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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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WHAT ARE WE HERE FOR?

BY ALAN W. EWERT, ACTING MANAGING EDITOR

THIS PAST SEPTEMBER marked the 33rd anniversary of the passage of The 1964 Wilderness Act in the United States (PL. 88-577). While wilderness areas were in existence well before 1964, the act codified a concept held dear by many citizens in numerous countries. Moreover, this concept of protecting specific areas for the natural continuation of ecological processes or primitive recreation use has gained substantial purchase in a number of other countries including Canada, New Zealand, Australia, Russia, Finland, South Africa, and Latin America.

While much has changed since 1964, the concept of wilderness endures. That is, there is a value that many societies have placed on setting aside certain lands from human intrusion, development, and other "improvements." Promoting that idea is what we are here for! Form follows function, and without an underlying philosophical belief in the value of undisturbed lands, any designation is prone to political whimsy and change.

This does not imply that all wildernesses are one and the same. Rather, under the broad rubric of wilderness there can, and does, exist a wide spectrum of landscapes with varying degrees of human presence and natural processes. Some are, for the most part, completely lacking a human element while others are inhabited by indigenous peoples practicing their relationship with the land just as their ancestors have done for thousands of years. Wilderness is a big idea and one that can accommodate a range of situations and settings.

What it cannot tolerate, however, is the lack of a conceptual and philosophical base. Doubtless, there is a multitude of other, more economically oriented uses for many wilderness areas. What ultimately defends these areas from exploitation is a generalized belief that undisturbed lands are a social good and of great value that transcends even economic worth. What are we here for? Certainly not just to encourage wilderness designation for certain lands. What we are really here for is to promote wilderness as a concept of great value to our people and our natural ecosystems. As a resource that is already scarce and increasingly threatened from a variety of venues. As a place where good things happen when people and wilderness meet, or where people aren't even part of the picture. If we get these things right, designation will surely follow. Perhaps Leopold had it right when he insinuated that good resource management was less about the resource and more about the human mind.

IJW acting manging editor Alan W. Ewert.

As you will see in this issue of the *IJW*, wilderness provides value in a number of ways and for a number of entities, both human and nonhuman. See for example Charles O. Mortensen's article on Henry David Thoreau and David Mattson's manuscript on wilderness-dependent wildlife. Once again, the *IJW* reflects the diversity and multidimensional nature of wilderness and its many attendent values. **IJW**

INTERNATIONAL JOURNAL WILDERNESS—1998!

Watch for three spectacular issues of the *International Journal of Wilderness* in 1998. These will be published in April, July, and December. Special feature highlights for these issues will include: April—Southern Africa; July-Latin America, including Cuba; and December—Water Wilderness Areas.

We have made this change in issues per year in order to better serve our subscribers and uphold our reputation for producing a high-quality publication at a reasonable price. We look forward to delivering three excellent products to you in 1998.

Thank You!

SOUL OF THE WILDERNESS

Recreation Management Priorities Are Misplaced—Allocate More Resources to Low-Use Wilderness

BY DAVID N. COLE

Abstract: Wildernesses and places within wilderness that receive heavy recreation use typically are allocated the most wilderness management resources. I argue that more resources should be allocated to lightly used wilderness areas because these are the places that are most precious, most vulnerable, and most responsive to management. These resources should be used to monitor conditions and implement management actions where needed to keep these places from degrading.

Article author David N. Cole.

EVERY YEAR, millions of people enjoy the benefits of the outstanding recreational opportunities that the United States' wilderness system provides. Wilderness recreation use and, presumably, resultant benefits have increased greatly since establishment of the National Wilderness Preservation System in 1964 (Cole 1996). However, recreation use inevitably degrades natural conditions intended for preservation and can also degrade the quality of the wilderness experience. Although there are some success stories—places where impact problems have declined—trend studies provide strong evidence that ecological impact problems are worsening, probably in most, if not all, wildernesses (Cole 1993). Similar studies provide little evidence that the quality of wilderness experiences is declining (Cole, et al. 1995), but declining quality may be difficult to detect if displacement and succession of users has occurred (Clark, et al. 1971). In most wildernesses, use density is increasing, conflict potential is increasing (because the diversity of users is increasing), and ecological impacts are increasing. This suggests the potential for declining quality, although the ultimate response is largely dependent on visitors' tolerance of and ability to cope with changing conditions.

Managers have responded to both the social and ecological impacts of recreation by employing a variety of management strategies and tactics (Cole, et al. 1987; Hendee, et al. 1990). They monitor conditions, identify problems, isolate specific causes of those problems, and select management tactics that attack those causes. When appropriate management actions are selected and adequately implemented, they can be highly effective in protecting wilderness quality. However, this requires resources—people, time, information, and money. These resources are not distributed equally. More resources are available for recreation management in some wildernesses than in others. Within individual wildernesses, more resources are expended in some places than in others.

In this article I would like to address three questions. First, how are priorities currently set for expenditures on wilderness recreation in the United States? Second, what should be the priorities for allocating resources? And third, how might these priorities be changed to increase management effectiveness? My comments are directed only at recreation management within wilderness and the allocation of resources to recreation management. My conclusions would be quite different if I were attempting to address the entire suite of threats to wilderness values.

Current Priorities

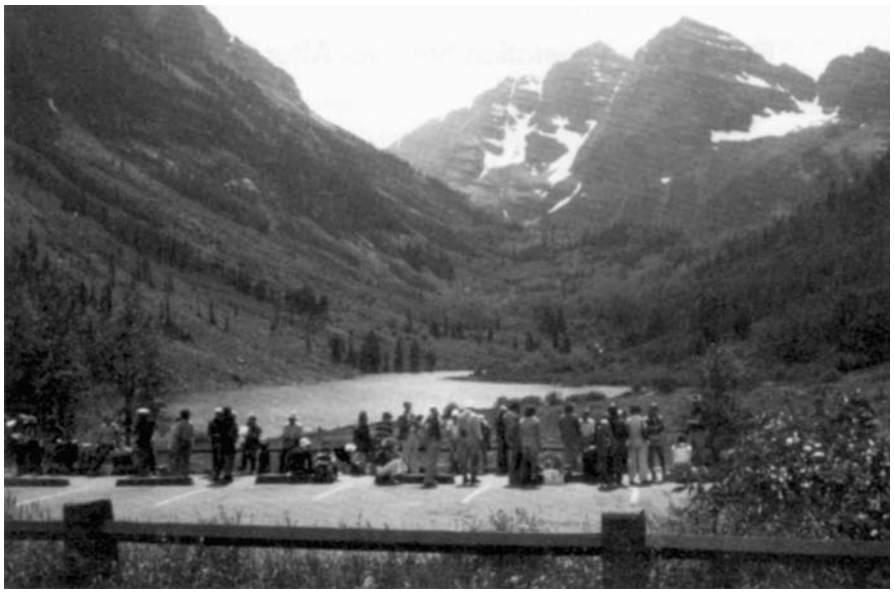
One criterion—amount of recreation use—explains most of the variation in expenditures on wilderness recreation management. This is particularly true for resource allocation within individual wildernesses. Aside from trail construction and maintenance, most field-level recreation management expenditures are on wilderness rangers. Wilderness rangers spend the vast majority of their time on the trail system and particularly on the most heavily used trails and in the most frequented destination areas. They seldom visit the majority of wilderness acreage, which is trail-less and lightly used. This seems to make sense. After all, most of the people and most of the severe problems are on popular trails and in popular destinations. If the job of the ranger is to work with visitors and to deal with the problems they have created, then this is where they should be.

(Peer Reviewed)

Resources are also allocated between wildernesses largely in relation to how much recreation use they receive. In the U.S. Forest Service (USFS), for example, the funds appropriated to each region for wilderness management in 1994 varied from $5.2 million for the Pacific Southwest region (California) to $1.2 million for the Alaska region. The funding allocation given to each region was highly correlated with the wilderness visitation each region receives (r=0.83) and very poorly correlated with wilderness acreage (r=0.13). The Pacific Southwest region, with 11% of the nations wilderness acreage and 18% of the nations wilderness use, received 20% of USFS wilderness management funds. The Eastern region, with 4% of the acreage and 13% of wilderness use, received 11% of funds. The Alaska region, with 16% of the acreage but only 6% of wilderness use, received 5% of the wilderness funds. The Northern region (Montana and northern Idaho), with 14% of the acreage and 7% of wilderness use, received 9% of funds. A current proposal would allocate USFS wilderness resources largely on the basis of amount of recreation use and total population within the region.

Priorities for Allocating Scarce Resources

Is it appropriate to allocate recreation management resources primarily on the basis of amount of recreation use? Clearly, the answer to this question is dependent on one's beliefs about how recreation management programs should operate. I would argue that wilderness managers should be proactive more than reactive. The first priority should be establishing a management regime that minimizes further degradation of wilderness. Only when this regime is in place should the focus shift to restoring the qualities of places that are already highly degraded. The rationale behind my argument is that it is more cost-effective to prevent problems than to fix them, and, therefore, more of the wilderness can be protected with a proactive management stance. Moreover, a proactive approach adheres to one of several proposed principles of wilderness management—nondegrada-tion—the objective of which is "to prevent degradation of current naturalness and solitude in each wilderness ... rather than letting all areas ... deteriorate to a minimum standard" (Hendee, et al. 1990, p. 183).



Most of the resources allocated to wilderness recreation management are focused on heavily used places in wilderness. Photo by David N. Cole.

Further, I suggest that to be proactive, resources should be allocated primarily on the basis of three criteria—preciousness, vulnerability, and responsiveness to management. In short, we should allocate more resources to those places in wilderness that are most precious, most vulnerable to degradation, and most likely to respond positively to "good" management. When resources are scarce, fewer resources should be allocated to places that are less precious, less likely to degrade further, and less likely to respond positively to good management.

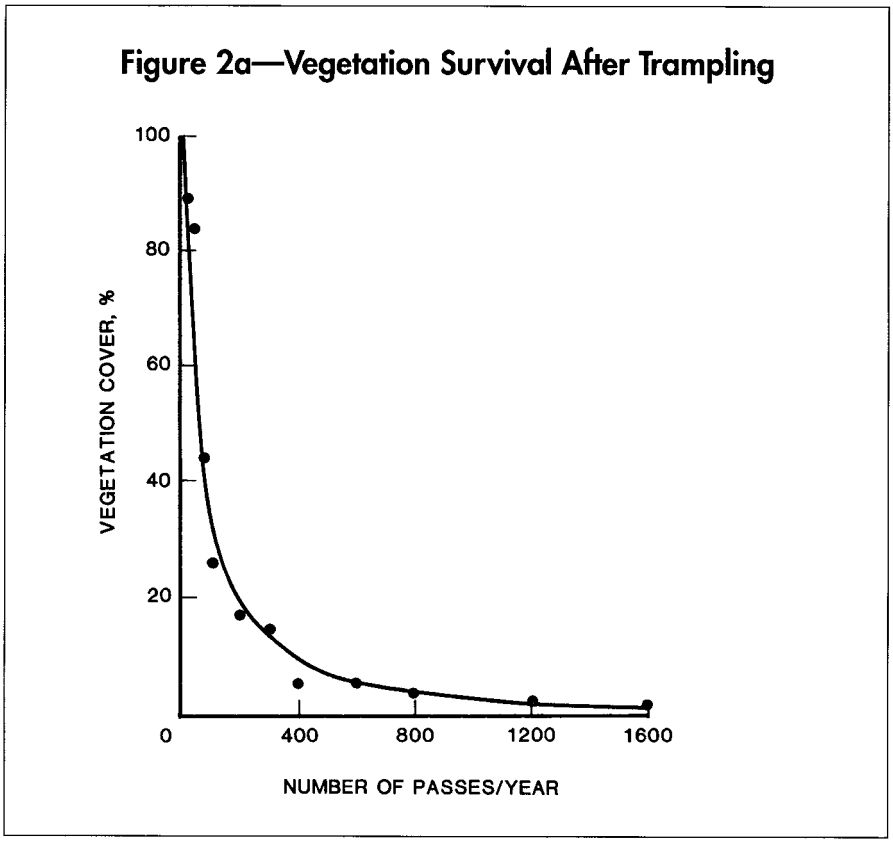
Preciousness

Which wildernesses and places within wilderness meet these criteria? Preciousness is a subjective quality that could legitimately be evaluated in many ways. Nevertheless, I argue that in wilderness, the most precious places are those that are closest to the wilderness ideal, as expressed in The Wilderness Act of 1964, and those that offer the most contrast with other recreational landscapes. On both of these bases, the most precious wildernesses and locations within wilderness are those that are most undisturbed and undeveloped. These places approach the ideal of being "untrammeled by man." They are among the last places that differ dramatically from the highly modified landscapes that cover most of the United States. In contrast, trailed areas, heavily used wilderness destinations, and heavily used wildernesses are much less unique.

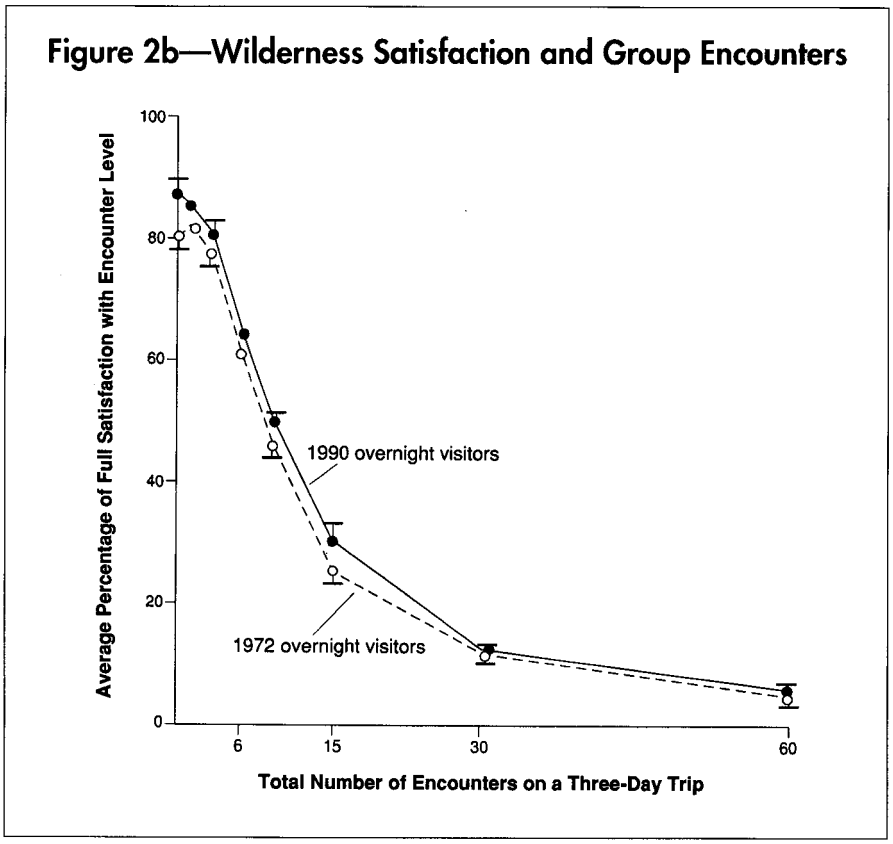
Frequent encounters, abundant impact, and facilities, such as trails, make these places more similar to developed, wildland recreation areas such as state parks. While highly valuable—particularly in terms of the quantity of recreation benefits they provide—these places are much further from the wilderness ideal.

Vulnerability

Scientific research can assist in identifying those wildernesses most vulnerable to further degradation. Numerous studies of ecological impact show that most impacts occur rapidly and that even light use causes near-maximum levels of impact (see Figures 2a and 2b; Marion and Cole 1996). The clear implication is that recreation sites that have been used for a long time or that are heavily used are not likely to experience further deterioration. This prediction has been verified in trend studies (Cole and Hall 1992). In contrast, places that have not been visited before or places that are lightly used are highly vulnerable to deterioration. Even slight increases in use of these places can result in substantial increases in impact.



The relationship between amount of use and both ecological and social impact is curvilinear. Data show (a) surviving vegetation after various trampling levels and (b) reported satisfaction in relation to number of other groups encountered on a three-day trip, overnight visitors to Desolation Wilderness, 1972 and 1990. Bars indicate 1 standard error.



Research on the relationship between number of encounters and the quality of visitor experiences suggests a similar principle. Lightly used wildernesses and wilderness locations are also probably more vulnerable to degradation of experience quality than heavily used wildernesses and locations. Interpretations are less clear-cut, however, due to various theoretical and methodological problems (Manning 1986). The data in Figure 2b are from a question overnight visitors to Desolation Wilderness were asked in 1972 and 1990 about how they would feel if they encountered various numbers of average-size backpacking groups on a three-day trip. Both in 1972 and in 1990, the reduction in satisfaction caused by an incremental increase in number of encounters is greatest between 3 and 15 groups (between 1 and 5 encounters per day). The reduction in satisfaction resulting from meeting 10 groups per day instead of 5 is minor in comparison. This makes intuitive sense. Isn't the difference between a day in which no other groups are encountered and a day in which 3 other groups are encountered much greater than the difference between a 7-encounter day and a 10-encounter day? The implication is that slight increases in use and encounter rates are most likely to cause a meaningful loss of solitude in lightly used places.

Responsiveness to Management

Which places are most likely to deteriorate dramatically if neglected by management or not to deteriorate or even improve if given management attention? Again, I conclude that the less-used wildernesses and places within wilderness should be most responsive to management. This follows largely from the implications of the research discussed under the vulnerability criterion. In a lightly used place, subtle increases in use or shifting use patterns often occur without detection by management. The result is a loss of solitude where outstanding opportunities existed before, disturbance of animal populations that had been undisturbed, creation of user trails in trail-less areas, and proliferating evidence of hu-

man use (e.g., campsites, litter). All of this could be avoided with a modest level of management activity—monitoring of use and impact and implementation of a few restrictions where needed. In lightly used places, relatively minor decreases in use intensity or per capita impact can have substantial positive effects.

In contrast, what has been accomplished by the substantial management attention given to the heavily used places in wilderness? Most of these places still do not offer outstanding opportunities for solitude; recreation impacts are evident wherever visitors go; and animal populations have either disappeared or become habituated to human presence. The sad fact is that it is impossible—aside from virtually closing these places to all recreation use—for management to make substantial progress in moving these places toward the wilderness ideal. While we clearly need to manage heavily used places to keep them from getting worse (and this management will require substantial investments), both the opportunities for meaningful improvement in conditions as a result of active management and the likelihood of substantial further deterioration in the absence of active management are relatively meager here.

Short of enacting draconian measures, high-use places are simply not very responsive to management. Given meager management resources and substantial management needs, shouldn't most available resources be allocated to places where they are likely to have substantial positive effects?

Conclusions and Suggestions

My fundamental conclusion is that current priorities in allocating recreation management resources are misplaced. The places most in need of management attention are the wildernesses and places within wilderness that currently receive the least attention. Current priorities reflect a reactive management stance. The places that have already been highly degraded are the places that receive most resources, while less disturbed places get very little attention. If we want to protect the most precious and vulnerable wilderness places—if we are serious about the principle of nondegradation—then we must change these priorities. We must allocate a much larger proportion of available resources to lightly used wildernesses and to lightly used places within wilderness.

I am not advocating a complete reversal of priorities. Highly used wildernesses are precious because they provide benefits to many visitors. Substantial resources must be devoted to maintaining these places in as wild a state as possible, to seeking to reduce conflict between recreationists, and to providing visitors with information—both to protect the wilderness environment and to enhance visitor experiences. What I am advocating is the elevation of acreage and vulnerability as criteria in allocating resources and a de-emphasis of current use levels. This would shift some resources to lightly used wildernesses and places within wilderness where resources are sorely needed.

What should be done with increased resources in these lightly used wildernesses? Three activities are clearly needed. First, it must be decided whether or not the principle of nondegradation is to be adhered to. If this principle is to guide management, plans will need to be developed for lightly used wildernesses or portions of wildernesses that stress maintaining the outstanding opportunities for solitude and low levels of impact that currently exist there. This can be accomplished by developing standards that tolerate no further loss of solitude or increase in ecological impact. Some proponents of strict adherence to the concept of nondegradation fail to understand its implications. There is little evidence that we can substantially reduce the per capita impact of wilderness visitors. Therefore, to allow no further degradation, use limits are virtually a necessity as use levels continue to rise. If some further degradation is to be tolerated, limits of acceptable change (Stankey et al. 1985) that limit the extent of further deterioration should be defined.

A second activity is condition monitoring in lightly used places. Monitoring of trails, campsites, encounter rates, and use levels are most common in the more heavily used wildernesses. Moreover, within individual wildernesses, the best data are available for the most heavily used places. More lightly used places must also be covered by monitoring programs if they are to be protected.

Finally, there may be more need for use restrictions in lightly used places than elsewhere. This is precisely the reverse of the most common situation, in which use limits and other restrictions are implemented first in the places where use is greatest and impacts are most profound. As noted before, however, even dramatic changes in amount of use may have relatively little positive effect in high-use places. In a study of six high-use wilderness destinations, Cole, et al. (1997) conclude that the benefit-cost ratio of limiting use declines as amount of use increases. On summer weekends at Snow Lake (Alpine Lakes Wilderness, Washington), for example, other visitor groups are encountered every three minutes on average. Even a 50% reduction in use would not provide a meaningful increase in solitude; other groups would still be encountered every six minutes. Environmental impact levels would also not be likely to decline meaningfully.

Contrast this with the effect of a 50% use reduction in a wilderness where trails and campsites are just beginning to appear and groups typically encounter one other group per day. This reduction might

Recreation use inevitably degrades natural conditions intended for preservation and can also degrade the quality of the wilderness experience.

lower trampling levels to the point where long-term impact does not occur. It might permit recovery of impacts that are just developing, because resilience is still high during the early stages of the impact process (Willard and Marr 1971). Finally, it should greatly increase the frequency of days in which no other visitors are encountered. The need for visitor education may be more significant in lightly used places. Low-impact materials stress the "special responsibility" (Hampton and Cole 1995, p. 15) that must be accepted to visit off-trail areas. The need for behavioral restrictions (e.g., length of stay limits) and prohibitions on particular types of use (e.g., pack stock or large groups) are also greater in more lightly used places.

