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International Journal of Wilderness

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

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

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The Heart-Space of International Wilderness

BY JOHN C. HENDEE AND MARILYN FOSTER RILEY

It was our privilege to participate in the 6th World Wilderness Congress, October 24 to 29, 1998, in Bangalore, India, with 750 delegates from 25 nations. This was the first gathering on the Asian continent to specifically address protection of wilderness. In the last *IJW* (vol. 4, no. 3), lead sponsor of the Congress, Vance G. Martin, *IJW* executive editor and president of the WILD Foundation, described its outcomes, including plans for an Asian wilderness initiative, a global inventory of wild rivers, prospects and needs for marine wilderness, reintroduction of cheetah in India, and other worthy actions embraced in approval of 28 resolutions (out of 62 proposed).

These commitments give hope to all of us concerned about international wilderness protection and conservation. But what impressed us most was the "heat-space" of the congress—the personal feelings for wilderness conservation by the international delegates. We felt the heart-space most directly during the World Wilderness Council—an open forum for speaking and listening that we led during four days of the Congress. These councils simulated the birth idea of the congresses by its founders, Ian Player and his Zulu mentor, as a "great indaba," or sharing of views and feelings for wilderness by all the people.

During the councils, delegates came to sit in a circle around a candle and spoke briefly and spontaneously what was in their hearts and minds. Heart-space, rather than technical debate, clearly prevailed. Participants focused on sharing frustrations with bureaucracy, corruption, and long-winded speakers, leaving little time for discussion; hopes for a more perfect world; and creative suggestions for action. Participants spoke in simple words with expression of feelings. Personal stories of conservation successes—and failures—were shared, struggles were recalled, invitations and appeals to visit particular areas were extended, and prayers for the Earth and humanity were offered. An aura of community, support, understanding, connection, and healing evolved. We left each session humbled but also empowered by the sense of community created.

Participants in the councils were far more likely to be from India and developing nations than from the United States; our delegates were at the concurrent technical sessions where the "head-space" of conservation was being developed, shared, and debated. We would not speak against the importance of such activity; but we return from the Congress seeing the heart-space of conservation in sharper focus and its special importance to our international colleagues. Perhaps we are more fortunate in this country, being surrounded with a more supportive environment for conservation and with many colleagues and institutions of similar mind. But let us not forget that an important function of all gatherings in support of wilderness is heart-space—the healing and renewing of our hearts and souls for the work we do, so that we will be more effective in all that remains to be done.

Now, six months after the Congress, while we can scarcely remember technical presentations, we continue to be inspired by the heart-space shared with our international colleagues. **IJW**

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Soul of the Wilderness

Wilderness Management Priorities in a Changing Political Environment

BY JERRY STOKES

Abstract: Following is an outline of some wilderness management issues facing the U.S. Forest Service (USFS). I also believe these are applicable to portions of the National Wilderness Preservation System (NWPS) managed by the U.S. Department of the Interior and perhaps to protected areas in other countries. Subsequently, I provide a summary of a strategy I believe is essential to the political sustainability of the wilderness management program, especially the USFS program. My view grows out of my USFS experience and my current responsibilities as assistant director for wilderness on the Recreation, Heritage, and Wilderness Resources Staff in the Washington, D.C., headquarters of the USFS. This article is an expansion of my presentation at the 6th World Wilderness Congress in Bangalore, India, on October 25, 1998.

Article author Jerry Stokes.

The NWPS includes 105 million acres (41 million hectares) in 624 units across 44 states. The NWPS is managed by the USFS in the Department of Agriculture, and the National Park Service (NPS), the Bureau of Land Management, and the Fish and Wildlife Service in the Department of the Interior. The USFS manages 398 units encompassing 35 million acres (14 million hectares), about one-third of the entire NWPS, including Alaska. However, in the 48 contiguous states, the USFS manages 379 units, including 29 million acres (11.6 million hectares), or 63% of the system, excluding Alaska. The USFS also manages the most wilderness areas located in close proximity to population centers.

Three Key Management Challenges

Among the many current wilderness management challenges in the United States, I will discuss only three: air quality, fire management, and encroaching development. Each has biophysical, social, and political components.

Air Quality

With passage of the Clean Air Act (CAA) amendments in 1977, the U.S. Congress designated 88 wilderness areas managed by the USFS as Class I federal areas for air quality, thus mandating special protection and monitoring for visibility. For wildernesses not designated as Class I areas, protection of their naturalness is still mandated under The Wilderness Act (TWA), although monitoring is not required by the CAA. Along with negatively impacting the experience of wilderness users, reduced visibility is an indicator of particulate matter and other pollutants with potential for adverse effects on vegetation, soils, and water quality. The existence of visibility problems in relatively remote, unoccupied locations, such as the Class I federal areas and other wildernesses, is a further indicator of the breadth and growth of air quality problems throughout the country.

Many wilderness areas are being adversely impacted by air quality deterioration. We have identified the following Air Quality Related Values (AQRVs) in wilderness that may be affected:

- visibility, which also serves as an indicator of alternate adverse effects on other AQRVs
- soils, which may be impacted by air quality with long-term ecosystem damage
- vegetation, impacted directly, leading to potential change in plant communities and naturalness

- water quality, stream and lake chemistry, and dependent fish and wildlife

Air-quality impacts on wilderness are occurring nationwide, and the Alpine Lakes and Goat Rocks Wildernesses in Washington State are a key example. In 1996 the USFS notified the state of Washington that visibility in these two wildernesses was being adversely affected by pollution from a coal-fueled power plant in Centralia, with supporting information also documenting impacts on water quality. The polluting source, then the largest in the western United States, emitted up to 75,000 tons per year of sulfur dioxide, more than half of the sulfur emitted in the state. In this case, the USFS, in collaboration with the NPS, worked with the plant owners and regulatory agencies to achieve a mediated settlement that will provide a 90% reduction in sulfur emissions from that plant by the year 2002.

Two additional examples: The San Gorgonio Wilderness near Los Angeles sustains major air-quality impacts from surrounding urbanization, with 30 years of research documenting ozone damage to vegetation. Visibility in San Gorgonio is so severely diminished on the most polluted days that visibility-monitoring cameras produce only black pictures (there is nothing to photograph). The James River Face and St. Mary's Wildernesses in Virginia are being impacted by pollutants generated by industrial centers in the Ohio Valley of the Upper Midwest, which are transported to Virginia by prevailing air currents. The St. Mary's River within the wilderness, a state-recognized blue ribbon trout stream, is now so acid from pollution that the USFS is proposing to add lime to the stream to reduce the acidity and to preserve its natural character.

Fire Management

We have significantly altered the natural fire regimes in our wildernesses and the surrounding landscapes by implementing six decades of highly successful fire suppression. This has resulted in ecological stagnation and fuel buildup to unmanageable catastrophic levels. Disruption of natural fire regimes is perhaps the most significant human-caused impact in U.S. wilderness. For several years, we used a prescribed natural fire (PNF) policy to address this problem, allowing fires ignited by lightning strikes to continue to burn naturally under certain criteria. However, this approach is proving inadequate in re-establishing the natural fire regime in many wilderness areas. Thus, we are considering a more proactive approach with broader applications of Management Ignited Fire (MIF) to re-create the vegetative mosaic a natural fire regime would produce. Fire management in wildernesses is rife with political, safety, scientific, technical, and philosophical challenges. Even if it works on the ground, it may backfire politically.

USFS national wilderness coordinator Jerry Stokes (far right) presents a U.S. NWPS commemorative medal to Dr. Ian Player of South Africa on a field trip following the 6th WWC in Bangalore, India. Watching (left to right) are Vance G. Martin, president, Wild Foundation; Greg Droll, USDI National Park Service; and James Kurth, USDI Fish and Wildlife Service. Photo by Marilyn Foster Riley.

Encroaching Development

Encroaching urban development characterized by growing urbanization and sprawl in rural areas adjacent to wilderness is increasingly a wilderness management challenge. In the case of the San Gorgonio Wilderness cited earlier, increased urbanization and sprawl affects air quality, which in turn adversely affects wilderness flora and fauna. The expanding urban-rural interface makes fire management more difficult and more costly. The effects of smoke on populated areas and the risk of PNFs and MIFs escaping into developed areas constrains fire management strategies. Urban encroachment also increases recreation use and fragments the landscape, thereby compromising wildlife corridors and threatening the wildlife population's viability. An example of this is the remnant population of grizzly bears in the Mission Mountains Wilderness in Montana. They are being increasingly isolated from other breeding populations by encroaching development in the adjacent valleys.

A Changing Political Environment for Wilderness

In 1963 the U.S. Senate passed—by a vote of 73 to 12—a legislative bill to establish the NWPS and sent the bill to the U.S. House of Representatives for consideration. After several negotiated compromises to the stronger Senate version, the House passed the wilderness bill by a stunning vote of

Article author Jerry Stokes (left) and *IJW* editor-in-chief John C. Hendee at the 6th World Wilderness Congress in Bangalore, India. Photo by Marilyn Foster Riley.

373 to 1. It was signed into law by President Johnson on September 3, 1964, thus concluding seven years of debate over the wilderness idea.

Obviously TWA had strong bipartisan support that I believe was due to:

1. Strong leadership from Congressional statesmen of the time (e.g., Senators Hubert Humphrey, Frank Church, and Clinton Anderson, and Representatives Morris Udall, John Saylor, and Wayne Aspinall).
2. Focused, passionate leadership in the conservation community.
3. An outpouring of public support through organized efforts.

The passage of TWA was a pinnacle achievement in a century of conservation, beginning with the establishment of Yellowstone National Park in 1872. In the years after the passage of TWA in 1964, debate focused on wilderness allocation; that is, what remaining roadless acreage would be added to the NWPS. The system grew from the original nine million acres (3.6 million hectares) to the current 105 million acres (41 million hectares).

Now the political climate for wilderness and debate have shifted dramatically from the focus on allocation to a focus on man-agement. USFS managers are being faced constantly with administrative, legal, and political challenges to their efforts to maintain the integrity of the NWPS. The political environment in which we are managing wilderness today is unprecedented because:

1. Society has changed dramatically due to population growth, urbanization, and immigration, all contributing to loss of connection with the land and nature.
2. The great statespersons who provided conservation leadership, institutional memory, and bipartisan support for the wilderness movement are gone.
3. Wilderness champions are no longer in key positions in Congress to filter legislative proposals that threaten wilderness, nor to launch protective measures.
4. No cohesive national wilderness movement is focused on protection and management of the NWPS, as was the earlier case for establishing and expanding of the wilderness system. The wilderness community is fragmented into small groups that are focused either on individual wildernesses or, in many cases, pursuing their own special interests in the use of wilderness.

Political Attacks on Wilderness

In the last U.S. Congress (January 1997 through December 1998) there were seven legislative proposals and numerous committee hearings that would weaken USFS wilderness management and threaten the integrity of the NWPS as a whole. Although all of these proposals were opposed by the current presidential administration, each came close to enactment into law, but only two actually passed in a form detrimental to the NWPS. One legislative provision that passed is intended to reopen to motorized equipment some of the portages in the Boundary Waters Canoe Area Wilderness in Minnesota. The other legislative provision transferred title of a five-acre (two-hectare) parcel of the Mt. Naomi Wilderness in Utah to a private individual who asserted that the USFS had made a boundary error. This is the first time in the history of the NWPS that wilderness land has been deeded to a private individual, thus establishing an extremely bad precedent.

It seems to me that the USFS portion of the NWPS is under siege and that the wilderness community and others who care about wilderness must be alerted. If the NWPS, as we know it, is to survive and not erode away like sand castles before the rising tide, public support must be mobilized for maintaining the integrity of the system. We need to renew the support that led to the passage of TWA in 1964, the roadless area reviews and evaluations of the 1970s, and subsequent passage of state-based wilderness allocation laws in the 1980s and early 1990s.

A Strategy to Rebuild Support for Wilderness

Three interrelated components that, I believe, must be implemented to re-

build support for wilderness and to avert the incremental erosion of the NWPS: expand public information about wilderness, strengthen wilderness monitoring, and develop information management systems.

Expand Public Information about Wilderness

We must better inform and educate the public about the true value of wilderness to our society.

We must move beyond the obvious recreational values to embrace wilderness values related to naturalness and solitude and the ecological services that wilderness provides that may be even more important. The public needs to know and appreciate the critical values of wilderness:

- air quality and the protection of wilderness air quality under the CAA;
- water quality and watershed values critical to urban water supplies and associated agricultural production;
- refugia for threatened and endangered species of plants and animals sensitive to human intrusion;
- as a benchmark of naturalness and a scientific baseline for assessing the impacts of development everywhere, and the overall environmental health of our nation and the planet; and
- vicarious enjoyment for millions of people who take solace in knowing that wilderness exists, even though they may never visit it. The importance of wilderness as a legacy for future generations needs more visible expression.

Strengthen Wilderness Monitoring

We need an ongoing monitoring network of key indicators by which to assess the health of the NWPS so we can report to Congress and the general public what is happening to the wilderness system. Besides guiding wilderness management, what better indicator could there be for what is happening to the regional, national, and global environment than the NWPS?

7-Lakes wilderness area. Photo by Steve Morton.

We don't have a wilderness monitoring network for many reasons, including the remoteness of wilderness lands, lack of agreement on what indicators to monitor, lack of measurement techniques and technologies, and disagreement over appropriate techniques for data collection in wilderness. All the social and ecological attributes of wilderness cannot be monitored; we need to agree on what attributes to monitor for tracking general trends as well as how to do it. Many cooperators, including federal and state agencies, universities, and nongovernmental organizations (NGOs), must be involved in this effort. Also, we must deploy the monitoring network across the NWPS in a statistically valid manner that will provide meaningful trend information on the system at the regional and national levels.

We need a wilderness monitoring network so we may obtain information about wilderness health and determine what we need to do for its protection and the broader national and global environment that is implicated.

Develop Information Management Systems

We need information management systems that will facilitate use of the management and monitoring data necessary for informed protection of the NWPS by managers, Congress, and the public. For example, a wide variety of wilderness-related information is needed for wilderness management, ranging from site-specific data for field managers to aggregated regional and national trends for responding to congressional inquiries. This information must be accurate, integrated, and timely. Natural resource agencies are responding to the information age with new information systems to meet new needs; wilderness must be a part of this trend. We have established a wilderness information management position in the USFS to meet this need.

Systemwide Cooperation for Wilderness

For the wilderness system to achieve its potential for the American people and global interests, many entities and agencies must work together. The USFS is involved in several systemwide efforts for wilderness; and several actions address the above strategic goals on an interagency basis.

- We are working with the University of Montana and the other three NWPS managing agencies through the interagency Arthur Carhart Wilderness Training Center to estab-

In my opinion the wilderness movement in the United States has become fragmented and divided, with its energies dissipated in focus on local areas and specific issues.

lish the NWPS Wilderness Information Network on the Internet (website: www.wilder-ness.net).

- The USFS-led interagency Aldo Leopold Wilderness Research Institute has launched a major effort to guide creation of a NWPS monitoring network.
- The USFS's Outdoor Recreation and Wilderness Assessment Research Unit will include a wilderness component in the next National Survey on Recreation and the Environment (NSRE 2000) to clarify markets for wilderness information and education.
- The USFS is a cooperator in international efforts to make the strategies and benefits of wilderness and environmental protection known, such as the IJW and the World Wilderness Congresses (WWCs).
- The USFS, through a cooperative effort between research and management, is planning the first statistical sample of wilderness use at the regional and national levels.

Wilderness is in the information age, like everything else, and managing information will be a key to our success.

Conclusion

In my opinion, the wilderness movement in the United States has become fragmented and divided, with its energies dissipated in focus on local areas and specific issues. In discussing protected area management with international colleagues at the 6th WWC, I was struck by how much the U.S. NWPS serves as a beacon of hope and example to those trying to protect wild lands in other countries, such as India and southern Africa. We in the United States have an obligation to ourselves, our society, and future generations of all the creatures of this planet to work together to protect and sustain the NWPS. Let all of us who love and value wilderness put aside our specialized differences and focus on protecting the NWPS from its current threats. We in the federal government need to do our part, but I also appeal to NGOs, academia, and other relevant interests and groups to mobilize together in a national coalition for wilderness, including actions called for in the strategy I have outlined. Managers cannot stem the tide of threats to the wilderness system without such broad public support. **IJW**

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Wanted: *IJW* Field Correspondents

The *International Journal of Wilderness* (*IJW*) needs two new field correspondents. The first will be someone currently engaged in federal agency wilderness stewardship. The second will be someone to cover issues of international interest to our readers. Duties will include gathering information on events, issues, policy, and personnel changes to be reported in the Wilderness Digest section of the *IJW*. The successful candidate should be on e-mail and able to draft short news items for submission. Apply by e-mail letter to John Hendee, Editor-in-Chief (hendeejo@uidaho.edu) and Michelle Mazzola, Managing Editor (m.mazzola@usa.net). Describe your past and present wilderness involvement, why this assignment would be of interest to you, and include the names of your current supervisor and two references.

