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Science and Stewardship to Protect and Sustain Wilderness Values:

Seventh World Wilderness Congress Symposium

2001 November 2–8
Port Elizabeth, South Africa

Abstract

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The Seventh World Wilderness Congress met in Port Elizabeth, South Africa, in 2001. The symposium on science and stewardship to protect and sustain wilderness values was one of several symposia held in conjunction with the Congress. The papers contained in this proceedings were presented at this symposium and cover seven topics: state-of-knowledge on protected areas issues in South Africa; traditional and ecological values of nature; wilderness systems and approaches to protection; protection of coastal/marine and river/lake wilderness; spiritual benefits, religious beliefs, and new stories; personal and societal values of wilderness; and the role of science, education, and collaborative planning in wilderness protection and restoration.

Keywords: biodiversity, protected areas, tourism, economics, recreation, wildlife, alien species, spiritual values

Compilers

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Science and Stewardship to Protect and Sustain Wilderness Values:

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Compilers:
Alan Watson
Janet Sproull

Concerning the front cover background photo of the BAOBAB tree:

"It is said, briefly, that the Great Spirit had created the Universe for reasons that nobody must endeavour to fathom. The Great Spirit used a being called the First Goddess, who worked as a tool under His directions. In answer to a request she was granted as a companion…The Tree of Life, the most revered deity throughout Bantu Africa, even today."

And from the First Goddess…
"A countless number of human beings was born."

And the Tree of Life…
"Bore living, snarling, howling animal fruit."
And
"Birds of all kinds came flying and waddling forth."

"The earth which had hitherto been lifeless and dead,
Began to live, and sounds of all kinds
Resounded from the forests and the valleys."

"Birds sang their happiness loudly
Towards the smiling sun.
The Song of Life had begun on earth."

"The most sacred tree is the baobab
With which are associated the souls of
Future witchdoctors, wise women, midwives and those people
Who will care for and control the lives of others."

"It is believed that the baobab is a direct descendant of the Tree of Life.
It is noted with great concern that the baobab is fast disappearing over great areas
And this is the basis of a belief that good people will become fewer."

Credo Mutwa, *Indaba, My Children*

Preface

The World Wilderness Congress returned to South Africa in 2001, under the banner "Wilderness & Human Communities—The Spirit of the 21st Century." The Congress first met in South Africa in 1977, followed by meetings in Australia (1980), Scotland (1983), the United States of America (1987), Norway (1993), and India (1998). While the wilderness movement in South Africa is heavily connected to the KwaZulu-Natal Province, in the true spirit of the 21st century, the Mayor and residents of Port Elizabeth, in the Nelson Mandella Municipality, welcomed this world event, associated symposia, and Wilderness Summit on behalf of the South African people.

The papers included in this proceedings represent the knowledge brought together and shared at the symposium entitled "Science and Stewardship to Protect and Sustain Wilderness Values: Seventh World Wilderness Congress Symposium on Research, Management, and Allocation." Every paper in this proceedings received peer edit by at least one of the compilers and one other reviewer. All copyrights are released by contributing authors except as noted on the articles.

The Aldo Leopold Wilderness Research Institute and the USDA Forest Service Rocky Mountain Research Station are proud to cooperate in compiling and distributing this publication. We thank the International Programs Office of the Forest Service for strong support of this symposium and this proceedings through contributions toward travel for U.S. managers and for publication expenses. The Wild Foundation of South Africa exhibited patience and leadership in coordinating facilities and schedules. And we thank the Rocky Mountain Research Station Publishing Services Staff for an outstanding job, once again, of editing and publishing these proceedings.

We hope that the knowledge compiled here will contribute to understanding the links between wilderness places and human communities around the world. Congress delegates from over 40 countries will be forever changed by the presentations, heightened cultural awareness, and the friendship shared in South Africa at this World Wilderness Congress. Sustainability of wilderness and human communities into the next century will depend upon the spirit created here.

The Compilers, August 2003

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1. State-of-Knowledge on Protected Areas Issues in South Africa

The Shamwari Game Reserve serves as an outdoor classroom for a pre-Congress training session (photo by Alan Watson).

Planning and Management of the Umfolozi Wilderness Area in KwaZulu-Natal, South Africa: A Model for Managing African Wilderness Areas

W. D. Densham
A. J. Conway

Abstract—The Umfolozi Wilderness Area, one of the first wilderness areas in South Africa, was administratively set aside within the southern half of the Umfolozi Game Reserve in 1958, by resolution of the Natal Parks Board. Originally, it was 12,500 ha (48 miles^2) in extent, and its management was not consistent with internationally accepted principles. Today, the wilderness area is 32,000 ha (124 miles^2) in extent, and management is aimed at preserving the wilderness resource by employing wilderness-sensitive programs detailed in a specific wilderness area management plan. The successes achieved in the wilderness planning and management approach used for the Umfolozi Wilderness Area over the last 6 years is presented as a model that can be used to manage existing and candidate wilderness areas in other parts of Africa. This model is being used to draw up wilderness management plans for wilderness areas in three formally protected areas in Southern Africa and a private game reserve in the Eastern Cape.

Introduction

Wilderness conservation in Africa began with the Umfolozi and St. Lucia Wilderness Areas being administratively zoned within the Umfolozi and St. Lucia Game Reserves in the mid-1950s by the Natal Parks Board, which legally mandated for the conservation of wildlife (nature conservation) in the Province of Natal.

The Umfolozi Wilderness Area was originally 12,000 ha (48 miles^2) in extent and located in the southern half of the Umfolozi Game Reserve. The wilderness did not receive any special management, which resulted in management practices that were inconsistent with accepted wilderness concepts and management philosophy. Today, the Umfolozi Wilderness Area is 32,000 ha (124 miles^2) in extent, and management is specifically directed at preserving the wilderness resource.

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The Umfolozi Wilderness Area has never enjoyed legal protection and as such has been at the mercy of the reserve administrators and managers of the day. The first reserve management plan produced in the mid-1970s had no special management prescriptions for the wilderness area. It was not until the mid-1980s, when a combined management plan for the Hluhluwe and Umfolozi Game Reserves was developed, that some reference to the wilderness was made. The section dealing with the wilderness zone was inadequate and sketchy, with little concern for preservation of the wilderness resource.

The Natal Parks Board adopted the first dedicated wilderness plan for the Umfolozi Wilderness Area on September 29, 1995. The plan outlined the management of the area using internationally accepted management principles that were adapted to suit the Umfolozi Wilderness Area conditions. This paper discusses the approach taken in the planning and management of the wilderness and proposes that it is an excellent model to be followed for existing and candidate wilderness areas in Africa.

Location and Historical Perspectives

The Umfolozi Wilderness Area is situated in Hluhluwe-Umfolozi Park in KwaZulu-Natal of the Republic of South Africa (fig. 1). The park is 96,453 ha (372 miles^2) in extent, of which the wilderness area is 32,000 ha (124 miles^2) and located in the south part of the protected area (fig. 2)

The Umfolozi Wilderness Area was administratively zoned in 1958, and the Eleventh Annual Report of the Natal Parks Board for the year April 1958 to March 1959 records the following:

> Some 12,150 ha were set aside by the Board as a wilderness area, in which all forms of motor traffic are prohibited, and only rangers, or visitors on foot accompanied by a ranger, are permitted to enter.

However, the rhino capture team was allowed to continue its operations using vehicles in the wilderness area.

Although several unsuccessful attempts were made, the Umfolozi Wilderness Area was never officially proclaimed wilderness, despite the fact that the Natal Nature Conservation Ordinance No. 11 of 1974 was amended in the 1980s to allow for the designation of wilderness areas.

Compilation of management plans for the Reserves in Natal began in the 1970s. The Umfolozi Wilderness Area

Figure 1—the Hluhluwe-Umfolozi Park shown in relation to South Africa.

received no special attention, and the management action developed for the rest of the Reserve was also applied to the wilderness area.

As a result of a general revision of management plans in the 1980s, a *Combined Management Plan for the Hluhluwe and Umfolozi Game Reserves* was prepared and approved by the Natal Parks Board on May 24, 1985. The wilderness area continued to be managed along with the rest of the Reserves with very little reference to the special management actions and uses to conserve the wilderness quality and resources of solitude and naturalness. Management action was confined to the following statements.

In Chapter 9, Zonation, the Wilderness zone was described as:

> Area characterized by lack of access roads open to the public. There are two sub zones recognized:
>
> **Class I: Pristine area**
>
> Area characterized by essentially unmodified natural environment. No facilities for comfort or convenience of their user are provided. Spacing of groups informal and dispersed, no marked paths permitted. Motorized use within the area not permitted.
>
> **Class II: Wild area**
>
> Area characterized by a predominantly unmodified natural environment. Rustic facilities are provided but kept to a minimum, such as, bush camp, toilet, and campsite. Spacing of groups formalized by use of paths and designated overnight sites. Motorized transport limited to service tracks, but may be excluded in some areas.

Under the heading, "Implications of this visitor use zonation for management and research," the following was recorded:

> **Wilderness Zone**
>
> There are no areas that could be classed as Pristine Areas, and the category of Wilderness Class II: Wild Area applies…
>
> ...In this area, visitors will be able to enjoy a 'wilderness type' experience, and due to low visitor density that is essential for this wilderness experience the ecosystem within this area will receive minimum human disturbance.

These statements, by implication, allowed access to the wilderness area by vehicles for management purposes. This was a grave threat to the wilderness resource at the time.

The rhino and game capture teams were allowed to continue to use vehicles to remove surplus wildlife species from the wilderness area. In the below-average rainfall years of the late 1970s and early 1980s, the management team graded roads into the wilderness area to facilitate easier game capture and culling operations. It also allowed for fairly sophisticated overnight trail camps in the wilderness area to be developed, which remain to this day.

It wasn't until September 1995 that a dedicated and comprehensive wilderness management plan was approved by the Natal Parks Board. The plan forms part of the overall management and concept development plans for the Hluhluwe-Umfolozi Park. The plan sets out the permissible management action of the biophysical components and visitor uses, with set limits of acceptable change in the different

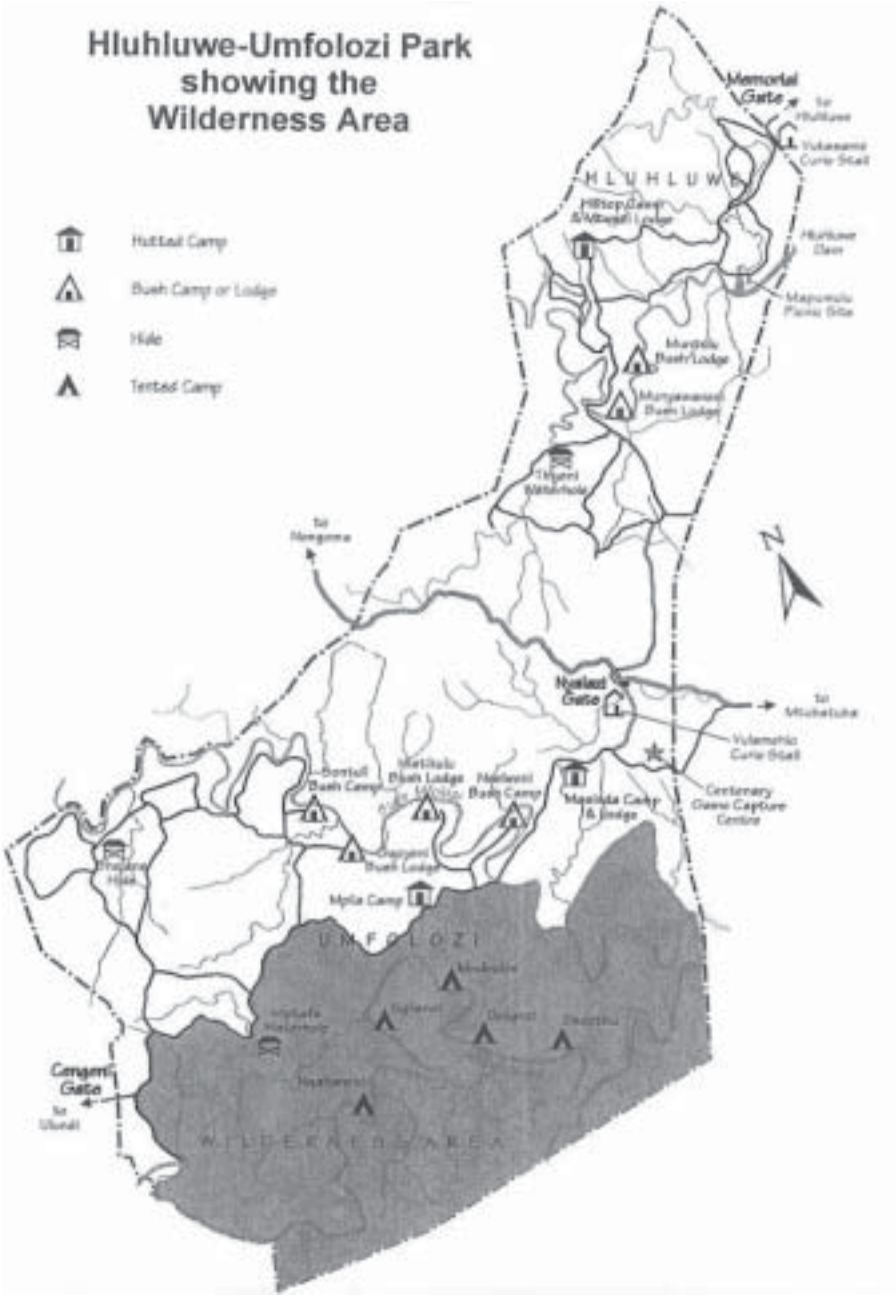

Figure 2—The Hluhluwe-Umfolozi Park showing the Umfolozi Wilderness Area.

wilderness zones. It is interesting to note that during this exercise *pristine* areas were found to exist.

The Umfolozi Wilderness Area still does not have legal protection. However, the new KwaZulu-Natal Nature Conservation Management Act (No. 9 of 1997) does provide for the proclamation of wilderness areas within protected areas. It is hoped that as soon as the regulations have been promulgated, all administratively zoned wilderness areas will be proclaimed (Densham 1999).

General Approach to Wilderness Area Management

The tension between the wilderness concept (an absence or minimum of human intervention) and the need for management (the control of nature) has been researched by a number of authors (for example, Bainbridge 1984; Hendee and others 1990). It is generally agreed that once wilderness areas have been proclaimed or administratively designated,

they need "formal professional management for their long term conservation." This will eliminate uncoordinated and haphazard management action and will lead to long-term direction, continuity, stability, and an adaptive management style. Protected area management plans reflect the legal aspects (where this is applicable), the management authority's policies and procedures, and the specific protected area objectives and management actions in a systematic framework (Hendee and others 1990, Chapter 8). In respect to wilderness area management plans, the same approach is required, but the focus is on the minimal human intervention to achieve the desired outcomes of management action and uses.

Generally, wilderness plans in developed countries focus on recreational use, with little specific reference to the biophysical components. In South Africa, wilderness areas are often relatively small (less than 30,000 ha [116 miles^2]) and are usually part of a larger protected area. Generally, they do not contain whole ecosystems and are biodiversity islands in a landscape heavily impacted by monoculture agriculture, peri-urban and rural community development, and other forms of land uses. It is vitally important to develop plans that address all biodiversity components (which is the protected area's primary objective) and recreational uses if the wilderness resource is to be conserved.

In drawing up management plans, a multidisciplinary team approach should be adopted involving planners, protected area management and community conservation staff, and ecologists. The involvement of the public at an early stage is an essential part of the development of the management plan in order to identify all the issues and concerns.

Management plans must have clear objectives and achievable goals that are measurable to evaluate the success or failure of management actions. They ought to provide a record of past and present management actions and results. Wilderness management plans should provide the following guiding principles:

- Ensure that human intervention is kept to the absolute minimum.
- Allow natural processes to operate freely.
- Manage wilderness as a whole entity together with the rest of the protected area.
- Only implement imperative management action while preserving the wilderness experience of solitude, surprise, discovery, and spirituality.
- Ensure that the "minimum test" and minimum regulation are employed rather than the least expensive or easiest actions.
- Ensure that where exceptions have to be catered for that these do not reduce the wilderness experience significantly (Krumpe and others 1986).

In addition, the "minimum tool" and "leave-no-trace" principles must also be applied to all intended programs.

Umfolozi Wilderness Area Management Plan Model

The Umfolozi Wilderness Area Management Plan is a separate document, which guides the area's management and use (Conway and others 2000) to protect the wilderness resource. Management needs of the wilderness area are served well by this model. It is also being used as a reference document by planning and management teams in the drawing up of wilderness plans for the Greater St. Lucia Wetland Park and the Ukhahlamba-Drakensberg Mountain Park World Heritage Sites Wilderness Areas, the Waterberg Plateau Park Wilderness Area in Namibia, and a wilderness area in the Shamwari Private Game Reserve in the Eastern Cape.

The location of the Umfolozi Wilderness Area in the southern third of the park presents management challenges. The wilderness area boundary follows the park boundary on the west, south, and east sides, with a narrow buffer zone (Wilderness Support Zone) (fig. 3). External influences are extremely difficult to control or mitigate against, which impacts on the solitude. These influences are the Vryheid-Richards Bay coal railway line, Eskom's rural electrification, and the rapid growth of rural homesteads. More recently in South Africa, the volume of air traffic over protected areas has become a major disturbance factor.

Management Plan Format

The format developed for the plan addresses management needs for recreational use and biodiversity preservation of the Umfolozi Wilderness Area (table 1).

Figure 3—The Umfolozi Game Reserve and Wilderness Area Zoning.

Table 1—Wilderness management plan format.

1. DEFINITIONS
2. VALUES
3. AIMS OF THE WILDERNESS MANAGEMENT PLAN
4. OBJECTIVES OF WILDERNESS MANAGEMENT
5. CLASS OF WILDERNESS
6. BOUNDARY DESCRIPTION
7. RESERVE AND WILDERNESS ZONATION
8. INTEGRATED ENVIRONMENTAL MANAGEMENT (IEM) PROCEDURES
9. LIMITS OF ACCEPTABLE CHANGE (LAC)
10. RESTRICTIONS ON DEVELOPMENT OF ADJACENT AREAS
11. LIMITS OF SOPHISTICATION (LOS) FOR HIKING AND CAMPING
12. VISITOR CARRYING CAPACITY
13. VISITOR UTILIZATION OF THE AREA
14. LITTER DISPOSAL
15. STRUCTURES WITHIN THE WILDERNESS AREA
16. ACCESS
17. INVENTORY OF ROADS
18. CASEVAC PROCEDURES
19. MANAGEMENT OF FAUNA AND FLORA
20. FAUNA
21. WILDLIFE POPULATION CONTROL
22. SUPPLY OF WILDLIFE WATER SUPPLIES
23. FLORA
24. CONSUMPTIVE UTILIZATION
25. EROSION RECLAMATION
26. LAW ENFORCEMENT
27. RESEARCH AND MONITORING
28. SEARCH AND RESCUE
29. AWARENESS PROGRAM
30. INFORMATION
31. ACKNOWLEDGMENTS

APPENDICES
Map of Umfolozi wilderness area zonation
IEM policy
CASEVAC procedure
Lion call-up program
Air-lifting immobilized black rhino
IUCN categorization of threatened species
Inventory of roads in the wilderness area
IUCN classification of wilderness
Darting and marking black rhino on foot
KZN Wildlife - internal scoping report format
Memorandum of Understanding - Wilderness Leadership School and KZN Wildlife Service
Wilderness law in South Africa
Umfolozi wilderness trails - questionnaire format.

Aims of the Wilderness Management Plan

Following are the aims of the management plan:

- To provide a comprehensive management plan for the effective management and sustainable utilization of the Umfolozi Wilderness Area.
- To refine a management philosophy that can be tested and evaluated through dialogue with wilderness managers and other interested parties.
- To gain understanding, acceptance, and support of a management philosophy by wilderness managers, users, and outdoor organizations that, hopefully, will extend beyond Umfolozi to other organizations that administer wilderness areas.
- To direct pioneering into the development of alternative management methods for essential wilderness operations.
- To secure, for all the people of South Africa, of the present and future generations, the benefits of an enduring resource of wilderness.
- To maintain the pristine character of the landscape and the opportunities for solitude it provides.

Objectives of Wilderness Management

The management plan uses the 16 management principles developed by the United States Forest Service (Krumpe and others 1986) as guidelines for the management of recreational uses.

Reserve and Wilderness Zonation

Zonation of the Umfolozi Wilderness Area and adjacent areas of the park follows the U.S. Forest Service Recreational Opportunity Spectrum and Wilderness Opportunity Spectrum approaches. It is in keeping with the Parks Concept Development Plan zonation of the whole protected area.

The Umfolozi Wilderness Area is zoned into three opportunity classes—semiprimitive, primitive, and pristine—with a Wilderness Support Zone (fig. 3). It is recognized that although external (and to a lesser extent internal) influences impact on the wilderness resources of solitude and naturalness, the area does offer a valuable wilderness experience for visitors. The pristine areas are confined to those portions of the wilderness where the sounds and sights of man are rarely noticed (for example, in valleys). There is a "Wilderness Support Zone" that buffers the Umfolozi Wilderness Area and its resources from outside influences. It also allows for the provision of basic management infrastructures such as Ranger outposts and the park boundary fence line and maintenance roads.

Definitions of these zones are reflected in table 2. The descriptions give managers a clear statement of the intended characteristics for each zone so that management actions and uses can be determined. All sensitive sites or areas of biodiversity or cultural importance are taken into consideration when delineating the zones to prevent possible conflicts with proposed recreational activities. These zoned areas are mapped so that they are protected.

In the planning process, the following aspects were taken into consideration for each zone and the appropriate standards set for monitoring purposes. The intention was to reduce the evidence of human intervention and control visitor use impacts on each zone.

Scenery Setting

This determines the intended ambiance visitors can expect to experience in the area (table 3). It also places constraints on management actions in each zone to ensure that the wilderness experience is not impaired.

Table 2—Wilderness zone definitions (abbreviated).

		Zone definitions
1	Pristine	The purest form of wilderness possible is characterized by having absolutely no sight, as far as the eye can see, or sound of man (except for passing aircraft and trains in the distance), or visual evidence of man having manipulated the ecosystem and landscape in any way and at any time past or present.
2	Primitive	Characterized by having no evidence of past or present human manipulation of the immediate ecosystem and landscape although views of human habitation, etc., are visible in the distance (that is, more than 10 km [6.2 mi] away).
3	Semiprimitive nonwilderness	Intervention by man in terms of past manipulation is present in forms such as old tracks and settlements. Present evidence of wilderness recreation facilities and users that are nonpermanent and wilderness compatible.
4a	Wilderness support zone nonwilderness	This, and the following zone, forms a transitional buffer between Semiprimitive (nonmotorized) and Roaded Natural. The influence of man's activities is becoming evident. This is limited to the minimum requirements to effectively administer and provide law enforcement to the wilderness area. Only such structures, infrastructure, and ecological management activities as deemed essential are permitted.

Table 3—Wilderness scenery settings (abbreviated).

Pristine	Primitive	Semiprimitive nonmotorized	Wilderness support zone nonwilderness
Unmodified natural environment.	Area is characterized by essentially unmodified natural environment of fairly large size.	Area is characterized by a predominantly natural or natural-appearing environment.	Area is characterized by a predominantly natural or natural-appearing environment.
Interaction among users nonexistent.	Interaction between users is very low, and evidence of other users is minimal.	Interaction between users is low, but there is often evidence of other users.	Concentration of users is low to moderate, and there is often evidence of other users.
Evidence of other users is minimal.			
Managed to be free of evidence of human control.	The area is managed to be essentially free from evidence of human-induced restrictions and controls.	The area is managed in such a way that minimum onsite controls and restrictions may be present, but are subtle.	The area is managed in such a way that minimum onsite controls and restrictions may be present, but are subtle.
Motorized use not permitted.	Motorized use is not permitted.	Motorized use is not permitted.	Motorized use is permitted on existing roads and tracks. In addition, Game Capture is allowed 500 m (547 yd) off any roads or tracks but may not damage any trees, plants, and so forth.
Views of this area only of a wilderness nature.	View of outside influence is allowed.	The zone includes all the area 500 m (547 yd) from both banks of the White Umfolozi River and the southern bank of the Black Umfolozi River. Evidence of pollution from inhabitants upstream is low to moderate. Impact of adjacent land use is moderate.	
No view of outside development within 10 km (6.2 miles).			

Permitted Activities

The limits on management and visitor-use activities are set and described (table 4) for each of the wilderness opportunity zones to ensure that the quality of the wilderness experience is maintained.

Wilderness Experience

Wilderness experiences are described and appropriate management actions and visitor-use levels set for each zone. This takes into consideration all wilderness-related activities and determines the zones into which each will be allowed to occur (table 5). All management and visitor use programs are subject to the following Ezemvelo KwaZulu-Natal Wildlife's integrated environmental management procedure and regular environmental audits:

- All proposed developments and any additions to infrastructure in and outside the park.
- All conservation management programs, such as game capture and culling operations, alien plant eradication programs, fire management, and resource harvesting.
- Improvements to existing flycamps in the wilderness area or movement of these to new areas.
- New wilderness trail operations.

These programs are assessed as to their impact on the wilderness resource and visitor experience. The Limits of Acceptable Change process is used to set measurable standards for monitoring purposes.

Limits of Sophistication

Limits of sophistication on the type of facilities and equipment allowed in each of the wilderness zones are set so that

Table 4—Permitted activities (abbreviated).

Pristine	Primitive	Semiprimitive nonmotorized	Wilderness support zone nonwilderness
Land based			
Viewing scenery. Hiking and walking on undemarcated routs is permitted. Nature study. No impact camping only	Viewing scenery. Hiking and walking on undemarcated routes is permitted. Tent camping is permitted at nonpermanent sites and tents must be backpacked in and out	Viewing scenery. Hiking and walking. Camping.	Guided day walks from Rest Camps and Bush Camps are permitted. Base camps for wilderness-dependent recreation facilities are permitted. Camping at permanent and regular tented camps is permitted.
Water based			
Canoeing is not permitted. Swimming is permitted.	Canoeing is not permitted. Swimming is permitted.	Canoeing is permitted. Swimming is permitted.	Canoeing is permitted. Swimming is permitted.
Administration			
Horse patrols permitted but no donkeys allowed. Aircraft may only land in the event of saving human life, or due to black and white rhino capture (for ecological reasons only). Aircraft (including helicopters) are restricted to a minimum altitude of 91 m (300 ft) for the purpose of game census. No chemical control of alien plants. Nonmanipulative research or monitoring is permitted. Controlled burning of vegetation for ecological reasons is permitted.	Culling on foot (for ecological reasons only). No live removal of any indigenous fauna and flora (except black rhino). No impact monitoring. Horse patrols are permitted. Aircraft—as for Pristine zone. No chemical control of alien plants. Nonmanipulative research or monitoring is permitted. Controlled burning of vegetation for ecological reasons is permitted.	Aircraft—as for Pristine zone. Horse patrols are permitted. Culling on foot (for ecological reasons only). Law enforcement must be affected on foot or horseback. No chemical control of alien plants. Nonmanipulative research or monitoring is permitted. Controlled burning of vegetation for ecological reasons is permitted.	Lion call-ups for research purposes are permitted from any of the four prescribed sites (appendix 4). Vehicle-based game capture and culling only on existing roads and tracks is permitted. Law enforcement may be affected on foot or horse back with the use of vehicles on any existing roads and tracks. Chemical control of alien plants allowed for specific species (see Section 23.2) Nonmanipulative research or monitoring is permitted. Controlled burning of vegetation for ecological reasons is permitted.

Table 5—Wilderness experience (abbreviated).

Pristine	Primitive	Semiprimitive nonmotorized	Wilderness support zone nonwilderness
Total isolation from the sights and sounds of humans, independence, closeness to nature, tranquillity, and self-reliance through the application of woodsman and outdoor skills in an environment that offers a high degree of challenge and risk.	Extremely high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquillity and self-reliance through the application of woodsman and outdoor skills in an environment that offers a high degree of challenge and risk.	High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquillity, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk.	Low probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquillity, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Opportunity to have a high degree of interaction with the natural environment.

the quality of the wilderness experience is kept within accepted norms. To preserve the qualities of the pristine zone, no facilities are provided. In the semiprimitive zone, the type of experience offered allows for some comfort (table 6).

Visitor Carrying Capacity

Visitor carrying capacity of the wilderness area is determined for each wilderness zone and trail operation sector. This is to ensure that separate trail parties do not encounter each other while in the wilderness, thus experiencing the highest level of solitude possible.

Access Limitations

Points of entry into the wilderness area are determined by management and are normally from the Ranger outposts, the trails base camp, and the main camp at Mpila. However, when the need arises, normally for law enforcement purposes, entry into the wilderness will be closest to the problem area.

The flight paths for the KwaZulu-Wildlife's fixed-wing aircraft and the Game Capture team's helicopter are set to ensure that no unnecessary flights occur over the wilderness.

Table 6—Limits of sophistication (abbreviated).

Pristine	Primitive	Semiprimitive nonmotorized	Wilderness support zone nonwilderness
No sophisticated improvement for the convenience of users or managers that has short- or long-term residual effect. Fires are permitted. No impact camping. Leave No Trace ethics. No pack animals are permitted thoroughfare to semiprimitive zone. Accommodation—portable tent. Sleep—"bed roll." Toilet—trowel.	A self "pack it in—pack it out" policy for all management and recreational activities. "No-trace" camping ethic will be implemented to ensure that every trace of human presence is eliminated. Users are to be self-reliant and self-sufficient. Accommodation—portable tent. Sleeping—"bed roll." Toilet—trowel.	Semipermanent movable camps allowed (for example, trail fly-camp). Essential supplies and equipment may be carried in on pack animals. Facilities provided for the convenience and comfort of users is restricted to the minimum limit of sophistication. Accommodation—tent. Sleeping—foam mattress. Toilet—spade.	Permanent rustic camps, such as trails base camps are permissible, but must be located within 1 km of the boundary. All visible building material must be natural, for example, reeds, thatch, timber, canvas. Unnatural building materials, for example, cement, must be invisible. Accommodation—portable tents. Sleeping—beds with mattresses. Toilet—water-borne sewerage via conventional plumbing into septic tank.

No motorized vehicles are permitted to enter into the wilderness except for emergency "casevac" operations, when it is necessary to remove black or white rhino (fig. 4). Helicopters are used to immobilize and airlift the animals out of the wilderness area (fig. 5). This is considered to be the "minimum tool" for this program, as the use of vehicles on the ground can leave visible tracks for several years thus detracting from the wilderness resource. While the capture operations are being conducted, the trail operations are conducted in sectors well away from the capture areas (table 7).

Figure 4—Preparing an immobilized white rhino for airlift out of the Wilderness Area.

Figure 5—Airlifting rhino out of the Wilderness Area.

Management of Fauna and Flora

Management of the park's fauna and flora is natural-process based. These processes are allowed to operate with minimum intervention. The impaired or absent processes are simulated by appropriate management action and by using the "minimum tool" principle.

The plan sets out how management of the important fauna and flora components will be implemented. To illustrate this, the methods of game censuring and removals, alien plant eradication, fire management, and other conservation related programs are described in detail. The results of all these programs are evaluated at biannual wilderness management steering committee meetings. Should changes to any of the programs be necessary, these are made to the appropriate section soon after the meetings. In this way, the plan is kept alive and relevant.

It is accepted that these actions will take longer to complete and be more expensive, and results from the monitoring programs will not have the desired confidence limits. Since the inception of the wilderness management plan these aspects have not resulted in any serious concerns.

Public Involvement

At the time when the plan was initially drawn up, it was required to involve the public in the process. However, the plan is now steered by a Wilderness Management Steering Committee that meets biannually. The committee membership is comprised of the relevant regional and park management staff, as well as members from the public. With the recent formation of a Local Board for the Park, a member of this Board will also sit on the Committee.

The task of this committee is to ensure that management and visitor use of the Umfolozi Wilderness Area is in accordance with the plan and that the wilderness experience for the visitor is maintained.

Conclusions

The Umfolozi Wilderness Management Plan is the first dedicated document that clearly sets out management philosophy and procedures. Since its inception in September 1995, it has been successfully used to conserve the wilderness resource in the Umfolozi Wilderness Area. This model is being used as a reference document in the drawing up of wilderness management plans for the wilderness areas in the Greater St. Lucia Wetland Park and the Ukhahlamba-Drakensberg Mountain Park World Heritage Sites, the Namibian Waterberg Plateau Park, and the proposed wilderness area in the Shamwari Private Game Reserve. It will also serve as a useful model for the preparation of similar plans for other existing and candidate wilderness areas in South Africa and other African States.

Table 7—Access limits (abbreviated).

Type	Pristine	Primitive	Semiprimitive nonmotorized	Wilderness support zone nonwilderness
Motorized	No	No	No	Casevac
				Access to base camp and administrative structures, including fence line for management purposes (except trig. beacons).
Helicopter and fixed-wing (flights)	If for administrative reasons involving game population monitoring, must be above 91 m (300 ft).	If for administrative reasons involving game population monitoring, must be above 91 m (300 ft).	If for administrative reasons involving game population monitoring, must be above 91 m (300 ft).	If for administrative reasons involving game population monitoring, must be above 91 m (300 ft).
	If in transit, must be above 610 m (2,000 ft).	If in transit, must be above 610 m (2,000 ft) including the Game Capture helicopter.	If in transit, must be above 610 m (2,000 ft) including the Game Capture helicopter.	If in transit, must be above 610 m (2,000 ft) including the Game Capture helicopter.
		For capture of game only, no limit for helicopter.	For capture of game only, no limit for helicopter.	For capture of game only, no limit for helicopter.
Helicopter landing	For administrative reasons involving the capture of black and white rhino.	For administrative reasons involving the capture of black and white rhino.	For administrative reasons involving the capture of black and white rhino.	For administrative reasons involving the capture of black and white rhino.
	For casevacs.	For casevacs.	For casevacs.	For casevacs.

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Wilderness Conservation in the Western Cape Province, South Africa: Where We Are Going

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Abstract—The Western Cape Province of South Africa has an extraordinarily rich biodiversity. Besides containing the majority of the Cape Floral Kingdom (CFK), it also includes significant portions of the Karoo Succulent and the Thicket Biomes. The primary goal of nature conservation is the maintenance of biodiversity. This can only be achieved through collaborative holistic planning and cooperation. The Cape Action Plan for the Environment is in the process of achieving this. This plan is supported by several other initiatives including nomination for World Heritage Site status for the CFK.

Due to ever-increasing development pressures it is essential to have the necessary planning principles and plans in place to prevent unwise utilization of resources. The Western Cape Nature Conservation Board's wilderness policy revision is part of the broad planning initiative to balance wilderness and infrastructure. The various aspects that relate to wilderness qualities are discussed and placed in context with the overall objective to protect the core conservation areas by encouraging appropriate peripheral development.

Introduction

The Western Cape Province of South Africa is extremely rich in terrestrial and marine biodiversity and contains the greater part of the Cape Floral Kingdom (CFK), one of six floral kingdoms in the world. Covering less than 0.04 percent of the Earth's land surface, the CFK, for its size, is unrivaled in global terms for its extraordinary diversity of species. Some 9,000 species of plants occur here. Of these, 6,000 are endemic (Goldblatt and Manning 2000). The invertebrates, although at this stage not as well studied, appear to rival the plants when it comes to levels of endemism. The CFK has been identified by Mittermeier and others (1998) as one of 25 global biodiversity hotspots. The adjacent Succulent Karoo is also identified by these authors as a biodiversity hotspot of global importance.

The organisms inhabiting the oceans (Atlantic to the west and Indian to the south and east) are as important from a biological perspective as the terrestrial plants and animals. The presence and interaction of cold and warm sea masses have brought about a high degree of marine biological diversity and endemism; for example, 11,000 marine animals have been recorded along the South African shores, with 3,500 being endemic (Griffiths and Prochazka 2000).

Threats to the future of this unique area come from the spread of invasive alien plants and fish, expanding agriculture and urbanization, pollution and overextraction of water, overexploitation of specific marine and terrestrial species, and soil erosion. As a consequence of these threats, over 1,400 Western Cape plant species are listed in the Red Data Book, the highest known concentration of such species in the world (Cowling and Hilton-Taylor 1994). Several heavily exploited marine species, such as linefish and abalone, have declined to dangerously low levels (Griffiths and Prochazka 2000). Of the 19 freshwater fish species indigenous to the CFK, 14 are threatened, including 12 which are endangered. As with the flora, there is high level of endemicity in the fish fauna, 16 of the 19 species being reliant on effective conservation of the region for their survival (Impson and others 1999).

Protected Areas and Major Conservation Planning Initiatives

The Western Cape Nature Conservation Board (WCNCB) manages an area of 677,000 hectares (1.6729e+06 acres), comprising Å 100 properties/land "parcels," forming the provincial nature reserves, plus 38,000 ha (93,900 acres) comprising marine reserves. This includes four Wilderness Areas with a total area of 116,000 hectares (286,642 acres). These are Cederberg, Groot Winterhoek, Boosmanbos, and Doringrivier. In the Western Cape, there are also six national parks managed by South African National Parks (SANParks), with a total area of 87,000 hectares (214,982 acres), plus 53,000 hectares (130,966 acres) represented by marine reserves. There are nine marine reserves with a combined area of 91,000 hectares (224,866 acres). The Department of Water Affairs and Forestry is also responsible for nearly 40,000 hectares (98,842 acres) of Indigenous Forest Reserves in the Southern Cape. In addition to

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conservation-worthy land managed by national and provincial authorities, there are also private and local authority nature reserves comprising 138,000 hectares (341,005 acres). There are also several initiatives that enhance the conservation status of mainly private land. These are, among others, two proclaimed biosphere reserves, and many conservancies, declared mountain catchment areas, and natural heritage sites. The area involved in these initiatives is over 1,074,000 hectares (2.65391e+06 acres), and is increasing steadily. The combined total for formally and informally protected areas, within the Western Cape, stands at the moment at over two million hectares (4.94211e+06 acres), approximately 15 percent of the land surface.

Cape Action Plan for the Environment

During 1999, the Cape Action Plan for the Environment (CAPE) was initiated with funding supplied by the Global Environment Facility. Through a participatory process, CAPE has produced a strategy and action plan. The overall objective of the strategy is to secure the conservation of the biodiversity of the Cape Floral Kingdom, and through this to deliver economic benefits. The strategy comprises three components: (1) conserving biodiversity, (2) promoting sustainable use, and (3) strengthening institutions.

Specific objectives include:

- The establishment of an effective reserve network, the enhancement of offreserve conservation, and support for bioregional planning.
- The development of methods to ensure sustainable yields, the promotion of compliance with laws, the integration of biodiversity concerns with catchment management, and the promotion of sustainable nature-based tourism.
- The strengthening of institutions, policies, and laws; the enhancement of cooperative governance and community participation; and the support of continued research.

These components are integrated into a single, comprehensive, multifaceted action plan, with priorities clearly identified. The CAPE strategy is aligned with the priorities of the South African government, which has committed significant counterpart funding to the program. The key executing agencies that will be responsible for the implementation have drawn up an agreement to ensure effective coordination of the program, and have identified the WCNCB as the lead agency for CAPE (Younge and Ashwell 2000). During the process, many projects were identified that are essential to the realization of the aims of CAPE. One that is central to the achievement of these objectives is the Conservation Planning Unit (CPU). This unit will develop an accessible, current, and reliable decision-support system, which will make inputs into bioregional planning and Integrated Development Planning. Using Pressey's (1999) Conservation Plan, it will also have the ability to assist in the decisionmaking process when evaluating options relating to land use or acquisition. Some of the other projects identified that will feed information into the CPU are those looking at remnants of formerly extensive and diverse vegetation types. There is also a program looking specifically at the rivers, their functioning, and associated organisms.

A charismatic concept that was given an identity during the CAPE process, when the term was coined, is the establishment of mega reserves. The process had already been initiated several years previously; the original concept, however, having been put forward by Burgers (1990) with the objective being to create conservation areas large enough to ensure that ecological, biological, and evolutionary processes can continue.

The three areas involved are (1) the Olifants River, Cederberg, Tankwa Karoo region; (2) the Gouritz River; and (3) in the Klein Karoo region, the greater Baviaanskloof conservation area. The lead agent for the first two areas is WCNCB, and the Eastern Cape Department of Economic Affairs, Environment and Tourism (ECDEAET) is the lead agent for the third.

The proposed Cederberg Tankwa Karoo mega reserve lies primarily in the winter rainfall zone of the CFK, spans a west-east gradient from coastal lowlands through moist mountain fynbos to semidesert conditions, and is drained by the Olifants River system. It also includes the northern extremity of the CFK. The process whereby WCNCB has facilitated the creation of a series of conservancies surrounding the wilderness area is well advanced. An additional provincial nature reserve, the Matjies River Nature Reserve, has been created with the financial assistance of the World Wildlife Fund of South Africa (WWFSA). Several private nature reserves and a natural heritage site have been declared, which has led to the proposal to create a biosphere reserve, with the Cederberg Wilderness Area (WA) forming the core. The planning for this is well advanced.

The proposed Gouritz mega reserve spans a long north-south environmental gradient from the arid Nama Karoo over the mountains to the moist coastal lowlands in the south, including representative portions of 14 of the 120 Broad Habitat Units (Cowling and Heijnis 2000). Substantial portions of land, especially in the foothills and valley basins of this area, are privately owned, and currently there is a danger that inappropriate land use options could compromise both conservation and tourism. WCNCB initiatives in this area include the extension of two of the provincial nature reserves (Anysberg and Rooiberg Nature Reserves)—again with the financial assistance of WWF SA, the creation of conservancies, and the proclamation of private nature reserves. The essential process of "selling" the idea to the local communities is well underway.