In conclusion, most wilderness recreation management resources are allocated to heavily used places. These are also the places that are most likely to limit use and have restrictive management programs. This prioritization of resources reflects a reactive management stance in which it is implicitly assumed that most attention should be given to fixing the most obvious problems. It would be wiser, I believe, to adopt a proactive stance and to shift these priorities dramatically. This shift in priorities should involve reallocation of a substantial proportion of funds to those wildernesses and portions of wildernesses that are most precious, most vulnerable to degradation, and most responsive to management—those that are relatively lightly used. These resources should be used to establish standards for conditions, to monitor conditions, and to implement use restrictions where they are needed to meet standards. Management programs should be established that will protect the vast majority of wilderness that still approximates the wilderness ideal before attempting to restore conditions in those relatively few wilderness locations where conditions are far from this ideal. **IJW**

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NATIONAL SURVEY HIGHLIGHTS AGENCY TRAINING NEEDS IN THE UNITED STATES

BY RICHARD CONRAD

Abstract: What education and training do wilderness managers need to meet current and future challenges? This is the question the Interagency Arthur Carhart National Wilderness Training Center (IACNWTC) examined by surveying the four federal agencies that manage the National Wilderness Preservation System (NWPS) in the United States. The major finding was that while there are many similarities in management issues, internal training needs, and external educational outreach, there are also some differences. These differences will require specialized training targeted to satisfy unique situations.

SINCE PASSAGE OF THE WILDERNESS ACT in 1964, the NWPS in the United States has grown from approximately 9 million acres to over 103 million acres. With this growth has come a corresponding increase in the challenges involved in managing these irreplaceable wildlands. In order to assist wilderness managers in meeting these challenges the IACNWTC conducted a Wilderness Education and Training Needs Assessment Survey.

Two Goals

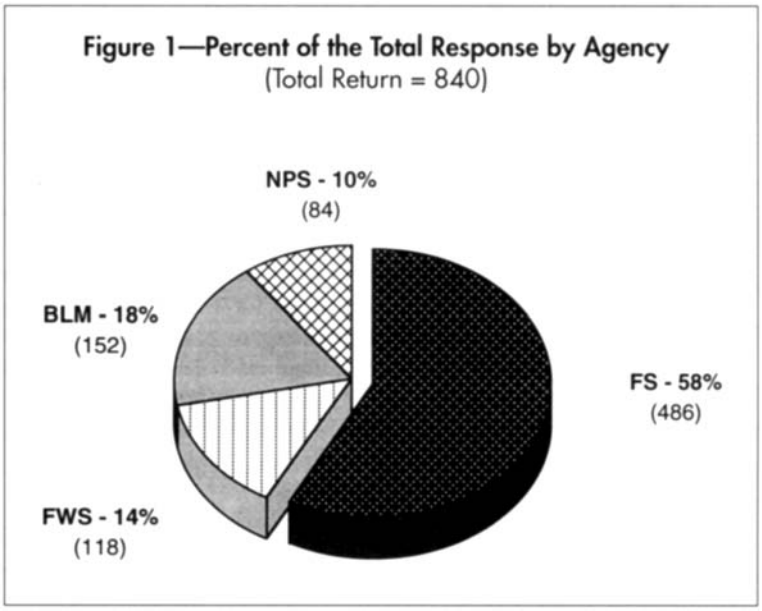
First, identify the issues that confront wilderness managers in the four federal wilderness managing agencies—Forest Service (FS), Fish and Wildlife Service (FWS), Bureau of Land Management (BLM), and National Park Service (NPS). Second, identify the education and training needed to prepare managers and staffs to successfully respond to these wilderness issues.

Needs Assessment Survey

Early in 1996 a total of 1,704 Wilderness Education and Training Needs Assessment surveys were sent to the 893 offices of the four agencies that manage wilderness or wilderness study areas. Two surveys were mailed to each office—one to the manager and one to the staff person most responsible for wilderness management.

Response: Eight hundred forty surveys were returned, from 575 (64%) of the 893 offices surveyed (see Figure 1). The survey results included more responses from the FS than from the three other agencies combined. This is simply due to the fact that there are more wilderness units and personnel in the FS than in the other agencies.

Current Issues: Each response was first categorized into a broad general category and then into a more specific category. Recreation (including specific issues such as overuse, trails, outfitters,



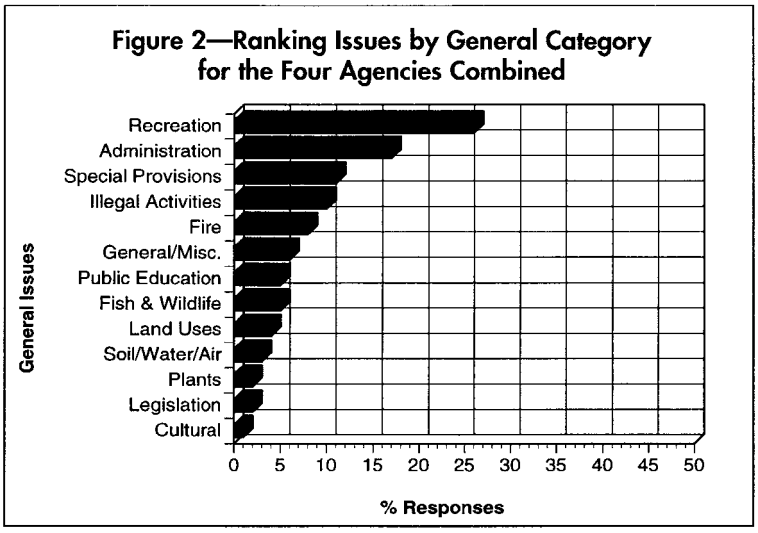


Table 1: Issues by General Category

	All Agencies (%)	FS (%)	FWS (%)	BLM (%)	NPS (%)
Recreation	26	33	17	8	30
Administration	17	16	10	22	21
Special Provisions	11	9	12	16	13
Illegal Activities	10	8	10	19	4
Fire	8	10	9	3	4
General/Misc.	6	5	5	5	10
Public Education	5	6	5	5	3
Fish and Wildlife	5	4	10	2	2
Land Uses	4	3	5	7	3
Soil/Water/Air	3	2	10	1	4
Plants	2	2	5	1	2
Legislation	2	1	1	7	3
Cultural	1	1	0	1	2

Table 2: Top Ten Specific Issues

	All Agencies (%)	FS (%)	FWS (%)	BLM (%)	NPS (%)
Recreational Overuse	31	42	22	9	21
Illegal Vehicle Use	15	12	11	35	5
Prescribed Natural Fire	15	20	15	3	11
Funding/ Staffing Shortage	14	20	6	8	6
Grazing Impacts	12	11	1	24	10
Trail Construction/ Maintenance	10	15	1	1	12
Plan Preparation/ Implementation	9	9	5	4	26
Outfitters Administration	9	14	4	1	0
Public Education/ Wilderness Values	7	9	7	7	2
Adjacent Land Uses	7	7	12	8	4

pack stock, human waste, etc.) was the number-one general issue for the four agencies combined (see Figure 2). When the four agencies were examined separately, recreation was the number-one general issue for all the agencies except the BLM, whose number-one general issue was administration (see Table 1).

The number-one specific issue for the four agencies combined was Recreation Overuse (see Figure 3). When examined separately, Recreation Overuse was the number-one issue for the FS and FWS. Illegal Vehicle Use was number-one for the BLM. Planning was the number-one issue for the NPS, followed closely by Overuse (see Table 2).

Anticipated Issues: Forty-two percent of the respondents anticipated a change in issues over the next five years (see Figure 4). Recreation Overuse was anticipated to be the number-one new issue over the next five years for the four agencies combined.

Training Needs: The number-one training need for the four agencies combined was Plan Preparation/Implementation, followed by Leave No Trace/Wilderness Ethic, and Public Education/Wilderness Values (see Figure 5). When examined individually, Plan Preparation/Implementation was identified by the BLM and NPS as being the number-one training need. The FS ranked Leave No Trace/Wilderness Ethic highest while Agency Policy and Regulations training was most important to the FWS (see Table 3).

Internal Audience: For the four agencies combined, managers were identified as the number-one internal audience that would benefit most from training, followed by nonwilderness staff, wilderness staff, and receptionists.

Delivery Method: Videos, courses taught locally, and three-ring binders, in that order, were the preferred delivery methods for the four agencies combined.

Educational Public Outreach: The wilderness education materials and programs

Figure 3—Ranking of Specific Issues for the Four Agencies Combined

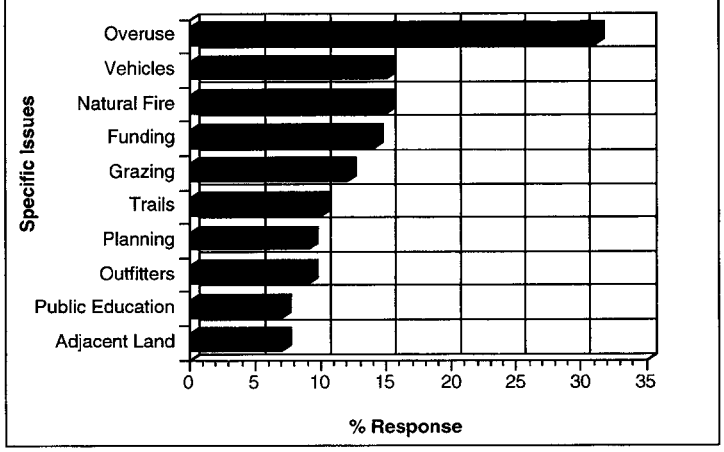


Figure 4—Ranking of Specific Issues Anticipated in the Next Five Years for the Four Agencies Combined

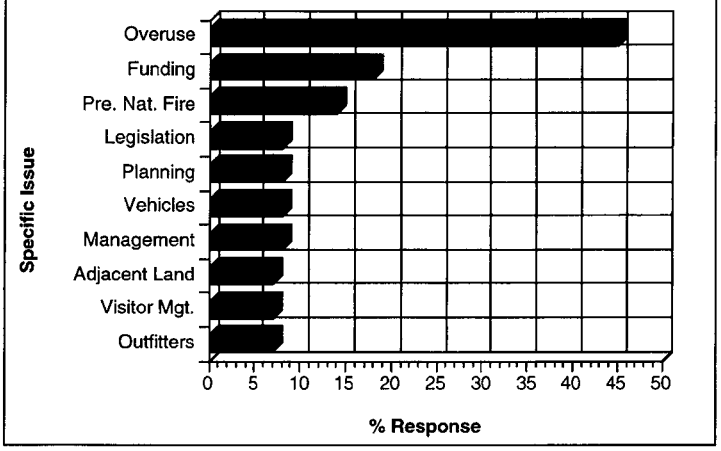


Table 3: Top Ten Specific Information and Training Needs

	All Agencies (%)	FS (%)	FWS (%)	BLM (%)	NPS (%)
Plan Preparation/ Implementation	18	16	12	21	30
Leave No Trace/ Wilderness Ethic	18	21	4	15	16
Public Education/ Wilderness Values	18	21	13	8	17
Wilderness Management	14	12	20	19	12
Recreational Overuse	12	14	12	7	10
Prescribed Natural Fire	11	14	7	4	5
Restoration of Impacted Sites	8	9	9	9	2
Wilderness Training	8	8	14	3	11
Monitoring	7	4	4	12	9
Agency Policy and Regulations	6	3	23	6	7

Table 4: Audiences That Would Benefit Most from Wilderness Education Outreach

	All Agencies (%)	FS (%)	FWS (%)	BLM (%)	NPS (%)
General Public	14	12	21	12	17
Hunters/Fishers	10	10	15	10	3
Organizations	9	12	4	7	10
Schools	9	11	9	8	6
Outfitters	9	11	8	7	3
Day Users	9	10	9	5	11
Adjacent Land Owners	7	4	12	12	11
Rural Residents	7	5	7	12	9
Stock Users	6	9	1	3	4
Urban Residents	5	6	3	4	6
Special Provision Users	5	3	3	16	4
Backpackers	4	5	1	2	11

most needed to reach the public for the four agencies combined was Public Education/Wilderness Values followed by Leave No Trace/Wilderness Ethic.

External Audiences: For the four agencies combined, the number-one external audience that would benefit most from wilderness education was the General Public, followed by Hunters/Fishers. While each agency, except for the BLM, identified General Public as number-one, there was considerable difference in the ranking of the other audiences. BLM identified Special Provisions Users as their number-one audience (see Table 4).

Implications

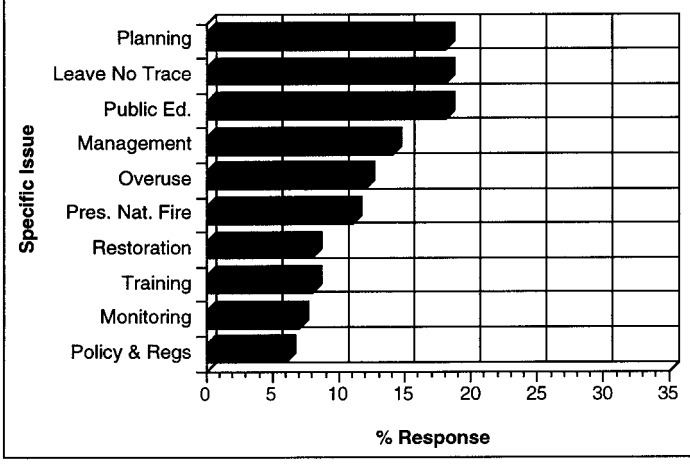
International: Individual wilderness areas in the United States are unique, and each federal wilderness management agency has a different overall mission. There are still, however, many shared similarities in issues and training needs. This may also be evident on an international level. Other countries, which have very different protected area systems and management entities, may also have similar issues and training needs common to all and shared universally.

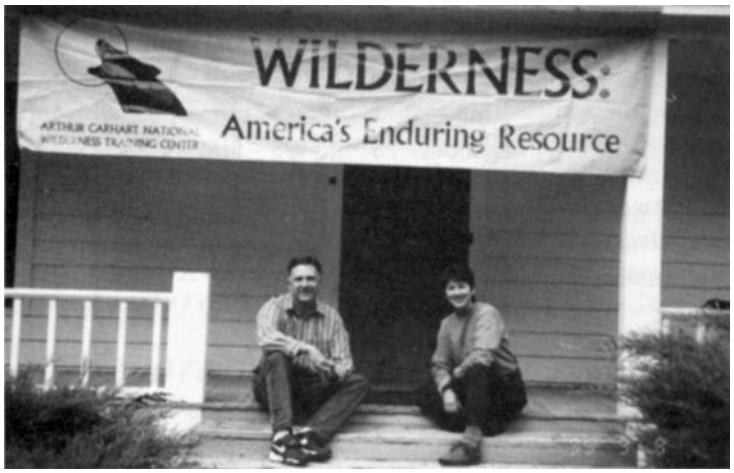
U.S. National Wilderness Preservation System: The similarities in the survey results from the different agencies clearly support the concept of "one" NWPS—not four different systems—each managed by a different agency with different issues and training needs. Responses pointed out the need for consistent application of wilderness principles, concepts, and regulations among the four agencies in order to solve similar issues. One of the best ways to achieve this consistent approach is through interagency training.

Providing educational materials/programs and training is a challenge due to the differences between agencies. As an example, the response to "audiences that would benefit most from wilderness education outreach" shows some very unique differences between agencies. Hunters are not a priority audience for the NPS since national parks usually do not allow hunting, but they are very important to the FWS in management of their refuges. Backpackers are very important to the NPS, but of little importance to the FWS as most of their refuges are for day-use only. Special Provision Users and Rural Residents are very important to the BLM because they are prominent users of the public lands on a consistent daily basis. Outfitters and Stock Users are important to the USFS because in certain regions they represent one of the dominant uses in their wilderness areas.

To address these differences and to address localized situations, education and training needs should be considered by region or by state. This would help address the unique needs and specialized situations of Alaska versus the continental United States, the eastern versus the western United States, the arid desert Southwest versus the Pacific Northwest, etc. However, this will still not address all of the differences and peculiarities among agencies and individual wilderness areas. Equal interest and participation from all the agencies or wilderness

Figure 5—Ranking of Specific Training Needs for the Four Agencies Combined





Arthur Carhart National Wilderness Training Center director Connie Myers and article author Richard Conrad.

managers in the education and training provided cannot be expected.

Perceived Issues: Thirty-one percent of the respondents feel that Overuse is now a problem, and another 45% think it will be a problem in the future. That means we can expect Overuse to be an issue for 76% of our wilderness areas in the next five years. The BLM was the only agency that did not have Recreation and Overuse as a current high-priority issue. However, the BLM anticipates that Overuse will be the number-one issue in the future. Many BLM areas have not yet been discovered by the public to the degree parks, refuges, and national forests have been. As more BLM areas are designated wilderness they will become better known and experience increased use.

The obvious implication is that those areas that are now being overused must be dealt with to prevent further degradation. In addition, the un-crowded areas and newly designated areas must be planned for before they start receiving increased use. Wilderness managers need information and training on how to manage increasing use and how to reduce crowded conditions and the impacts they cause.

Information and Training Needs: Planning, Leave No Trace, and Public Education were identified as the top training needs. To address those issues the respondents felt they needed training on how to: (1) develop good management plans that provide clear wilderness management objectives and direction for the protection and management of wilderness areas; (2) develop a minimum impact land-use ethic that managers can use to reduce impacts from increasing use, such as the Leave No Trace program; and (3) educate the public about this land-use ethic and about wilderness values, principles, and management.

Internal Audiences: The only agency that did not identify Managers as the number-one internal audience that would benefit most from wilderness information and training was the USFS. This may be a result of more USFS managers having received wilderness training than those in other agencies. An emphasis should be placed on training the decision makers from the other three agencies.

There also needs to be a concurrent focus on training wilderness staff and other multidisciplinary staff (e.g., fire, wildlife, and range staffs). Front line field-going personnel, both permanent and seasonal, need to be well trained. These folks are critical to the success or failure achieved in addressing wilderness management issues. They are normally the first to come in contact with wilderness visitors and the first (and sometimes the only ones) to deal firsthand with the many complex issues that arise.

Delivery Method: Traditional methods such as videos, courses taught locally, and three-ring binders were the most popular delivery methods. Obviously, high technology methods utilizing interactive satellite links, the internet, CD-ROM, and other computer-delivered methods have not been fully embraced by the respondents. Correspondence courses are not fully utilized either. These alternative delivery methods are perceived to have limitations (e.g., the ability to interact with others face-to-face) when compared to the more traditionally taught courses. However, these alternative delivery methods can provide less expensive avenues to reach large numbers of trainees and may, out of necessity, replace the more traditional methods.

Public Outreach: Responses indicate that wilderness awareness, an appreciation of wilderness values, and a wilderness use ethic seem to be missing in large segments of our society. Respondents felt that a wide variety of user groups do not understand wilderness or how to properly use it with minimum impact. These are basic entry-level, foundation-forming concepts. They point out that we have a long way to go in public wilderness education.

Conclusion

In order to meet current and future wilderness management challenges, a significant investment must be made in our wilderness managers and staffs. They must be instilled with enthusiasm by preparing them with the very best knowledge, skills, information, education materials, and training that is available. The IACNWTC is currently processing the responses from the "Needs Assessment" survey in order to plan and prepare future training courses and workshops. **IJW**

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The Interagency Arthur Carhart National Wilderness Training Center

Location: Historic Ninemile Ranger Station near Huson, Montana.

Mission: "Foster interagency excellence in wilderness stewardship by cultivating knowledgeable, skilled, and capable wilderness managers and by improving public understanding of wilderness philosophy, values, and processes."

Staff: Interagency team of training specialists from the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and U.S. National Park Service.

worldwide website:
www. wi lderness. net/carhart

HENRY DAVID THOREAU

A Lecture and a Wilderness Legacy

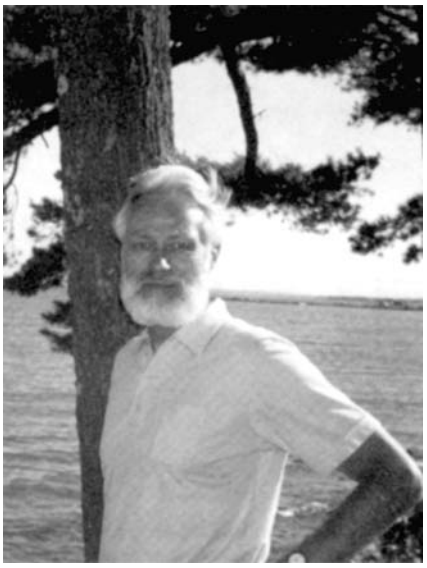
BY CHARLES O. MORTENSEN

BY 1850 THE POPULATION OF THE UNITED STATES had reached 23 million, and in the Northeast a once verdant landscape had been radically transformed. The forest had given way to farms, expansive meadows, cities, and towns. Many wildlife species were either not compatible with the new cultural landscape or had their habitat severely restricted with a concomitant lowering of numbers. In mid-century New England, with the exception of Maine, the bear, moose, deer, wolf, cougar, lynx, wolverine, and other fauna were largely absent from what were once viable populations. Thus the stage was set for a remarkable individual, who for more than a decade had been critically thinking, writing, and lecturing on the diminution of "nature" in his beloved landscape.

From a historian's hindsight it appears to be all but inevitable that in April 1851 Henry David Thoreau, then 34 years old, a Harvard University graduate, a published poet and essayist, and a somewhat failed book author, would stride to the lecture podium of the Concord Lyceum and begin with an "idea" that eventually would be heard and valued throughout the world. "I wish to speak a word for Nature, for absolute freedom and wildness, as contrasted with a freedom and culture merely—to regard man as an inhabitant, or a part and parcel of Nature, rather than a member of society. I wish to make an extreme statement, if so I may make an emphatic one, for there are enough champions of civilization. ..." (Anderson 1973 and subsequent lecture/essay quotes).