New York's Adirondack Park

Where U.S. Wilderness Preservation Began

BY ELIZABETH THORNDIKE

Abstract: The state lands (Forest Preserve [FP]) in New York State's six-million-acre Adirondack Park are owned in common by the people of the state of New York. Since 1894 they have been protected as "forever wild" under Article XIV of the New York State Constitution. The Adirondack Park State Land Master Plan (SLMP), adopted in 1972, classifies more than 1 million of the 2.5 million acres of Forest Preserve as wilderness. This article describes the history of constitutional protection, the substance of the State Land Master Plan, and highlights some current issues affecting these lands.

New York state's six-million-acre Adirondack Park is the largest designated park in the contiguous 48 United States. Two and one-half million acres of public lands (FP), including more than one million acres of designated wilderness, are protected by Article XIV of the New York State Constitution, the so-called "forever wild" clause: "The lands of the state, now owned or hereafter acquired, constituting the Forest Preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."

These lands are managed under policies incorporated in the Adirondack Park SLMP, as set forth in the Adirondack Park Agency (APA) Act, adopted in 1973. This wilderness resource constitutes 85% of the designated wilderness in the northeastern United States and the largest forested wilderness area east of the Rocky Mountains (Scrafford 1990). Use and development of the 3.5 million acres of private lands in the park are governed by this same law.

The park's public and private lands—diverse ecosystems of forests, mountains, wetlands, lakes, rivers, streams, wildlife, and humans—are intermingled in a mosaic pattern among more than 100 towns and villages in northern New York, constituting about 20% of the state's land area. The park is as large or larger than each of the seven states and is nearly three times the size of Yellowstone National Park.

The Adirondacks form the headwaters for five major drainage basins: Lake Champlain, and the Hudson, Black, St. Lawrence, and Mohawk Rivers. Within the park are 2,800 lakes and ponds, and more than 1,200 miles of rivers classified by the state as Wild, Scenic, or Recreational, fed by an estimated 30,000 miles of brooks and streams. In the northeast part of the park, rising from the base elevation of 1,000 feet, are 46 peaks over 4,000 feet, nine with alpine summits. The park constitutes the major portion of the Champlain-Adirondack Biosphere Reserve.

Article author Elizabeth Thorndike.

The park is home to 130,000 permanent residents who, along with 70,000 seasonal residents and an estimated 9 million visitors, live, work, and/or recreate within its borders. Principal employment is in tourism, forest products, and government. Most of the private lands are in large holdings owned by forest products industries, sporting and recreation clubs, and educational institutions. About 35% of the private-land acreage (20% of the park) is owned by year-round residents.

While its sheer size and mix of public and private ownerships are distinctive features, the Adirondack Park is equally significant for its historic role as incubator for key leaders of the wilderness movement. Robert Marshall, who grew up in New York state, "learned the ways of wilderness" in the forever wild Adirondacks (George Davis in Zahniser 1992). Howard Zahniser, architect of The Wilderness Act (TWA), summered in the Adirondacks. Speaking in 1953 in Albany to the Joint Legislative Committee on Natural Resources, Zahniser addressed the unique protection

High Peaks Wilderness Area. Photo by Gary Randorf, Adirondack Council.

given to the FP, "Inasmuch as it is provided for, in the very constitution of the state, the protection 'forever wild' of the Forest Preserve has a security that is unique in all our American programs for wilderness preservation. …" (Zahniser 1992). An inspiration to Zahniser, today this constitutional protection remains the nation's strongest public land protection safeguard.

History of Forest Preserve Acquisition and Zoning: Constitutional Protection

As a result of widespread despoliation of the timber, fish, and game resources of the Adirondacks during the first half of the 19th century, utilitarian concerns, especially from New York City residents, were raised about the need to protect the forests to ensure consistent water supply for the state's commerce. Thus the New York State legislature, in 1885, created an FP in 11 Adirondack and three Catskill counties to be kept as wild forest lands; no mention was made of the timber thereon. In 1892 a 2.8-million acre Adirondack Park was established by the state. It consisted of 681,000 acres of forest preserve lands. Within a blue line on the map, an area was set aside in which to concentrate future land purchases; however, timber cutting on the FP lands continued.

The New York City Board of Trade and Transportation recommended constitutional protection and enlisted several delegates to the 1894 Constitutional Convention. Among these were Louis Marshall, father of Robert Marshall, and David McClure who chaired the committee that drafted the amendment barring the lease, sale, or exchange of the lands and prohibiting sale, removal, or destruction of the timber. This last word became critical when later proposals for dams in the park were proposed. The constitutional amendment was approved by the voters later that year (Graham 1978; Brown 1985).

Looking in to Dix Wilderness from Elk Lake. Photo by Gary Randorf, Adirondack Council.

Origins of the State Land Master Plan

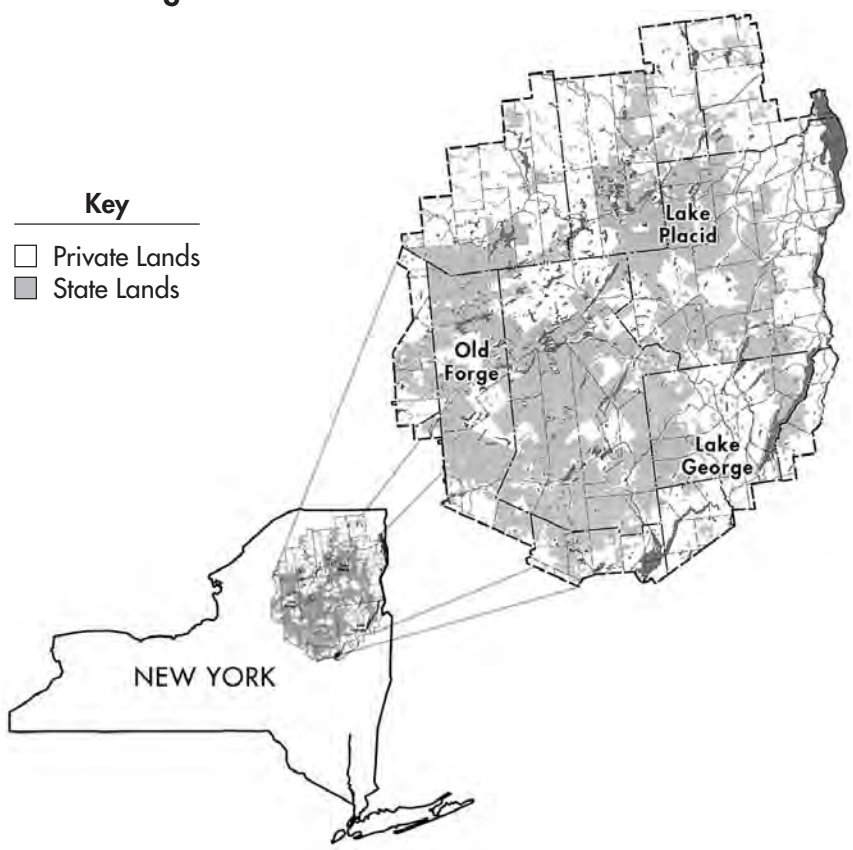
Beginning in 1934, when Robert Marshall had suggested zoning the Adirondack FP into wilderness, semiwild, and intensive recreational use areas, several proposals for zoning FP lands, including wilderness, were made (Brown 1985). The action that catalyzed the creation of designated wilderness areas in the Adirondack Park was the 1967 proposal of Laurance Rockefeller, conservationist and brother of New York Governor Nelson Rockefeller, to create an Adirondack Mountains National Park. The proposal was opposed from all sides for various reasons, the most prominent being that a national park would weaken the existing constitutional protection. As a result, in 1969, Governor Rockefeller appointed a group of prominent citizens to a Temporary Study Commission on the Future of the Adirondacks (TSCFA). The commission was faced with the reality that a new interstate highway had just been built, increasing the park's accessibility. At the same time, only a handful of the park's municipalities had even rudimentary zoning regulations. It was recognized that what happened on the private lands in the park would have significant impact on the intermingled public lands. There were corresponding concerns expressed about recreational overuse in parts of the FP. (Graham 1978).

The temporary study commission recommended, and Governor Rockefeller promptly implemented, the creation of an APA with general powers over the use of private and public lands in the park. The APA, as charged, com-

pleted an SLMP in 1972, along with a Private Land Use and Development Plan adopted by the state legislature in 1973.

The APA board of commissioners, the decision-making body recommended by the temporary study commission, includes eight citizens nominated by the governor and confirmed by the U.S. Senate for four-year renewable terms. Three must reside in New York State outside the park, five within the park, and no more than five of the citizen members can belong to the same political party. The Commissioners of Environmental Conservation, Economic Development, and Secretary of State also serve as agency members. Sixty staff members administer the regulatory and planning programs and the two visitor interpretive centers.

Figure 1—New York's Adirondack Park



The Adirondack Park State Land Master Plan

1. General Provisions

With adoption of the APA Act in 1973, the legislature established a two-tiered structure regarding policy and management of state lands in the park. The APA is responsible for long-range planning and policy, in consultation with the Department of Environmental Conservation (DEC) and subject to approval by the Governor. The DEC, and other agencies with land under their jurisdiction, are responsible for managing these lands in compliance with the guidelines and criteria in the SLMP. This master plan zones the public lands in the park into wilderness, primitive, wild forest, and canoe areas. Intensive use areas (campgrounds and boat launches); historic sites; state administrative areas; Wild, Scenic, and Recreational rivers; travel corridors; scenic vistas; and special management areas are also listed and described in the plan, along with guidelines for acquisition, easements, and rights-of-way.

Land acquisition is the responsibility of DEC, which negotiates with willing sellers. The department is also responsible for the development of unit management plans in the park, in consultation with the APA. The law requires the APA to classify state lands in the park according to "their characteristics and capacity to withstand use," although nothing prevents the DEC or any other agency from providing more restrictive management in order to comply with constitutional requirements or to protect the natural resources of such lands.

The constitutional prohibition against removal or destruction of timber applies to all state land classifications in the park. Specific guidelines in each classification cover nonconforming uses, structures and improvements, ranger stations, motorized access, roads and trails, flora and fauna, recreational use, bicycles, boundaries, fire towers, fishing waterway access, tent platforms, campgrounds, boat launches, ski areas, visitor centers, rivers, highways, signs, scenic vistas, aesthetics, and general management guidelines.

2. Wilderness Guidelines

The definition of wilderness in the master plan closely parallels that in TWA. There are two notable exceptions set forth in the master plan. A wilderness area is to be protected and managed so as to preserve, but also "enhance and restore, where necessary" its natural condition. A wilderness area should have at least 10,000 acres (State of New York 1986).

Oswegathchie Wild River in the Five Ponds Wilderness Area. Photo by Gary Randorf, Adirondack Council.

Under the wilderness management guidelines, which are based on the above-noted definition, hunting, fishing, and trapping are permitted uses in wilderness. Motorized vehicles are not permitted in wilderness, except for use by officials in cases of sudden, actual, and ongoing emergencies involving protection of human life or intrinsic resource values: search and rescue, forest fires, and large-scale contamination of water bodies. Motorized equipment or aircraft are permitted for use by administrative personnel or research projects under specific guidelines, but not for daily administrative use, maintenance, or research. All-terrain bicycles are not permitted, except under the same restrictions as for administrative personnel or research projects applicable to motorized equipment or aircraft. Primitive areas, wilderness in character but with a nonconforming use or of a size that prevents classification as wilderness, are subject to the same restrictions: equipment, aircraft, and vehicles are permitted for removal of nonconforming structures. Bicycles may be used on roads and truck trails designated by the DEC in specific adopted unit management plans. Canoe areas, managed as wilderness and to protect the quality of the water and fishery resources, are subject to the same motorized access restrictions, except that vehicles may be used by administrative personnel to preserve and enhance water or fishery resources as specified in adopted unit management plans. The 16 wilderness units range in size from 7,000 to nearly 200,000 acres, including Mt. Marcy, the state's highest peak at 5,344 feet and Lake Tear o' the Clouds, the source of the Hudson River, which lies at about a 4,300-foot elevation. The most remote wilderness areas are located in the western portion of the park. Proposals for combining these areas, with (now) private parcels, would result in the largest single forested wildland tract in the eastern United States.

Wilderness Policy and Management Issues

In the past 25 years, major issues have included removal of nonconforming uses, military overflights, use of mechanized transport, acid rain controls and fisheries management, and constitutional issues regarding tree cutting and removal. With the exception of three road segments, substantial progress has been made in removing fire towers, phone lines, snowmobile trails, roads, and truck trails. The military has reduced flights and flight patterns over wilderness areas and has agreed to maintain a standard of 2,000 feet above ground level. All-terrain bicycles are permitted on designated trails in wild forest areas where designated motorized access is permitted. The issue of motorized access and off-road vehicle use on state lands and waters in the park, including wilderness, has resulted in a recent lawsuit in federal court, charging that the SLMP restrictions on motorized access in the forest preserve are contrary to the Americans with Disabilities Act.

The Adirondack Park has been the bull's-eye recipient of excessive acid deposition in the eastern United States, with documented damage to resources. Recent acknowledgment by the Environmental Protection Agency that standards for pollutant controls established by the 1990 Clean Air Act Amendments are insufficient to prevent further deterioration of lakes and ponds has resulted in a concerted campaign, supported by the governor and all of the New York congressional delegation, to institute further controls regarding emission trading and standards.

Significant Current Issues

1. Unit Management Plans and the High Peaks Wilderness Area

The APA Act directs the DEC to develop, in consultation with the agency, unit management plans for each unit of land under its jurisdiction classified in the master plan. These unit management plans, in accordance with statutory mandate, must conform to the guidelines and criteria set forth in the master plan and cannot amend the plan itself.

There has been continuing interagency tension between the agency and the department on a variety of issues related to planning and management of the FP. A Memorandum of Understanding allows the department to conduct ordinary maintenance, rehabilitation, and minor relocation of conforming structures without notifying the agency. However, there is often a dif-

ferent interpretation of what this means, especially in the context of compatibility with wilderness values.

Although new facilities and programs should only be implemented when an approved unit management plan exists, most of the 58 units of wilderness, primitive, and wild forest areas in the FP lack any plan after 25 years. As a result, there has been a loss of solitude and destruction of habitat in parts of some wilderness areas, while these same delays have limited development of recreational uses in wild forest units better able to accommodate such activities. Many reasons are given for this state of affairs; primarily, the unit management planning process has rarely been a priority with the department, as evidenced by inadequate funding and insufficient staffing to undertake the mandated tasks (Dawson 1990).

Absence of an adopted unit management plan for the High Peaks Wilderness, the largest (nearly 200,000 acres) and the most heavily used area, is a major problem. The 1970 TSCFA technical report lists unstaffed trail registrations in 1969 at various locations in the High Peaks, including up to 18,000 registrations at Marcy Dam, the most popular day-hike and campsite area two miles from the trailhead. The first iteration of the SLMP in 1972, citing heavy public use at Marcy Dam and Lake Colden, noted that this use "threatens to destroy the wilderness character of these sections if appropriate management systems are not applied now. … it may well be necessary to limit public use of the eastern portion of the High Peaks area during certain periods."

The 1986 revision of the plan, when trailhead registrations in the entire unit were at nearly 80,000, again cites heavy public use near Marcy Dam, Lake Colden, and the John's Brook Valley as threatening to destroy the wilderness character of these sections if appropriate management systems are not promptly applied. It further states that future measures to control or limit public use in particular areas and at given times of year are inevitable and calls for prompt development of a peripheral control system for the Adirondack Loj/South Meadows corridor.

Giant Mountain Wilderness Area. Photo by Gary Randorf, Adirondack Council.

Since 1983 annual visitor use has almost tripled from 57,000 to more than 150,000, most of that in the eastern portion of the unit. Although a draft unit management plan, submitted for public comment in 1994, recommended management controls that included a permit system to limit total numbers of visitors, the subsequent draft eliminated this recommendation, calling only for a self-issuing permit system that would enable the department to monitor the number of users over another five-year period (High Peaks Wilderness Complex Unit Management Plan 1996).

The unifying theme of the SLMP is that protection and preservation of state land natural resources is paramount. "Human use and enjoyment of those lands should be permitted and encouraged, so long as the resources in their physical and biological context as well as their social or psychological aspects are not degraded." The primary wilderness guideline in the master plan is "to achieve and perpetuate a natural plant and animal community where man's influence is not apparent." It is the author's opinion that the current 1996 draft High Peaks Unit Management Plan, by recommending no action to control numbers, is problematic in terms of complying with the guidelines and criteria of the master plan, as required by law.

2. Acquisition Policies

The master plan provides guidelines for future state land acquisitions in the park. Fee purchases should be made only where such lands are threatened with development that would curtail their use for forestry, as open space or for wildlife habitat. Just such a threat was avoided in 1998 when the state, with exceptionally strong encouragement from Governor Pataki, negotiated purchase of 15,000 acres of Whitney Park, part of a 51,000-acre tract owned for a century by the family of Cornelius Vanderbilt Whitney. The purchase includes a key link in an historic canoe route and Little Tupper Lake, the largest privately owned lake in a single ownership in the northeast. Pending classification by the APA, the DEC is managing the land under wilderness guidelines in the SLMP.