The proposed Baviaanskloof mega reserve, with ECDEAET as the lead agency, represents the eastern portion of the CFK and includes important moisture, altitudinal, and longitudinal gradients. This area has of late received much attention (Boshoff and others 2000) that mirrors the objectives of CAPE. This has resulted in the drafting of a Memorandum of Understanding to be entered into by the relevant national and Eastern Cape provincial departments. The object of this exercise is to facilitate cooperation to ensure wise development and utilization of this vast and relatively unspoiled area.

World Heritage Site Nomination

The WCNCB and SanParks are at present in the final stages of the preparation of a nomination to be submitted to the United Nations Educational, Scientific and Cultural Organization (UNESCO) for World Heritage Site status for a series of sites representing the CFK. This process has been divided into two phases. The first is the responsibility of SanParks and deals with the Cape Peninsula National Park nomination. The second phase is managed by WCNCB and comprises seven nominated sites. Three of these sites are formally proclaimed wilderness areas, namely, Cederberg (64,000 ha or 158,147 acres), Grootwinterhoek (26,000 ha or 64,247 acres), and Boosmansbos (15,000 ha or 37,066 acres) Wilderness Areas. De Hoop Nature Reserve (32,000 ha or 79,074 acres) and Swartberg (112,000 ha or 276,758 acres), consisting of Gamkaskloof Nature Reserve, and Groot Swartberg and Swartberg East State Forests, represent the fourth and fifth sites. The sixth site is referred to as the Hottentots Holland Complex (113,000 ha or 279,229 acres) and is made up of four management areas, namely, Limietberg, Jonkershoek, Hottentots Holland, and Kogelberg Nature Reserves, mostly representing State Forests. The latter forms the core of the Kogelberg Biosphere Reserve, the first to be proclaimed in South Africa. These six sites are all managed by WCNCB.

The seventh site is the Baviaanskloof, the majority of which falls in the Eastern Cape, and is effectively the responsibility of the ECDEAET. These sites were selected and nominated because their attributes complied with two of the four criteria laid down by UNESCO for natural sites, namely:

- Outstanding example representing significant ongoing ecological and biological processes and evolution.
- The most important and significant natural habitats for the *in situ* conservation of biological diversity.

These nominations have several objectives, of which the first is to secure an enhanced status and international recognition for some of our prime conservation areas. This enhanced status will assist the various current initiatives taking place around these sites. These initiatives take many forms, including the establishment of conservancies, private nature reserves, and biosphere reserves, which act as buffers and corridors, or improve the conservation status of altitudinal gradients and, in some cases, rectify impractical or ecologically inappropriate reserve boundaries. It is believed that these efforts will lead to the increased awareness and appreciation of the value of the biodiversity and the benefits of being associated with core nature conservation areas.

Current Position Regarding WCNCB's Management of Wilderness

The Western Cape Nature Conservation Board (WCNCB) manages the only four officially designated wilderness areas in the Western Cape Province of South Africa. The wilderness areas were proclaimed under the Forest Act of 1971, and the management policy for these areas has remained unchanged since its formulation in 1972. Wilderness management, although not a key focus area, forms part of the overall management strategy of WCNCB within the following parameters—namely the mission statement:

> The conservation of the Western Cape's unique natural heritage in partnership with all its people, for the welfare, advantage and enjoyment of present and future generations

and the so-called vision statement:

> We strive to become a world leader in conservation. We aim to instill in all our people a deep sense of ownership and pride in our unique natural heritage and a realisation of its intrinsic and economic value.

Nature-based tourism has been identified as one of the key economic activities that can be developed (Younge and Ashwell 2000), and the WCNCB is constantly being pressured to provide recreational opportunities that correspond with the goals of biodiversity conservation, while also generating economic returns and creating jobs. If not well planned, managed, and monitored, a "push factor" for sustainable development in conservation areas could have detrimental effects for proclaimed and candidate wilderness areas. The management challenges that the WCNCB faces include the following needs:

- To undertake an audit of reserves and adjacent land (where relevant) to identify and map areas with high wilderness qualities that could be proclaimed as wilderness areas.
- To decide what recreational activities may be allowed in proclaimed and candidate wilderness areas, both on land and sea.
- To manage diverse types of adventure and ecotourism activities over large geographical areas.
- To obtain adequate funding for the maintenance of wilderness qualities in wilderness areas;.
- To involve communities in wilderness management with tangible benefits to local people.
- To promote the wilderness concept among local landowners whose lands include protection-worthy wilderness, particularly where nonwilderness activities represent potentially higher financial returns.
- To promote the wilderness concept with the public, drawing attention to, among others, the importance of wilderness areas as primary water catchments.

Key Questions

The WCNCB needs to evaluate, candidly, its present contribution to the wilderness cause. In this respect, the following questions are relevant:

Are our officially proclaimed wilderness areas (WAs) offering genuine high quality wilderness experiences? At present, the answer would generally be negative. This is because our management has not been sufficiently dynamic and because some of the wilderness areas, or portions thereof, did not fully qualify as wilderness at the time of proclamation. The vast majority of people visiting the wilderness areas come away still not understanding the difference between wilderness areas and other conservation areas. This is mainly because of a lack of effective marketing and

education and very little difference between the management of WAs and other reserves. This should not be seen as an entirely negative factor, since the levels of manipulative management and development are generally low.

What are our moral obligations to the public with regard to providing opportunities to enjoy wilderness experiences? The implication that our wilderness areas should generate more income by marketing them as normal hiking trails, where the overnight shelters are upgraded, where the routes are more regulated, and where group sizes and numbers are increased, could mean that any ability to offer wilderness experiences would effectively be impinged upon. Although it can be argued that we may not be doing the wilderness cause justice at present, we still have an enormous moral responsibility to provide the people with the opportunity to enjoy genuine wilderness experiences. At present, the public may be relatively "spoilt" in respect of opportunities for wilderness recreation, but future generations, in a progressively more sophisticated technological society, will probably not be as fortunate. One only needs to consider the demand for wilderness and professionalism in wilderness management in North America to realize how important wilderness areas have become in more developed countries.

How then are we, as a management organization, going to do justice to the wilderness movement? A more professional and dynamic approach to wilderness management needs to be adopted.

The Way Forward for Wilderness in the Western Cape

We see the way forward as being a three-step process. First, an inventory of the remaining wilderness resources in the Western Cape, including those areas officially proclaimed and those having such potential, is needed. The existing wilderness areas must be zoned according to the Limits of Acceptable Change (LAC) and the Wilderness Opportunity Spectrum (WOS), and the candidate areas should, where feasible, be given formal status. Secondly, certain decisions that have yet to be taken after more than two decades (with regard to, for example, the roads and huts) must be taken and implemented. Thirdly, we need to educate the public and market the wilderness experience, not only as a means of generating income, but as a means of fostering support for the conservation of wilderness areas in perpetuity.

Step 1: Inventory of Wilderness Quality in the Western Cape

An inventory of the wilderness resource in the Western Cape is the first step that needs to be taken in the process of bringing the WCNCB's wilderness management up to the highest possible standard. This exercise could be similar to the approach taken by the Australian Heritage Commission (The National Wilderness Inventory Programme), and by the U.S. Forest Service (Roadless Area Review and Evaluation) (Roggenbuck and others 1990), where wilderness quality across each of these countries was mapped using wilderness "indicators," such as the following:

- **Remoteness from settlements**—how remote an area is from the nearest house, hamlet, or town.
- **Remoteness from access**—how remote an area is from established roads or tracks.
- **Apparent naturalness**—the degree to which an area is free of all human modifications, including fences, power lines, telephone lines, and radio towers. This indicator must also include visual isolation from any landscape that has been modified by humans.
- **Biophysical naturalness**—the degree to which an area's original plant and animal communities have been disturbed by humans.

These inventories are used primarily to identify whether areas should be given formal wilderness status, as well as to predict the potential effects on the wilderness resource of proposed peripheral developments. The benefits of a similar inventory for WCNCB are obvious. All conservation areas managed by the WCNCB, including private mountain catchment areas, should be evaluated and mapped using a Geographic Information System. The database must not only be regional in nature, but must incorporate fine-scale mapping of the potential zones (according to WOS) within each wilderness area and potential wilderness areas.

Many of the WCNCB existing conservation areas contain potential wilderness areas. Most of these reserves have wilderness zones that are clearly demarcated in their management plans. There have, however, been no efforts to identify further candidate wilderness areas, and there is the risk that they may be lost, due to inappropriate developments, before this exercise is undertaken. As an example, Burgers (1990) pointed out that the De Hoop Nature Reserve has probably the only coastal wilderness area in the southwestern Cape, but should tourist facilities be developed in this area, then the wilderness character would be lost—a prediction that has sadly come true.

Step 2: Addressing the Current Conflict Points in Our Wilderness Areas

Several issues need to be addressed as a matter of urgency.

- **Set limits of acceptable impacts through spatial and temporal zonation**—Prescriptions in respect to recreational use in the wilderness areas managed by the WCNCB, number of visitors per day, maximum group size, and zonation were laid down at the time of the proclamation of these wilderness areas. These prescriptions were based on the intuition of managers involved in the management of these areas at that time. The usage patterns and intensity have, however, increased, and the appropriateness of these prescriptions with regard to their impact on the wilderness resource urgently needs to be reassessed. While accepting that recreational impacts are inevitable, we nevertheless need to assess whether the wilderness experience is being unacceptably detracted from. We therefore need to incorporate elements of the LAC process into the management of our wildernesses. This is particularly relevant in the Cederberg Wilderness Area where there

are areas that experience excessive visitation by day and weekend hikers. At present, 50 persons per block per day are allowed, but this use is concentrated in specific areas. Somehow we need to dissipate use, to lessen intergroup contact, as well as to relieve pressures on popular overnight areas. This obviously has to be done without being too restrictive. The WOS zoning concept should therefore be implemented. The objective should be to rehabilitate degraded areas as well as to preserve the remaining pristine zones.

- **Closure and rehabilitation of management roads**—There are management roads in all four of the WCNCB wilderness areas. Although these roads prove useful to management for fighting wildfires, alien invasive control operations, footpath maintenance, and other management tasks, these tracks compromise the integrity of our wilderness areas. The decision should be taken to close them off and to rehabilitate if necessary and where feasible.
- **Overnight shelters**—The old huts in the Cederberg, Boosmansbos, and Groot Winterhoek Wilderness Areas are not only a contradiction of the wilderness concept, but it is their presence that has led to certain routes being marketed as "weekend trails" in popular hiking books. This has led to the concentration of users along certain routes and at the sites of the huts, resulting in excessive intergroup contact and to impacts such as trampling of vegetation and much evidence of human waste. The naturalness and solitude of the wilderness is severely impinged upon, and the wilderness experience subsequently lost. The argument that these huts are useful for emergencies, such as during storms and severe cold, is not compelling because personal risk and challenge associated with adverse weather conditions are appropriate features of the wilderness setting, and it is neither practical nor desirable to eliminate such risks.
- **Footpaths**—Four issues need to be discussed under this subject: (1) existing, poorly planned, or constructed footpaths; (2) footpaths that are seldom used; (3) the existence of impromptu footpaths along strong desire lines; and (4) the need for new paths. Surveys, in the form of a mapping exercise, should therefore be conducted in each wilderness area to determine the status of existing footpaths in terms of their ecological and visual impacts, popularity of individual routes, presence of impromptu footpaths, and "unexplored" areas. This exercise could be seen as part of the LAC process.
- **Define permissible activities in wilderness areas**—Wilderness Areas in the United States generally only allow hiking, horseback riding, climbing, canoeing, and overnight camping. However, "nonconforming uses" are also allowed, such as mining, grazing of livestock, hunting, and fishing. These activities, especially mining and grazing, from a South African viewpoint appear to be a complete contradiction of the wilderness concept, but the issue is unique to the United States (Hendee 1990). Wilderness uses have been defined as ranging from:
  - Wilderness-dependent uses—long distance backpacking, traditional rockclimbing, canoeing, primitive camping opportunities, scientific observation, and some fishing and hunting.
  - Wilderness-associated uses—short day hikes, sport-climbing, picnicking, fishing; hunting; and observation of nature and scenery.
  - Wilderness-independent uses—mining, grazing of livestock, competitive events, and fishing for stocked fish.

  The demands on the wilderness resource in the Western Cape will undoubtedly intensify over time, and there are likely to be requests for types of recreation that may be incompatible with the wilderness concept. What types of recreation must we then define as wilderness dependent? What will our argument against horses, hunting, and fishing be, for example, when these activities are allowed in American Wilderness Areas? An example of such a request has been made from the sport-climbing fraternity that asked for the designation of a sport-climbing area in the Rocklands area of the Cederberg Wilderness Area. Potentially, this activity could generate much income because the area is internationally renowned. How puristic can we afford to be when the area in question is not visually isolated from roads and agricultural landscapes?
- **Toilets**—There are valid arguments for and against the provision of toilets in our wilderness areas, especially at popular overnight sites. They have the advantage of discouraging users from defecating over a wide area. This is problematic because toilet paper is often not properly covered and, consequently, because of the large number of visitors, there is often much evidence of previous visitation. There is also the risk of water pollution, with the provision of water being one of the more important social benefits frequently attributed to Western Cape Wilderness Areas. Toilets, however, no matter how primitive, are manmade structures and therefore represent a civilizing influence. They are also usually obtrusive and have a limited life span.
- **Degraded areas**—Here the minimum tool approach must be used with respect to the equipment, material, and techniques used in the rehabilitation process, as well as the control of visitor use—by way of restricting numbers or dissipating use, to the closure of routes and campsites. Every proposed rehabilitation project must first be scrutinized to determine its necessity before implementation. The use of natural materials instead of artificial products such as cement, net, and gabions, must be preferred where practical. Degraded areas include old quarries and sites of gully erosion along footpaths and jeep tracks.
- **Fire management**—This is another complicating issue, but ideally a natural ignition fire management strategy should be implemented in wilderness areas, or at the very least, a strategy of adaptive interference. The basic objective is to maintain the natural role of fire in the wilderness ecosystem consistent with the safety of persons, property, and other resources. The use of firebelts and block burns in wilderness areas should be avoided.
- **Exotic trees**—All exotic trees, even those deemed to have sentimental value, should be removed, as they are incompatible with the wilderness concept. In addition, priority should be given to the control of alien, invasive

trees in wilderness areas above those in areas of lesser conservation status.

Step 3: Education and Communication

The Leave No Trace (LNT) concept revolves around educating wilderness visitors, prior to their entering wilderness areas, in outdoor skills and ethics. The emphasis is on low-impact or no-trace hiking and camping skills that reduce trampling, multiple trailing, shortcutting across switchbacks, littering, and other physical impacts. The principles of "pack it in, pack it out" and "properly dispose of what you cannot pack out" are central to the concept. It also addresses social impacts related to trail etiquette and consideration of other users seeking silence and solitude.

The motivation for the appointment of a wilderness officer is to appoint a person who is dedicated to leading wilderness trails, educating the public, monitoring ecological and social conditions within wilderness areas, acting as a liaison with other wilderness authorities and NGO's, keeping abreast of international wilderness management trends, and training staff.

As a means of fostering and encouraging public support for our wilderness areas, as well as generating income, trails similar to those run by the Wilderness Leadership School, the South African National Parks Board, and the KwaZulu-Natal Nature Conservation Services should be organized in our wilderness areas. It will be important to accommodate political and community leaders as a means of lobbying for the wilderness cause, while also targeting corporate leaders for financial support. The wilderness officer will be responsible for organizing and leading these trails.

Our communications section could mount a "Wilderness Appreciation" campaign, which would educate the public in respect to what wilderness is; what its social benefits are; the principles of the LNT concept; as well as marketing our wilderness areas as places where personal risks and challenges associated with remote, isolated landscapes, rough terrain, and adverse weather conditions can still be experienced.

Proposed Policy for Managing Wilderness Resources

The Western Cape Nature Conservation Board, **recognizing** that:

- Wilderness is the most remote and pristine setting on the continuum of landscape settings.
- The wilderness experience is a distinct psychological resource, which offers incomparable opportunities for character building, stress therapy, and spiritual communion.
- Naturalness and solitude are the two key conditions of true wilderness.

and **realizing** that:

- Freedom of movement and spontaneity, together with personal risk and challenge associated with remote, isolated landscapes, adverse weather conditions, and physical features, are appropriate features of the wilderness setting.
- There is an enormous moral obligation to provide the people of South Africa with the opportunity to benefit from a true wilderness experience.

undertakes to:

- Actively seek to identify the *de facto* remaining wilderness areas in the Western Cape and pursue statutory protection for them.
- Incorporate the fundamental principles of the wilderness concept into the management of all our wilderness areas.
- Involve the public in the development and implementation of wilderness management plans.
- Base the management of our wilderness areas on the Limits of Acceptable Change planning framework.
- Remove all infrastructure, where possible, from the wilderness areas.
- Only permit wilderness-dependent recreation in the wilderness areas.
- Use the minimum tool approach in respect to management activities and visitor control.
- Where practical, practice the natural ignition fire management system in the wilderness areas.
- Remove all exotic trees from wilderness areas.
- Educate the public in terms of the principles associated with the "Leave No Trace" concept.
- Promote support for wilderness through the organization of trails for political and corporate leaders.

Conclusion

The primary objective of all these initiatives is the maintenance of the biodiversity in the Western Cape Province, including the CFK, succulent Karoo, and thicket biomes. There are, however, several other extremely important reasons for these plans. Due to ever-increasing development pressures, it is essential to have the necessary planning principles and plans in place to prevent unwise utilization of resources. For these plans to be effective, they have to be the product of a collaborative process; CAPE is such a process, where all interested and affected parties have participated and political support has been obtained. The conservation bodies are, however, under continual pressure to generate funds, and the temptation to undertake inappropriate development, for the sake of fund generation, must be guarded against. It is believed that the CAPE process, along with the planning and legislation already in place, will go a long way toward the achievement of these goals. It is felt, however, that the revised wilderness policy will contribute significantly toward the maintenance and enhancement of not only proclaimed wilderness areas, but all conservation areas for the simple reason that the principles and guidelines set out in the policy will be equally applicable to these areas.

These principles and guidelines must be used to ensure that the wide diversity of nature-based opportunities are recognized and wisely exploited. The objectives are numerous, but possibly the most important would be to raise the level of awareness of the diversity of the area, and its value, if wisely managed, to the local communities. The underlying principle guiding wilderness management should always be to protect the core conservation areas by encouraging appropriate

peripheral development. The LAC process will be critical to the achievement of the desired state of the environment.

Finally, the answer to the question on where we are going is that the WCNCB supports wilderness. We are involved in a range of projects, have formed various partnerships toward expanding conservation land, and have also revised our wilderness policy. Hopefully, we will contribute to the concept of "Keeping Wilderness Wild" in the Western Cape, one of the most biodiverse places on earth.

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Establishment of Buffer Zone in the Peripheries of Wilderness Areas in the Ukhahlamba-Drakensberg Park World Heritage Site, KwaZulu-Natal Province, Republic of South Africa

William R. Bainbridge

Abstract—The Ukhahlamba-Drakensberg Park is one of the most important high altitude protected areas in Southern Africa. It consists of four designated wilderness areas (including the first wilderness area to be legally designated in the country), which make up about 48 percent of the park's total area. The park was recently added to the World Heritage List, as both a Natural and a Cultural Site. The KwaZulu-Natal Town and Regional Planning Commission has implemented an investigation to determine whether there is a need to protect the natural beauty and high scenic values in private and communal land in the peripheries of the park, in view of its value for present and potential future tourism development. A planning project was undertaken that recommended a zoning system, based on the Seville Strategy of the United Nations Educational, Scientific and Cultural Organization (UNESCO), which makes provision for a gradation of intensity of development away from the eastern boundary of the park. The system includes two primary zones, including a Buffer Zone immediately adjacent to the park. A further planning project has recently been undertaken to more precisely define the extent and functions of the Buffer Zone. This is the first such initiative to formally establish a zoning system, which will be entrenched in legislation and regional plans. This paper discusses the expected benefits that will be provided by the proposed Buffer Zone for the protection of the integrity of the park and its inner wilderness system, as well as benefits for landowners and communities resident within or adjacent to the zone by the provision of tourism development opportunities immediately adjacent to the park. Control measures will be put in place to limit the scale and location of such development, promote retention of environmental quality, and limit negative impacts on the park and wilderness system. Also discussed are measures to be implemented to promote collaboration between park authorities and private and communal landowners. The eventual outcome of this initiative could be the formation of a system of Biosphere Reserves in the entire peripheries of the park.

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Introduction

The Ukhahlamba-Drakensberg Park is one of the most important high altitude protected areas in Southern Africa. It is 242,813 ha (600,000 acres) in extent, and protects a significant proportion of the upper reaches of the Drakensberg Mountains in KwaZulu-Natal Province, along the international border between Lesotho and South Africa. The border lies along the watershed between the west-flowing Orange or Senqu River system, and the east-flowing rivers of KwaZulu-Natal (KZN). The park conserves important biodiversity resources in the most extensive portions within the country in two of the seven floristic regions of Africa south of the Sahara—the Afro-alpine and Afro-montane regions. The park also protects the watersheds of the most important rivers of the province, as well as valuable archaeological heritage and natural resources. In addition, the Drakensberg Mountains have an international reputation for their spectacular natural beauty, and the park preserves some of the Drakensberg's most scenic portions. The Drakensberg is regarded as the most important inland tourism destination in the province, and the park is the center of this attraction (KwaZulu-Natal Town and Regional Planning Commission 2001a).

The park is in the custody of Enzemvelo KwaZulu-Natal Wildlife, the organization responsible for protected area management in the province. It comprises four wilderness areas proclaimed under national legislation: Mdedelelo, Mlambonja, Mkhomazi, and Mzimkulu, as well as a number of nature reserves proclaimed under a provincial statute. The four wilderness areas include the first wilderness to be legally proclaimed in South Africa. They have a total area of 117,765 ha (291,000 acres), or about 48.5 percent of the park (Bainbridge 2001).

The park (and its component wildernesses) was recently accorded World Heritage status under both natural and cultural criteria. The natural criteria of outstanding universal value recognized by the World Heritage Bureau of UNESCO were:

- Superlative natural phenomena or natural beauty and aesthetic importance.
- The presence of significant natural habitats for in situ conservation of biological diversity and, in particular, outstanding species richness—it is a recognized Centre of Plant Diversity and Endemism, and a globally important endemic bird area.

The cultural criteria refer to the important San (Bushman) rock art and other archaeological deposits present in the park.

Threats to the Park and Its Wilderness Areas

As indicated above, the park and its wilderness areas enjoy secure protection in law. However, while the park is relatively large in local terms, it is relatively narrow in width, and thus is vulnerable to unsympathetic development in the immediate peripheries. The wilderness areas are protected by an internal buffer area, but this, consequently, is also of relatively narrow proportions, and thus the wildernesses are also vulnerable to disturbance and nonconforming physical development in the peripheries. As an example, lights in some of the settlements and small villages in the approaches to the park, although distant from the park boundary, may be seen at night even from the top of the main escarpment, and are certainly visible from many vantage points in the wilderness areas.

Specific policies were formulated over a decade ago by the provincial government for the control of nonconforming physical development such as large-scale tourism facilities on private land immediately adjacent to the park (Martin 1990). However, these policies lacked legal sanction and did not apply to a number of land uses, such as commercial timber plantations of alien tree species, which have recently been responsible for significant landscape transformation in the area. It was for these reasons that the study described below was commissioned (KwaZulu-Natal Town and Regional Planning Commission 2001a).

Initiative to Prepare a Special Case Area Plan for the Drakensberg

Aim and Scope of the Study

The study was commissioned in 1999 by the KwaZulu-Natal Town and Regional Planning Commission to consider the desirability of designating the lower-lying portions of the Drakensberg Mountains and agricultural lands of the province surrounding the park as a Special Case Area (SCA), and to prepare a Special Case Area Plan (SCAP) for the mountains and influent surrounds. The need for the study arose out of increasing pressure for various forms of development in these mountains and peripheries, which had the potential to negatively affect the integrity of the park and the unique resources of the mountains, especially their biodiversity, water production, and scenic values. Protection of the inner wildernesses was seen as a key consideration. An SCA is defined as an area with special or unique character, which may require additional protection over and above normal legislated development application procedures.

The study area forms an important component of a greater study area (the Maloti-Drakensberg Conservation and Development Area) in the high altitude mountains shared between Lesotho and South Africa, in which a parallel feasibility study was undertaken by the two governments in cooperation with the World Bank. The goals of these two studies were broadly similar, with particular emphasis on the promotion of sustainable land uses, conservation of the unique natural resources, and economic upliftment of the people resident in the area (KwaZulu-Natal Town and Regional Planning Commission 2001b).

Summary of Principal Findings and Recommendations

The study showed that existing legislation makes provision for the protection of all the principal resources of the study area except landscape quality. Landscape transformation by a number of land uses such as agriculture, commercial afforestation, and rural settlement was found to be a significant threat to scenic values and the natural beauty of much of the area. Tourism (and ecotourism) are primary land uses in significant portions of the study area together with agriculture, and thus the potential for these uses could also be threatened by such land uses. Furthermore, uncoordinated or nonsustainable development was found to be a primary cause of landscape transformation impairment of scenic values of other portions with unrealized potential for tourism, to the probable future detriment of current landowners and communities.

The planning strategy adopted was to select a candidate SCA strategically located to protect both the integrity of the natural resources and scenic values in the approaches to the park, and of the park itself. A zoning system for the proposed SCA was developed, based on the Seville Strategy of UNESCO. This system incorporates the park itself as a core area and makes provision for a gradation of intensity of development eastward away from its eastern boundary. The objectives for the zoning system were to provide a reasonable level of development opportunities within each zone, as well as to decrease the potential negative effects of development as the visitor approaches the mountains. The system includes two primary zones: a Buffer Zone immediately adjacent to the park, with development largely restricted to extensive forms of agriculture and limited low-intensity tourism development; and a Commercial Agriculture Zone away from the park, in which intensive forms of agriculture and tourism are considered to be appropriate.

The principal findings and recommendations of the report of the study (KwaZulu-Natal Town and Regional Planning Commission 2001a) include:

- The area shown in figure 1 should be declared an SCA for conservation of its unique natural resources, in particular its scenic values and landscape quality.
- A system of zones, and in particular a Buffer Zone, should form the basis for the regulations for the Drakensberg SCAP.
- The policy provisions for the SCAP (and its zoning system) should be integrated into the relevant subregional plans.
- The primary objectives of the SCAP are to contribute to conservation of the unique natural resources, the integrity of the park and the promotion of sustainable land uses, economic stimulation, and job creation.
- Consideration should be given to designation of a part, or the entire SCA, as one or more Biosphere Reserves in terms of the UNESCO Man and the Biosphere Program.

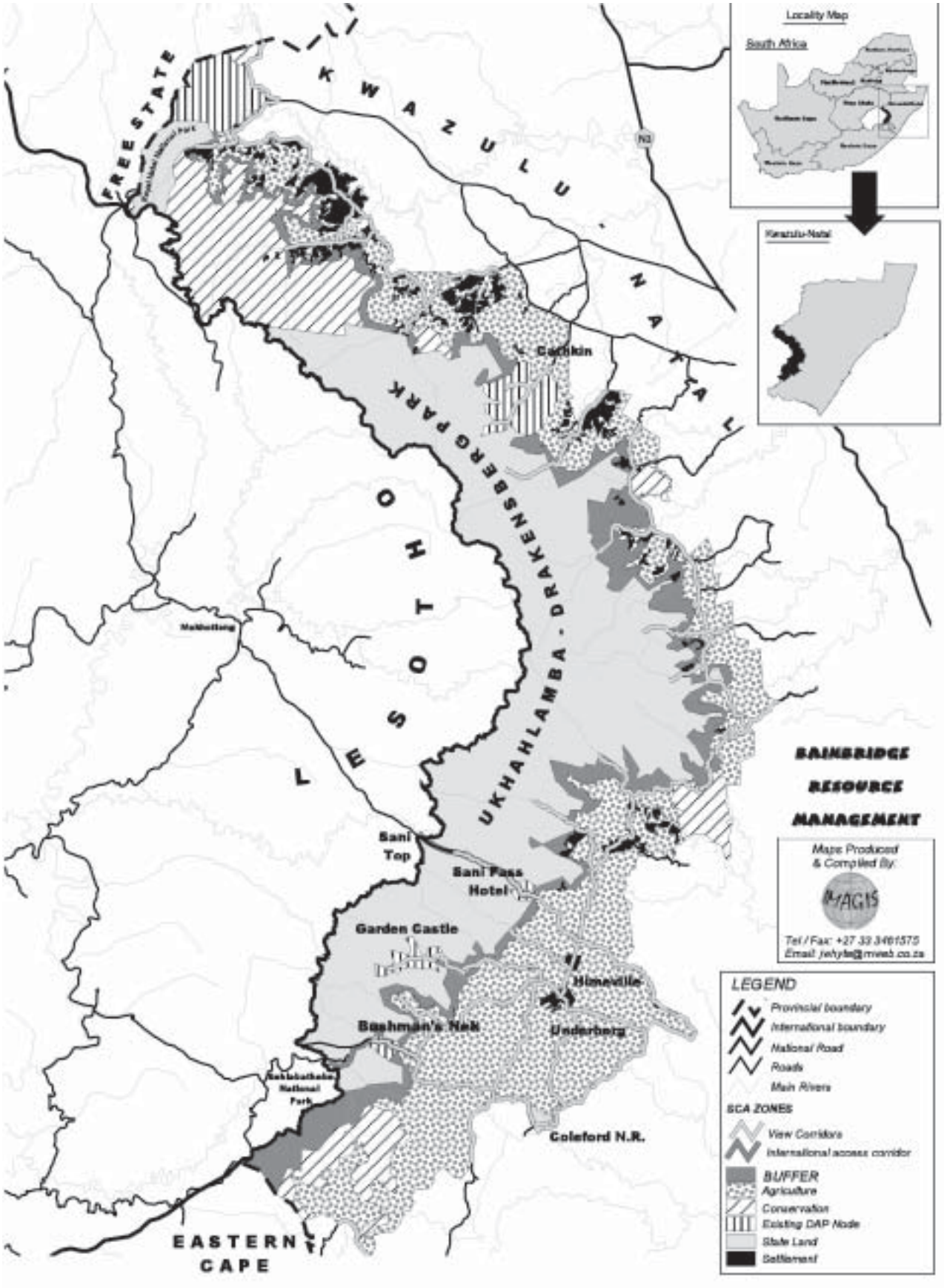

Figure 1—Buffer Zone, Drakensberg Special Case Area.

- Areas of Resource Conservation Zone, identified in the study, should be considered for formal designation as protected areas.
- Tourism (and ecotourism) has the potential to become a primary land use together with agriculture.
- Consultation with authorities and communities in the study area should form a continuous component in the implementation of the recommendations.

Project to Refine and Delineate the Eastern (Outer) Boundary of the Buffer Zone

Study Aim

One further recommendation of the SCAP study was that there was a need for refinement of the eastern boundary of the Buffer Zone, to ensure a rational basis for the implementation of regulations applied to the SCA, as well as to reflect the underlying physiographic and environmental determinants. This second study was undertaken shortly after the initial study (KwaZulu-Natal Town and Regional Planning Commission 2001a,b).

Major issues that were addressed in this second stage project were:

- Establish principles and criteria to be used for demarcation of the eastern boundary of the Buffer Zone.
- Relevant policies and legislation.
- World Heritage status and the need to protect the important resources of the park.
- Consultation with interested and affected parties.

The approach employed for this study was based partially on recently published guidelines for establishing policy and best management practices for buffer zones in terrestrial ecosystems in developing countries (Ebregt and De Greve 2000). These support the following definition of a buffer zone, proposed by Wild and Mutebi, which was adopted for this study:

> Any area, often peripheral to a protected area, inside or outside, in which activities are implemented, or the area managed, with the aim of enhancing the positive, and reducing the negative impacts of (nature) conservation on neighboring communities, and of neighboring communities on conservation (Ebregt and De Greve 2000: 7).

Ebregt and De Greve (2000) recommend a holistic approach for the establishment and management of buffer zones. This implies that both conservation and development considerations be employed as appropriate for the specific conditions that pertain for each buffer zone, with social and cultural settings considered at least as important as environmental factors, and that nature conservation and socio-economic development are not only complementary, but also strengthen each other's effectiveness and positive impacts. This summarizes the approach adopted for the present study. Furthermore, the specific key needs identified for delineation of the Buffer Zone included requirements for protection of the integrity of the park and conservation of the natural character of the Drakensberg foothills peripheral to it, as well as to meet the needs of residents, tourists, and visitors to the Drakensberg, bearing in mind its location as a key component of the Maloti-Drakensberg Transfrontier Conservation and Development Study Area.

Consultation

The consultation process involved a series of workshops and consultative meetings with official agencies and stakeholder groups.

Summary of Principal Findings and Recommendations of the Secondary Study

This study confirmed the need for a buffer zone around the entire eastern boundary of the Ukhahlamba-Drakensberg Park, that is, that this zone should form part of the zoning system of the Drakensberg SCAP. It was decided that the zone should principally comprise land of low agricultural potential, that is, areas where soils and other physical conditions such as slope are not conducive to intensive agriculture or other forms of development. As far as practicable, land of high agricultural potential, which is a natural component of the adjacent Commercial Agricultural Zone, should be excluded. This proved feasible by virtue of the hilly nature of the Drakensberg foothills. These and other considerations (such as the inclusion in the buffer of sensitive sites and natural communities) provided the basis for development of a series of principles and criteria, which led to the delineation on maps and aerial photographs of the precise location of the eastern boundary of the Buffer Zone; the western boundary consists of the park boundary.

The study further indicated that agriculture (and in some instances settlement) are current primary land uses in the Buffer Zone, but the zone is also well suited for small-scale ecotourism, a use which should be promoted in order to offer landowners another economic incentive compatible with the overall vision for the area. The forms of tourism facilities considered to be appropriate include small-scale chalet complexes, small hotels, camping, cottage industries, and arts and craft outlets. The zone is also particularly suited for nature-based forms of outdoor recreation, which should be facilitated by development of a system of trails for use by foot, horseback, or mountain bicycle.

Based on the principles and criteria defined for the purpose, the zone was delineated both in a Geographic Information System (GIS) and physically on the ground by means of Geographic Positioning System (GPS) points to an accuracy of 20 m (65.6 ft). The Buffer Zone varies in average between a minimum width of about 500 m (546.8 yards) and a maximum of just over 2 km (1.2 miles).

It is believed that the proposed Buffer Zone has the potential to achieve the principal objectives of the SCAP, in particular to make significant contributions to protection of the unspoiled natural character, and the resources of outstanding universal value of the World Heritage Site and its component inner wildernesses. It should also contribute to the protection of the present, largely unspoiled natural character of the landscapes, to scenic values and natural

communities in the immediate peripheries of the park, and to the promotion of sustainable land uses.

The SCAP makes provision for the formulation of spatial framework plans and land use schemes that should address the following:

- Identification and conservation of natural resources in the Buffer Zone that are of outstanding universal value.
- Promotion of sustainable development and conservation of the other natural resources of the Buffer Zone and other zones of the SCAP.

The recommendations of the second phase study include:

- Development of partnerships between the park authority and stakeholders for development of a comprehensive strategic land use management system for the Buffer Zone within the framework of objectives for the Maloti-Drakensberg Transfrontier Conservation and Development Project.
- Consideration given to the nomination of all or part of the SCAP as a Biosphere Reserve, as recommended by the World Heritage Bureau and the SCAP Report.

The plan includes the provision of incentives to landowners and communities with title to the land to accept and to benefit from the provisions of the plan. These include the following recommendations:

- Tourism should be recognized and promoted as a primary land use along with agriculture, not only throughout the SCAP area, but also in the Buffer Zone.
- The permissible density for low-scale tourism development in the Buffer Zone should be increased from previous levels.
- Provision should be made for direct access into the park for guests to tourism facilities in the Buffer Zone (instead of through distant public entry points).

A primary product of the SCAP is a recommended system of land use guidelines and controls for achievement of the objectives of both studies. A list of preferred and nonpreferred land use activities is provided for each zone. Table 1 provides the recommended activities for the Buffer Zone.

Summary and Conclusions

As far as is known, this is the first attempt in South Africa to delineate a buffer zone on private and communal land around the peripheries of a major protected area such as the Ukhahlamba-Drakensberg Park. The proposed Buffer Zone was designed to benefit both the park itself, as well as landowners, visitors, and tourists, through the implementation of control measures to conserve the integrity and natural character of both the protected area and the buffer, and by promotion of sustainable land uses, including tourism and agriculture. These measures could create the opportunity for the creation of one or more Biosphere Reserves in the proposed SCA. They should also promote protection of the integrity of the wilderness areas within the park through the preclusion of nonsympathetic development in the approaches to the park.

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I wish to thank the KwaZulu-Natal Town and Regional Planning Commission for permission to quote from its published reports on these two projects. I also wish to acknowledge, with thanks, the contributions made by my colleagues J. van der Vegte, B. Martin, J. Alletson, C. Whyte, and Professor J. McCarthy, who were coauthors of these two reports.

Table 1—List of preferred and no-preferred land use activities for the buffer zone[a].

Zone	Preferred activities	Nonpreferred activities
Buffer (overall)	Amenity planting with noninvasive species	Agri-industry
	Extensive agriculture	Commercial afforestation
	Intensive agriculture	Industrial development
	Nature and resource conservation	Intensive or semi-intensive human settlement
	Nature and culture-based tourism	Large-scale infrastructural projects
	Small-scale tourism	Large-scale tourism development
	Small-scale agriculture	Mines and quarries
	Subsistance agriculture	New roads
	Trails	Subdivision of land
Buffer (settlements)	Amenity planting with noninvasive species	Agri-industry
	Extensive agriculture	Commercial afforestation
	Intensive agriculture	Industrial development
	Nature and resource conservation	Large-scale infrastructural projects
	Nature and culture-based tourism	Large-scale tourism development
	Small-scale tourism	Mines and quarries
	Small-scale agriculture	New roads
	Subsistence agriculture	Subdivision of land
	Trails	

[a]Town and Regional Planning Commission 2001b.

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Mountain Conservation in South Africa

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Abstract—South Africa comprises approximately 10 percent mountainous terrain and isolated mountains, based on the criterion of 450 m (1,476 feet) local relief. Distinctive hilly terrain and distinctive coastal and river relief make up approximately 13 percent of the land surface. The highest mountains are located in the Drakensberg with peaks reaching 3,400 m (11,155 feet) and local relief up to 2,100 m (6,890 feet). The extensive Cape Fold Mountain Range (totaling about 21,000 km^2, or 8,108 $miles^2$) also have several peaks with local relief close to 2,000 m (6,562 feet). Many other less extensive mountain ranges exist throughout South Africa.

Developments and poor management practices in mountain areas are increasing on private and government land, and mountain wilderness is shrinking. The objective of this paper is to: provide an overview of major mountain ranges, their conservation status, and the type of communities that live in close proximity to these mountains; highlight key threats to mountain wilderness; and discuss and analyze policies, legislation, and other "social contracts" that deal with mountain management in South Africa, focusing on how key issues such as overexploitation, overburning, lack of finance, law enforcement, lack of knowledge, bad environmental attitudes, water pollution, inappropriate private and infrastructural developments, and poorly planned access routes are being addressed.

A hypothetical case study, where suitable socioecological zoning is used in the planning and development of a private mountain reserve, is discussed. The rationale for using socioecological zoning is to encourage the conservation of mountain wilderness by only developing in areas where potentially negative effects on wilderness qualities can be minimized, and to restrict nonwilderness-dependent activities in identified wilderness areas. Socioecological zoning requires that a predetermined range of social needs and uses, applicable to the characteristics of the mountain environment in the country, is scientifically matched to the appropriate ecological and physical characteristics of the mountain area.

Introduction

Based on the criterion that a mountain constitutes an area elevated at least 450 m (1,476 feet) from the local relief (the height difference measured from the lowest point within the area being considered), South Africa comprises approximately 10 percent mountainous terrain and isolated mountains. Distinctive hilly terrain and distinctive coastal and river relief make up approximately 13 percent of the land surface.

Mountains in South Africa either form part of the Great Escarpment or are free standing. The Great Escarpment extends from the mountainous regions of the Northern Province, southward to the Drakensberg, past Lesotho and the Eastern Cape into the Southern Cape. It then continues north of the Cape Fold Mountains to Sutherland in the Karoo, before turning northward toward Springbok in the Northern Cape (DEAT 1997).

The highest mountains in South Africa are located in the Drakensberg with peaks reaching 3,400 m (11,155 feet) with local relief up to 2,100 m. The extensive Cape Fold sandstone mountain ranges (totaling about 21,000 km^2, or 8,108 $miles^2$) also have several peaks with local relief close to 2,000 m (6,562 feet). Many other less extensive mountain ranges exist throughout South Africa (Blignaut 2000a).

Mountain Wilderness

Some mountainous areas are still wild and unspoiled as a result of harsh living conditions for humans, rough topography, and remoteness. In these pristine wilderness areas, there are few signs of human modification. Indigenous fauna and flora are very dominant. These places provide a range of opportunities to visitors for solitude and to interact with nature on nature's terms.

The wilderness qualities in mountains vary depending on geomorphology, climate, surrounding land use, and fauna and flora, for example:

- The Cape Fold Mountains form part of the extremely biodiverse Cape Floral Kingdom ecosystem and offer many undisturbed mountain peaks and kloofs. Visiting these wilderness areas can be strenuous. Leopard and signs of free-ranging wildlife are present in some areas, but the wilderness character of these mountains is linked to solitude; striking scenic beauty with steep ascents and rough terrain; sandstone cliffs; pure mountain water; and multicolored, unsurpassed endemism among flora.
- The KwaZulu-Natal Drakensberg harbors one of the world's greatest rock art collections. There are an estimated 600 sites with more than 35,000 individual rock art images. It contains high-altitude and unique Southern African alpine-tundra vegetation and associated endemic paleoinvertebrates. It offers outstanding views and a range of peaks to climb. Wildlife can be encountered at varying altitudes.
- The Lebombo Mountains are less than 800 m (2,625 feet) high, but are probably the richest wildlife moun-

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In: Watson, Alan; Sproull, Janet, comps. 2003. Science and stewardship to protect and sustain wilderness values: Seventh World Wilderness Congress symposium; 2001 November 2–8; Port Elizabeth, South Africa. Proc. RMRS-P-27. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

tain habitat south of the Zambezi Escarpment, mostly by virtue of their length down the Kruger National Park and the wilderness of Mozambique on the eastern side. Elephant, lion, leopard, buffalo, rhino, and another 40 to 50 large mammals, mainly antelope, as well as enormously rich birdlife inhabit parts of it.