This lecture titled "The Wild," which was later published posthumously as an essay entitled "Walking" by the *Atlantic Monthly* (1862) is, perhaps, the beginning point or foundation of our recent intellectual thoughts about wilderness. That is, wilderness has inherent value for its best expression of the vitality and continuity of natural systems and a mythical/spiritual entity to be personally and collectively valued outside of its physical extractive resource values. As Oelschlaeger (1991) elucidates in *The Idea of Wilderness*, humans have expressed variants of this theme from Paleolithic time forward. Thoreau, however, was setting his sails against the prevailing modernist philosophy of nature, as having value primarily to the extent that it could be transformed into an industrialized society. Russell Train, in an article titled "To Conserve and To Create," cites Benjamin Franklin biographer Catherine Bowen's description of the landscape he viewed, on a journey up the Hudson River in 1754, as an example of then current attitudes. "Westward stretched the forest, endless, primeval, reaching on and on. No one in the sloop would have ventured to call the forest beautiful. Rather it was solemn, interminable, barbaric, harsh; one meets the adjectives often. Trees were man's enemy and must be felled." (Train 1976).

Now in 1851, Thoreau was attacking that seemingly universal view in a public gathering. He was quite literally "standing for nature." His counterpoints continue to move to the theme of walking or sauntering in the natural landscape. For it is one way, if not the most important way, man can learn from and draw "sustenance" from wild areas. Thoreau extols these physical/psychic values when he states, "I think that I cannot preserve my health and spirits, unless I spend four hours a day at least... sauntering through the woods ... absolutely free from all worldly engagements." However, in typical Thoreau fashion, he adds, "Of course, it is of no use to direct our steps to the woods, if they do not carry us thither."



Article author Charles O. Mortensen.

Wisker Lake Wilderness Area, Nicolet National Forest, Wisconsin. Photo by Charles O. Mortensen.

(Peer Reviewed)

Porcupine Lake Wilderness Area, Chequamegon National Forest, Wisconsin. Photo by Charles O. Mortensen.

"I think that I cannot preserve my health and spirits, unless I spend four hours a day at least ... sauntering through the woods ... absolutely free from all worldly engagements."

—Henry David Thoreau

Thoreau goes on to ask rhetorically, which is the better person to deal with, one who knows nothing of a subject and knows that, or one who knows something about a subject, but thinks that he knows all? Thus, his famous mid-lecture statement, "In wildness is the preservation of the earth." One can assume that what Thoreau meant was that all learning (since in his time philosophy included natural history) was, in part, the study of nature, natural events, and so on. In that respect, then, we would place collective self-interest below protection of a physi-cal/biotic wholeness for portions of the Earth, for in doing so we not only pass on an inheritance for which we do not yet know all the uses to the world, but the continuing opportunity for the unborn to draw emotional aesthetic, spiritual, and other values, each interpreted in their own way. Additionally, as Roderick Nash (1990) states, much of classic wilderness is unknown, and the unknown is a primary stimulant for discovery, perhaps again what Thoreau may have meant in his "In wildness is the preservation" statement.

As an example of its far-reaching effect and foundation for contemporary thought, Thoreau's theme, stating how wilderness has given rise and nourishment to civilization, was alluded to a century later when ecologist Aldo Leopold (1949) stated, "Wilderness is the raw material out of which man has hammered the artifact called civilization." Leopold's comment that "wilderness is a resource which can shrink but not grow" and "... the creation of a new wilderness in the full sense of the world is impossible" is closely related to Thoreau's much-quoted journal entry a few years after his lecture: "1 take infinite pains to know all the phenomena of spring for instance, thinking that I have here the entire poem, and then to my chagrin, I hear that it is but an imperfect copy that 1 possess and have read, that my ancestors have torn out many of the first leaves and grandest passages ..." (Thoreau 1984b).

Finally, in the lecture's closing he states: "So we saunter toward the Holy Land, till one day the sun shall shine more bright than he ever has done, shall per chance shine into our hearts, and light up our whole lives with great awakening light, as warm and serene and golden as a bank side in autumn."

So, in the richness of Thoreau's metaphor is wilderness to be equated with the Holy Land, as in seek and you shall find, or as a replacement for organized formal religion (Dreiser 1958)? Or did he equate wilderness to the Holy Land's religious context of enlightenment and thus a provisioner for an enlightened attitude toward nature? We will never know, of course, but this "depth" is what makes his writing so brilliant, stimulating, and lasting.

Foundation of a Wilderness Advocacy

What were the life experiences that led Thoreau to the wilderness philosophy he stated so eloquently in 1851? Thoreau's background was exceedingly rich; he had access to nature surrounding Concord, a university education concentrating on classical literature including such works as Homer's *Iliad* and Pliny's *Natural History*, and he exhibited a dedicated and driven self-study by a powerful and accomplished mind. He read extensively, if not voraciously, on natural history and Indians, recording nearly 3,000 pages of notes between 1847 and 1861. Undoubtedly though, it was his 1846 Maine excursion that would have a most singular and profound affect on his developing wilderness advocacy or philosophy.

He left Concord on the last day of August so as to avoid the worst of summer insects and with the goal of ascending Katahdin, which would be in wildness and beyond the reach of logging. He reported that in 1837 alone, 250 mills on the Penobscot River and its tributaries above Bangor sawed 200 million board feet. In the opening pages of The Maine Woods, which was published posthumously in 1864, Thoreau points out the immediacy of his need to get to and observe the deep forest that was beyond the present altered landscape where "The mission of men there seem to be, like so many busy demons, to drive the forest all out of the country, from every solitary beaver swamp and mountainside, as soon as possible" (Thoreau 1985; also the remaining Maine quotations). Traveling by bateau (canoelike boat), the party navigated rivers and lakes to reach a camping area along a stream emanating from Mt. Katahdin, a dozen miles away.

> "There stood Ktaadn [Katahdin] with distinct and cloudless outline in the moonlight, and the rippling of the

> rapids was the only sound to break the stillness. Standing on the shore, I once more cast line into the stream, and found the dream to be real and the fable true. The speckled trout and silvery roach, like flying fish, sped swiftly through the moonlight air

That morning the long ascent to the summit began by pushing up the Aboljacknagesic stream leaving the bateau tied to a tree. Moving to the stream's north side, they passed through "burnt" lands partially overgrown with young aspen. Soon the party was on a ridge with a view of the peak, which surprised Thoreau with the amount of naked rock unlike any mountain he had previously seen. Shortly, they were required to take a compass bearing and plunge into the woods or as Thoreau put it, "We were soon buried in the woods." By noon a member of the party climbed a tree to view the summit, and they were relieved "when it appeared that we had not swerved from a right line, the compass down below still ranging with his arm."

By four o'clock the weary party decided to camp, and Thoreau with what little daylight was left attempted to climb the mountain alone. Working his way up a water-filled ravine covered with impenetrable thickets of scraggly birches and spruce, he soon cleared the larger trees and could look back over the falling water still far from its headwaters. As he continued the arduous task of moving upward, he hit the krumholtz "scrambling on all fours over the tops of ancient black spruce trees (Abies nigra), old as the flood, from ten or twelve feet in height. ..." He continued on or, as he stated, "slumped, scrambled, rolled, bounced and walked" until he hit only rock, and the words now are less exalting, but penetrating with realism: "... rocks, gray, silent rocks, were the flocks and herds that pastured, chewing a rocky cud at sunset. They looked at me with hard gray eyes, without a bleat or low." With time running out and the ascent uncompleted, he returned to his companions.

The next morning the party made an effort to reach the summit, but soon Thoreau left his companions behind as he climbed alone over the rocks. The peak was now concealed by mist, and his thoughts moved to realities at his feet: "The mountain seemed a vast aggregation of loose rocks ... the raw materials of a planet dropped from an unseen quarry which the vast chemistry of nature would anon work up, or work down, into the smiling and verdant plains and valleys of earth." Now the juxtaposition of the mile-high Katahdin, the most abrupt granite mountain in New England, to the gentle ridges and valleys of eastern Massachusetts, was exacting an unforeseen toll: "It was vast, Titanic, and such as man never inhabits ... . He is more alone than you can imagine .... Nature has got him at disadvantage, caught him alone, and pilfers him of some of his divine faculty .... I have never made this soil for thy feet, this air for thy breathing, these rocks for thy neighbors."

Thoreau thought about the fact that Indians rarely went to the summits of mountains because they are sacred and mysterious tracts are never visited. "Pomola is always angry with those who climb to the summit of Ktaadn." Interestingly, Indians on the West Coast. 3,000 miles away had a similar sentiment. In 1870 Sluiskin, a Yakima hunter, had guided the first successfully documented climbers to reach the peak to the base of Mt. Rainier and warned them not to go further:"... should you escape these perils and reach the great snowy dome, then a bitterly cold and furious tempest will sweep you off into space like a withered leaf ..." (National Park Service 1978).

Thoreau definitely was awed by starkness of granite outcrops, the vast and dark nature of the coniferous forest. He described the Maine wilderness as primeval, vast, titanic, but also the freedom it portended is precisely why he valued it so, and stated: "Here prevail no forest laws, but those of nature," and "It was the fresh and natural surface of planet Earth, as it was made forever and ever." It was also the most formidable landscape he would ever experience and he knew it immediately: "What is this Titan that has possession of me? Talk of mysteries! Think of our life in nature—daily to be shown matter, to come in contact with it—rocks, trees, wind on our cheeks! The solid earth! The actual/world! The common sense! Contact! Contact! Who are we? Where are we?"

Now wilderness, like all mountaineers know, was bipolar. Gone was the sweet pine-scented air surrounding Concord to be replaced by high-altitude harsh wind on the cheeks. Yet the wild landscape had the liberating effect of new knowledge—the Earth held a vastness previously unknown to him. Perhaps for Thoreau this liberation and the accompanying intellectual freedom to view nature in a totally new context was one of the germinating seeds that later produced his lecture statement "In wildness is the preservation of the earth."

Knowing that clouds could conceal the peak until days end, if not for days,

Rainbow Lake Wilderness Area. Chequamegon National Forest, Wisconsin. Photo by Charles O. Mortensen

and that his companions would be anxious to return to their river camp spot, Thoreau was compelled to descend the mountain without reaching the summit. As he came down, the wind would provide an opening in the mist"... through which I could see the country eastward, boundless forests, and lakes, and streams, gleaming in the sun .... Now and then some small bird of the sparrow family would flit away before me ... ." A vista of mountains, which for the most part had names known only to the Indians, Lake Millinochet with its hundred islands, and 100 without names. He recalled that a previous visitor to this elevation had compared it to "a mirror broken into a thousand fragments and wildly scattered over the grass, reflecting the full blaze of the sun."

With reference to this biome, Thoreau 's wild, then, is as encompassing of the total environment as ours is today, mountaintop to valley floor. It is the total organic wholeness that is paramount, as he states in his wild lecture five years after this 1846 experience: "I enter a swamp as a sacred place, a sanctum sanctorum. There is the strength, the marrow, of Nature." His last trip to Maine in 1857 was a voyage on the Allegash and East Branch of the Penobscot Rivers documenting details of river travel, camping, watershed vegetation, and wildlife.

Thoreau went on to state that wilderness sounds give voice to its wildness. Sigurd Olson, a key figure in the movement for U.S. and world wilderness preservation, echoed those thoughts in his inspirational book The Singing Wilderness: "We sat around until long after dark and listened, but instead of becoming quiet as the moon went high, the calling increased and there again was the wild harmony, the music that comes only once a year, when it is spring on Lac la Croix" (Olson 1970).

A Life That Will Never End

When Thoreau died of tuberculosis nearing the end of his 44th year in 1862, his last spoken words were "moose" and "Indian." No one will know why this was his last intelligible communication to those around him, but he wrote often of both as symbols for the last vestige of wilderness in his native New England. Thus, the survival of each, was partial insurance that wilderness would survive.

It is the lot of those who exhibit true genius that death does not dim their brilliance. And so it has been with Thoreau and his unyielding and passionate advocacy for nature and wilderness. When the axe rippled through the forests surrounding Concord during the same year of his wild lecture, Thoreau noted in his journal that he wanted the town bell to sound a knell for a fallen pine that had lived two centuries as it did to honor those individuals who had lived and died in the village (Thoreau 1984a), and in another context he would exclaim, "Thank God, they cannot cut down the clouds!" (Harding 1965).

Ralph Waldo Emerson, in the last words of Thoreau's funeral eulogy, made a comment that has met the test of time: "... wherever there is knowledge, wherever there is virtue, wherever there is beauty, he will find a home" (Harding 1965). Like others of brilliance before him and those yet to come, Thoreau made a wilderness trail, the blazes of which will never fade. For all who love wilderness, who cherish rivulet, wave, tree, rock, bird, and translucent morning light, indeed all of nature's myriad forms, he walks with us as we travel to our own Katahdin or Walden shores: "My greatest skill has been to want but little. For Joy I could embrace the earth. 1 shall delight to be buried in it. And then I think of those among [us], who will know that 1 love them, though I tell them not" (Thoreau in Channing 1966). **IJW**

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WILDERNESS MANAGEMENT TRAINING FOR LATIN AMERICAN MANAGERS

BY GEORGE WALLACE AND JIM WURZ

Participants learn backpacking, llama packing, and horse packing skills, as well as the relative impacts and advantages of each travel mode.

EACH YEAR, the Management of Wildlands and Protected Areas short course at Colorado State University trains 21 Latin America managers. An important part of this training is conducted in U.S. wilderness areas.

The field-based short course, now in its ninth year, is designed to pack a lot of experiences into a month of intense activity. The course, conducted in Spanish, is taught by Drs. George Wallace and Craig MacFarland, along with guest instructors from the USDI Bureau of Land Management, the USD A Forest Service, and the USDI National Park Service. Over the course of a month, managers are exposed to a range of protected areas, the purposes for which they are managed, and their problems and successes, with an emphasis on integrated resource management and interagency cooperation. For most, it is their first exposure to the U.S. concept of wilderness.

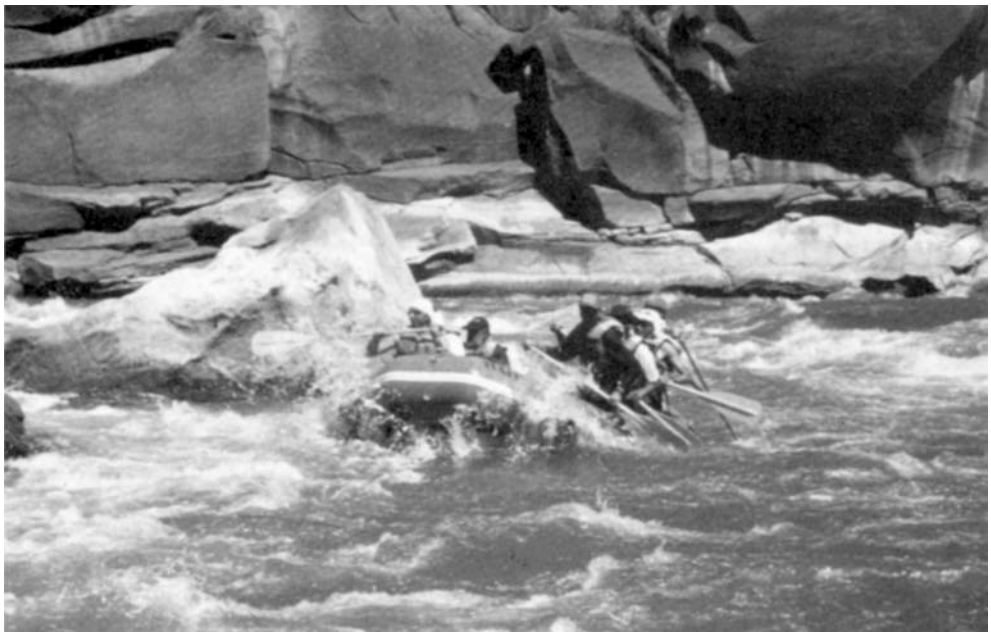
Management topics that run throughout the course include biodiversity conservation and planning at the national, ecosystem, and unit levels; wildland values; building international, national, and local constituencies; managing personnel, visitors, concessions, and nonconforming uses; integrating wildland protection with social and rural development; controlling impacts to soil, vegetation, water, and wildlife; infrastructure layout, construction, and maintenance; conflict resolution; and financing strategies.

The final field experience is a five-day wilderness trip integrating most of the concepts discussed during the preceding weeks. This is a working pack trip with daily classes in which students encounter a range of issues related to wilderness management such as zoning, visitor management, patrolling, emergency procedures, selection and maintenance of trails and user sites, resource inventory and monitoring, and personal wilderness skills and leadership.

To set the example of minimizing impacts, the class is divided into four groups that travel by different routes and camp in sites one to two miles apart. One group leads horses, another llamas, and the last two carry backpacks. Midway through the trip participants change camps so that those who entered with pack stock leave carrying backpacks and vice versa. Participants are contacted by local wilderness rangers/specialists who inspect the camps and talk about their training, equipment, responsibilities, and challenges. Participants are enthusiastic about the coordinated program of ranger patrols, monitoring, and record keeping, as well as the dedication of the forest rangers they meet.

Rapid growth in Latin America's national protected area systems means that the best and brightest natural resource professionals often have ascended quickly to positions of authority with limited field experience. Many of those skills, such as land navigation, search and rescue techniques, visitor contacts, site and resource monitoring, handling of pack stock, and field equipment use, are eagerly sought. The minimum impact practices utilized throughout the trip are also new for most Latin Americans. Many Latin American protected areas exclude visitors from backcountry both due to fear of natural resource impacts and inability to manage people in those areas.

Course field trips include lectures as well as physical activities.



The course covers management issues in wild and scenic river corridors.

The wilderness trip intends to show managers they can slowly begin to allow people to experience the unique values of wilderness and build a constituency of those who have intimately experienced the area without sacrificing resource protection. The trip also illustrates the relative advantages and disadvantages of backpacking, llama packing, and horse packing; the type of work that can be done; associated impacts; and the necessary management techniques for each. For some participants, the wilderness component of the course provides them with one of the most challenging experiences of their lives. Many leave with a sense of accomplishment, confidence, and inspiration that stays with them in their work. Course instructors know this because the past participants with whom they meet, work, or correspond in later years invariably reminisce about the wilderness trips. **IJW**

Many Latin American protected areas exclude visitors from backcountry both due to fear of natural resource impacts and inability to manage people in those areas.

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Jim Wurz is a consultant in protected areas training and management. He has been an instructor for Colorado State University's summer course for international protected area managers for the past six years.

SEPARATION ANXIETY

BY LESLIE A. KING

AS AN URBAN NORTH AMERICAN, wilderness has always meant to me the natural world—but the natural world in a very special state—untouched by humans. I sought wilderness experiences far from where I lived and worked. I joined campaigns and inspired my students to work to set aside wilderness areas and representative ecosystems that could be kept from the destruction and degradation of humans and their artifacts. Then I met a raven ....

I had lived for two years on the edge of a deep and beautiful lake in northern British Columbia. Like many lakes in this wild region, the lake was named, in the Carrier language, for fish. Fish are the reason why this lake has always been sacred and sustaining for First Nations people in the region. Every fall they came, and come still, to the lake to fish and dry their harvest for winter use. Before the snow flies they depart for winter traplines, leaving a sense of spirit and mystery in their wake for newcomers like me to ponder on evening walks. When winter deepens the lake returns to the few creatures that can survive: chickadees, whiskey-jacks, and just before ice up, trumpeter swans. Primary among them is the raven—revered, deified, and gently mocked by the people of the region. The raven is teacher, trickster, and powerful clan symbol. The raven's hoarse "crock" was often the only living sound I heard in the winter, although in summer the loon's cry and the whistle of the eagles raising their young in the nest above my roof often outcompeted the raven's conversation. Raven has always been here, from before the beginning. Not far from here, on the coast, raven's insatiable curiosity led him to open a clamshell and release humans to scramble out onto the earth, and left all of creation to rue the day. Raven has been atoning for this faux pas ever since by trying to catch our attention, to teach us about the world.

Not long before I had to leave the lake, and when I needed it the most, I encountered raven—twice. A full grown raven, of awesome proportions, walked into my house. I was working, and my attention was caught by crashes from the kitchen. I ran in and without thinking of the consequences of massive beak and claws, picked up the raven, put him down again without a struggle to improve my grip, walked outside with him, and as I released my grip, he turned his great head to look back at me with what I imagined was a somewhat wry expression of thanks. Then, about a week later, I was driving with a friend on the road through the forest above the lake. "Stop! Raven!" I cried. I leaped from the car to find a young raven, probably fallen from a nest. I picked it up and placed it gently on a fallen tree and left. Since it was only about a mile from my house, I walked back a*bout two hours later. The raven was in the same place. I left it, hoping the parents would find it. Next morning it was in the same place with no sign of parents. I examined it and discovered injuries, not serious but probably needing attention. This was a difficult call—take it home and assume responsibility, or leave it to parents and fate. This raven left me no choice. I took him home. While resisting naming him, he became at times Lucifer, at times just ndegi (I am, after all, a human and a scientist). I fed him, stuffing tidbits down his open throat (cat food, fruit, and boneless, skinless chicken breast left by a nonvegetarian guest), cleaned his wounds, weighed him, made him an imitation raven nest and gave him the run of the house. Next morning I made an inspired decision—raven day care. I took the raven back into the forest, gave an imitation "crock" and waited. Within minutes two ravens flew overhead, doubled back and swooped into the towering Douglas firs above Lucifer, who squawked his indignant demands. I left and returned a few times during the day, often leaving peace offerings for the parent ravens—an apple, a decaying fish from the beach.

From that day, I had to learn to think like a raven. I decided it was too dangerous to leave Lucifer in the forest at night since he could not fly, and so the pattern was set. I left him with his parents during the day and picked him up at night, fed him, enjoyed watching him, and attended to his wounds. The only problem was I had to find him in the forest. I had to imagine where he could be. I had to stay silent and feel where he was. In the midst of a dense magnificent Douglas fir forest, I always found him. He would squawk, his parents would object to my presence, or I would simply stand silently, clearing my mind and will, in one spot, and there he would be. An effective system evolved. When I left him in the morning he would squawk after me, thereby alerting his parents to his presence and reminding them it was their shift. In the evening the parents would shriek at me, thereby giving away the babe's location. Into the raven/cat carrier and home for the night. He discovered music. He seemed particularly fond of Mozart, Gregorian chants, operatic sopranos, and Joni Mitchell, cocking his head and staring at the CD player with his improbable blue eyes. Was he pretending to share my taste? He was not polite. He was proud, vociferous, and even when begging for food, not humble. He was not good for housekeeping, but, as he strengthened, very amusing. I set out to ensure that he did not become attached to me, before I realized that it was not his heart that was endangered.

