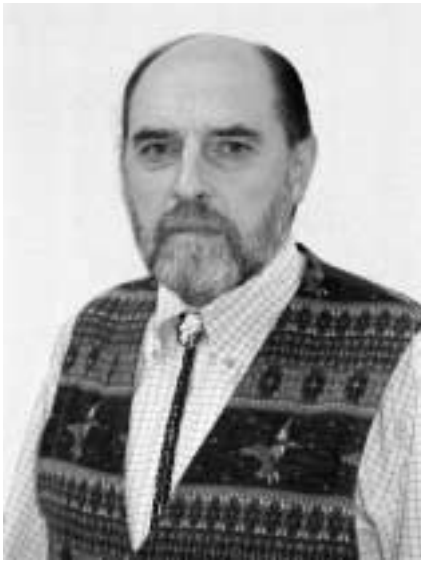
Editor's note: *This article provides a continuing commentary on the emergence of a "wilderness movement" in Europe. The author (previously published in* IJW*) here comments on other* IJW *articles, primarily Weinzierl (2003) and Deimer Held and Hofmeister (2003). We welcome this escalating and serious appraisal of European wildness and wilderness.*

In recent years, in Italy and other countries of Europe (certainly in Switzerland and Germany), the word *wilderness* has been discovered, and this may be a good thing. Yet there is a problem of interpretation: too many people are speaking of wilderness as nature, and they simply use this "new" American word when they previously used the term *nature*. However, this is not a correct use of the word *wilderness* because wilderness is a philosophy and concept of preservation.

Very few know the connection of the word to the wilderness philosophy and the wilderness concept of preservation. The best-informed people are saying that wilderness areas are the very small pieces of virgin—or almost virgin—or pristine woods of these countries. Obviously, biologically speaking, this interpretation is correct, but it has gone astray because wilderness is not only an environmental subject, it is also a concept of preservation and conservation. This concept is meant to be about a large expanse of the environment, or land, not dissected by roads and other human structures.

I found the articles of H. Weinzierl and of M. Diemer, M. Held, and S. Hofmeister that appeared in the *IJW* (December 2003) very interesting because the European authors are writing of wilderness in a country very near mine. These authors appeared to me to make the same errors of many Italian naturalists and protectionists by calling wilderness what was called nature until few years ago.

Also, in Roderick Nash's (2001) book *Wilderness and the American Mind*, I think that some of the author's ideas about the roots of the wilderness philosophy are incorrect: as with many Italians today, he confuses the words *nature* and *wilderness*. The wilderness concept is an American idea, with its roots in America, not in Europe, Italy, or Greece. The philosophy about nature is another story. Wilderness is not nature, wilderness is also nature; this is a point of confusion that is spreading in all central European countries.



Article author Franco Zunino. Photo by Massimo Odella.

From what I know of Germany, there are some small parcels of almost-wild or near-virgin or rewilded woods and mountains, but almost no large area without roads. An area of 1,000 hectares (2,470 acres) is a rarity, I think. Small, wild, wooded areas may not be classified wilderness, and it is correct to call them what they were called until recently: a nature reserve if protected, or wild woods if not protected.

It is important not to cause confusion or create misinformation with the use of the words *wilderness* and *wilderness area*. If we began to call wilderness what previously we called nature, we would do a disservice to the wilderness philosophy and a worse disservice to the wilderness concept of preservation. The "forever wild" idea is the spirit of the Wilderness Act and was used by Americans in the middle of the last century (e.g., Robert Marshall, Aldo Leopold, Howard Zahniser, Arthur Carhart, and others) as the concept for wilderness as a designation of a special area and not simply any natural area.

Figure 1—Bric Zionia Wilderness Area (Liguria Region). One of the first wilderness areas designated by a municipality; afterwards enlarged by an agreement with a private landowner. Photo by Franco Zunino.

Figure 2—Val di Vesta Wilderness Area, in the Alto Garda Bresciano Regional Park (Lombardia Region). Designated by the Regional Forest Service. Photo by Franco Zunino.

What if we began to refer to any national park, protected area, or environmental area as wilderness? With such criteria, almost all the North America is wilderness. And I think that very few American conservationists or preservationists would agree to such an interpretation of the term *wilderness*.

We in Italy have classified very small wooded parcels that we directly obtained (about 112 hectares, or 276 acres) or acquired (until now 3.5 hectares, or 8.6 acres) as wilderness, but these woods are part of larger wild areas without roads. It is possible to classify these areas as wilderness according to the wilderness concept inspired by the U.S. Wilderness Acts. Also, in Europe, an area cannot be wilderness simply because it contains populations of wolf, brown bear, or lynx; otherwise a large part of my overpopulated and urbanized country could be considered wilderness.

Wilderness areas are the wildest examples of nature in a cultural, ecological, and political context. They must meet some minimum criteria for wildness. It is difficult, therefore, to classify many European areas as wilderness, especially when compared to elsewhere. In Italy we have adopted the term *wilderness area* to maintain a direct connection to the spirit of the wilderness concept. But we are conscious that our wilderness areas are only small, and likely less-wild examples of the (normally much larger) wilderness areas in the United States, Australia, South Africa, and elsewhere. Therefore, it is correct to classify our wilderness areas in a different category from those areas protected by national legislation in the United States and elsewhere.