- The Richtersveld is a mountain desert with summer daytime temperatures regularly higher than 40 °C (104 °F), where both plants and animals have adapted to the harsh desert conditions.

Although a mountain zonation policy (fig. 1) has been proposed (Blignaut 1992), there is currently no formal policy specifically aimed at mountain conservation. Many mountainous areas are not zoned, and there are no specific management objectives or indicators to monitor compliance to set targets on State or private land. In many cases the diverse mountain wilderness landscapes are not managed.

There is currently no attempt to protect the remaining mountain wilderness by restricting access and making inducements to go elsewhere through the provision of recreational facilities in more appropriate areas. As a result, many of these wilderness areas are being targeted for ecotourism. Even with a moderate increase in the use of wilderness areas, their nature conservation status may be totally unimpaired, while the wilderness experience may be ruined.

Mountain Communities in South Africa

True mountain communities, people who have traditionally lived in mountain areas, are a rare phenomenon in South Africa. African communities are mostly located in hilly terrain with few communities actually inhabiting the mountains, unlike mountain communities in South America, Asia, and Europe.

Diversity of Mountain Communities

The culture of people living in close proximity to mountains varies from mountain to mountain, depending on agricultural potential, proximity to markets, climate, scenic value, rock formation, biodiversity, presence of wildlife, conservation status, recreational opportunities offered, socioeconomic factors, and so forth. The following loose categories attempt to describe different communities who live close to mountains or who enjoy benefits provided by mountains:

- Traditional mountain communities, which are people who live in the foothills or who live in the mountains on a permanent basis, whose ancestors also lived in mountainous terrain, and who utilize resources provided by mountains, mountain slopes, or mountain streams as

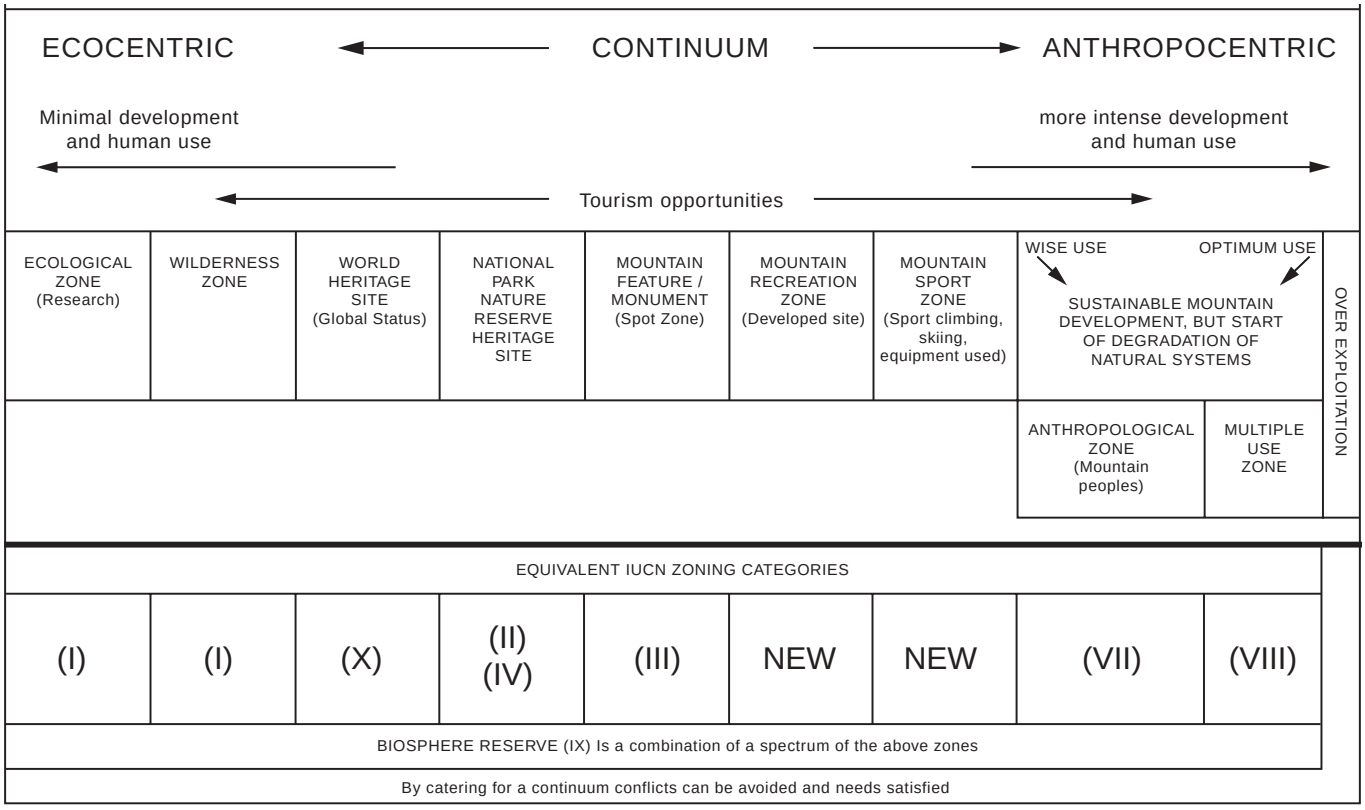

Figure 1—Socioecological zoning.

their primary livelihood. This includes livestock farming (cattle, goat, and sheep), crop farming, and dagga growing. Examples of mountain communities are: Basotho people who live on the Great Escarpment between South Africa and Lesotho; the Hananwa people of Blouberg in the Northern Province; and the people of the Richtersveld, the Namas, and the Bosluis Basters (Van den Berg 2000).

- Subsistence communities such as at Wupperthal in the Western Cape, Qudeni in Zululand, and Mnweni and Singati in the KwaZulu-Natal Drakensberg.
- Rural communities, which include commercial farmers, small-scale commercial farmers, and farm laborers. Farms can be managed by private individuals, companies, or consortiums. Examples are flower farms in the Cape Mountains, trout farms in the KwaZulu-Natal Drakensberg, and cattle farms in the Waterberg.
- Communities living within or on the boundaries of private or public mountain conservation areas, such as in the Richtersveld and Drakensberg.
- Landowners of private nature reserves and those including their land in nature conservancies such as the Cederberg, Voëlvlei, and Grootvadersbosch Conservancies in the Western Cape.
- Foresters and personnel working for mining or logging companies.
- Urban communities living within or on the boundaries of private or public mountain conservation areas, for example, in Cape Town, Ceres, and Franschhoek. Two groups can be identified: "Armchair mountain admirers," the people who are fairly passionate about mountains but who seldom climb them; and "local mountain users," the people who utilize the mountains on a regular basis for exercise, recreation, spiritual renewal, and to socialize or enjoy the scenic beauty.
- Business people running ecotourism operations who use the mountains as the attractant.
- Mountain tourists, the visitors from other areas, nationally or internationally, who travel to mountainous areas to enjoy stunning mountain landscapes or to hike.

In general, people living in mountainous areas have become ecoconscious and take a direct interest in the management of mountains as well as their resources. This has led to the formation of Mountain Forums, Friends of the Mountain group, and Hiking and Mountain Clubs.

Projects Involving Mountain Communities

Sustainable mountain development, as per Chapter 13 of Agenda 21 (developed at the 1992 World Summit on Sustainable Development, Rio de Janeiro), requires the involvement of local mountain communities to ensure that both community needs and conservation needs are met. Some local projects involving mountain communities are:

- **Mnweni Donga Erosion Reclamation Project**. This project in the KwaZulu-Natal Drakensberg is coordinated by the Mnweni Community Trust. Trained groups are now offering a commercial service to other communities along the slopes of the mountain range. This is an excellent example where the community formed a partnership to combat environmental degradation on mountain slopes in their area.
- **Working for Water Project**. The Government's Working for Water Program, spearheaded by the Department of Water Affairs and Forestry, was launched in 1995 to gain control of the growing problem of invasive alien plants. The program currently runs over 200 projects in all nine of South Africa's Provinces. Special teams have been trained to undertake high-altitude alien vegetation clearing in mountainous terrain. Through Working For Water Projects, people living in mountainous terrain have been given opportunities to develop new skills and to work as contract laborers.
- **Zululand Trail Project (ZTP)**. This South African Youth Exchange Project started in 1992. The objective of the ZTP is to explore the remote and beautiful areas of Zululand, very often scarcely populated, to identify possible routes for hiking trails and incorporating local villages as "stop-overs." Visiting local villages provides an interesting cultural experience to exchange students, and provides tangible financial benefits to the locals.

Key Threats to Mountain Wilderness

Threats to South African mountains are numerous and can be categorized under two headings: unsustainable land use practices and potentially threatening situations (Blignaut 2000b).

Unsustainable Land Use Practices

Unsustainable land use practices could include:

- Burning and overburning of indigenous mountain vegetation. Indigenous vegetation is adapted to the incidence of lightning and rock falls. These start the mountain fires that are necessary for the germination of some plant species. However, deliberate and frequent manmade fires have devastating and severe effects on mountain vegetation, particularly at high altitudes and on dry slopes where regeneration is slow. Mature vegetation in South African mountains is currently rare.
- Cultivation, even on moderately steep mountain slopes, leads to erosion, particularly during fallow periods and heavy rainfall. The loss of vegetation cover has multiple consequences: landslides, siltation of dams, drying up of perennial streams, flash floods downstream, and loss of biotic diversity and genetic resources, including insect and other faunal populations essential for pollination of fruit and seed sources.
- Plantations and invasive alien vegetation. Plantations of imported invasive tree species located in mountain catchments cause a massive loss of runoff and perenniality. The water yield from a mountain catchment covered by invasive vegetation, such as hakea, pine, and wattle, is reduced by 50 percent compared to a catchment covered by indigenous fynbos (Burgers 1993).

- Grazing in fragile mountain areas and overgrazing. Bad farming practices by owners of mountain land, and demographic pressures in mountain communities coupled with unsustainable cultural practices that do not match current realities, result in overstocking. This leads to loss of natural vegetation cover, with its serious consequences. It also increases pollution from animals and humans within the catchment areas, resulting in ill health, greater filtration costs, and negative effects on tourism and recreation.
- Badly located and inappropriate infrastructure has an accumulative adverse effect on mountain ecology and landscapes, leading to loss of natural vegetation cover and to pollution. For example: illegal impoundments made by farmers diminish water supply to main dams and degrade riverine ecology; illegal tourism developments, such as roads for offroad vehicles and mountain cottages, cause erosion and pollution; masts and other communication devices on mountain summits adversely impact landscapes and ruin wilderness.

Potentially Threatening Situations

Potentially threatening situations include:

- Easy access. South African mountains are not high in global terms, nor indeed extensive. Many of the mountain ranges are narrow. In the Cape Fold Mountains, there is an average width of only 7 km (4.3 miles). Similar to the Drakensberg, this permits reasonably easy access for exploitation to core wilderness areas.
- Many largely unspoiled public mountain reserves are being developed for ecotourism to provide funds for management and other government agendas. This occurrence has at its source the general weakness in the economy and the indifference of many politicians to long-term conservation and most certainly to wilderness. Even protected areas are being opened up for limited exploitation by adjacent communities and to provide new livelihood opportunities. While in much of the developed world conservation of protected areas is becoming more strict, the reverse is occurring in Africa. This augers badly for wilderness, which once destroyed can seldom be restored.
- Economics is at the root of many land exploitation problems. Some private landowners are now looking at exploiting their mountain land to gain short-term benefits for economic survival. The withdrawal of farming subsidies, low agricultural prices, steep increases in fuel costs, and higher labor expenses all contribute to this.
- Politics. Some commercial farmers are apprehensive about their future in South Africa. This perception has been exacerbated by local farm murders and the Zimbabwe land grabs and land claims. Insecurity of title usually leads to exploitation of land in the short term, which could have a noticeable impact on mountains.
- Lack of respect for the natural environment is often at the root of exploitation of mountain land. This attitude has its source in lack of knowledge and education, coupled with indifference and greed for personal gain. If we were healthy morally, we would not consider the mountains as "waste land" to be exploited and ruined for personal and public gain.
- Climate change. If carbon dioxide levels double by the year 2050, some of the Cape fynbos biome will disappear, as it will be unable to adapt to climate/atmospheric changes. However, much of the species-rich montane fynbos is likely to adapt because of the climatic diversity found in mountain environments. Mountain areas in South Africa are therefore likely to be significantly important repositories of biotic diversity in the future.

Policies, Legislation, and Other "Social Contracts" That Deal With Mountain Management in South Africa

Social contracts regarding mountain conservation involve a range of government, private, and communal stakeholders. The instruments for mountain conservation range from formal explicit contracts, such as national legislation, to undocumented implicit private initiatives. There are also various public-private partnerships that contribute to mountain conservation. These social contracts mainly relate to land use, infrastructure developments, commercial opportunities, and access.

Ownership of Mountains

Mountains, hilly country, coastal buttresses, or cliffs in South Africa can be owned or managed by: the State (national, provincial, regional, or municipal authorities); private individuals; communities; Nongovernment Organizations (NGOs), or partnerships between the above-mentioned parties. The area of mountain catchments on State land amounts to 1.7 million hectares (6,564 miles^2), about 15 percent of the total area of major catchments. Eighty-five percent of mountain catchments, about 9.7 million hectares (37,542 miles^2), is privately owned (Rabie and others 1992). Of the privately owned areas, 5.5 percent are proclaimed mountain catchment areas, while 79.5 percent are undeclared catchments (Rabie and others 1992). The result is that many mountainous areas with high wilderness qualities are not proclaimed as such. It is thus essential that public-private partnerships be promoted to conserve South Africa's mountain heritage.

Legislation Relating to Mountains

The only legal definition in South Africa related to "mountain" is that of "mountain catchment area" in terms of the Mountain Catchment Areas Act (MCAA) (Act 63 of 1970). Such an area is simply described as an area defined and declared by the Minister of Environmental Affairs by notice in the Gazette to be a mountain catchment area. This definition fails to describe the characteristics of such an area, although a good idea of what represents a mountain catchment is obtained from the interdepartmental Ross Report (1961), which culminated in the MCAA.

Legislation that pertains to mountain areas are (Price 2000):

- **The MCAA** applies to State-owned mountains and a percentage of privately owned important mountain catchment land. Its overall purpose is the production of clear, pure water. The biotic diversity of these proclaimed mountain areas has been reasonably well conserved as unsilted, unpolluted water through the retention of a reasonably mature vegetation cover.
- **National Forests Act (Act 84 of 1998)**. This Act makes provision for the protection of indigenous forest, as well as for the support of community forestry (http://www.gov.za/ yearbook/water.htm). It provides for the designation of wilderness areas on State forest land.
- **National Veld and Forest Fire Act (Act 101 of 1998)**. In terms of this Act, Fire Protection Associations (FPAs) need to be established. While it is compulsory to establish FPAs on all State lands, FPAs on private lands are voluntary. The purpose of the Act is to prevent and combat veld, forest, and mountain fires throughout the Republic.
- **National Water Act (Act 36 of 1998)**. This Act provides for the protection of water resources (the definition includes streams) and the use of water, including its abstraction from streams and other sources, and regulates activities that result in the reduction of streamflow. In some regions, steering committees have been established to compile catchment reports that provide input into the development of integrated Catchment Management Plans. Integrated Catchment Management is a focus of the new Water Act.
- **National Environmental Management Act (NEMA) (Act 107 of 1998)**. This Act is broadly aimed at the decisionmaking processes and coordination of governmental functions relating to the environment. Of general interest is the Act's adherence to principles of Integrated Environmental Management and Environmental Management Plans.
- **Environment Conservation Act (Act 73 of 1989)**. This Act provides, among other things, for the declaration of Protected Natural Environments, the control of pollution, the control of environmentally harmful activities, and the creation of regulations to govern procedures to be followed in environmental impact assessments.
- **The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983)**. The new regulations under CARA add substantial legal capacity to the quest to control invasive alien plants, especially in mountain catchments.

Government Initiatives Toward Mountain Conservation

Government initiatives regarding mountain conservation include:

- **Wilderness Areas**. Since 1971, 11 wilderness areas have been designated in terms of the Forest Act. All but one (Ntendeka W.A.) protect high altitude ecosystems in the principal mountain systems of the country (Bainbridge 2001).
- **National Parks**. National Parks are proclaimed in terms of the National Parks Act (Act 57 of 1976). South African National Parks (SANParks) manages four National Parks where mountains are the key attraction: Cape Peninsula, Golden Gate, Tsitsikamma, and Richtersveld. Other National Parks with mountainous terrain are the Kruger, Karoo, Addo Elephant, Marakele, and Mountain Zebra. Private, communal, or NGO land can be incorporated into national parks on a contractual basis.
- **Provincial Nature Reserves**. Some Provincial nature reserves are proclaimed in accordance with empowering provincial legislation by which the Provinces manage State land. Many of these reserves contain mountains, hilly country, coastal buttresses, or cliffs. A breakdown of Provincial reserves per province is as follows: Eastern Cape (47), Free State (17), Gauteng (6), KwaZulu-Natal (87), Mpumalanga (14), Northern Cape (6), Northern Province (52), North West (14), and Western Cape (51). Some of the mountainous nature reserves do not have resident managers.
- **Indigenous Forests**. A National Forestry Action Program (NFAP) for South Africa was developed in 1997. Indigenous high forest covers only about 300,000 hectares (1,158 miles^2) or 0.25 percent of the country's surface, mainly on the eastern and southern slopes of mountain ranges from the Cape Peninsula in the Western Cape to the Soutpansberg in the Northern Province. Forty-three percent of indigenous high forests are managed by the Department of Forestry according to certain multiuse objectives.
- **Protected Natural Environments**. There are three Protected Natural Environments in mountainous areas: the Cape Peninsula Protected Natural Environment (CPPNE) portions that are included in the CPNP, the Magaliesberg Protected Natural Environment (MPNE), and the Lourens River Protected Natural Environment.
- **World Heritage Sites**. On November 29, 2000, the uKhahlamba-Drakensberg Park was inscribed as a "mixed" natural and cultural World Heritage Site, in terms of the Convention on the Protection of the World's Cultural and Natural Heritage. An application for World Heritage Status for eight representative constellation sites is currently being prepared for the Cape Floral Kingdom and the Cape Fold mountains.
- **Transfrontier Conservation Areas**. A Memorandum of Understanding was signed between South Africa and Lesotho in June 2001 for the establishment of the Maloti-Drakensberg Transfrontier Conservation Area (TFCA). The uKhahlamba-Drakensberg Park World Heritage Site is located within the Maluti-Drakensberg TFCA. On August 17, 2001, a Memorandum of Understanding was signed between South Africa and Namibia to put in place an environmental collaboration program through the establishment of the Ai-Ais/Richtersveld Transfrontier Conservation Park.
- **Mega Reserves**. The Cape Action Plan for the Environment (CAPE) project recommended that three mega-conservation areas (400,000 to 600,000 ha, or 1,544 to

2,317 miles^2) be established in the Cederberg, Little Karo, and Baviaanskloof areas (WWF-South Africa 2000). This important initiative will contribute respectively to an integrated approach to mountain conservation in the Western and Eastern Cape Provinces.

Public-Private Partnerships

Public-private partnership initiatives regarding mountain conservation include:

- **Biosphere Reserves**. Three biosphere reserves have been registered with the United Nations Educational, Scientific and Cultural Organization (UNESCO), and there are nine initiatives underway. Declared Biosphere Reserves in mountainous terrain are Kogelberg (established in 1998) and Waterberg (established in 2000). Biosphere Reserves in mountainous areas currently in the planning phase are: Soutpansberg/Limpopo; Kruger to Canyons, Drakensberg Special Case Area (included is Pholela Biosphere Reserve), Thukela (Weenen), Cederberg, Boland, and Royal Zulu.
- **Conservancies**. A conservancy is an association of private landowners or tenants who voluntarily set aside and consolidate the natural resources of their properties for the purpose of conservation and sustainable utilization. Through cooperation between the farming community and conservation authorities, this concept has grown into a national conservation movement (Cape Nature Conservation 1997).

Private Initiatives

Private initiatives regarding mountain conservation include:

- **Natural Heritage Sites**. South African Natural Heritage Sites are designated where certain criteria are met and where landowners commit themselves to the conservation management of the site. The number of natural heritage sites in mountainous areas is not available.
- **Private Game Farms**. Presently there are more than 9,000 game farms, from unregistered farms to those officially recognized by nature conservation departments as "exempted game farms" that allow the capture, selling, and hunting of game. Many game farms are located in mountainous areas.
- **Private Reserves**. There are approximately 160 private reserves in South Africa. Figures per vegetation type are not available (SA State of Environment Report 2000).
- **SA Natural Heritage Program**. Private landowners can apply to the Department of Environmental Affairs and Tourism to have properties awarded Natural Heritage Program status.

Access to Mountain Areas, Rock Faces, and Coastal Cliffs

Access to mountains in South Africa is dependent on the ownership of the area, resulting in no legal right for access to climb or mountaineer—therefore, "no right to ramble." Only a limited extent of mountain land meeting the criteria for wilderness exists, and a fair percentage is privately owned.

- **Access on Private Land**. Private landowners may give permission to climb mountains in their ownership or they may refuse. Mountain and hiking clubs undertake extensive measures, including the purchase of mountains and rights of way, to obtain access. Some landowners now require payment, at least for road maintenance across farms and parking.
- **Access on State Land**. In mountain ranges located in national or provincial parks, access is granted according to permit conditions, and in a few areas there is no access for mountaineering. In proclaimed wilderness areas, access is also per permit and is restricted to prevent overcrowding and a degradation of the wilderness experience.
- **Access to Communal Land**. Some mountainous areas fall within communal tribal ownership, and permission to climb must be obtained from the tribal authorities concerned. Payment for access to such areas is now becoming common.
- **Access to Coastal Cliffs**. Land below the high water mark belongs to the State in terms of the Sea Shore Act (Act 21 of 1935) and is accessible to everyone. However, coastal cliffs above the high water mark could be in private ownership. Rocky coastlines may thus become inaccessible without obtaining permission.
- **Access in Conservation Areas**. In certain areas, access for mountaineering has been lost or restricted due to the establishment of national parks or private nature reserves. In particular, an emphasis on conservation of the "Big Five" (lion, elephant, leopard, rhino, and buffalo), resulting in the creation of additional national parks (for example, Marakele National Park), has in some cases meant that climbers and hikers can now only access such areas under guard, if at all. Trails in some national parks have been closed due to the introduction of buffalo (for example, Mountain Zebra National Park). In other areas (for example, Baviaanskloof), mountaineering is popular, even though buffalo have been released.

User Fees and Financing

Provincial and national authorities have nearly always charged a fee. An exception is the Cape Peninsula National Park, which has partial free access. With the cut in conservation budgets in South Africa, fees are increasing, in some instances dramatically. Although some private landowners still allow free access, many are now charging fees to mountaineer and hike on their property.

Financial resources to cover the objectives of sustainable mountain development are obtained from each national, provincial, or municipal authorities' budget. In certain instances, financial assistance is provided by donor organizations, such as the Global Environment Facility or Peace Parks Foundation. On occasion, conservation-worthy mountainous land is purchased by NGOs such as the World Wildlife Fund (WWF) for approved projects and The Mountain Club of South Africa for mountaineering.

Legal Liability

The situation regarding the legal liabilities of landowners for mountain accidents on their land varies. Some national and provincial authorities and some private landowners require indemnity forms to be completed; in other instances, there are no agreements. There is no legislation ruling on this, and there has not been a court case in South Africa to test this aspect. Rescue services are provided by provincial emergency services and on a volunteer basis by members of the Mountain Club of South Africa. On land managed by KwaZulu-Natal Wildlife, including some areas in the KwaZulu-Natal Drakensberg, a rescue services levy forms part of entrance fees.

Case Study: Riviersonderend Private Mountain Farm

Background: Mr Smith bought a share in a beautiful farm in the mountains as a weekend getaway. He is a keen botanist and mountaineer and wanted to conserve the mountain land in an appropriate, scientific way, while making some money through ecotourism. He spoke to the consortium of landowners, which he was part of, and they decided to appoint a consultant to advise them on a mountain management strategy that combines ecotourism with conservation.

Consultant's Strategy: The first step was to undertake a field trip to identify core wilderness areas that need to be protected; to get an idea of wilderness qualities; to identify features of outstanding scenic beauty; to gather information on topography, fauna and flora; and to identify ecotourism opportunities. The second step was to consult the Department of Water Affairs and Forestry regarding the catchment management plan of the area. The third step was to zone the area to inform future land use. The fourth step was to set objectives and targets for the management of each zone, with measurable indicators. Thereafter, a mountain management and monitoring plan was developed. Four zones were identified:

1. Pristine mountain wilderness. The purest form of wilderness with no signs of modern modification (no roads, fences, dams, windmills, powerlines, fire breaks, solar panels, and so forth), only natural sound, no motorized access. Recreational activities: backpacking, kloofing, rockclimbing, swimming.

2. Remote mountain wilderness. As above but signs of modern modification visible in the distance. Recreational activities: backpacking, kloofing, rockclimbing, swimming.

3. Modified wilderness. Areas with easy access that retain naturalness. The road to the farmhouse and the footpath to the tented camp were included in this zone.

4. Developed area. The farmhouse and laborers' cottages were included in this category.

Process: A meeting was held with the landowners to discuss the mountain management and monitoring plan, aimed at combining mountain conservation with low-impact ecotourism.

Outcome:

- The landowners supported the idea of protecting the wilderness qualities of the mountain reserve. They agreed that infrastructure should be limited to the existing footprint, which included an old farmhouse and two laborers' cottages. No new roads were to be constructed, thus limiting vehicular access to the existing farmhouse. Where present, old boundary fences were to be removed to improve the wilderness qualities.
- They decided to erect two tented camps and a "long-drop" to accommodate overnight visitors. Visitors would have to walk to these camps. Local people were employed to manage the tented camps. This included cooking, cleaning, and "portarage" from the farmhouse to the tented camps. Visitor opportunities included day walks, kloofing, rockclimbing, bird viewing, and botanizing.
- All supported the removal of alien vegetation in a phased approach, taking cognizance of the importance of followup clearing. Local contractors were to be used.
- A meeting was organized with neighboring farmers to join a Fire Protection Association.
- A decision was made to reintroduce wildlife to the area. In this regard, a meeting was set up with the nature conservation authority.
- A monitoring program was implemented to establish whether management objectives were met.

Assumptions: The above-mentioned scenario assumes that:

1. A socioecological, national mountain zoning policy is not in place. If such a policy was operating, mountain ranges would already have been socioecologically zoned by a panel of experts in cooperation with all landowners concerned. Thereafter, a Mountain Management Board comprising landowners, affected parties, and authorities would have ensured that the landowners' application met the criteria of the existing zoning plans. (This is the policy advocated by Blignaut, via oral and written submissions to the Council for the Environment and other institutions, since 1987. The principle aim being to preserve remaining mountain wilderness.)

2. The landowner(s) cooperates with the concept of wilderness. This is usually not the case, as the landowners' principle objective is to make money. Thus, 4-wheel-drive tracks through the mountains and chalets deep into the mountains, with concomitant access and communication infrastructure, are likely pressures. Because there is no national mountain policy and because what legislation there is, is poorly enforced, massive wilderness degradation may take place. When landowners view their land for benefits, wilderness is nearly always the first casualty.

Conclusions

Although South Africa does not have a formal wilderness management or mountain management policy, various partnerships are being implemented toward achieving sustainable development in mountains. In some instances, developments in mountainous areas are not sustainable,

as short-term financial gains are perceived as more important than long-term sustainability.

The government is responsible for conserving mountains in national parks, provincial and municipal reserves, and wilderness and indigenous forest areas on State land, while a range of mechanisms, for example Biosphere Reserves, Natural Heritage Sites, and Conservancies are available for mountain conservation on private land. In addition, private, communal, or NGO land can be incorporated into national parks on a contractual basis.

There is a need to include mountain communities in decisionmaking regarding mountain management and to ensure that these people derive benefits from ecotourism. More projects aimed at environmental education and the creation of jobs for mountain communities need to be initiated.

As a way forward, the only remedy to save remaining mountain wilderness is to undertake socioecological zoning of South Africa's mountain ranges, preferably as part of a national mountain management policy, in order to identify and protect these wilderness areas for posterity. The existence of unambiguous zoning plans covering South Africa's important mountain ranges would pre-empt development pressures and inappropriate compromises with the resultant loss of wilderness.

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WAG-CEAD Alliance: Commitment to Wilderness Training and Protection in Southern Africa

W. D. Densham
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Abstract—The partnership formed between the Wilderness Action Group (WAG), the Centre for Environment and Development (CEAD)-University of Natal, and the partners of both organizations promotes an exciting philosophy of training, research, and management in wilderness. It embraces ideas that highlight a sound understanding of the African as well as the more global contexts in which a pedagogical philosophy must be etched. It is a philosophy that builds on the ideas and writings of key Africanists and also takes cognizance of the ever-expanding conservation and wilderness literature found elsewhere. The aim of this paper is to examine the value of bringing wilderness practitioners and more broadly focused academics together to develop a program of wilderness training and research that is intended to contribute to wilderness management and protection. To achieve this aim, a brief outline of the historical background of the alliance is presented. Thereafter, the nature of the alliance is examined before its achievements are considered. Key challenges are articulated as a basis for a prognosis of future actions.

Introduction

Change and transformation are arguably two of the keywords that spring to mind if one becomes embroiled—sometimes unwittingly and invariably reluctantly—in contemporary political, social, and economic debate in Southern Africa. They are also key words behind principles and practices in global contexts, where attempts are made to address present development problems and envisage the sustainable use of resources into the future.

> The call for sustainable development is often heard and is invariably defined as: …development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Botchway and others 2001: 407).

In our opinion, that definition in itself is insufficient and ineffective as a means to understand the challenges of securing and perpetuating a tradition of innovative debate around wilderness training, management, and protection. McNeill (2000: 22) notes that the

> …sustainable development debate has often been cast (by the Bruntland Report and others) in terms of the rights of future generations. …it necessarily involves:
>
> - Rights of the poor in the present generation, as against those of the rich.
> - Rights of non-humans as against humans.
> - Rights of future generations as against present generations.

His observations are crucial because they underline the political, most often government- driven desire to uplift the considerable populations of the continent, where poverty fashions the life expectations of most people. There is serious error in thinking that we can plan for the future by adopting consensus-type definitions eschewed by Botchway (2001) and the famous Bruntland Report (Bruntland 1987). We must rather face the confrontation that exists in the heart of the "sustainable development" debate, as made so abundantly clear when the other two dimensions as spelt out by McNeill (2000) are added. The world of the "haves" and the "have nots" have very different views on the value of conservation, for example, and they color the theory and practice of conservation and wilderness actions we may wish to take. Mary Seely, speaking at the 1996 Wilderness Management Symposium in Namibia (Jankowitz and others 1999: 189), sets out the issue succinctly:

> …I would like to suggest, that if all of us are interested in Wilderness, as we all profess to be, and why we are here, we ought to be spending a lot more time looking outside of the Wilderness in Namibia. That is where the poverty is taking place. That is where the land degradation is taking place. That is where the population is…and the situations…that are going to impact upon what we consider Wilderness, what we would like to see as Wilderness in the future. And we should be spending more time there already.

It is our contention that the alliance formed between the Wilderness Action Group (WAG), the Centre for Environment and Development (CEAD)-University of Natal, and the partners of both organizations promotes an exciting philosophy of education, training, and research in wilderness. It embraces ideas that highlight a sound understanding of the African, as well as the more global contexts in which a pedagogical philosophy must be etched. It is a philosophy that builds on the ideas of Africanists such as Draper (1998), Mkhize (1999), Player (1999), Muir (1999), Densham (1999), Bainbridge (1987), Van Rensburg (1995), and Carruthers (2001). It also takes cognizance of the

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ever-expanding conservation and wilderness literature found elsewhere (Beinart and Coates 1995; Martin 1999; Nicolson 1970; Weingart 1999; White 1967; and many others).

As such, the objective of this paper is to examine the value of bringing wilderness practitioners and more broadly focused academics together to develop a program of wilderness training that is intended to contribute to wilderness management and protection. To achieve this aim a brief outline of the historical background to the alliance is presented. Thereafter, the nature of the alliance is examined before its achievements are considered. Key challenges are articulated as a basis for a prognosis of future actions.

Context and Perspectives

A major concern in fostering wilderness conservation in this region has been that key organizations embrace wilderness as part of their mandate. As Densham (1999) points out, wilderness conservation in Africa had its origins in KwaZulu-Natal when the then Natal Parks Board, now the Ezimvelo KwaZulu-Natal Wildlife (EKZNW), set aside the first wilderness area in Zululand in 1955, others being added in the Province and elsewhere thereafter. By the 1990s, wilderness as a separate category in the South African classification of protected areas was in place. While these steps are laudable, there has been little imprint of wilderness proclamation more widely on the continent, although the symposium held in the Waterberg Plateau Park in Namibia in 1996 highlighted its significance and what was being done in that country (Cooper 1999).

Another issue highlighted by Densham was the lack of a common approach to management of wilderness. Herein lay the impetus to develop wilderness management training. WAG became the driving force behind training after its inception in 1979 as a voluntary nongovernment organization (NGO). Amongst others, its mission is to:

> Promote the ethic of wilderness conservation in southern Africa and elsewhere; and Promote the appropriate management and use of wilderness areas.

It has also been concerned with:

> Submissions to governments, politicians, decision-makers and international agencies on the value of wilderness; and Education and training programs for wilderness managers, administrators, users of wilderness areas and communities living adjacent to wilderness areas.

By the 1990s, WAG was fully involved in a vigorous training program to fill a clearly perceived void. It also realized that it was not only formal organizations that required such training but that other NGOs and communities with direct and indirect interests in wilderness needed to be vitally involved.

It also became evident that its partnership with the United States Forest Service was pivotal in developing training, given the considerable experience from those parts. So, it delivered courses from the early 1990s, training some 500 to 600 participants over an 8-year period—both in South Africa and in Namibia, where similar concerns and a growing wilderness expertise made for happy synergy.

In 1998, WAG and CEAD met to formally discuss the evolution of a partnership to forward the training program they had developed. Also attending was Dr. Wayne Freimund from the Wilderness Institute, University of Montana, School of Forestry. This tripartite alliance has been important in the development of the management training that has ensued, as indicated later in this paper.

The Centre for Environment and Development-University of Netal, established in 1995, has three key functions: (1) teaching, (2) research, and (3) outreach activities. In its inception years, the flagship activity has been a 1-year interdisciplinary course work Masters Program in Environment and Development (MEnvDev). The program annually attracts 25 or so students, from all over Africa in particular. In more recent times, students and researchers from other parts of the globe are joining the program, denoting a more global appeal of the program and the work of CEAD. However, the African nature of the programs remains a key strength.

From a potential focus on wilderness alone, the meeting mentioned earlier also resulted in the establishment of an entirely new program of postgraduate study in Protected Area Management (PAM). The first intake of postgraduate students will enter the program in July 2002. The PAM program admirably complements the MEnvDev program. Its purpose is to produce graduates who understand the concepts and principles of Protected Area Management in the local and Southern African context. These graduates will provide the skills and expertise critical to institutions and communities tasked with managing the sustainable use of all categories of protected areas.

- It is useful to touch on one or two aspects of the PAM program, since we see that as the context for future wilderness teaching and management training.
- PAM opens up the possibility to train managers of Wilderness through participation in the Masters program itself. This will enable graduates (exit qualifications include certificates, diploma, and degree options) to have training in conservation management and principles from theory and practice that are directly relevant to wilderness.
- Professional short courses associated with PAM will include the Wilderness Concepts and Practice course, open to all who meet the necessary entrance requirements. This course has evolved out of the two courses developed by WAG, the Basic and the Advanced management courses, offered before the alliance was set in place.
- The offering of the Basic and the Advanced management courses to potential audiences as in the past.
- The offering of specially tailored courses based on those above, for example, as in the Special Course given just prior to the 7th World Wilderness Congress.

CEAD/WAG Partnership

TANSTAAFL is a wonderful acronym boldly making the point that, "There ain't no such thing as a free lunch." Any partnership requires careful nurturing, and a hallmark of this one has been the joint commitment of both parties. What then makes for the successes that it has achieved? The following issues spring to mind:

- Complementarity—Each partner has brought specific skills to the marriage. WAG's practical experience has been invaluable. CEAD's interdisciplinary expertise and unique position within the academic community is vitally important.
- Complexity—The very nature of wilderness begs a multifaceted examination. To progress in the training and garnishing of management skills for wilderness means that learners must, on the one hand, not embrace wilderness concepts and practice via experiential learning from practitioners alone. That learning must be packaged within a broader range of theoretical economic, environmental, social, political, and ethical considerations that work at different scales within a system (fig. 1). WAG provides the former, and the university provides the latter.
- Problem-based learning—This approach to training (fig. 2) is well suited to the wilderness philosophy. Learning is driven by the learner; the lecturing and wilderness experts act as facilitators. The ability to link theory and practice in a meaningful way is greatly enhanced.
- Accreditation—All courses taught are now fully accredited within a University System that has international standing and demands quality assurance in the delivery of its programs.
- Skills Development Act of the Republic of South Africa—In an effort to enhance the skill levels in all organizations, each one has to pay a 1-percent levy on all salaried individuals within it. In turn, about 75 percent of that levy is retrievable if staff are sent on accredited training programs. The *Concepts and Practice* courses meet these requirements, and so it means that future intakes are, in principle, assured for organizations whose mainstream activities include wilderness management.
- Evaluation and review process—I (the Coordinator of the training program) have instituted a course evaluation and review system that obtains strong feedback from learners and from those who teach on the course. In this way the program remains relevant and meets needs.
- Adaptability—Courses can be adapted and tailor made to suit the requirements of clients.
- A virtual reality—CEAD and WAG have long held the philosophy that "small is beautiful." The courses developed through the partnership have not required huge infrastructural requirements, but rather the development of course material and staff skills that are readily transportable. As such, the courses can be taken to different venues. Delivery in the Southern African Development Community region and further afield are distinct possibilities.

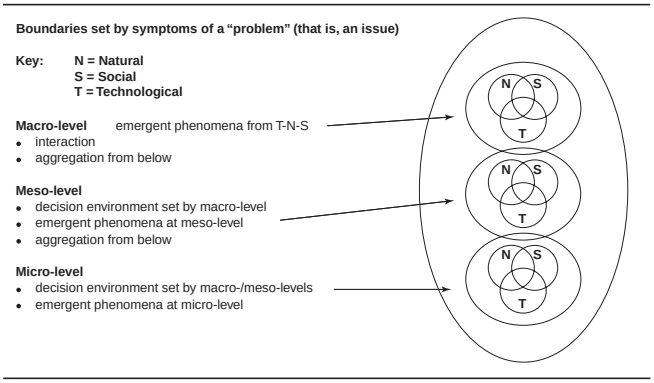

Figure 1—Issues leading to emergent phenomena (Botchway and others: 398, fig 24.1). Emergence refers to the phenomena whereby causes at one hierarchical level generate qualitatively new characteristics at another level of greater complexity. Translated into our terms, wilderness problems mainly caused by the complex interactions between technological (T), natural (N), and social (S) systems across space and time.

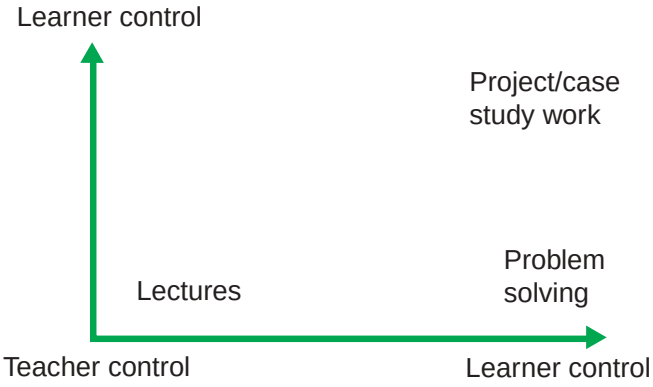

Figure 2—Opting for problem- and project-based learning.

Partnership Achievements

Following are some of the key achievements to date:

- Proven contribution to trained management capacity—There is now a trained cadre of field workers who can provide management capacity in wilderness designated areas, specifically within an African context.
- Involvement of communities abutting and/or with a stake in wilderness areas in capacity building—Communities abutting on wilderness are developing capacity to appreciate and contribute to wilderness conservation.
- Professional training of postgraduate students—Students are being trained at a postgraduate level in *Wilderness Concepts and Practice*.
- Exposure for wilderness—The courses have provided broad exposure for the need of wilderness conservation in an underdeveloped or disadvantaged world context.
- Development of expertise in making management plans—The ability of a broad group of learners to conduct management plans is in place.
- Assistance in the proclamation of new wilderness areas and setting in place wilderness legislation—The setting aside of new wilderness areas in Southern Africa has taken place, and WAG in particular has made considerable contributions to the legislative process in South Africa.

- Namibian Wilderness Training Initiative—The Namibian Wilderness Association (NWA) has indicated that they wish to, and are capable of, assuming the role of a Wilderness training provider. The NWA has stated that they wish to retain their association with WAG and CEAD. However, they will be seeking a more direct partnership with the Polytechnic of Namibia in respect to accreditation.