A week later, it became more and more difficult to find Lucifer in the evening because he was beginning to fly. After two nights of climbing trees to retrieve him, I questioned whose needs I was now serving. The next evening, after searching for some time, I discovered Lucifer at the top of an aspen on the

edge of the lake. The parents and siblings swooped overhead, and then all disappeared. I sank into the wild roses, clover, bunch berries, and Indian paintbrush, watching the dying light touch the golden tops of the Douglas firs, a beaver swimming along the edge of the lake, and fish jumping at flies. As night descended the raven family again swept low over my head and then high into the dusk. I only recognized Lucifer by the demonic tuft of feathers above one eye. "Fare thee well," I murmured and walked back to my cabin, sadly, but at the same time alert to feelings of joy in renewed intimacy with the whole that was my lake. An exchange of worlds ... but ours is the same world. It was all a trick, a raven gift.

Musing on this experience, I thought about the ways in which humans crave connection with the wild, the wild creatures, and the wild that is in ourselves. For centuries, we have attempted to separate ourselves from the wild with increasing desperation—asserting that we are the only creature to possess a soul, to be made in God's image, to communicate, to make and use tools, to feel pain, to plan, to lie, "to look before and after and pine for what is not." As science has challenged each of these attempts at distinction, humans have come to realize how desperately we need to feel a part of the natural world, to reconnect with our natural history and our wild neighbors. The tremendous growth in wilderness recreation speaks to this need. Yet my life as an environmentalist and the environmental movement of which I have been a part, have in many ways contributed to that separation of humans and wilderness, which in turn has led to the disrespect for and heedless degradation of the natural world decried by environmentalists. By setting aside wilderness areas, parks, and wildlife as "out there," places where one goes only on vacation or to get away from the real world of cities, human technology, and institutions, we have tacitly condoned the trashing of our own backyards. Perhaps as part of my penance, I have worked for some years in Africa, helping villagers reintegrate wildlife into their daily lives, economically and spiritually, through such programs as Zimbabwe's Communal Area Management Program for Indigenous Resources. Here in Canada, I have learned much from First Nations people about the sustainable and spiritual uses of wildlife and other resources as part of a vision of humans as an integral part of the natural world. As environmentalists, I believe our great challenge is reintegrating the natural world, wilderness, and wild creatures into our daily lives and consciousness, here in our own backyards. This is part of the lesson that raven taught me! **IJW**

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Wilderness Information Network Makes Wilderness Research Documents Available on the Web

The Wilderness Institute at the University of Montana has begun a project to make wilderness research documents available for free downloading through their Wilderness Information Network website (http://www.wilderness.net). The first phase of this project will be to collect, scan, and convert the nearly 300 publications of the Aldo Leopold Wilderness Research Institute. To date, this is the best collection of wilderness-related research publications available anywhere. Eventually the database of publications will be expanded. Document inclusion will be decided by committee.

Creation of this resource has been spurred by a shared notion among researchers, educators, and students that wilderness-related research can be very difficult, if not impossible, to obtain. Traditionally, in order to locate wilderness research publications, students in a natural resource related field would need to search through journals, library resources, and inevitably order publications through interlibrary loan. Due to the technology available today, and especially because of the proliferation of the World Wide Web, this no longer has to be the case. Today, receiving documents can be as easy as clicking on an interesting title, downloading the document, and printing it! The document library is scheduled to be online in early 1998. For more information contact Chuck Burgess at (406) 243-6933 or by e-mail at cburgess@selway.umt.edu.

WILDERNESS @ INTERNET

Wilderness in the 21st Century— Are There Technical Solutions to Our Technical Problems?

BY WAYNE FREIMUND AND BILL BORRIE

IS THE PLANET SHRINKING as a result of technological advancement, or are we simply affirming how small it has always been? Is a society that is plugged in to computers being rendered incapable of escape from day-to-day responsibility, or are we gaining a newfound freedom to reintegrate the various components of our lives? When considering these questions, the importance of wild places is heightened, but, equally, their roles may need to be reassessed in both social and ecological terms. In the absence of this reassessment there may be a potentially paralyzing confusion of how to manage and maintain wilderness in a rapidly changing and increasingly information-based society.

The purpose of this article is to begin to formally organize a set of discussions about the role of information and communication technology within and about wilderness. We also hope to offer a broad perspective and a series of questions through which clarity may begin to emerge. Captured within this essay are comments and thoughts shared in numerous discussions, formal and informal, including sessions at this year's George Wright Society Meeting held in Albuquerque, New Mexico, and the first annual Wilderness Watch Conference held in Missoula, Montana, in July 1997. We thank all of those who helped stimulate these thoughts.

The Continued Genesis of Progress

As the United States approaches the turn of the century, the American conservation movement is moving toward its 100th year (Udall 1997). During this first 100 years the United States has seen a laudable shift from the utilitarian-agrarian economy and industrial revolution, to an era in which environmental sympathy is often a political prerequisite, and environmental education is a cause championed by students and teachers alike. The challenge remains to continue to make relevant the protective and preservationist policies and interests of the past century.

Within a milieu of vastly changing economies and societal attitudes, the National Wilderness Preservation System emerged as a symbol of what has been lost to progress. The almost unanimous passage of The Wilderness Act (TWA) in 1964 was a testament of rejection for the unbridled cost of progress. Perhaps most telling was the prohibition of the internal combustion engine, the mechanical device that perhaps most symbolized progress and technical advancement at the time. There is little doubt that the language of TWA reflects an intention to construct a sanctuary from the products of the industrial revolution: for the sake of the environment, and as a means of escape from what society had become. The need for such escape and contrast to technological society can only be expected to increase in the future. It is clear that wilderness, or some similar construct, will continue to be relevant to modern society.

The next 100 years of conservation will most certainly take place in a post-industrial and information-based economy Within that context, advocates of wilderness are beginning to recognize the myriad challenges this social context poses for wilderness (e.g., the appropriateness of cell phones, Global Positioning Systems, digital cameras, laptop computers, satellite links, seismic instruments, and large databases about wilderness available via the Internet). Since information and communication are foundational to the society we are now constructing, it can be assumed that there are effects of that progress that wilderness will most suitably balance. Unfortunately, there is a lack of clear direction about how to manage information and communication in or about wilderness. This lack of direction is apparent in the confusion and occasional blaming that the authors have observed in numerous professional gatherings this year. However, we believe that the roles of technology for wilderness will be among the most critical issues of the next 10 years. At the base of the confusion is the fact that social change is happening so quickly that it is very difficult to anticipate the next challenge to arise.

Can we be certain of the true intentions of the founders of TWA, relative to the information-based society of today? Had it been passed on the brink of the industrial revolution, would it have adequately protected us from the internal combustion engine? Would it be sufficient now to develop preserves exempt from two-way communication, places where there is no satellite-fed information, and places where we do not use sophisticated technology to study and further learn about our natural environment? Even 30 years after TWAs passage, are the regulations limiting technology to electric shavers, Geiger counters, and so on, relevant today?

How than can TWA and its provisions be expected to cope with the technological developments of the future? If we were to pass a wilderness act today, would we be comfortable that we were making informed decisions about the appropriateness of Toffler's fourth wave artifacts (the combination of computing and genetic technology)? While it may seem absurd to be pondering whether genetically cloned, impact-reduced llamas should be

permitted, or whether solar powered genetic monitoring systems should be allowed, these are only among the imaginable products that may be on a near horizon. Are we prepared to rule out this type of wilderness use?

What Questions Should We Be Asking About Emerging Technology?

In essence, our crystal ball is becoming increasingly cloudy. Therefore, how should we assess the relative appropriateness of varied technologies in and about wilderness? How can we determine what is good technology and what is bad for wilderness? Perhaps broader discussion of the following set of questions will provide a partial basis for the clarity needed for leadership to emerge.

Will the Imax theaters and virtual wilderness of tomorrow reduce our desire for self-sufficiency, or will we have targeted a new way to meet such a need?

1.) Are we at a crossroads? Yes. The pervasive influence of information technology on the formative years of the next generation cannot be underestimated. As academics, we can attest that competitive success in the academic environment will soon be as dependent on computing proficiency as on the use of books and notepads. The current trend suggests that computers will soon outweigh paper in the archive and distribution of information. More information from myriad sources will be available to greater numbers of people. The challenge will be to become adept at efficient and timely access to that information.

The amount of information becoming available to people is also increasing at an exponential rate. And as Baudrillard has stated: "We are living in a society with more and more information and less and less meaning." Reaction to this phenomena will make access to a share of public debate and opinion increasingly competitive. Marketing firms are already aware of the difficulty in reaching selected audiences, when there are now scores of TV channels instead of three; when the Internet can distribute information with far less expense than the glossy magazines or newspapers. We have gone from mass broadcasting, to market segmentation, to niche marketing, to the annoying phone calls that are a function of personal marketing campaigns. A heightened awareness of wilderness values will have to be created within this information overload and communication framework. The question remains as to who will own and provide knowledge about wilderness. How will wilderness information compete in the glutted market of information and make it through the necessary filters people will be forced to construct in a sea of meaningless terabytes?

2.) Who is benefiting from new technology? There is a profound freedom associated with the ability to communicate. Although a society plugged in to computers may find it difficult to escape from professional responsibilities to recreate (even in wilderness), there is also a sense of empowerment associated with integrating the compartmentalized aspects of our current social structure. Taking a class from home may remove you from the college environment but unite you with your family. Bringing a cell phone into the wilderness may change the intensity of your experience but enable you to go on a trip that you otherwise wouldn't be able to experience at all. Down-linking from a wilderness area to a grade school classroom may reduce your sense of escape but stimulate awareness and curiosity about wilderness in the minds of future advocates. Providing information about a wilderness area may increase use of selected places, but failure to provide information through dominant mediums may reduce critical awareness and constituency for the wilderness ideal.

An even more immediate but less-discussed artifact of a plugged-in society lies in the increased freedom to work from remote locations. As we increase our ability to combine the components of work, family, and leisure, more people will move to what are now relatively remote places to be closer to the amenities of wildness. Many are now successfully doing this and increasing their ability to experience wild places through long day trips and extended weekends. This is often viewed as a negative change in the use of a wild place, especially if impacts associated with recreational use are evident. But perhaps this phenomenon is indirectly facilitating reassembled work, family, and spiritual realities. Is it possible that people are reintegrating their lives? Thus, increased ability to communicate and access to information might determine future awareness of and demand for wilderness. The questions can then be raised of who this constituency for wilderness will be, and what expectations will they have? What will be the impacts of these new demands and expectations?

3.) How will the wilderness experience change as a result of increased technology? The most apparent challenge may be in securing opportunities to escape and explore. Will there be a place in 20 years' time where one can completely escape from industrialized society? Will we be able to feel assured that the next person coming down the trail won't have a cell phone stashed away in their pack and be able to contact the outside world if an emergency arises? Will people still elect not to bring their cell phones along? Will society, through its normative pressures for responsible behavior allow or condone the very experiences that wilderness has the opportunity to provide? Will people be held accountable for the absence of a cell phone if an emergency arises?

How will our need for nature-based frontier experiences evolve? Will we still seek and need the illusion that we were the first person to cross a pass, see a particular feature, or to chart a canyon 100 years from

now? For the third generation of people who have had access to interpersonal contact from any point on Earth and who have grown up with the ability to monitor from home global respiration and photosynthesis rates in a real time, will there be enough relevance to our current frontier illusion to sustain it as a strong motivation for a wilderness experience? Would it be a good or bad thing if it were? Would we want to maintain a primitive vignette of the frontier that existed in the 19th-century American West now? If not the nostalgia of the frontier, then are the conditions of 1964 any more attractive or relevant?

What will become of our public opinion of what a wilderness experience should be? How will it be tamed as we strive to tame and civilize ourselves? Will the Imax theaters and virtual wilderness of tomorrow reduce our desire for self-sufficiency, or will we have targeted a new way to meet such a need? Or, will our increased artificial awareness of the environment focus even further the need for real and unmediated experiences in wild areas. Will we even be able to distinguish the real and unmediated from the produced and constructed? Or, will our expectations of what wilderness should be become irreversibly modified by our mediated images of it? As Eric Katz (1992) suggests, technology has the potential to create an artifactual reality far removed from the "wildness" of nature.

Conclusion

It is undeniable that the social context in which wilderness exists is on the brink of epochal changes. Within this experience, it is necessary to develop a meaningful dialogue of the role wilderness should have in the upcoming era of technological advancement and scientific management. In the absence of thoughtful discussion, the fear of change will continue to confuse the issue inviting additional technological responses to the situation. In fact, through the use of some technologies, many wild places are impacted less by people now than they were in 1964. For example, it is no longer acceptable to cut tent poles or build cooking fires in fragile areas. And much of the information or communication technology of today could easily be refined to reduce social impacts. Would cell phones be acceptable if they were no larger than a conventional hearing aid? Would motorized canoes be appropriate if they were totally silent and nonpolluting? Would infinite information about wilderness areas be acceptable if it were only available to a chosen few, or if each individual could be assured it would be blacked out from their modem if they so chose?

It is the concept of wilderness that is most vulnerable to the changes on the horizon. It is our hope, therefore, that by beginning the discussion at a philosophical level, the tendency to secure further technical resolutions may be minimized. Technical solutions to technical problems often sidetrack the underlying philosophical or political questions. For every technical solution there will inevitably be a new technological problem. They are instead symptoms of our underlying unwillingness to question the soundness of the provisions of TWA. Without a discussion of what wilderness is most fundamentally, and hence should undeniably be protected, the concept will slowly wither under the assault of more and more technological challenges. At the heart of the discussion should be the notions of freedom, of what is acceptable, and of what is natural.

We are currently limited in our guidance of how to decide what is good and bad technology for wilderness. There is little in the way of an information policy or specific guidelines on how to constrain the airwaves of wilderness. It seems that drawing lines of appropriateness will be impractical in the absence of this guidance. Why is the discussion postponed even as we face accelerated technological developments?

Recognizing that we are constrained by our contemporary assumptions of how the world should or could change, we must accept that the discussion about technology is more one of values than of technical devices. In essence, there are no technical solutions to our current dilemma. We have little choice but to confront the role of technology from ethical and policy perspectives argued from multiple perspectives. As Rothenburg suggests, "Technology never simply does what we tell it to, but modifies our notions of what is possible and desirable." Technology can help the human condition, but is limited in its ability to provide or reconstruct the "wild." We face a challenge of not turning the wild nature of wilderness into yet another artifact of the human world. IJW

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HIGH ELEVATION MEADOWS AND GRAZING

Common Past Effects and Future Improvements

BY MICHAEL P. MURRAY

Abstract: High elevation grazing of cattle and sheep is a legal activity in wilderness areas administered by the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) and occurs in about one-third of the U.S. Wilderness System (USWS). General effects of grazing on species composition and soil properties are described based on reported findings for three extensive types of high elevation meadows—grass, herbaceous, and moist sedge. The challenge for wilderness managers is to keep grazing within limits that protect the naturalness of meadow ecosystems. In general, where excessive grazing occurs, shifts in species composition from preferred livestock forage to less desirable, nonpalatable, and exotic species is observed. Soils of each meadow type respond differently to grazing pressure, and careful management should reflect these differences. Suggestions are offered for careful control of livestock distribution, timing, and stock numbers in order to protect naturalness of high elevation wilderness meadows.

GRAZING OF CATTLE AND SHEEP is a legal activity in wilderness administered by the USFS and BLM and occurs in about one-third of the USWS (Reed, et al. 1989). But, while grazing is a legal and important use in the wilderness system, impacts and management schemes to control livestock are not well understood by many wilderness interests. High elevation meadow vegetation where grazing often occurs in wilderness is subject to extremes in temperature, wind, moisture, and sunlight. These influences can vary greatly across time and space, creating a very rich and diverse assemblage of plant communities. High elevation meadows include extensive grass, sedge, and herbaceous plant community types. This article summarizes general effects of grazing on species composition and soil properties of these meadows, and some management approaches that would help minimize negative impacts of grazing on them.

High Elevation Grass Meadows

Upper timberline plant communities in the Rocky Mountains and the Inland Northwest are extensively dominated by grasslands. These meadows occur on ridgetops and south-facing slopes, which are relatively dry and free of snow early in summer. There, abundant grasses, such as fescue (*Festucaspp.*), blue-grass (*Poa spp.*), timothy (*Phleum spp.*), and alpine hairgrass (*Deschampsia caespitosa*), are important forage plants for livestock. Heavy grazing is believed responsible for replacing historically natural fescue-dominated meadows with communities characterized by Columbia stipa (*Stipa columbiana*), California brome (*Bromus carinatus*), and black heads (*Rudbeckia occidentalis*), or other forbs (Franklin and Dyrness 1977; Hickman 1976; Johnson 1991; Pickford and Reid 1938, 1942). Grazing may redistribute native species as well such as alpine timothy (*P alpinum*) and alpine bluegrass (*P. alpina*) (Bonham 1972).

In general, drier meadows supporting good cover of grasses or sedges exhibit greater resistance (ability to withstand grazing-induced change) but lower resilience (speed of recovery to pregrazing conditions) than wetter meadows. Greater resistance can be attributed to the extensive tightly interwoven mat of roots that resists penetration. However, when intensive grazing causes damage, drier conditions hamper productivity, which can cause the rate of recovery to be extremely slow. Rundel and others (1990) noted apparent impacts 50 years after removal of sheep from a dry shorthair sedge (*Calamagrostis breweri*) meadow in the Sierra Nevada where Crane (1950) had earlier observed pedastelled bunchgrasses, indicating rill and gully erosion in the Sierras.

High Elevation Herbaceous Meadows

Herbaceous meadows are sometimes pure assemblages of nongrasses (forbs) but are most often associated with at least some grass and/or sedge cover. Distribution of herbaceous communities does not conform as strictly to the soil moisture extremes as other meadow types. They are usually found on sites of intermediate moisture but sometimes occur on dry and wet soils. Important high elevation forbs include lupine (*Lupinus spp.*), valerian (*Valeriana spp.*), corn-lily (*Veratrum spp.*), and knotweed (*Polygonum spp.*).

Grazing can decrease fescue and mountain bromegrass (*Bromus marginatus*) and common forbs such as groundsel (*Senecio spp.*) and loveroot (*Ligusticum spp.*) (Branson and Payne 1958;

(Peer Reviewed)

Willard 1991). In turn, plants which increase in abundance include sage (*Artemisia spp.*), rubber rabbitbrush (*Chrysothamnus nauseosus*), and exotics such as timothy (*Phleum pratense*) and Kentucky bluegrass (*Poa pratensis*) (Bennett 1965; Branson and Payne 1958; Ellison 1954; Vogl and Miller 1968). Grazing can lead to tree invasion. The potential proliferation of trees in herbaceous meadows may be greater than other meadow types due to intermediate soil moisture availability. With intensive invasion, associated meadow forbs, grasses, sedges, and other plant life forms would be replaced by forest understory plant associations, which could threaten the future existence of individual meadows (Franklin 1966) and have important implications for overall biodiversity in subalpine regions. Such transformations have been linked to climate change (Brink 1959; Franklin 1966; Franklin, et al. 1971; Jacobs and Romme 1993; Taylor 1995; Woodward, et al. 1995); however, improper grazing by livestock are probably an important contributing factor.

For example, livestock disturb plant cover, often cutting through the roots and exposing bare mineral soil, which is conducive for the establishment of tree seedlings. Franklin and others (1971) suggested a three-year period of cattle presence initiated invasion of a bunchgrass/lupine (Festuca viridula/Lupinus latijolius) meadow in the Goat Rocks Wilderness USA. Livestock were thought by Ellison (1954) to cause invasion of rubber rabbitbrush/stipa meadow communities in the Wasatch Range USA. Vale (1981) surmised that fire suppression and climate change were not as important as the presence of sheep in causing invasion of Cascade Meadows. Interestingly, tree invasions can be most pronounced under low to moderate levels of livestock use or soon after livestock are removed (Dunwiddie 1977; Taylor 1990; Vale 1981), possibly because under heavy use, livestock tend to trample or eat invading tree seedlings.

High Elevation Moist Sedge Meadows

Sedge meadows are typically dominated by grasslike plants, such as rushes (*Juncus spp.*) and sedges (*Carex spp.*), which commonly form a dense cover resembling a short green leafy mat at moist sites such as small basins and lake margins. Associated soils are acidic, oxygen-poor, and highly organic. These soft mucky sites offer little physical resistance to hooves and can be easily disturbed if not for the mantle of plant material that provides some protection.

Initially, grazing can cause changes in species abundance.

A grass meadow that receives very little grazing pressure. Proposed West Big Hole Wilderness, Montana. Photo by Michael P. Murray, (left)

Heavily grazed meadow with loss of vegetation and erosion. Exposure of soil is conducive to establishment of young invading trees. This meadow was probably once dominated by Idaho fescue but is now dominated by buckwheat, with invading Shasta red fir. Russian Peaks Wilderness, California. Photo by Michael P. Murray, (below)

Herbaceous meadows can better withstand grazing pressure than other types due to their naturally abundant plant cover and intermediate soil moisture. Marble Mountain Wilderness, California. Photo by Michael P. Murray, (left)

Even herbaceous meadows can be impacted when heavy grazing removes plant cover. Because high elevation meadows are subject to extremes in temperature, wind, moisture, and sunlight, thresholds of acute livestock-induced change, may occur more quickly than at lower elevations. Near McCall, Idaho. Photo by Department of Range Resources, University of Idaho, (below)

Experiments conducted by Pond (1961) indicated that moderate season-long grazing can severely reduce or eliminate sedges (*Carex festivella* and *C. rostrata*). Less desirable or unpalatable plants can replace sedges. For example, lupine (*Lupinus spp.*), penstemon (*Penstemon spp.*), and buttercup (Ranunculus spp.) were found to be abundant in heavily grazed sedge meadows of the Sierras (Crane 1950).