It is not easy to establish how large a wild area must be to be classified as wilderness, but I think that small virgin or wild woods cannot be called wilderness, if they are not enclosed in larger areas with characters of wild country (valley, ravines, plateaus, or large areas of plain woods), where it is possible to walk for hours without seeing roads or other human structures. So we must be very careful not to risk overuse of the term *wilderness* and the essence of wilderness areas.

We must remember that when Aldo Leopold visited Germany he did not accept their approach to forest management, a practice that eventually spread to most of the central European countries. This German school of forestry regards the forests and mountains as "fields" for the cultivation of trees, crossed with many small and large forest roads. Weinzierl wrote that "foresters, hunters, anglers, water managers and road builders all assume that the good Lord is incapable of keeping his creation in order without their help," (2003, p. 5) and this is true in almost all central European countries. Since it is very hard to steward a new vision of nature, we must "show more courage" for wilderness. We must hinder the current trend of our media to speak of wilderness rather than of nature, because unless we obtain more knowledge about the word *wilderness*, we run the risk of reducing the intrinsic and very real sense of its philosophy. Wilderness is not only "to live and to let live" (Weinzierl, 2003, p.5), above all it is to let wild!

Biologically or environmentally speaking, it is correct to consider that "a number of isolated wilderness areas exist in relatively remote locations throughout central Europe" (Diemer, Held, and Hofmeister 2003, p. 7), but it is not correct to consider them "… synonymous with national parks of which they comprise core zones," because with such a definition we negate the

wilderness concept. Preserving small parcels of pristine or rewilded habitat is not an act of wilderness preservation, but only one of biological preservation.

In Europe, the focal point for wilderness area designation should not be based on an environmental state such as pristine habitat nor on "tracts of land specifically set aside to evolve without human interference" (Diemer, Held, and Hofmeister 2003, p. 10), but rather on the existence of a large wild area without paved roads, forest roads, or other modern human structures. The environmental state may not be "without human interference" in a European wilderness area, because human use may be include primitive methods (by foot or horse) and use of natural renewable resources (e.g., hunting wildlife).

A small wood divided up or surrounded by roads, even one in a pristine state, cannot be designated as a wilderness area. If we adopt that criterion in Italy, almost all the nature reserves would be called wilderness. This designation would be incorrect because these nature reserves, although biologically preserved (no pastures, no cutting of woods), are managed simply as nature parks with roads, marked paths, and recreation facilities—use that is not in the spirit of the wilderness concept. We are battling to obtain formal wilderness designation for these nature reserves by subtracting the normal tourist use and maintaining their wildness with "forever wild" criteria.

It is absolutely absurd to postulate that proposed urban wilderness could "complement the more remote wilderness areas, such as national parks and reserves throughout central Europe and elsewhere" (Diemer, Held, and Hofmeister 2003, p. 11). The small "urban wildernesses" described by the authors are a good thing, but in Europe, we risk confusing the wilderness philosophy and criteria of what a wilderness area must be with a large expanse of continuous natural environment. The spirit of the U.S. Wilderness Act and the Eastern Wilderness Act teaches that is the philosophical path we must follow in Italy. If national parks and other reserves are to declare wilderness areas within their boundaries, the area must have an official designation by the authorities that manage it. Otherwise, it cannot be a wilderness area, because a de facto wilderness is not a wilderness preserved by a law, decree, or formal act that designates and protects it through management direction.

> Too many people are speaking of wilderness as nature, and they simply use this "new" American word when they previously used the term *nature*.

This type of designation that I first heard at the 3rd World Wilderness Congress, in Findhorn, Scotland, in 1983, is one we have used in Italy over the last 15 years to obtain the designation of 36 wilderness areas for a total of about 28,000 hectares (69,200 acres). Of these wilderness areas, three are in national parks (one established by the national parks authority itself, and the other two by a commune), and seven are in regional parks but designated by

Continued on page 20

Figure 3—Amici di "Scolopax" Wilderness Area, now in the Partenio Regional Park (Campania). Designated thanks to a hunters' society. Photo by Franco Zunino.

Figure 4—Burrone di Lodisio Wilderness Area (Liguria Region). One of the Italian Wilderness Areas designated through an agreement with a private property, and afterwards enlarged with a direct purchase of land by the Italian Wilderness Society. Photo by Franco Zunino.

Plant Community Monitoring in Vodlozhersky National Park, Karelia, Russia

BY RALPH DUNMORE

Article author Ralph Dunmore.

Introduction

National parks are relatively new in the system of Russian nature reserves; the first two were created in 1983. The primary functions of national parks (managed by the Federal Forest Service) are to protect and restore natural and cultural heritage, maintain public access to lands for recreation, educate the public on environmental and conservation issues, foster conservation science for the protection of nature and culture, and carry out ecological monitoring (Colwell et al. 1997).

The location of this study, Vodlozhersky National Park (VNP), lies within eastern Karelia (Pudozh District) and the western part of the Arkhangelsk region (Onega District) to the north. Established in 1991, VNP comprises 467,000 hectares (188,992 acres) (Antipin and Tokarev n.d.), and lies on a mire plain containing a number of paleovolcanic and rift formations. Its climate is of the boreal-temperate-continental type (Danilov-Daniljan 1995), in which precipitation exceeds evaporation, favoring formation of mires.