Constraints

The following have been identified as limiting factors in the sustained development of training in wilderness management:

- Need for self-sufficiency—Becoming self-sufficient from a funding perspective will be a necessity. Taking full advantage of the Skills Development Act will be crucial so that relevant courses become self-supporting and donor funds are not necessary.
- Striving for formal support—The formal support from conservation organizations will be crucial so that staff is required to undertake relevant courses, including the anchor Basic and Advanced courses specifically designed for managers and the Wilderness Concepts and Practices fashioned for postgraduate student training.
- Executive and senior management training—At present, there is no strong targeting of executive/senior management within the teaching schema. Invariably, this key group of decisionmakers do not rate wilderness as a priority within sustainable development and conservation contexts. They generally do not understand or appreciate the need for wilderness and its special visitor and management requirements.
- The training of facilitators—The facilitators of the training programs need to ensure that relevant individuals and organizations master the wilderness material and can, themselves, become facilitators. The inception of a *Train the Facilitators* course in October of this year has paved the way to ensure this capability into the future.
- The maintenance of standards is crucial—The University of Montana has, in principle, agreed to act as an outside evaluator of all courses developed, and that role must be ensured.
- Government support—Government support for wilderness is understandably limited. Here, the work of the Wilderness Action Group, the Centre for Development, the Wilderness Leadership School, and the Wilderness Foundation provides a model so that this program of training can be emulated.
- The need to spread the message—There remains a limited number of key NGOs in the region that do not know of the program. Strategies to involve them will be essential.
- The need for a focused research initiative to underpin the training—No teaching initiative can long remain relevant and vibrant without reference to practitioners who are at the cutting edge of discovery around their area of expertise. As such, a vision for linking research to the teaching program is necessary.

Looking to the Future

The context in which protected areas are managed, whether under private, State, or communal ownership, has changed dramatically. Whereas, in the past, a professional approach to species protection many have been appropriate, now it is necessary to manage simultaneously for social, economic, and biodiversity sustainability within and across socio-political and geographical boundaries. To bring about a fresh approach to the job, a new generation of managers is required.

The development of the Protected Area Management (PAM) program at CEAD-University of Natal provides a context within which wilderness concerns can be strategically integrated within a broader educational program. Wilderness must be conceived literally and figuratively as an integral part of conservation management. It must not be viewed as an “add on” or a “nice to have” activity.

This is the strategy being adopted by the WAG-CEAD partnership. It provides a model for furthering wilderness teaching, research, and outreach, and it is one that can be adopted more widely outside the confines of these two organizations. Under their auspices, in association, or simply bearing the lessons learnt here, the promulgation of new initiatives is entirely feasible and to be welcomed.

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Wilderness, Wilderness Quality Management, and Recreational Opportunities Zoning Within Kruger National Park, South Africa

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Flip J. Nel

Abstract—Kruger National Park (KNP) embodies a range of intrinsic "wilderness qualities," varying from wilderness areas to developed rest camps. In 1997, the Recreational Opportunities Zoning (ROZ) Plan was developed to meet the needs and expectations of widely different levels of visitors, by presenting as broad a range of wilderness qualities as possible, based on the premise that no facets of biodiversity conservation are significantly affected by existing ecotourism activities within KNP. As pressure to generate revenue mounts, there is an increasing squeeze on wilderness areas and the sense of place within KNP. The boundaries and development limitations of the ROZ Plan, the very policy that was designed to allow a graded range of wilderness experiences, is being challenged.

The KNP zoning policy and philosophy is presented, as well as a nonquantified assessment of the environmental impacts of ecotourism within the Park, to challenge the premise that biodiversity conservation is not affected by tourism developments. A simple investigation into the ecological basis for zoning within KNP has been included, as well as a list of shortcomings that should be addressed in the upcoming revision of this policy.

Introduction

One of the fundamental drawing cards for visitors to Kruger National Park (KNP) is its wide range of intrinsic and often intangible "wilderness qualities." These vary in degree from pristine wilderness trails and areas to large, well-developed, and modernized rest camps. The attributes, which are perceived, sought, and experienced, include remoteness, serenity, peace, wildness, solitude, harmony, reflection opportunities, and inspiration. The intensity with which the environment is experienced is a direct function of the ambience and spirit of a place that combines both physical characteristics and atmosphere, also termed the "sense of place" (fig. 1).

History of Zoning in Kruger National Park

Zoning in KNP has been a source of debate for many years and is an ongoing challenge in terms of the geographic extent and size of different zones, their desired quality of pristineness, and the development and management thereof. Generally, criticisms and conflicts arise over the varying range of perception, expectation, and interpretation of what wilderness is and how it should be treated.

The KNP 1975 Masterplan (Joubert 1975) resulted in 32 zones being identified within five main categories: (1) botanic priority areas, (2) wilderness areas of minimal human influence, (3) rare antelope priority areas, (4) elephant priority areas, and (5) general wildlife areas. These were delimited primarily on the basis of vegetation and animal communities, with no attempt made to categorize the intensity of tourism development.

The subsequent delineation of 35 landscape types, based on extensive phytosociological surveys, geomorphological features, soil types and vegetation composition and structure (Coetzee 1983; Gertenbach 1978, 1983; Van Rooyen 1978) and their associated faunal communities were considered more appropriate units for the zoning of KNP. The reasoning was based on the fact that composition of landscapes reflects the natural diversity of species and structure of the area and thus represents the primary priorities for the Park's management. Thus, in 1986, the KNP Masterplan included a zonation plan based entirely on the 35 landscapes, with all landscapes including wilderness zones, natural zones, and development/general tourism zones (Joubert 1986). This formed the basis of the revised zonation policy developed from the 1997 review of the KNP Master Plan.

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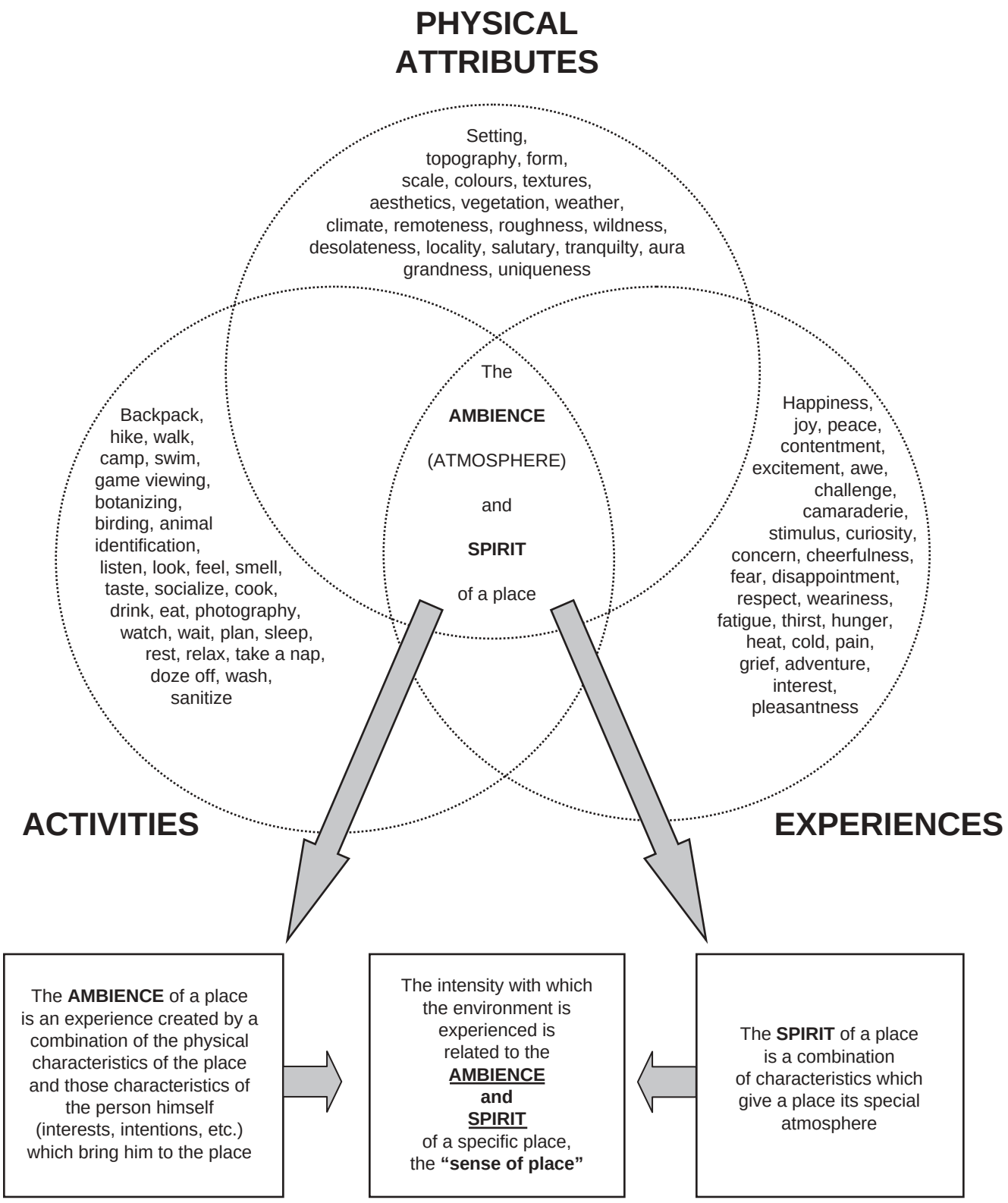

Figure 1—Graphic representation of the relationship between people and conservation areas and determination of "sense of place" (Venter and others 1997).

Wilderness Within the Kruger National Park Management Framework

As part of the 1997 Master Plan review and contribution to the management of KNP, an objectives hierarchy (Volume VII) (Braack 1997a) and revised policy recommendations (Volume VIII) (Braack 1997b) were developed as supplements to the 1986 Master Plan. This places the wilderness theme, as one of the four cornerstone objectives under the KNP Mission Statement, into context within the overall KNP management framework (fig. 2). The zonation subobjective has received the most attention and resulted in the development of the Recreational Opportunities Zoning policy in 1997 (Venter and others 1997).

Recreational Opportunity Zoning Plan for Kruger National Park

Zonation in the 1997 revision of the Master Plan for the management of KNP aims to meet the needs and expectations of widely different levels of "wilderness" visitors and, therefore, presents as broad a range of wilderness qualities as possible. This zonation exercise was termed the Recreational Opportunities Zoning Plan (ROZ, figure 3, table 1; Venter and others 1997) and has been a useful guide to the further infrastructure and ecotourism developments in the Park.

It was argued at the time of formulation of the ROZ policy, that the conservation of wilderness for its own sake was not a driving issue. This premise was based on the fact that the conservation of all facets of biodiversity, namely structure, function, and composition, were not significantly affected by existing ecotourism activities anywhere within KNP. The proper management of ecotourism use was considered to pose no threat to the Park's primary conservation objective, namely ecosystem maintenance. Biodiversity maintenance was thus no longer the driving principle behind the zoning of KNP, but it was recognized that visitors to conservation areas seek intangible attributes of "wilderness qualities" such as solitude, remoteness, and peace, in addition to simply viewing wildlife. This led to a philosophy of maximizing wilderness experience and opportunities for visitors in the ROZ Plan.

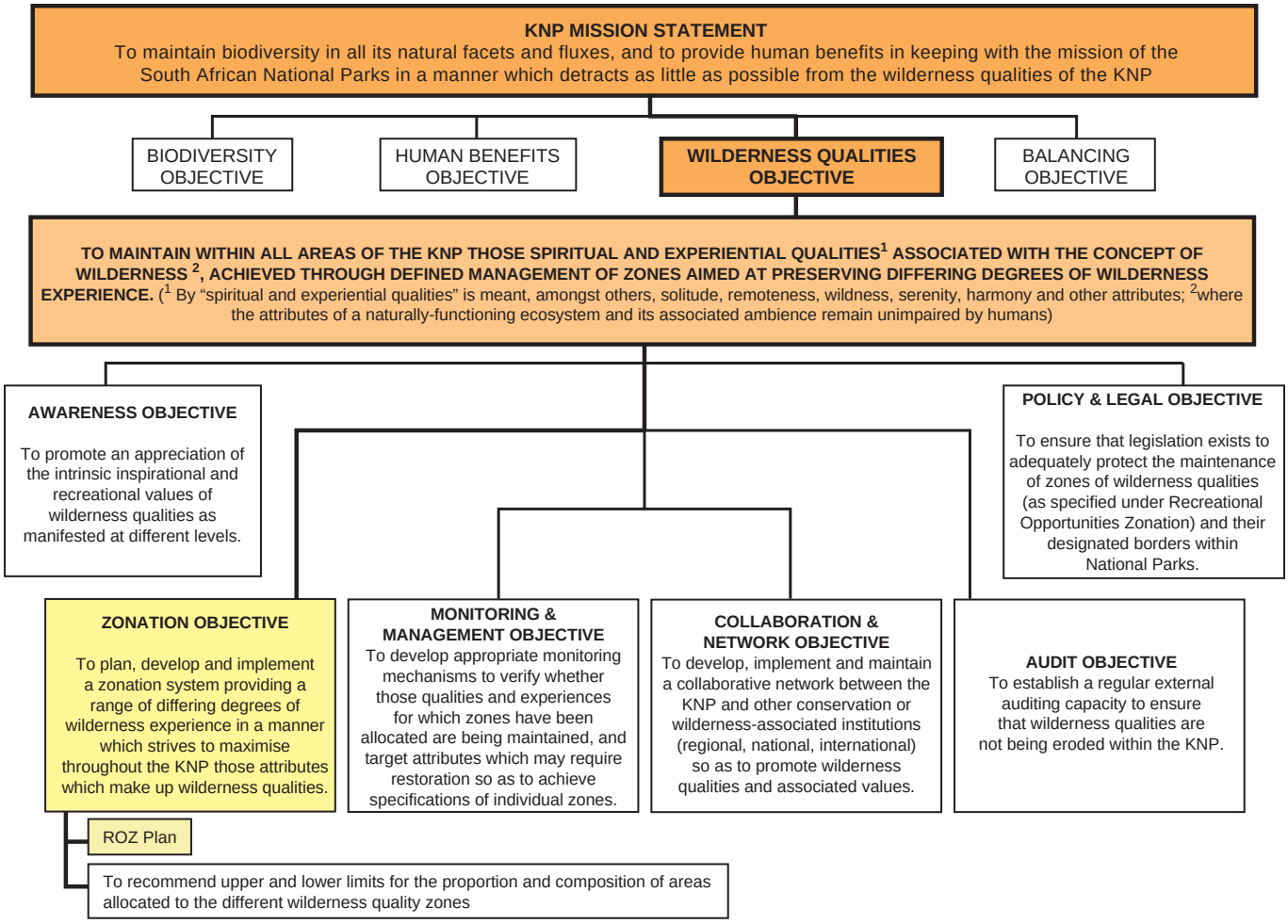

Figure 2—Position of wilderness and zoning objectives within the overall Kruger National Park management framework (compiled from Volume VII of the KNP Master Plan; Braack 1997a).

Nevertheless, pristine minimum impact zones were retained in substantial tracts in the ROZ Plan on the basis of (1) keeping options open for future generations, (2) providing for the increasing need of a sector of society seeking remoteness and a back-to-basics approach in truly pristine and unaffected wilderness, and (3) satisfying the ethical and moral justification for at least some such areas remaining. Many of these wilderness areas (pristine and primitive categories) are located in blocks historically unaffected by development, but often peripheral to the Park or fragmented by linear management and other infrastructure developments.

The ROZ system was thus devised within the wilderness objective

> …to maintain within all areas of KNP those spiritual and experiential qualities associated with the concept of wilderness, achieved through defined management zones aimed at preserving differing degrees of wilderness experience (figs. 2 and 3; table 1).

Zone delineation took into account the following:

1. Due consideration for the distribution of existing wilderness areas and wilderness trail operations (= zonation by default).

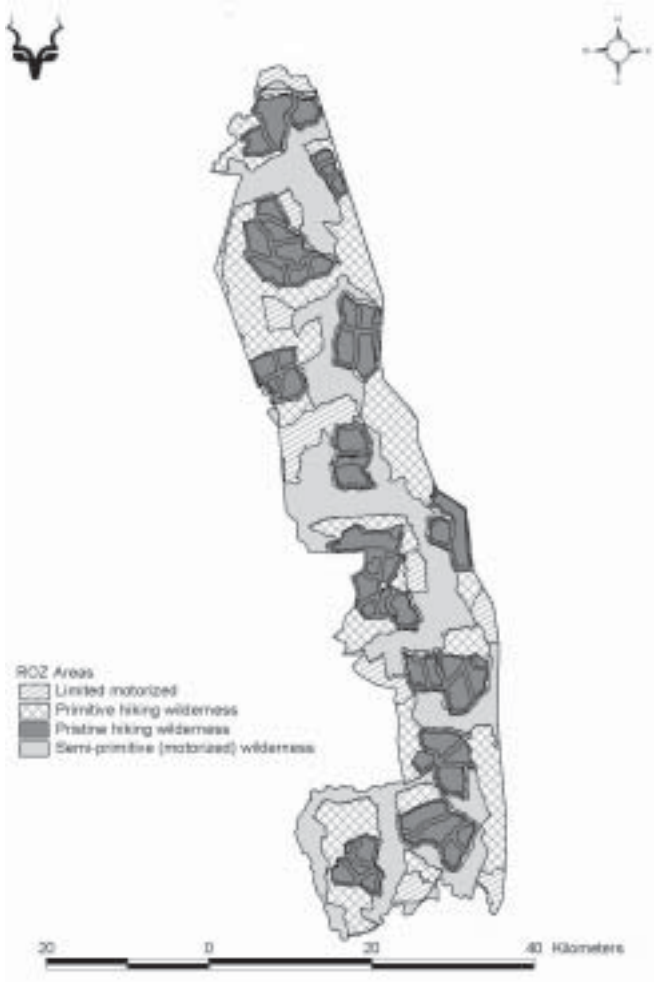

Figure 3—Recreational Opportunity Zoning Plan within Kruger National Park.

2. Designation of the most appropriate and sustainable environmental zonation for an area.

3. The extent of possible alteration by future human actions.

4. Distribution of impacts in time and space that affected existing zonation at the time of ROZ development (such as, management actions and existing infrastructure and development).

5. Cognizance of uncertainty or sensitivity to specific zone designation for an area.

Challenges to the ROZ Policy

One of the fundamental reasons for continuous challenges to the ROZ policy by development proposals is the perception that zone definition is not made explicit enough and that the ecological basis for setting aside these areas is not emphasized. This is coupled, to some degree, with the notion that wilderness areas do not generate comparative incomes to other developed zones. This has resulted in some "bending of the rules," as the intrinsic need for and right of pristine and primitive wilderness areas and associated wilderness qualities are not viewed equally by all parties. Similarly, the impacts of tourism have not been quantitatively assessed and thus no impact value is put to these, and they are considered insignificant or absent.

Ecological Basis of Zoning in Kruger National Park Assessed—The zoning proposed by Joubert in 1986, and based on the 35 landscapes described by Gertenbach (1983), form the basis of the zoning policy described in the ROZ Plan. However, these ecological principles underlying zone delineation are not explicitly stated, which has led to some challenges to the underlying philosophy of ROZ in KNP.

Over the years, there have been a number of different ecological systems of land classification used in KNP (for a comparative summary see Solomon and others 1999). Here, we use (1) the Venter-based land classification hierarchy (Venter 1990), which is mainly focussed on the decisive role of soil characteristics in shaping plant communities of the Lowveld region, and (2) the Gertenbach landscape classification (Gertenbach 1983), based on geomorphology, climate, soil, vegetation pattern, and associated fauna. A simple Geographical Information System (GIS) based analysis of geographical overlays of ROZ zones and Gertenbach's landscapes (n = 35), as well as Venter's land systems (n = 11) and land types (n = 56), was used to evaluate the ecological basis for zoning within KNP. The results are provided in figures 4 and 5, where bar graphs indicate the extent of coverage by ROZ zones, as well as wilderness zones only (categories A and B) afforded each land unit (be it land system, landscape, or land type). Figure 4a graphically illustrates the spread of land units across ROZ zones in KNP, indicating complete representation of all three land classification units in the pristine and primitive wilderness zones (zones A and B). The majority of land units are also represented by more than 40 percent of their areas in wilderness zones (fig. 4b).

If Venter's land type is used as the mesoscale most desirable and adequately detailed unit of land definition, eight land types stand out as being potentially underrepresented (<35 percent of their areas) in the wilderness zones of KNP as currently defined geographically: Lwakahle, Marithenga,

Table 1—Recreational Opportunity Zoning Plan for Kruger National park—zone definitions and limits of sophistication.

Zone	A Pristine	B Primitive	C Semiprimitive	D Limited motorized	E Motorized	F High-density development
Definition	• Unmodified natural environment • Purest form of wilderness possible in KNP • No evidence of modern man having manipulated the ecosystem in any way, past or present • No sight as far as the eye can see, or sound of modern man—own noise only • No roads or other infrastructure in or peripheral to the area	• Essentially unmodified natural environment • No evidence of modern man having manipulated the ecosystem in recent past • Views of outside development or Park infrastructure may be visible in the distance from certain vantage points. Sounds of vehicles and trains sometimes audible in the distance • No roads or other infrastructure. Area buffered from roads by Zone C • Potential for rehabilitation to Zone A	• Slightly modified natural environment • Limited evidence of modern man having manipulated the ecosystem • Views of outside development or Park infrastructure possible but infrequent • Roads (mainly ungraveled) or other infrastructure present but limited to the minimum required for management and tourism activities	• Slightly or moderately modified natural environment • Limited evidence of modern man having manipulated the ecosystem • Views of outside development or Park infrastructure possible but infrequent • Gravelled roads or other infrastructure present but limited to minimum required for management and tourism activities	• Traditional game viewing routes with associated road infrastructure such as picnic sites, viewpoints, bridges, self-guided trails • Occur as corridors in Zones A to D • Moderately modified natural environment • Evidence of modern man having manipulated the ecosystem	• Highly modified natural environment (such as rest camps, staff villages, administration buildings, rangers posts) developed for visitors and administration • Modern amenities very much in evidence • Facilities to spend money and to buy goods are available • Many other nongame reserve-dependant facilities are provided
Recreational opportunity	• Hiking • Backpacking • Walking	• Hiking • Backpacking • Walking • Canoeing	• Hiking • Backpacking • Walking • Canoeing • Limited motorized • Camping	• Hiking • Backpacking • Walking • Canoeing • Limited motorized	• Motorized activities	• Motorized • Variety of recreational opportunities, often associated with infrastructure
Levels of sophistication provided	• None	• None	• Low	• Moderate	• Moderate to high	• High
Interaction with other users	• Nonexistent	• Very low to minimal	• Low	• Moderate	• Moderate, sometimes high	• High
Evidence of other users	• Minimal or absent	• Minimal	• Often	• Generally visible	• Generally visible	• Highly visible
Access	• On foot *only* • Guided • Restricted access • Portable tents or open near edge of zone • No-trace camping ethic	• On foot or canoe • Guided • Restricted access • Access to perimeter mainly on ungraveled dirt roads • Portable tents or in open	• Only 4x4 or other suitable vehicles (official or private) allowed • Guided or unguided • Restricted access • Access mainly on ungraveled dirt roads	• Sedan cars and other suitable vehicles (official or private) allowed • Guided or unguided • Restricted access only on official roads	• Sedan cars and other suitable vehicles (including buses and approved open vehicles) • Mainly unguided, but guided possible	• Sedan cars and other suitable vehicles (including buses and approved open vehicles) • Mainly unguided, but guided possible

(con.)

Table 1—Con.

Zone	A Pristine	B Primitive	C Semiprimitive	D Limited motorized	E Motorized	F High-density development
Access (con.)		• No-trace camping ethic • Semipermanent rustic camps allowed on edge of zone	• Permanent rustic camps allowed within 1 km (0.6 miles) of boundary • Accommodation—tent or rustic hut • Camping with own tent	• Access mainly on graveled roads • Permanent luxury (low density) camps • Permanent rustic camps • Camping with own tent or caravan	• Unrestricted access but limited to official roads • Access mainly on tarred and graveled roads	• Unrestricted access but limited to official roads • Access on tarred and graveled roads • Permanent (high-density) camps with modern amenities • Permanent rustic camps • Camping with own tent or caravan possible

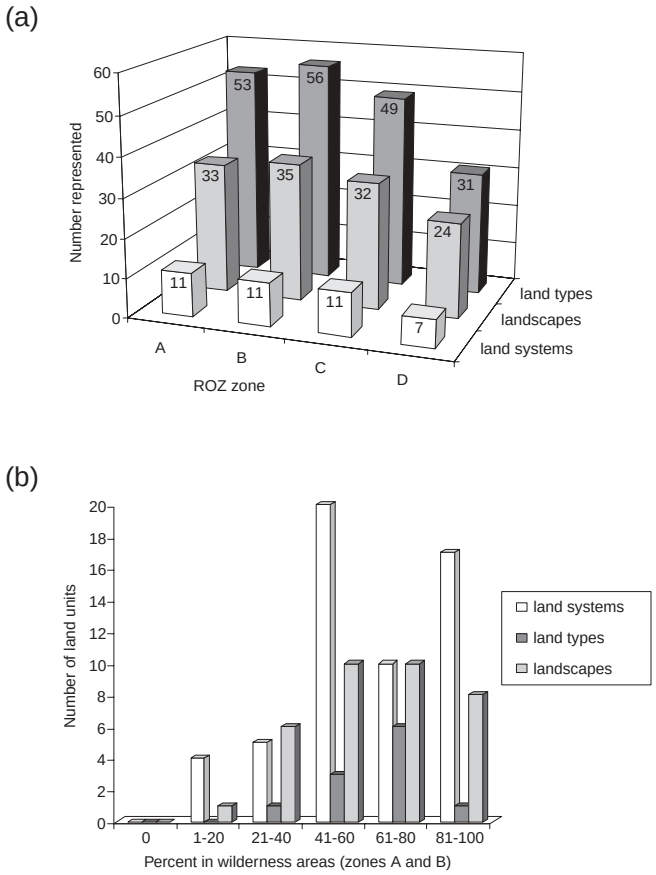

Figure 4—Extent of representation of different land type classifications (land systems, landscapes, land types) in ROZ zones in Kruger National Park: (a) number of land units per classification type within zones A to D; (b) percent of land units represented within wilderness zones A and B.

Mavumbye, Pafuri, Phalaborwa, Rabelais, Shivhulani, and Tsotsi (fig. 5c). Interesting to note is that there are also eight land types that are almost completely located within wilderness areas (fig. 5c). At the slightly courser Gertenbach landscape scale, landscape 8 is severely underrepresented in wilderness zones (fig. 5b). This constitutes the moderately undulating granitic plains with *C. mopane* tree savanna, namely, the Phalaborwa sandveld. At the macroscale of land systems, the least represented land system in wilderness areas is the Bulweni system (BU, fig. 5a), a very narrow and sensitive north-south land system.

Environmental Impacts of Wildlife Tourism—A nonquantified assessment of the environmental impacts of ecotourism within KNP is presented here to challenge the premise that biodiversity conservation is not affected by tourism developments within the Park (table 2). Many of these impacts have been observed by rangers and others, and have been grouped and summarized here.

The conclusion can be drawn that, although only <3 percent of KNP is directly disturbed by human infrastructure, there is evidence that certain components of biodiversity (structure, function, composition) may be affected, and the overall

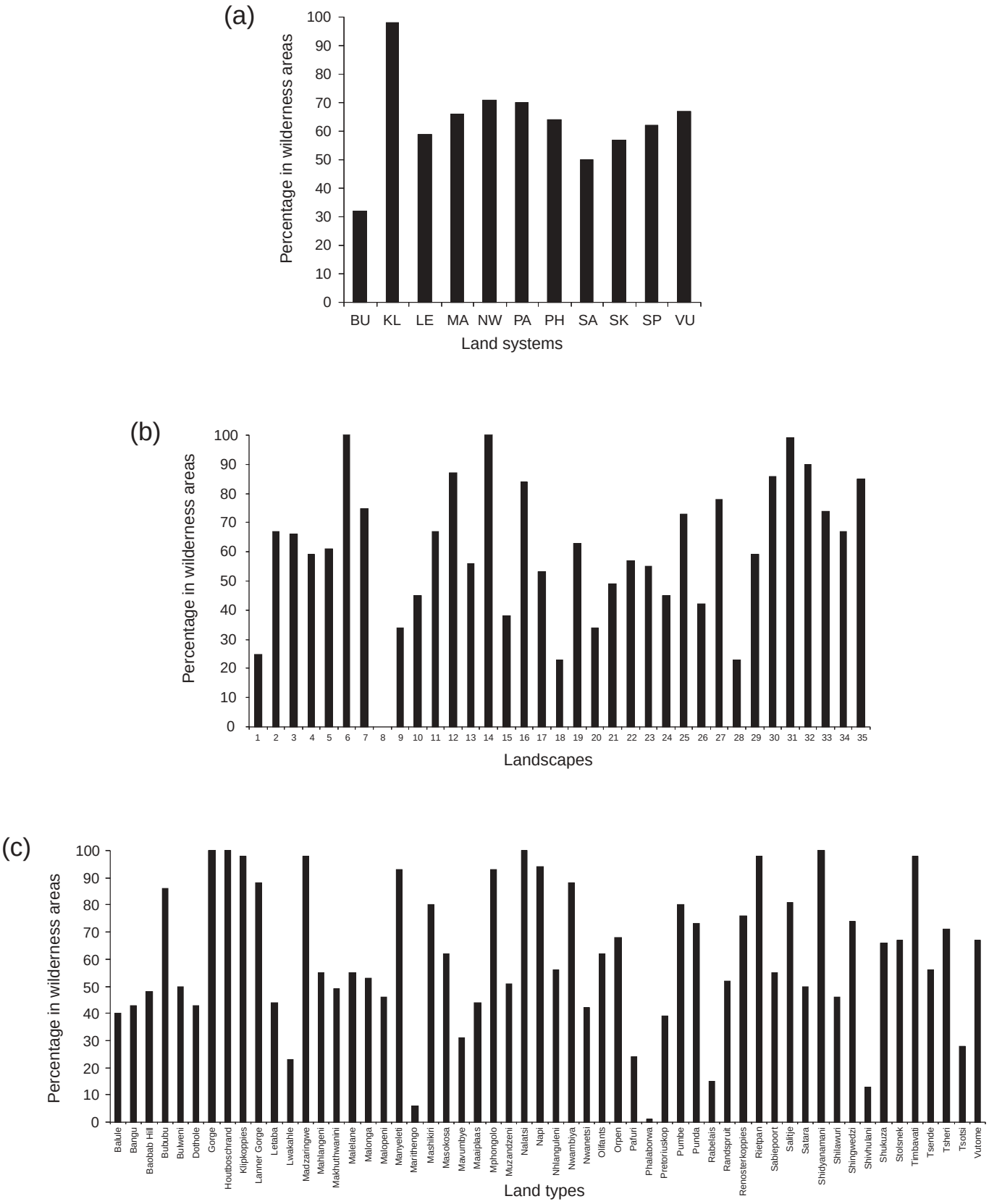

Figure 5—Percentage representation of each individual land unit for the three land classification systems in wilderness areas (zones A and B) in Kruger National Park: (a) land systems; (b) landscapes; (c) land types.

Table 2—A nonquantified list of tourism impacts on wildlife and biodiversity as observed in Kruger National Park.

Observed impact	Examples to support this
Disturbance of animal feeding pattern and behavior	• Ground hornbills beg for food along most tarred roads. • Baboons and vervet monkeys have become problems at picnic sites and rest camps, although they are still completely wild in wilderness areas and avoid trails and camps in these areas. • Terrapins at water points along general tourist roads feed on tidbits thrown to them and may even "beg." • Bushbuck in Letaba Camp often feed on pasta, bread, and a variety of other dishes offered to them by tourists. • Honey badgers, various mongooses, and spotted hyenas often raid dustbins and are fed around rest camps, particularly along fencelines. • Diurnal birds, such as fork-tailed drongos, have been known to become nocturnal because of permanent spotlights at camps. • Artificial lights and lighting attract insects, which attract frogs, which in turn attract snakes, which are often killed. • Yellow-billed kites and other birds become problematic at picnic sites and camps where they are fed and/or become thieves in their own right. • Vultures have been known to follow helicopters during culling operations.
Increased collection of wildlife products from the field by visitors	• Tortoises picked up and removed from the field. • Fish trapped in wire gabions during flood conditions and sometimes exploited by staff and visitors, primarily as a food source. • Mutilation and theft of plants for private use or gardens. • Collection of medicinal plants or plant parts.
Increased vulnerability to competition and predators	• Predation efforts are disturbed, for example, along tarred roads with high volumes of traffic. • Conversely, predators may capitalize on the distraction caused to prey by vehicles. • Certain KNP lion prides have become experts at catching giraffe by causing them to slip on tarred roads or up road embankments. • Predators may kill antelope by chasing them into camp fences. • Scrub hares, kudu, and so forth, often congregate within fenced-off camp areas and attract predators, such as leopard regularly found inside Berg-en-Dal Camp fence.
Genetic introgression and introductions	• Numerous reports and suspected cases of cross-breeding of domestic cats and African wild cats in peripheral areas of KNP. • Occurrence of exotic Nile tilapia and silver carp in KNP rivers, and the probability of hybridizing with indigenous fish species. • The introduction of alien plant seeds into the KNP system, and further spread thereof on vehicle tires, and so forth, (for example, the suspected spread of red water fern (*Azolla filiculoides*) along the eastern boundary rivers and tributaries by vehicles on the Lebombo Overland Ecotrail). • Inadvertent introductions of locally foreign animal species into areas of KNP from neighboring farms and reserves, such as gemsbok from the Timbavati area and nyala from Mthethomusha and Sabie Park Reserves.
Death of individuals	• Snakes and scorpions are readily killed in rest camps, as they are viewed as undesirable. • Poisons and other means are used to remove or kill ants, bees, wasps, and so forth. • Monkeys and baboons are regularly killed in and around rest camps and picnic spots as problem animals. • Kori bustards in the Lower Sabie area have been killed against powerlines when flushed during night drives. • Powerlines can potentially kill many large birds, and there have been reports of giraffe electrocuted by sagging powerlines (when supporting poles are pushed over by elephants). • Grey louries and other birds have been recorded as drowning in reservoirs. • Road kills by speeding tourists and staff are ongoing and include wild dog pups, lion cub, honey badger, impala lambs, and many nocturnal and other birds. • Numerous night-jar and scrub-hare road kills, especially on tarred roads at night when there is late driving. • There have been reported incidents of antelope poaching from vehicles. • Animals have drowned in water troughs.
Habitat modification	• Reeds, bush, and riparian trees are cut for better game-viewing opportunities. • Waterholes created as game-viewing points cause unnatural game concentrations and vegetation damage. In some cases, erosion also results due to bad placement on sensitive soils. • Sewage systems/French drains/artificial wetlands create new unnatural habitats, sometimes in naturally dry areas.

(con.)

Table 2—Con.

Observed impact	Examples to support this
Habitat modification (con.)	• Tarred roads lead to increased runoff stimulating tree growth and encroachment—this is particularly noticeable with mopani in the northern KNP and sickle-bush in the south. • Litter degrades the natural scene and is a danger to wildlife. An extreme example is the dump sites. • Weirs, dam walls, and gabions have a barrier effect to fish migrations and may lead to deaths and disturbance of migrations and spawning. • Certain activities may result in introduction or spreading of alien biota (for example, the spread of Azolla on the Lebombo Ecotrail route). • Floods cause damage to infrastructure that requires significant reconstruction and the use of gravel and sand from natural sources, as well as resulting in unsightly concrete and other debris being deposited in river systems. • Dust from gravel roads affects plants and their palatability. • Widespread harvesting and subsequent transport of thatching grass on open vehicles has increased the distribution of this species along roadsides. • Building materials (for example, the use and transport of river sand) spread alien seeds and plants. • Artificial dams and other water surfaces increase the distribution and breeding habitats of mosquitoes and associated malaria epidemics. • During summer months, tarred roads may be hot barriers to movements of snakes, reptiles, and so forth, and may be a death trap for insects, snails, millipedes, and so forth, that are killed by vehicles. • Road construction has resulted in many instances of unnatural damming of water flows.
Disruption of group cohesion	• Vehicle or other tourist activity disrupts animal group cohesion by separating groups of animals on either side of a road. • Similarly, traffic and tourist interest may result in separation of parents from their offspring when crossing roads.

impact of tourism activities on biodiversity is poorly understood.

The Way Forward

As pressure to develop and generate much needed revenue mounts, there is an increasing squeeze on wilderness areas, as well as the greater sense of place within KNP. This is exerted directly on the boundaries and development limitations of the existing ROZ Plan, resulting in challenges to the very policy that was designed to allow a graded range of wilderness experiences. A revision of the ROZ Plan is scheduled for the upcoming months, and a number of issues that need to be addressed during this process are listed in table 3. In addition, pressures around the borders of KNP are mounting as developments impinge on the conservation area, effectively reducing the nonimpacted core area and shrinking the distribution of "pure" wilderness attributes.

It is accepted that a system of zoning alone will not provide a holistic approach to the protection of wilderness qualities or wilderness areas, but that an integrated environmental management approach is needed. Park managers must solidify the basis upon which to consolidate the maintenance of a graded wilderness system that combines societal values, biodiversity conservation, precautionary principles, and sustainable development into a balanced plan guiding the further development and expansion of Kruger National Park.

Acknowledgments

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Table 3—A preliminary list of issues to be addressed during the upcoming ROZ Plan revision.

Main issue	Description of subcomponents to be further considered
Ensure ecological basis of zoning and make this explicit	• Description of management blocks within ROZ zones according to biodiversity status, disturbance, suitability for use. • Where possible, move toward catchment-based wilderness zonation (within KNP subcatchments where possible), for example, Sweni, Mbyamiti.
Rehabilitation requirements per ROZ block, especially wilderness areas	• Compile a comprehensive list of manmade disturbances, with special reference to type, extent, and impact base of disturbance. • Must be GIS linked—a database and map are necessary for every block, providing GPS locations of all impacts and structures. • In principle, there should be no structures in wilderness areas, with the exception of possible water points. Gravel pits, old structures, and so forth, must be rehabilitated. Rubbish, stockpiled gravel, and so forth, to be removed.
Buffering of wilderness zones	• Where a motorized zone directly borders a pristine wilderness zone, no cascading of zones is practical or necessary—the core area can be managed as pristine. • Propose a Wilderness Buffer Quality Zone—this should enable a ranking of proposed activities on the edge of wilderness zones according to size, scale, and persistence of impacts (for example, a vehicle has a short-term impact while driving by, while a structure on the edge of a wilderness zone is permanent and will always lower the quality of the wilderness experience). • Roads within a cluster of wilderness blocks should be downgraded and, where possible, completely rehabilitated. • Impacts must be managed in all instances—this should be made explicit in a management plan for all zones.
Classification and management plan for roads	• Use the minimum-tool principle to maintain roads in wilderness areas where these are essential for specific management actions. • Cement drifts must be maintained on the “best practice principle” —avoid building cement drifts in wilderness areas where possible. If a drift is necessary, it must be built with the least impact and as unobtrusively as possible. • An operational management and action plan for roads will be necessary and must be part of the Limits of Sophistication (LOS). • The road classification document should provide guidelines in terms of maintenance, gravel pits, documentation, and so forth.
Matching zones with Trans-frontier Conservation Area developments in Mocambique	• Use KNP wilderness areas as a starting point. • Encourage wilderness zoning according to landscapes. Motivate for 20 km (12.4 miles) of the Shingwedzi River to stay wilderness on both banks. • Apply concentric zoning—cascading out from pristine areas where possible. • Consider research possibilities through wilderness study areas—these are untouched in Mocambique versus more impacted areas in Kruger.
Zoning of areas adjoining KNP	• A strategy is essential—the KNP must get involved in land use planning exercises in adjacent areas. • Neighbors must be influenced as far as possible. • Neighbors must be made aware of KNP zones, their importance, and what they stand for. • Produce a map of the adjoining areas to identify land uses and land use change to assist with the strategy to influence adjacent actions to achieve regional harmony. • Interactively design a land use plan for zones next to KNP, taking into account softer issues such as noise, lights, and skyline intrusions (audio and visual impacts).
Wilderness monitoring, auditing, and thresholds of potential concern (TPCs)	• Formalize the monitoring and auditing indices and end-points for KNP wilderness qualities. • Integrate research and management activities. • Establish acceptable noise levels for wilderness (24 decibels?). • How do we monitor and evaluate visual impacts to wilderness areas (lights, masts, and so forth)? • Similarly, how do we address issues of pollution, for example, litter, black snow (smoke from sugar cane burning outside the KNP), and smells? • Footprints in wilderness areas—when is it too much, and should there be a resting/recovery/reset phase?
Legal protection status	• How do we provide formal legal protection status to KNP wilderness areas? • Investigate World Heritage site status.

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Cross-Boundary Impacts in the Crocodile River Valley: A National Parks Perspective

Ralf H. Kalwa

Abstract—This paper illustrates threats facing Kruger National Park in South Africa. It discusses the value of Recreational Opportunity Zoning within the boundaries of the Park, as well as the impacts of boundary intrusions on its wilderness characteristics. The need for an Integrated Management Approach near Park boundaries is highlighted, and the concept of a "brick wall syndrome" is discussed in detail. Possible solutions are suggested, and it is concluded that the answer may lie within adopting an Integrated Development Zone approach for the Park's border areas.

Introduction

Game Rangers in Kruger National Park have the mandate to protect and manage the integrity of this unique system. They are faced with many challenges in this regard, and have managed the Park's 22 sections, protecting its components of biodiversity, for over 100 years.

Some 200 field rangers assist the section rangers in daily counter poaching exercises and patrols. The gradual growth of the white rhinoceros population over the past three decades, together with an increase in elephant numbers, bear testimony to their achievements.