A moist sedge meadow. Very light grazing can cause changes in the relative abundance of different species without erosion. These subtle changes can go unnoticed by the untrained eye. Russian Peaks Wilderness. Photo by Michael P. Murray, (above)

Extremely moist soils offer little physical resistance to hooves and can be easily disturbed. Erosion can be evident by pedasteiled sedge plants. Central Idaho. Photo by Department of Range Resources, University of Idaho, (below)

When grazing removes or tramples significant plant cover, negative impacts can become more apparent. Trampled and denuded trails, for example, can persist for at least two years after removal of stock in these meadows (Ratliff 1985). Where grazing pressure is heavy enough, dramatic far-reaching impacts may occur. Bennett (1965) describes such an instance in Sequoia-Kings Canyon National Park: "Lacking the ability to form a tough sod, sphagnum areas are severely cut up by hoofed [domestic] animals, exposing the soft muck soil beneath to erosion during the spring snow melt or by summer showers. This muck erodes very rapidly and the deep channels cause the water table to lower and drain the meadow. As water drains out of the soil the air, which is admitted quickly, oxidizes and thereby destroys the finely organic soils."

Consequently, lodgepole pine (*Pinus contorta*) seedlings were invading this formerly wet meadow (Bennett 1965), probably due to the lowered water table. The progression from extensive sedge and moss-covered wet meadow to a dry, almost barren site with tree encroachment, emphasizes the potential far-reaching effects of inappropriate livestock grazing.

Range Management Principles for High Elevation Wilderness Meadows

Grazing of high elevation wilderness meadows need not be accompanied by dramatic damage to resources, and should not because The Wilderness Act of 1964 mandates that naturalness be maintained. Fortunately, today most livestock producers are aware that such damage reduces forage sustainability and reflects badly on them, threatening long-term continuation of wilderness grazing. From past mistakes, combined with our developing knowledge of the ecological dynamics of meadows, we can better manage livestock to ensure that the goals of wilderness naturalness are more closely realized. These include the following items.

1.) *Tailor Use by Meadow Type:* In general, meadows that are least likely to be damaged by livestock have moderate to high plant cover, soils of intermediate moisture, and gentle slopes less than 40%. Herbaceous meadows often exhibit these characteristics in addition to supporting a high variety of preferred forage species. Livestock grazing in wet meadows requires close monitoring because of the high susceptibility of succulent plants to trampling and soil compaction. Extremely dry meadows usually support low plant cover and shallow soils, which subject them to erosion.

Certain sites within herbaceous meadows should not be grazed. These include locations of high gopher use, as evidenced by many tailings mounds from tunnels. These areas are highly susceptible to erosion when sheltering plants are removed. Sites in the vicinity of snowbanks should be avoided due to wet conditions and newly emerging plant, which may not recover from excessive early grazing. The banks of alpine watercourses can be easily damaged by trampling. Exposed ridges with high potential for erosion should also be avoided.

2.) *Time Use to Avoid Wet Conditions:* All meadow types exhibit very moist soils in late spring and early summer. Entrance of livestock before a majority of the snow melts causes risk of damage to soils. Conversely, late-season grazing causes risk of autumn snowfall and heavy utilization of shrubs. A commonly used time-window in the western United States occurs between July 1 and October 15, but the grazing period should be tailored according to the site and regional weather for the year (Allen and Clayton 1994).

3.) *Stagger Use to Reduce Impacts and Allow Recovery:* The same meadow should be grazed at different times every year and allowed to be livestock-free at different times annually. The goal is to avoid grazing plants at the same stage of development (e.g., seeding) every year, thus limiting consistent interference in important plant processes that are responsible for survival (carbohydrate reserves) and reproduction (flowering, seeding). The "rest-rotation" system is one method incorporating this concern and is particularly well-suited to high elevation wilderness where fencing is discouraged and terrain is mountainous (Holecheck, et al. 1995). Continuous season-long

grazing at even moderate stocking rates can lead to severe damage, especially with cattle. Livestock tend to congregate near their preferred sites for long periods of time. These sites are usually where water, shade, and forage are near each other such as in wet fragile meadows.

4.) *Avoid Overstocking:* Low forage productivity, naturally unstable soils, and long recovery periods justify conservative stocking rates at high elevations. Naturally occurring wildlife, such as bighorn sheep and mountain goats, tend to occur in low population densities limited by snow-free winter forage (Noss and Cooperrider 1994), unlike high numbers of feed-supplemented cattle and sheep.

5.) *Monitor and Set Aside Some Meadows as Benchmarks of Naturalness:* Selected meadow sites should remain off-limits to domestic grazing as a comparison of relative naturalness. The tradition of setting up exclosures of several square meters in size for each meadow can be useful to monitor the amount of forage consumed; however, these small exclosures may not adequately buffer against livestock effects on hydrology, seed availability, pollinators, soil organisms, and other ecosystem components. Using plant communities in their spatial entirety can better ensure a baseline of naturalness. Matches for comparison need to be made carefully because site factors and species composition can be highly variable. An additional challenge in finding sites is that few meadows were never grazed by domestic stock whose impacts can last decades. New introductions of livestock to ungrazed meadows should be discouraged due to their value as baselines of naturalness.

6.) *Rehabilitate Impacted Sites:* Exotic plants and invading trees should be controlled or removed using methods consistent with wilderness such as prescribed burning and hand-removal. Efforts to hamper erosion include placing small check-dams and dissipaters of, preferably, natural materials (stones, tree trunks, posts) into gullies. Seeds of native species collected as close as possible to the site should be carefully applied.

7.) *Monitor and Manage Tree Invasion and Other Species:* It can be difficult to determine whether tree invasion is caused by livestock, climate, or fire suppression. Good records of livestock use, fire history, and climatic trends can be helpful. Tree rings of invaders should be examined for chronological patterns of trends that may help determine possible causes (e.g., climate change, fire, or overgrazing). If livestock and/or fire suppression are causes, managing for naturalness would support tree removal in order to maintain meadow'communities and/or allow their recovery. Removing trees is much easier than identifying why they have invaded.

8.) *Support Research:* We are just beginning to understand the effects of grazing on individual plants in high elevation meadows. We also know very little about grazing inter-relationships with other high elevation ecosystem components such as pollinators, soil fauna and flora, and plant populations and ecosystems at a landscape level. Additional research is needed on both rehabilitation techniques and the ecology of ungrazed meadows, both of which are essential in maintaining or measuring progress toward goals of wilderness naturalness.

Conclusion

Excessive grazing generally causes a shift in species composition from preferred forage to less desirable, nonpalatable, or exotic species. Tree invasion may accompany grazing, especially in herbaceous meadows. Drier meadows seem to be of low resilience to heavy grazing. Moister meadows generally exhibit low resistance due to high susceptibility of soil to erosion and compaction. When vegetation and soil disturbance is significant, the ability of a site to retain water is compromised, and a subsequent shift to dryland-associated plant species may be expected.

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High elevation meadows present managers with unique challenges in protecting wilderness naturalness. The short growing season, cold temperatures, and shallow soils limit the productivity and recovery of vegetation. Thresholds of acute livestock-induced change, such as shifts to drier conditions, may occur more quickly than in similar meadow types at low elevations. Furthermore, inherent differences among diverse meadow types, often occurring within a single grazing allotment, require carefully managed livestock. Range management in wilderness to maintain a semblance of naturalness of high elevation meadows is possible and is mandated by The Wilderness Act. The foregoing has described ecological changes that can occur from improper grazing of three types of high elevation meadows and the management principles to help avoid them. **IJW**

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CONDITION INDICATORS FOR DISTINCT WILDERNESS

Is There Uniformity?

BY MICHAEL A. TARRANT AND C. SCOTT SHAFER

Abstract: By measuring the discrepancy between visitor concern and perceptions of social, managerial, and physical conditions across three distinct wilderness areas, we explore the potential for uniformity of indicators in the National Wilderness Preservation System (NWPS). Although overnight campers to the Cohutta (Georgia and Tennessee), Comanche Peak (Colorado), and Okeefenokee (Georgia) wilderness areas ranked conditions in a similar order of concern, there were considerable differences in (1) the level of concern for the conditions and (2) how they perceived conditions to exist. In contrast to previous studies, concern for wilderness conditions appeared dependent upon regional (i.e., East versus West) location. The question of uniformity versus variety in selecting condition indicators for the NWPS may be dependent upon the type of condition. For example, indicators of physical conditions (especially litter, resource damage, wildlife viewing opportunities) may be suitable for diverse wilderness areas. In contrast, indicators representing social and managerial conditions may be more unique to specific areas, or types of areas, in the NWPS.

WILDERNESS MANAGEMENT TOOLS, such as the Limits of Acceptable Change (LAC) (Stankey, Cole, Lucas, Petersen, and Frissell 1985) and the Visitor Impact Management (VIM) (Graefe, Kuss, and Vaske 1990) frameworks, rely on measurable indicators and objective standards to assess the magnitude and acceptability of impacts to wilderness areas. Recently, researchers and managers have questioned whether uniformity among indicators and/or standards should be developed. The argument for uniformity recognizes that all wilderness areas form part of a system (the NWPS) and, therefore, should be maintained to a minimum standard of social, physical, and managerial conditions in order to provide a similar quality of wilderness recreation experience (Higgins 1990). The argument against uniformity is that conditions (perceived, actual, and/or preferred) within the NWPS are so diverse that standards would not be comparable across wilderness areas (Mitchell 1990). To address the issue of uniformity, a first critical step is to identify if key indicators of physical, social, and managerial conditions exist across wilderness areas in the NWPS and to determine if these conditions appear to exist in a similar state of existence.

From its origins in 1964, the NWPS has become increasingly diverse (Cole 1990). This diversity is apparent in the geographical distribution of wilderness areas and may be largely attributed to two acts of Congress. The original Wilderness Act of 1964 (PL. 88-577) and the so-called Eastern Wilderness Act of 1975 (PL. 93-205) used somewhat different criteria to guide the designation of areas into the NWPS. Research, however, suggests that only minor differences in user experience and setting preferences across geographically distinct wilderness areas in the NWPS exist. Roggenbuck (1980), for example, reported that visitors to seven (three western and four eastern) wilderness areas ranked many experience items (including scenery, escape, and nature), physical conditions (wildlife, water, and scenic views), and preferences for management actions in the same order of importance to their wilderness recreation trip. More recently, Roggenbuck and others (1993) found that eastern and western wilderness visitors placed similar levels of importance on the effect of site indicators on the wilderness recreation experience, concluding that any differences between individual wilderness areas may be more attributable to the type and level of use an area receives than of regional location (e.g., East versus West).

We extend the work of Roggenbuck and others by exploring the extent to which visitor concern for, and perceptions of, social, physical, and managerial conditions are similar across three distinct wilderness areas (a relatively high-use mountainous area in the East, a moderate-use mountainous area in the West, and a low-use swamp area in the East). Key indicators were identified by measuring visitor concern and perceptions of wilderness conditions. To examine the potential for uniformity, the discrepancy between the two measures was calculated.

Study Areas

Three wilderness areas were selected: the Cohutta in southern Tennessee and northern Georgia, the Comanche Peak in northern Colorado, and the Okeefenokee in southern Georgia. The Cohutta, an area of 37,043 acres, ranges in elevation from 950 feet to 4,200 feet above sea level and consists of densely mixed

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Table 1

Mean score[1] and rank for Comanche Peak, Cohutta and Okeefenokee respondents on concern for wilderness condition items.

	Comanche		Cohutta		Okeefenokee			
	Mean	Rank	Mean	Rank	Mean	Rank	F	p
Amount of litter found in campsites (P)	5.45[a]	1	5.76[b]	1	5.57[a,]	1	5.40	.005
Amount of litter found along the trail (P)	5.32[a]	2	5.65[b]	2	5.47[a,b]	2	4.21	.015
# of trees and vegetation damaged by other users (P)	5.01[a]	3	5.42[b]	3	5.45[b]	3	7.40	.001
Amount of noise heard from out of the wilderness (S)	4.74[a]	4	5.01[a,b]	4	5.14[b]	5	3.98	.019
Distance between your site and other campsites (P)	4.55[a]	5	4.69[a,b]	7	4.94[b]	8	4.20	.016
Amount of noise from other wilderness visitors (S)	4.53	6	4.47	10	4.48	15	.07	.936
Amount of solitude your group experiences (S)	4.40[a]	7	4.66[a]	8	4.95[b]	7	8.91	<.001
# of areas in the wilderness that are very remote (P)	4.18[a]	8	4.56[a,b]	9	4.76[b]	11	6.94	.001
Observing a natural ecosystem at work	4.16[a]	9	4.75[b]	6	5.21[c]	4	26.84	<.001
# of groups that pass within sight of your camp (S)	4.16[a]	9	4.11[a]	15	4.60[b]	12	8.55	<.001
Amount of fully mature forest in the wilderness (P)	4.01[a]	11	4.76[b]	5	4.88[b]	9	15.86	<.001
Seeing specific types of wildlife (P)	3.93[a]	12	4.24[a]	13	4.88[b]	9	25.95	<.001
# of different species of wildlife you see (P)	3.91[a]	13	4.42[b]	11	4.98[c]	6	30.95	<.001
Having areas where camping is unconfined (M)	3.87	14	4.08	17	3.84	22	1.62	.198
# of days in a row you can stay in the wilderness (M)	3.81[a]	15	3.89[a]	22	4.22[b]	19	4.15	.016
# of permanent structures in the wilderness (M)	3.80	16	3.96	19	4.00	20	.78	.458
Having completely primitive areas in wilderness (P)	3.77[a]	17	4.14[a,b]	14	4.40[b]	17	5.50	.004
# of vehicles you see at a trailhead (S)	3.74	18	3.66	26	3.47	27	1.50	.225
# of groups you pass during the day (S)	3.73[a]	19	3.51[a]	27	4.29[b]	18	20.54	<.001
Seeing an unusual type of plant (P)	3.66[a]	20	3.80[a]	25	4.56[b]	13	26.56	<.001
Amount of time you do not see or hear others (S)	3.61[a]	21	3.96[a]	19	4.48[b]	15	14.99	<.001
Amount of restrictions on where you can camp (M)	3.57[b]	22	3.89[b]	22	3.13[a]	30	14.49	<.001
Amount of light seen from outside the wilderness (S)	3.56[a]	23	4.27[b]	12	4.55[b]	14	15.05	<.001
Amount of restrictions on where you can travel (M)	3.53[a]	24	4.09[b]	16	3.47[a]	27	10.25	<.001
Level of trail maintenance (M)	3.49[a]	25	4.03[b]	18	3.86[a,b]	21	4.89	.008
Distance of campsites from trailheads (P)	3.44	26	3.15	31	3.49	26	3.19	.052
# of fire-rings found in a campsite (P)	3.40	27	3.85	24	3.83	23	3.18	.052
Having signs which state wilderness regulations (M)	3.23[a]	28	3.35[b]	30	3.03[b]	32	2.51	.082
Having trail markers placed by management (M)	3.18[a]	29	3.94[b]	21	3.67[b]	24	7.47	.001
Distance of wilderness trailheads from busy roads (P)	3.13	30	3.46	28	3.55	25	2.42	.090
# of signs designating locations in the wilderness (M)	3.07	31	3.44	29	3.40	29	2.40	.091
# of rangers you see in the area (M)	2.89	32	3.06	32	3.07	31	.51	.602
Amount of ranger contact in the backcountry (M)	2.87	33	3.05	33	2.89	33	.76	.468

[1] Mean scores range from 1 "unconcerned" to 6 "extremely concerned."
(P) Physical, (S) Social, (M) Managerial

Table 2

Mean score[1] and rank for Comanche Peak, Cohutta and Okeefenokee respondents on perceptions of wilderness condition items.

	Comanche		Cohutta		Okeefenokee			
	Mean	Rank	Mean	Rank	Mean	Rank	F	p
_Amount of noise heard from out of the wilderness (S)	4.87[a]	1	4.97[a]	1	5.35[b]	6	10.57	<.001
Amount of light seen from outside the wilderness (S)	4.73[a]	2	4.94[a]	2	5.42[2b]	2	19.13	<.001
Amount of solitude your group experienced (S)	4.71[b]	3	4.01[a]	16	5.40[b]	4	92.91	<.001
Amount of litter found along the trail (P)	4.70[b]	4	3.40[a]	29	5.23[c]	8	140.73	<.001
Amount of noise from other wilderness visitors (S)	4.61[b]	5	4.08[a]	15	5.42[c]	2	81.64	<.001
Amount of litter found in campsites (P)	4.55[b]	6	2.84[a]	33	5.15[c]	14	203.71	<.001
Observing a natural ecosystem at work (P)	4.45[a]	7	4.33[a]	11	5.23[b]	8	54.93	<.001
Level of trail maintenance (M)	4.36[a]	8	4.41[a]	5	5.11[b]	15	31.70	<.001
# of groups that pass within sight of your camp (S)	4.32[b]	9	3.61[a]	22	5.38[c]	12	136.71	<.001
# of trees and vegetation damaged by other users (P)	4.31[b]	10	3.31[a]	31	5.05[c]	18	145.43	<.001
# of areas in the wilderness that are very remote (P)	4.31[a]	10	4.36[a]	9	5.21[b]	10	50.01	<.001
# of permanent structures in the wilderness (M)	4.27[a]	12	4.51[a]	3	4.87[b]	29	15.49	<.001
# of days in a row you can stay in the wilderness (M)	4.27[a]	12	4.24[a]	13	5.00[b]	21	36.85	<.001
Distance of wilderness trailheads from busy roads (P)	4.24[a]	14	4.37[a]	8	4.79[b]	32	14.72	<.001
Distance between your site and other campsites (P)	4.23[b]	15	3.70[a]	21	5.44[c]	1	133.39	<.001
Amount of fully mature forest in the wilderness (P)	4.20[a]	16	4.13[a]	14	5.06[b]	16	46.52	<.001
# of unusual plants that you saw (P)	4.19[b]	17	3.84[a]	19	5.01[c]	20	72.14	<.001
# of signs which state wilderness regulations (M)	4.14[a]	18	3.91[a]	17	4.87[b]	31	48.61	<.001
# of trail markers placed by management (M) 4.13[b]	19	3.77[a]	20	4.99[c]	23	77.18	<.001	
Distance of campsites from trailheads (P)	4.12[a]	20	4.33[a]	11	5.02[b]	19	43.70	<.001
# of fire-rings found in a campsite (P)	4.11[b]	21	3.37[a]	30	4.87[c]	31	95.41	<.001
Amount of time you do not see or hear others (S)	4.05[b]	22	3.61[a]	23	5.24[c]	7	115.70	<.001
Amount of restrictions on where you can travel (M)	4.05[a]	22	4.40[b]	6	4.97[c]	25	37.40	<.001
# of completely primitive areas in wilderness (P)	4.03[a]	24	4.44[b]	4	5.17[c]	12	47.19	<.001
# of signs designating locations in the wilderness (M)	4.02[a]	25	3.86[a]	18	4.95[b]	29	63.56	<.001
Amount of restrictions on where you can camp (M)	3.90[a]	26	4.40[b]	6	5.06[c]	16	55.21	<.001
# of groups you pass during the day (S)	3.90[b]	26	3.55[a]	25	5.17[c]	12	142.07	<.001
Amount of ranger contact in the backcountry (M)	3.85[a]	28	3.59[a]	24	5.00[b]	21	62.30	<.001
# of rangers you see in the area (M)	3.81[a]	29	3.54[a]	26	4.99[b]	23	81.80	<.001
# of areas where camping is unconfined (M)	3.75[a]	30	4.34[b]	10	4.97[c]	25	36.72	<.001
# of vehicles you see at a trailhead (S)	3.56[a]	31	3.51[a]	27	4.77[a]	33	87.47	<.001
Seeing specific types of wildlife (P)	3.31[a]	32	3.19[a]	32	5.19[b]	11	174.44	<.001
# of different species of wildlife you see (P)	3.30[a]	33	3.42[a]	29	4.96[b]	27	125.71	<.001

_[1] Mean scores range from 1 "very poor" to 6 "excellent."
(P) Physical, (S) Social, (M) Managerial

hardwoods and conifers that are typical of the Appalachian mountains. It is administered by the USDA Forest Service (USFS) and is within a two-hour drive of three major metropolitan cities: Atlanta, Georgia; Chattanooga, Tennessee; and Knoxville, Tennessee. In 1986 visitor-days in the Cohutta were 77,300, which averages at 2.09 visitor-days per acre (Hendee, Stankey and Lucas 1990). Elevations in the Comanche Peak, an area of 66,901 acres in the Rocky Mountain range, are from 7,800 feet to 12,700 feet with ecological community types ranging from ponderosa pine to alpine tundra. The wilderness is also administered by the USFS and is within a two-hour drive of Denver, Colorado, and a one-hour drive of Fort Collins, Colorado. Total visitor-days in 1986 for Comanche Peak were 20,100, an average of .30 visitor-days per acre. The Okeefenokee, administered by the U.S. Fish and Wildlife Service, is 353,981 acres and part of the larger Okeefenokee swamp system, which is characterized by flat wet terrain supporting cypress forests and large open prairies of grass and peat. Annual overnight visitation is approximately 4,000 users (visitor-days are not recorded at the Okeefenokee) and is composed of only nonmotorized canoers. Unlike in the Cohutta and Comanche Peak, permits are required for overnight travel in the Okeefenokee.

Sampling

Visitors to the Cohutta and Comanche Peak areas were contacted at the trailhead and asked to complete an off-site, post-age-paid, mail-back survey A stratified random procedure was used to select days and times for contacting visitors. All visitors exiting or entering the wilderness during the selected time period were asked to participate in the study. Subjects were asked to complete the survey at the conclusion of their trip and mail it back by a requested date. Okeefenokee users were randomly selected from a list of the names and addresses of permitees. For all three user-groups, a modified Dillman procedure (1978) was used: after the initial on-site contact (for Cohutta and Comanche Peak) or mailing (for Okeefenokee), one reminder postcard and one follow-up survey were mailed at 10- to 14-day intervals, respectively.