The park's forest complex, part of the northern-middle European taiga, is almost 10 times larger than other European sites of this type, and may be one of the world's largest. VNP's forests are within the virgin basin of the Ileksa River and Vodlero Lake. About 96% of the park's area consists of climax ecosystems. As of 1996, 90% of VNP's territory was untouched by commercial logging or other human activities (Danilov-Daniljan 1995).

Typical taiga coniferous forest occupies the middle portion of VNP, composed of spruce forests (54%) and pine forests (44%), with secondary growth of birch and aspen forests (2%). Within a natural succession stimulated by fires and windfalls, the park's trees range in age from 200 to 280 years; some dated samples are 500 to 600 years old.

Mires constitute the second major ecosystem in VNP, making up about 200,000 hectares (80,939 acres) and 41% of its area. Most mires in the park form complex systems of 5,000 hectares (2,024 acres) each (Antipin and Tokarev n.d.). According to Danilov-Daniljan (1995), the Vodlozhero mire complex in the south of the park "has no equal in Europe [for] its size and state of preservation." These mires provide very large reserves of berry-producing species such as cranberry *(Vaccinium oxycoccus)* and cloudberry *(Rubus chamaemorus)*. Most of VNP's mires are of the raised, transitional type. In the Ileksa River basin, oligotrophic sphagnum moss and pine-undershrub mires occupy about 20% to 30% of the area. Over such a large tract, a great number of transitional mires are found in the park, and for that reason Danilov-Daniljan (1995) stated that they could be considered

The park's forest complex, part of the northern-middle European taiga, is almost 10 times larger than other European sites of this type, and may be one of the world's largest.

"a standard of a kind." Reflecting two major mire floristic provinces, VNP's local mires are significant for their very high flora diversity and complex ecological structure.

VNP lies within the northwest section of Russia's taiga forests. These forested reaches are composed primarily of pine, spruce, fir, cedar, larch, birch, and aspen. The Republic of Karelia is heavily forested (about 70% of its area is covered by pine and fir) and is a major supplier of wood and wood products. In addition, this region has many complex mires. Kuznetsov (n.d.) reports 283 plant species occurring in Karelian mires, 22% of which are regarded as rare in some parts, or all, of the republic.

Occupying a low plateau, Karelia has many rivers and lakes, including Europe's two largest lakes, Ladoga and Onega. Geologically, Karelia lies within the eastern part of the Baltic Shield (Elina and Filimonova 1996), and because of glaciations, about two-thirds of the republic's territory is a flat mire/morainal plain; the remaining area has water-glacial forms: lakes, outwash plains, and lake terraces. The region has long, snowy, severe winters and short summers. Inland waters are iced over for more than half of each year

Russian scientists have begun designing a coordinated system for monitoring biological diversity in their country (Blagovidov et al. 1995). Thus, the Ecological Centre of VNP and the Karelian Research Centre of the Russian Academy of Science have initiated ecological studies to establish a scientific basis for the management, conservation, and preservation of plant communities within VNP. As part of my doctoral internship in natural history, I joined with Russian scientific colleagues for the establishment of plant community monitoring sites in one section of VNP. The goals of this article are to: (1) report some representative results of these plant surveys, (2) focus attention on the unique opportunities for ecological research in the Ileksa area of VNP, and (3) invite hemispheric collaboration and development of scientific, conservation, and educational efforts within VNP.

Table 1. Importance Values for Live Trees in Four Community Types at the Ileksa Site, 1996.

	Species							
Site	*Pinus sylvestris* L.		*Picea abies* (L.) Karst		*Betula pendula* Roth		*Salix* spp.	
Community	Small trees	Large trees	Small trees	Large trees	Small trees	Large trees	Small trees	Large trees
Mature pine	—	75.0	—	—	—	—	—	—
Mature pine-spruce	—	67.1	91.2	28.7	13.7	—	7.7	—
Forest-mire boundary	60.9	91.7	16.0	—	23.1	—	—	—
Mire	91.7	79.2	—	—	—	—	—	—

Field Methods

A permanent camp, on the east bank of the Ileksa River (see Figure 1), approximately 75 meters (69 yards) south of its confluence with the Novguda River, was a base for the field studies conducted mid-August through early September 1996. These surveys constitute a baseline for further monitoring of the sites at five-year intervals.

One representative circular plot (201 square meters, 240 square yards) was chosen a priori in each of four nearby plant communities: mature pine, mature pine-spruce, forest-mire boundary, and mire. Structural classes for tree species included seedlings, saplings, small trees, and large trees. Data taken at each plot for live trees included species, number of live stems

Figure 1—Norway spruces above silver birches along the Ileksa River. Photo by Ralph Dunmore.

Table 2. Regeneration (stems per ha.) of Dominant Canopy Potential Tree Species in the Four Community Types at the Ileksa Site, 1996.