This success is also reflected in the following figures: only five elephant and 15 white rhinoceros deaths related to poaching incidents were recorded during the past 3 years. The size of Kruger National Park (more than 2 million ha, or 7,722 miles^2), the diversity in topography, and the extreme changes in climatic conditions make this an achievement of note.

In addition to many other challenges facing the rangers in the year 2000, the increase in alien plant infestations have impacted on available manpower and budgetary requirements. Rangers have responded to this exotic threat, and more than 100,000 foreign plants have been eradicated or removed over the past 18 months in southern Kruger Park alone. It is, however, suggested that there are other threats to the integrity of Kruger National Park, and many may argue that these are more significant and have a greater impact on the future of this natural heritage.

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Recreational Opportunity Zone Plan

During the late 1990s, Kruger National Park embarked upon an ambitious exercise to reevaluate its Management Plan. Scientists, rangers and other interested and affected parties became party to a plethora of workshops and public debates. Various aspects of the management plan were scrutinized and reassessed. The Fire Policy, the Elephant Management Plan, the Water Provision Policy, and the Recreational Opportunity Zone (ROZ) Plan, were some of the management tools that faced revision and that were accepted by the South African National Parks Board (SANParks) for implementation.

The ROZ Plan was regarded as a useful tool in the management decisionmaking process. Although it has been criticized for delineating Kruger National Park into zones based on the wildlife experiences that could be expected, it did carve the route for the establishment of Wilderness Areas.

Many will argue that these wilderness zones are far from perfect. This may be so; however, the challenge faced by rangers in the year 2000 is to ensure that these areas are conserved in all their facets and fluxes, and that rehabilitation programs are implemented with the same vigor and enthusiasm afforded to counter poaching programs and alien plant control.

The ROZ Plan recognized the recreational value of the various zones and landscapes in Kruger National Park (fig.1). Based on this approach, 49 percent of the surface area was allocated to a wilderness land use. The challenge faced by rangers was to manage the pristine value awarded to these areas and to maintain the particular characteristics associated with this type of land use. Essentially, these areas are untrammeled by man, have little or no man-made influences or infrastructure present within their boundaries, and are open for public use for hiking and sleeping close to nature, with its limitations and splendors.

Primitive and pristine hiking areas within Kruger National Park are also targeted for rehabilitation and corrective management programs to rectify mistakes and improve their "wilderness" characteristics.

Southern Boundary: A Grey Area

The Crocodile River, flowing from west to east, represents the southern boundary of Kruger National Park. The National Parks Act, backed by the outcome of several court

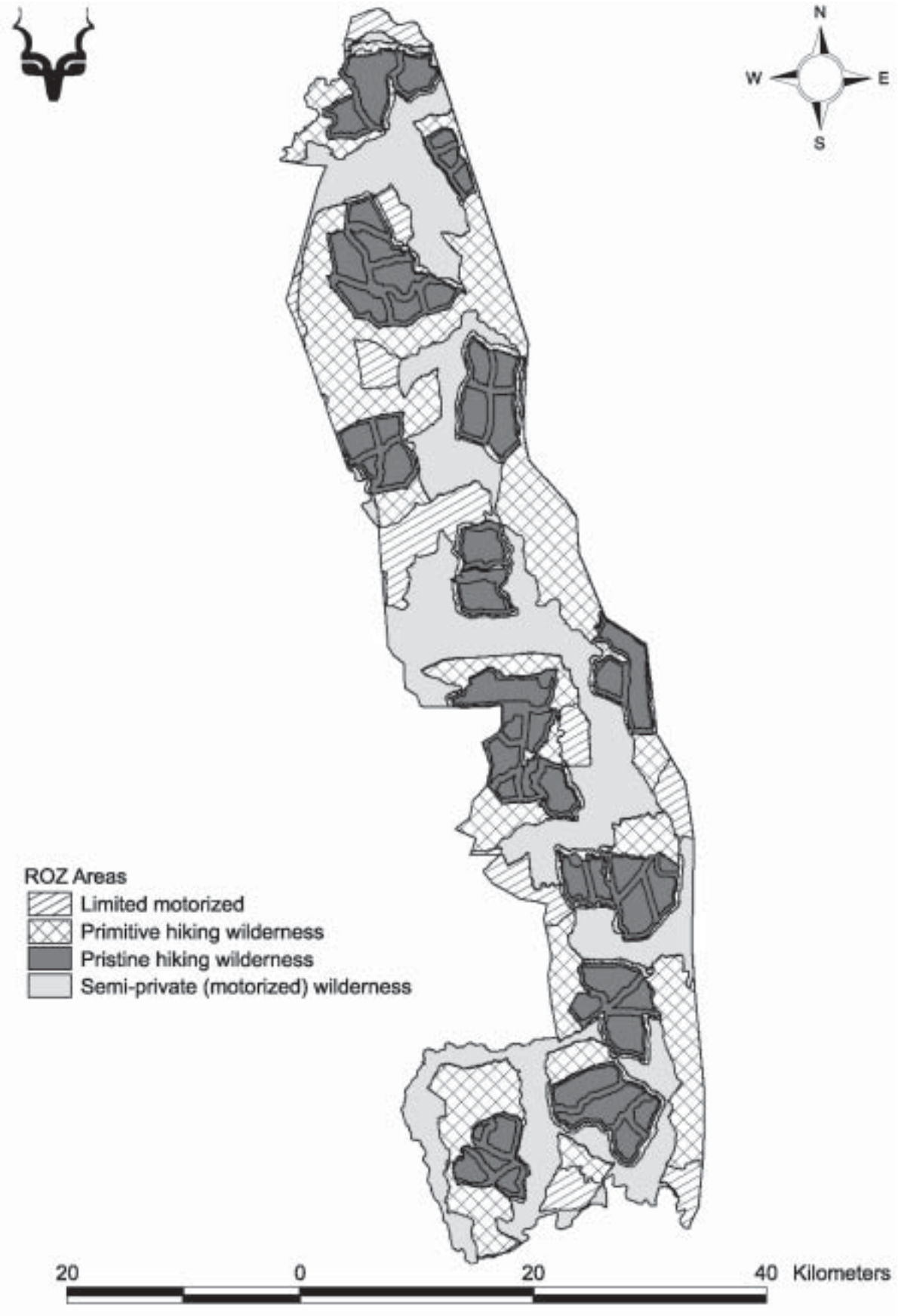

Figure 1—Kruger National Park Recreational Opportunity Zones.

cases, describes the annual, average high water mark on the southern portion of the river (the right bank) as the southern boundary of Kruger National Park.

A Veterinary Fence, demarcating the veterinary boundary of the Foot and Mouth line, fences off the upper bank. The zone between the fence and the water's edge has become a management nightmare. Law enforcement and conservation management in this zone is particularly difficult, and various government departments and associations are at loggerheads as to who should carry the responsibility for this "gray area."

Boundary Intrusions

Developers adjacent to this "no mans land" have capitalized on this confusion and are building closer and closer to the water's edge, infringing upon the Park's boundary. In many cases, these developments do not follow the Integrated Environmental Management approach, with tragic results. Cross-boundary intrusions include light and visual pollution from spotlights that are seen by our tourists during night drives-up to 13 km (8 miles) into Kruger National Park.

The millennium floods of February 2000 comfortably pressed the reset button, and many structures were damaged and washed away. Kruger National Park and its rivers are now inundated with broken pieces of building rubble, decks, pump houses, entertainment lapas, and other structures that were built in and around the Park's boundary, below the 1:50 year flood line.

The industrial boom associated with the advent of the Maputo Corridor has increased noise levels, which can be heard by the hikers in the primitive wilderness zone 25 km (15.5 miles) into the Malelane Mountains. An increase in rail and road traffic compounds this "annoyance" factor even further.

Pump stations, loyally drawing on the water resources from the Crocodile River to quench the ever-thirsty cane fields, add to this constant hum in the air. This is regularly interrupted by the aerobatics and thunderous roar of the crop sprayer leaping from field to field in its endeavor to boost agricultural yield.

Wilderness trail rangers have been forced to seek refuge on the rare occasion a pilot has "transgressed" the Kruger Park airspace and "spooked" an elephant or buffalo herd into a short stampede. One may be excused to ask whether these clients should continue supporting this hiking area under these conditions. Prevailing intrusions and pollution threatening the integrity of these unique areas have become difficult to mitigate.

"Brick Wall Syndrome"

In the late 1990s, the ranger corps in this area realized that the threats to our unique National Park had shifted from the impacts of poaching, toward the negative, long-term impacts of indiscriminate developments and associated wilderness and habitat degradation. It soon became evident that the Park (the ROZ Plan), its boundary, and the neighbors on the southern bank of the Crocodile River were interconnected, like the bricks in a wall.

Removing one or two bricks at a time would not necessarily cause the wall to topple; however, at some unknown point in the future, the removal of one brick too many may cause the system to collapse. The future of the wall lay in Integrated Environmental Management.

Lower Crocodile River Environmental Group: A Fresh Initiative

Discussions initiated by the local ranger and backed by management saw the establishment of the Lower Crocodile River Environmental Group (LCREG). More than 100 interested and affected parties workshopped towards the following vision statement:

> To balance all interests in the Crocodile River Region towards sustainability.

Participants agreed to support the following objectives:

> Whilst ensuring environmental integrity the LCREG should:
>
> - optimize economic growth for the region,
> - optimize economic opportunities in the region,
> - optimize sustainable resource utilisation and management in the region, and
> - establish communication highways.

From this early beginning, the local ranger involved all the role players in the area to participate in the decisionmaking process, especially pertaining to the development initiatives in the area. The LCREG initiative managed the process based on the principles of Integrated Management, and all developments were drawn into an Environmental Assessment process. Decisions were not based on an ad hoc assumption. A process of informed decisionmaking replaced the old approach, and mitigation became a management tool used by developer and neighbor alike.

The Nkomazi Toll Plaza was shifted to a new site farther down the road, the TSB Pump Station near Malelane Gate was given a "sound proofing" facelift, and participation on behalf of the LCREG saved many trees in the riparian zone from being bulldozed into oblivion.

Involvement further afield has brought the plight of our wilderness areas to the attention of an international consortium of airport developers. Noise and flyover tests within Kruger National Park will ensure that the new Kruger Mpumalanga International Airport is built at the right site and within an acceptable environmental framework. Air traffic control (the crop sprayer?) will now be managed, and transgressions will become a management issue. The use of aircraft that satisfy European Standards are supported, and the integrity of the ROZ Plan may now be guaranteed.

Integrated Development Zone: A Pie in the Sky?

Where to from here? The LCREG has been operational for 3 years. At a recent plenary, its members voted to continue with this initiative and unanimously supported the objectives set for the group in 1996.

Government legislation makes it possible for an area of special significance to be declared a Limited Development Area (LDA). This would need the support of all the role players in the zone to ascribe to the same objectives and limitations dictated by the declaration. Is this a possibility for the Crocodile River Valley adjacent to Kruger National Park? The LCREG Plenary has asked its steering committee to investigate the implications of declaring the Lower Crocodile River Area an LDA. This gives the rangers of Kruger National Park hope—a hope based on Integrated Environmental Management and a recognition that this valley suffers from a bad case of the "Brick Wall Syndrome."

2. Traditional and Ecological Values of Nature

The Wilderness Summit at the Feather Market in downtown Port Elizabeth preceded the symposium (photo by Alan Watson).

In Quest of African Wilderness

Malcolm Draper

Abstract—Within the emerging field of scholarship exploring the interaction between nature and culture in Africa, the idea of wilderness has provided a convenient "straw" target for critical researchers. Primarily this is derived from the association between wilderness and the colonial preservationist mindset seeking to alienate indigenous people from nature, both intellectually and materially.

This essay is written from the straddling standpoint of one who has learned much from both wilderness thought and writing antagonistic to it. The objective is to probe for truths, thereby opening paths toward reconciliation. A more positive inclusion of wilderness in the promising research agenda exploring African landscapes is beginning to emerge and needs further encouragement. It is conventional wisdom that wilderness arrived on the South African conservation scene, and thus to Africa, in Zululand during the 1950s, through American literature eagerly grasped by rangers such as Ian Player. Another reading of the past has been made by Carruthers (1995, 2001) who found wilderness-oriented management in the policy and practice of the first warden of Kruger National Park, James Stevenson-Hamilton, which paralleled that of Aldo Leopold in the North American context. This paper considers a telling aspect of park management not considered by Carruthers—the burning regimes of the Kruger—to confirm that distinctively wilderness-oriented policy and practice emerged endogenously and needs to be acknowledged and celebrated. The intention of the exercise is to demonstrate the insight of environmental history into the shifting relationship between culture and nature. However, for critical scholars to assist in the quest for African wilderness, some dangerous excesses of storytelling and mythmaking have to be looked back upon and disowned. In the same gesture, others need to be brought forward and embraced since they offer wilderness a redeeming resource of hope.

Wilderness and War

When I wrote the above title, the 7th World Wilderness Congress was far off on a hazy horizon. My intention was to square a wilderness tradition up with scholarly onslaught while playing referee, commentator, and judge in the ensuing pages of exchange. As the title indicates, I favored wilderness as the contender most in need of encouraging commentary and aimed to improve its bad press in academic work on Africa. I never imagined how difficult this task would be. What turned things around was a book hitting the market with unfortunate pre-Congress timing. *Storyteller* is Jones' (2001) biography of Laurens van der Post, who was, and still is, a hugely important figure for wilderness generally, but for African wilderness in particular. Many key speakers at the Congress were clearly haunted by the dark side of this wilderness legacy and, through dismissive remarks, unsuccessfully sought to exorcise the Congress of the shadow thrown by the book. Clearly, they were saddened by the book, but so was the author:

> This has also been a sad experience for me. Soon after I took on the commission I discovered, to my astonishment, that Sir Laurens was—to use the (extremely) polite word—a fantasist. In fact, I discovered that scarcely a word he spoke or wrote could necessarily be believed. To use Martha Gellhorn's phrase about Hemingway, he was a mythomaniac. I was concerned not to deny that Laurens, in his long life, achieved much good. But most readers have concluded from my book that, behind the glossy career, Laurens van der Post can best be described as a charlatan (Jones 2002).

Like the events of September 11, 2001, the ramifications are still yet to be fully appreciated. But among the rubble of both demolition sites there is something to be learned. Perhaps the publication of an unflattering profile of such an important figure in the history of this Congress provided an opportunity to reflect on and repair some of the damage to the wilderness ideal.

Studies taking into account the interaction between culture and the environment, together with a stance critical of colonial and scientific approaches to conservation in Africa, have gathered momentum in the last few decades. Anderson and Grove (1987: 5,6) pulled together a wide-ranging variety of work in a landmark volume for the environmental history of the continent. A point of departure for them is van der Post's statement at the 2nd World Wilderness Congress:

> We must come to grips with the need for the survival of life on this planet and one of the most essential of these needs is the preservation of large areas of wilderness…it is a war in which we are engaged…it is a subject which is not political, but beyond politics, sociology, and material ideals.

Anderson and Grove (1987: 5, 6) maintain that this view is "naive and idealized" and that their book sets out to "explode the myth" and "assert the importance of sociological factors and material ideals." The recent revelations about van der Post unfortunately vindicate their argument. He wielded his considerable influence and used it in an attempt to prevent the first democratic elections in South Africa. He fanned the flames of political violence, taking its toll on thousands of lives in the run up to 1994, and encouraged Zulu and Afrikaner leaders to pull out of national politics. He was desperate for a confederate constitution for South Africa rather than a government of national unity as we now have. He dreamt of "a model of a new world, a model of a Zulu—and ultimately Afrikaner—renaissance into the spirit of a new South Africa." In 1992, van der Post was introduced by Ian Player to the late John Aspinall and

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Jimmy Goldsmith who had thrown their maverick rightwing ideas and considerable capital behind Mangosuthu Buthelezi of the Zulu nationalist Inkatha Freedom Party (IFP). Fortunately, Buthelezi got swept up by the spirit of forgiveness and compromise personified by Nelson Mandela. Nonetheless, van der Post never felt touched by "Madiba magic." After meeting Thabo Mbeki in 1989, van der Post said that he and his ilk had no vision of a new and greater South Africa and that it would be wrong to build up their self-importance (Jones 2001). Like Aspinall, van der Post died deeply pessimistic about the future of South Africa without some form of balkanized homeland system along the lines of that designed by apartheid's architects.

Both Aspinall and van der Post's vision of South Africa derived from the romantic tradition that shaped their understanding of wilderness and politics alike. Africa for them was an Eden where humanity could make a fresh start. Both were pulled along by Rousseau's historical slipstream of belief. "Noble savages" whose culture was shaped by the serendipity of wilderness provided the model for the world to follow. Granted, their ideas have to be seen in the context of their time, but both bowed out very recently and their ideas live on. Even the critical Richard Grove observed van der Post's spectre over an academic conference on African environments, at Oxford in 1999. At the same conference, I presented a paper in which we sought to come to terms with Aspinall (Draper and Maré, in press). William Beinart, the Rhodes Chair of Race Relations, who convened and hosted the conference, said in opening that environmental history had successfully challenged and inverted the colonial elevation of western culture and stereotypes of Africans as incompetent environmental managers, but perhaps this has been all too neat (Beinart 2000). Nevertheless, activists are more likely than academics to have led the way to this change of heart. This Congress was one such forum that has been hugely influential in this regard. So, too, has been the *Ecologist* magazine that preceded it by 7 years. Thus, the fallout among the *Ecologist* editors in the late 1990s provides an instructive warning to this Congress.

The *Ecologist* was launched by Edward (Teddy) Goldsmith with the support of both Sir James (Jimmy) Goldsmith and Aspinall. In 1972, Nicholas Hildyard joined and grew to be the most influential figure next to Teddy. By 1997, a deepening ideological rift grew into an unbridgeable chasm. Hildyard claimed that differences with the magazine's founder over ethnicity and gender issues led him and the rest of the editorial team to leave and to set up *The CornerHouse*. The conflict spread waves of dissent among environmentalist circles in Britain. Hildyard (1998, 1999) maintained that in the last decade the authoritarian New Right in Europe had consciously reframed its politics of exclusion in the progressive language of cultural difference: a language that permits the racist to project racism as a socially acceptable act of loyalty to people of one's own kind or as legitimate cultural self-defense. This is precisely what Aspinall came to address the IFP about in 1992, when he was made an honorary Zulu in recognition of his unstinting patronage. He encouraged Zulus to not only proudly wield their cultural weapons, but sharpen their spears and fall on their traditional enemies—the Xhosa led by Nelson Mandela (Draper and Maré, in press; Jones 2001). Hildyard argued that such thinking becomes a politics of cultural apartheid. Within the Greens, for example, a preoccupation with "authentic cultures" and "ancient traditions" naturally lends itself to a politics of authoritarian cultural essentialism (Hildyard 1998, 1999). His warning that there is a grave danger in such ideology, could not be better illustrated than by the killing that took place as the IFP, with the support of the apartheid regime, attempted to ensure its hegemony in the face of growing support among isiZulu-speaking South Africans for a more inclusive vision of a Rainbow Nation.

Romantic feeding of ethnic conflict stems from a view, childlike in its simplicity, that "natives" can be divided into two categories: good and bad. According to Neumann (2000), African local communities are still divided into "good" and "bad" natives, depending on how close they are to nature—in the perception of conservation agencies dominated by western capital. The closer they are to nature the "better" they are, and the more they have the right to stay in the area and taste the financial privileges of western donor attention. The more "modern" they are, the more they pose a threat to the success of nature conservation and the farther away they should be held from these conservation areas; that is, they should be removed.

The writing of Rider Haggard best illustrates the romantic view of Africa and Africans. A close friend of his was Theophilus Shepstone, the 19th century Native Affairs colonialist in Natal associated with designing indirect rule. Both men construed the order of things in a fashion quite out of step with their Victorian contemporaries. Most significantly, they did not associate the Zulu kingdom as "other" or wilderness, but inverted the opposites of their day, associating colonial Natal with barbarism and chaos. Zulu patriarchal order provided an inspiring model for these Victorian men nostalgic for older forms of authority becoming steadily undermined by modern industrialism. So, too, it did for Aspinall whose boyhood reading of Haggard's *Nada the Lily* was life changing. According to Hamilton (1998), however, the novel explored the way the Shepstone system sought to reach into a Zulu world to discover the principles by which it might best establish its authority. Such mythical fiction inspired Aspinall to patronize both Zulu politics and Zululand wilderness conservation. Similarly, van der Post's life story is about the blurring between fiction and fact.

An Indiscriminately Burning Romance

One of the tasks of social scientists, philosophers, historians, and the like is to demythologize, and the "received" American idea of wilderness has drawn a good deal of such critical flak in recent years (Callicot and Nelson 1998; Soulé and Lease 1995). I do not want to rehearse these debates here. Rather, what I want to argue is that South Africa has been largely absent from this story. This is surprising given that the wilderness history of Africa began here, as did the World Wilderness Congress. Although this was in the Zululand reserves with Jim Feely, Ian Player, and others reading the received American ideas of Leopold and Tripensee, it took a very distinctive character that sets the African wilderness history apart from the

American. Similarly, academic histories of Africa have tended to gloss over wilderness, usually conflating it with national parks and game reserves or invoking it as an extremely conservative policy. For instance, Cock and Koch (1991: 1) introduce a volume that sought to interpret the local progressive environmentalist agenda as follows:

> Until very recently the dominant understanding of environmental issues in South Africa was an authoritarian conservation perspective. This focused exclusively on the preservation of wilderness areas and particular species of plants and animals.

Jane Carruthers (1995, 2001) has provided insightful accounts of James Stevenson-Hamilton's conservation career, which began in 1902 and continued through the creation and management of Kruger National Park. She suggests that his was a nascent romantic wilderness philosophy and that he was suspicious of the national park concept as well as interventionist science. While he was grudgingly sympathetic of poachers and viewed the bushman's genocide as "brutal injustice," he was not romantic about Africans. All the same, when the National Parks Board decided to replace all African skilled labor with whites, he was appalled, believing that "'good natives' were far better workers than 'poor whites.'" While he was an advocate of a restrained hand in management of the Park, he did not have any doubt about the importance of anthropogenic fire:

> Controlled burning of old grass…is I believe essential to the welfare of the animals in a sanctuary….It has been proved by experiment in the Park that failure to burn grass at the right time of the year [between March and May] not only drives away all game from the unburnt portions, but is the cause of devastating fires at a later period of the year. The natives on the Portuguese side of the border, invariably burned their grass in early winter, with the result that the game used to flock over to that side, and the same was the case with the shooting-farms over to the west (Stevenson-Hamilton 1947: 14, 15).

The common-sense fire regime instituted by Stevenson-Hamilton, which ruled until 1948 when the Nationalist apartheid regime took power, is righteously looked back upon by today's managers as "indiscriminate" burning. The absence of firebreaks and the accumulation of high fuel loads led to occasional wildfires raging through the park in the early years (Kennedy 1999). Such lack of control was the nemesis of successive management regimes that sought to have flame flickering benignly on the alter of science in accordance with the laws of nature, not culture. As the recent inferno claiming several human lives in the Kruger testifies, however, wildness is recalcitrant. Uncoincidentally perhaps, half of Magqubu Ntombela's speech at the first World Wilderness Congress was occupied by an eco-poetic description of May:

> *Nhlangula* the month of May, the month when winter starts, when the leaves fall and we feel the first pinch of cold. The days grow shorter and a great stillness falls upon the land. *Nhlangula* is the time when my people begin burning grass on the hills and pastures... (Ntombela 1979: 81).

Carruthers' (1995) chapter exploring the tension between "wilderness and science" in Kruger National Park is entitled "Playing God" after Chase's book about the devastating Yellowstone Park fire in the United States, yet her social history does not include fire. Andrew Kennedy has filled this gap and sees management of the Kruger turning full circle back to the laissez-faire philosophy of its first warden, Stevenson-Hamilton, whose motto was "keep it simple, keep it wild." Kennedy's (1999) conclusion is derived in part from the Kruger's management, adopting a lightning-fire regime that assumes that humans played little or no role in burning early African savannas. Rather than returning to Stevenson-Hamilton's view, this approach would appear to have rejected it, and embraced an American policy—only lightning-induced fires are legitimate in large wilderness areas like Yellowstone. Pyne (1997: 451) has shown how fire is the key to understanding the separation of nature from culture that is the hallmark of American wilderness ideology until relatively recently. For Europeans and others who have a less stringent idea of natural purity, the necessity of human burning was obvious:

> To a new generation of critics it appeared that the only alternative to bulimic binges of fire-feast and fire-famine was to replicate something like the indigenous fire practices. But that was tantamount to stating that the reserve had been fashioned by people, that it was not truly and purely wild, and that wilderness was more a state of mind than a state of nature.

A recent issue of the U.S. Department of Agriculture Forest Service journal *Fire Management Today*, containing articles by historians of fire, shows that the critics are being heeded (Pyne 2000; Williams 2000a,b). The dangerous buildup of dry matter in the chasm between nature and culture is going up in flames, and fresh growth will no doubt emerge.

Stevenson-Hamilton's approach to wilderness "management" flew in the face of the conservation wisdom of his time. He saw the need for fire to inhibit tree and bush growth on the African savannah, thereby cultivating range for grazing animals. At the beginning of the last century and before, desiccation and soil erosion were perceived as the harbingers of an environmental apocalypse in South Africa. In the mid-nineteenth century, a Scottish missionary in Cape Town, Croumbie-Brown, advocated a halt to deforestation and advocated the planting of "trees of righteousness" (Grove 1997).

Although not Scottish, continuing in this tradition was Father Bernard Huss, the social apostle of Marrianhill Mission near Durban, whose career was parallel to Stevenson-Hamilton. He was the teacher of and guru to hugely important African intellectuals such as H. I. E. Dhlomo and B. W. Vilikazi. He also taught Robert Mazibuko agriculture. Mazibuko, fondly remembered as the "tree man," became a leading light of environmentalism through his advocacy of organic horticulture, tree planting, and the like. Mazibuko won many accolades such as the Audi *Terra Nova* award shared by Ian Player and Credo Mutwa. Huss's *Textbook on Agriculture* was first published in 1921 and continued to be printed over two decades. It was translated into several African languages and widely used in "native" education. Father Huss broke new ground with what probably was the first significant environmental education initiative in Southern Africa, carrying as it does a strident conservation message. I am currently trying to disentangle his message from that of Mazibuko whose prophetic words, such as "soil

erosion leads to soul erosion and visa versa," are still alive in our minds after his death in 1997, but this cannot be done here. Yet, like those who went before him, Huss advocated afforestation by exotic species as an imperative to bring rain and shore up soil erosion. Today of course, we know that it can cause desiccation and erosion. Huss also advocated the "conservation" of native bush and forests that are destroyed by "indiscriminate" cutting and burning, "especially by natives and Indians…by contemptuous disregard for the laws of nature, we bring down curses upon the land" (Huss 1936: 60).

The use of the term "'indiscriminate," to describe indigenous burning practices and settler emulation thereof, by both contemporary science and early missionary environmentalism, is not coincidental. By claiming privileged access to the laws of nature, science seeks to elevate itself as the high priesthood, dictating the terms on which culture should relate to nature. The new fire suppression regime in the Kruger coincided with the ascendancy to power of the apartheid regime in 1948 and also marked a separation, but between nature and culture, with a downturn for wilderness thinking. The social and ecological consequences of both ideas were moribund and dangerous. As had Gifford Pinchot in the U.S. Forest Service before them, this new generation of resource conservationists were confident of their mastery over nature and sought to eliminate burning that seemed wasteful. This presumption of control marked a shift that Stevenson-Hamilton would have contested given his loathing of scientists (Carruthers 1995, 2001). Such an attitude had continuity after the Second World War in the Zululand reserves, where the white rhino was saved and where the first formal African wilderness areas were established by Ian Player and others in tension with bureaucrats and scientists, but with a pragmatically negotiated relationship with others (Draper 1998).

To use Ian Player's Jungian vocabulary, the romantic wilderness idea has a soul troubled by the shadow cast by people who once lived in African wilderness. Congress debates and the "however" clause of the Port Elizabeth Accord make this patently obvious (Martin and Muir 2002: 7). Player, who had a role in moving "wilderness people" from Ndumu Game Reserve, observed this dark side of himself and wondered if, perhaps, at least some of them should have been left to live there:

> These were wilderness people who had existed in a tough environment of malaria, searing heat and extreme material poverty, but spiritually they had a richness we could not imagine. They were being removed from the game reserve, and their situation would come back to haunt us. They had been part of the landscape, and although it was true that they had killed most of the antelope, it was their slash and burn practices that later enabled the game to increase dramatically when the last person left (Player 1997: 47).

Player, in turn, was moved by such wilderness people, but spiritually since they "blunted our Western mindset and subconsciously led us on new paths" (1997: 47). While the American and Australian idea of wilderness has been roundly criticized for the sublime being associated with "virgin" or "empty" land, the same could not be said of Africa where, in its formal birthplace in Zululand, the architects of wilderness recognized that the land had been occupied for millennia. Piety did not derive from an imaginary depopulation of the land, but from its indigenous inhabitants, as well as the environment from which they had been banished by the irresistible serpent of modernity. This could derive in part from the fact that South Africa was not, by Alfred Crosby's definition, a "land of demographic takeover" by western Europeans (Crosby 1988). Cultural factors were more important than biological phenomena and thus have distinguished our idea of wilderness from the received American idea. According to Bill Bainbridge, whose career is central to our mountain wilderness story, from their designation as such in the 1970s there was never any question about the role of anthropogenic fire. Management sought to emulate the burning practices of the San or bushmen. Since they were long gone and their remaining artifacts left little clue about their burning habits, a combination of guesswork and science had to suffice (Bainbridge 2001).

Critics, such as Cronon, argue that the sublime tendency of wilderness tends to converge around the worship of the mountain as cathedral (in Callicot and Nelson 1998). Yes, we do have our awesome Cathedral Peak in our world-heritage mountain range, but among the first areas declared wilderness were Zulu names such as *Mdedelelo* (the one who cannot be conquered), which contrasts sharply with a name such as Kruger, or Bob Marshall for that matter. The range itself is now called Ukhahlamba-Drakensberg, an evocative amalgam of Zulu (the barrier of spears) and Afrikaans (Dragon Mountain). The relatively peopled landscape in this region meant that we have a rich legacy of indigenous names such as those of the oldest game reserves in Africa: Hluhluwe-Umfolozi, proclaimed more than a century ago where our (official) wilderness story began.

Wilderness and the African Mind?

While much has been written of the psychological function of wilderness for the American and European mind, apart from the assertion of the economic benefits thereof circulating more equitably, the same cannot be said of the African mind. The problem is that today it is probably impossible to speak of such a thing as the African mind, so what we are left with are landscapes with multiple layers of perception. The task of sifting through the sediment of cultural deposit in Southern Africa has been taken up by a small and loose interdisciplinary constellation. Apart from publications and a research agenda (Ranger 2000), such meetings have resulted in pilgrimages to holy mountains, from those of the Valley of a Thousand Hills in KwaZulu Natal, to the Motopos in Zimbabwe. At every conference a serpent raises its head. This mythical creature appears to inhabit rivers and lakes throughout Southern Africa. When angered, *inkanyamba*, as she or he is known in isiZulu, can vengefully visit people in a devastating storm or flood. In Lesotho, the monster is powerful enough to cause seismic tremors damaging foundations of houses in retribution for the recent damming of rivers, which reverses their flow and sends the water to Johannesburg. "We went to look on top of our 'Table Mountain' (*Mkhambathini*) near where I live. There the snake is said to have opened the earth and engulfed people who try to settle as well as their houses, but the creature eluded us" (Peden 2000). Nevertheless, the absence of development and

cultivation on a readily accessible and arable stretch of plateau surrounded by poor homesteads proves the existence of the mountains guardian in real, material terms. From the top, one can see *Nhlangakasi* in the east where the faithful make an annual transcendental ascent as their prophet Isaiah Shembe bade them. Magqubu Ntombela was one of his devoted followers. In Harare, Zimbabwe, the popular Wilderness Church worship outdoors.

If, as critics point out, wilderness is rooted in sublime myths, and conservative ones at that, then it has some untapped allies in Africa. Wilderness is surely not only the "other" of modern western society. As Haila (1997) has shown, in early Finland, wilderness was defined from the ethnocentric standpoint of the dominant culture and imposed as a category upon relatively powerless inhabitants of the area. Such processes seem to be universal. So, too, does the association of myth with wilderness. Whether ancient or modern, they make that which is changeable appear fixed and primordial: mythologizing "transforms the reality of the world into an image of the world, History into Nature. And this image has a remarkable feature: it is upside down….In passing from history to nature, myth acts economically: it abolishes the complexity of human acts, it gives them the simplicity of essences" (Barthes 1973: 141, 143). Mythologies, therefore, make that which is cultural and politically contestable seem natural. But myths depend on storytellers to evolve and do this. As Hope (2001) noted in his damning review of Jones' *Storyteller*, van der Post gave a face and a story to a discarded people before anyone else thought to do so. So, too, did this Congress to many other marginalized people and environments. In so doing, however, it verged on the flip side of the racist imperial coin. Perhaps this might explain why, in its inaugural year of 1977, the Congress was opened and blessed by apartheid minister Piet Koorhof, "who during the 1980s, was responsible for the forced removal of thousands of black people in order to conform to the dictates of 'separate development,' and who has earned a well deserved notoriety in the roll call of apartheid politicians." Such associations have made local progressive environmentalists treat the idea of wilderness with caution (Khan 2000). Van der Post found that his ready endorsement of environmentalist causes could lead to the absurd when he found his name associated with a group called "Planet in Change" which had among its speakers a hypnotherapist whose mentor was the Archangel Gabriel, and a woman in touch with a group of aliens from the Pleiades (Jones 2002). Recognizing that water spirits are important and overlooked factors of wilderness protection and landscape appreciation in Africa (see Bernard, this proceedings), we turn to the Sanusi (African spiritual leader of the highest order) Credo Mutwa. He opened, blessed, and along with Ian Player, told many stories at this Congress. Following him we experience a similar slippage from the sublime:

> Now, sir, this story has got many versions in it. Throughout South Africa, amongst many tribes, you'll find stories of these amazing creatures who are capable of changing from reptile to human being, and from reptile to any other animal of their choice. And these creatures, sir, do really exist. No matter where you go throughout Southern, Eastern, Western, and Central Africa, you'll find that the description of these creatures is the same. Even amongst tribes which never, throughout their long history, had contact with each other at all.
>
> So, there *are* such creatures. Where they come from, I will never claim to know, sir. But they are associated with certain stars in the sky, and one of these stars is a large group of stars which is part of the Milky Way, which our people call *Ingiyab,* which means 'The Great Serpent.' And there is a red star, a reddish star, near the tip of this huge rim of stars which our people call *IsoneNkanyamba*….It is the star called Alpha Centauri, in English. Now, this, sir, is something that is worth investigating. Why is it that well over 500 tribes in parts of Africa which I've visited in the last 40 or 50 years or so, all of them describe similar creatures (Mutwa 1999)?

While Mutwa provides astonishingly valuable insight into this African cultural universal, he pushes the limits of credibility and leaves this scholar somewhat incredulous. His prophet status at the Congress was challenged by the WILD Foundation President, Vance Martin, when Mutwa, in the context of a call for his people to have their land and wild animals returned to them, held that conferences such as the Congress achieve nothing. This is not to say that all Western minds are alike. Mutwa's ideas converged with those of fringe conspiracy theorist, David Icke (1999, 2001), who has made an industry of disseminating Mutwa's ideas as authentically African confirmation of his own (Icke and Mutwa 2001). Icke combines New Age mysticism (voices, intuition, astral projection, "energies" and "densities" or "domains") with environmental activism; he was spokesman for the Green Party in Britain during the 1980s (Poole 2001).

If this Congress can make a difference by laying the foundations on which the New Partnership for Africa (Nepad) recovery program can be built, as its founder Ian Player hopes (Player 2001), then we have to re-examine our myths and reject those that are dangerously divisive. At the same time, we need to seek out and nurture other stories and their tellers for they are the keepers of hope. After the Congress, however, having followed an important line of storytelling to the stars, I wonder.

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Protecting Restorative Relationships and Traditional Values: American Indian Tribes, Wildlife, and Wild Lands

Linda Moon Stumpff

Abstract—More than 560 Federally recognized American Indian Tribal Nations exist within the United States. This paper explores the high value these indigenous nations place on protecting wildlife species that are deeply rooted in indigenous tradition. Tribes have taken a leadership role in conserving species on tribal trust lands, and they also influence Federally managed areas. Of particular importance are Federal lands with wilderness status, critical to assuring the continuance of key species of significant cultural and ecological value. Tribal treaty and religious rights create a Federal nexus on public lands. Large predators and fish important to these indigenous nations are particularly threatened by poorly planned development on public and private land. Also threatened are fish whose existence may depend on clean, free-flowing waters that emanate from headwaters protected by wilderness and wild river status.

This paper explores how Tribes are leading the way in restoring three species and the ecosystems on which they depend; these efforts include restoration of wild salmon, buffalo, and the wolf. It draws on native voices and tribal projects and policies. Although no policy is a perfect match for tribal values, the phrase "all my relations" has significant meaning for threatened species who may depend on the preservation of their wild land habitats. A future in which tribes and the Federal government develop adaptive, collaborative policies for public land is one that keeps a place for brother wolf, salmon, and buffalo in active, restorative relationships. Through such collaboration, health is shared with all who pass through the wild lands.

Introduction

The high value American Indian Tribes place on protecting wildlife and their habitat is deeply rooted in indigenous traditions. These internal, indigenous nations within the United States are leading a number of wildlife restoration efforts. This paper describes the role these Tribes play in three major wildlife restoration projects, the interconnections with wildlife restoration and wilderness, and their efforts to protect wild rivers and native fish. About 560 Federally recognized tribal nations hold trust lands amounting to somewhere between 3 and 5 percent of the landmass of the United States. They exert influence on other Federal lands through treaties and executive orders of the President of the United States, and the Secretary of the Interior who acts as the fiduciary agent for the President in these matters. Tribal lands, Federal public lands, and waterways, particularly those with wilderness status, are critical to key species of significant cultural and ecological value to the Tribes.

The threat of loss of key species in North America, such as salmon, buffalo, wolf, and eagle, is itself a measure of the magnitude of threats to cultures, human health, and wild lands. Conversely, restoration of these species and their ecosystems restores the health of human communities with the health of their surroundings. A tribal vision of the essence of the wild embeds ideas of how particular tribes came to be part of the Earth, part of creation, and part of what the future holds. Various species play important roles in the creation and migration narratives of native peoples: they remain tied to the people in the past, present, and future. They remain present in prayers, in visions, and in healthy diets. Certain animals in particular indicate the health of the ecosystem. Spiritual values related to the natural system are dependent upon restoring health to species and humans in this combined cultural and natural context.

Issues for Native Americans on Federal Wilderness Lands

There are three major wilderness issues of significant concern for American Indian Tribes. First, the idea of a natural ecosystem without human intervention runs against many tribal traditions. Although many tribes traditionally control use to some areas for both spiritual and practical reasons, complete exclusion was unusual. Recognition of the human role in the ecosystem is widely recognized. Even though legal wilderness designation under the Wilderness Act of 1964 is intended to protect cultural values, these provisions can be forgotten in practice. Second, Federal land agencies have often tended to target resources for high use recreation areas, not toward species and the habitats upon which they depend, creating a management dilemma (Cole 2001). Third, heavy-use public recreation trails may be juxtaposed against areas traditionally restricted as shrines or the combined spiritual and actual homes of animals. In the past, policy gaps all too frequently led to regulations that excluded native peoples from traditional activities, while inadvertently excluding indigenous knowledge of the ecosystem.

Significant improvements have occurred in these areas in recent years, especially after the issuance of Presidential Orders on consultation with tribes through government-to-government relations and on sacred lands, and a

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Joint Secretarial Order in 1996 on cooperation with tribes in implementing the Endangered Species Act. These orders, combined with treaty provisions and other agreements, constitute a Federal nexus within which American Indian Tribes work with land policy on Federal lands, including wilderness and wild river designations, to assure the continuity of wild species and their cultural traditions. Some tough challenges remain. Despite significant changes, major policy areas outlined in laws and executive orders have not received the needed attention that creates administrative mechanisms and guidelines to assure their broad implementation. Much is left to the discretion of line managers who must work under strong local political pressure; they frequently lack sufficient administrative guidance, training, and support from higher levels to make decisions that fully implement the intent of laws and executive orders regarding American Indian rights. Another major challenge comes from the political boundaries that mark differences in practices and facilities between wilderness areas, other public lands, tribal lands, and other forms of public and private property, and result in negative impacts to species (Landres and others 1998).

Two Principles Emerging From Indigenous Relationships With Wildlife

The guiding wisdom that governs indigenous relationships with species is respect. It is a respect that flows from a deep understanding of the life force in every particle of living beings. Respect is incorporated in action through restorative practices for humans and "all our relations." This reciprocal, restorative principle is applied in planning and practice. These values, intended to guide action, are reflected in the statement of a tribal vision for the rebirth of a great river, which was made by the Columbia River Intertribal Fish Commission:

> The tribal vision is the rebirth of the spiritual values of the Basins' land, water, air, plants, fish and wildlife and the importance of those values expressed in love, purity, respect and worship that sustained life for native peoples before the time of…the worlds' great religions. This strength should not be lost (CRITFC Biennial Report 2000: inner cover).

This vision leads to the first principle guiding restorative relationships within the ecosystem. It derives from an indigenous concept of evolution—the idea that peoples, species, and processes evolved together over time in the most useful and efficient ways. The value that emerges from this principle is diversity over monoculture. The actions that flow from this principle are represented in connective relationships to ecosystem processes. Knowledge acquired over the long term is applied to restorative actions.