As this article is written, an unprecedented amount of land, more than 360,000 acres mainly owned by forest

products industries, is for sale in the park. It includes significant acreages along river corridors that have not been open to the public for more than a hundred years. With revenues from a state Environmental Protection Fund and a 1996 Clean Water, Clean Air Bond Act, and vigorous support from a governor with strong environmental convictions, the state is in an excellent position to negotiate purchase or easements for these lands to ensure their permanent protection for wild land and open space uses.* **IJW**

*On December 9, 1998, Governor Pataki announced a plan to protect 144,000 acres of land put up for sale by Champion International Paper Company, by purchase of easements and acquisitions with U.S. $25 million from state environmental bond act money.

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EXTRA

News from the Aldo Leopold Wilderness Research Institute

Non-native Fish Stocking in Wilderness

Over the past century, sport fish have been introduced into most of the naturally fishless lakes in U.S. wilderness areas. Fish introductions have changed entire lake ecosystems and communities, often with detrimental impacts to native fish and amphibians. However, people who enjoy fishing have come to expect fish in these lakes as part of their wilderness experiences. Wilderness managers must make difficult and controversial decisions about how to balance this recreational opportunity with preservation of the native fauna and flora threatened. The Leopold Institute supports several ongoing studies related to this issue, including studies on the impacts of exotic trout to amphibians in wilderness lakes in Idaho, California, and Montana, and a study of exotic trout impacts to native invertebrates in Utah.

The Leopold Institute co-sponsored a workshop, entitled Effects of Fisheries Management on the Amphibians and Other Biota of Wilderness Lakes, on October 16–18, 1998, in Polson, Montana, to provide managers with the latest research results and to facilitate discussion among managers, scientists, and wilderness users. As a result of this workshop, a compilation of research results and management recommendations is in preparation for publication. In the interim, presentation abstracts and a reading list can be viewed through the Leopold Institute's website at http://www.-wilderness.net/leopold.

VITA WRIGHT is a wilderness applications specialist at the Aldo Leopold Wilderness Research Institute, an interagency unit administered by the U.S.D.A. Forest Service, Rocky Mountain Research Station. Focusing on the application of science to management, Vita works to facilitate the communication of information between scientists and managers on a variety of wilderness issues. She can be reached at the Leopold Institute, P.O. Box 8089, Missoula, Montana 59807, USA. Telephone: 406-542-4190. E-mail: leopold_institute/rmrs_missoula@fs.fed.us.

NOLS

Wilderness Education Today for Leadership Tomorrow

BY TOM REED

It was cold, threatening to snow, and they were lost. Four students—Spencer, Jay, Alex and Bobby—got a late start for their day of backpacking in Wyoming's Wind River Range in the United States, but the move that day was short and fairly straightforward. Yet somewhere in that tangle of nondescript lodgepole pine and granite, they got off track. They were lost and they knew it. So they did the right thing. They stopped and made camp.

A NOLS Lesson

The group of three men and one woman were on their 17th day of a fall semester in the Rockies with the National Outdoor Leadership School (NOLS). For 17 days, they had been learning how to live in the mountains. They had learned how to dress for the capricious autumn weather. They knew how to pack their packs, ignite camp stoves, set up tents, cook good meals, use a compass, and read a map. They had learned how to lead in tough situations, how to get along with others, how to communicate, and how to "deal." They had been taught first aid and instructed on what to do if they should ever become lost.

At 5:30 P.M. they decided to stop again and talk it over. They combed over the maps hoping to match the terrain they saw before them—a small stream and a meadow—to the maps. "We could keep moving," someone said. "No, everyone is tired and hungry. We need to camp and wait out the storm." So they pitched their tent, cooked a meal, and went to bed. They could feel the impending snow in the air when they turned in that night.

By dawn, more than a foot of fresh snow had fallen on their camp and more was drifting down through the sky. To move was out of the question. The snow was too deep and their visibility too poor. They spent the rest of the day looking at maps, laughing a lot, cooking, and watching the snow filter through the trees. By 7 P.M. they were in bed.

NOLS courses focus on leadership as well as wilderness skills such as mountaineering. Photo courtesy of NOLS.

The next day brought more scouting. They knew the rest of the course participants—three instructors and eight students—would be out looking for them by now. They were okay. They had food and clothing and a good mountain tent. By 9 A.M. they found a knoll and were able to identify a distinctive mountain, putting them significantly west and south of their original location. That night, they went to bed with a plan to move in the morning.

The morning dawned clear and bright. It was great traveling weather, so they broke camp and moved north. "Okay," they breathed, "we now know exactly where we are. We know where we need to be and how to get there." They hiked until dark, set up camp again, and laughed. It was challenging, but it was almost fun. They had learned a great deal and were putting it to use.

Early on October 6, 1998, as the sun barely began to lighten the sky, they were on their way. They each wrote a

Team work is a vital component of learning leadership on NOLS courses. Photo courtesy of NOLS.

short goal: find camp. They moved confidently through the timber, following the map and reading the land. They found a trail that looked like a virtual highway, and they hiked up it into the Dad's Creek drainage, their original destination. By 10:30 A.M. they caught sight of their course mates and their shouts of jubilation filled the mountain air. They were home, safe, healthy, happy—four NOLS students who had put their training into action.

This anecdote illustrates what NOLS is all about—giving students the training and tools to travel safely in a wilderness setting, learning and leading along the way. Founded in 1965 by legendary mountaineer Paul Petzoldt, the mission of the school is "to be the leading source and teacher of wilderness skills and leadership that serve people and the environment." NOLS accomplishes its mission in many ways. The most obvious is the "on-the-ground" lessons taught to the school's students in every course. But there are other ways the school extends its mission, from scholarships for some students to partnerships with government agencies, corporations, and others. In more than 30 years of existence, NOLS has taught 40,000 wilderness travelers such things as leadership and teamwork, safety and judgment, outdoor skills, and environmental studies.

NOLS teaches such skills as rock climbing so students can participate in such activities after their course. Photo courtesy of NOLS.

Petzoldt had a dream when he started NOLS: to train leaders. He wanted to help people learn to care about and protect the wilderness, and he wanted to give people the tools to travel safely through wild places. "I've always been somewhat of a missionary," he said in a 1996 interview, "but I saw that if I really wanted to do something for the youth of this country and if I really wanted to do something to protect the outdoors, then to develop a leadership program to … train people … was the way I could accomplish the most for the youth of America."

To accomplish his dream, Petzoldt and his cadre of instructors, individuals such as Tap Tapley and Rob Hellyer, took students out into the mountains for 30 days. They had no base camp, no shower, no chef on the trips. The students learned to cook, camp, hike, climb, and fish on their own. The expedition culminated with a five-day "survival" where small groups of students hiked out of the mountains without instructors.

From the start, NOLS has been a place of creativity and ingenuity. If the staff couldn't find the gear they needed, they made it. If they couldn't afford supplies, they bartered for or borrowed them. They bought and broke wild horses to resupply courses. They drove groups to and from the mountains in cattle trucks. They made up camping practices to minimize their impacts. They dressed in army surplus and cooked in old coffee ("billy") cans over fires. The resulting experience proved powerful. Young women and men rose to the challenge. After a few years of operation, "Thirty Days to Survival," a documentary about NOLS, was broadcast on television, and the school's popularity exploded. Overnight, demand outpaced supply.

Growth was not without pain. For years, NOLS operated at a deficit, and existence was hand-to-mouth. But the school weathered the hard times. Today, the tales of cattle trucks, "billy" cans, and army surplus wool trousers are fond memories. Yet the legacy of the early days remains, as does the creativity and ingenuity of those days. Extended wilderness expeditions still form the basis of the NOLS curriculum, and our goal still is to train competent outdoor leaders.

With the changing times, NOLS has also changed. The nonprofit school

now has an aggressive fundraising department and is working to complete a U.S.$8 million endowment. Nearly U.S.$600,000 is awarded for scholarships every year in an effort to expand and diversify. The school also has outreach programs and public policy and research efforts, operates eight branches, and leads courses on five continents. Yet much has stayed the same. NOLS still does real education with real results in a very real place—the wilderness. And the base of international operations is still the same place that Petzoldt handpicked: Lander, Wyoming, a gateway to Wyoming's Wind River Range. But no matter where one takes a NOLS course, from the Arctic to Australia, students are assured of a quality education that combines excellent instruction, top-notch practical leadership training, the best in skills development, and an outstanding wilderness classroom.

Excellent Instruction

The NOLS instructor course, which every instructor must pass, sets a unique industry standard in outdoor educator training. NOLS offers three types of instructor courses: mountain, whitewater, and sea kayak. Most people apply for the mountain instructor course, held either in Wyoming or Arizona. Instruction is intensive and covers a wide range of topics over its 35-day duration. Only the very best applicants are admitted. This highly selective course and subsequent apprenticeships assure that students will have outstanding qualified teachers.

Practical Leadership

"Leadership training" has become a buzz-phrase, but it's nothing new for NOLS. Ever since Petzoldt led his first group of students into the Wyoming wilderness, the school has been training leaders. Skills and qualities, including team building, problem solving, judgment, communication, self-confidence, conflict resolution, responsibility, and motivating others, are things that last long after one leaves the school. Students use these skills in the classroom, on the playing field, or in the boardroom. This leadership is practical: students make decisions and learn by doing.

Students form life-long friendships in the wilderness. Photo courtesy of NOLS.

Proven Skills

Providing instruction, tools, and the freedom to practice are the roots of a NOLS education. NOLS students don't have a guided experience where others take over, or a superficial one that lasts only a few days with no time to practice. Early in the course, they learn the fundamentals of outdoor leading; then they get a lot of opportunity to practice what they've learned. Sea kayaking, mountaineering, whitewater boating, sailing, rock climbing, backpacking, outdoor risk management, minimum-impact camping, horsepacking—the list of things NOLS teaches is impressive.

Wilderness on Five Continents

NOLS operates eight branch schools around the world. These include the granite isolation of the Bighorn Range in Wyoming, the jagged peaks of Patagonia, the vast oceans of Mexico, the sweeping grassy steppes of Kenya, the rugged deserts of Australia, and many places in-between. NOLS courses explore some of the wildest reaches of five continents. Nothing is contrived out there. The wilderness teaches lessons that students learn well. But NOLS doesn't just use the wilderness to teach other lessons, the school teaches students about the wilderness. Through service and guided education, participants gain an appreciation of their surroundings, which stays with them long after they leave.

Training Leaders

The wilderness has a powerful way of bringing people together. When students come to NOLS, they meet people with interests very similar to their own. NOLS students come from all walks of life, from all 50 states, and from 42 countries, drawn to the school for similar reasons. NOLS teaches people to thrive and have a good time in the outdoors.

Besides training people to be leaders, as an institution NOLS has been a leader. Nowhere is this more evident than in the national Leave No Trace (LNT) program. Back when Petzoldt started going on camping trips in the 1920s and 1930s, "leave no trace" meant throwing tin cans behind a tree and eventually dousing the embers of last night's bonfire. In those days one chugged cold water

NOLS course size is restricted to enhance education quality and decrease impacts in the wilderness. Photo courtesy of NOLS.

right out of the stream, trenched the tent site, and headed off for a new campsite the next day.

Today, of course, no serious backpacker carries cans, much less leaves them behind. Campfires, even small ones, are illegal in many places, and one doesn't dare drink the water unless it has been treated or filtered. Simply stated, there are more people on this planet now than when Petzoldt was guiding clients in the Tetons. Yet while being visited by thousands of people each year, many wild places remain pristine. How is this happening? The answer is simple: People, most people, care about wild lands and treat them accordingly.

A big step in developing these backcountry ethics is the national educational program called LNT. Launched in the early 1970s by the U.S. Forest Service (USFS), the LNT program languished for a number of years without coordination and resources. Because of NOLS's success with the book and video called *Soft Paths* in the late 1980s, land managers knew NOLS could help with the fledgling LNT program. After all, outdoor conservation techniques and wilderness ethics had been part of NOLS from its start. In 1991, NOLS became a founding partner of LNT program. By supplying financial, technical, and curriculum support and collaborating with four prominent federal land management agencies (the USFS, Bureau of Land Management, National Park Service, and Fish and Wildlife Service) and numerous other partners, NOLS established LNT as an important national program.

NOLS launched LNT into a new era in a number of different ways. Wilderness rangers, information specialists, and educators have benefited from a special course designed specifically to spread the LNT message. After five days of training, graduates are ready to teach others about building a fire that doesn't leave an ugly black ring, or how to go to the bathroom outdoors without polluting the streams. Participants become familiar with pertinent ecological, pedagogical, and social research.

The LNT program also has been embraced by the outdoor retail industry. For instance, you might see a patch sewn inside a new Osprey pack just purchased, or you might read about the LNT principles in a North Face advertisement in your favorite magazine. If you travel in a country like Mexico, you might even run into a Mexican land manager who is adept at training others in the principles of No Deje Rastro (Leave No Trace). Call 800-332-4100, for information on the program, pamphlets, booklets to distribute, or a bumper sticker. The beauty of the LNT program is that it's for everybody. The principles of the program:

- Plan ahead and prepare.
- Camp and travel on durable surfaces.
- Pack it in, pack it out.
- Properly dispose of what you cannot pack out.
- Leave what you find.
- Minimize use and impact of fires.

Components of NOLS Leadership

LNT is just one of the ways that sets NOLS head and shoulders above other wildland users. A central theme of the NOLS mission over the many years has been overall leadership in the outdoor education field. Since NOLS's inception in 1965, the aspects of maintaining that leadership have changed

… no matter where one takes a NOLS course, from the Arctic to Australia, students are assured of a quality education that combines excellent instruction, top-notch practical leadership training, the best in skills development, and an outstanding wilderness classroom.

significantly, but central to this mission are three important components: curriculum development, outreach, and research.

Curriculum development is central to the continued success of field courses and is essential in this era of growth in outdoor visitation. Key principles are maintenance of the highest standards for training outdoor leaders in the industry, constant re-evaluation of current field practices, development of new practices where appropriate, and ongoing feedback from students.

Outreach takes on many diverse forms at NOLS and runs across many programs and initiatives. Leadership in the field requires making information available to other organizations, land managers, and the general outdoor public. NOLS has been a primary motivating force in the success of the LNT program, which is an excellent example of a public-private partnership that has contributed greatly to preservation. We regularly host an annual risk management conference that has become an important event for outdoor programs nationwide, and we publish books such as NOLS Wilderness First Aid.

Finally, research remains as the foundation of the NOLS program, whether it's investigating the best field practices, learning more about our students' educational experiences, or monitoring important ecological conditions in our wilderness classrooms. Research allows us to maintain our "cutting edge" approach to our profession and to meet new challenges. The research department studies wildland impacts and makes recommendations that NOLS instructors can bring to the students in the classroom. Beyond the students, NOLS helps bring data to land managers through the school's ongoing research on various projects.

International Outreach

NOLS also reaches out to the countries and communities where we operate. An example of this is the NOLS Outdoor Education Program for East Africans (NOEP). NOEP was started in 1991 when the school saw a significant increase in the interest and enthusiasm that East Africans were showing for outdoor education. East Africans are deeply concerned with the conservation of their wilderness areas, but a resource for learning outdoor skills and leadership was lacking. Thus, a cornerstone of the NOEP program's philosophy is that if more East Africans can visit their parks and reserves and gain an understanding of their value, they will take greater interest in the wise management of these areas for the future. A NOEP course is two to three weeks in duration, with full scholarships available. Some 600 to 800 students have successfully completed NOEP courses since 1991.

In Mexico, NOLS has formed a partnership with the National Institute of Ecology to provide LNT training to land managers. The training takes place in reserves throughout the country and has focused on various climates, including temperate forests, arid lands, and coastal deserts. NOLS also helps run training programs for students at the University of La Paz; teaches group management, leadership, and risk management in the field; and instructs in minimum-impact camping. Additionally, NOLS sponsors an LNT course for land managers.

In Chile, the school has partnered with Chilean forest managers to do LNT training and is helping managers of Torres del Paine National Park plan for recreational use and monitor the impacts of recreation in Chile's most often-visited national park. What's more, the school is collaborating with the University of Virginia to monitor impacts in the park. NOLS also runs a mountaineering course each year for Chilean students and has a scholarship for one Chilean student on every semester in Patagonia that the school runs—seven this year. NOLS has also partnered with nonprofit Chilean organizations to provide outdoor educator training in the country's wildlands.

As the school moves into the next century, plans are underway for more innovations and changes to help students, land managers, and others become better stewards of the Earth's remaining wildlands. Given the training and tools, NOLS students and trainees learn how to take care of themselves and the wilderness. NOLS makes a difference in its students' lives, and the students make a difference in the world. **IJW**

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Wilderness@Internet

The Wilderness Information Network: The First Year of Use

BY WAYNE FREIMUND AND CHUCK BURGESS

The emergence of the World Wide Web (WWW) provides unique potential for improved communication among the dispersed people with wilderness interests worldwide (Freimund and Queen 1996). Realizing that potential, however, will require the emergence of order to the location and organization of wilderness information within cyberspace. The Wilderness Information Network (WIN) was designed with that goal in mind.

WIN was conceived originally as a repository for research materials that would enable students in the Wilderness Management by Distance Education Program to easily access course materials. There was soon recognition that a comprehensive information resource for wilderness managers, educators, researchers, advocates, and the general public was within the scope of possibility. A task force convened at the University of Montana, United States, in 1996 to brainstorm and create a clearer vision for a WIN. In attendance were representatives from the Arthur Carhart National Wilderness Training Center (ACNWTC), Aldo Leopold National Wilderness Research Institute (ALNWRI), the Washington, D.C., offices of the U.S. Department of Interior National Park Service and Bureau of Land Management, the U.S. Department of Agriculture Forest Service in Florida, and staff and faculty from the Wilderness Institute at the University of Montana.