Community Type	Species	Seedlings	Saplings	Small trees	Large trees
Mature pine	*Pinus sylvestris* L.	—	—	—	2,188
	Picea abies (L.) Karst	—	—	—	—
Mature pine-spruce	*Pinus sylvestris*	—	—	—	1,194
	Picea abies	—	199	2,586	796
Forest-mire boundary	*Pinus sylvestris*	796	2,586	1,592	1,393
	Picea abies	398	398	398	—
Mire	*Pinus sylvestris*	8,754	1,990	1,592	398
	Picea abies	—	—	—	—

(all four structural classes), azimuth reading, and estimates of height and crown cover. Importance Values (IV) were computed as relative density plus relative frequency plus relative basal area divided by 3.

For shrubs, herbaceons plants, and mosses, data were collected from eight 40-square centimeter, (258-square inch) subplots within each plot, and included species and estimates of percent cover. IVs were calculated as relative cover plus relative frequency divided by 2.

Vodlozhersky is a wondrous postglacial landscape of extensive wetlands and old-growth forests.

Results

Among the two potential canopy tree species, *Pinus sylvestris* and *Picea abies*, only *P. sylvestris* occurred in all four community types, as large trees (see Table 1). Highest IVs, both for small-tree and large-tree classes, also were attained by *P. sylvestris*. This species occurred only as small trees in the wettest community types (forest-mire boundary and mire). *Picea abies* and *Betula verricosa* occurred together as the only tree species in the two mature-tree communities (pine and pine-spruce), primarily in the small-tree class, with *P. abies* attaining the highest IV values. *Populus tremula* occurred only as small trees in the moist, mature pine-spruce forest, and the wetter forest-mire boundary community. All four tree species occurred together in only one community type, the mature pine-spruce forest, with *P. abies* alone found in both tree size classes. *P. abies* also had the highest IV in that community.

In large-tree regeneration (see Table 2), the highest value (stems/hectare [2.47 acres]) attained by *P. sylvestris* surpassed the highest of *P. abies* by 2.8-fold. However, for small trees, the greatest regeneration of *P. abies* exceeded the highest of *P. sylvestris* by a factor of 1.6. Similarly, regeneration of *P. sylvestris* exceeded that of *P. abies* by 6.5-fold for saplings, and 22-fold for seedlings. Within the mature pine community (the driest community), only *P. sylvestris* (of the two potential canopy-dominant species) had any regeneration, and only as large trees (see Table 2).

Overall, *P. sylvestris* regenerated in all four classes in the two wettest communities (forest-mire boundary and mire), but only as large trees in the two less moist communities (mature pine and mature pine-spruce). *P. abies*, however, showed no regeneration in the driest site (mature pine community) and only as large trees in the next moistest community (mature pine-spruce). It attained regeneration as small trees, saplings, and seedlings in the wet forest-mire boundary community, but no regeneration in the wettest (mire) community.

Seedling regeneration occurred only in the forest-mire community and mire community (see Table 2). Both potential dominant-canopy species produced seedlings; stems/hectare for *P. sylvestris* exceeded that of *P. abies* in the forest-mire community by a factor of 1.8. Only *P. sylvestris* produced seedling regeneration in the mire community. The IV for *P. sylvestris* exceeded that of *P. abies* in the forest-mire community.

IVs for *Vaccinium vitis-idaea* were highest among all 11 species (nine shrubs and two herbaceous plants) in the mature pine, mature pine-spruce, and forest-mire boundary communities. In the mire community, *Chamaedaphne calyculata* attained the highest IV. Overall, the three highest IVs among all communities were recorded in the mature pine and pine-spruce forests (*V. vitis-idaea* [2] and *Calluna vulgaris* [1]). Only *V. vitis-idaea* and *V. myrtilis* occurred in all four communities. The fourth highest IV was noted for *C. calyculata* in the mire community.

A total of 13 other plant species (one each of sedge, lichen, and lycopodium, and 10 sphagnum mosses) was counted in the four communities. Species diversity was highest (S = 10) in the second wettest community (forest-mire boundary), and lowest (S = 4) in the driest community (mature pine).

Discussion

VNP's Ileksa locality offers unique opportunities for long-term ecological inquiries into the complex of interacting abiotic factors (soil type, geological formation, water table and flow, light, and available nutrients) and natural disturbances (fire, windthrow) and how they affect plant ecology (species composition, regeneration, and replacement within and between communities) in a large taiga ecosystem with minimal effects from historic human activities (logging, mining, water pollution, soil disturbance, roads, pipelines, and settlements).

Some of our planet's largest unbroken tracts of wilderness lie within Russia's 14 principal bioregions (Dinerstein et al. 1994; Blagovidov et al. 1995; Martynov et al. 1995). Even though Russia itself is the world's greatest region of temperate and boreal biological diversity (Colwell et al. 1997), that country's nature reserves face threats of degradation from the ever-changing face of Russian economics—as evidenced by developing markets—which exploit its natural resources (Colwell et al.). Concurrent with Russia's financial woes, that country's governmental support for conservation has faltered, with sharply reduced funding for the protection of biological diversity (Simonov and Stepanitsky 1995).

In the face of these challenges to resource conservation, the establishment of VNP in 1991 represented much-needed protection of a large, relatively

Some of our planet's largest unbroken tracts of wilderness lie within Russia's 14 principal bioregions.