The second principle comes from the idea that the bounty of species and natural resources represents a gift that entails human responsibility. Thus, the greater the damage to the species and the ecosystems on which they depend, the greater the responsibility to sustain them through the governance of human use or restorative practices. Restorative actions are invoked only by high risks to species; they are limited by respect for the bounded and incomplete nature of all human knowledge. The loss of wildness and wild species stems from the reversal of these two principles and results in the concurrent loss of knowledge and in unleashing human irresponsibility without limit. Knowledge of the basis of the interconnected, adaptive restorative relationships constitutes the substance of wildness, as far as we know it. Responsible action to preserve ecosystem relationships based on long-term knowledge, constantly renewed and reborn with changing conditions, is the only sustainable solution.

Restoration of the Wild Buffalo, Salmon, and Wolf as Examples of Federal-Tribal Comanagement

Tribes continue to influence the Federal Government in placing lands and water in appropriate kinds of protected status to benefit fish and wildlife. Tribal initiatives take place within the context of a Federal nexus, which gives tribes leverage to apply pressure through negotiation and legal action. In the Northwest, and in other areas, they work for the protection of pristine waterways and clean water supplies to benefit fish, wildlife, and humans. In some areas, they are taking over management of reintroduced species such as the wolf, or taking actions to protect species before they become endangered, such as the Apache trout.

Recently, a number of significant relationships and agreements led to numerous instances of comanagement between American Indian Tribes and the Federal Government on Federal and State lands. The Grande Rhonde Tribe in Oregon exemplifies a relationship in which tribes influence Federal policy. The Tribe has currently taken over the land use planning function on National Forest and Bureau of Land Management lands. Concern for the care of the land and biodiversity was the primary motivating factor for the Tribe. Leadership for the wolf reintroduction program in the State of Idaho by the Nez Perce Tribe represents another outstanding example. Actions initiated by the Northwest Indian Fish Commission for restoring salmon to Puget Sound and the greater Seattle region of the State of Washington represent the long-term commitment of Northwest Tribes. Protection of traditional values and re-establishment of traditional ecological relationships with the buffalo through educational programs are special actions created by tribal colleges and many Tribal Nations. The three case studies included in this paper demonstrate how tribes initiated actions to restore wildlife and the land and water on which they depend, implementing their programs based on the two principles of respect for evolutionary processes and remembrance of the original gift and attendant responsibilities to restore and protect. In researching the cases, I found that the three programs are implemented with modern science, but guided by traditional knowledge with cultural objectives.

Traditional Knowledge

Tribes have accumulated knowledge over long periods of time as they interacted with various species on the North American Continent. This knowledge, originally drawn from empirical experience and validated by spiritual values,

became encapsulated in cultural narratives. The traditional knowledge base is adaptable and verifiable in the continuous expression and implementation of relationships with other species and the ecosystem to which all belong. It is the center of long-term knowledge of the continent, while science can only infer a picture of the North American ecosystem through tree-ring analysis and other limited methodologies. As such, this knowledge is critical to the sustainability of wildlife and the ecosystems upon which they depend.

Significant challenges exist for creating a useful dialogue between modern science and the knowledge base of traditional science held by tribes. Resolution of differences will mean finding common ground and working to understand disparate objectives and methodologies. It will also mean releasing the stereotypes of the "noble Indian" and the "noble scientist." Actual integration of such diverse ways of knowing may be neither possible nor desirable. At the same time, great benefits may be obtained from recognizing parallel ways of knowing that inform each other and connect the past with the present and future. As a starting point, some characteristics of the development and use of traditional knowledge and science need to be recognized. One characteristic of traditional knowledge focuses on continued cycles of use and restoration to assure the health of humans and "all our relations." This is different than a science that explores for all that is knowable or all that is of economic value, or even all that serves the most humans best. A second major choice in science is the decision of where and how it is to be applied. Applications of traditional science to land-use systems connect humans to the living elements through care of the ecosystem. Actions based on changing factors harmonize adaptive decisions. Finally, "best use" as it applies to traditional science is to use knowledge to evaluate the quality of human interactions and their impacts on other species. Visions of the land are often connected with ideas of use, as Elizabeth Woody (1999: 14) reminds us:

> What has happened to Celilo Falls illustrates a story of inadequacy and ignorance of this land. The story begins, of course, long before the submergence of the falls, with the seed of ambition to make an Eden where Eden was not needed. One needs to learn from the land how to live upon it.

The conceptual framework behind traditional knowledge and science goes back to the first principle of respect for the love that flows from understanding the life force in every grain of evolution. Thus, to fish, and to take life, while respecting that the fish lives in ways we can relate to, constitutes the basis for a defined respect expressed in behavior and in ceremony. The next step in expressing this love of the life force affects immediate behavior that leads to sustainable relations. This is reminiscent of the kind of experience Aldo Leopold had when he recollected the sight of that kind of love extinguished in a dying green fire deep in the eyes of a wolf. That experience led him to an inspired set of actions that initiated the wilderness system.

A scientific emphasis on restoration takes place in the narrow gorge of time between the past and future. It moves Tribes and governments away from endlessly deconstructing colonialism and making promises. It shifts energy to restorative actions that benefit communities. In order to take restorative action, the knowledge base itself needs restoration. Experience from the past is drawn from tradition and worked into guidance that leads to a vision of the future. Actions are informed by experiential knowledge in the cycle of adaptation. In this context, restoration is a form of rebirth and the recognition of the sovereign nature of all species.

Restoring Salmon Nations

Rebirth and retention of spiritual values contained in the natural system and in the people are components of salmon restoration. Healthy relationships are reborn in natural cycles that depend on wild rivers that in turn depend on the human responsibility to assure the continuity of the wild. Restoration, then, carries express human responsibilities. In the case of the Nisqually Tribe, the fact that the headwaters of the Nisqually River fall within the protection of the National Parks, and its delta now is included in a National Wildlife Refuge, greatly widens the opportunities for restoration. Billy Frank, Jr., of the Nisqually Tribe, clearly restates the main idea of the second principle that connects restoration and responsibility for the salmon:

> Some of the scientists say that our river's spring chinook went extinct back in the 40's. I don't believe that. That any salmon is extinct. The salmon was here when we got here. Nature put the salmon here. For us. And nature will take care of that salmon. That life is still here, in the streams, out in the ocean. I can't believe all that life, from the Nisqually headwaters all the way up to Alaska, is gone. I'll never say extinct. With a flicker of the right action, that life will revive itself (Wilkerson 2000: 104).

Salmon live as part of a complex cyclical system, migrating out from their natal streams to the ocean and returning years later to the streams to spawn—a journey of thousands of miles. Tribal wisdom and knowledge guide scientific and technical aptitude to restore salmon in action. Tribal fish commissions in the Northwest assemble hydrologists, geneticists, biometricians, and other scientists to do research that benefits the salmon. At the same time, they bolster the Tribal position in the realm of public opinion and public policy. What works and what does not work is the bottom line of applied restoration. Failure is obvious to all. The score from destroying wild river habitat is salmon few, humans zero. The lesson is not that the fish will be gone, it is that the people will be gone. Success is based on a many-sided vision. Supaneeqx, a Walla Walla word, has no easy translation. However, its general meaning makes sense when circumscribing appropriate human actions in the Columbia River Basin—actions like looking at something, whether an issue, a problem, or an organization, from many different angles and directions.

This many-sided vision is applied in practice through the implementation of the tribal-based "Spirit of the Salmon Restoration Plan," or the "Wy-Kan-Ush-Mi-Wa-Kish." This tribal plan for salmon restoration makes recommendations even to areas outside of the Tribes' control, such as changes in hydroelectric operations and changes in ocean fishing regulations. Despite the bounded nature of the Tribes' political control, the plan places them in a leadership role for restoration of harvestable and healthy runs of salmon in the Columbia Basin. The way is known, but partnerships are required. Tribes employ their extensive abilities for collaboration, while they persist in bringing multiple public and

private entities together. At home, they build tribal capacity to assume greater responsibility. After years of persuasion, tribal pressure resulted in abundance-based regulations for ocean fishing of Chinook salmon, and even the great hydroelectric dams now make some seasonal releases of water for the salmon.

Restoring Relationships From the Heart—During their thousands of years of history on the Columbia River, indigenous people knew about experimenting with dams as a means of containing fish for individual villages. From these experiences, a traditional understanding emerged that outlined how dams disrupted the natural allocation patterns of wild rivers, for fish do not go above the dams. A traditional story from the Nez Perce Tribe illustrates the human problems that create dams and result in allocative dilemmas. It is a story of point and counterpoint, a perversion of the first stories of creation that contain a lesson about the consequences.

> Coyote was walking up the river on a hot day and decided to cool himself in the water. He swam down the swift river until he came to the waterfall where the Wasco people lived. Five Maidens had dwelt there from ancient times. This was the place where the great dam kept the fish from going up the river.
>
> While he was looking at the great waterfall, Coyote saw a Maiden. Quickly he went back upstream a ways and said, "I am going to look like a little baby, floating down the river on a raft in a cradle board, all laced up." As Coyote was drifting down the river, he cried, "Awaa, awaaa." The Maidens, hearing this, quickly swam over, thinking that a baby might be drowning.
>
> The Maidens took the baby home and cared for it and fed it. He grew very fast. When he was crawling around one day, he spilled some water on purpose.
>
> "Oh Mothers," he said. "Will you get me some more water?"
>
> The youngest sister said, "Why don't you make him go and get it himself? The river is nearby."
>
> He began to crawl toward the river, but when he was out of sight, he jumped up and began to run. The oldest sister turned around and said, "He is out of sight already. He certainly can move fast."
>
> "That is because he is Coyote," the youngest said.
>
> When Coyote reached the river, he swam to the fish dam and tore it down, pulling out the stones so that all the water rushed free. Then he crawled up on the rocks and shouted gleefully, "Mothers, your fish dam has been broken."
>
> The sisters ran down and saw that it was true. The youngest Maiden just said, "I told you he was Coyote."
>
> Coyote said, "You have kept all the people from having salmon for a long time by stopping them from going upstream. Now the people will be happy because they will get salmon. The salmon will now be able to go upriver and spawn."
>
> This is how Celilo Falls came to be where the Wasco people are today. As a result of Coyote tearing down the fish dam, salmon are now able to come up river to spawn on the upper reaches of the Great Columbia River and its tributaries (Landeen and Pinkham 1998: 83).

This story is in direct contradiction to the philosophy of Manifest Destiny—the belief that resources were put here to belong to the individual user, to maximize profit, who then gained the right to rule over the land. It points out its own philosophical flaw by which use becomes the right itself, rather than just one type of relationship between living things governed by a system of rights based on the workings of natural systems. American Indian Tribes need to use the resources, but use occurs within the workings of natural systems. If the newcomers to North America thought that the resources looked unused and the fisheries plentiful—wasn't this good? Wasn't this the real definition of success, of a job well done? Everything was put back in its place, used so skillfully and understood in its underlying design that it appeared almost unused. The plants, the animals, and fish and birds returned in good numbers. The underlying maxim of "control the people, not Nature," even in its wildest manifestations, applied. Some areas were restricted from use, others used only for certain purposes. No one hunted or fished who was not properly trained to understand the web of relations and interconnecting parts. Save all the parts, save the many relations, save ourselves.

The Federal Nexus—Six species of salmon swim the rivers of the Northwest: they are Chinook, they are Pink, they are the Silver or Coho, they are Chum, and they are Sockeye and Steelhead. The number of salmon stocks in the United States is now 335, and of these, 100 are threatened and 12 are extinct. N'ch-iwana, the main stem of the Columbia River, choked by 19 Federal hydroelectric dams, blocks the salmon from returning home to spawn. Dams were built all over the West for a variety of purposes. Some of the dams are no longer even functional, but they still create salmon barriers on numerous streams and rivers in the Northwest.

The lack of Wild River designation on the Columbia River system and throughout the Northwest led to continuing the activities that obliterated a once rich King salmon fishery. The State of Washington, with its vast network of rivers, remains almost without Wild River designations. Federal wilderness designation and other protective regulations, such as National Parks and National Forests, however, protect headwaters essential to clean water for the fish. Designations that protect the watersheds downstream to assure the flow of cool, clean water for feeding areas and other habitat conditions essential to the fish, are lacking.

Hatcheries, History, and Histrionics—The wild salmon lives to produce bounty. It hatches from a tiny egg high in forested streams, and the 1-ounce fish swims to the ocean where it grows to 15, 20, or even 60 pounds. Salmon that return to spawn afterwards die and rot to feed the mountains, providing 16 percent of the nutrients needed by young salmon and 17 percent of the nutrients for streamside vegetation. In the Columbia River alone, nearly two hundred million pounds of fish return each year. If they were cows, a rancher could turn loose a 200-pound calf that would disappear and come back to his gate on a predetermined date in a few years weighing about 50,000 pounds: that would be equivalent to what the wild salmon do (Manning 1999).

Fish hatcheries, first implemented by State and Federal agencies to maintain harvestable runs, are controversial. Improperly managed, they release fish that compete with wild fish. And regulatory science sometimes leaves logic wanting. In runs with 80-percent hatchery fish and 20-percent wild fish, harvest limits are set that allow for harvesting 66 percent of hatchery fish and 33 percent of wild fish. Thought to protect the wild fish, simple extrapolation of the math suggests that such limited regulatory policies will assure the eventual demise of the wild fish. In

other cases, hatchery bred fish, that come from original broodstock from native streams that are on the brink of extinction, may offer the only possibility of restoring those runs of Steelhead and salmon.

In response to the loss of salmon, the Federal Government and the States began an active program of fish hatchery production in an attempt to replace the wild salmon. Many aspects of this restoration effort are fraught with problems. Each hatchery fish costs $62.50 (Manning 1999). Fish hatcheries consume energy in order to dump biomass into the system, while the wild salmon return biomass to the system in a natural cycle. The average hatchery spends the capital, not the interest, by feeding the hatchery fish other fish. This reverses the allocation system implemented by a natural salmon run in a wild river. Not only do wild salmon living in wild rivers bring back protein from the ocean without cost, they also provide point-to-point delivery by returning to their stream of origin.

Despite the difficulties involved with hatcheries, they are key to the restoration efforts developed by the Tribes in the Columbia River Basin. Most Tribal fish hatcheries adapted their programs to the principle of compatibility with native wild fish and naturally spawning populations. The production of fish of native origins to specific watersheds was prioritized. Faced with extinction of an increasing number of salmon species, hatcheries become a way of "saving all the parts," while persisting in efforts to mount pressure. Federal and State hatcheries tended to manage for nonnative fish that crowded out the wild salmon. At some places, like Redfish Lake, Idaho Game and Fish projects killed and poisoned native salmon in order to replace them with hatchery-raised "sport fish." Many problems occurred even when the State and Federal hatcheries were developed for native fish species. The State of Oregon produced so many Steelhead, they deemed them "surplus to their hatchery program." In 1988, with support from the Yakima Tribe, the Nez Perce Tribe, and the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Indian Reservation sued the State of Oregon (United States versus Oregon). They obtained an injunction to prevent Oregon from destroying Imnaha River hatchery Steelhead. These Steelhead, developed from native broodstock of the region, are being used by the Tribes to rebuild runs in the Imnaha Basin from which their ancestors came.

Tribal Perspectives on Linked Actions to Sustain Wild Salmon—In the practice of restoration, traditional knowledge and science have never been separated. Attempts to restore fish runs through hatcheries are at best a short-term solution. This links to longer term solutions for preserving the wild character of waterways. Because the Nez Perce, Umatilla, and other Tribes revere water and the fish that live in it, there is great concern for the Columbia River. In 1997, the Affiliated Tribes of Northwest Indians and the Columbia River Intertribal Fish Commission nominated the Columbia for designation under the American Heritage River program, as a step in getting Federal support to recover plants, animals, fish, and people. Wild and Scenic River Designation for the Hanford Reach, the last free-flowing section of the Columbia, was sought. In many similar actions, Tribes repeatedly used their Federal relationship to create restoration actions that preserve key components of the ecosystem.

Great dam building projects significantly impacted the ecosystem and prevented salmon migration, plunging some runs of fish into near extinction. Fish hatcheries were often the only mitigation. Hatcheries have been among the most complicated issue. Thirty-eight hatcheries were constructed below the Bonneville Dam, however, the Dam prevented the fish from swimming upriver where the Tribes might catch them. Hatcheries caused a loss of biological diversity in spawning fish that were not adapted to their environment, and that may lack survival skills. At the same time, Tribes have established some hatcheries under a different rubric, using eggs from native fish and working to mimic natural conditions. In cases where the salmon are virtually gone, such hatcheries are critical to the continuance of the culture of the people, who so firmly believe their fate is linked to the salmon. Tribes continue to pressure the Federal Government to increase water releases from dams in attempts to mimic wild conditions on the Columbia that benefit salmon.

The Northwest Tribes have a clear understanding that salmon restoration will require multiple connected actions occurring in cycles over a period of many years. From the basis of their long-term perspective, they recognize the need to:

- Understand all sides, including traditional, political, and scientific aspects of restoration.
- Anticipate all consequences by completing an analysis from all perspectives.
- Retain traditional knowledge as the guiding wisdom, while making use of the best technical information available.
- Understand the effects of decisions on people, groups, and organizations.
- Make necessary recommendations, including those outside of tribal control, with persistence and dedication to collaborative action (CRITC 2000).

What works and what does not work is the bottom line of applied restoration science and policy. Failure is obvious to all. Success is based on a many-sided vision. Supaneeqx—that Walla Walla word that has no easy translation—still carries comprehensive meaning for planning efforts by describing the action of looking at something, whether an issue, a problem, or an organization, from many different angles and directions. Their Salmon Plan is accompanied by demands for restoring sections of wild river. Tribes must now use their extensive abilities for collaboration and their persistence to bring multiple public and private entities together, while working at home to build tribal capacity to assume greater responsibility. The Boldt Decision, a Federal Court decision affecting Washington State, assured the Tribes of a harvestable catch of salmon, and fortified their rights to gather shellfish and materials for traditional use on public and private lands. Tribal Nations, through their Federal standing, may sue States, individual, and corporations to protect salmon. And they continue to do so.

Restoring the Buffalo Nations

Tribes maintain an ancient relationship to the American Bison, called "buffalo" in common parlance. The buffalo is considered a spiritual being who can be called by those who listen and offer respect. The buffalo lived on the Great Plains

in vast prairie grasslands. Estimates of the number of buffalo at the time of European contact range from 30 to 70 million animals. These great herds were called "the greatest animal congregations that ever existed" (Matthiesen 1987: 151). By the end of the Indian Wars in the Northwest in the 1870s, less than 100 buffalo remained in the wild.

Buffalo bulls are larger than females, weighing about 2,000 pounds. They have heavy horns and a large hump of muscle that supports their huge heads and thick skull, yet they can run as fast as a horse. They become especially ill-tempered during rut. The roars and posturing of their battles certainly justify the expression of "buffaloing" someone. Buffaloes raise their droopy tail straight up when they are ready to charge. Cows have narrower, curved horns and they weigh about half as much as bulls. They are protective of the calves and may be even more dangerous.

American Indian Tribes played a critical role in preserving the American bison. The Cape buffalo of Africa and the water buffalo of Asia are true buffalo, but the American bison has been called "buffalo" for so long now that the terms are used interchangeably in popular literature. According to a peculiar characteristic of the buffalo, the calves followed the horses of the hunters who had slain or separated them from their mothers on a hunting expedition. The buffalo herds, the lifeblood of the Indian Nations of the Plains, were victims of wasteful overhunting by the newly arrived "frontiersmen." The systematic slaughter of the bison was the military, political, and economic expression of colonialism and oppression. The Southern herds were the first to go. Between 1872 and 1874, a million animals a year were shot, leaving a solitary survivor to meet its end in Buffalo Springs, Texas, on the trail to Santa Fe (Matthiesen 1987). Massive slaughters accompanied the Northern Pacific Railroad construction that cut directly across Sioux treaty lands. The slaughters coincided with the height of the Indian Wars in the 1870s and 1880s.

Walking Coyote, a Pend d'Oreille Indian, brought in several calves that followed him to St. Ignatius, Montana. He kept a small herd of buffalo that grew from those orphaned calves. He later sold them to Charles Allard, Sr., and Michael Pablo, who were ranching on the Flathead Indian Reservation. From this small herd came many of the animals later used in restoration, including the larger number of them in Yellowstone National Park. In 1893, they bought Buffalo Jones' remnant herd at Omaha, adding 26 purebred animals that they kept until purchased by the Canadian Government. This herd, so oral history says, originally came from Canada. The hybrids, or cattalo, were never allowed to mix with the thoroughbred bison, but were sequestered on Wild Horse Island, at Flathead Lake.

When the Federal Government implemented the allotment policy that opened the reservations for white homesteaders in 1910, Michael Pablo was forced to sell the buffalo to the Canadian Government. In the 23 years under Indian management, the herd of 36 bison increased to over 30 times their original number (Jones 1909). The roundups were extremely difficult. He notes, "The buffalo, when they found themselves being urged from their native pastures, would turn on the riders and in the wildest fury charge the line," scattering all over the country (Jones 1909: 7). Finally, a specially constructed fence running 26 miles (42 km) in length, gave them a line to drive the buffalo down to the 24-inch (61-cm) timber corrals before being shipped by special trains to Alberta. Much of this narrative of the restoration of the buffalo relies on traditional knowledge of the buffalo retained on the Flathead Reservation. It is an unusual example of how restoration efforts following traditional management practices may accomplish significant and amazing objectives.

When the Federal Government interfered with the management of Indian trust lands by American Indian Tribal Governments by passing laws that broke up traditional wild range lands, the result was the loss of wild animal range and the animals that used it. At the time when the Flathead Reservation was fragmented by the Allotment Act, Allard realized that their wild bison herd would not be welcome. He sold his bison to Charles Conrad in Kalispell. This herd was later important as the nucleus of the National Bison Range stock. The sale to Canada drew strong public response, and the American Bison Society was formed. President Theodore Roosevelt and William Hornaday of the Smithsonian worked to persuade Congress to set aside national range land for the American bison. Three reserves were established between 1907 and 1909. Again, the Salish Kootenai Nations of the Flathead Indian Reservation responded, extending a long-term lease of their trust lands to establish the 18,500-acre (7,487-ha) National Bison Range. Its reserve is primarily made up of native Palouse prairie grasslands, but also includes forest, wetland, and river bottom woodlands. This wildlife refuge is intensively managed for species diversity.

The extreme damage done to natural processes through farming, cattle ranching, and the resulting introduction of noxious plants and exotic animals requires significant conservation work by humans to begin emulating natural conditions. The bison are vaccinated today due to largely unproven, but politically troubling, claims that they might act as transmitters of disease to cattle. In fact, brucellosis, the disease attributed to the buffalo, is really a cattle disease that was transmitted to bison in some areas. Bison are strong and hardy beasts, much better adapted to the American Plains than European varieties of cattle. The restoration of the buffalo is intimately connected to their central place in the living ecosystem. Understanding and respecting the bison is considered integral to bringing them back. In oral history, recorded by the culture committee of the Blackfeet Nation of Montana, Mary Ground tells the story of Iniskim, the Buffalo Rocks, that illustrates how the buffalo is regarded as a spiritual entity who can be called back:

> It was the middle of winter in the days before the Pikuni (Blackfeet Tribe) had horses. They were camped down by a creek for the winter and the people were starving. The buffalo had moved out somewhere. The men would go out and hunt but there were no buffalo any place. In camp, they cleaned out everything they could think of to eat. Finally, they even started to cook those little calf skins they used to dry berries in…They boiled some of their rawhide ropes for food. There weren't even any birds or rabbits left.
>
> The youngest wife of the Chief took her rope down to the creek to get wood. She was looking for some of those dried-up rosebuds, too. She was gathering up her wood and looking for those dried-up rosebuds when all at once she heard someone singing.
>
> "Woman over there, you woman, take me, I am holy. I want a gift. May I have kidney to eat?"

> There was no one there but her. She stood there but she couldn't see anything. Finally, she saw the gravel and rocks rolling down on the side of the cliff on the bank. She went over there and found this Iniskim, a buffalo rock. It's a petrified rock shaped like a buffalo. The woman picked it up and kissed it and said, "You must be the one who's singing. Sure I'll take you. I'll take you home with me." She put it in her dress and got her wood all ready and went home.
>
> When she got to her teepee, she told her husband, "I want you folks to straighten up the teepee...invite all the elder men, the Medicine Men and the young men. We're going to make Medicine. She showed him the Iniskim and said, "I feel sorry for the little ones and the older people. They're starving. We'll see if we have the good luck to get our buffalo back again." In those days they had buffalo jumps. They were nearly always ready in case the buffalo would come near the camp" (Ground 1978: 37–38). In the story, the buffalo return and the woman is honored for her work in calling back the buffalo.

The Federal Nexus—The Federal Government was slow to react to the loss of the buffalo. Tribal members secured buffalo here and there. Tribes took the initiative for introducing buffalo on many reservations. The sale of the major remaining herd of buffalo to Canada finally resulted in political pressure. The National Bison Range, the reintroduction of buffalo into Yellowstone National Park, and other actions resulted.

In the Southwest and other areas, a number of tribes keep small herds of buffalo today. They are regarded as important animals to the spiritual health and welfare of the communities. The Buffalo is part of the sacred Mountain Way ceremonies of the Navajo, and the Pueblos celebrate their connection to these animals with Buffalo Dances. Before European contact, many of the Southwest tribes traveled eastward to the southern plains to hunt buffalo.

The restoration of the buffalo is intimately connected to their place as the centerpiece of a lifeway, especially for the northern tribes. Understanding and respecting the bison is considered integral to bringing them back. The Inter-Tribal Buffalo Commission has worked to encourage building up herds through the application of traditional methods and some marketing. They now coordinate the efforts of a number of tribes. Tribes continue educational efforts to teach people that the buffalo must be respected and that it is integral to sustained living on the Great Plains. Tribal colleges develop curriculum on buffalo, and Winona La Duke writes extensively about the vision for returning the prairies to the buffalo and the buffalo to the prairies in a major effort to restore native ecosystems.

Restoring Brother Wolf

The relationship of many tribes to the wolf reflects the kinship between first peoples and the wild. John Marshall, Lakota Sioux, noted, "This kinship between first peoples and the wolf took us down the same road nearly to the end" (Marshall 1995: 6). In a time before people became arrogant, it is said that people learned from the wolf. The wolf uses what he has within to hunt. The wolf is emulated because he is so successful in living within the web of relationships. The wolf's powerful knowledge and skill as a hunter further encouraged that emulation. Many tribes learned the practice of the wolf. The Apache tribe, locked in a 300-year battle with the Spanish, Mexican, and later the United States Governments, learned to copy the howls. They copied them so exactly that they could communicate across great distances and not be recognized.

Northern Wolf-Sungmanitu or Timber Wolf—John Marshall, in his book, *On Behalf of Wolf and First Peoples*, reveals a dream of a wolf he had as a small boy. From this dream, in which a wolf asks him to sing his song, he interprets his role as an equal of the wolf with a responsibility to tell the wolf's story. He says, "It was then that I began to learn that the wolf and I are brothers. That I am more like him than I ever imagined. Born into the same land of the same Mother. We are kindred spirits and fellow travelers in a common existence, bound together by respect, adversity, and challenge" (Marshall 1995: 5). The wolf's vigilance in defending his family, regardless of the strength of the enemy or the odds of the struggle, was observed. Finally, people learned that they could emulate the wolf and, in turn, came to exist to serve the environment and participate in the mutuality of life (Marshal 1995). By accepting the premise that the wolf is a model, the different levels of relationship and meaning between wolves and first peoples can be understood. This means recognizing boundaries and parameters of mutual respect on the Earth. It also recognizes the physical relationships of living in the same place together. Finally, it recognizes the being of the Earth itself, the ecology of being.

The emulation of the wolf was not the same as being the wolf, for it was understood that each species had its own place and its own characteristics or strengths that were its key to survival. Although humans held great powers of understanding, those powers were not held to dominate, but to survive. Sometimes, emulation led to the formation of special societies in tribes. For example, the Pawnee tribe was known on the plains as the "Wolf People," and the sign language for the wolf was the hand with two fingers held in a v-shape on the right side of the head.

Marshall (1995) gives the name of the wolf in Lakota, "sungmanitu tanka," great dog of the wilderness. He notes that this is a new name, because it includes the concept of wilderness, which is European in origin. Previous to European contact, the Lakota did not compartmentalize the world with anthropomorphic terms like "wilderness." Rather, culture and society were joined as a concept, not a place. And the more correct interpretation of manitu was not wilderness, as place, as legal entity, but wilderness "place away from where humans are." Marshall also notes an older word for wolf, "mayaca," a term that may more closely relate to the wolf's characteristic of denning in a step face or riverbank.

He tells a story, similar to stories from other tribes, this one learned from his grandfather, about the understanding between people and wolves:

> A woman leaves her village and home in heartbreak and anger because her husband has brought home a second, younger wife. It is late autumn and she travels toward the village of some of her relatives. She becomes lost, her food supply is gone, and she faces the prospect of having to totally fend for herself. Eventually, she is found by a family of wolves, which leads her to shelter and occasionally brings her fresh meat. Over the winter, she learns the nuances of their communication. Finally, a wolf tells her that some of her people are moving close. After that, she leaves her wolf family and finally reaches the villages of her relatives, who

> had received word that she was probably dead. Her relatives were overjoyed to see her, and they give her the name of Woman Who Lived With the Wolves (Marshall 1995: 12–13).

The story records the closeness of the relationship between humans and wolves and their mutual interdependence. In fact, the near extinction of the wolf and of first peoples ran parallel after European contact. Both wolf and Indian got in the way of Manifest Destiny. Pressed to extinction, the timber wolf of the North, the lobo wolf of the Southwest, the red wolf, and other subspecies reached the brink.

Marshall develops the idea that the wolf is a hunter who is the equal of his prey—he uses what he has within him to hunt. There is no question of superiority to the prey. This is why the wolf is emulated, because he is successful in living within his own place, unimpaired by ideas of progress and superiority over another. A political economy of wolves is different than that of ranching and markets. Both northern and southern wolves were pushed over the borders, the northern wolf retreating to Canada, the lobo retreating into Mexico. Today, the wolf is a bio-political pawn in the wider battle that will determine who owns the future of the North American West (Mitchell 1994).

The Federal Nexus—The Federal Government, under the Endangered Species Act, launched a plan to restore the wolf to the North in the early 1990s. Wolves were moving across the Canadian border and frequenting Glacier National Park. The new plan was to release wolves into the Rocky Mountain area, Yellowstone National Park, and National Forests and wilderness areas of central Idaho. Fifteen wolves were released each year to reach about 100 wolves in each of the areas. The State of Idaho refused to participate, so the Nez Perce Tribe was chosen as the Governmental authority to release the wolves in that State. Their diligence was rewarded; the wolves prospered under the management of the Tribe. Through the wolf, the Tribe took a greater role in land management off reservation. The wolf's reintroduction range roughly resembled the five million or so acres (20,234 km^2) of territory once under the stewardship of the Nez Perce Tribe. Now they are on this land again, monitoring the wolf and the conditions he lives in. The restorer is the restored.

The Lobo—The Mexican Wolf of the South

The movements of the southern wolf, or lobo, called the Mexican wolf (*canis lupus baileyi*), crossed my own lifepath on several occasions. I saw the last known pair in Arizona shortly before their capture in the 1960s, outlined against the dusk on the Nantac Rim. When I moved up to Olympia, Washington, in 1997, I found that captive lobo wolves were living near me at the Wolfhaven facility. The breeding program at Wolfhaven, a nonprofit organization, produced some of the packs later to be released in the Southwest. In 1998, I visited the Turner Ranch for the annual Native American Fish and Wildlife Association meeting, and was allowed to view the same wolves at a distance shortly before their release into the wild.

After the virtual elimination of the elk in the Southwest, the wolves thrived on livestock. This introduction of cattle was paramount in changing the native diet, as well as impacting the ties between native peoples and the animals that filled their landscape. The extermination of Mexican wolves occurred before they were extensively studied through the methods of Western science. Much remains to be learned, making traditional knowledge about the wolf even more important. Mexican wolves have the most consistent coloration of all of the gray wolves—a richly colored mix of buff, gray, rust, and black. The wolves may weigh from 50 to 85 pounds, with male wolves weighing more than the females. An adult wolf is about the size of an adult German shepherd.

The southwestern subspecies of the gray wolf, often called the lobo or Mexican wolf, shares long-held and important ties to the cultural and spiritual world of the Apache people. Missing from the native landscape they shared with the Apache people from time immemorial, a landscape that included Arizona and New Mexico in the United States and ranged down into the Sonoran Desert in Mexico, the Mexican wolf is again heard in the mountains and grasslands of the Southwest. The Mexican wolf is the most genetically distinct of all of the gray wolves and is one of the rarest of all mammals.

The Apache belief that all life is sacred meant that action must be considered to benefit the wolf, an animal that carries special powers. In a practical way, it is understood that wolves play a critical role in the ecosystem that cannot be filled by other predators. Wolves live in family groups, or packs, and practice complex social behaviors. Wolf families usually consist of a set of parents (alpha pair), their offspring, and other nonbreeding adults. They usually live within a specific territory, which may range in size from 50 to more than 1,000 square miles (129 km^2 to more than 2,590 km^2). Their social structure is maintained by their communication systems: through vocalizations, body postures, and scent marking. Wolves are noted for their distinctive howls, a sound that has become attached to various traditional songs and to the idea of wild lands. A tightly organized structure, enhanced by communication such as howling, enables them to work together and, conversely, to stake out their own territory. Wolves hunt as a group, coursing or chasing their prey. It is believed that the characteristic of killing weak or old animals helps to keep their prey populations of white tail deer, mule deer, and elk healthy.

The virtual disappearance of the lobo from its range in the Southwest was due to a program of continuous and unbridled killing encouraged by government policy. Wolves were extensively poisoned, shot, and trapped by government agents and private individuals. In the Southwest United States and in Mexico, both the Apache people and these wolves carried a government bounty on their heads in the 1800s. By the early 1900s, high cattle-stocking rates coupled with overhunting of deer and elk resulted in many wolves preying on livestock. The Arizona, or Merriam's elk, a large antlered elk that ranged from the Wichita Mountains of Oklahoma to the Mogollons in New Mexico, west to the Chiricauhuas of Arizona and south into Sonora in Mexico, once ran in herds of as many as 2,000. By the close of the 19th century, they became hard to find. After the virtual elimination of the elk, wolves thrived on livestock.

The Federal Nexus—In 1970, it was decided that the only chance for ensuring the survival of the Mexican wolf

was to begin a captive breeding program. The last wolves were captured around the San Carlos Apache Reservation in the 1960s for breeding in zoos. The last time I saw them, only a year before their capture, they seemed to cling to the top of a ridgeline, so much a part of the land itself. At that time, I did not know they would be the key to the restoration program, but perhaps they did, for coming down so close as to be in our range of vision was unusual. In 1973, the United States passed the Endangered Species Act (ESA). Although it did not apply specifically to tribal lands, tribes again became partners in the return of the wolf to the Southwest through cooperatively working on the implementation of that Act.

The Mexican wolf was listed as endangered under ESA in 1976. By 1992, the U.S. Fish and Wildlife Service (USFWS) established the *Recovery Goal for the Mexican Wolf* under the ESA, "to conserve and ensure the survival of *Canis lupus baileyi* by maintaining a captive breeding program and re-establishing a viable, self-sustaining population of at least 100 Mexican wolves within the wolf's historic range." In 1998, a wolf release program was initiated to relocate wolves into the Apache National Forest of Arizona. They began releasing captive-reared wolves into the area in March 1998.

The release area chosen by Federal authorities was directly adjacent to the White Mountain Apache Reservation. Because of the ranging behavior of wolves, it was obvious that the wolves would move outside the boundaries onto tribal lands. Without the existence of the 4.4 million acres (17,806 km^2) of National Forest land, including primitive areas and lands designated under the Wilderness Act of 1964, and the cooperation of the White Mountain Apache Tribe and San Carlos Apache Tribe, whose adjacent lands provide a buffer, the future of the wolf would have loomed uncertain. Although a Federal rule exists to allow the release of the wolf on Federal lands in the State of New Mexico, the effort has stalled as a Federal agency has bowed to the perceived private interests of cattle ranchers who exert their influence over Federal wilderness lands. We will all have to wait longer to hear the howl of the wolf in Aldo Leopold's Gila Wilderness.

Under a joint agreement between the United States and Mexico, five wolves were captured near Durango and Chihuahua, Mexico. The USFWS completed a captive wolf management facility and began providing an environment that minimized human contact and encouraged wild behaviors for wolves that were potential candidates for release.

The reintroduction plan allows for the wolves to be removed or relocated when conflicts with humans occur, such as livestock depredation. This has been done to increase the success of wolf recovery by encouraging a wolf population with behaviors that focus on native prey and maintains a tolerance level for coexistence among livestock producers. The increasingly healthy elk herds in these Forest Service and Apache tribal lands further encourage a natural balance. In addition, the replacement of cattle ranching with American bison on the nearby Ted Turner ranch may provide an alternative buffalo range model that proves more compatible with range lands and wetlands than extensive cattle ranching. In addition, Defenders of Wildlife, a private conservation group, established a fund to compensate ranchers at market value for any documented losses of cattle to wolves. (Mitchell 1994). In the end, the political economy of wolves differs from that of ranching and markets. The wolf populations that escaped to Mexico and Canada, pushed back over the boundaries by trapping, shooting, poisoning, and the destruction of their prey, retreated from the United States. A few of the southern subspecies of wolf survived in Mexico, and a pair lived on the San Carlos Indian Reservation. From all of these retreating animals, the wolf has been restored.

Summary

American Indian Tribal Nations continue to extend leadership activities in restoration efforts on tribal and Federal lands, and waterways to which their traditional rights and treaties extend. Increasingly, they work collaboratively to transcend political boundaries. Many key species play key roles in the cultural narratives, political institutions, and health of these Tribes. These ways of life are expressed through the rebirth of the ecosystem.

Wilderness areas and wild rivers are an integral part of the success of strategies to assure the continuance of cyclic celebration of rebirth and restoration. As reintroduced species become re-established and expand their populations, co-management of land that affects species and tribal rights and lifeways is vital. A better understanding of indigenous knowledge will be an integral part of successful restoration efforts that contribute to the health of communities of humans and the species who inhabit the same ecosystems. The nature of knowledge and the spiritual values expressed within it, contain the substance and the guiding wisdom for restoring health to species and humans.

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Helping "Ecosystem People" Protect Wilderness and Their Own Welfare

T. Damu

Abstract—This paper deals with the historic details of the tribes named Muthuvans of the High Ranges of Kerala in India's south-western mountain ranges. Their origin, their migration into the hills, their culture, their occupation, their demographic profile, and so forth, are delineated. A comparison of their past and present lifestyle is presented.

The question of why they are called the "ecosystem people" is analyzed. The details of how they helped the pioneering planters from the United Kingdom to trace the area and establish tea plantations in the hills are provided. They are portrayed as excellent guides for scientific game preservation in the early days.

The birth and growth of the nature preservation movement in this part of the world, namely the High Range Wildlife and Environment Preservation Association, is detailed in this paper. The good working relationship between the Association and the Muthuvans, which has been preserved for nearly a century, is highlighted. The projects undertaken by the Association for the welfare and betterment of the Muthuvans are enumerated.

This paper shows how a corporation can be proactive in promoting the spirit of protecting wilderness by enlisting the support of a human community, which is more close to natural wilderness than the rest of us living in the cosmopolitan wilderness of today's cities. And it concludes with suggestions for newer systems and approaches that could be emulated in developing countries.

Introduction

The Muthuvans are "the superior tribesmen" of the splendid High Ranges of the Western mountains of Kerala in Southern India. They, with their incredible knowledge of this rugged terrain, which varies from 3,000 to 6,000 ft (914 to 1,829 m) above sea level, rendered tremendous assistance to the pioneering British planters on their onward march to turn these hills into teeming tea plantations.

The Muthuvans were of immense help in preparing the land for cultivation, constructing sheds for plantation workers, building tea nursery sheds, cutting boundaries for tea fields, and so on. Even as the plantations changed hands, these hill men were not left in the lurch. As a mark of gratitude, even after a century and a quarter, the present day tea company (Tata Tea Limited) maintains an indivisible and sustainable relationship with the Muthuvans by implementing various welfare schemes for them to help improve their living standards, promote their health status, and protect their identity.

The High Range is one of the few environmental hotspots in the world, having rich biodiversity, and the Muthuvans live in areas that are amidst thick jungles of the High Range. Most of their hamlets are situated far away from motorable roads; hence one has to trek more than 6.2 miles (10 km) through thickets infested with wild animals and poisonous snakes, in some cases, to reach their abodes.

These nonindigenous hill tribes of the High Range are distributed in small, scattered hamlets, numbering nearly 90, each with about 30 households. These hamlets are spread out in four Taluks (revenue subdivisions in a District) in Kerala. In total, the Muthuvan population is about 4,000. Surprisingly, males exceed females by about 22 percent. The Muthuvans are a closely guarded community. Their cultural practices, beliefs, and mores are not much known to the outside world.

Anthropo-Genesis

Mystery and controversy surround the ancestry, history, immigration, and consequent settlements of Muthuvans. The anthropologists, who have studied the morphology and ethnographic details of the tribes, say that the Muthuvans are a mixture of Proto-Australoids (the pre-Dravidians) and Negritos (the pygmies of Malayalam origin with Negroid features).

Edgar Thurston (1906), in his *Ethnographic Notes in Southern India*, says:

> Judging from the two distinct types of countenance, their language and their curious mixture of customs, I hazard the conjecture that when they arrived in the hills they found a small tribe in possession with whom they subsequently intermarried, this tribe having affinities with the West coast, while the new arrivals were connected with the east...