In more than 20,000 visits, people from around the world have downloaded research documents and training materials, scanned current events, and become aware of conferences and current issues.

Task force recommendations focused on a need for a library of research documents and management plans to be readily available to a worldwide audience, a centralized site and data resource for the National Wilderness Preservation System (NWPS), and a place for ongoing communication among people with wilderness interests. With this guidance, the University of Montana Wilderness Institute, with support and ongoing guidance by the ACNWTC and ALNWRI initiated a project to begin the process of making state-of-the-art wilderness information available to national and international audiences.

While there has been confidence among people associated with the WIN project that there will be a significant demand for wilderness research and information about the system within cyberspace, necessarily there also has been an element of faith that this type of medium would serve as an efficient communication tool. The purpose of this article is to illustrate the amount and type of demand the WIN site received within the final three-quarters of 1998. Data were collected within log files for that period of time and analyzed for this article using Microsoft Site Server Express Analysis software. This article addresses three questions: How much has WIN been used? Who is using it and where are they from? What types of information are they seeking and how can the site be improved?

WIN Use

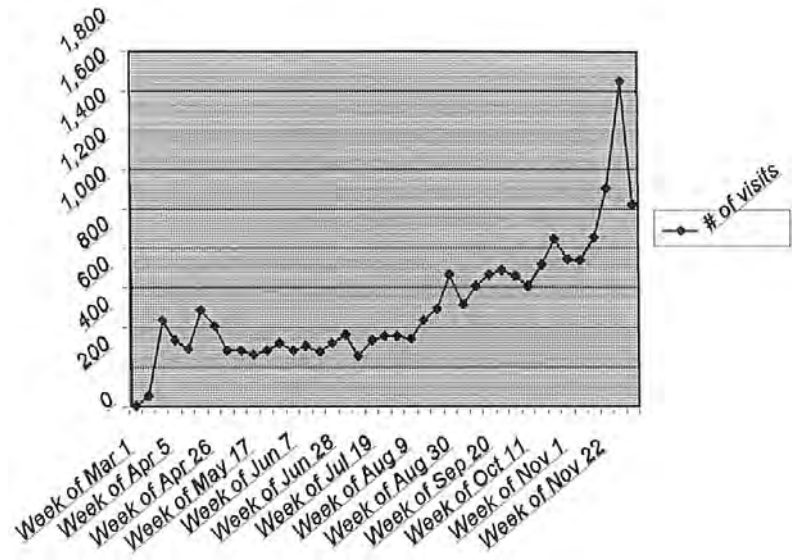
The number of times a site is "hit" is often used as a measure of its popularity. While hits are a relevant measure of the strain placed on a computer system, they can be mis-

leading in understanding overall use. Every component of a webpage, be it an image, ad, or background, counts as a hit whenever the page is accessed. The WIN homepage, for example, contains numerous icons, links, pictures, and Java scripts. Accessing the site once can result in a dozen hits. A more accurate representation of a site's use, therefore, is to examine the number of "visits" that occurred and the number of "requests" for information resulting from each visit. A visit is a series of consecutive "requests" from a user to an Internet site. A request is a hit that successfully retrieves content. Requests don't include inline image, ad view, or ad click requests or errors. Request counts are conservative because browsers and many Internet gateways intercept some requests before reaching the server.

Prior to analysis, it was necessary to filter out hits, visits, and requests that originated from The University of Montana in order to accurately reflect true visitors to the WIN, because Montana was where the development work was completed. Unfortunately, many hits were filtered out that were legitimate. That is, the hits originated from someone at the University of Montana other than the developers. Therefore, the numbers used in this report should be considered conservative and not to accurately represent the population of WIN visitors from Montana.

During the weeks of March 1 through December 6, 1998, the WIN site received 640,666 hits during 20,534 visits that led to 61,160 requests for information. Figure 1 illustrates the growth in weekly visits over that time period. During March there was very little activity because this was a time of intensive server development and experimentation. Between April and August, the number of weekly "visits" hovered around 300 to 400. The fall season, however, demonstrated a surge of growth coincident with the schedule of several academic institutions. WIN averaged 506 visits weekly with the maximum number of visits within a week being 1,650. The reduction of visits in mid-December may reflect the general influence of the holiday season.

Figure 1—Weekly visits to the Wilderness Information Network March–December 1998



WIN Visitors

Visitors to WIN logged onto the site from a broad complement of access points, as Figure 2 demonstrates. The most frequent access service was from the commercial sector. Organizations within this sector included individuals who were registered through a commercial site for their web access, people accessing the site via a search engine,

Figure 2—Distributions of Sectors through which Visitors are Accessing WIN

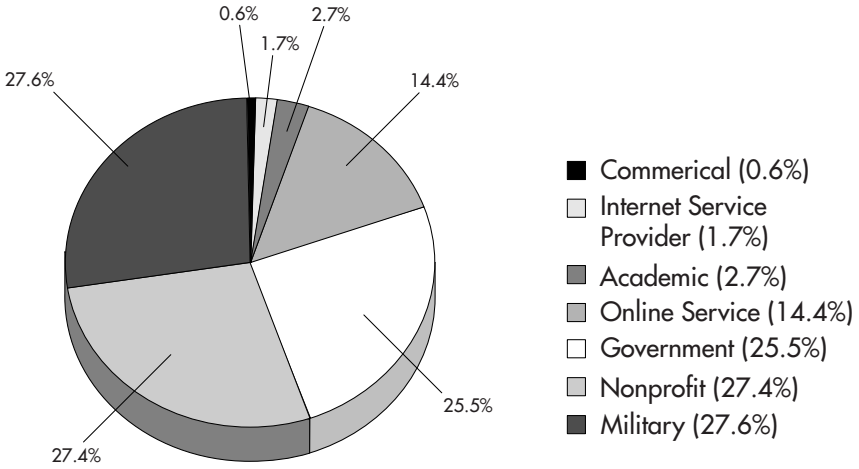


Table 1—Top Countries Outside of the U.S. Using WIN

Country	# of visits	% of top ten int'l visits
Australia	326	40.05%
Canada	251	30.84%
United Kingdom	99	12.16%
New Zealand	37	4.55%
South Africa	27	3.32%
Japan	18	2.21%
Malaysia	17	2.09%
Germany	17	2.09%
Singapore	12	1.47%
India	10	1.23%
Total (Countries)	814	100.00%

and people who logged on from their place of employment. The second most popular point of access was from an Internet service provider. This form of access tended to be facilitated by telephone companies and local businesses. Twenty-five percent of the visits originated from academic origins. Visits were made from 25 domestic universities and colleges spanning the United States from California to Maine. Dominant use was by students from Humboldt State University in California, who were participating in a distance education course on wilderness management offered by the University of Montana. Online services included, America Online, NETCOM, Compuserve, and Prodigy. America Online dominated this sector, with nearly 1,500 visits. While the percentage of government visitors was relatively small, many government employees found it easier to log onto the web from their home service provider than at work. This was the case for several government employees who participated in a discussion group associated with the distance education program. Expansion of agency capacity to access the Internet is increasing rapidly, and it is anticipated that this sector will demonstrate a larger presence of total use in subsequent years. While the use of WIN was primarily domestic, more than 800 of the 20,534 visits to WIN were from locations outside the United States. WIN's second and third place popularity came from Australia and Canada (see Table 1). Use in these countries was dominated by the academic sector.

WIN Sites

Seven components of the WIN site accounted for 76% of its use (see Table 2). Research was the hottest topic of interest in WIN, and the ALNWRI received 23% of the use by registering over 13,800 requests for information. Within the Leopold directory, visitors were seeking information on the research staff, publication lists, and research and conference announcements. This popularity demonstrates the potential for WIN to grow as a resource for people with research interests.

The ACNWTC directory had 8,729 requests for information. Although there was broad interest in the site, the downloadable training manuals were particularly popular. The manuals for wilderness awareness, K-8 curriculum, planning, and fire received 640, 629, 293 and 214 requests, respectively. This activity demonstrates the potential for the distribution of training and educational materials via the WWW.

The popularity of these directories was followed by requests for information from the research library and *IJW* features of WIN. The wilderness li-

Table 2—Number of Requests from the Top Fifteen Directories on the WIN Site

Title	# of requests	% of total WIN requests
Aldo Leopold Wilderness Research Institute Home	13,837	23 %
Arthur Carhart National Wilderness Training Center	8,729	14%
Wilderness Library	6,333	10%
International Journal of Wilderness	6,277	10%
Distance Education Home Page for Humboldt State	5,339	9%
National Wilderness Preservation System Home	2,933	5%
Current Wilderness Newsbriefs	2,761	5%
Total	31,462	76%

brary offers dozens of downloadable research documents from the ALNWRI publication list. During this period, papers on Limits of Acceptable Change (LAC) were downloaded more than 400 times. Another group of research papers that primarily dealt with ecological impacts and social conflict were downloaded nearly 900 times. This feature not only demonstrates the demand for wilderness-related research on the web, but also the potential in savings associated with mailing thousands of research documents around the world. Our goal is to triple the amount of downloadable full-text information within this library during the coming year.

The *IJW* website (www.wilderness.net) is designed with a similar orientation to the WIN. *IJW* provides an integrative look at wilderness from the perspective of manager, scientist, advocate, and educator. Between March and December the *IJW* directory of WIN received nearly 6,277 requests for information. This popularity demonstrates the complementary nature of online and traditional wilderness communication forums. This group of requests was evenly distributed around the site; and sought information on current and past issues, sponsors, and how to subscribe or submit manuscripts.

The WIN site is serving as a formal resource for online wilderness education. Aside from the academic use mentioned, the group of distance education students from Humboldt State University was responsible for 9% of the WIN-site use. The various features of WIN serve as one of the most current and comprehensive sites concerned with wilderness. As college graduates continue to emerge with skill in this type of medium, sites such as WIN will become a more commonplace academic and professional information resource.

The NWPS site is still in its infancy and is expected to be the fastest growing aspect of WIN in the upcoming year. In late November, an interactive database of the entire NWPS system was put in place within WIN. A visitor can now search for wilderness areas by name, state, agency, or date of legislation. From each search, visitors can access basic information on acreage, agency, and legislation, and get immediate links to each administrative unit's home page. This feature will be complemented during this year by expanded basic information about location, regulations, flora, and fauna, etc. on each wilderness unit.

News briefs are compiled quarterly; and volunteers who find wilderness-related items on the web now send many to us. The news briefs also serve as a resource for finding current management plans that are under review as well as discussions of wilderness-related issues.

Conclusion

The first year's progress demonstrates the potential of WIN to elevate the wilderness dialog worldwide. In spite of being a work in progress, there has been considerable interest in all of the material housed on the site. In more than 20,000 visits, people from around the world have downloaded research documents and training materials, scanned current events, and become aware of conferences and current issues. People are accessing WIN from schools, governments, nongovernmental organizations, corporate offices, and their homes. They have downloaded hundreds of documents that otherwise would need to be printed in hard copy and mailed. With the expansion of the wilderness library, the addition of the interactive NWPS site, and time for more people to become aware of WIN, we are planning for a three-fold increase in demand for WIN over the next year. **IJW**

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A Study of High Mountain Lake Fish Stocking Effects in the U.S. Sierra Nevada Wilderness

BY KATHLEEN R. MATTHEWS AND ROLAND A. KNAPP

Article coauthor Kathleen R. Matthews.

One common perception is that high mountain lakes in protected areas such as wilderness or national parks are pristine and can be viewed as reserves for native biota. However, recent articles (Duff 1995; Carter 1997) have discussed how stocking non-native fish may have profound impacts on native biota and that the introduction of non-native fish disrupts "naturalness" that should be an integral part of wilderness (Carter 1997). Indeed, in our research we found a profound change in the natural conditions of high mountain lake ecosystems within the John Muir Wilderness in the Sierra Nevada mountain range of California, United States. Moreover, our surveys found a link between the widespread introduction of non-native trout and the decline of a native amphibian, the mountain yellow-legged frog (*Rana muscosa*). This article summarizes preliminary results from our three-year study of the impacts of non-native trout on native biota in high elevation lakes in the Sierra Nevada, proposes some possible restoration ideas, and discusses some related problems.

A Comparative Study of 2,200 Lakes

All lakes at the upper elevations of the Sierra Nevada were historically fishless, but the majority of large lakes now have one or more species of non-native trout. To improve our understanding of non-native trout impacts on native vertebrate and invertebrate species in Sierra Nevada lakes, we compared the aquatic fauna in lakes in the John Muir Wilderness (JMW) to that found in lakes in Kings Canyon National Park (KCNP). Both sites are located in California and are very similar except regarding fish stocking. Fish stocking historically has been much more intensive in the JMW than in KCNP. While this practice continues in the JMW, most fish stocking in KCNP was terminated in the late 1970s. Therefore, comparisons between lakes from these two areas allowed us to separate the effects of non-native trout from other environmental factors (e.g., acid deposition, climatic conditions, pesticide drift) in altering the distribution of native aquatic species.

Between 1995 and 1997, research teams from the U.S. Forest Service (USFS) Pacific Southwest Research Station and the University of California Sierra Nevada Aquatic Research Lab surveyed approximately 2,200 lakes (1,079 lakes in the JMW and 1,083 lakes in KCNP). During field surveys, quantitative information on fish, amphibians, invertebrates (zooplankton and benthic macroinvertebrates), and the physical attributes of the lakes and ponds, such as presence of inlets and outlets, lake depth, and lake size, were collected. This study represents the most extensive sampling of lakes in the Sierra Nevada to date.

Findings

The results of our study indicate that fish distributions have changed dramatically in high elevation lakes throughout the Sierra Nevada. In the areas we surveyed, 316 of 1,079 lakes (29%) in the JMW have introduced trout compared to 207 of 1,083 (19%) in KCNP. The percent of lakes with trout increases markedly when only larger lakes are considered, as small lakes and ponds typically have not been stocked with trout. For lakes larger than one hectare (2.5 acres), 80% contain trout in the JMW, but only 40% contain trout in KCNP.

The majority of large lakes (> 1 ha.) in the Sierra Nevada mountain range are regularly stocked by the California Department of Fish and Game based on the assumption that these lakes do not have sufficient natural reproduction to maintain trout populations; however, little study of trout self-sustainability in lakes has been undertaken. We distinguished between lakes with self-sustaining trout populations (those with sufficient natural reproduction to maintain the population even in the absence of stocking) and those with non–self-sustaining trout populations (those with populations maintained solely by stocking because of an absence of natural reproduction) by comparing fish ages with the years in which each lake was stocked. Based on these comparisons for 123 JMW lakes, we estimate that 70% of the lakes currently stocked actually contain self-sustaining trout populations. These populations would persist even if stocking were completely halted. Our estimate that 70% of the currently stocked lakes within the study area are self-sustaining is very similar to the actual percentage of formerly stocked lakes in KCNP that still contain trout. Our surveys of 74 KCNP lakes in which stocking was halted in the late 1970s indicates that 80% still contain trout populations.

We found many more mountain yellow-legged frog populations in KCNP compared to lakes in the JMW. Thirty-five percent of the lakes in KCNP (379 of 1,083) contained mountain yellow-legged frogs compared to only five percent of the lakes in the JMW (56 of 1,079). In addition, the total number of frogs observed in KCNP was much higher: A total of 69,638 adult, subadult, and larval mountain yellow-legged frogs were found in KCNP, versus 8,819 adults, subadults, and larvae in the JMW. The mountain yellow-legged frog is particularly sensitive to trout introductions, because it is highly aquatic in all life stages and it has an unusual natural history in which tadpoles overwinter two to three times before metamorphosing into subadult frogs. This overwintering requirement restricts successful breeding to bodies of water that do not dry up in the summer. These are the same bodies of water into which trout most commonly have been introduced.

Netting in a high mountain lake. Photo by Kathleen R. Matthews.

Benthic invertebrate and zooplankton samples are currently being processed and the data summarized. Benthic invertebrate data from JMW lakes sampled in 1995 were presented in a 1996 master's thesis by Don Rowan (New Mexico State University). He reported that benthic invertebrate species diversity, mean abundance, and mean size were all lower in trout-containing lakes, compared to fishless lakes, and that guild composition was greatly altered in trout-containing lakes. The effects of trout on zooplankton appear to be similar.

In conclusion, our preliminary results indicate that most stocked lakes in the JMW have self-sustaining fish populations, and that current levels of fish stocking have had an adverse impact on native biota, especially the mountain yellow-legged frog. Apparently, the lower historical intensity of fish stocking in KCNP and its termination in the late 1970s provided numerous fishless lakes that serve as refuges for mountain yellow-legged frogs. These refuges are nearly absent in the JMW because most of the larger lakes now contain trout. As a result, the mountain yellow-legged frog is now absent from the majority of sites in the JMW where it previously occurred and, if no steps are taken to reverse this decline, it is likely to be listed under the federal Endangered Species Act in the future. Fish and frog distributions in KCNP could serve as a useful model for future restoration strategies in the JMW. Our study indicates that recovery of the mountain yellow-legged frog in the

Mountain yellow-legged frog (*Rana muscosa*). Photo by Kathleen R. Matthews.