"untouched" tract in northwestern Russia. Yet, even though 50% to 100% of lands within any Russian national park may be designated as a reserve for recreational, educational, and scientific activities, remaining lands are open to resource exploitation. Thus, several years after formation of VNP, Danilov-Daniljan (1995) was concerned that the Russian timber industry continued to use areas adjacent to the park for logging, and had proposed to build a road for timber transport through the park's center. In addition, open mines and facilities for ore processing were planned for construction near VNP's borders.

In September 2001 VNP became the first Russian national park designated as a UNESCO Biosphere Reserve, as approved by the Bureau of the International Coordinating Council of that organization's Man and the Biosphere Programme. VNP is now the core of the 862,360-hectare (348,992-acre) biosphere reserve of the same name. This reserve is primarily a boreal forest ecosystem, containing some of the last remaining uncut pine-spruce forests in Europe (Zeljadt 2001). Realizing the importance of integrating local peoples with their economies, Vodlozhersky Biosphere Reserve will focus, among other efforts, on monitoring fish populations and reviving traditional forms of forest agriculture,including the cultivation and harvesting of native berry species such as cranberry and cloudberry.

Vodlozhersky's new title is indicative of its precious floral, ecological, and geological status. Its new status is a clear invitation to European and North American scientists, especially botanists, ecologists, land managers, conservation biologists, and teachers, to join their Russian colleagues in long-term studies of a near-pristine complex ecosystem, in a national park that is really a test case to see how Russian national parks will fare as biosphere reserves (Gräbener 2001). As Colwell et al. (1997) point out, an effective reserve system needs to be

Figure 2—Vodlozhersky National Park scientists conducting a mire survey. Left to right: Pavel Tokarev, Nikolai Balykov, and Vladimir Antipin. Photo by Ralph Dunmore.

able to maintain ecosystem processes, such as hydrological cycles, nutrient cycling, predator-prey interactions, and natural disturbance regimes.

Vodlozhersky is a wondrous post-glacial landscape of extensive wetlands and old-growth forests, moose *(Alces alces)* and wolf *(Canis lupus)*, capercaille *(Tetrao urogallus)* and the elusive great gray owl *(Strix nebulosa)*, giant ant mounds and stunted poplars, summer white nights and shimmering Aurora borealis. Its long-term success as a vital part of the Russian reserve system can be assured by active collaborations among scientists, students, land managers, and conservation teachers from both Russia and other parts of the West.

Acknowledgments

I extend thanks and gratitude to my Russian friends and colleagues Vladimir Antipin, Pavel Tokarev, and Nikolai Balykov. For collaboration with the staff of VNP/Biosphere Reserve, interested scientists are urged to contact Dr. Vladimir Antipin, Karelian Research Centre, Russian Academy of Sciences, Institute of Biology (e-mail: ANTIPIN@krc.karelia.ru). Visits and exchanges of conservation students, managers, and teachers can be facilitated by Pocono Environmental Education Center (e-mail: rcn@igc.org) and Margaret Williams (editor), Russian Conservation News (e-mail: margaret.williams@wwfus.org). **IJW**

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Eroding hoodoos and their remnants in the Bisti/De-Na-Zin Wilderness (Bureau of Land Management, New Mexico). Photo by Chris Barns.

Announcements and Wilderness Calendar

COMPILED BY STEVE HOLLENHORST

IJW Solicits Nominations for Stewardship Award

The *IJW* solicits nominations for the Keith Corrigal Excellence in Wilderness Stewardship award to honor persons whose efforts to protect and manage wilderness are worthy of special recognition. The award honors the late Keith Corrigall, who was wilderness branch chief for the Bureau of Land Management (BLM) during its wilderness program's formative years, from the mid-1980s to the mid-1990s. Keith was a strong leader and advocate for wilderness education, protection of wilderness and wilderness study areas, low impact use of all public lands, and wilderness skills training. His influence extended beyond BLM to all the wilderness agencies, universities, and environmental organizations. Keith's quiet determination, passion, and high standards for wilderness and all resource management provided leadership and mentoring to all his colleagues and cooperators. Rarely outspoken, he set an outstanding example of dependability, vision, and professionalism that charted direction and fostered cooperation. The Keith Corrigal Award for Excellence in Wilderness Stewardship is given annually to an individual or team of persons whose efforts to protect and/or steward wilderness is worthy of special recognition. Nominees may be professionals or citizens involved in wilderness work. Nominations are solicited until August 30 each year for the annual award. To submit a nomination, send a 500-word statement and a second supporting letter to Steve Hollenhorst, *IJW* Digest editor, *IJW* Corrigal Award (e-mail: stevenh@uidaho.edu), describing why the award is deserved, with complete postal, e-mail, and telephone contact information for the nominee(s) and the person(s) making the nomination.

Largest Amount of Wilderness Ever Designated in Nevada

On November 30, 2004, President George W. Bush signed the Lincoln County Conservation, Recreation, and Development Act of 2004. Supported by the state's entire congressional delegation, the act designates 14 new wilderness areas totaling 768,294 acres (311,050 ha) in eastern Nevada's Lincoln County. The areas range in size from 5,371 to 157,938 acres (2,174 to 63,942 ha). The final legislation contained several provisions that conservationists opposed—including grants of rights-of-way for utility and water pipeline corridors and shortcuts for effective environmental review. Important areas were also left unprotected, including the Pahranagat Range, a rugged and scenic mountain range just an hour and a half north of Las Vegas that contains a stunning array of petroglyphs and other cultural resources. Nonetheless, the act represents the largest single wilderness designation in the state's history and one of the largest such congressional actions in the last decade.