The idea opens up a very interesting field of study. In the 1960s, Mr. W. S. S. Mackay, a pioneer planter and an ardent environmentalist, observed that their variable appearance seemed to be accounted for by union with a small, dark-skinned tribe that they found in the mountains at the time of their arrival, possibly the remnants of some prehistoric migration from the African Continent, isolated at the toe of India, following some great global eruption.

These are not just speculations but studied observations, which have their basis in the scientific fact about the prehistoric tectonic movements of Mother Earth that tore apart the Indian subcontinent from the African mainland, resulting in traces of the Negroid race forming part of the people of India, especially in Southern India.

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Historically speaking, the Muthuvans are believed to have fled from the Madurai district of Tamil Nadu, one of the States of India, situated at the southeastern end. There are many theories and hypotheses about the arrival of the Muthuvans. All sound probable, since it is said that trials and tribulations due to battles and wars and political cataclysm characterized the history of Southern India, from the start of the first millennium after Christ until the mid-second millennium. This resulted in the exodus of people belonging to a fleeing community fearing the wrath of some invaders, and thus escaped to the hills to form the present tribes.

Etymology

Muthuvan—the name's origin itself has drawn various interpretations. It is said that during their emigration from Madurai they carried their dethroned King in turn on their back (Muthuvu, or Muthugu, in the Tamil language refers to the upper thoracic region of the back) while crossing rivers and climbing hills. The King, pleased with their affection and loyalty, and surprised by their enduring capacity, named them Muthuvans. It is also stated that during their flight to the hills they carried their children and belongings on their backs, and after settling in the hills they called themselves Muthuvans. Today, one can still see the Muthuvassis (female Muthuvans) carry their little children on their backs (fig. 1); no cradle or mat is used to lay the baby. The Muthuvans carry their belongings on their backs, not on their heads.

Whatever the historical facts and pseudo-historical popular beliefs, the traditions, folklore, language, religious customs, certain cultural patterns, rituals, kinship structure, rules of inheritance, village organization, economy, and so forth, of the Muthuvan community are a potential subject for research.

Socio-Economic Profile

Muthuvans live in hamlets called *kudi* (fig. 2). A kudi is an economically self-sufficient unit and has important political and judicial functions. It used to be a mobile unit both in respect of membership and territoriality. All kudies are invariably known by the name of the place or have some local association.

Figure 2—The "Kudi"—Muthuvan hamlets are usually situated amidst the thick forest and high locales of the High Range far away from the mainland.

The kudi represents the Muthuvan society, each of which consists of 30 or more families. Almost all members of a kudi are related. The kudi's headman is called a Kani (fig. 3), which in the vernacular means supervisor or protector. The Kani or Kanikkar is chosen to the position by common consent of the adult male members of the kudi, and he generally retains the title until death, unless deposed for his inefficiency, infirmity, or insolence.

The Muthuvans follow the matrilineal system. Formerly, they were very strict about marriages, marrying only Muthuvans belonging to other subclans of equal social status. A marriage between members of two subclans of the same clan in those days would amount to incest and

Figure 1—The "Muthuvassi"—a typical Muthuvan woman with her child clinging to her back in a cloth sack.

Figure 3—The "Kani"—the Muthuvan Headman whose authoritarian influence over the clan is being eroded by the changing attitudes and lifestyles among Muthuvans.

was severely dealt with. Until the1970s, the Eastern Muthuvans never used to mingle or intermarry with the Western Muthuvans or other community members, although things are changing. Marriages are duly registered, and intra, inter, and outside clan marriages are taking place at present.

In the past, a Muthuvan man would marry only after the age of 25, and a woman never was given to marriage before 18 or even 20 in a Muthuvan kudi, whereas today one finds marriages taking place at an early age for both sexes. Widow marriage is permitted. This is to ensure the safety and subsistence of the widow and her children.

The Muthuvans always emphasize the need for group living. They very much appreciate the advantage of communal life and mutual assistance. The kudi also provides a certain measure of economic security against widowhood, old age, sickness, and incapacity to work, by enabling persons to live through these contingencies. Mutual aid is a predominant characteristic of Muthuvan kudies.

The Muthuvans in general do not seem to have material aspirations, and they prefer to stay in their respective kudies cultivating lemon grass, and so on, even though there is scope for employment in nearby tea estates of big companies and others.

Statistics based on the recent Economic Survey conducted by the officials of Tata Tea Limited, at the behest of the High Range Wildlife & Environment Preservation Association, reveal that the average annual income per Muthuvan family ranges from 2,000 to 18,000 Rupees (U.S. $41.30 to $371.75). It is below 4,000 Rupees (U.S. $82.60) in 42 kudies and about 12,000 Rupees (U.S. $247.85) in about 48 kudies. The main source of income is from agriculture/farming. Muthuvans with a lower income are found to depend on lemon grass cultivation and ragi farming. The Muthuvan families with higher incomes are seen dependent on pepper, coffee, or cardamom cultivation. Moreover, young Muthuvans in these families find employment in small estates as casual labor, which is reflected in higher earnings.

They also rear cattle and poultry, but they don't sell the produce. They give eggs, ragi, honey, and so forth, to guests as a token of their love. Ward and Conner (1860) in their *Memoir of the Survey of the Travancore and Cochin States*, state:

> They are somewhat more civilized than the other hill tribes, at least the comparative regard they show to their women would induce such a belief.

Ecosystem People

The Muthuvans are the best stewards of the natural resources. They are well acquainted with hill tracts and trace by instinct the devious paths and decide with unerring certainty on the number and variety of animals that have lately traversed them. Their senses are, from constant use, keenly developed, and they can hear sounds and see objects that other people would not notice. They are expert trackers with great knowledge of the country. Their endurance and the dexterity with which they use their bill hooks in clearing paths make them invaluable as guides to anyone traveling in the forests.

The author himself, once while returning from the plains to the High Range, happened to witness the Muthuvans' oneness with nature and understanding of wildlife. When the author's chauffeur tried to negotiate a turn on the forest road, the car had to be brought to an abrupt halt because there were some wild elephants blocking the road ahead. A couple of other vehicles were also stuck there with the passengers looking terrified. We couldn't move forward as the elephants never bothered to budge. Half an hour passed without any progress. Then to our rescue came some Muthuvans, who seeing our plight, slowly walked toward the elephants, all the while talking to them in a strange language. As if they understood the meaning of what the Muthuvans were saying, the elephants looked at them and walked away into the forest without any sign of resistance or agitation! It seemed to the author that the wild beasts considered the Muthuvans not as a threat but a friendly lot.

Shifting cultivation was the popular and customary method followed by Muthuvans in the distant past for raising crops. The lay of the land, the nature of trees and undergrowth, the accessibility to waterways, and the suitability of the land for setting up hamlets, were the chief considerations for the Muthuvans in selecting a site for cultivation. Clearing operations, which were a communal undertaking, used to start on an auspicious day in January determined by divination by the religious headman of the Muthuvan hamlet. The Muthuvans used to camp on the site for a year, cultivating rice, ragi, and other millets, following a standard pattern of sowing and harvesting, which would all be over by November only to celebrate the festival Karthikai with pomp and pleasure. Then they would pack up after the Oracle by the religious guru and move to another hill or valley. With the beginning of Thai (mid-January, representing the lunar month of the Tamils), the whole process would repeat. The idea of shift cultivation was to preserve the soil fertility of a particular area and protect its natural resources from pollution or depletion.

The practice of shifting cultivation is no longer in vogue because, as the tea plantations expanded, the British planters demarcated vast areas for these hill men where they established their kudies and agricultural lands for a more settled mode of cultivation.

Wildlife and Environmental Preservation

The pioneer British planters sought the help of the Muthuvans' knowledge of the forests and wild animals in more ways than one. As the Muthuvans were good game watchers, their advice was sought by the planters on the presence and movement of game, the game to be culled, the wounded "wild" that needed assistance, and so forth.

The High Range Game Preservation Association was started in 1928 by the pioneer British tea planters with the main objective of controlling the indiscriminate killing of animals to preserve the varied fauna of the area. To actualize this objective, the following activities were accomplished: appointing the Muthuvans as game watchers, checking the culling of animals during the nonbreeding season, and preventing people from entering the game reserve during the breeding season.

With the formation of the High Range Game Preservation Association, the relationship with the Muthuvans was much

more strengthened. The Muthuvans, who were until then living in caves and natural rock shelters, were encouraged by the Kanan Devan Hill Produce Company, a subsidiary of the famous Finlays of Great Britain, to construct huts to live in and helped them financially.

Since Tata Tea Limited's business takeover in the district, more constructive philanthropic activities have been undertaken for the welfare of the Muthuvans. The High Range Game Preservation Association was rechristened as the High Range Wildlife and Environment Preservation Association, with its primary aim to conserve flora and fauna of the High Ranges. This organization is a registered body, which in the case of the Muthuvans, provides financial assistance in procuring teaching aids for the schools in the kudies and also learning aids for the students.

Yet another area in which the High Range Wildlife and Environment Preservation Association helps Muthuvans is social assistance. The Association coordinates with the tribal welfare schemes of the Tata Tea Company and the Government. The Association organizes periodic liaison meetings by inviting the Muthuvan representatives and the Government Officials concerned, such as the District Collector and Officers of the Forest and Wildlife Departments.

The Association activities are financed by Tata Tea Ltd. through annual grants. In addition to this, the management staff of the Company are actively involved in wildlife preservation and helping Muthuvans in many other ways. The Association's other important activities include forming nature clubs and organizing nature camps, competitions and classes for students in the region to create nature awareness, rejuvenating the degraded sholas (the deciduous rain forests) with native species, assisting the Wildlife Officer of Eravikulam National Park in taking wildlife census, and managing the park by employing Muthuvan watchers.

Muthuvan watchers have been employed over the past decades, and at present there are 12 of them on the payrolls of Tata Tea Ltd. The duties of the Muthuvan watchers include keeping a vigil on divisional boundaries, fuel areas, and other places; keeping a watch on the flora and fauna; reporting to the estate Manager the movements and presence of wild animals; reporting on any poaching, illegal felling, or cutting of trees; fire prevention; theft prevention; and reporting on stray cattle. The Muthuvan watchers have been instructed to write down their weekly observations of both flora and fauna. This record is studied by the Department concerned in the Company, and necessary conservation and promotional activities are undertaken. Muthuvan watchers also assist the management staff in boundary checking and act as guides to the researchers, environmentalists, and nature lovers who trek to Eravikulam National Park, one of the finest wildlife sanctuaries in India, situated at an elevation of 6,000 ft (1,829 m) above sea level in the High Ranges.

The famous Eravikulam National Park occupies an area of 25,946 acres (10,500 ha), and is an integral part of the vast stretch of forests extending from Anamallais to the Palani Hills of Tamil Nadu. The park is unique with the shoal grassland ecosystem at an average elevation of 6,562 ft (2,000 m). The climate here is of tropical, cool montane type. The diurnal temperature variation is high compared to typical temperate climate. The rolling grasslands hold the thin topsoil. And the area has remained undisturbed by human agency from time immemorial. Considering the ecological, floral, faunal, and geomorphological significance of this area, it is listed as one of the environmental "hotspots" in Asia. The Nilgiri Tahr (*Hermitragus hylocorius*), an endangered and extremely rare type of mountain goat, is protected in this park. More than half of the total world population of these goats, numbering nearly 1,000, are here. Indian Gaur, Malabar squirrel, and a wide range of wild animals, including the lion-tailed macaque, Nilgiri Langur, barking deer, wild dogs, leopard cats, and tigers are the pride of the High Range.

Tribal Outreach Programs

The Muthuvans have always looked to Tata Tea Ltd. for help, encouragement, and guidance in solving their problems. And the company, owing allegiance to the Muthuvan community, has always treated it as its moral and social obligation to do the best to alleviate their suffering and ameliorate their welfare. Since the inception of the Community Development and Social Welfare Department in Tata Tea in 1984, regular tribal medical camps (fig. 4) have been held in the kudies adjoining the tea estates and located even far away in this region.

After Independence, the British left, and the Indian inheritors of this tea planting company have kept up the legacy of medical care. Medical camps are being held in most kudies two to four times a year. These are conducted whenever the Muthuvans report outbreaks of disease, and there are no restrictions on the number of camps conducted and hamlets covered. Thus, it is more a need-based type of response than a regular system of medical care. However, these literal forays into the leech-infested jungles helped boost the confidence of the Muthuvan in modern medical methods, and has built rapport. Word about compassion and care has spread. It has led to emergency cases from these remote tribal areas, located in jungles spread out in a radius of 12.4 to18.6 miles (20 to 30 km), being referred to Tata Tea's General Hospital,

Figure 4—Community Medical Outreach—Tata Tea Limited's medical officers and welfare officers seen in a remote kudi at one of the regular medical camps organized by the Company.

Munnar. In all these places, the Tea Garden Hospitals continue to provide free medical aid. There is no going back on this trend, and often one can see a Muthuvan family among the outpatient crowd or snuggled in bed at Tata Tea's General Hospital.

The free medical aid camps are also utilized for conducting health surveys including nutritional status of the children. Even though exact statistical details have not been maintained, the medical team has seldom come across any case of marasmus or kwashiorkor (conditions arising from severe malnutrition) among the Muthuvan children.

Two decades ago, the State Government built a Primary Health Center in Society Kudi, a hub of tribal activity because of its proximity to a nearby school, Forest Guard's hut, and a Tribal Cooperative that procured tribal produce and promoted trade. Because of refusal by Government doctors to trek to these far interior regions, the Primary Health Center was not utilized for a long time.

The high point of medical care has been the construction of its own dispensary 3 years ago by Tata Tea at Edaliparai. The medical officers of the Company trek to this small hospital once a quarter, stay there a few days, and conduct medical camps there and in nearby hamlets. After discussions with the Health Secretary during his visit to Munnar last year, governmental supply of medicines has started to this dispensary. Government health care workers also accompany the medical officers of Tata Tea Hospitals.

A singular point of note is the selection of willing young men from among the tribal community to work as Tribal Barefoot Doctors. At least one young man from each kudi has been selected and training imparted on the basic health care and preventive measures, so that after a 10-day residential workshop at Tata Tea General Hospital, they can return to their community and function confidently in their new role as Tribal Barefoot Doctors.

The Interventions for Sexual Health Project of the Indian Medical Association, Munnar Branch, which is an HIV/AIDS prevention project supported by Tata Tea, has conducted many focus group discussions and case studies among the various tribal hamlets. Findings indicated that though Muthuvans generally had some knowledge about sexually transmitted diseases (STDs), the majority of them did not know that condoms could be used to prevent STDs. They believe that indigenous medicines made of ground leaves of jungle plants and shrubs promote contraception. Surprisingly, there are very few Muthuvan families that have more than three children!

Conclusions

The Muthuvan who was a guide and friend to the British planter had an unwritten agreement that the Planting Company would look after the welfare and medical needs of his community. Thus started a unique bond that has remained intact through two centuries. This relationship not only benefited the community but also the High Range environment through the nature preservation efforts jointly undertaken by Tata Tea Ltd., the High Range Wildlife and Environment Preservation Association, and the government departments concerned with helping the Muthuvans.

This model of corporate citizenship and corporate environmental responsibility put into force by Tata Tea in this part of the Indian subcontinent has been appreciated by many ecologists in India. It is an example to be emulated by many corporations around the world, wherever there is opportunity for joint effort in nature conservation and tribal welfare.

No nature conservation effort would be a complete success without enlisting the support of the tribes or the local inhabitants in that region. There are lots of ways we can learn from these tribes in understanding nature and devising ways to conserve her riches. It is the social and moral responsibility of the corporate world to educate and rehabilitate tribes in the neighborhood, which in turn motivates them to come forward willingly to cooperate in efforts for nature and wildlife conservation.

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Endangered Species, Endangered Culture: Native Resistance to Industrializing the Arctic

Sandra Hinchman

Abstract—This paper examines the responses of two indigenous groups to the potential opening of the coastal plain of Alaska's Arctic National Wildlife Refuge (ANWR) to oil and gas exploration. Gwich'in Indians, whose culture revolves both materially and spiritually around the caribou, oppose all such development for fear that it will jeopardize that species' optimum calving grounds. Inupiat Eskimos, who stand to gain economically from petrodevelopment, favor oil and gas exploration on the coastal plain while opposing it offshore, where it might threaten the bowhead whale, the species at the center of their own culture. After reviewing the history of the conflict and weighing the respective claims of these two peoples, the paper concludes with a discussion of the threats posed to ANWR by international terrorism and by global warming.

Introduction

When Alaska entered the Union, President Eisenhower designated several million acres of tundra between the Brooks Range and the Beaufort Sea as a refuge for wildlife. A decade later, in 1969, oil was discovered 60 miles (96.5 km) west of the refuge at Prudhoe Bay. Although the oilfield itself was on State-owned land, transporting the oil to the Port of Valdez would require the construction of a pipeline. Over its proposed 800-mile (1,287-km) route, the pipeline would have to pass through Federal lands tied up in litigation between the State of Alaska and its indigenous peoples. Eager to expedite development, the State agreed to a deal intended to eliminate all such obstacles. The 1971 Alaska Native Claims Settlement Act (ANCSA) awarded aboriginal groups 44 million acres (178,062 km^2) of land and a billion dollars in cash, establishing 12 regional and over 200 village corporations to manage that settlement. It also authorized the Secretary of the Interior to set aside lands he or she deemed scenic or ecologically significant. Intense conflict spawned by the latter directive ended only after Jimmy Carter's failed bid for re-election, when Congress, over the protest of the State delegation, passed the Alaska National Interest Land Conservation Act (ANILCA). Carter himself would later call ANILCA the most important environmental legislation of the twentieth century, as it dramatically increased the amount of Federally protected land, adding 104 million acres (420,873 km^2), including 56 million acres (226,624 km^2) of wilderness, to the system. The size of the original Arctic National Wildlife Range (renamed a Refuge) was itself doubled, and 17.5 million (70,820 km^2) of its 19 million acres (76,890 km^2) were declared permanently off limits to industrial development. However, to win passage of the 1980 bill, the administration agreed to a fateful compromise: Congress reserved the right to open Alaska's Arctic National Wildlife Refuge's (ANWR) 1.5-million-acre (6,070-km^2) coastal plain to oil and gas exploration in the future.

The status of that coastal study area—commonly called the 1002 land, after the pertinent section of the Act—has galvanized the petroleum industry and its critics like no other issue. It has also called forth some unusual alliances. On the one side stand interests seeking to open up the area for development: the four transnational corporations (British Petroleum, Exxon-Mobil, Phillips Petroleum, and Chevron) competing for drilling rights; American labor unions, anticipating the creation of up to735,000 jobs around the country; the vast majority of Alaskans, hoping to continue receiving dividends and tax relief from oil leasing; and the Inupiat people, who reside on the North Slope. Attempting to exclude the coastal plain permanently from development are the Government of Canada, the Gwich'in Nation, whose members dwell on either side of the Alaskan/Yukon border, and the environmental community. Opinion polls taken prior to September 11, 2001, indicated that 66 percent of Americans oppose drilling in ANWR (Defenders of Wildlife 2001a).

Virtually no fact about ANWR is uncontested. Estimates of how many billion barrels of technically and economically recoverable oil lies beneath the coastal plain, what percentage of American energy demand it would satisfy, how long it would take to erect the necessary infrastructure, and how extensive, permanent, and damaging that industrial "footprint" would be, all vary widely. Disagreements have arisen over the likelihood that oil would be sold abroad, whether it would significantly reduce United States dependence on foreign sources, and whether it would result in lower prices for consumers or merely in more profits for corporations.

Finally, and inevitably, there are disputes regarding the aesthetic and ecological qualities of the coastal plain itself. As Barry Lopez (1986: 278) has remarked, "it is precisely what is *invisible* in the land…that makes what is merely empty space to one person a *place* to another." Supporters of development depict the study area as a flat, boggy, treeless, almost featureless wasteland that is virtually uninhabitable by animals most of the year. They emphasize the

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ruggedness, resilience, and near invulnerability of both the land itself and the 200 bird and animal species that summer there. This image is difficult to reconcile with what some of their opponents (such as, the Wilderness Society, the U.S. Fish and Wildlife Service, and the National Resources Defense Council) see: America's Serengeti; the premier birthing and nursing ground for Arctic wildlife; one of the most complete, pristine, and undisturbed ecosystems in the world; and ANWR's biological heart. In their view, the ANILCA Section 1002 area is inherently fragile, and its fauna can be extremely sensitive to disturbance. Bruce Babbitt, Interior Secretary during the Clinton administration, predicted that if oil companies were allowed in, it would be ANWR's death knell as a wildlife refuge.

Porcupine Caribou

Debate regarding the status of wildlife in the Refuge has centered around the Porcupine caribou herd. Section 1002 of ANILCA had directed the Interior Secretary, in consultation with his/her Canadian counterpart, to assess the likely impact of coastal plain development on this particular group of ungulates. Seven years after the passage of ANILCA, the United States and Canadian Governments signed a bilateral agreement affirming their commitment to conserve the herd (Canadian Embassy Web site 2001a). Indeed, the Canadian Government, which established two National Parks for its protection, continues to press its southern neighbor to follow suit. Similar concerns about the herd's welfare led over 500 American and Canadian scientists to sign a petition in March 2001, calling for a ban on oil exploration in ANWR (Defenders of Wildlife 2001b).

Proponents of development, however, bristle at the suggestion that the caribou might be threatened by it in any way. The Porcupine herd is extensive, numbering between 130,000 and 170,000 animals (according to environmentalist and oil company estimates, respectively). Like all other herds, its numbers fluctuate in natural cycles (Lopez 1986). If it is currently in temporary decline, that is offset by increases in the Western and Central Arctic herds. In fact, when the members of these other herds are factored in, it turns out that there are actually more caribou in Alaska than people.

Why, then, has the status of the Porcupine herd generated so much concern and controversy? Of three subspecies of caribou residing in North America, Barren-ground caribou, to which the Porcupine, Western Arctic, and Central Arctic herds belong, migrate the farthest distance (Lopez 1986). All these herds reside seasonally on Alaska's North Slope. Wintering in the Canadian taiga near the Porcupine River, a tributary of the Yukon, the Porcupine group treks hundreds of miles every spring to the ANWR coastal plain, where the Brooks Range pinches down to between 15 and 40 miles (24 and 64 km) of the sea (Dunkel 2001). Pregnant cows lead the exodus toward this optimum calving and postcalving habitat. After the cows have given birth, bulls and juveniles join them to browse on tundral grass and lichens (Canadian Embassy Web site 2001b). Aside from the superior foraging opportunities it provides, the area is favored by the herd because it affords relative protection from predators and relief from insect pests. When the cows fail to reach the plain before they drop their calves, as has happened at least 5 out of the last 19 years, the newborn mortality rate skyrockets.

Environmentalists fear a substantial population crash among the Porcupine caribou if the infrastructure associated with development alters the herd's migration routes. They point out that pregnant and nursing females are so sensitive to "disturbances such as the presence of humans, vehicles, and noise" that they might "abandon their main calving ground" if the proposed development goes forward (McManus 2000: 42). Ample evidence exists to support this view. One study has concluded that caribou around development facilities tend to spend less time feeding and to run more (Murphy and Griffiths 1999). More ominously, a Canadian Government report alleges that calving by the Central Arctic herd near Prudhoe Bay has "nearly ceased," and that "starving and dead caribou have been documented" in the area (Davidson 1993: 30). Petroleum industry analysts counter that the Central Arctic herd, far from being harmed by industrial development, is actually thriving in the midst of it. But whatever the status of the Central Arctic caribou, the Porcupine herd's situation may be unique: "Other herds may survive but this one won't, because there is not enough land to the east" of the zone where drilling would occur. With mountains to the south, the sea to the north, and the already occupied habitat near Prudhoe Bay to the west, the herd has literally "nowhere else to go" (Gemmil, personal communication). Indeed, Canada's Interior Department estimates that the herd's birth rate may fall by up to 40 percent if drilling commences in ANWR (Linklater and Gemmil 2001).

Caribou People

Should harm befall the Porcupine herd, no group would shoulder the consequences more than the Gwich'in (Kutchin) Nation. Of all Indians in the hemisphere, the Gwich'in are the most northerly, residing in 15 isolated villages above the Arctic Circle in Alaska and Canada. For over 20,000 years the Gwich'in were nomadic, following the caribou and other game in their seasonal migrations. Once 100,000 strong, these Athabascan hunters now number fewer than 8,000, having been decimated by exposure to Old World diseases. Much has changed in their culture since the time of first contact with Caucasians: they exchanged their shamanism for the Episcopalian faith, established permanent settlements in order to remain near their children's schools, adopted the English language, and embraced certain technological innovations, from rifles and snowmobiles to electricity and satellite TV. But what has not changed, despite their (limited) participation in the cash economy, is a commitment to subsistence living. Materially, socially, and spiritually, their culture continues to revolve, as it has since time immemorial, around their relationship to the caribou. Comparisons are sometimes made to the dependence of traditional Lakota culture on the buffalo (Bartholet 2001; Davidson 1993). "The caribou is everything to us," as Gwich'in spokesperson Faith Gemmil (personal communication) put it. "It is our life."

The centrality of the Porcupine herd to the Gwich'in culture is apparent in their creation legend. Originally, so the story goes, humans and animals were one species. When the hour

of separation arrived, the Gwich'in were split off from the caribou. Yet the brothers forged a pact of eternal kinship, by which each would always retain a piece of the other's heart. Thus, "what befalls the caribou befalls the Gwich'in and vice versa" (International Indian Treaty Council 1992: 2).

The Gwich'in bond with the Porcupine herd is hardly metaphorical. Caribou meat accounts for about 80 percent of the tribal diet. In a typical year, the tribe will harvest about 3,000 caribou, utilizing virtually every part of the animal for food, tools, or clothing. It is their belief that hunting can succeed only when animals voluntarily surrender their lives. The sense that reciprocal obligations exist between the caribou and the Gwich'in has given rise to strict norms regulating when, where, and under what conditions hunting may occur (Callaway, personal communication). The Gwich'in maintain seasonal hunting camps for about 2 months of the year, after the caribou have left the coastal plain on their long return migration. The plain itself, as "the sacred place where life begins," may never be disturbed (International Indian Treaty Council 1992: 2), even in times of famine and starvation (Linklater and Gemmil 2001). "We don't go there," says Gemmil (personal communication). "No one should go there. The caribou need time to themselves." Aside from not entering the birthing ground, hunting parties must spare the first band of caribou that passes by, kill no more animals than they need, and give thanks for what they take. Animals are butchered on the spot, great care is taken not to defile the ground with blood, and although some meat is consumed right away most is dried on racks and preserved for later use. This meat is shared throughout the village community, for as one elder said, "we have always done things as a group and thought in terms of the tribe and the family" (Davidson 1993: 28, 25).

Although it is true that the Gwich'in would have few alternate sources of food if the caribou herd diminished or its migration routes were altered, the importance of the caribou harvest to their culture goes well beyond the economic. Subsistence is more than just nutrition; it is the basis for ethical relations among people, and between people and nature (Callaway, personal communication). To preserve their way of life, the Gwich'in believe they must preserve the Porcupine herd, which in turn demands preserving its birthing ground. "If there were no caribou we wouldn't have lived here for thousands of years," says one Gwich'in man. "That's who we are and where we came from" (Bartholet 2001: 23). The depth of these attachments is evidenced by the fact that out of 211 native villages that qualified for benefits under ANCSA, two of the seven that refused to participate were Gwich'in (Anders 1994). Recognizing that all cultures require an economic base, Gemmil (personal communication) comments, "We were offered money and jobs, first pick. But we said, no! No amount of money can replace our heritage. Our land must always be here for us to survive on." "We are the caribou people," adds another Gwich'in woman. "Without the land we are nobody" (Davidson 1993: 31).

Gwich'in Environmentalist Alliance

The Gwich'in did not always oppose industrial development in the high Arctic. From the 1970s through the mid-1980s, they entered into lease agreements allowing Exxon, British Petroleum, and Rougeot of Tulsa to explore for oil on lands through which the Porcupine caribou migrate, making no provision to protect the herd in the process. Critics contend that only when these efforts came to naught did the Gwich'in decide to reverse course. Tribal spokespersons respond that the leases pertained only to the southern part of their reserve, outside the herd's range. They emphasize the environmental lessons they learned from the experience: when elders noticed a dieoff of smaller creatures near where seismic tests were being conducted, they advised the tribal council to terminate all leases (Davidson 1993). The Nation's resolve to oppose drilling in ANWR crystallized in 1988, after the Exxon-Valdez oil spill, when representatives from all 15 of their settlements in Alaska and Canada convened in Arctic Village, 125 miles (201 km) south of the coastal plain. Perceiving a threat to their culture's survival, they unanimously passed a resolution against development and created a Steering Committee as their political arm, instructing it to "go out and tell the world why we take this position. Do it in a good way and we will succeed" (Gwich'in Steering Committee 2001).

The eight-member Steering Committee has attempted to influence the political process in far-off Washington and Ottawa, primarily through lobbying efforts, attracting media attention, and establishing alliances with other indigenous peoples and international environmental groups. Their efforts enjoy a "solid base of support among native peoples," including the Alaska Intertribal Council, the National Congress of American Indians, to which 500 tribes belong, and the worldwide Indigenous Environmental Network, backed financially by Greenpeace and similar organizations (Taylor 1995: 32). Church groups—depicting theirs as a human rights struggle—have rallied behind them (Carpenter 2001), as have all major American environmental organizations, most notably the Sierra Club, Audubon Society, Friends of the Earth, The Nature Conservancy, Defenders of Wildlife, and the National Wildlife Federation (Faith Gemmil from the Gwich'in Steering Committee sits on their Board of Directors; Dinero, personal communication). These groups are concerned not only about the integrity of the Arctic ecosystem and its species but also about the bad precedent that would be set if drilling were allowed in a wildlife refuge. For this reason, among others, "If ever there were a Stalingrad for the environmental movement in Alaska, it's ANWR" (Jans 2001: 11A).

Detractors of the Gwich'in Nation allege that they are fronting for environmental groups that are using them for their own ends. They depict the Steering Committee as a "white-dominated organization" based in far-off Anchorage and "funded by environmental foundations" (Arctic Power 2001a). Gwich'in spokesmen deny all that, insisting: "We aren't manipulated by anybody. Our position was homegrown" (Gemmil, personal communication). And indeed, the alliance between the Gwich'in and environmentalists does seem in some ways a marriage of convenience. The Gwich'in don't think of themselves as anti-oil; like most other Americans, they use many petroleum products in their daily lives (Davidson 1993). An observer at a recent meeting in Arctic Village remarked that "when the environmentalists made speeches, [Gwich'in] eyes glazed over… Their cause has been fought in the U.S. by the environmental community

above all others. They know this. But when the issue dissolves, the marriage will too" (Dinero, personal communication). Still, although "not environmentalists by any stretch," the Gwich'in in small ways "are moving in that direction," for instance by banning the use of styrofoam and using solar power to run the communal freezer that stores caribou meat during the summer months (Dinero, personal communication).

Environmental organizations, for their part, have sometimes taken positions antithetical to the perceived self-interest of indigenous peoples, particularly when the welfare of endangered species seemed to be at stake. As Dryzek and Young (1985) point out, policies that environmentalists have supported in the past have actually heightened the problems of remote communities in the North. On this issue, however, there is a shared conviction uniting environmentalists and the Gwich'in: both believe—in the words of the National Wildlife Federation President—that it is impossible to "partially change the coastal plain without altering the whole ecosystem" (Lurie 2001: 24).

Inupiats and Petrodevelopment

Like their Gwich'in neighbors, the 6,500 Inupiat (Inupiaq) Eskimos of Alaska's North Slope traditionally were nomadic hunters and gatherers. Generally speaking, fish and marine mammals like the seal, walrus, and especially the bowhead whale were their mainstay, supplemented by caribou, bear, moose, sheep, waterfowl, and other wild game. Famine and starvation in bad years were not uncommon (Anders 1994). However, the economic situations of Inupiat bands varied considerably, depending on whether they resided primarily in the Brooks Range or along the Arctic coast. The coastal Inupiat, from the early 20th century on, could supplement their subsistence harvest with commercial whaling, trapping, and herding, as distant markets began to penetrate their remote land. Although each of these commercial ventures ultimately failed, their collective impact was indelible, tying the coastal Inupiat to the cash economy and introducing new technologies into their traditional subsistence harvest (Chance 1990).

Few sources of income remained for the Inupiat until Washington, in the Cold War era, began to appreciate the high Arctic's strategic value. During this period, the Inupiat repeatedly were treated as pawns in the geopolitical arena. The construction of the Distant Early Warning (DEW) Line radar installation near the coastal village of Kaktovik provided jobs for some local people, but led to the displacement and forced relocation of many others (Chance 1990). More sinister was Project Chariot, in which the Atomic Energy Commission (AEC), with the blessing of the State of Alaska, planned to conduct atomic weapons tests under the pretext of blasting out a deep-water harbor near an Inupiat village in the northwestern part of the State (Chance 1990). When the economic value of the proposed harbor proved negligible, the AEC's rationale shifted: they now billed Project Chariot as an experiment "in 'geographical engineering' [designed to] determine the effects of a nuclear explosion on the environment—its rock substrata, soils, atmosphere, and biota, including man" (Chance 1990: 144). Not until the Inupiat, the environmental community, and the larger public learned of this wantonly destructive and arguably genocidal scheme was it unceremoniously shelved. It is noteworthy that, in the campaign against Project Chariot, the Inupiat Paitot ("People's Heritage") was formed as the first association of its kind to protect Native interests in the far north.

A decade after the defeat of Project Chariot, the 1969 discovery of oil at Prudhoe Bay resulted in an economic windfall that substantially altered the Inupiat way of life. Tax revenues generated by the oil boom financed infrastructural improvements and the provision of expanded public services. The Inupiat, already partially integrated into the cash economy, quickly embraced the "accoutrements of a modern lifestyle once limited to communities far to the south" (Buege 1997: 99; Chance 1990: 4, 197). "Living conditions were difficult, pre-oil," says an Inupiat spokesman. "But thanks to the industrial tax base created by the oil fields, ...we have opportunities we couldn't have dreamed of" (Arctic Power 2001b). Indeed, the mayor of Kaktovik, the only community within ANWR's geographic boundaries, bluntly warns: "If you take away the oil money, you've got a subsistence way of life. All of a sudden you'd be trying to find food, stay warm, keep out of the wind" (Bartholet 2001: 31).

These material advantages, however, have come at the expense of traditional values, institutions, and relationships (Dryzek and Young 1985). The Inupiat norm of self-sufficiency erodes with the influx of consumer goods from afar (Chance 1990). Subsistence activities have become less necessary for survival, and their nature has changed as a function of "capital intensification" (Dryzek and Young 1985: 126); for example, the snowmobiles now used to facilitate subsistence hunting are costly to purchase, operate, and maintain (Anders 1994). Then, too, social cohesion is threatened by the growth of new cleavages and forms of political and economic inequality. Ideologies of individualism and personal achievement undermine norms of sharing, "kin-kin cooperation," and collective responsibility (Chance 1990). And the rise of village and regional corporations has challenged, and in many places disempowered, traditional structures of authority. Thus, while the Inupiat historically were no strangers to economic booms and busts, the weakened condition of their cultural "support and distribution systems" renders the prospect of a decline in oil revenues extremely daunting (Chance 1990). "It is difficult," as Dryzek and Young (1985: 127, 135) say, "to hold the cash economy in a partial embrace... The social transformation has gone too far in most of the villages of the North to permit a [simple] return to older ways" of life. When the oil runs out, as it inevitably must, Inupiat society is likely to confront even more wrenching dilemmas and challenges.

Tensions have also erupted between coastal and mountain Inupiat, with the latter believing their interests have been shortchanged by the Arctic Slope Regional Corporation, one of the 12 regional corporations established as part of the settlement of Native land claims. The Corporation acquired subsurface rights to over 90,000 acres (364 km^2) in ANWR in a 1983 land swap with the Department of the Interior (Chance 1990). The swap, brokered by a public interest environmental law firm, added 100,000 acres (405 km^2) to Gates of the Arctic National Park. But this was land on which the mountain Inupiat historically had conducted their subsistence harvest. Thereafter, they needed permits to enter the land and were not allowed to use all-terrain vehicles (their preferred, if untraditional, mode of transport)

to reach the hunting grounds. For its part, the Arctic Slope Regional Corporation cannot lease out the land acquired in the transfer unless Congress approves opening up the coastal plain to oil and gas exploration. Thus, the hopes of the North Slope Inupiat when the swap was made have not yet been realized.

Cleavages and tensions aside, most Inupiat—belonging to one of the wealthiest Native groups in the United States—do seem strongly to favor development in ANWR (Buege 1997). A former mayor of Kaktovik contended that the oil beneath the surface of ANWR could provide jobs, schools, and a thriving economy for residents. In a recent opinion survey of Kaktovik villagers, 78 percent of respondents said they either "agree" or "strongly agree" that the 1002 area should be opened to oil and gas exploration (Arctic Power 2001c). The oil companies have helped to promote these sentiments by ingratiating themselves with the Inupiat and co-opting their leaders (Chance 1990). A representative of Arctic Power, a pro-development lobbying organization financed by the State of Alaska, stresses the convergence between the Inupiat right to use North Slope land "to provide for their culture" and the right of "all Americans... to benefit from the national treasure lying beneath the coastal plain" (Easley, personal communication). Supporting the ambition of the oil companies and the Inupiat is the 90,000 member Alaska Federation of Natives, a political organization led by an educated, urbanized elite for whom petrodevelopment is the "key to a brighter future" (Chance 1990: 149–150, 163).

Bowhead People

Although most Inupiat apparently support drilling in ANWR, they simultaneously oppose offshore oil exploration, fearing potential harm to the bowhead whale, which traditionally was as central to their culture as the caribou is to the Gwich'in. Even with the benefit of modern technology, whaling remains a dangerous occupation in which hunters' lives are regularly lost. Accordingly, Inupiat men pride themselves on their whaling prowess. Like the Porcupine caribou herd, bowhead whales are threatened by development, but unlike the caribou, bowhead whales are officially endangered. In the late 1970s, an international moratorium on hunting the marine mammals, supported by certain environmental groups, was briefly in effect; it was lifted only in the wake of a sophisticated media campaign orchestrated by the Arctic Slope Regional Corporation. As part of the compromise rescinding the ban, the Inupiat agreed to limit the size of their annual bowhead harvest (Chance 1990).

The Western Arctic subgroup of bowhead whales, numbering about 7,800 animals, comprises the majority of the species' global population. Each spring, passing through narrow channels in the ice as it breaks up, the Western Arctic bowheads migrate en masse to the Beaufort Sea, where they consume the bulk of their annual calories during a 4- or 5-month stay. Because oil spills would likely concentrate in the ice-free channels, the species seems highly vulnerable. The risk of accidents is increased by the severe storms that occasionally blow into the area. Understandably, many Inupiat worry about British Petroleum-Amoco's upcoming Northstar Project, which incorporates a 6-mile (10-km) long offshore pipeline. They are also concerned about continuing offshore exploration in the Beaufort Sea, sponsored by the Government of Canada.

Despite their apparent support for oil exploration and their participation in the global economic system, the Inupiat of the North Slope continue to regard the hunting of creatures like bowhead whales and caribou (which, in contrast to the Gwich'in, they do hunt on the coastal plain [Chance 1990]) as a vital component of their identity. For them, as for the Gwich'in, subsistence hunting reaffirms a deep cultural connection to their environment. It provides them with a link to their past and to their spirituality. Indeed, employers complain that these activities too often distract Inupiat workers from their job responsibilities. "It's just that they always want time off to hunt. That's the big problem" (Chance 1990: 83). Many prefer to work intermittently, combining wage labor with more traditional economic activities.

Economic Ethics and International Law

To some extent, the rights of indigenous groups are a matter of international law. The United Nations' Covenant of Civil and Political Rights guarantees ethnic minorities the right to "enjoy their own culture" (Kymlicka 2001: 123). Because Indians and Eskimos are not just minorities but peoples, they have a more robust right to self-determination as well (Anaya 1996). Natural resource rights, enabling peoples to freely dispose of their natural wealth and resources for their own ends, are also widely recognized in international law (Crawford 1988), as is an "inalienable human right" to economic development (Anaya 1996). The Draft Declaration on the Rights of Indigenous Peoples, currently making its way through channels at the United Nations, promises additional rights, including "cultural integrity" (Anaya 1996), "the right to maintain their distinctive and profound relationships with their lands, territories and resources," and "the right to be secure in the enjoyment of their own traditional means of subsistence" (Crawford 1988: 63; Wilmer 1993: 223–224).

Unfortunately, international covenants can offer little guidance in a case like this, which pits the rights of one First Nation against another. The Inupiat right to economic development collides with the Gwich'in right to preserve their way of life. It is unclear whether the latter guarantees a right *not* to develop, or only to receive compensation for development's unwelcome effects (Kymlicka 2001). But no after-the-fact remedy could adequately compensate the Gwich'in if disaster were to befall the Porcupine caribou, the essence of their culture. Some scholars have argued that indigenous groups wishing to maintain premodern ways of life may deserve special protections over and above those granted to peoples with "pervasive links to the global economy" (Anaya 1996; Kymlicka 2001). In that view, international law requires an "endangered cultures" convention to parallel agreements regarding endangered species (Kymlicka 1989). Yet the analogy in some ways seems false, if not pernicious. Unlike the course of biological evolution, that of cultural evolution is determined at least partly by conscious choices that people

make. It is one thing to want to shelter a culture from choices made by outside forces beyond its control, but quite another to freeze it into the amber of traditional patterns and relationships. Doing so would "prevent aboriginal peoples from adapting to new circumstances, from having a living culture" (Kymlicka 2001: 203). Should the Inupiat, opting to join the mainstream, have rights inferior to those of the Gwich'in simply because the latter prefer not to? At what point in any movement away from traditionalism does a group forfeit its rights?