High mountain lake in the Sierra Nevada. Photo by Kathleen R. Matthews.

JMW will require that some currently stocked lakes be allowed to revert to a fishless condition. If such lakes are selected carefully, the recovery of the mountain yellow-legged frog could be accomplished with only minimal effect on the recreational fishery. Steps taken now to restore the mountain yellow-legged frog to a subset of formerly occupied habitat could dramatically reduce the likelihood of federally listing this species in the future.

Recommendations

To this end, we recommend that adaptive management projects be implemented in the JMW to evaluate the effect of reducing trout stocking on resident trout populations and native biota. Specifically, we have proposed first trying to restore frogs in the basins where they currently are most abundant and where fish distribution can be managed. Within these basins, we propose a halt to fish stocking and removal of fish from lakes where they are self-sustaining if frogs are present or nearby. Techniques are currently available to remove fish using gillnets (Knapp and Matthews 1998), which avoids any adverse affect of poisons. However, according to current interpretations of The Wilderness Act (TWA) and subsequent agreements, management responsibilities for fish stocking on U.S. Forest Service lands lies with the state agencies. The USFS's role in managing fish stocking in wilderness remains unclear. For example, in the final Environmental Impact Statement (EIS) for the Desolation Wilderness (November 1998) in the northern Sierra Nevada mountain range, fish stocking was not analyzed as an issue and, instead, will be dealt with outside the EIS.

Conclusions

Some have argued that fish stocking is not compatible with the intent of TWA, which defines wilderness as that "which is protected and managed so as to preserve its natural conditions." Regardless of its compatibility, even if fish stocking were completely halted over the entire Sierra Nevada mountain range, fish would still dominate the landscape, because most lakes now have self-sustaining populations. Thus, any restoration projects would only hope to return some small proportion of lakes back to a naturally fishless condition. Moreover, the costs of evaluating the impacts of fish stocking or repairing its damage has not been incorporated into fish stocking programs; so far these have been the financial responsibility of federal agencies. The prospect for restoring lakes to a fishless condition remains uncertain. **IJW**

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Health-Related Knowledge and Preparedness of High-Altitude Wilderness Hikers in Colorado

BY JOHN M. WESTFALL, ROBERT E. GRAMLING,
ANN O'BRIEN-GONZALES, AND GWYN BARLEY

Abstract: Millions of Americans are involved in backpacking and day-hiking each year, many of whom will experience illnesses or injuries related to their activities. This study assessed the knowledge and basic preparedness of a group of high-altitude hikers in wilderness conditions in Colorado, United States. One hundred twenty-six hikers in Rocky Mountain National Park, Colorado, were surveyed on-site, over a four-day period at an elevation above 10,000 feet, as to their knowledge of common wilderness-related illnesses and their level of preparedness for common wilderness-related illnesses or injuries. A large percentage of these respondents were not carrying the recommended equipment for their hikes, nor could they identify the symptoms of hypothermia or high altitude pulmonary edema, both common acute illnesses. A majority of respondents were not adequately acclimated to the altitude prior to beginning their mountain hikes. Physicians, wilderness and hiking organizations, and public land management agencies may play an important role in educating wilderness enthusiasts about mountain hiking hazards and the preparation required to safely enjoy wilderness experiences.

It has been estimated that more than 45 million Americans are involved in backpacking or day-hiking yearly (Crouse, Josephs 1993) and between one to two million person-days are spent hiking in the mountains each year (Gentile, et al. 1992). Many of these people will experience illnesses and injuries related to these activities because moderate to high-altitude hiking is associated with numerous illnesses and injuries. Acute Mountain Sickness has been reported at rates up to 25% with rapid ascent to moderate elevation (6,745 to 9,200 feet) and above 60% at higher elevations (13,900 to 14,405 feet) (Tso 1992). High Altitude Pulmonary Edema and High Altitude Cerebral Edema are life threatening and have been reported at rates as high as 15% and 1%, respectively, at high altitude. Solar radiation, which is intensified 53% with every 9,000 feet elevation gain, and is effectively reflected by rocks and snow, is associated with squamous cell carcinoma, melanoma, keratoconjunctivitis, and cataract formation, putting high-altitude hikers at increased risk, secondary to extreme exposure (Ambach, et al. 1995; Wentzell 1996). Musculoskeletal injuries, hypothermia, heat illness, exhaus-

We surveyed hikers on knowledge and preparedness for altitude-related illness or injury as well as conditions common to hiking at any altitude or terrain.

Photo by Robert E. Gramling.

(PEER REVIEWED)

Table 1—Demographic Information

Variable	Number n=126	% of Total
Gender		
Male	93	74%
Female	33	26
Age		
<20	16	13%
21-30	35	28
31-40	31	25
41-50	25	20
51-60	17	13
>60	1	1
State of Residence		
Colorado	93	74%
Coastal State	8	6
Other	25	20
Number in Hiking Group		
1	6	5%
2	32	25
3	29	23
4	21	17
>4	31	25
Medical Conditions		
None	108	86%
Pulmonary	5	4
Heart	1	1
Other	12	9
Daily Medicine		
None	105	83%
Pulmonary	3	2
Heart	2	2
Other	16	13
Medical Training		
None	83	66%
First Aid	26	21
CPR	9	7
Other	8	6
Wilderness Training		
None	80	63%
Scouting	22	17
Other	24	20
Time in Colorado		
<3 days	18	14%
3-28 days	17	14
>28 days	91	72
Altitude night before climb*		
<4000 ft	0	0%
4-8000 ft	94	75
>8000 ft	32	25
Altitude 2 nights before climb*		
<4000 ft	7	6%
4-8000 ft	107	85
>8000 ft	12	9

*Recommended 2 nights >8000 ft for this altitude hike (Wilderness Medical Society)

tion, dehydration, and lightning are hazards common to hiking in many steep terrains and altitudes (Ruff 1996).

The USDI National Park Service (NPS) provides trailhead recommendations and educational materials designed to help backcountry users prepare for and avoid potential hazards (National Park Service 1996). The Wilderness Medical Society (WMS) publishes guidelines for prevention and treatment of backcountry injuries and illnesses (Forgey 1995). Private companies, such as the National Outdoor Leadership School, Outward Bound, and Solo also provide wilderness medical training. However, we continue to know very little about the basic knowledge, preparedness, and educational needs of the average wilderness hiker. Awareness of any lack of preparedness by outdoor enthusiasts is essential for physicians, rangers, and other wilderness groups to better advise and educate them in the prevention and early recognition of potential hazards. Because day hiking and backpacking are common recreational activities, physicians and wilderness and hiking organizations are in need of epidemiological and descriptive studies of hikers (Zlotnik, et al. 1994). The purpose of this study was to assess the knowledge and basic preparedness of a group of high-altitude hikers in wilderness conditions and determine their educational needs.

Methods

One hundred twenty-six (n=126) hikers were surveyed on four weekend days over a two-week period in late August to early September 1996 on the Keyhole Trail ascending Longs Peak in Rocky Mountain National Park, Colorado. This is a popular and heavily used trail by both experienced and novice hikers. The Keyhole Trail begins at 9,400 feet and climbs 7.5 miles to the 14,255-foot summit. This terrain does not involve technical climbing during typical summer conditions. For hikers planning on reaching the summit, the NPS recommends beginning at 3 A.M. to allow adequate time

for ascent and descent by mid-afternoon when the weather is unpredictable and potentially dangerous, even in summer. Seventy-seven hikers were surveyed at the "Keyhole" rock formation (6.1 miles up the trail at 13,125 feet elevation) over a two-day period, and 49 were surveyed below tree line on the same trail (2.5 miles up the trail at 10,800 feet elevation) over the remaining two days.

The one-page questionnaire was piloted for content and response time by wilderness experts (search-and-rescue teams, wilderness educators), medical experts (physicians and paramedics), and children and adults experienced in neither medicine nor the wilderness. Many of the survey items were taken from specific recommendations by the NPS published in a free pamphlet provided at the Keyhole trailhead. Others reflect the WMS's published recommendations in its Practice Guidelines (Forgey 1995). Only those hikers who stopped at the trailside booth were surveyed. No information on nonresponders is available; however, very few hikers did not stop and complete the five-to-ten minute survey.

Hikers voluntarily responded to a small Wilderness Medicine Survey sign, filled out the questionnaire individually, and immediately returned it to the investigator at trailside. Respondents were offered free sunscreen for their participation. The study was approved by the Rose Medical Center Institutional Research Review Board, Denver, Colorado. Responses were entered into a database. Analysis was primarily descriptive; statistical analysis on differences between groups was performed using simple chi-square calculations. An expert in high-altitude medicine coded responses to questions on HAPE, hydration, and hypothermia.

Table 2—Hiking Equipment

Variable	Number n=126	%of Total
Clothing		
Rain Gear*	107	85%
Wool Hat	70	56
Heavy Top*	84	67
Shell*	109	87
Dry Shirt	83	66
Helmet	2	2
Hiking Boots*	96	76
Polypro shirt*	64	51
Sun Protection		
Shade Hat*	94	75%
Sunglasses*	95	75
Sunblock*	87	69
Equipment		
Medical Kit	63	50%
Trail map	70	56
Topographic Map	49	39
Compass	53	42
Water Filter	24	19
Food and Water		
Food	124	98%
Water**	123	98
>1 liter	87	69
4 liters or more	14	11
Altitude Medicine	5	4
acetozolamide	1	1
meclizine	1	1
aspirin/NSAID	3	2

* Recommended by either National Park Service, Wilderness Medical Society, or both.
** Recommended by Wilderness Medical Society: 7-8 liters per day or 1/2 - 1 liter per hour of exercise.

Results

The study population (n=126) included 93 males (74%) and 33 females (26%). Hiker residences were reported as 74% Colorado, 6% coastal states, and 20% other noncoastal states. Thirty-four percent reported having formal medical training such as first aid or as an emergency medical technician or registered nurse; 37% reported having formal wilderness training, such as Outward Bound or Scouting. Fifty-seven percent reported an intention to hike to the summit; 43% were not planning on reaching the top of the mountain. Five percent were hiking alone. Ten respondents (8%) reported plans to camp out overnight from two to four days. Demographics for the study population are presented in Table 1.

Male respondents were more likely to report an intent to reach the summit than females (p=.001). Younger hikers were more likely to report an intent to reach the summit than were older hikers (p=<.001). Sixty percent of hikers under the age of 40 reported they planned to reach the summit, compared to 40% of those aged 41 to 50, and 29% over the age of 50 (p<.001).

Survey results were compared to recommendations of the NPS and WMS. A large number of respondents were not carrying the recommended hiking equipment with them. Table 2 presents the equipment carried by the study population. More than 30% were not using sun protection; only 11% were carrying even half of the recommended water. Less than 1% were car-

Table 3—Knowledge of Common Hazards

Variable	Number n=126	% of Total
Medical Knowledge		
Symptoms of HAPE	7	6%
Treatment of HAPE	28	22
Symptoms of Hypothermia	46	37
Treatment of Hypothermia	87	69
When Lightning most likely to strike	106	84

rying the recommended amount of water (6 to 8 liters) for a hike of this length and difficulty (15 miles with a 4,850 foot gain in elevation). Those planning to reach the summit were slightly more likely to carry a water filter than were those not planning to reach the summit; however, this amounted to just 25% of the group planning to reach the summit (p=.05). Fifty-six percent of those planning to reach the summit reported plans to drink two liters or less of water. Sixty-seven percent of the population brought no water purifying method with them; 32% of this group carried just one liter or less of water.

Dehydration predisposes hikers to hypothermia, heat illness, altitude illness, and fatigue. Guidelines by the WMS recommend drinking one-half to one liter of water per hour of exercise or seven to eight liters per day at high altitude.

As shown in Table 3, the study population had limited knowledge of several common serious conditions associated with high-altitude and wilderness hiking. The WMS recommends hikers acclimate above 8,000 feet for two nights before a hike at this altitude. Those residing in Rocky Mountain states (Colorado, Wyoming, New Mexico, and Utah) reported less time in acclimation above 8,000 feet prior to their hike. Fifteen percent of those from Rocky Mountain states spent one night above 8000 feet elevation and 4% spent two nights above 8,000 feet. Sixty-five percent of those from non-Rocky Mountain states spent one night above 8,000 feet, and 31% spent two nights above 8,000 feet (p<.001). Respondents from Rocky Mountain states were more likely to carry an extra dry shirt (p<.01), a topographical map (p=.03), and a water filter (p=.01). Rocky Mountain residents also were more likely to identify the correct signs and symptoms of hypothermia, 41% v. 19% (p=.04). Hikers under age 20 were more likely to correctly identify the treatment for hypothermia (p=.02). No other significant differences were found based on age or gender.

Respondents reporting prior wilderness or medical training differed from those without training in only a few areas. Those reporting prior wilderness training were more likely to begin their hike by the recommended 3 A.M. starting time, 20% v. 6% (p<.01). They were more likely to carry a medical kit (p=.016), an outer shell (p<.01), trail map (p<.001), and a topographical map (p=.01). They were more likely to know when lightning would strike, 96% v. 78% (p<.01) and the signs and symptoms of hypothermia, 52% v. 28% (p=.001). Respondents reporting prior medical training were more likely to spend the night prior to their hike above 8,000 feet, 35% v. 20% (p=.02). They also were more likely to carry a medical kit (p<.01), trail map (p<.01), topographical map (p<.01), and a compass (p=.05). Respondents reporting prior medical training were more likely to know the correct treatment of HAPE, 35% v. 16% (p=.01).

Discussion

The Keyhole Trail on Longs Peak is one of the most popular routes for hiking one of the 53 mountains designated as "Fourteeners" (>14,000 feet elevation) in Colorado, and it is a common hike for both day hikes and overnight trips (Roach 1992). This study of 126 hikers represented a broad spectrum of knowledge and preparedness by a wide range of hikers and backpackers. We surveyed hikers on knowledge and preparedness for altitude-related illness or injury as well as conditions common to hiking at any altitude or terrain.

Recognition of early symptoms of HAPE and prompt descent are essential and may effectively lower reported rates of 44% mortality (untreated) to minimal levels (Forgey 1995). Sixty-nine percent of the people in our study intended to gain between 6,455 feet and 10,455 feet elevation in less than one day. Only 6% were able to correctly report early symptoms of HAPE.

Dehydration predisposes hikers to hypothermia, heat illness, altitude illness, and fatigue. Guidelines by the WMS recommend drinking one-half to one liter of water per hour of exercise or seven to eight liters per day at high altitude. This would estimate a need of roughly five to eight liters total water consumption for this hike. While such large quantities of water may not be reasonable to expect all hikers to carry or consume, many hikers in the study reported plans for significantly less water intake. Only 11% reported plans to drink four or more liters of water, and 32% of those planning to reach the summit carried only one liter or less of water over the high altitude terrain where water sources are scarce. More than half reported plans to consume less than two liters of water. Of those carrying only one liter, 69% had no other plans for obtaining other water (i.e., water purification tablets or water filter). The recommendation to carry a minimum of two one-liter bottles and a water-purification method would better prepare a large portion of this population for their wilderness experience.

Hypothermia is common even during summer months and may occur rapidly when accompanied by dehydration, exhaustion, exposure to the elements, or altitude illness. Less than half (46%) of the study group were able to recognize early symptoms of hypothermia; 30% did not know the appropriate treatment for hypothermia.

Interestingly, while 84% of hikers knew when to expect lightning at the summit, only 19% began their summit ascent before 3 A.M. The early start time is recommended so hikers can be off the summit by afternoon when lightning is most likely to strike. This may mean that lightning was not seen as a serious threat, or that hikers planned to hike faster than recommended. The former would increase their exposure to lightning (100 deaths per year in the United States) and the latter would increase their chances of experiencing high-altitude illness.

Prior medical or wilderness training only minimally improved hikers' knowledge or preparedness for common wilderness hazards. While we did not directly measure hikers' previous training, the important factor is that they reported previous training. Physicians and wilderness organizations may need to provide hiking risk information and recommendations even to their patients or clients who report medical or wilderness training.

Respondents residing in the Rocky Mountain states were less likely to spend the recommended time in acclimation for a hike to 14,000 feet elevation. Rocky Mountain state residents may have planned this hike as a day trip and driven from their home that morning. They may have believed they were at less risk because they reside at elevations between 4,000 to 6,000 feet year-round. It is important that wilderness and hiking organizations and state and national parks not assume that residents of the Rocky Mountain region are knowledgeable about, or prepared for, high-altitude wilderness hiking.

Study Limitations

First, this study reported on a relatively small number of hikers. We attempted to choose a trail common to both experienced and novice hikers to improve the generalizability of our findings. We surveyed hikers at several locations on this trail to capture both serious hikers and backpackers planning on reaching the summit, and more casual day hikers. We chose items unique to high-altitude hiking (HAPE, acclimation) and items common to hiking in any altitude or terrain (hypothermia, water intake, lightning). In addition, more than 25% of our respondents were from a state other than Colorado. Physicians and wilderness groups from anywhere in the United States will have patients and clients who participate in high-altitude hiking and camping.