Submit announcements and short news articles to STEVE HOLLENHORST, *IJW* Wilderness Digest editor. E-mail: stevenh@uidaho.edu.

New Wisconsin Wilderness Honors Gaylord Nelson

The Gaylord A. Nelson Apostle Islands National Lakeshore Wilderness permanently protects 33,500 acres (13,562 ha) of wildland on the waters of Lake Superior. Known as the ancestral home of the Ojibwe people, the Apostle Islands include remarkable cliff formations, sea caves, and some of the most pristine sand landscapes remaining in the Great Lakes region. Wilderness permanently protects 80% of the 21 forested islands that form the Apostle Islands archipelago and 12 miles of pristine shoreline located on Lake Superior's southern shore in northwestern Wisconsin. Broad bipartisan support from both Republican and Democratic parties, local municipalities and unprecedented public support ensured that the process moved quickly. Over the last few years visitors to the islands (including sailors, hikers, campers, kayakers, and sightseers of the historical lighthouses) have numbered 170,000 to 186,000. The founder of Earth Day, Gaylord Nelson is the elder statesman of the environmental movement and a long-time leader of the wilderness movement. The Apostle Islands wilderness designation is a fitting testament honoring the continuing conservation legacy of this former U.S. senator and governor from Wisconsin.

Funding for Northwest Territories Protected Areas Strategy

The Canadian federal government announced $9 million of funding over five years to protect important ecological and cultural lands in the Mackenzie Valley of the Northwest Territories (NWT) through the NWT Protected Areas Strategy (PAS). Funding has also been committed by environmental groups, the Canadian Parks and Wilderness Society and its partners, World Wildlife Fund Canada, Ducks Unlimited Canada, and the government of the Northwest Territories. Together this funding will allow implementation of the PAS in the Mackenzie Valley to take place ahead of proposed industrial developments such as the Mackenzie Valley Pipeline. The NWT Protected Areas Strategy is a partnership that includes eight aboriginal organizations in the NWT, the territorial and federal governments, northern-based environmental organizations, and representatives from the oil, gas, and mining industries. The PAS allows communities to protect areas that are important for culture and wildlife in order to balance economic development with the protection of the land for future generations. A five-year Action Plan has been developed by the PAS partners to achieve these goals in the Mackenzie Valley. The funding will allow for the implementation of the plan before conservation opportunities are lost through industrial development. For more information on the PAS, visit the Canadian Parks and Wilderness Society at http://www.cpaws.org/.

World Database on Protected Areas

The 2005 version of the World Database on Protected Areas (WDPA) was released at the International Union for Conservation of Nature and Natural Resources (IUCN) in Bangkok, Thailand, on the November 18, 2004. The WDPA provides the most comprehensive dataset on protected areas worldwide and is managed by United Nations Environment Programme Wilderness Conservation Monitoring Centre in partnership with the IUCN World Commission on Protected Areas and the World Database on Protected Areas Consortium. The WDPA is a fully relational database containing information on the status, environment, and management of individual protected areas. The WDPA allows for protected area searches by site name, country, and international program or convention. Statistical information relating to WDPA datasets is also available, in addition to information on the definitions and categorization of protected areas worldwide. The WDPA can be downloaded at http://sea.unep-wcmc.org/wdbpa/.

New Protected Area Conservation Awards for Young Conservationists

The IUCN World Commission on Protected Areas (WCPA) announces two new awards for young people working in protected area and biodiversity related conservation. The first award is made available through WCPA and the Consortium for International Protected Area Management (CIPAM) and will give two training scholarships to young professionals in protected areas each year. The second, an annual award for young conservation leaders, will be offered jointly by WCPA and the International Rangers Federation (IRF). Awardees for the joint WCPA-CIPAM prize will be selected based on a global essay competition and take part in international protected area training seminars organized by CIPAM. For the joint WCPA-IRF award, a call for nominations will be posted on both the IRF and WCPA websites in the near future. "It is about time that young people's efforts in this field are recognized," said David Zeller,

president of the International Rangers Federation. For more information on the awards, visit the WCPA website at http://www.iucn.org/themes/wcpa/.

Vietnam Designates New Marine Reserve

More than 160 coral reefs off the coast of the Vietnamese province Quang Nam, harboring more than 200 fish, coral, and reptile species, are now protected. The new Cu Lao Cham Marine Reserve, set up with assistance from the government of Denmark, is the second Marine Protected Area (MPA) in Vietnam. The reserve protects an important part of Vietnam's marine biodiversity and is a critical element in efforts to reestablish a healthy fishery and preserve coral reefs and pristine turquoise water for sustainable tourism. The establishment of Cu Lao Cham also marks a positive trend, as Vietnam plans to establish a total of 15 MPAs in the future. A collaborative management model will be implemented at the Cu Lao Cham Marine Reserve in which local communities are involved in the park management, the park contributes to their income, and tourism activities are developed in accordance with the park's management plan. For more information, visit http://www.iucn.org/info_and_news/press/vietnamese-MPA.pdf.