The following response rates were obtained: 66% (n = 361) for the Cohutta, 68% (n = 343) for the Comanche Peak, and 68% (n = 232) for the Okeefenokee. However, since the Okeefenokee sample was composed entirely of overnight users, and in order to reduce variation across users of the different areas, day-hikers were excluded from the analysis. This resulted in the following sample sizes: Cohutta (n = 192), Comanche Peak (n = 91), and Okeefenokee (n = 232).

Measurement of Variables

Visitor concern for conditions was measured by asking respondents to rate how concerned they were generally with physical setting conditions in wilderness on a six-point polar scale from "unconcerned" to "extremely concerned." A total of 33 condition items representing social (8 items), physical (14 items), and managerial (11 items) domains were used (see Table 1). Perceptions of setting conditions were assessed by asking visitors to indicate how they found the same 33 conditions to exist at the particular wilderness area they visited (see Table 2). Items were rated on a 6-point polar scale from "very poor" to "excellent." Differences among the three wilderness areas were made using the AN OVA procedure in SPSS/PC+Version 2.1 (Norusis 1991).

Concern for Wilderness Conditions

The results will be presented and discussed in terms of rankings of items and mean values of items. Rankings represent relative values while means indicate absolute levels of concern and perceptions. Table 1 shows that rankings of concern for wilderness conditions were generally similar across the three areas. Consistent with findings of Roggenbuck and others (1993), litter (along the trail and in campsites), vegetation/tree damage, and noise were among the top five concerns of all three user groups. Management activities (amount of ranger contact, number of rangers seen, number of signs and trail markers) were among the conditions of least concern for users of all three areas. There were, however, some exceptions to the similarity in rankings: two social issues ("amount of noise heard from outside the wilderness" and "number of groups that pass within sight of the camp") ranked a much lower level of concern with eastern visitors who, on the other hand, ranked "the amount of mature forest" a much higher level of concern than did visitors to Comanche Peak.

Looking at absolute rather than relative differences among concern levels, significant differences in mean concern scores occurred for 23 of the 33 items. This suggests that visitors to the three areas differed in the amount of concern they held for conditions in wilderness generally Overall, Okeefenokee visitors indicated the highest concern while Comanche users expressed the lowest concern. For example, Comanche Peak visitors were significantly less concerned than Okeefenokee visitors on 78% (18) of the significant difference items and less concerned than Cohutta visitors on 48% (11) of these items. Cohutta visitors fell in the middle, being less concerned with

Table 3

Mean score and rank for Comanche Peak, Cohutta and Okeefenokee respondents on concern for wilderness condition and perceptions of wilderness condition scales.

–	Comanche Mean	Rank	Cohutta Mean	Rank	Okeefenokee Mean	Rank	F	p
Concern for Wilderness Conditions[1]								
Physical	4.16[a]	1	4.48[b]	1	4.79[c]	1	26.27	<.001
Social	4.06[a]	2	4.21[a]	2	4.53[b]	2	11.11	<.001
Managerial	3.43[a]	3	3.71[b]	3	3.51[a,b]	3	3.73	.025
Perceptions of Wilderness Conditions[2]								
Social	4.34[b]	1	4.04[a]	2	5.29[c]	1	150.50	<.001
Physical	4.12[b]	2	3.86[a]	3	5.15[c]	2	176.61	<.001
Managerial	3.89[a]	3	4.09[a]	1	4.98[b]	3	95.61	<.001

[1] Mean scores range from 1 "unconcerned" to 6 "extremely concerned."
[2] Mean scores range from 1 "very poor" to 6 "excellent."

Table 4

Discrepancy scores[1] representing differences between the concern visitors expressed for wilderness condition items and they way they perceived conditions to exist in a given wilderness area.

–	Comanche disc. scores	Cohutta disc. scores	Okeefenokee disc. scores
Amount of litter found in campsites (P)	-0.90	-2.92	-0.42
Amount of litter found along the trail (P)	-0.62	-2.25	-0.24
# of trees and vegetation damaged by other users (P)	-0.70	-2.11	-0.40
Amount of noise heard from outside the wilderness (S)	+0.13	-0.04	-0.21
Distance between your site and other campsites (P)	-0.32	-0.99	+0.50
Amount of noise from other wilderness visitors (S)	+0.08	-0.39	+0.94
Amount of solitude your group experiences (S)	+0.31	-0.65	+0.45
# of areas in the wilderness that are very remote (P)	+0.13	-0.20	+0.45
Observing a natural ecosystem at work	+0.29	-0.42	+0.02
# of groups that pass within sight of your camp (S)	+0.16	-0.50	+0.78
Amount of fully mature forest in the wilderness (P)	+0.31	-0.63	+0.18
Seeing specific types of wildlife (P)	-0.62	-1.05	+0.31
# of different species of wildlife you see (P)	-0.61	-1.00	+0.02
Having areas where camping is unconfined (M)	-0.12	+0.26	+1.13
# of days in a row you can stay in the wilderness (M)	+0.46	+0.35	+0.78
# of permanent structures in the wilderness (M)	+0.47	+0.55	+0.87
Having completely primitive areas in wilderness (P)	+0.26	+0.30	+0.77
# of vehicles you see at a trailhead (S)	-0.18	-0.15	+1.30
# of groups you pass during the day (S)	+0.17	+0.04	+0.88
Seeing an unusual type of plant (P)	+0.53	+0.04	+0.45
Amount of time you do not see or hear others (S)	+0.44	-0.35	+0.76
Amount of restrictions on where you can camp (M)	+0.33	+0.51	+1.91
Amount of light seen from outside the wilderness (S)	+1.17	+0.67	+0.87
Amount of restrictions on where you can travel (M)	+0.52	+0.31	+1.50
Level of trail maintenance (M)	+0.87	+0.38	+1.25
Distance of campsites from trailheads (P)	+0.68	+1.18	+1.53
# of fire-rings found in a campsite (P)	+0.71	-0.48	+1.04
Having signs which state wilderness regulations (M)	+0.91	+0.56	+1.84
Having trail markers placed by management (M)	+0.95	-0.17	+1.32
Distance of wilderness trailheads from busy roads (P)	+1.11	+0.91	+1.24
# of signs designating locations in the wilderness (M)	+0.95	+0.42	+1.55
# of rangers you see in the area (M)	+0.92	+0.48	+1.92
Amount of ranger contact in the backcountry (M)	+0.98	+0.54	+2.11

[1] Calculated by subtracting the mean concern score for an item from the mean perception score for that item.
(P) Physical, (S) Social, (M) Managerial

39% (9) of the significant difference items than Okeefenokee users.

The same pattern of concern, based on rankings, was evident when items were reduced into wilderness condition domains of a social, physical, and managerial nature. Table 3 indicates that visitors to each of the three wildernesses ranked physical conditions of highest concern followed by social and then managerial conditions. Mean scores show that Okeefenokee (and to some extent Cohutta) visitors expressed significantly greater concern about these condition domains in wilderness than Comanche Peak users.

Perceptions of Wilderness Conditions

Considerable differences in user perceptions of the way in which conditions existed across the three wilderness areas were evident (see Table 2). Cohutta visitors ranked several social and physical conditions much lower than Okeefenokee or Comanche Peak visitors, including solitude, litter (trail and campsites), visitor noise, number of groups that passed the campsite, and amount of trees and vegetation damaged. There were also large differences in the mean level of perceived conditions across the three wilderness areas for all 33 items. Overall, the Okeefenokee was rated in significantly better condition than the Comanche Peak on 94% (31) of the 33 conditions and the Cohutta 64% (21) of the 33 conditions. The Comanche Peak was perceived to be in better condition than the Cohutta on 36% of the conditions and similar on 51% of them.

Rankings of the condition domains (see Table 3) were different for the Cohutta than the remaining areas. Interestingly, managerial conditions were ranked highest in the Cohutta and lowest in the Okeefenokee and/or Comanche Peak while physical conditions were ranked lowest in the Cohutta; social conditions were ranked highest in the Comanche Peak and Okeefenokee. Differences in mean scores for the domains were also found. Notably, the Cohutta was perceived in significantly lower social and physical condition than the Comanche Peak, and lower social, physical, and managerial condition than the Okeefenokee.

The Discrepancy Between Concern and Perception

Discrepancies between visitor concern and perceptions of wilderness conditions were used to determine if there were some key indicator conditions (see Table 4). Conditions for which the discrepancy between concern and perception is negative may be considered as especially good indicators of visitors' experiences in a specific wilderness. These conditions should be those considered most closely by management for immediate attention. The extent to which these concern-perception discrepancies are similar across diverse wilderness areas suggests the potential for uniformity among indicators.

The first trend that is apparent is that visitors to each of the wilderness areas seem to differ in the way they felt about conditions there. Okeefenokee visitors appear to have felt best about the conditions they encountered, scoring 85% of the condition items as existing at a higher level (positive) than their level of general concern for those conditions. Comanche Peak visitors scored 75% of conditions in a positive way while the scores of Cohutta visitors indicated a 50% positive orientation. Second, looking across areas, litter and damaged vegetation were consistently perceived to exist in a state that was lower than visitor concern for those conditions. The largest discrepancy appeared in the Cohutta where visitors were "very" to "extremely concerned" with these two conditions and perceived them to exist in a "poor" to "fair" way The overall trend suggests that in each of these three wilderness areas improvements in the condition of litter and damage to vegetation are needed. Wildlife conditions in the Comanche and Cohutta rated less than visitors' concern, whereas the Okeefenokee visitors would appear to rate the conditions more in line with their level of concern. Finally, there appeared to be several conditions that were perceived by visitors in each area as existing in a positive way relative to concern. These included: light seen coming from outside the wilderness; distances of campsites from trailheads and trailheads from busy roads; signs in the wilderness; and rangers in the wilderness.

Conclusions and Discussion

Although visitors to all three areas ranked conditions in the same order of concern, there were considerable differences in (1) the level of concern for the conditions and (2) how they perceived conditions to exist in the respective wilderness areas. In contrast to findings by Roggenbuck and others (Roggenbuck 1980; Roggenbuck, and others. 1993), concern for wilderness conditions were found to be somewhat dependent upon regional location (i.e., visitors to the two eastern wilderness areas typically expressed more concern about wilderness conditions than their western counterparts).

Clearly, visitors to the three wilderness areas perceived conditions to be dramatically different. Social, physical, and managerial conditions were generally highest in the wilderness with the greatest restrictions on use level (i.e., Okeefenokee). The Cohutta, an area with relatively high use, was perceived to be in the poorest condition of the three wilderness areas studied.

To identify potential key indicators we examined the differences between visitor concern for, and perceptions of, wilderness setting conditions. Findings suggest there may be support for a limited number of uniform indicators across wildernesses. For example, opportunities to view wildlife, evidence of vegetation and tree damage, and litter were conditions that would appear to have negatively influenced visitors across all three wilderness areas. Conditions for which this influence seemed to vary across all three wilderness areas included camping restrictions, number of groups and vehicles seen, level of solitude, number of permanent structures, distance between campsites, and noise. Overall, uniformity was evident for the three conditions that were of the highest concern for visitors to all three wilderness areas (e.g., litter and vegetation damage).

The question of uniformity versus variety in selecting condition indicators for the NWPS may be dependent upon the type of condition. For example, indicators of physical conditions (especially litter, resource damage, and wildlife viewing opportunities) may be suitable for diverse wilderness areas. In

contrast, indicators representing social and managerial conditions may be more unique to specific areas, or types of areas, in the NWPS. **IJW**

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WILDERNESS-DEPENDENT WILDLIFE

The Large and the Carnivorous

BY DAVID MATTSON

Abstract: Wilderness is vital to the conservation of wildlife species that are prone to conflict with humans and vulnerable to human-caused mortality. These species tend to be large and are often carnivorous. Such animals are typically problematic for humans because they kill livestock and, occasionally, humans, and cause inordinate damage to crops. The vulnerability of large herbivores and carnivores to humans is exacerbated by vigorous markets for wild meat and other body parts, widespread human poverty, and human societies prone to the breakdown of civil order. The survival of wilderness-dependent wildlife is thus not only linked to the preservation of extensive wilderness but is also affected by the health of human societies. Because overt intervention has limited uses in the preservation of wilderness-dependent wildlife, these animals pose a special problem for humanity. Their survival requires that we forgo domination of a substantial portion of the remaining wildlands on Earth.

Siberian tigers. Photo courtesy of Hornocker Wildlife Institute.

HENDEE AND SCHOENFELD (1978) introduced the concept of wilderness-dependent wildlife more than twenty years ago. Wilderness-dependent species are those "... vulnerable to human influence, whose continued existence is dependent on and reflective of ... wild, extensive, undisturbed habitat. ..." Historically, this concept has not been widely used to help organize our thinking about conservation. However, it promises to serve an important role in conservation because wilderness-dependence encompasses issues of fundamental importance to how we relate, not just to wildlife, but to each other. Suffice to say, it is vitally important for those interested in conservation to identify species dependent on wilderness for their survival, because in these cases, short of relegating the animal to zoos, active intervention has limited long-term prospects.

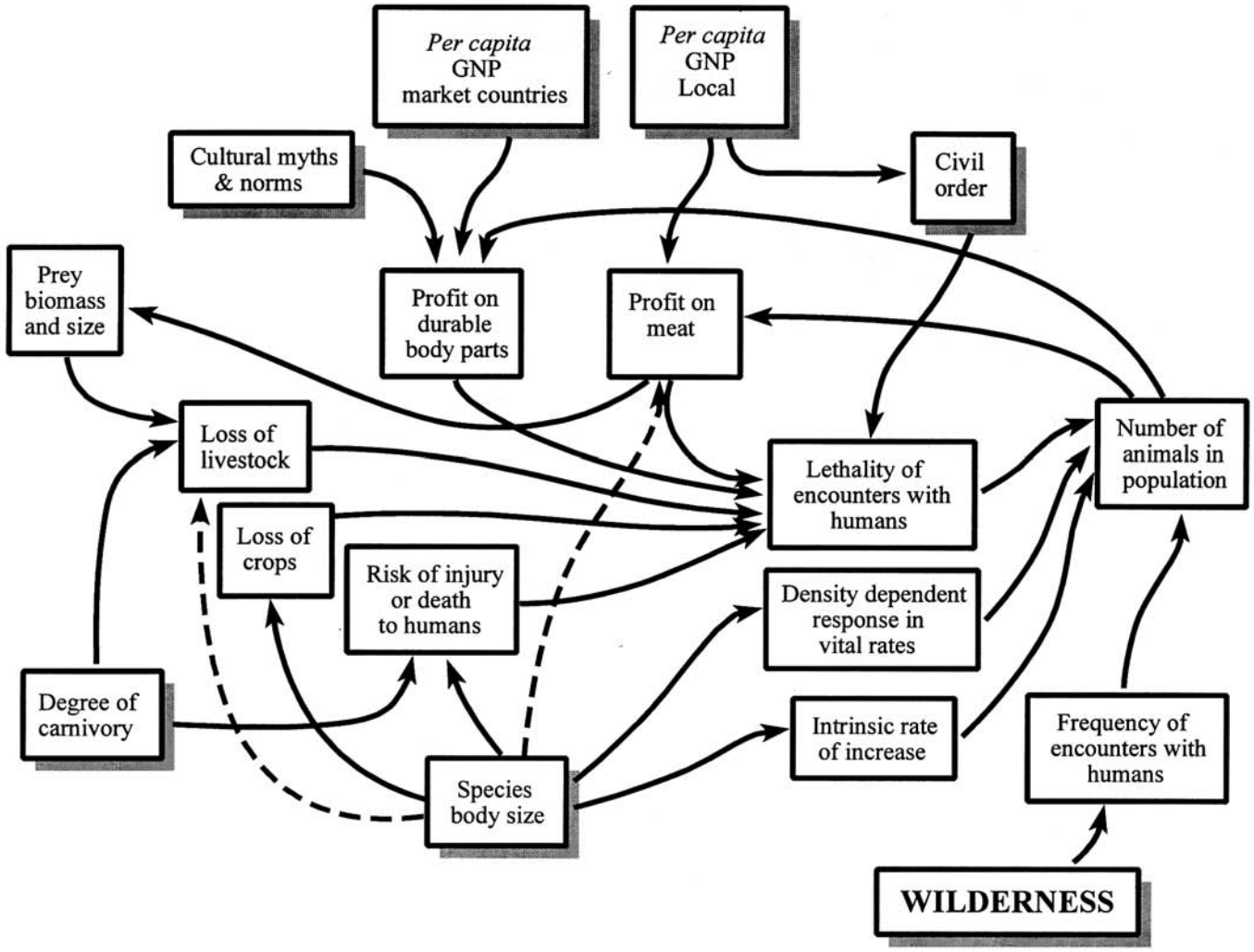
A Definition of Wilderness for Wildlife

Wilderness serves a functionally different purpose for wildlife conservation than for human recreation. Survival rather than intangibles is paramount. Although the psychological well-being of individual animals is of concern to some people, this issue is of far greater consequence to the management of wilderness for humans than it is for the conservation of wildlife populations at risk of extirpation. Wilderness can also serve to preserve natural behavior and processes that naturally regulate wildlife populations. However, the worldwide decline of numerous species in the last several decades emphasizes the paramountcy of simple physical persistence. Persistence of populations depends on birth rates exceeding death rates. Humans can affect birth rates of wild animals by changing vegetation structure and, along with it, food abundance. However, humans have had their most dramatic impacts on wildlife as predators.

Thus, for purposes of conservation, wilderness primarily betokens an environment with few humans where, as a consequence, animals vulnerable to direct contact with humans can find refuge. Species associated with habitats subject to widespread destruction by humans may also benefit from a relative absence of humans. Indeed, there is often a positive association between few humans and habitat structure perpetuated by intact ecosystem processes. However, as with the northern spotted owl (*Strix occidentalis caurina*) in North America, it is more often the case that species sensitive to habitat structure will respond to changes in vegetation management without requiring seclusion from humans. The most salient feature of a wilderness-dependent species is the need for seclusion as a means of directly enhancing survival.

(Peer Reviewed)

Figure 1—Major Factors That Determine Wilderness-Dependence of Wildlife Species



Why Are Some Species Wilderness-Dependent?

Some characteristics of wilderness-dependent wildlife are predictable. Given that wilderness-dependence derives from conflict with humans and from vulnerability to human-caused mortality, these characteristics are both human and wildlife related. Even so, some features are more closely identified with the animal while others are more closely identified with humans. Some factors are also more amenable to change. Most of these happen to be identified with the culture and behavior of humans rather than the behavior or morphology of wildlife. In defining the salient features of wilderness-dependent wildlife I have, therefore, acknowledged affinities with the biological and anthropological realms, and have highlighted features, aside from the area of wilderness, that are potentially subject to intentional change (see Figure 1).

Biological Factors

Wilderness-dependent animals tend to be large. There are several important reasons for this. First, large animals tend to be less resilient to human-caused mortality. This is a consequence of predictable declines in fecundity and potential population growth rate as average body size of a species increases. This underlies the related tendency for large animals to exist at low densities. Large animals also tend to exhibit density-dependent responses in survival and reproduction only at densities near carrying capacity, and so have a limited ability to compensate for increases in mortality when they are already exploited. Thus, all else equal, populations of large animals are more vulnerable to extirpation than populations of small animals. If humans are the primary agent of death, then large animals require a correspondingly greater level of protection from contact with humans. This has been clearly demonstrated for ungulates and primates subject to subsistence and market hunting in impoverished developing countries. Larger-bodied species have often been severely depleted while smaller-bodied species have survived or even flourished.

Second, large mammals are more likely to be killed because they more often pose

Grizzly bear. Photo courtesy of Schleyer/Interagency Grizzly Bear Study Team.

a physical threat to humans or cause more per capita damage to crops. Rhinos (*Rhinocerotidae*) and elephants (*Loxodonta africanus* and Elaphus maximus) are notorious in this regard. Elephants have killed a surprising number of people. Even though populations of these pachyderms have dramatically declined, human victims still receive considerable attention and provide a sometimes legitimate rationale for continued lethal resolution of conflicts in the relatively few places where crop damage still occurs. In addition to these better-known species, many larger ungulates and, in places, bears (*Ursidae*), are implicated in damaging crops that are sometimes critical to the survival of individual subsistence farmers or owned by wealthy and politically powerful individuals.

Third, large animals also tend to be preferred by meat hunters, whether for subsistence or market. Although this preference is modified by cultural and market considerations, large animals tend to be selected by hunters, who focus their attention on small prey only after depleting the large. These impacts of meat hunting are not trivial. In many areas of Africa and South America, as well as remaining wild areas of Asia, meat from wildlife is a major source of dietary protein for humans. The current market for wild meat is economically potent, partly because of a seemingly irreducible cross-cultural human preference for protein and fat that drives demand until all wild game is extirpated or alternate sources of protein are found.

Wildlife behavior is another "biological" factor related to wilderness-dependence. The inherent aggressiveness of a species can make it a threat to human safety, thus precipitating retaliatory or preventive killing by humans. The importance of this factor is highlighted by differences in aggressiveness between North American black and brown bears (*Ursus americanus* and *U. arctos*, respectively), related human responses, and the greater ability of the less aggressive black bear to coexist with humans. Given that many megaherbivores also tend to be aggressive in their defense of space, young, or access to food (e.g., rhinos, elephants, buffalo [*Synceros coffer*], and bison [*Bos bison*]), lethal human responses to this aggression compound the body-size related vulnerability of these animals to human-caused mortality.

Predaciousness is perhaps of greater importance than aggressiveness per se in determining whether a species can abide contact with humans. Wherever carnivores come into contact with domestic livestock there is some level of depredation. The almost universal human response has been and continues to be eradication of the offending carnivores. Ironically, in almost all instances humans have exacerbated this conflict by reducing or eliminating native prey, thereby leaving domestic livestock as the only prey available to the remaining predators. Again, it is the largest predators that are most vulnerable, not only because of low reproductive rates, but also because their preferred prey is among the first to be eliminated with agricultural expansion. The largest predators, such as lions and tigers, are also more likely to resort to predation on humans. These predators are typically inexperienced or debilitated by age, disease, or injury. This scenario of prey reduction, human retaliation for depredations on livestock, and eventual extirpation has been and continues to be played out worldwide.