Longs Peak Trail, Colorado Rockies. Photo by Robert E. Gramling.

Second, the survey methodology may not represent the true knowledge of the respondents. Although few respondents knew that hypothermia normally presents victims with changes in judgment, it may be that most hikers would identify this as abnormal and retreat to a safer environment. Third, some of the WMS's recommendations cited in this article may be too rigid and not appropriate for all short mountaineering or day hiking (e.g., water recommendations); however, these recommendations provide a framework from which to study high-altitude hikers in wilderness conditions and their educational needs.

Conclusions

High-altitude hikers in wilderness conditions have specific health-related educational needs to comply with NPS and WMS recommendations for safety. This trailside survey of high-elevation hikers in Rocky Mountain National Park revealed that a majority of hikers lacked knowledge about common wilderness-related illnesses, and a large number were not prepared for their hikes or emergencies they might encounter on the given terrain. Physicians, wilderness groups, and public land management agencies may play an important role in proactively educating outdoor enthusiasts and communities about high-altitude hiking hazards and preparing them for rewarding and healthy outdoor experiences. **IJW**

ACKNOWLEDGEMENTS

We wish to thank Richard Nicholas, M.D., cofounder of the Colorado Altitude Research Institute for assisting in the interpretation of data on altitude-related illnesses; Meaghan Walsh at Rocky Mountain Sunscreen for providing samples of sunscreen for survey respondents; and Jim Detterline, Ph.D., with the NPS, for his invaluable assistance.

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Erratum

University of Montana Continues as IJW *Sponsor*

IJW apologizes to the University of Montana School of Forestry and Wildlife Dean Perry Brown for an incorrect reference to the University of Minnesota in the last issue, Vol. 4, No. 3, when we meant Montana. The University of Montana (not Minnesota) is one of the *IJW*'s stalwart sponsors and supporters, providing a healthy financial contribution each year and supporting the efforts of faculty member Wayne Freimund as *IJW* executive editor for electronic communications.

—John C. Hendee, *IJW* editor-in-chief

In the article on the results of the 6th World Wilderness Congress (*IJW* Vol. 4, No. 3), the named organization "WWF India" should have read "Worldwide Fund for Nature, India," whose secretary general is Mr. Samara Singh. WWF (India) headquarters and branches were very active in the 6th WWC. We apologize for this error.

—Vance G. Martin, *IJW* executive editor (International)

EXTRA

Zahniser Institute for Environmental Studies Dedicated at Greenville College in Illinois, United States

"More than any other single figure, it was Howard Zahniser who spearheaded The Wilderness Act of 1964, the bedrock of the nation's Wilderness system," according to the environmental publication WildEARTH. "His immense talents as a writer, organizer, and lobbyist proved to be of crucial importance in the long campaign for the wilderness bill in the 1950s and 1960s."

Saturday, November 7, 1998, Zahniser was honored for his commitment to wilderness education, preservation, and restoration, by Greenville College in Illinois, United States, as the Institute for Environmental Studies was dedicated in his name. David Patrick, director of the Zahniser Institute for Environmental Studies, stated, "We are, by our actions this weekend, dedicating ourselves to a mission that I believe would have been close to the heart of Howard Zahniser. With diligence, we will educate our students and all those around us about conservation. … With passion, we will advocate the preservation and protection of wilderness. … With patience and perseverance, we will seek to facilitate the integration of a true ethic of land stewardship into the life and work of the broader faith community. To this mission-education, advocacy, and facilitation—we dedicate ourselves today."

"I was gathered up by Howard Zahniser," voiced Zahniser's close friend and colleague, Stewart Brandborg. "I found a friend and he never let go." These words proved evident for many as a tremendous showing of family, friends, and colleagues honored the man primarily responsible for the federal law that now protects more than 104 million acres of America's most beautiful wildlands. Brandborg continued, "He built this great plan, The Wilderness Act, with its National Wilderness Preservation System, into which areas would be placed with policy guidelines to ensure that good people in agencies would follow the structures and see that these areas would be free of the terrible things that could threaten their beauty and wonderful qualities."

In an evening reception, Zahniser was remembered by those who knew him best: his wife and children. Memories shared by Alice, Howard's widow, oldest son A. H. Matthias, and daughters, Esther Zahniser Gillies and Karen Zahniser Bettacchi, recalled "Zahnie's" great love of the outdoors and his compassion and humility in pursuing wilderness protection. Zahniser's son, Edward, added these words about his father, "To know the wilderness is to know a profound humility, to recognize one's littleness, to sense dependence and interdependence, indebtedness, and responsibility."

Howard Zahniser graduated from Greenville College in 1928. His love for the outdoors, especially the wild areas, became evident as he joined the U.S. Biological Survey in 1930. Later, his skills and love for the wild things of this earth led him into the position of executive secretary of the fledgling Wilderness Society. He also served as editor of the society's journal, The Living Wilderness. Howard Zahniser used the journal and many other means to make the American public and its politicians more aware of wilderness issues.

Wilderness Experience for Personal and Spiritual Growth in Siam

BY PRACHA HUTANUWATR

I don't like for my country (Thailand) to be called a developing country, because it has a connotation that we are not good enough and we have to be like the United States, Europe, or Japan. In Siam we belong to a different kind of culture and civilization.

In Buddhism every species has its own inherent value, and human beings can be reborn into other species and vice versa. To be reborn as a human being is very precious because of the potential to go beyond anthropocentrism. Thus, the aim of being human is to get rid of greed, competition, and individualism, both as a collective and a single person. In place of these characteristics we aspire to develop generosity, compassion, and wisdom of selflessness, or the wisdom to reunite with wilderness.

While some people refer to Siam as an "undeveloped" country, North America and Western Europe are very underdeveloped in many aspects if they use our cultural norms. Part of the cause of the wilderness problem is using one western standard for the whole world. The negative effects in western countries seem to me to be a collective karma of people in the West.

Article author Pracha Hutanuwatr.

In Siam there is a spiritual tradition in which monks and nuns live and practice meditation at the edge of a forest in what we call a "forest monastery." Many of these people spend a period of their lives in Tudong where they wander from forest to forest. They may start in a small group, but once they gain enough confidence they walk alone. Some may spend a few weeks, others months or years, in obtaining their wilderness experiences.

The Tudong and forest monastery tradition is a torch of wisdom, an art of searching for a deeper meaning of life that has been handed down from generation to generation since the time of the Buddha. This spiritual connection with nature used to be a main element of the Thai civilization until modernization. With the development era and globalization, this tradition is now a marginalized part of the contemporary Thai culture, but it is still vitally alive among serious searchers.

When a monk (or occasionally a nun) goes on a spiritual walkabout in the jungle, they take along basic necessities such as a few robes to cover the body, a begging bowl for begging food in the morning, a water container, an umbrella, and a net to protect from mosquitoes at night. Before departure, they have been taught basic skills for living in the forest for spiritual searching. This includes the basic characteristics of life: how to meditate, how to ask permission from the wilderness before putting up your umbrella for your night stay, what suttra to chant to befriend snakes and wild animals, etc.

When one embarks on a journey like this, mindfulness in every step is vital and highly recommended. However, no matter how well prepared we are, we face many problems when we enter the jungle. Even if we follow the teachings closely, it sometimes doesn't work. Some monks cry for days before being able to meditate. Some face their deepest fears or loneliness in life, while others face wilderness in their own subconscious. Some go without food for days before encountering a village for alms. Some meet with wild animals that have never met a human being, so the animals are curious and come close enough to smell and lick the robe. Some monks even have experienced a snake going up

the body when sitting in meditation. We hear all sorts of cries from the inner circle of these wandering monks and nuns, not to mention those related to the beings in the other realm, such as ghosts and forest spirits.

In short, it takes some time to be tamed by the wilderness, or for the wilderness in one's mind to be tamed. Most people who come back from this journey find themselves transformed into a more mature person. Some decide to be a monk or nun for life; some want to continue for a while; others feel ready to go back to the mundane world with a new vision of life. In Siamese culture, every young man is expected to ordain as a monk for a short time before getting into a family life. This is still a living tradition, although it is somewhat degraded.

Why Wilderness?

Several factors foster spiritual growth when one goes into the wilderness for a spiritual search. This wandering life in the wilderness is designed so we can face real insecurity. We don't even know if we will receive our one meal a day or food for today or tomorrow. We don't know where we will sleep, what we will meet in a few minutes or hours, and what dangers we are going to encounter. So this is a wonderful opportunity for our natural inner wisdom to develop.

In wilderness, we can see the true nature of interrelatedness closely and clearly. Hence, it sinks deeper into our heart beyond our head. It is no longer a lofty philosophy in our mind. It becomes more and more a living reality in our life. In this way the sense of "I am the center" becomes thinner and thinner.

The solitude of the wilderness helps to foster the internal solitude and slowly turns loneliness into aloneness. This involves a process of internal turmoil and comes from what we call the "fermented" elements in our subconscious. When one is by oneself with no one to play games with, eventually wisdom comes up to cope with the turmoil, and this wisdom can be used to shape our growth.

We believe that in the wilderness the basic energy of the earth, the water, the wind, and the fire is in its purest form. This primordial energy is very vital for supporting our inner energy and harmonizing it with the universal energy. Hence the healing, the recovery of health, and the deep meditation.

What Do We Mean by Spiritual Growth?

With the support of the above-mentioned conditions of wilderness, the fruit of spiritual growth eventually sweetens.

First of all, we can see our existential dissatisfaction of life or our suffering, face-to-face: no excuse, no escape. In Buddhism, this is an unavoidable step for maturity, and the wilderness provides the best opportunity for it.

Then we see clearly the causes of these existential senses of lack, which are negative thoughts motivated by greed, lust, hatred, anger, self-conceit, fear, and jealousy. This means seeing our self-deception that keeps us going in our normal daily life. At this stage, we can feel very depressed and life becomes quite awkward.

Monks on a solitary walk. Phra Sampora (left) and Phra Kosin. Kosin is the leader of a group of monks doing yearly dharma walks around Thailand's biggest lake—raising environmental awareness.

However, as we continue our practice, we develop more awareness of the internal and external interrelatedness. Then, as we see the basic dissatisfaction of life and its causes, and when causes and conditions are ready, a sense of compassion for oneself and a sense of humor naturally arise. With this compassion comes maturity, and we are at ease with and able to forgive ourselves and others for all that happened in the past, with less and less guilt and

In wilderness, we can see the true nature of interrelatedness closely and clearly. Hence, it sinks deeper into our heart beyond our head. It is no longer a lofty philosophy in our mind. It becomes more and more a living reality in our life.

An interfaith tree ordination ceremony along Yodana pipeline where rare old-growth trees had been marked for cutting.

hatred. This is an important part of the healing process.

This pure self-love leads us to be able to really love others, develop deeper relationships, and able to build and be in a community. These are rare qualities among people of the modern sector. Along this path, we also cultivate the ability to cope with the ups and downs of life with more and more inner stability. We are not easily shaken by gains or loss, praise or blame, power or powerlessness, happiness or suffering, success or failure. With deeper awareness of interrelatedness, these pairs become more and more of an illusion. However, we have to bring these practices of the wilderness into our daily life so that personal growth can continue after we leave the wilderness for the concrete jungle.

Phra Prachak's Story

There was a monk, about 50 years old, who had been wandering barefoot from forest to forest, jungle to jungle, all over the country for more than 10 years. One day in 1991, he came across a beautiful forest called Dongyai, where trees were being cut down by villagers. With his deep love of forests, he used his cultural influence as a highly respected forest monk to beg the villagers for that forest, in the manner monks beg for food every morning. The villagers agreed to donate that forest for a forest monastery. The monk initiated a tree ordination ceremony with Buddhist chanting and tying of monks' robes around the large trees. This creative use of the traditional Buddhist ordination ceremony made the forest a sacred place in the eyes of the villagers. The local people greatly respected the saffron robes and did not dare cut down the trees. Since then, tree ordination ceremonies have been used widely throughout the country by environmental groups to protect forests.

Phra Prachak caught the imagination of the Thai public and was one of the most effective forces in raising national awareness about the urgency of saving the tropical forests. However, the monk who had been in the forest for 10 years was ingenuous regarding political situations, and his well-meant actions got him into a lot of trouble. Dongyai Forest was a source of vested interests of the local mafia, corrupted police, and greedy forestry officials. To make a long story short, he was attacked from all levels of state machinery and local Mafia. The determined but naive monk attempted nonviolently to rise to the challenges against him. His wilderness wisdom and limited political understanding were not such effective tools, and he was finally pressured to be disrobed and arrested; his cases are still in the courts after five years.

In 1993, to support his cause, we organized a deep ecology walk into Dongyai Forest, combining the traditional Tudong Buddhist forest walk with deep ecology study. Phra Prachak led the walk as the meditation master. Other friends with an interest in deep ecology were invited to join and share their wisdom. Participants were from the modern sector of Siam and the international community. These initiatives brought about personal growth for the participants and spread the word of Phra Prachak's work both locally and internationally. A second walk was held in 1994 before he was forced to disrobe later that year.

Elizabeth Roberts and Elias Amidon

Over the following four years, Elizabeth Roberts and Elias Amidon of the Boulder Institute for Nature and the Human Spirit in Colorado, United States, have been of great help in organizing and co-leading several more forest walks in the Karen area of northern Thailand where the indigenous people are threatened with relocation. With Elizabeth and Elias's thorough understanding of deep ecology, their experiences in leading vision quests, and their skillful teaching methods, our wilderness walk became successful in combining the ancient wisdom of the Karen people, Buddhist teachings, and contemporary ecological wisdom.

Both Elizabeth and Elias have become our good friends and an integral part of this event. Their main contributions are sharing with us what is wrong with western development in the United States and Europe, and describing various kinds of alternatives that have been attempted in counteracting negative tendencies. They are also able to link the new trends of the West to the ancient traditions of Buddhism and indigenous wisdom. This is a mutually empowering process for both them and the Westerners they bring as well as Thai participants and

indigenous people in the walk areas. Moreover, Elizabeth and Elias's spiritual and emotional maturity makes them lovable partners in our quests.

Supporting and Learning from the Karen People

Besides spiritual growth, which we all gained from the meditation and the vision quest in the wilderness, we discovered that by bearing witness to their way of life and listening to their stories, we were empowering our Karen friends. Each year more and more of them join our meditations, walks, and solo fasts. We have learned a great deal, enjoyed ourselves, and felt enriched by our experiences with our Karen friends in the jungle.

The Karen are people of great wisdom, not only about the forest but also about important issues of life in general. Their worldview is quite poetic; every sound of the birds is accompanied by a story as well as is each star constellation, river, and mountain. They have a rich musical tradition with song and saga telling the ancient stories. Their way of life and connections to nature are like the bee that extracts the sweetness from a blossom without ever harming the flower.

Their houses are constructed with natural materials, and their belongings are sparse and handcrafted. Some of our western friends had more in their backpacks than an entire Karen family would possess. Being with the Karen is a humbling experience for environmentalists and ecologists from the modern sector like us. We are inspired by them and have a strong feeling that we need to further simplify our own way of life and commit ourselves to changing our social structure so people are not pressured to consume more than they need.

The Karen way of life is under threat. The burning question is whether the Karen people can live in the jungle with a sustainable future. The sinister outside forces are presenting two connected major challenges. First, can the Karen liberate or protect themselves from colonization by consumer monoculture? Can they find strength and confidence in their way of life, in their civilization? If they believe their way of life is not inferior to the Thai or western culture, then there is a future for the Karen culture.

Second, it is unlikely they can retain their sustainable lifestyle unless the surroundings and encroaching Thai society changes its direction. If our elite and our technocrats continue to push for economic growth, industrialization, big agribusiness and consumerism, there will be no hope for the sustainable cultures of any indigenous people. In the past 10 years of fast economic growth, we have witnessed much harm to the natural wilderness where our indigenous people live in such harmony with nature. The power of greed is much more efficient than any law enforcement. Moreover, laws can be changed when the government changes.

Moves Toward Sustainable Wilderness

Working with the cause of the problem requires action at several levels. One is to try to protect the wilderness from the threats of modernization. Another is to simplify our own lifestyles. A vital area we are working toward is the empowerment of indigenous people and collaboration with them about how to cope with change in a sustainable way. We also feel a strong moral imperative to work to change the structural violence of modernization and globalization. Just changing our lifestyle is not enough. Without a structural change to base our society on a more holistic worldview in the long run, our short-term work of preserving and protecting the wilderness and empowering indigenous people will not lead to a sustainable future.

In short, the enemies of wilderness, the enemies of a sustainable future, the enemies of healthy individuals, are industrialization, consumerism, economic growth, globalization, and our own greed for wealth, power, recognition, and success.

In short, the enemies of wilderness, the enemies of a sustainable future, the enemies of healthy individuals, are industrialization, consumerism, economic growth, globalization, and our own greed for wealth, power, recognition, and success.

We cannot overcome these enemies by anger, hatred, or violence, because they are so powerful and so intimate. Only by the spiritual power of the wilderness, motivated by deep compassion and clear wisdom, will we be able to heal ourselves and act positively to heal our Mother Earth. **IJW**

PRACHA HUTANUWATR is a former Buddhist monk and director of the Wongsanit Ashram in Nakonawok, Thailand. This article was presented at the 6th World Wilderness Congress in Bangalore, India (October 1998), and will be published in the 6th WWC proceedings by Fulcrum Publishing.