Once the Iron Curtain, Now the European Green Belt

At a meeting of European conservationists at Fert-Hanság National Park, the European Green Belt Project was recently launched to create a single ecological corridor out of the "rubble" of the former Iron Curtain. It is hoped that the Green Belt will become an icon for nature conservation and sustainable development in Europe. Experts from the 22 countries that border the Green Belt agreed that this project has an important role to play in the future of trans-boundary cooperation. The Iron Curtain, a political, ideological and physical barrier that separated Europe for more than 40 years, created a forbidden zone to people along its entire length. Elsewhere landscapes were being shaped and modified by intensive agricultural and development processes, but habitats within the forbidden zone were given a 40-year breath of life. Thus, many of Europe's important habitats and ecosystems fall along the route of the former Iron Curtain. For further information, see www.greenbelteurope.org and www.iucn.org.

Assessing Protected Area Management Effectiveness

Measuring the success of protected areas in meeting their planned goals can involve a significant amount of fieldwork and data collection—a challenge for resource-strapped managers. New scorecards, produced by the World Bank, provides a simple, site-level tool to help managers and stakeholders assess their protected areas without additional field level research. A version for marine protected areas is available online at http://www.mpascorecard.net. A terrestrial version can be found at www.panda.org/downloads/forests/Summary_final.pdf. The scorecards are not intended to replace more thorough methods of assessment. Rather, they provide managers with an overview of the progress of their management efforts and illustrate gaps in management that should be addressed. The scorecards are designed to be filled in by managers or other site staff, and are adaptable to site and regional needs.

IJW First 10 Years on CD

A new CD due out in the summer of 2005 will feature the first 10 years of *IJW*, including all 30 issues complete with front covers, tables of contents, and 48 pages of content. The CD will be packaged as an interactive Adobe Acrobat version that is readable and searchable and with standard security to prevent copying of text and figures. The CD will be available for both Macintosh and IBM-type personal computers. The CD is meant to offer a complete set of *IJW* issues through 2004 for new subscribers, teachers, managers, advocates, and libraries without a complete set, as back issues are not available for most older issues. The new product will be for sale in a color cardstock CD sleeve and available through Fulcrum Publishing. Order information will be available in the August 2005 issue of *IJW*.

Book Reviews

The Enduring Wilderness: Protecting Our Natural Heritage through the Wilderness Act

by Doug Scott. 2004. Fulcrum Publishing, Golden, CO. 200 pp., $12.95 (paper).

This book, as part of the Speaker's Corner book series recently introduced by Fulcrum Publishing, is designed to stimulate, educate, and foster discussion on significant public policy issues in the United States. Doug Scott, long-time wilderness advocate and currently the policy director for the Campaign for America's Wilderness, takes this opportunity to offer an illuminating history of the passing of the Wilderness Act, highlight its ramifications and significance, and provide a clarion call for grassroots advocates to continue to create new wilderness areas in the United States.

The historical component of the book provides an excellent overview of the battle to pass the Wilderness Act in 1964. Scott emphasizes that concern over the impermanence of existing wilderness designations led to the Wilderness Society's attempt to create the Wilderness Act. Scott also focuses on the unforeseen impacts of Representative Wayne Aspinall's insistence that only Congress could add any new wilderness areas to the wilderness system. Although initially seen as a major blow to the legislation, wilderness advocates soon realized that Congress was often far more willing to create designated wilderness than land management agencies. Moreover, "however sincere the promises of protection in administration orders and plans [in agencies] may be, anything less than statutory protection is temporary at best and illusory to boot" (107). Finally, the act hastened the formation of a grassroots, decentralized wilderness movement, including people like Doug Scott.

Scott also provides an interesting discussion of the current political climate in the United States regarding wilderness designation, noting that the current administration is attempting to bypass or weaken the permanence of wilderness designation promised by the Wilderness Act. Scott is a strong supporter of compromise over dogmatic advocacy, and believes the wilderness movement, although having broad public support, "must identify, persuade and enlist new constituents for wilderness" (122). He prefers the term *wilderness stewardship* to *wilderness management*, as he feels it better reflects the Wilderness Act's mention of nonhuman influences.

A strength of the book is its use of numerous, well-selected sidebar quotes, although there are several instances of repeated quotes in the text, and the lack of an index is unfortunate. In sum, however, Doug Scott provides a wonderful, deeply personal view of where the wilderness movement came from, reminds us of the continuing significance and ramifications of the Wilderness Act, reviews the current political challenges facing the wilderness movement, and highlights the need for more advocates to continue this long battle. *The Enduring Wilderness* succeeds magnificently in stimulating readers' awareness of these issues, and assures us of the need to keep fighting for additional designations of wilderness in the United States. As seven of eight acres of wilderness on federal lands are de facto wilderness rather than designated wilderness, advocates are keenly needed to ensure that agencies give a fair, thorough evaluation of public lands for wilderness designation.

Review by JOHN SHULTIS
IJW Book Editor

Wildland Recreation Policy: An Introduction, *2nd ed.*

by J. Douglas Wellman and Dennis B. Propst. 2004. Krieger Publishing, Malabar, FL. 374 pp., $49.50 (paper).