Finally, of the biological factors, wilderness-dependence is potentially affected by whether wildlife are vectors for diseases detrimental to human economic interests, or whether in turn the wild species is vulnerable to diseases propagated by domesticated animals. The former issue is well illustrated by the case of bison in North America, where there are grave concerns among livestock owners about the transmission of brucellosis from bison to domestic cattle. The latter issue is exemplified by the fates of canids (i.e., wild dogs [Lycaon pictus] and Ethiopian wolves [Cams simensis]) affected by canine distemper and rabies transmitted primarily by dogs, and by the history of large antelope infected by the rinderpest virus in East Africa.

Human Factors

Humans kill wild animals for many reasons. These reasons can include primal needs for critical nutrients such as protein and energy (as discussed above), fear of death or injury, the desire to eliminate competition for economic resources, the desire for wealth and related power, or spiritual incentives. Some of these motives are rooted, in the most fundamental sense, in our own imperatives to survive and reproduce. The first three reasons fall in this category. Manifestations of the other

motives are substantially influenced by culture, and thus potentially subject to long-term change or considerable variation among societies and nations.

Some animals are destined to be wilderness-dependent, at least in the near term, because they have high commodity values and are not amenable to being ranched. I have discussed the importance of meat marketing above—but the focus here is on culturally idiosyncratic traits that engender markets for body parts. This is exemplified by the penchant of Yemeni men for dagger handles made of rhino horns and by the medicinal uses of tiger bones, rhino horns, and bear parts in Asia. Similarly, the worldwide lust for pelts of exotic predators such as the snow leopard (*Panthera uncid*) and for elephant ivory has been fed not by basic need, but by a sense of esthetics and the quest for status.

The power of these motives is illustrated by the fact that, as much as rhinos, elephants, and tigers have been reduced in numbers for other reasons, the single-most important cause of declines has been a culturally defined demand for their body parts. Prior to the last few years, there was much fanfare about the extent to which international prohibitions and education had been able to curb this demand. However, the strength of cultural traits, exacerbated by rising affluence in Asia and the opening of formerly closed markets in China and Russia, has been reflected in recent upsurges in poaching of elephants, tigers, rhinos, and bears.

Finally, of the human-related factors, the extent to which wildlife depends on wilderness for survival is influenced by long-term disparities in wealth among humans, the prevalence of poverty, and the related stability of human societies. Numerous studies have shown that positive attitudes toward otherwise problematic wildlife are positively associated with affluence and education. Similarly, extinction risks for mammals and rates of environmental degradation are negatively related to per capita gross national product. Aside from engendering chronic conflict with vulnerable, wilderness-dependent wildlife, poverty and inequity also inevitably lead to conflict among humans. When this happens, wildlife that were previously thought to be secure in some well-protected reserve can be slaughtered, and in some instances, eliminated altogether. Thus, even in places such as Chitwan National Park in Nepal, where rhinos and tigers were thought to be safe because of local incentives and high levels of protection, the collapse of a government could lead to rapid endangerment of megaherbivores and large carnivores. Put another way, the extent to which survival of vulnerable species depends upon remote habitat, little used by humans, will likely vary with the long-term health of human societies.

The Limits of Intervention

Humans have successfully used technology to appropriate much of the Earth's resources and thereby increase carrying capacity for our species. We have concurrently used scientific insight to manipulate animals and their habitats to achieve this usurpation without losing more species than might have otherwise been the case. Even so, some species pose a dilemma—that is, their preservation poses a problem that is unresolvable unless we redefine the problem. Among these species are those that I call "wilderness-dependent."

Several techniques exist for conserving wilderness-dependent wildlife, aside from preserving wilderness for their use. For example, electric fencing has been touted as a means of diverting elephants and rhinos from agricultural lands. Yet this merely serves to ameliorate some immediate difficulties and exacerbates long-term problems by eliminating additional habitat while sometimes encouraging the fatal (to pachyderms) continued expansion of humans and agriculture. As much as trade in body parts has reduced pachyderm populations, their distributions are sharply curtailed by human settlement. Where humans are most numerous in Africa and Asia, large herbivores are becoming almost wholly restricted to reserves and other wildernesslike settings.

Much has been written about the prospects for captive breeding. Yet, if there is no native habitat where these animals can survive on their own, we have surely lost the "wildness" of this wildlife. Focus on this technique has also contributed to lost opportunities for more productive conservation measures, especially for species such as the Sumatran rhino (*Dicerorhinus sumatrensis*) that have not responded to captive breeding efforts.

The importance of using conventional incentives to recruit local support for and investment in conservation of wilderness-dependent wildlife is widely known. While this is indisputably important, it is nonetheless premised on the existence of wildernesslike reserves. It is viewed primarily as a means of reducing poaching and recruiting local political support for the continued existence and possible expansion of such reserves. However, these measures can be rendered totally ineffectual in a very short period of time with the collapse of civil order. Given the level of social turmoil in most of the world, it seems a very uncertain long-term tactic to rely on human kindness, in a proximal sense, for the survival of wilderness-dependent wildlife. There are limits to which people can be enticed to accept animals that kill livestock, damage crops, and pose a potential hazard to human safety In the absence of fundamental changes in human cultures, the survival of these species rests on the availability of habitat that is remote from humans and the vagaries of human society and politics.

Legal protection from human-caused mortality is indisputably important to the survival of wilderness-dependent wildlife.

Legal protection from human-caused mortality is indisputably important to the survival of wilderness-dependent wildlife. Yet the nature of conflict between these species and humans engenders what I call an irreducible level of mortality. This is strikingly revealed by animals

such as grizzly bears and wolves (Canis lupus) in an affluent country such as the United States of America. Here, despite rigorous protection by federal laws, compensation programs for livestock losses and other control of inherently problematic situations, virtually all grizzly bears and wolves that die are still killed by humans. Despite this, increased lethal resolution of conflicts has been espoused as a management tactic, as a means of promoting local support. For both of these species, survival remains fundamentally tied to wilderness.

Having outlined the limits of intervention in the preservation of wilderness-dependent species, conservation of these animals is often confounded by a double bind. Wilderness conditions are rapidly disappearing from the Earth. Survival of wilderness-dependent animals is thus likely to depend on the willingness of humans to protect much of the wilderness that is left. For these species, this wilderness cannot be defined in terms suitable to some psychological needs of humans. Small parcels of officially designated wilderness surrounded by urbanized or agricultural landscapes will not work. Even with legal protections, there is surprising unanimity among felid biologists that wildernesslike reserves need to be more than 2,000 square kilometers. The same has been suggested for African elephants. For grizzly bears and wolves, reserve sizes may need to be even larger. Even so, it is arguable that the size of a reserve will need to vary with the lethality of local humans (i.e., where humans are less tolerant and otherwise more prone to kill wilderness-dependent species, these animals will require even greater protection by virtue of remoteness—even greater expanses of intact wilderness). Yet it is precisely in countries where humans are antagonistic toward wilderness-dependent wildlife that there are probably fewer chances of reserving the requisite greater amounts of wilderness. It is in these areas that we have probably either lost or stand the greatest chances of losing wilderness-dependent wildlife.

The Value of Wilderness-Dependent Wildlife

It is intriguing that survival of wilderness-dependent wildlife is probably linked to the affluence and education of humans, and to the stability of human societies. Few would disagree that the well-being of humans is also linked to the alleviation of poverty, increases in education, and the achievement of equitable and stable societies. Thus, in many places, the status of wilderness-dependent wildlife is a mirror for the plight of humanity.

Perhaps the most important implication of wilderness-dependent wildlife is that there are limits on the extent to which humans can occupy and dominate the Earth. The full complement of Earth's biodiversity is at least partly dependent on the existence of well-distributed and extensive wilderness conditions. Implicitly, there are limits to the extent that humanity can use the Earth's resources and simultaneously meet conservation aims by technological fixes. Wilderness-dependent wildlife require that we forgo prerogative to the entire Earth if we want them to survive. In this way, these species have the potential to play a radically transforming role in the evolution of human worldviews and spirituality. **IJW**

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WILDERNESS AND RECREATION IN NEW ZEALAND

BY GORDON R. CESSFORD AND PAUL R. DINGWALL

Abstract: New Zealand has a rigorously defined approach to management of wilderness within an extensive system of conservation lands. A major challenge confronting conservation managers is how to maintain and enhance wilderness qualities in the face of changing recreation demands, accentuated by significant tourism growth. While the formal designation of wilderness areas will remain fundamentally important, the integration of wilderness qualities and recreation needs will also need to be addressed in other backcountry areas.

CONSERVATION LANDS COVER ALMOST 30% of New Zealand (see Figure 1), a country with a total area of 103,500 square miles (270,500 square kilometers), or approximately two-thirds the size of the State of California. Subject to their primary biodiversity protection roles, these conservation lands are also the principal settings for backcountry recreation and the predominantly nature-based tourism of New Zealand. Formally designated "Wilderness Areas" occupy a very small proportion of these lands (see Molloy, *IJW*, vol. 3, no. 2, for wilderness management policy).

Most conservation lands are located in challenging mountainous terrain remote from the major population centers. Until the 1970s, this was an adequate buffer against increasing recreational pressures. However, in what became locally termed a "backcountry boom" (Mason 1974), recreational use levels began to grow more rapidly, reaching as much as 300% in some key areas between 1970–1985 (Davison 1986). Initially most of this growth resulted from greater interest in outdoor recreation among New Zealanders, made possible by increasing affluence, mobility, improved access, information and leisure time. But since the early 1980s, outdoor recreation growth has become dominated by overseas tourists, whose numbers have increased tenfold since 1970 to around 1.5 million per year.

More than half of these tourists make visits to conservation lands, where traditionally their activities have been concentrated on sightseeing and short scenic walks at a few key sites along a distinct tourist circuit. However, data from the New Zealand International Visitor Survey (New Zealand Tourism Board 1996) show that in recent years the scope of tourist activities and variety of sites visited in New Zealand have broadened rapidly, and now encompass a wider range of conservation lands. Apart from raising concerns about the spread of environmental impacts, these changes in recreation and tourism patterns present a threat to the quality of recreation experiences available both in Wilderness Areas and in other conservation lands.

Recreation Experiences in Wilderness Areas

The recreational experiences provided in New Zealand Wilderness Areas are represented by the "Wilderness" opportunity class in the New Zealand Recreation Opportunity Spectrum (ROS) (see Figure 2). While this class is essentially equivalent to the "Primitive" opportunity classes usually defined in U.S. ROS systems, it is more extreme as absolutely no recreation facilities or services are allowed.

Figure 1—Existing and Proposed Wilderness Areas in New Zealand

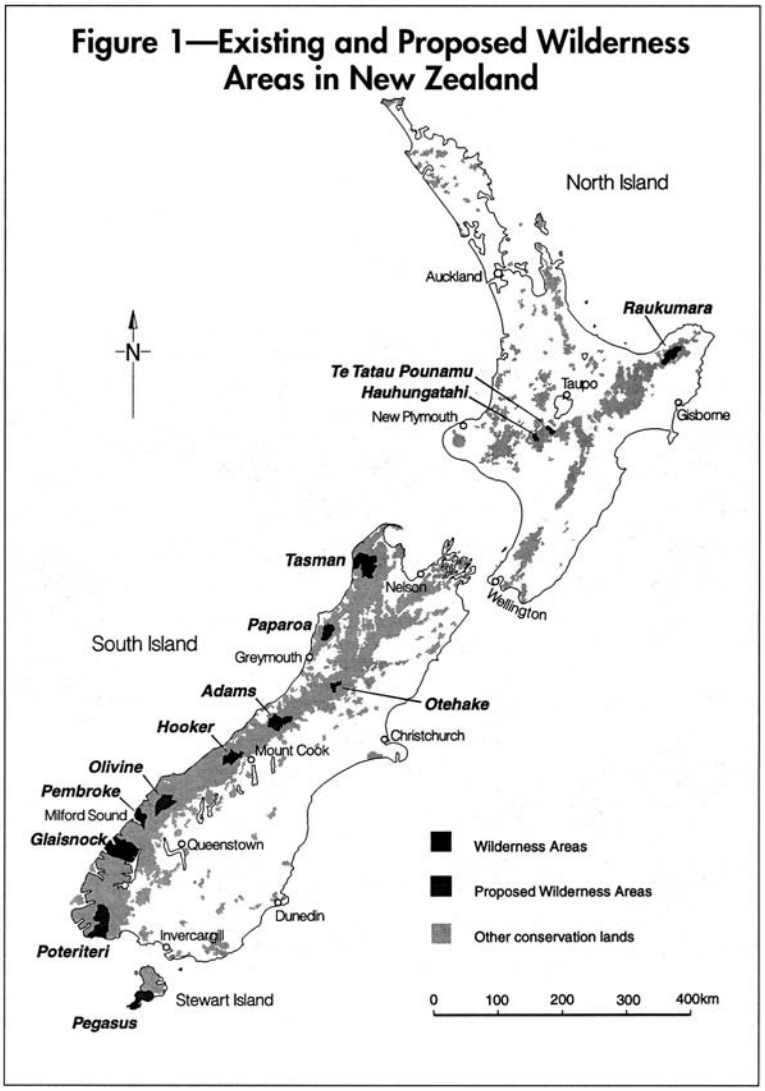

Figure 2—Opportunity Classes in the New Zealand Recreation Opportunity Spectrum (After Taylor 1993)

Urban	Urban Fringe	Rural	Backcountry			Remote	Wilderness
			Drive in	4X4 Drive in	Walk in		

The physical setting requires a natural landscape with no apparent modification and no huts, tracks (trails), bridges, signs or other facilities. No motorized access is allowed, and at least half a day's walk by foot is generally required from any motorized access point (road, air, or water). Once in the Wilderness Area, foot access is dependent upon the prevailing environmental conditions, and the resources, experience, and skills of the individual to cope with them. The quickly changing weather patterns and nagged terrain in New Zealand require that wilderness parties be prepared for any weather conditions and to sit tight for many days if necessary when trapped by flooded rivers and storms.

The management setting requires that there be no discernible management presence, and any exceptions for specific environmental management tasks or for search-and-rescue operations must be temporary and unobtrusive. The serious threats to the survival of the natural indigenous flora and fauna of New Zealand conservation lands from foreign animal pests, such as deer, stoats, cats, and brush-tail possums, require that aircraft are often used in control operations, and that basic staff facilities may also be temporarily located inside Wilderness Areas. For safety, many wilderness parties now carry radios to receive weather forecasts or to alert authorities, should assistance be required, although parties are expected to be self-sufficient unless in extreme emergency.

The social setting emphasizes small party sizes (the minimum recommended for safety is four) and minimal likelihood of any interaction with other groups. Wilderness visits are likely to be of several days duration and physically strenuous due to rugged terrain and the need to carry all necessary clothing and equipment. Under these conditions the activities most often possible are the backcountry extremes of tramping (hiking), mountaineering, hunting, fishing, canoeing, rafting, and some specialized nature tours. In most cases, overseas tourists do not have adequate local knowledge, equipment, experience, time, or backcountry skills in camping, route finding, alpine travel, and river-crossing to undertake such wilderness recreation opportunities unassisted.

The consequent visit experience includes an extremely high probability of isolation from the sights, sounds, and activities of other people, and little likelihood of interaction with other visitor groups. Visitors must apply their outdoor skills and fitness, and it is likely that there would be a high degree of closeness to nature with a sense of discovery, solitude, and freedom. This visit experience is what could be considered the New Zealand version of the "purist wilderness experience." Only the "Remoteness Seekers" from the range of visitor groups to conservation lands (see Table 1) aspire to these experiences. The New Zealand Wilderness Areas fulfill these purist expectations, and the extremes of weather, terrain, river conditions, and remoteness they encompass have ensured that, apart from the notable exception of overflights by aircraft, the growth of tourism has not yet significantly intruded on these experiences. However, such intrusions are progressively more evident in other conservation lands.

Users of New Zealand Wilderness Areas must be fit, experienced, and completely self-sufficient in difficult conditions. Photo by Gordon Cessford.

Recreation Experiences in Nonwilderness Backcountry

Outside designated Wilderness Areas lie extensive areas of conservation lands with few human settlements, little reading, and broad tracts of landscape free of obvious human alteration. Recreational access to these areas is primarily by foot trails. While often very similar to wilderness areas, many of these "Remote" and "Backcountry Walk-in" areas do not sufficiently meet the rigorous wilderness criteria to be formally designated as wilderness areas, although the distinctions is often not apparent. In the U.S. system, such areas would likely be categorized under the generic "wilderness" label.

Over a long period, an extensive network of walking trails (10,000 kilometers) and backcountry huts (almost 1,000) has developed in many of these areas. Trail types include the highly developed and maintained walks, the marked and formed tracks, and the often unmarked and unformed routes. Huts vary from small and basic shelters to large huts with gas cooking, heating and lighting, mattresses, running water, flush toilets, and supervision by wardens. Camping is largely unrestricted, except along the more popular and developed tracks, where it is sometimes confined to specified sites. These tracks and facilities support the bulk of the backcountry recreation currently occurring in New Zealand.

Most backcountry activity involves tramping, concentrated particularly on the eight "Great Walks," the busiest of which receive up to 10,000 walkers over the six-month "summer" walking season. These are the premier backcountry walks in New Zealand, managed to a high level of development due to their high use levels and importance for the tourism industry. These tracks provide the settings used primarily by the "Backcountry Comfort-Seeker" visitor group. By contrast, the traditional tramping trip of New Zealanders has usually been based on widely dispersed use of less developed backcountry tracks and facilities. These tracks provide the settings used primarily by the "Backcountry Adventurers" and some "Remoteness Seekers."

While growth in the numbers of New Zealanders using these backcountry areas appears to have recently stabilized, overseas visitor numbers have continued to increase in key settings such as the Great Walks. Numbers on the more backcountry-oriented tracks are lower, usually numbering in the hundreds, but there are clear indications that visitor use is diffusing from the main tracks as overseas visitors exchange "word-of-mouth" information about new places where "there are not so many people." Once this information makes its way into the popular travel guidebooks and the new areas are "discovered" by the more adventurous tourists, change in use levels may be rapid.

In some cases it is apparent that this localized increase in overseas visitors, and their progressive dispersion

Table 1—Recreation Features of Visitor Groups to Conservation Lands in New Zealand.

	Visitor Groups to Conservation Lands						
Recreation Features	Short Stop Visitors	Day Visitors	Thrill Seekers	Overnighters	Backcountry Comfort Seekers	Backcountry Adventurers	Remoteness Seekers
Settings and Accessibility	Roadside travel breaks or attraction visits for up to 1 hour.	Across most of ROS, often coastal/lake/river sites. Road access, often long travel times.	Natural/spectacular sites across ROS. Access by vehicles (land/sea/air), or short well-built tracks.	Rural/Backcountry drive-in and boat-in to camps or other overnight facilities.	Backcountry walk-in, good transport links to high-use walking tracks, some boat/air options.	Back-country walk-in and Remote. Variety of less developed tracks, boat/air options unommon.	Remote/Wilderness. Basic track access to edges, no tracks, facilities, signs or boat/air options within.
Nature of visit and activities	Passive viewing and short easy walks in casual sightseeing recreation.	Day at a site/day doing a specific activity. Facilities allow casual visitors.	Exciting/extreme activity. If more than 1 day, then Backcountry Adventurers.	Camping main use, base for variety day activities. 1 night to 1+ weeks. Often regular holiday spot.	Mostly tramping well developed tracks (Great Walks). 2-5 days, with 1 night at each hut/camp.	Tramping/ backcountry activity, high self-reliance. 2-7 days or longer. Some specialised day visits.	Tramping/backcountry activity, total self-reliance. 3-7 days or longer.
Experience sought	Convenience or easy visit to attractions, scenic or of historical, cultural, natural significance.	Social group visit or specific activity in outdoor natural setting. Sense of space and freedom.	Managed risk in exciting outdoors. Attractive and natural setting desireable.	Traditional NZ family summer holiday. Mainly overnight stays, associated outdoor activities.	Backcountry walking in managed safe conditions. Often first introduction to NZ backcountry settings.	Traditional NZ experience in backcountry, challenge, sense of freedom, accept some risk/difficulty.	Activities with purist wilderness experiences, challenge, freedom, accept much risk/difficulty.
Facilities sought	Quality carparks, toilets, interpretation and information facilities and short tracks catering for most abilities and ages.	Quality road access, toilets, carparks, picnic sites, good access to tracks and waterways important.	Specilised facilities (e.g skifields, bungy ramps) or key natural features (e.g cliffs, rapids, caves). Often commercial agents.	Basic camp facilities (toilets, water), and high activity facility standards. Some seek developed sites. Activity information important.	Quality tracks, bridges, huts, camps, signs. Often hut wardens. All-weather access. Some commercial provision of opportunities.	Basic facilities, varying standards of huts, tracks, route-marking, limited signs and key bridges. Access often subject to weather/environment.	No facilities once in remote/wilderness areas. Access totally subject to weather/environment.
Visitor types and numbers	NZ and overseas visitors. High numbers if sites at scheduled stops or key attractions.	NZ and overseas, med-high numbers. Sites for local repeat users or non-local one-off visits.	Young and affluent. Low numbers if independent activity, high numbers if commercial operation.	NZ family groups stay longer, independent overseas mostly 1 night while touring country. High peak summer use.	Often mostly overseas aged 20-40. NZ ages wider. Inexperienced relative to other NZ backcountry visitors.	Experienced, fit, young, male, NZ in low numbers. Fewer overseas, lack required knowledge, experience, opportunity.	Experienced, fit, young, male, NZ in very low numbers. Overseas rare, lack required knowledge, experience, opportunity.
Projected use	Rapid overseas visitor growth, pressure around main tourism highways and attractions.	Growth rapid for overseas visitors and slow for NZ. Pressure on sites used mainly by non-locals.	Demand in activities popular with overseas visitors. Supply pressures may intrude on other sites.	Slow increase, where most visitors NZ, pressure at key sites "discovered" by overseas visitors.	Rapid increase in overseas numbers. NZ numbers static, or even declining (crowding displacement).	Slow increase as most from NZ. Displacement from busy tracks may lead to growth in someareas.	Slow increase as most from NZ. Overseas visitor growth limited by current management conditions.
	FRONTCOUNTRY FOCUS				BACKCOUNTRY FOCUS		

(derived and developed from Visitor Strategy categories - Department of Conservation, 1996)

Backcountry ski-mountaineering in a setting where air access, sightseeing overflights, and a few alpine huts prevent any designation as a Wilderness Area. Photo by Gordon Cessford.

to less-used backcountry areas has affected how New Zealanders feel about their backcountry experiences. While no specific research has been undertaken, observations by management staff over time and anecdotal accounts from backcountry enthusiasts provide numerous examples of displacement. Until recently the Milford Track was unique among tracks in New Zealand in having a limit imposed on visitor numbers and requiring reservations. However, a similar reservation system has recently been applied to address crowding issues on the popular Routeburn Track, where it was not uncommon for the 40-bunk huts to accommodate up to twice their capacity during the peak tourism periods. Such regulation further conflicts with the attitudes of New Zealanders who have traditionally valued freedom of the outdoors as one of their defining cultural attributes. The imposition of such regulations, along with the effects of overseas visitor diffusion, are the main concerns for maintaining high-quality backcountry recreation experiences. For many observers, these backcountry areas are where wilderness experiences are being most compromised, while the true wilderness areas remain largely unaffected.