Announcements & Wilderness Calendar

Upcoming Conferences

1999 International Symposium on Society and Resource Management, July 7–10, 1999, in Brisbane, Australia. Hosted by the University of Queensland and Griffith University, Brisbane, Australia. The International Symposium on Society and Resource Management (ISSRM) is an interdisciplinary forum focused on the interactions between society and natural resources. ISSRM provides researchers and practitioners an opportunity to discuss research and management strategies. Contact Sally Brown Conference Connections, P.O. Box 108, Kenmore, Queensland 4069, Australia. Telephone: +61 (07) 3201 2808. Fax: +61 (07) 3201 2809. E-mail: sally.brown@uq.net.au.
Website: http://www.geosp.uq.edu.au/issrm99/.

Sixth Annual Wilderness Risk Management Conference, October 14–16, 1999, at the Windemere Hotel and Conference Center in Sierra Vista, Arizona, United States. Learn about field and administrative practices of wilderness risk management. For more information, contact Debbie Derbish. Telephone: 307-332-1229. E-mail: wild.risk@nols.edu.

1999 Congress on Recreation and Resource Capacity, November 29–December 3, 1999, at Snomass Village in Aspen, Colorado, United States. Drs. Glenn Haas and Mike Manfredo, Cochairs. For more information, contact Susan Scott Lundquist. Telephone: 970-491-4865. Fax: 970-491-2255. E-mail:susanlun@lamar.colostate.edu. Website: www.cnr.colostate.edu/nrrt/capacity/.

Wilderness Inquiry Celebrates 20th Anniversary

In 1998 Wilderness Inquiry (WI) based in Minneapolis, Minnesota, United States, celebrated its 20th anniversary of operations. In 20 years WI has grown into a nationally recognized leader in providing integrated outdoor experiences. Each year WI continues to serve more and more people. In 1998, WI served 8,643 people on more than 200 socially integrated outdoor activities throughout North

WI sponsors unique efforts to make wilderness experiences available to people with disabilities. Photo by Bill Waring.

America. These events included two new trips in Washington State: WI's first backpack trip in the northern Cascade Mountains and a kayak trip in the San Juan Islands.

In addition to the people it directly serves, WI has an impact on many others. For example, in 1998 alone WI was covered by more than 70 print and broadcast media, from The New York Times to the Duluth News-Tribune to the San Francisco Chronicle and a host of others. Through Project FIT (Families Integrating Together), WI has significantly expanded opportunities for families that have individuals with disabilities to enjoy the benefits of integrated outdoor recreation and education as lifelong pursuits.

Another interesting development is a joint project of WI and the Minnesota Department of Natural Resources, called Project START (State Targeting Accessible Recreation Trails). WI has assessed the accessibility of one to three miles of trails in 68 parks throughout Minnesota over the last two years. The issue of trails and accessibility has become very significant, as the federal ACCESS (DEFINE "ACCESS") board is about to issue standards on the level of accessibility required. WI also completed the first year of a two-year initiative called Project PARTNERS. This project works cooperatively with more than 3,500 students, parents, and teachers in 12 Minnesota school districts to provide program development assistance in both environmental education and inclusive education for students of all abilities.

The Minnesota State Council on Disability presented WI with its Chair's Award on October 23, 1998. The award was given in recognition of WI's excellence in bringing the joys of outdoor experiences to people with and without disabilities. WI provides outdoor adventures throughout North America. For more information, contact Greg Lais, executive director at 1313 Fifth Street S.E., Box 84, Minneapolis, MN 55414, USA. Telephone: 612-379-3858. E-mail: greglais@wildernessinquiry.org. Website: www.wildernessinquiry.org.

(*IJW* salutes WI for their efforts to make wilderness experiences available to people with disabilities.—John C. Hendee, editor-in-chief)

Twelve Great Things That Happened to America's Land in 1998

Here are what The Wilderness Society considers the 12 best things that happened to America's lands this year. For more information, visit their website at http://www.wilderness.org/newsroom/greatin98.htm.

- North Yellowstone protection (Montana)—more than 7,700 acres are now protected
- Creation of Opal Creek Wilderness Area (Oregon)—20,000-plus acres
- Land rescued in northern forest (New York, Maine, New Hampshire, and Vermont)
- Resounding support for open space on Election Day
- Protection of Baca Ranch (New Mexico)
- Protection of one million acres in the Sierra Nevada
- Defeat of Congressional threats to Alaskan Lands
- Plan to eliminate Okefenokee mine threat (Florida/Georgia)
- Unearthing Utah wilderness
- Road-building moratorium in national forests
- Rescue plan for the Everglades (Florida)
- Green-certified paper—A first for North America

(Excerpted from WildAlert, 12/21/98.)

Snowmobiles Prohibited in Lolo National Forest

In a holiday-season victory for wilderness, the U.S. Forest Service (USFS) announced December 16, 1998, that snowmobiles now will be prohibited from 400,000 roadless acres of the Lolo National Forest in Montana. This decision finally will bring management of 17 areas into compliance with the Lolo's own forest plan issued in 1986. Led by efforts of the Montana Wilderness Association, The Wilderness Society has been working to pressure the USFS to manage the areas in accordance with its plan. (Excerpted from WildAlert, 12/21/98.)

Atlas of the Grand Staircase-Escalante National Monument Available

A comprehensive atlas of the greater Grand Staircase-Escalante ecosystem, the "Crown of the Canyons" is now

available online from The Wilderness Society (http://www.wilderness.org/-standbylands/utah/atlas/index.htm). The Crown of the Canyons Atlas was created to introduce local residents, the general public, and decision makers to the exciting and abundant natural values of this ecosystem. It was also created to promote an ethical widespread public commitment to sustaining the wild character of the Crown of the Canyon ecosystem. (Excerpted from WildAlert, 12/21/98.)

WildAlert: E-mail Action Alert

WildAlert is an e-mail action alert system brought to you by The Wilderness Society to keep you apprised of threats to our wildlands—in the field and in Washington. WildAlert messages include updates along with clear concise actions you can take to protect America's last wild places. You are welcome to forward WildAlerts to all people interested in saving America's wildlands. TWS, founded in 1935, is a nonprofit conservation organization working to save the last of America's wildlands through advocacy, research, and education. To take action on behalf of wildlands today, visit our website at http://www.wilderness.org. (Excerpted from WildAlert, 12/21/98.)

New Zealand's Wilderness Research Foundation

The New Zealand Wilderness Research Foundation (WRF) was established in 1997 as a medium to encourage and facilitate research into New Zealand's wilderness and backcountry environments and to foster linkages with other wilderness scholars around the world. The present focus of the foundation's work is the management of the consequences of human use of wilderness areas, especially with regard to tourism. The WRF recently established a website, designed and constructed by the Centre for Tourism, University of Otago, New Zealand, and can be accessed at http://divcom.otago.ac.nz/-tourism/wilderness/default.htm.

The WRF organizes conferences (the first was the Trails in the Third Millennium Conference, December 1997) and seminars and publishes an occasional paper series in conjunction with the Centre for Tourism, University of Otago, Dunedin, New Zealand. In 1999 the WRF will begin hosting a series of invited speakers to contribute papers that will be published electronically on the WRF website.

The goals of the WRF are to provide:

1. an electronic link between wilderness researchers worldwide;
2. a notice board for forthcoming events such as conferences;
3. an electronic discussion group to allow the discussion of current issues;
4. refereed articles of 5,000 to 7,000 words published electronically on the WRF website in two issues annually;
5. audiences for guest speakers hosted by the Centre for Tourism, University of Otago, with 2,000 to 3,000 word articles published electronically on the WRF website; and
6. e-mail correspondence to those listed on the directory to provide up-to-date information on current New Zealand wilderness issues, guest speakers, and publications as they become available on the WRF website.

To foster links with other scholars around the world, you are invited to submit your name, affiliation, e-mail address, contact address, and a one to two paragraph biosketch for inclusion on the WRF directory. With your support, the directory will perform the function of an electronic information network for social science researchers in the field of wilderness management. Submit this information to James Higham. E-mail: jhigham@-commerce.otago.ac.nz. Fax: 64-3-479-9034.

Administration Proposes 5 Million Acres More Wilderness in the United States

Congratulations to everyone involved in creating the support necessary for the administration's proposal to designate five million more acres of wilderness areas in Grand Teton, Yellowstone, Great Smoky, Zion, and other national parks and monuments. This finally will provide legislative protection to deserving roadless areas that have been waiting decades for designation.

Save a Bear, Donate a Bear Canister!

The Yosemite Association has founded a new way for the public to assist in the battle to protect Sierra Nevada bears. Through their canister donation program, concerned visitors can donate money to get bear canisters available for rental. They charge a nominal fee of U.S.$3.00 per visit. The program is being piloted in the Hetch Hetchy Area of Yosemite National Park to resounding success! Ninety to ninety-five percent of the backcountry visitors there are using the canisters. (Excerpted from the Central and Southern Sierra Wilderness Education Project, Summer 1998.)

Paul Brouha—New Associate Deputy Chief of National Forest System in the United States

U.S. Forest Service Chief Mike Dombeck announced the selection of Paul

Brouha as the agency's new associate deputy chief of the national forest system. Brouha has been executive director of the American Fisheries Society since 1991. "Paul has the experience and the leadership skills to help guide our policies into the 21st century," Dombeck said. "His vision and background both with the Forest Service and the American Fisheries Society will be a welcome addition to our leadership team."

Denny Bschor—New Director of Recreation, Heritage, and Wilderness

U.S. Forest Service Chief Mike Dombeck also announced the selection of Denny Bschor as the agency's new director of recreation, heritage, and wilderness. Bschor has been the forest supervisor of the Mt. Baker-Snoqualmie National Forest in Washington State since 1994. "I am very pleased that Denny will be providing us with national leadership for our recreation management program," Dombeck said. "He is a proven leader, with experience at many levels of the U.S. Forest Service that will prove beneficial in managing the nation's largest outdoor recreation program."

Wilderness Education Association Has New Office

The Wilderness Education Association (WEA) has moved its national office to Nashville, Tennessee, United States. WEA offers outdoor leadership training from weekend to 30-day experiences through a network of affiliate organizations across the United States. The new address and contact information is WEA, 1101 Otter Creek Road, Nashville, Tennessee 37220, USA. Telphone: 615-331-5739. Fax: 615-331-9023. E-mail: wea@edge.net.

Letter to the Editor

Dear *IJW* Editor,

I disagree with the book reviewer's interpretations and conclusions (*IJW* Vol. 4, No 2, July 1998) about my views expressed in *Purple Hearts and Ancient Trees: A Forester's Life Adventures in Business, Wilderness and War* (352 pages, paperback).

My conception of heaven includes wilderness and the time to use it, and since 1946 I have spent roughly 350 days in wilderness. I love wilderness and regard the U.S. wilderness system as a praiseworthy contribution to forest management alternatives. My views are also shaped by earning three Purple Hearts, having nearly 50 years as a professional forester based in the Pacific Northwest, and working in both hemispheres.

In the book, using strong words, I criticize the Sierra Club's proposal to stop all commercial timber harvest on federal lands—primarily because of the additional pain that would be inflicted on the people and communities directly affected. I call the proposal, not the club, evil. Also, in less harsh terms, I criticize the U.S. Forest Service land management policies. I have never even thought the Sierra Club or the U.S. Forest Service were evil.

Perhaps some of your readers will buy the book and draw their own interpretations and conclusions. It's available for U.S.$18 at P.O. Box 2087, Gig Harbor, Washington 98335, USA. [Washington residents, add $1.44.]

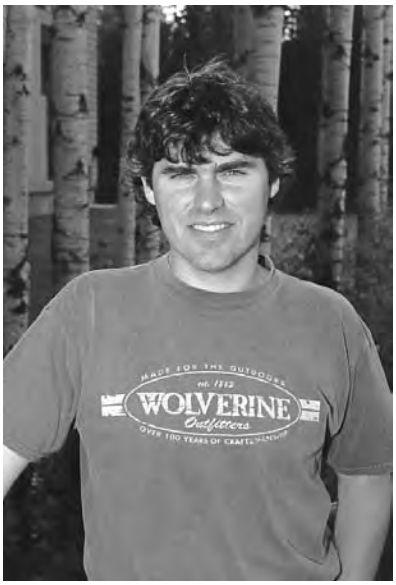
Thank you,

Jay Gruenfeld

Book Reviews

BY JOHN SHULTIS, BOOK REVIEW EDITOR (shultis@unbc.edu)

A Wilderness Within: The Life of Sigurd F. Olson by David Backes. 1997. University of Minnesota Press, Minneapolis and London. 424 pp., $24.95 (hardcover), USA.



Book review editor John Shultis.

The name of Sigurd Olson is still almost synonymous with the canoe country found along the Minnesota-Ontario border in the United States and Canada. More than any other writer, Olson was able to convey the joys of paddling the interconnected lakes and rivers of the north land and interpret the unique voice of the singing wilderness along these solitary shores. His books, particularly *The Singing Wilderness, Listening Point,* and *Reflections From the North Country,* are still among the greatest examples of interpretive nature writing and have reached millions of readers, including many contemporary nature writers (e.g., Annie Dillard, Barry Lopez). But Sigurd Olson's record as a tireless defender of wilderness and other protected areas in the United States is equally remarkable.

Olson's childhood seems to be remarkably similar to that of John Muir. Raised by a dominating father who worked as a fundamentalist minister, Olson often retreated to the wilds surrounding his home in northern Minnesota to escape his oppressive home environment. Both Muir and Olson rejected the traditional religious ideologies of their fathers, and used the feelings they received from the wilderness to guide them on a new spiritual and professional path. As Backes notes, Olson's "outdoor excursions had come to serve as a metaphor for his spiritual journey; by exploring the physical wilderness around him, Sigurd was coming to know the wilderness within" (72). Also, similar to Muir, his attachment to nature and the peak experiences generated by his outdoor recreation activities caused Olson to set his life's course to a career that could revolve around wilderness: "The more I think of the goal of my life, the more I am convinced that for me life holds one thing, and that is the expression of my views of life, existence as seen through my eyes" (72).

The primary story told in Backes's biography is Olson's lifelong struggle to find a vocation that could support his wilderness habit. Therefore, those looking for a case-by-case account of Olson's efforts to create or protect numerous American wilderness/protected areas should look elsewhere. While it is somewhat disappointing that *A Wilderness Within* only refers to these famous battles in passing (perhaps a future book?), Backes's focus on Olson's search for his life's meaning has created an eminently readable, even gripping, account of Olson's painful struggle to become an author and conservationist.

Painful is perhaps too mild a term. *A Wilderness Within* documents a number of intense internal battles fought by Olson. His first struggle was to convince himself that his profound love of nature was not simply a means of avoiding "real" work. In this struggle he was tortured by Thoreau's famous admonition that "the mass of men lead lives of quiet desperation" and thus can never find genuine fulfillment in their lives. After finally deciding that quiet desperation would not be his fate, that he would follow his heart and become a wilderness evangelist, it is more than a little ironic that a life of quiet desperation would indeed be Olson's fate for several decades. This was a result of his second battle of trying to become a published author, which he felt was the only vocation that would allow him to live the life he had chosen. It soon became apparent to Olson that he could not make a living as an author; his early attempts at writing were met with a heartbreaking barrage of rejection letters.

After rejecting several options—Aldo Leopold tried to convince him to undertake a Ph.D. in wildlife ecology—Olson turned first to teaching, then became the dean of a small but prestigious private school in Ely, Minnesota.

Backes's extensive research makes it clear that Olson was leading a double life. While on the outside he appeared to be a successful dean, enjoying the respect and admiration of his students and colleagues, inside Olson was extremely unhappy, if not clinically depressed. He felt he was wasting his life pursuing the mundane activities of a dean. One typical journal entry, according to Backes, states, "This morning a pit in the center of my stomach, more like vomiting than going to breakfast, forcing down the food, trying to smile and be cheerful, gritting my teeth and going off to work. It cannot last without something breaking" (135). It would be about 30 years later until his first book, *The Singing Wilderness* appeared in 1956, just after Olson turned 57. After years of living a life that sometimes caused him extreme anguish, Sigurd Olson finally achieved the success and recognition he so richly deserved.

Much more success was to follow. Olson's work as a professional conservationist had begun in the mid-1940s and, by the time he retired, Olson had been the president of both the National Parks Association (beginning in 1953) and The Wilderness Society (in 1968, when he was 69 years old); had received the John Burroughs Medal, the highest honor in nature writing; and had become the only person to have received the highest honors from four leading conservation organizations: the Izaak Walton League, the National Wildlife Federation, the Sierra Club, and The Wilderness Society.

It is fitting that David Backes has created a remarkable biography for a remarkable man. Backes provides a clearly sympathetic yet balanced review of Olson's life, highlighting the many victories and accomplishments while making us share Olson's anguish in fulfilling his life's dream. This book is highly recommended for all those who are touched by Sigurd Olson's writings, for those interested in the history of the wilderness and protected area movements of the late 20th century, and, perhaps most importantly, for all those who have—like Sigurd Olson—struggled to make a difference in this world after hearing what the wilderness has whispered to them.