The American wildland and wilderness estate had its roots in the early land use policies and philosophies of utilitarian conservation and the romantic notions of preservation and nature appreciation. The interest in protecting wildlands and natural landscapes has created a complex system of policies and institutions, with management responsibilities from publicly owned urban lands to remote wilderness areas.

The authors build a 140-year historical policy review by focusing on the philosophical roots of policy, its formulation, implementation, and the management of wildlands. How wildland resources came to be central to the provision of public recreation is illustrated through a brief review of the

institutional origins of the U.S. Forest Service (USFS) and National Park Service (NPS). The chronology is selective to provide a broad overview of the people and events that shaped the institutions and policies of wildland recreation. The chapters find a good balance of efficiently outlining the historic milestones to bring life and interest to the topic without tediously trying to recapitulate too much of the complex history of the debate and issues.

The themes of (1) balancing preservation versus use and economic development and (2) competition between the USFS and NPS lead the reader through the early conflicts that led to U.S. wilderness policies and legislation. Urban national parks and urban forestry programs led to the formulation of wildland recreation policy within urban landscapes and environments.

The chapter on origins and formulation of policy leads to two chapters on the implementation of the policies and the difficult issues of allocation and management of wildland resources. The current issues, conflicts, and management dilemmas are more understandable given the background provided. The multiple dilemmas of balancing preservation versus use, reconciling very changeable and diverse public interests and providing public benefits, are brought into focus. The implication for managers today is that they must understand how we arrived at the current challenges if they are to integrate the origin and evolution of policy into contemporary decision making.

Wildland Recreation Policy works on two levels: (1) as a case study of the policy process from philosophical origins to formulation and implementation; and (2) as an overview of the social and political forces that shaped the wildland resource and its management for recreation. My only concern about the book is that a reader could arrive at the mistaken impression that wilderness is predominantly a place for recreation, when that is but one of numerous values of wilderness as defined in wilderness legislation. Overall, the authors succeed in providing an introductory text suitable for students, managers, policy makers, and wildland users studying how the policy processes affect wildland management issues today.

This is a well-organized book that gives examples of how recreation planners and managers have had a profound and pivotal role in the policy process. Chapter 11 focuses on the realities of policy implementation through specific examples of the dynamic nature of a manager's job in situations that have no easy or single solutions. The authors show how overall policy affects specific decisions in wildland resource and recreation management, and this approach is effective in this second edition of a very readable book.

Review by CHAD DAWSON,
IJW Managing Editor

Wildlife Tourism: Impacts, Management and Planning

edited by Karen Higginbottom. 2004. Cooperative Research Centre for Sustainable Tourism, Griffith University, Gold Coast MC, Australia. 277 pp. $89.95 AUS.

Wildlife tourism (WT) is a rapidly growing sector of the nature tourism industry, and it is already a strong contributor to many local and national economies. In the first chapter of *Wildlife Tourism*, WT is defined as "tourism based on encounters with non-domesticated (non-human) animals" (2). This broad definition leaves the individual authors of each chapter the freedom to discuss various issues regarding WT, ranging from zoo tourism, to hunting and fishing, to nonconsumptive recreation in wilderness. Through this variety, the reader acquires a deeper understanding of the immense and international significance of the WT industry.

Wildlife Tourism provides information on (1) the history and scope of activities related to WT, (2) the environmental impacts of WT, and (3) sustainable management frameworks and business plans for the future. This division and presentation of the material is logical and clear, even for those who have little background in this field. The first two sections of the book discuss definitions and types of WT, followed by their positive and negative impacts on communities, species, habitats, and economies. The second section is by far the book's best, presenting information in a clear and comprehensive manner that should interest people of all levels of expertise and interest. The last section of the book—managing and planning wildlife tourism—is perhaps the most difficult, as it does not flow as smoothly as it could from the previous sections. When reading this component, I became confused about the desired audience for *Wildlife Tourism*; there is much discussion of markets, business plans, and a brief how-to section for starting a WT operation. Given the subtitle, I anticipated this section would outline the current management problems and offer management solutions that would ensure the sustainability of the industry. To be fair, these issues are briefly addressed in chapter 11 ("Managing Impacts of WT on Wildlife"). Here, a useful general management framework (213) is presented and further

broken down into suggestions addressing specific management goals (218–19). These few pages are likely the most valuable in *Wildlife Tourism*. Readers interested in additional information on planning and managing WT may wish to read Michael Manfredo's (2002) excellent book, *Wildlife Viewing: A Management Handbook*, from Oregon State University Press.

Each chapter in *Wildlife Tourism* contains several boxes highlighting case studies and references to current literature that support the specific issue being addressed. These are extremely useful for understanding the concepts and providing examples of various management approaches, which are discussed on an international scale. In sum, *Wildlife Tourism* is a very good introduction to this increasingly important field, containing many relevant and educational international examples of this form of tourism, both successful and unsuccessful.

Review by SARAH ELMELIGI, master's candidate in the Resource Recreation and Tourism Program at the University of Northern British Columbia, Prince George, BC, Canada. E-mail: elmeligi@unbc.ca.

Salmon Glacier along the Alaska/Canada border in the Misty Fjords National Monument Wilderness (U.S. Forest Service, Alaska). Photo by Lynn Kolund.