The vast bulk of New Zealand and overseas visitors confine their activities to the front country, and this use is projected to continue increasing with overseas tourism growth and a progressively aging New Zealand population.

Distinguishing Front Country Recreation

On the margins of backcountry areas and alongside road corridors through conservation lands lies an undefined zone commonly termed the front country. In practical terms this includes any areas directly accessible from formed tracks within 1-2 hours walk of major roads. The vast bulk of New Zealand and overseas visitors confine their activities to the front country, and this use is projected to continue increasing with overseas tourism growth and a progressively aging New Zealand population. These visitors are the Short Stop Travelers, Day Visitors, Thrill Seekers and Overnighters described in Table 1, each contributing to the greater diversity of recreation in the front country. One of the challenges facing management is to maintain those aspects of visitor satisfaction which are derived from these peoples' perceptions of natural quality, or keeping some of the "wilderness" in their recreation.

Keeping the "Wilderness" in Recreation

Keeping the wilderness in recreation for Remoteness Seekers in wilderness areas is not difficult, unless management conditions are altered and intrusions are allowed for inappropriate recreation activities. However, when considering the other visitor groups outside the Wilderness Areas, this management challenge involves identifying those elements central to their perceptions of "wilderness qualities," and applying management for protection and enhancement of such qualities.

Identifying key elements of wilderness experiences among different visitor groups is a considerable management challenge. As described in the Wilderness Policy (See Malloy *IJW*, vol. 3, no. 2), the idea of wilderness is very personal and embodies perception of remoteness and discovery, challenge, solitude, freedom, and romance. A wilderness experience is not completely determined by the characteristics of the physical setting, but how the setting and the visit to it are perceived by the visitor. For example, the Greenstone Valley near Queenstown is largely managed as a setting for backcountry tramping experiences suitable for "Backcountry Comfort-Seekers," but it is also a renowned trout fishery and among only six rivers classified as a "wilderness fishery of national importance" (Richardson, et al. 1985). Rivers classified

as such were characterized by a combination of remoteness, foot access, good catch rates, dry-fly only, large fish, extensive fishable water, scenic beauty, and solitude. In this case anglers demonstrated their own array of setting and activity qualities that comprised their "wilderness experiences," but which did not fulfil the requirements for a wilderness area.

While recognizing such activity-specific aspects, maximizing the general qualities of "wilderness in recreation" outside the wilderness areas will require management that reinforces visitor perceptions of: (1) unaltered natural settings; (2) low-impact and experience-sensitive facilities and services; (3) unobtrusive regulatory presence; and (4) minimal apparent visitor numbers.

Recreation planning and management should promote these four principles wherever possible. Wilderness Areas completely fulfill these elements, but managers face more difficulties in other areas. For example, while the Milford Track is not in a designated Wilderness Area, it traverses remote and spectacular mountainous terrain of high wilderness quality, and fulfills the "wilderness" expectations of many visitors. A well-formed track, good huts, and limited visitor numbers combine to promote "wilderness experiences" among track walkers who represent the "Backcountry Comfort-Seeker" visitor group (see Table 1). Yet current impact research (Cessford 1997) highlights aircraft noise as a negative impact on almost 70% of these visitors. Moreover, although Milford Track numbers are controlled to minimize crowding, perceptions of congestion are created by a bottleneck at an alpine pass, where congregation of walkers at an extensive scenic attraction is accentuated by the daily walking pattern between huts. While visitor satisfaction remains apparently high, such a finding suggests the quality of the anticipated wilderness experience is being compromised. In this case, changes promoting alternatives for both flight paths and daily walking patterns may provide a means to enhance the "wilderness components" of their visitor experiences.

As a further example, in the case of a roadside site managed primarily for "Short-Stop Visitors," management to maximize the "wilderness components" of their visitor experiences may require emphasis on design and layout of facilities, maintaining highly natural appearance, and finding means to minimize the apparent visitor numbers (e.g., visual layouts). It may not be a true wilderness experience, but even in this roadside context there are means by which "wilderness qualities" can be promoted. Such specific management of particular visitor components may be the main answer to providing the "wilderness in the recreation" outside the Wilderness Areas.

Conclusion

In the face of growing recreation pressure, the greatest threat to maintaining real wilderness experiences does not lie in the Wilderness Areas themselves, but in the related backcountry areas. Particular attention is needed for those tracks in backcountry that are being progressively "discovered" by overseas tourists. Generally though, the pressures for substantial development are on the areas most popular for tourism, mainly on the Great Walks and other more developed tracks, on the front country areas near key tourism attractions, and along tourism highways. Overall, while there are some recreational and tourism pressures on wilderness experiences, biological conservation issues remain far more critical. The underlying conservation values of wilderness and other natural areas continue to be seriously eroded every day by the ongoing pressures from invading animal and plant pests. This deterioration of fundamental wilderness quality is a phenomenon only the most aware wilderness users would notice. **IJW**

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ANNOUNCEMENTS AND WILDERNESS CALENDAR

BY WOODY HESSELBARTH, WILDERNESS DIGEST EDITOR

Fees for Wilderness Tested in Demonstration Program

In a nationwide demonstration program the U.S. Forest Service has been authorized to test collection of user fees at 100 demonstration areas, with 80% of the fees kept for management of the collection site. Fifty sites have been identified for participation in the test, including the Desolation Wilderness in California where the Aldo Leopold Wilderness Research Institute is evaluating results. Look for their report next year on this potential important innovation that could help fund management of heavily used wilderness areas.

U.S. Forest Service Issues Outfitter-Guide Administration Guidebook

This 200-page document, issued February 1997, provides "guidance" to agency permit administrators and outfitter guides. The compilation, principally authored by Ron Erickson, Steve Morton, and Ed Stellmach in the Missoula, Montana, regional offices, provides valuable interpretation and explanation of U.S. Forest Service policy as outlined in the agency manual and handbook. With use of wilderness increasing, and with competition between public and privately outfitted use also increasing, this "guidebook" will be valuable because it provides clear explanations and examples in a complex area of policy.

Washed Out Cabin Creek Airstrip to Be Repaired in Frank Church-River of No Return Wilderness

The Cabin Creek airstrip in the heart of the Frank Church-River of No Return Wilderness in Idaho was washed out during flooding in 1996. It will soon be repaired using horse-drawn equipment (fresnos, slips, graders, rollers, and wagons), which were determined in the environmental analysis to be the minimum necessary tools to complete the job. The project will require moving and compaction of 1,200-1,500 cubic yards of material from designated areas adjacent to the airstrip. A majority of this

material will come from a 350-foot disturbed stretch of Cow Creek, which will then be rehabilitated and stabilized using plantings of native vegetation. Repair of the airstrip will restore aircraft access to the central Big Creek drainage in the wilderness, while improving water quality and fish habitat. Contact the Krassel Ranger District at (208) 634-0600 for more information.

Videos on Sustainabilily

Griesinger Films has released a set of four videos that portray the new "ecological economics," challenging current national accounting systems. Existing economic models typically value "undeveloped resources" for their extractive potential and view the preservation of wilderness as "forgone" economic opportunity. Ecological economics views a more complex picture that finds sustainability of natural systems critical to the human enterprise. Although observers such as Jack Turner ("The Abstract Wild") may find such calculations horrifying, the ecological community and natural resource managers in particular increasingly frame the preservation of wilderness in economic terms. Conservation easements, land acquisition, and management budget requests are promoted for their nonconsumptive natural resource benefits.

"An Introduction to Ecological Economics," "Investing in Natural Capital," "Conversation for a Sustainable Society," and "Costa Rica Counts the Future" all paint portions of this collage of new economic ideas. Three of the four videos come with a study guide to the concepts presented. For more information contact Griesinger Films, 7300 Old Mill Road, Gates Mills, Ohio 44040, USA. Telephone and fax (216) 423-1601; e-mail: prgfilms@ix. netcom. com.

What Is the Central and Southern Sierra Wilderness Education Project?

The USA Wilderness Education Project (WEP) is an interagency partnership between the Sequoia, Sierra, Stanislaus, Inyo, and Toiyabe National Forests; Sequoia-Kings Canyon and Yosemite National Parks; and the Ridgecrest, Bishop, and Caliente Resources Areas of the Bureau of Land Management. These collaborators created the project in 1990 based on their belief that one key to successful wilderness management is education. Through the WEP's education programs, agencies and private partners work together to assure an enduring wilderness resource. (Excerpted from Central and Southern Sierra Wilderness Education Project, summer 1997.)

Recreation Students Go Wild

For the second consecutive year, students in the Recreation Administration Program, Natural Resources Management Department, Cal-Poly at San Luis Obispo, California, USA, have been teaching lessons from the kindergarten-eighth-grade Wilderness and Land Ethics Curriculum to San Luis Obispo and Santa Barbara County school children. Approximately 400 kindergarten-eighth-grade students have benefitted from this partnership between the interagency central and southern Sierras Wilderness Education Project, and Cal-Poly University. For more information about this project contact Bill Hendricks at (805) 756-1246; e-mail: bill_hendricks@nrm.calpoly.edu. (Excerpted from Central and Southern Sierra Wilderness Education Project, summer 1997.)

An Army of Wilderness Teachers ... YETI Takes the First Steps

The Yosemite Institute, USA, Yosemite National Park's Education Branch, and the Wilderness Education Program (WEP) took strides toward realizing the vision of an army of park and wilderness ambassadors with its four-day back-to-back Yosemite Environmental Teachers Institute (YETI) trainings. Two trainings were held this past July, one targeting kindergarten-fourth-grade teachers and the other targeting fifth-eighth-grade educators. The sessions were a rousing success! Teachers left the training with an appreciation for park and wilderness management and the lessons to be found (and taught) in these wild natural places. Many promised to send their peers to next year's sessions. For more information about YETI contact Pete Devine at the Yosemite Institute: (209) 379-9511. (Excerpted from Central and Southern Sierra Wilderness Education Project, summer 1997.)

USA Interagency Wilderness Strategic Plan Released

The USDA Forest Service, USDI Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, and National Biological Service have released their Interagency Wilderness Strategic Plan. A major focus of the 1994 National Wilderness Conference, the Wilderness Strategic Plan is the result of several years of effort by an interagency group that polled the wilderness community about federal wilderness management priorities. They identified 33 distinct areas of management action, grouped into five broad topic areas. The necessary actions are listed in priority for each topic beginning with the call for Preservation of Natural and Biological Values and followed by Management of Social Values, Administrative Policy and Interagency Coordination, Training of Agency Personnel, and Public Awareness and Understanding.

The plan provides federal wilderness managers with an outline for focused management planning and action to fulfill the intent of The 1964 Wilderness Act—to secure the benefits of wilderness "... for the permanent good of the whole people. ..." It also provides the greater community a clear measure to hold the agencies up against. As the introduction states: "While some of these actions are more general than others, and they all may not be equally important to each of our agencies, our commitment to progress in every one of these areas is unequivocal—America's 'enduring resource of wilderness' is too important for anything less."

Copies of this plan may be obtained by contacting Ralph Swain at the Arthur Carhart Wilderness Training Center, 20325 Remount Road, Huson, Montana 59846, USA. Telephone: (406) 626-5208.

Snowmobiles in Wilderness

An interagency group convened last spring to look at the issue of snowmobiles operating in classified wilderness. Growing numbers of snowmobilers and improvements in snowmobile capabilities have resulted in an increase in the reported amount of snowmobile trespass. This issue became front-page news last winter when Bobby Unser was cited for riding a number of miles into the South San Juan Wilderness in Colorado.

A wide range of concerns have been identified. Managers of wilderness areas near Yellowstone are concerned that potential use restrictions inside the park may lead to large numbers of snowmobilers being displaced to adjacent areas, some of which contain wilderness. Other managers report major difficulties in identification of wilderness boundaries; pressure from adjacent groomed snowmobile routes; riders seeking previously inaccessible terrain to engage in "highmarking"; and lack of resources for patrol, boundary identification, and enforcement.

For more information on the meeting or on the issues raised, contact Linda Merigliano, Bridger-Teton National Forest, PO. Box 1888, Jackson, Wyoming 83001, USA. Telephone: (307) 739-5010; e-mail: /s=l.merigliano/oul=r04f03a@mhs.-fsbo.attmail.com.

Silva Forest Foundation Offers Unique Workshops

The Silva Forest Foundation of British Columbia is now completing its fourth year of operation sponsoring and organizing a variety of unique workshops in ecologically responsible forest use. Ideas and methods presented in all workshops are based on maintaining ecosystem integrity—focusing on what to leave, rather than on what to take. Some workshops are designed for the general public, other workshops are specifically designed for those who work in resource management, or who have a solid understanding of the technical concepts used in resource management.

Silva's workshops provide practical training in ecosystem restoration and conservation. The ideas of ecologically responsible forest use are still very new to the world of resource management, but these ideas and methods are important for those seeking to use forest resources, while at the same time protecting the whole ecosystem. The Silva school is located on a 1,600-acre forest reserve near Salmo, in southeastern British Columbia. For more information about Silva and their 1998 workshop schedule, contact Susan Hammond at (250) 226-7222; or e-mail: silvafor@netidea.com. Visit their website at http://www.silvafor.org.

Trouble for BLM Wilderness?

The Bureau of Land Management (BLM) has proposed new regulations that don't bode well for wilderness.

The proposed regulations allow increased use of motorized vehicles and mechanical equipment for both administrative purposes and private use. They allow greatly expanded use of permanent structures and installations. They also allow for expanded use of technology (cellular phones, global positioning systems [GPS] units, etc.)—the steady creep of growing mechanization that The Wilderness Act sought to avoid.

Two of the most significant changes proposed by the BLM would allow the use of rock bolts and other permanent "fixed anchors" for climbing and caving, and add cellular phones, GPS, and other electronic equipment to the list of mechanical equipment allowed in wilderness. Other proposed changes would make management more permissive for increasing livestock grazing and related use of vehicles and structures, and for using motor vehicles while conducting research. *IJW* views these proposed BLM regulations with great concern because they further dilute the wildness of wilderness.

Upcoming Conferences

FORESEA (Forest Sector Analysis)

International symposium on global concerns for forest resource utilization, sustainable use, and management. To be held October 5-9, 1998, in Miyazaki, SEA-GAIA, Japan. Official conference language is English. For more information contact Atsushi Yoshimoto, Department of Agricultural and Forest Economics, Miyazaki University, Miyazaki 889-21, Japan. Telephone: +81-985-58-2811; fax: +81-985-58-2884. E-mail: a0a2 05u@cc. miyazaki-u .ac.jp; website: hyperlink http://www.miyazaki-u. ac.jp/FORESEA.

Rivers Conference

The purpose of Rivers Conference (May 3–5, 1998, Richmond, British Columbia, Canada) is to get researchers and activists talking—" The whole is greater than the sum of the parts" will be aptly demonstrated when researchers, river stewards, and activists brainstorm solutions to river problems and share stories on what works and where help is needed.

For more information contact the Outoor Recreation Council of British Columbia, #334-1367 West Broadway, Vancouver, B.C. V6H 2A9, Canada. Telephone: (604) 737-3058; e-mail: orcbc@istar.ca.

Submit items for the Wilderness Digest via e-mail to Woody Hesselbarth: whesselbarth@igc.apc.org.

Letter to the Editor

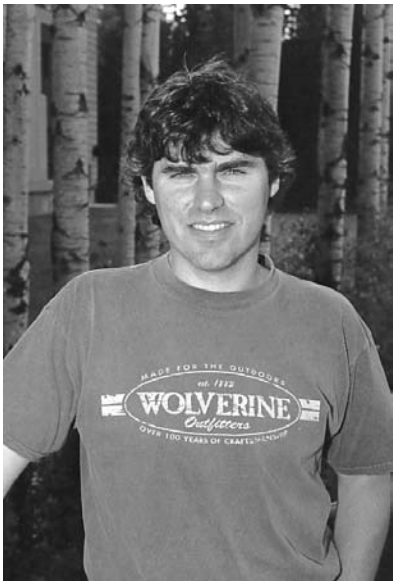
Dear Editor:

I am in the process of establishing a website for the New Zealand Wilderness Foundation, part of which will include a directory of active wilderness researchers. I am receiving interest from various New Zealand researchers and would welcome any names from overseas to facilitate contact between researchers with common interests. All I ask for is name, affiliation (contact details), wilderness research interests, and current research. Forward your information to James Higham, Centre for Tourism, Commerce Division, University of Otago, PO. Box 56, Dunedin, New Zealand. Telephone: 64-3-4798500; fax: 64-3-4799034; website: http://divcom.otago.ac.nz:800/tourism/.

BOOK REVIEW

BY JOHN SHULTIS, GUEST BOOK REVIEW EDITOR

Wilderness and the Changing American West by Gundars Rudzitis. 1996. John Wiley and Sons, New York. 220 pp., $34.95 (paperback).



Guest book review editor John Shultis.

THE PROVISION OF DESIGNATED WILDERNESS areas in the United States has never been without its opponents. The sizable list ranges from companies and special interest groups representing extractive industries (primarily in forestry, mining, and grazing), to federal land management agencies who are often concerned with what they consider to be the erosion of their traditional land base and philosophical foundations.

Over the last two or three decades, the battle over designation and use of wilderness areas has gained focus in the American West. In hindsight, this is hardly surprising. Outside of Alaska, which contains approximately 60% of U.S. wilderness, the majority of designated wilderness areas is found in the West. Also, the sometimes self-imposed stereotype of the West as a haven for rugged individualism has exacerbated the battle for extractive activities in wilderness. Moreover, the western economy and way of life continues to be reliant on the extraction of natural resources. Finally, migration into the West has recently increased, further fanning the flames of conflicts over the "proper" use of these public lands.

Gundars Rudzitis brings together these and related strands in his overview of wilderness management policies and practices in the American West. Several basic themes are touched upon repeatedly in this book. After setting the stage and providing a brief history of the wilderness concept, Rudzitis touches upon the "geography of place" in the West, its unique blend of natural and social landscapes, the continued abuse of this rich mosaic by the corporate world, its promoters in federal agencies, and their use of flawed economic principles and practices. It is evident, states Rudzitis, that "Much of what makes the West unique and gives it a sense of place is the physical environment and its elements of the wild. It is this sense of place that is important to the social and economic well-being of people and their places, not whether they continue to work in extractive industries. Indeed, it is these very industries, in their 'using up' of the landscape, that contribute to the destruction of the Western sense of place."

As intimated by the above quotation, this book provides a pro-preservationist view of the complex issue of the preservation-versus-extraction dilemma facing the West and many other regions throughout the world. Rather, Rudzitis attempts to provide a "call to arms" for all those who wish see the failed policies and management practices ended. He rightly emphasizes the importance of considering Native American views, as well as addressing the perspective of the Wise Use movement and the Sagebrush Rebellion that have recently come to symbolize the American West. However, if you are looking for a detailed analysis of these movements, *Wilderness and the Changing American West* is not the place to begin. William Graf's *Wilderness Preservation and the Sagebrush Rebellions* and R. McGreggor Cawley's *Federal Land, Western Anger: The Sagebrush Rebellion and Environmental Politics* remain the best books on wilderness and the Sagebrush Rebellion and Wise Use movement.

To be fair, Rudzitis's expressed purpose was to write a book "that reached out to the general public as well as to traditional academic and public policy audiences," which explains the sometimes frustrating lack of detail on these and other issues. Rudzitis has succeeded in his objective of providing a well-written overview of westerners' reactions to the designation of large tracts of public land as wilderness. This book is an excellent place to start for readers relatively unfamiliar with these issues and would be well suited as a case study for a first- or second-year college/university-level course.

One of the strengths of this book is the discussion of migration patterns within the West, and the reasons behind many immigrants' decisions to relocate in the West. Rudzitis provides evidence that, contrary to contemporary economic theory, many people moved west not to increase their economic earning power (incomes often decreased) but for the amenities and quality of life that the region provided. Rudzitis further argues that the presence of the wilderness and other protected areas is a primary attraction for these new residents. Indeed, migration into regions surrounding protected areas is higher than for those areas that do not border protected areas.

Another strength of the book is Rudzitis's use of public surveys of western residents, which indicate that contrary to popular sentiment, they overwhelmingly support

the provision of wilderness areas and question the sustainability of the resource management policies and practices by both private and public sector agencies. These studies, although frustratingly few in number, are often overlooked in discussions on how American public lands should be managed. Normally, "public" input is actually input from stakeholders and special interest groups, each of which has its own agenda and philosophical viewpoint; it is rare to directly assess a representative, random sample of the public for their views on these critical issues.

The lack of photographs in this book is disappointing, as they would have helped illustrate the issues discussed, including the ecological and social effects of natural resource extraction, the aesthetic attraction of the West's wilderness areas, the boom-and-bust cycle and its affect on western communities, or the potential role of tourism in creating a service-based economy.

While *Wilderness and the Changing American West* will change few of the entrenched attitudes toward the issues it addresses, it succeeds in providing an interesting overview of the conflict over wilderness and resource extraction in the American West. **IJW**

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