Talk and Log: Wilderness Politics in British Columbia, 1965–1996 by Jeremy Wilson. 1998. University of British Columbia Press, Vancouver. 452 pp., $29.95 (paperback), Canada.

Battles between the forest industry, government agencies, and the environmental movement over the creation of wilderness and protected areas have helped define late 20th-century society. Just as the United States was the first country to create national parks and wilderness areas, so it was the first country in which the politics of wilderness preservation received critical attention. Authors such as Samuel Hays (1987), Randal O'Toole (1988), Ben Twight (1983), and Paul Hirt (1994) all have documented the remarkable clashes between these powerful combatants.

While the vast majority of research on this issue is centered in the United States, other western nations were fighting similar battles. For example, Canadian society underwent the same shift in environmental attitudes during the 1960s and 1970s, and eventually the Canadian public began questioning their governments and forest companies as to the impact of forest policies and practices on the environment. While political wrangling between timber extraction and protected areas may be as American as apple pie and baseball, it seems that it may also be as Canadian as winter and hockey.

At least, that is the impression one gets after reading *Talk and Log* by Jeremy Wilson. In this book, Wilson tackles the tangled politics of forestry and parks in the Canadian province of British Columbia (BC) between 1965 and 1996. Wilson, a political scientist, concentrates his analysis on the impact of environmental advocacy groups on changes to BC's forest and protected area legislation and policy. He approaches this subject by focusing on (1) "policy networks," defined as the relationships between the actors that formed around the issue of forestry and protected areas; (2) the "idea streams" that changed forever the debate between foresters, the government, and environmentalists (e.g., wilderness, ecology, multiple use, old growth forests, conservation biology, biodiversity); (3) perspectives on "business power," the privileged yet conflicting position of business in influencing government decision making; (4) the rise of the environmental movement and their ability to mobilize popular and political support for their positions; and, finally, (5) the changes in legislation and policy that occurred as a result of these and other influences.

A key theme running throughout the book is the idea that institutions and policies run on path-dependent

"historical trajectories" (339). That is, past decisions play a large part in determining contemporary decisions. More specifically, Wilson believes that the decision to follow a liquidation-conversion (i.e., sustained yield) policy in the 1940s limited the number and scope of the victories the environmental movement could achieve. The liquidation-conversion policy conceived of old growth forests as a wasting asset that needed to be converted to tree farm plantations to produce crops in perpetuity. As the forest industry and government bureaucracies built their practices and philosophies around this policy, "the resulting patterns of dependency, and the associated political pressures, structured the policy space, establishing the boundaries between the politically feasible and unfeasible" (339). While many battles have been won by BC's environmentalists, Wilson suggests that "at the end of the story, we find the province's forest industry and government doggedly continuing along a development path that will see most of the province's remaining accessible old growth timber liquidated before today's young adults reach retirement age" (x). As this quote intimates, Wilson seems to be more supportive of the environmental movement than the forestry industry, although he provides a thorough, balanced discussion of each group's philosophical outlook and strategies.

While Wilson cautions the reader from comparing the impact of environmentalism on BC's forest and wilderness policy with other regions, numerous trends are difficult to ignore. For example, the same diffusion of ideas (e.g., multiple use, ecosystem management, biodiversity) occurred; similar tactics by the environmental groups were used; the response of both the forest industry and government agencies dealing with forestry, wilderness, and protected areas seem analogous; and the end results appear remarkably similar: many protected areas have been created, but forest practices remain relatively unchanged.

Part of the value of this book is that Wilson approaches the issue from a political science perspective. Students and managers of natural resources have not traditionally received much, if any, exposure to such political science concepts as policy space, idea streams, and policy networks. As a result, Wilson's discussion will provide many readers with the ability to see a familiar issue from a refreshingly different disciplinary perspective.

Talk and Log assumes additional importance in that it is the most comprehensive historical analysis of forest policy in BC and perhaps any other province in Canada. While reading this book, non-Canadian readers will be able to compare the forest policies and environmental skirmishes in BC with their own country/regions. Also, some of the cutting-edge policies introduced by the BC government in the 1990s to address resource management issues (e.g., the Commission on Resources and Environment [CORE], the Land and Resource Management Planning [LRMP] process, and the Forest Practices Code) deserve the wider audience that this book may generate.

There are some minor weaknesses in this book. Perhaps most important, Wilson falls into the common trap of confusing the popular and political conceptions of the term wilderness. In *Talk and Log,* the term wilderness is used both to describe various types of protected areas as well as specifically designated wilderness areas/zones (primarily the former). Those looking for a history of designated wilderness areas in BC may be disappointed; a more fitting subtitle would have been "Protected Area Politics in British Columbia, 1965-1996."

Also, the few maps that are provided do not give the reader an indication of the exact location of the parks or their extent. Non-Canadians may not be aware of the location of the province, let alone the specific cities, towns, landforms, parks, or forest types discussed in the book. Similarly, the use of photographs to depict, for example, some of the battles between environmental protesters and forestry workers would have helped make these confrontations come alive for the reader.

But these are relatively minor weaknesses. *Talk and Log* is highly recommended as a cogent, detailed case study of the late 20th-century battle between prodevelopment and propreservation forces in BC. Wilson provides a fascinating, if sobering, account of the power of the forest industry and its influence on resource management and protected areas. Notwithstanding its geographic focus on BC, this book will be of great value to all those interested in the history of resource management, forest policy, and protected area creation in western nations.

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The Wolves of Denali by L. David Mech, L. G. Adams, T. J. Meir, J. W. Birch, and B. W. Dale. 1998. University of Minnesota Press, Minneapolis and London. 238 pp., $29.95 (hardcover), USA and England.

Two of the strongest symbols of wilderness—one biological, one geographical—are addressed in this book. The wolf, of course, has long been closely associated with the concept of wilderness; though, through an unfortunate and effective predator control policy, they have been eradicated from most of the lower 48 states in the United States. Similarly, perhaps no area better conjures up images of a wild, relatively undisturbed environment than Denali National Park and Preserve, a 6.1 million acre (24,000-square-kilometer) reserve in central Alaska. In *The Wolves of Denali,* David Mech and his associates describe some of the main findings of a longitudinal research program on wolves undertaken in the Denali region from 1986 to 1994.

Mech's work follows the path set by two famous wilderness defenders. Adolph Murie's spirit pervades *The Wolves of Denali,* as his classic *The Wolves of Mount McKinley,* published in 1944, is frequently noted and referred to in the text. Prior to Murie's work, the best scientific study of the wolf was by Sigurd Olson, who studied wolves in the Superior National Forest region of Minnesota and published his findings in 1938 (a biography of Sigurd Olson is also reviewed in this issue of the *IJW*).

Much has changed since the time of Olson and Murie: The research undertaken by Mech and his colleagues was made possible by such technological advances as radio collars, anaesthetics, fixed-wing aircraft, helicopters, aerial radio telemetry, and global positioning systems. Basically, individual wolves and caribou would be located, darted with a tranquilizer, and radio-collared. After the collars had been placed, the animals could be (relatively) easily found, and their movements could be monitored. There is no doubt that these are the only techniques available to cover such a large research area and in such extreme weather conditions; on-the-ground research could not hope to cover such a vast area.

According to Mech et al., the Denali study was generated by concerns over wolf-poaching in Denali, the effect of wolf culls on wolf populations, and the effect of wolves on prey species, primarily caribou, but also moose and sheep. As a result, after describing the study area (chapter 1) and the research methods (chapter 2), the book focuses on describing the number and distribution of wolf packs in the Denali region (chapter 3), the social ecology of the wolf packs (chapter 4), their feeding habits and strategies (chapters 5 and 6), and the interactions and relationship between caribou and wolves (chapters 7 and 8). The final chapter summarizes the major findings of their research.

Many interesting findings are presented in *The Wolves of Denali.* In particular, I found the relatively high level of wolf mortality through fighting with other wolves surprising: of 57 radio-collared wolves that died while the study was taking place, between 39% and 65% had been killed by neighboring wolf packs (the range is due to a 26% unknown cause of death). This percentage is the highest ever found in any published wolf study.

The extent to which wolf pack territories change over the years is also surprising. These changes appear to be due to a high death rate among Denali wolves and a continuously changing membership in the wolf packs.

The complexity of both predator and prey numbers is also fascinating. For example, it seems that the level of the snowpack each year has a significant impact on both the number and distribution of wolves, caribou, and moose. The more snow, the better for the wolves, as it is easier to locate and kill prey (so, correspondingly, the worse it is for the ungulate prey species). The year after a deep snow, the number of wolf pups from satiated breeding females increases dramatically. A bad snow year means that female wolves produce fewer and smaller cubs.

The strengths of this book derive from the longitudinal aspect of the research and the large area able to be covered by the aerial techniques, as well as from the deep well of knowledge that Mech and his colleagues obviously bring to the subject. The scope of the study is also remarkable. *The Wolves of Denali* gives us a glimpse of ecological forces at the landscape level, and humbles us into acknowledging how many abiotic, biotic, and cultural forces are at work when looking at long-term predator-prey interactions, even in a relatively simple ecosystem.

Yet the reliance on aerial tracking, while necessary to cover the 6.1 million acres of the hostile Denali region, is somewhat unfortunate. To their credit, the authors note several flaws with their research methods. For example, there is a reliance on winter conditions (it is far easier to track animals in the winter), and a bias toward large prey-predator relations (small prey are difficult if not impossible to see from the air). What is needed now, perhaps, is to revisit the techniques used by the old-timers like Olson and Murie—ground-level observations over an extended period of time—to corroborate and expand the informa-

tion gathered from aerial techniques to learn even more about the day-to-day existence of these wilderness icons.

In terms of the writing style, *The Wolves of Denali* tries to be accessible to a general audience, but it still contains much scientific terminology and graphs, so it is perhaps best for a college-level audience. Despite these minor reservations, these renowned wolf researchers have succeeded in writing a fascinating book that will provide the vast majority of readers with a captivating glimpse into the lives of one of the world's most maligned predators in the wilds of Denali. **IJW**

EXTRA

Worldwide Amphibian Decline

BY VITA WRIGHT

Amphibians such as frogs and salamanders are disappearing from wilderness areas around the world, exhibiting a decline that has the potential to permanently alter wilderness ecosystems and wilderness experiences. There is no doubt that amphibian populations are declining, but in many cases, scientists still do not know why they're declining. How much of their disappearance is a result of human actions, and how much is a result of naturally changing global conditions? Steve Corn, a scientist working for the Biological Resources Division of the U.S. Geological Survey, has worked at the Leopold Institute since August 1996. Corn is an active member of the World Conservation Union's Declining Amphibian Populations Task Force, which works to determine the nature, extent, and causes of amphibian declines throughout the world and to promote means by which these declines can be halted or reversed. Specifically, Corn works to understand the factors that contribute to amphibian distribution and status, the effects of global change on breeding amphibians, and to develop monitoring and conservation techniques. Research and conservation efforts by Corn and his colleagues are an attempt to preserve biodiversity and ecosystem integrity, as well as the opportunity for enthusiasts to see a variety of frogs and salamanders while exploring wild areas. People interested in learning more about the extent and causes of this drastic decline can obtain the following publications from the Leopold Institute:

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VITA WRIGHT is a wilderness applications specialist at the Aldo Leopold Wilderness Research Institute, an interagency unit administered by the U.S.D.A. Forest Service, Rocky Mountain Research Station. Focusing on the application of science to management, Vita works to facilitate the communication of information between scientists and managers on a variety of wilderness issues. She can be reached at the Leopold Institute, P.O. Box 8089, Missoula, Montana 59807, USA. Telephone: 406-542-4190.
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Guidelines for Contributors

Editorial Policy

The *International Journal of Wilderness* (*IJW*) invites contributions pertinent to wilderness worldwide, including issues in stewardship, education, research, international perspectives, and inspirational feature articles. *IJW* also publishes articles, commentaries, letters to the editor, photos, book reviews, and a "wilderness digest" section of upcoming events and announcements.

The *IJW* solicits manuscripts for peer review not previously published or simultaneously submitted elsewhere. Materials revised or reoriented by the author(s) sufficiently to constitute a new contribution are also welcome. In addition, the *IJW* invites feature articles and opinion pieces that will not be peer reviewed (these may include previously published material). Authors are requested to accompany their manuscripts with a cover letter explaining: (1) any previous use of data or information in the manuscript, (2) how the submitted manuscript is different, and (3) that it has not been submitted elsewhere for publication.

The International Wilderness Leadership (WILD) Foundation holds copyright for materials printed in the *IJW.* Authors will be asked, prior to publication, to assign their rights to the WILD Foundation. Authors whose work is not subject to copyright, such as material produced by government employees, should so state when submitting their manuscripts. The managing editor reserves the right to edit all manuscripts.

Four Major Article Types

1. Manuscripts

These are both peer-reviewed and non-peer-reviewed reports of wilderness-related research, stewardship, international, and education issues presented in a factual manner. It is strongly advised that the Results (factual) and Discussion (interpretive) sections be kept separate to enhance clarity; sections reporting recommendations and implications are encouraged. Articles must have an abstract of 50 to 100 words, in which objectives, methods, and major findings are clearly summarized. Stewardship, science, and education articles may be peer reviewed prior to acceptance. Photos, with captions illustrating key points in the submitted text, are strongly encouraged. Peer-reviewed manuscripts will be identified in the *IJW.*

2. Commentaries

A commentary consists of a reasoned argument culminating in recommendations or proposals for some action (e.g., a research program, a change in administrative procedure, etc.). Narratives should be approximately 500 words and deal with an important wilderness issue. Accompanying photos with captions are encouraged.

3. Special Features

IJW contains special feature sections: The "Soul of the Wilderness" section presents inspirational articles and/or articles with a proactive voice on wilderness issues or situations by notable figures. Nominations of potential "soul" authors or materials are encouraged. The "Wilderness @ Internet" section describes and reviews wilderness-related Internet material and feature articles dealing with the implications and use of electronic media for wilderness.

4. Wilderness Digest

Letters to the editor, announcements of meetings and important events, photos, administrative policy updates, major personnel changes, and special event information are welcome for the "Wilderness Digest" section.

Style and Form

Manuscripts must be submitted in final form. The author is responsible for accuracy of data, names, quotations, citations, and statistical analyses. Strict economy of words, tables, formulae, and figures should be observed and specialized jargon avoided. Submissions from the United States will use English units, followed by metric units in parenthesis. Submissions from outside the United States will feature metric followed by English units in parenthesis. Usage must be consistent throughout the manuscript. Target length of articles is 2,500 words; shorter articles may be published sooner; longer articles may be rejected for length.

First Submission

Initially, two double-spaced copies of the manuscript should be submitted to the managing editor. All accompanying tables, charts, and photo captions should be included.

Final Submission

Once manuscripts have been reviewed and review comments have been incorporated, the final manuscript should be submitted with one computer diskette, clearly labeled with the title and version of standard software (DOS preferred), author's name(s), and document title as it appears on the diskette. Or, alternatively, submit the manuscript as an e-mail attachment.

Subheadings

Subheadings are preferable to enhance organization within each article. Article titles should be short and explicit, beginning with a key word useful in indexing. The title, author's name(s), and the abstract should be listed at the top of the first page. All paragraphs must be double-spaced and contain no indentations.

About the Author(s)

A photo of the author(s), waist up and outdoors should be sent with the final manuscript. At the end of the manuscript include a two- to three-sentence biography for each author. This should contain affiliation, location, and contact information, including mailing address, telephone number, and e-mail address (if applicable).

Figures and Tables

Tables with any graphics, such as pie charts, maps, bar graphs, etc., can include either of the following:

(1) A laser printout of the chart along with the manuscript. Authors must make sure all information contained therein is exactly correct. Tables of this nature cannot be edited; they will be submitted to the publisher as camera-ready art.

(2) Save the table on disk in Macintosh format as either an ".eps" or ".tif" file. Hard copies must be enclosed with the final manuscript.

(3) If figures or tables are not formatted, then include the data in a word-processing format so we can create the chart without retyping the data. Hard copies depicting exactly how the final chart should look must be enclosed with the final manuscript.

Literature Citations

Cite references parenthetically at the appropriate location in the text by author and date (e.g., "Hendee 1995"). List all references alphabetically by senior author, and in chronological order for multiple publications by the same author at the end of the article. Do not use footnotes. Citations should include full name(s) of authors, date of publication, title of material cited, source, publisher, and place of publication. Use corporate titles where relevant. Theses and unpublished manuscripts or occasional papers may be cited sparingly.

Artwork

All photographs, line drawings, maps, and graphs are designated as figures and must be keyed to the text. They should be consecutively numbered and identified with soft pencil on the reverse side. Photo captions should be listed at the very end of the manuscript and keyed to numbered photos. Figures should not duplicate data presented in tables. Glossy black-and-white photos are most desirable. High-resolution color slides and photos are also acceptable. These will be printed in black and white in the journal.

Questions

Direct all correspondence pertaining to manuscripts, including name, address, business phone, fax, and e-mail address of the lead author, to: John C. Hendee, editor-in-chief, International Journal of Wilderness, University of Idaho, Wilderness Research Center, Moscow, Idaho 83844-1144, USA. Telephone: 208-885-2267. Fax: 208-885-2268. E-mail: wrc@uidaho.edu.