The political theorist Van Dyke (1985), a long-time advocate of group rights, has advanced eight guidelines for rank ordering the claims of groups and adjudicating conflicts between them. In his scheme, the claims of a group should take priority to the extent that it: (1) is a self-conscious entity seeking its own preservation; (2) has a reasonable chance to succeed in that endeavor; (3) is effectively organized to act in its own interest; (4) has members who pin their identities on it; (5) has been perceived traditionally as a group by others; (6) is divided from other groups by deep cleavages; (7) is not costly or burdensome to others in pursuing its interests; and (8) is able to grant to similar groups the same rights and statuses it claims for itself. In the current case, both the Inupiat and the Gwich'in meet the first six tests. The Inupiat, precisely because they seek further integration into the world economy, seem to have the edge on criterion #2, though to the extent to which they succeed in that ambition, they may be less able to satisfy criterion #4. In regard to criterion #7, substantial costs would accrue to each of these groups if the claims of the other were to win out. The Inupiat potentially stand to gain billions of dollars in revenues. But because they are already wealthy, it does seem fair to say that "they will be fine even without development in ANWR. They won't suffer poverty. They have alternatives" (Gemmil, personal communication). For the Gwich'in, the stakes are far higher. The cost could be cultural as well as economic, their effective death—or murder—as a nation. Not unreasonably, they "view any threat to the calving grounds as an act of genocide" (Lurie 2001: 20). A member of the Gwich'in Steering Committee has declared: "[The Inupiat] are not our enemy. This is not an Indian versus Eskimo issue. This is about our right to self-determination and to continue to live in our culture" (Lurie 2001: 21).

The eighth criterion may be decisive. It has a Kantian aspect, for it asks, what would happen if the claim of each of these groups were universalized, or made applicable to all? The Inupiat claim cannot meet this test. It would allow drilling for oil on ANWR's coastal plain, which might imperil the caribou, but would disallow offshore drilling, which might imperil the bowhead whale. Since the species play equivalent roles in these cultures, such a policy would violate criterion #8. Gemmil (personal communication) sums this up as follows: "We respect [the Inupiat] position... We support their opposition to offshore development, and we are disappointed that they don't reciprocate."

In short, the two groups have claims that are irreconcilable and for all practical purposes mutually exclusive. There are asymmetries of wealth and power between them, and also asymmetries in regard to what it will cost each to lose its battle. Financial compensation to the Gwich'in for drilling on the coastal plain would do nothing to assuage their loss, which could be both intangible and incalculable. By contrast, since the Inupiat loss *would* be financial, monetary compensation to them for *not* allowing drilling on the coastal plain seems to be an appropriate remedy. It has been estimated that Americans might be willing to pay between $300 million and $40 billion per year in taxes and higher energy costs in order to keep Alaskan wild lands pristine (Manning 2001). Assuming that this was an accurate assessment at the time it was made, one wonders whether it remains true post-September 11.

Two Threats

Prior to the terrorist bombings in Washington, DC, and New York City, drilling on the ANWR coastal plain seemed unlikely to win Congressional approval. Although the Bush-Cheney administration had identified opening up the 1002 study area as a priority, and although the House of Representatives had voted in its favor, the Senate, controlled by a slim Democratic majority, held firm in opposition. But the political situation has changed radically, and champions of development in ANWR are using the threat of future terrorist attacks to press their advantage. More than ever, exploring potential domestic oilfields is presented as a national security/patriotism issue. In the words of Alaska's Senator Murkowski, "Mideast oil funds terrorism. The need to reduce our dependence on foreign oil is a legitimate need." A poll taken before the attacks showed that 74 percent of Americans favor exploring for new domestic oil sources rather than continuing to import oil from abroad (Henry 2001).

And if boosters of exploration are correct, ANWR's coastal plain may well turn out to be the biggest potential field in the country. Pro-development forces estimate that there is enough subsurface petroleum in the 1002 area to replace 30 years' worth of Saudi oil, or to meet the needs of the entire United States military for at least 6 months. Already there has been an attempt in Congress to attach the opening of the 1002 area as a rider to the $40 billion response package passed in the wake of the bombings. If anything, the political atmosphere now is even more charged than it was during the OPEC oil crisis of the mid-1970s, when suits filed by environmental groups wishing to stop construction of the trans-Alaskan pipeline were quashed by swift Congressional action (Haycox, personal communication). There were previous Congressional attempts to open the coastal plain to drilling during the mid-1980s (until the Exxon-Valdez accident rendered that effort impolitic) as well as a few years later, during the Gulf War. Nothing is easier to imagine than a repeat of those efforts. Indeed, at this writing, the momentum for opening up the 1002 area seems practically irresistible, even though terrorism itself is already driving up the costs of North Slope oil: the vulnerability of both the pipeline itself and the massive holding tanks in Valdez has necessitated heightened surveillance and security. From an ethical standpoint, the pro-development position rests on "resource egalitarianism," according to which resources on public lands should be used to benefit the greatest number within the national community (Kymlicka 2001), with no group enjoying a special status or claim. Unless Americans were to see wilderness and biodiversity as "resources" more valuable than oil, the national need for energy independence in

a time of political crisis would trump the Gwich'in desire to maintain their culture.

But if the politics of countering terrorism poses the main immediate threat to the ANWR ecosystem, the Porcupine caribou, and the Gwich'in people, there is also the long-term threat of ozone depletion and global warming. In fact, anthropogenic climate change caused by fossil fuel use might threaten the Inupiat, especially those residing in low-lying coastal areas, at least as much as their Athabascan counterparts. For complex reasons, the greenhouse effect is especially pronounced in the circumpolar regions of the world (Steiner 2001). Accordingly, no State is more affected by climatic change than Alaska, where average temperatures have risen 5 °F in the past 50 years (Bartholet 2001). The form of atmospheric pollution known as Arctic haze absorbs light from the sun and thereby increases the temperature of Arctic air (Chance 1990). Higher air temperatures promote melting. Glaciers have receded dramatically, permafrost has thawed, sea levels have risen, and about 11,500 square miles (29,785 km^2) of Arctic ice (the combined size of Maryland and Delaware) have disappeared annually over the last decade. Some climatologists predict that by the end of the century, the Arctic Ocean during summer months could be entirely ice free (Stolzenburg 2001). Locals already have noticed changes in seasonal patterns (Lurie 2001). Summers are hotter. Snow arrives later and, although there is now more of it, it melts faster. River and stream levels are in flux. Each year, spills of toxic materials at the Prudhoe Bay complex release tens of thousands of tons of the potent greenhouse gas nitrous oxide into the atmosphere (Davidson 1993).

These changes, in turn, inevitably affect the subsistence harvest in particular, and economic activity in general. Rougher seas, more severe storms, and more frequent storm surges have made hunting bowhead whales and other marine mammals—always a dangerous occupation for the Inupiat—even more so (Callaway, personal communication). Salmon runs have declined; caribou numbers will probably fall as well. Research has shown that the caribou are harassed by insects more during warmer summer months and therefore spend more time standing around and less time feeding. It is also harder for them to get at their winter food when the snow is deep. This uses more energy and takes time away from eating. In fact, one study concluded that abiotic phenomena, especially snow cover, seem to be the best predictors of the size and well-being of large herds (Arctic Borderlands Ecological Knowledge Society 2001). Likewise, the early breakup of river ice during the calving season can spell disaster for caribou. In 2000, when pregnant caribou were unable to cross the ice-choked Porcupine River before giving birth, an estimated 15,000 newborn calves drowned, being too small and weak to swim (Gemmil, personal communication). In essence, the Porcupine caribou herd may serve as the "canary in the coal mine" for the health of the Arctic ecosystem.

Finally, and ironically, global warming is likely to cause problems even for the oil companies themselves. The thawing of permafrost adds to the cost of road, bridge, and pipeline construction and maintenance (Steiner 2001). More volatile and unpredictable weather at sea will jeopardize offshore drilling installations and possibly lead to more spills and accidents. Inevitably, these costs will be passed on to consumers, even while their use of petrochemicals—regardless of where these originate—worsens global warming in a vicious cycle. As Gemmil has observed, global climate change itself is a symptom of the bigger problem that people are depleting the Earth's resources too fast (Lurie 2001: 16).

In the last analysis, the path to both national security and a healthy environment leads away from fossil fuel dependency and toward reliance on energy sources that are renewable, decentralized, and less vulnerable to political and economic vicissitudes or terrorist attack. By contrast, if national security concerns lead Americans to aggravate global warming by despoiling the environment, "the tragedy of September 11"—as one ecologist has argued—"may be amplified many times over" (Ahl 2001).

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Contested Rights: Impacts of Game Farming on Farm Workers in the Bushmans River Area

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Abstract—This paper discusses the effects of the change to game farming, most notably trophy hunting, on farm workers in the Bushmans River area of South Africa's Eastern Cape Province. Game farming is viewed by government and tourism stakeholders as a much needed source of foreign investment in the impoverished Province. What is often unrealized and unreported however, is the effect of the transition to game farming on farm workers who still reside on the affected land. This paper traces the tensions that exist between white landowners and/or managers, and black farm workers. It questions the applicability of current legal statutes aimed at providing security of tenure for farm workers. It examines potential solutions to the impasse reached between landowners and farm workers. It stresses the need, due to the politically sensitive issue of land and land restitution in South Africa, for an equitable solution that provides security of tenure for farm workers, along with access to the various sacred sites within the game farming landscape, while allowing a compromise to be reached that is acceptable to the landowners.

Introduction

The goal of the ongoing research initiative from which this paper is drawn is to investigate the impact that changes in private farming strategies are having on farm workers in the Bushmans River area of the Eastern Cape. Although commercial farming has decreased considerably in the area since the early 1990s, current changes in the region revolve primarily around the development of commercial game farming, most notably for trophy hunting. The potential of game farming for ecotourism and the associated benefits of employment, capital generation, and infrastructure development have seen the creation of a large number of private game farms between Grahamstown and Port Elizabeth. What is often unreported and unrealized, however, is the effect that this transition to commercial game farming is having on former Xhosa farm workers who still reside on the affected land.

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The tensions that exist between landowners and/or managers and farm workers have been identified as revolving around a number of key issues: security of tenure and residency rights, access to water and grazing land, stock restrictions, housing provision, and access to grave sites and other sites of cultural significance (chief here being certain water pools and riparian zones considered to be inhabited by ancestors and that are essential components in both traditional and Christian oriented family rituals).

Through a discussion of the current legal position of farm workers in South Africa, an examination of the economic situation of farm workers, an explanation of the security concerns of farmers, as well as through the use of empirical case studies, this paper analyzes the tensions that exist between farm workers and landowners and/or managers. It discusses attempts at tacit eviction of farm workers by landowners. It addresses the question of the need for access to the landscape by farm workers to ensure their social and spiritual well being, and finally examines a possible solution to the situation of farm workers and game farms.

Economic Concerns of Farm Workers

The economic implications of game farming for farm workers revolves around their inability to secure a livelihood due to unemployment and certain residential and livestock restrictions. Game farming demands a different kind of labor force than that associated with crop and livestock farming. This has resulted in a large number of retrenchments. Following this, most farm workers rely on seasonal jobs and members of the family who draw pensions and disability grants. Seasonal work on chicory farms yields an average of 10 Rand (approximately $1) per day. Farm workers are therefore severely economically disadvantaged. For those farm workers with rights to remain on the land, the loss of income and rations makes the possession of stock a vital necessity for survival. The keeping of stock and the access to sacred sites within the game farm allow for continued practice of various traditional and religious rites. These serve to ensure the spiritual and social well-being of the affected people.

Security Concerns of Farmers

Farm killings are a national problem. Accounts of farm killings in the Eastern Cape are common in the media. These attacks on both farmers and farm workers have generated a

feeling of apprehension amongst the Province's farming community. A number of farmhouses in the Bushmans River area have been burgled in recent months. It is therefore understandable that farmers would seek to secure themselves through restricting access to their property. The Government has allowed farmers to erect boom gates as a means of ensuring their safety.

What must ultimately be understood is that it is often not the farm workers on the property who are responsible for the growing number of farm attacks. It is usually other people in the area, or those from further afield. It is therefore in the interests of landowners to ensure that they are on good terms with the farm workers on their land. These people will then have a vested interest in protecting the land and ensuring that it is free from outside interference.

Existing Legal Protection for Farm Workers

Farm workers in the Eastern Cape have a long documented history of inconsistent working conditions and a lack of adequately protected legal rights. Influx control and the absence of trade union organization has resulted in low wages and limited means of legal protection from human rights violations and work related abuses (Antrobus 1984; Cocks and Kingwell 1998; Manona 1988). The current government has attempted to improve the situation of farm workers through the implementation of the Extension of Security of Tenure Act 62 of 1997 (ESTA). ESTA provides for stringent procedures when a landowner, or person in charge of the land, intends to evict residents. The would-be evictor has to make an application in writing to a magistrate stating his reason for eviction. While a farm worker's right of residence may be terminated on any lawful ground, the process must be equitable, fair, and in accordance with the various provisions, as laid out in the Act. Furthermore, the Act extends additional protection to those "long-term occupiers" who have resided on the land for a period of 10 years and have reached the age of 60. Despite this, the National Land Committee (NLC) acknowledges

> ...that although offering limited rights, [ESTA] has been demonstrated to be woefully inadequate in securing real tenure rights for farm dwellers (NLC Annual Report 1999-2000:23).

The ineffectiveness of the Act results from its inability to protect the tenancy rights of the dependents of household heads once they die (dependents may be legally evicted 12 months after the death of the household head), as well as its inability to ensure the residential security of short-term occupiers.

Beyond the above, farm workers are often uninformed about the existence of the Act, something which has led to attempts at tacit eviction because once people leave the land they lose all associated rights to it. Such evictions and retrenchments have reached alarming proportions in recent years. Downsizing in existing farming operations, and game farming, has led to landlessness, unemployment, growing shack settlements in neighboring towns, and livestock overpopulation on urban commonages.

Legal protection as it currently stands extends to securing residency rights for long-term occupiers, but does not provide for the protection of those aspects of the landscape that are identified by farm workers as sacred and therefore essential for the continued practice of religious rites. Although there is a strong international call through organizations such as the Convention on Biodiversity (CBD-UNCED), the United Nations Working Group on Indigenous Populations (WGIP), and the Working Group on Traditional Resource Rights (WGTRR), for the recognition of indigenous knowledge and the need for its preservation and protection (Gray 1997), the preservation of and access to sacred sites is not something that is legally enforceable in South Africa. Farm workers have a strong affiliation with the surrounding landscape, due in many cases to long-term residency and the existence of family graves. There is also a strong identification with various sacred sites within the landscape and the articulation of a need for their protection.

The two case studies discussed in this paper are taken from one research site along the Bushmans River. Mr. Engelbrecht (names of individual farmers, landowners, and farm workers have been changed) is the South African director and a 20-percent shareholder of a newly established game farm. Mr. Engelbrecht is in partnership with a number of Americans with a long established history of game farming and trophy hunting in America. The partnership has bought six adjacent farms along the river, which are being consolidated to form a game farm. There are 19 farm worker families in residence on three of the purchased farms

Case 1: Attempts at Tacit Eviction

Tacit evictions, through such measures as the imposition of severe water restrictions, lack of access to farms for farm workers, and stock restrictions, are a common reality as certain landowners attempt to force their workers to leave voluntarily, thereby rendering null and void their responsibilities as laid out in ESTA. These responsibilities include the stipulation that if farm workers are evicted or retrenched, a settlement offer must be secured that will allow for the construction of housing in a new locality that is of equal standard to that occupied in the place of former employment. In many cases, the advent of game farming and trophy hunting, which heightens the danger for resident farm workers, has served as justification by certain landowners to limit farm worker access to the landscape.

Mr. Stewart bought his farm from the Landbank in 1999 after the previous farmer had gone bankrupt. The farm was later purchased in November 2000, along with five other properties in the area, by an American investment group for the purpose of establishing a game farm for trophy hunting. Mr. Stewart negotiated a *usufruct* right, which allowed him to remain in residence and run his cattle in a specified area of the farm.

When Mr. Stewart took over management of the farm in 1999, he imposed cattle restrictions of two animals per family. Although cattle restrictions are often placed on farm workers (Cocks and Kingwell 1998), the previous owner had not imposed any restrictions. The lack of livestock restrictions being replaced by these new stringent restrictions could set a precedent that could be detrimental to farm

workers. Only three of the six resident families have stock, but of these, all have animals in excess of the limit imposed by Mr. Stewart. The farm workers informed Mr. Stewart that they could not abide by the restrictions, as they needed the stock to ensure their economic well-being. Mr. Stewart then implemented a system in which stockowners had to pay 20 Rand (approximately $2) a month per full-grown animal for grazing, vetting, and dipping. Sometime later, he is reported to have informed the farm workers of his intention to personally sell all of their animals and hire a truck to collect them. Such actions and threats can be seen as attempts to force farm workers to leave the land and settle elsewhere.

More seriously, Mr. Stewart imposed severe water restrictions on the farm workers living on his property. The farm contains two dams: one for human consumption and one for livestock use. There is also a borehole in close proximity to the main farmhouse. He has consistently denied access to the dam with water fit for human consumption. In July 2001, during a public meeting between Mr. Engelbrecht, the South African Manager of the game farm; Mr. Stewart's son, who acted as interpreter; Mr. Bonda, a representative of an agricultural NGO; and the farm workers, Mr. Stewart's son defended the blocking off of the dam by saying it was in response to the farm workers, who had left certain farm gates open and let their own cattle move freely through these gates. The situation has yet to be resolved. Meanwhile, the farm workers approached a neighboring farmer and requested permission to draw water from his dam. The request was granted.

The farmhouse that Mr. Stewart occupies is situated just off the main driveway leading to his farm and one of the other farms within the game farm. The gate leading to Mr. Stewart's home is also used to access the remaining driveway to the second farm. Mr. Stewart frequently locks this gate, complaining of too much traffic through the farms. The farm workers are not informed about the locking of the gate and are left without a key, something that severely restricts both their and their visitors' access to the property. While locking the gate is understandable, given the incidents of farm attacks discussed earlier in the paper, Mr. Stewart should inform the farm workers and possibly negotiate a situation in which they keep their own key or have access to one.

The above case illustrates an active attempt on the part of the landowner, or in this case occupier, to make life difficult for the resident farm workers. Although many of the discussed actions took place prior to the onset of the game farm, such attempts have escalated now that the game farm is being constructed. Both Mr. Stewart and his son have given assistance to Mr. Engelbrecht, and frequently oversee the still fledgling operation while he is away with clients at other more established hunting sites. These actions constitute an attempt on the part of Mr. Stewart to tacitly evict those people resident on his land, all of whom were resident before his arrival.

Case 2: Sacred Sites Within the Game Farming Landscape

Sacred sites refer to specific areas considered by the local people to be places within the landscape where their ancestors reside (Hirsch 1995). The Xhosa farm workers and members of the larger community identify three such localities: the water, the grassland, and the forest. Each locality is believed to contain ancestral spirits, the most powerful being the river people (*abantu bomlambo)* who reside in certain identifiable pools (De Jager and Gitywa 1963; Hammond-Tooke 1975; Hirst 1990, 1997; Ngubane 1977; Soga 1931). Access to these sites is considered vital for the continued well-being of the community. Family rituals are often conducted at the various river and forest sites to ensure agricultural success, health, fertility, and good fortune. Diviners and their apprentices also make use of certain pools, revealed to them in their dreams, for training purposes.

Alongside the traditional, indigenous-oriented use of the various sacred sites within the landscape, local African Zionist Christian, farm-based congregations make use of the sacred pools for full submersion baptisms. This ritual is a definitive step for adult churchgoers, as it marks their full entry and acceptance into the congregation. The strong influence of indigenous African beliefs within the African independent/indigenous churches (Maboea 1994; Oosthuizen and others 1996), which view the healing energy of the church as converted ancestral/traditional energy, has cultivated a respect for the landscape which parallels that felt by traditionalists.

It is pertinent to point out at this stage that a respect for the landscape arises out of an awareness of the need to show the "proper" respect to the ancestors. As stressed in Bernard (this proceedings), this involves an ecological ethos of protection and preservation of sacred sites, as environmental degradation or disturbance of any sort will result in the ancestors abandoning the sacred site.

Mr. Menzi and his brother, Mr. Sol Menzi, are both former farm workers. Mr. Menzi is a resident of Mr. Stewarts farm, and Mr. Sol Menzi lives on a nearby farm that has been turned over to the people through the government purchasing the land from the previous owner.

Mr. Sol Menzi's wife developed a rash on her arms and back. Initially she approached the local herbalist and Zionist priest, Mr. Zenani, for advice. Mr. Zenani prescribed a course of treatment. When this failed to bring relief, Mr. Zenani suggested she be taken to the local clinic. The medication offered by the clinic did not bring any relief either. Mr. Zenani then suggested she be taken to a healer, Mr. Zenani's niece, who was in the area performing a ritual for clients. During the divination session, she revealed that the rash was in fact caused by the ancestors, and was an outward sign that the family needed to purify itself. The healer advocated the performance of a river ritual. This would involve the seclusion of the family, with the imposition of certain food taboos, and the offering of gifts, by a chosen representative to the ancestors at a sacred pool.

It is pertinent to point out at this juncture that these rites of passage were conducted in the past on an annual basis. Rituals involve not only the religious ceremony itself, but the provision of food and beer for ritual participants and guests, and the payment of the healer for his or her services. The significant cost of performing such rituals has resulted in a situation where they are often neglected. It is believed that the neglecting of such rituals may result in ancestral displeasure, as is evident by Mrs. Sol Menzi's rash. It is also important amongst the Xhosa that river rituals be performed at sites associated with the family, as it is believed that the

family ancestors reside in certain pools near where they lived in their earthly lives. Familial association with a particular site is usually dependent on long-term occupancy in an area. In the past, this has resulted in farm workers approaching their employers, or adjacent landowner, depending on the location of the nearest sacred pool. Increasingly, however, it is game farm managers who need to be approached in respect to the performance of ritual.

A detailed discussion of the ritual, and the symbolism of rebirth and renewal involved, is beyond the scope and theme of this paper. What is important to stress is the need for access to these sites within the landscape to ensure both the spiritual and social well-being of the people involved.

South Africa, unlike Australia, has no sacred site protection laws to ensure access to and use of the various water, forest, and grassland sites. Many farmers are sensitive to the need of the people to access the various identified sites on their land. If timely requests are made, permission is usually granted. In some cases, farm workers report setting aside a piece of the slaughtered animal (when ritual sacrifice was involved) for the farmer and his family to secure good relations between the two parties. It has been suggested by some local African National Congress (current ruling governmental party) counselors that this system be encouraged to establish rapport between farm workers and game farm owners. Sharing the meat of a sacrificial animal is a strong symbolic gesture of social affiliation and respect.

The ecological ethic of many traditional cosmologies, as mentioned above, ensures respect for the site and thereby preservation of the landscape. The presence of the ancestors is in fact indicated by the presence of various animals and birds associated with the water (otters, fish, birds), the forest (monkeys, mongoose), and the grassland (mongoose, hare) (Hirst 1990). By supporting these attitudes of respect for the landscape, pollution and degradation of such sites may be avoided. Access to such sites is vital for the spiritual well-being of farm workers and therefore cannot be avoided. Although landowners hold legitimate concerns of pollution of sites, the promotion of and empathy for traditional ideologies may well prevent this.

Potential Solutions to the Problem

The Extension of Security of Tenure Act is aimed at farm workers on farms still under production or those left fallow. It could subsequently be argued that game farming and the land on which it is conducted require additional legislation. Because of the restrictive nature of game farming in relation to stock numbers, residential security, and access to sacred sites, current government initiatives to protect the rights of farm workers are inadequate.

A possible solution to the problem of a restriction to individual livelihoods, viewed as favorable by a number of farm workers, is the allocation of land adjacent to or on the periphery of game and hunting zones. The purchasing of this land, if not already held by the game farm, is potentially facilitated through settlement offers made by the landowners to the farm workers, and by ESTA grants afforded by the Department of Land Affairs. Some landowners are exploring this option and are seeking ways in which the farm workers may benefit through their engagement in cultural and ecotourism or agri-villages. Such endeavors should be commended and supported by all who are seeking a satisfactory resolution of the problem and a means whereby the benefits of game and ecotourism can be shared with affected communities.

An initiative, which involves the farm workers from the first two case studies, is far from finalized. Mr. Engelbrecht, the Director of the game farm under discussion, has identified a potential site outside of the game farm. The process is, however, hampered by a number of factors, including the fact that the transfer of ownership from the previous farmer to Mr. Engelbrecht has yet to be successfully finalized. Although access to the various sacred water and forest sites within the game farm and burial rights have been successfully secured, the size of the allocated land is still under discussion. Mr. Engelbrecht has agreed to give ownership of the land to the farm workers by giving individual title deeds to household heads for their residential plot and establishing communal grazing land for the stock. This will provide residential security for farm workers and their dependents, as well as a certain amount of security for Mr. Engelbrecht, as it ensures the proximity of people with a vested interest in the protection of his land. A number of the farm workers have expressed their desire to leave the confines of the game farm due to the restrictions and dangers (the eventual introduction of predators and hunting) it imposes. Still others have articulated their plans for the land in question (grazing land for stock, as well as arable land for potato and mealie [corn] production). What remains to be investigated and finalized is the role of the government in terms of housing and agricultural assistance.

Conclusions

The situation faced by farm workers resident on land set aside for game farming and trophy hunting is complex. Attempted farm worker evictions and the need for the performance of ritual, as well as the economic implications of the move to game farming for farm workers, have shown the need for reconciliation between farm workers and landowners, not least because of the security this would provide landowners, considering the potentially volatile nature of land restitution issues in Southern Africa.

Values attached to the landscape by farm workers are due in part to their long residence in the area, as well as their cosmological orientation that promotes ecologically sound practices. The ineffectiveness of current legislation governing farm workers in South Africa demonstrates the need for additional legislation as well as the need for landowners to act in such a way as to secure the tenure of farm workers and to assist in providing generally poor, uneducated, and unemployed people with sustainable livelihoods.

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Understanding Wilderness and Subsistence in Gates of the Arctic National Park and Preserve, Alaska

Chad E. Dear

Abstract—Recreationists' understanding of subsistence in Gates of the Arctic National Park (GAAR) was examined using Structural Developmental Theory. This perspective contends that people universally differentiate three major domains of social issues—moral, conventional, and personal—by how they reason about them. Seventy-five percent of respondents understood subsistence use of GAAR as a moral issue. Further, respondents maintained conflicting moral judgments when justice, welfare, and naturalism values associated with subsistence were juxtaposed with human and nonhuman welfare values associated with wilderness. The high incidence of conflicting judgments suggests the existence of conflict, or cognitive disequilibrium, between values associated with subsistence and values associated with wilderness. Respondents attempted to coordinate their judgments in ways that can be described as overriding, contradictory, and contextual. No respondents had hierarchical integrated understandings of subsistence and wilderness values. Implications of these findings are discussed.

Introduction

Gates of the Arctic National Park & Preserve (GAAR), one of the 10 park units created by the Alaskan National Interest Lands Conservation Act (ANILCA) of 1980, was established with a management mandate to preserve wilderness values that is unparalleled in any other U.S. National Park (USDI/NPS 1986). This mandate, however, must be understood in the context of the other purposes for which the park was established, allowed uses, and prior existing rights. GAAR and other National Parks created by ANILCA, unlike parks in the lower forty-eight United States, allow for the continuation of "customary and traditional" subsistence uses by rural Alaskan residents of wild, renewable resources for direct personal or family consumption (Willis 1985).

Although the allowance of subsistence in GAAR diverges from previous legislative definitions of wilderness, the human presence and subsistence culture in the park was initially thought to complement the wilderness purposes of the park (USDI/NPS 1986). Such a complimentary relationship would successfully harmonize the GAAR management mandates to allow for the continuation of subsistence and to "provide for the enjoyment" of the wilderness qualities of the park. The actual relationship between the subsistence culture and the wilderness purposes of GAAR, however, has not been adequately studied and is, therefore, not yet well understood. Understanding recreationists' perspectives regarding subsistence in GAAR is important for two primary reasons: (1) to determine if the aforementioned GAAR management mandates conflict, and (2) to empirically examine the influence interactions with subsistence may have on psychological developmental aspects of recreationists' understanding of nature, indigenous people, the human role in wilderness, and the human-nature relationship. The purpose of this study, therefore, is to identify, classify and analyze recreationists' understanding of subsistence in the context of their experience in GAAR.

Theoretical Framework

Such an analysis requires an approach that accounts for the complexities inherent in the coordination of the social-psychological constructions of wilderness and subsistence. In other words, recreationists' behaviors and reactions to subsistence can not be taken at face value because such behaviors and reactions are underlain by complex patterns of understanding and active efforts to balance personal judgments about the issues the situation in GAAR provokes.

Structural Developmental Theory, the perspective employed in this study, explains human understanding through the nature and functions of psychological structures (Ginsburg and Opper 1969). These structures are comprised of the various ideas people develop and maintain regarding social issues. Structures also include patterns of thinking, or schemas, that situate ideas within more or less well-organized wholes. Ideas are organized within these schemas through the process of reasoning about social issues. Ideas and schemas regarding social issues can be differentiated depending on the perceived moral, conventional, or personal nature of issues (Turiel 1998). In other words, if a person thinks morally about an issue, they will employ different ideas and reason about the issue differently than a person who thinks about the same issue as governed by conventional or personal considerations. Specific qualities of individuals' judgments and supporting justifications are the criteria for determining into which "social domain" the individual conceptualizes an issue.

Identification, classification, and analysis of ideas and schemas within moral, conventional, and personal social domains provide a basis for understanding the interrelations between thought, action, and cultural context (Kahn 1999). The premise here is that forms of reasoning make a difference in how different possibilities are weighed and

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calculated by an individual. The link between thought, action, and cultural context is complicated, however, by the psychological fact that people develop and simultaneously maintain multiple and, at times, conflicting judgments regarding the same issue (Turiel and others 1991). Such cases may result in judgment/action inconsistencies.

Turiel and others (1991) note that judgment/action inconsistencies require explanations that take judgment coordination into account. Judgment coordination occurs when an individual's experience simultaneously activates psychological structures supporting conflicting judgments. These structures, which were not brought into relation before, are forced into a psychological relationship. The relationship established through judgment coordination generally involves a compromising of structures. Identifying, classifying, and analyzing ideas and schemas related to an issue within moral, conventional, and personal domains aid in understanding an individual's or group's progress through the process of judgment coordination.

Finally, hierarchical integration, or structural development, happens when previously held psychological structures are, through interaction with the social and physical world, transformed into more comprehensive and adequate ways of understanding the world and acting upon it. This process involves the development of a new understanding of conflicting values that preserves the integrity of both values, but transforms their relationship from one of conflict to one of integration under some superordinate concept. This process is distinct from judgment coordination in that it does not involve a compromising of judgments, but instead involves an integration of judgments at a hierarchically elevated level.

Methods

Semistructured interviews including hypothetical scenarios describing interactions between recreational and subsistence use of GAAR were posed to GAAR recreationists. Qualitative methods were employed to (1) identify recreationists' initial and secondary judgments and justifications of the issue; (2) classify respondents' initial judgments within moral, conventional, or personal social domains; and (3) analyze the coordination efforts between recreationists' multiple and conflicting judgments and justifications.

The respondent group was composed of 24 males and 6 females ranging from 19 to 66 years of age with an average age of 42. Seventy-six percent had received or were working on four-year college degrees. Forty-six percent had attained or were working on graduate or professional degrees. Forty-eight percent of respondents identified their homes as being in urban areas, 30 percent in suburban areas, and 22 percent in rural areas. Thirty-three percent of respondents were from the contiguous United States east of the Rocky Mountains, 26 percent west of the Rocky Mountains, 22 percent were from Alaska, and 18 percent from Europe. Ninety-three percent of respondents identified themselves as being Caucasian. Respondents had been planning their trips to GAAR for an average of 7.5 months.

Findings

Sixty-one percent of respondents were accepting of subsistence in GAAR and conceptualized the issue as moral. Fourteen percent were not accepting of subsistence in GAAR and also conceptualized the issue as moral. Justifications of both positive and negative moral judgments referred to concepts of justice (rights and fairness), welfare (of humans and/or nature), and naturalism (perceived harmonious and respectful relationship between subsistence user and nature). Twenty-five percent of respondents were accepting of subsistence in GAAR and conceptualized the issue as conventional.

A broad finding of this study is that respondents' psychological structures associated with wilderness generally developed exclusively of psychological structures associated with subsistence, and vice versa. In other words, there was a lack of coordination between wilderness and subsistence structures. These structures may have developed separately because they were never before forced together through experience.

While previous experience may have rarely done so, the scenarios presented to respondents in interviews did simultaneously activate recreationists' psychological structures regarding wilderness and subsistence. Questions in the interview forced respondents to reason about the issue of subsistence use of GAAR Wilderness in a way that connects these previously disconnected structures. Respondents' attempts to reason about the hypothetical scenario resulted in respondents maintaining multiple and conflicting judgments in the interview. The high percentage of individual respondents who maintained conflicting judgments suggests the existence of conflict, or cognitive disequilibrium, between values associated with subsistence and values associated with wilderness.

The psychological discomfort associated with states of disequilibrium led respondents to attempt to resolve or coordinate their conflicting judgments. Respondents were identified as coordinating their judgments in ways that can be described as overriding, contradictory, and contextual. Each major coordination type and subtype, as well as their implications, are described below. In many cases, individuals coordinated their conflicting judgments in multiple ways.

Judgment Coordinations

Overriding—In overriding coordinations, a moral judgment supporting subsistence trumped conflicting secondary judgments supporting wilderness values. The 37 percent of respondents classified in this category lacked a developed moral understanding of wilderness values. This allowed the well-established moral content and structure of respondents' judgments supporting subsistence to override emerging, still tentative, and not as widely shared judgments supporting wilderness values. For example, Doug, a 55-year-old from New Jersey, stated that an interaction with subsistence in GAAR would make his experience "less of a wilderness experience, but in the kind of situations we are

talking about its okay…that is part of the balancing of interests that I'm prepared to accept and that I believe is just." The moral value Doug associates with subsistence, what he "believes is just," overrode values he associated with wilderness experience. Doug's judgment coordination, as well as others in this category, may be explained by the general acknowledgment that social justice moral schemas are much stronger in society than wilderness/biocentric ones. The lack of strength of wilderness values also may have to do with the tendency of these subjects to frame wilderness values as mostly grounded in self-interested references relating to "wilderness experience"—an argument perceived as much weaker than social justice as grounds for moral justification.

The implication of this finding is that the subsistence community, as well as land managers, can rely on a significant amount of support for subsistence use of GAAR. Overriding coordinations, however, foreclose any attempts at integration between wilderness and subsistence values. Recreationists' support of subsistence, therefore, is at the expense of wilderness values.

Contradictory—In contradictory coordinations, two contradictory judgments were simultaneously upheld. The 25 percent of respondents classified in this category conceptualized the issue of subsistence in wilderness as being conventional rather than moral. Psychologically structuring the issue as conventional allowed these respondents to maintain contradictory judgments because their final judgment ultimately depended upon the social norms of the area established by custom, laws, and regulations. This group of recreationists does not need to be persuaded to accept subsistence for any reason besides the fact that there is a law allowing subsistence use of GAAR.

Contextual—In contextual coordinations, respondents' judgments depended on the specific context, as specified by them. Four major types were identified: ecological impact, naturalism, race, and frequency of interaction. Each contextual coordination subtype, as well as its implications, is detailed below.

Eighty-three percent of respondents' support for subsistence use of GAAR was contingent upon subsistence users' impact on what was perceived as the more important moral value of ecological health. If subsistence was determined to degrade the ecological health of the environment, then subsistence would not be acceptable. For example, Eric, a 19-year-old from England, claimed that he would support subsistence "as long as the other concerns for the ecology of the area…are being met." If this category of respondents is added to the 14 percent of respondents who were initially not accepting of subsistence for reasons including ecological impact, then nearly all (97 percent) respondents can be understood to value ecological welfare when set in competition with justice, welfare, and naturalism values associated with subsistence. The implication of this finding is that if recreational and subsistence activities occur in the same geographic area, and psychological conflict is to be kept at a minimum, perceived environmental impact must be kept low. The greater the perceived environmental impact, the greater the difficulty of eventually integrating wilderness and subsistence values.

Seventy percent of respondents made contextual coordinations referring to naturalism, or a perceived harmonious and respectful relationship with nature. In such cases, respondents supported subsistence; however, this support was contingent upon subsistence users' ability to exemplify a harmonious and respectful relationship with nature. Recreationists required that subsistence users conduct their activities according to an environmental ethic that, in most cases, was assumed to be part of the subsistence culture. Recreationists' support for subsistence was withdrawn if this ethic was not perceived.

This pattern of support—and withdrawal of support—for subsistence, depending on respondents' perceptions of local peoples' relationships with nature, is characteristic of the stereotype of the "ecologically noble savage" (Buege 1996). This requirement of "authenticity," Buege claims, is oppressive in that it forces Natives to conform to non-Native conceptions of how they should live and relate to nature. Very few respondents overtly acknowledged that the right to self-determination—a prominent justification supporting subsistence in the park—contradicts and could possibly override the naturalistic reasoning pattern described above.

Respondents' support of subsistence was also dependent on race. Thirty-three percent of respondents were less likely or unwilling to judge subsistence acceptable if the subsistence user was a non-Native. For example, Dave, a 47-year-old Hispanic from California, claimed that "if a non-Native person...had the right to [subsist in the park] through...a government permit or something like that then I would be more adverse to that than if it was a person who through family generations acquired that right."

The ANILCA mandate "to provide the opportunity for *rural resident people* engaged in a subsistence way of life to continue to do so" (emphasis added) is a colorblind mandate (Willis 1985). A significant portion of subsistence activities in and around GAAR is undertaken by non-Native rural residents. The condition of race described by this group of respondents reveals a potential for increased conflict between recreational users and non-Native subsistence users of GAAR.

Frequency of interaction was the final major type of contextual coordination identified. Thirty percent of respondents claimed that their support for subsistence would deteriorate with increased encounters with subsistence or signs of subsistence activities. The implication of this finding is that conflict between recreation and subsistence users of GAAR could be avoided by regulating recreational visitation to keep frequency of contact with subsistence low. If high frequency of contact is unavoidable, stronger justifications supporting subsistence may be needed to minimize conflict.

A less prominent, but interesting, contextual coordination referred to a distinction between subsistence being acceptable in the park and subsistence being acceptable in respondents' experience in the park. In other words, subsistence is acceptable, but "Not In My Wilderness Experience" (NIMWE). The enormous size of GAAR, coupled with the fact that recreational and subsistence activities generally occur in separate areas of the park, suggests that a large majority of visitors to GAAR never see subsistence activity or signs of it. These physical realities currently allow for the continuation

of NIMWE thinking. The finding that NIMWE thinking was apparent in at least 17 percent of respondents suggests that a partitioning of the park through a zoning scheme, where recreationists would know that they have a lesser chance of encountering subsistence, would be accepted and appreciated by this segment of recreationists. The separation of users or perpetuation of NIMWE thinking would not, however, contribute to a more adequate understanding of the unresolved conflicts in recreationists' understanding of subsistence in GAAR. In other words, this practice would avoid psychological and social conflict rather than attempting to resolve conflict.

Toward an Integrated Understanding of Wilderness and Subsistence Values

Respondents generally lacked the ability to coherently reason about or understand subsistence use of GAAR. Through the interview process, many respondents showed signs that they were becoming aware of the inadequacy of their understanding of the issue. This awareness of their inadequacy of understanding, or state of disequilibrium, led in this case to judgment coordination efforts. Such efforts involved certain values being maintained at the expense of other values. Disequilibrium may also instigate the development of new and more adequate psychological structures that preserve the integrity of both values, but transform their relationship from one of conflict to one of integration under some superordinate concept (that is, hierarchical integration).

The presence of disequilibrium, and the subsequent potential for hierarchical integration, represents an opportunity to move closer to the goal of reducing conflict between wilderness and subsistence values in GAAR and other parks and protected areas around the world. Left unmanaged, recreationists' personal experiences, such as actually encountering subsistence in GAAR or other parks, might activate developmental processes or it might not; existing biases and contradictions might prevail. Without presentation of balanced views regarding this issue, such as was presented in interviews, exposure to subsistence in GAAR or other "wild" areas may only reinforce and elaborate existing conflicting understandings of wilderness and subsistence.

The opportunity for the National Park Service, or other parties with a vested interest in the continued preservation of the physical and cultural values inherent in GAAR, is to facilitate the developmental process of creating new understandings of wilderness, subsistence, and their relationship in the park. Recognizing that the active mental life of visitors is critical in their experience is a first step in this process.

Recreationists are not passive receptors easily molded by pamphlet-style educational efforts. Recreationists' response to these or any other informational medium is determined in large part by their existing ideas and schemas regarding an issue. Their existing understanding is not idiosyncratically structured, but generally follows the various patterns revealed in this study. Specifically, recreationists are inclined to identify and reason about conflicting moral ideas involved in interactions between recreational and subsistence use of the park. In this sense, wilderness recreationists are moral philosophers potentially seeking advanced forms of reasoning.

Effective efforts to influence recreationists' judgments and actions regarding subsistence use of GAAR and other parks and protected areas involves understanding and accounting for the deliberate, systematic, and philosophical nature of recreationists' thought. To the extent that managers can understand, work with, and employ methods that more directly engage peoples' psychological structures, the more precise and sure they can be about the effects of particular managerial interventions.

Understanding recreationists' thought content and processes relating to subsistence are also relevant beyond immediate management concerns. Such understanding can add clarity to the current contentious discourse regarding the idea of wilderness and its ability to appropriately address issues of past and present indigenous human cultures on wild lands. In this regard, a structural developmental approach to what has been termed by some, "The Great New Wilderness Debate" (Callicott and Nelson 1998), may illustrate the disequilibrium many in the conservation philosophy community are experiencing. Such an approach may also trace our psychological progress toward a more adequate and integrated understanding of wilderness, subsistence, and the human role in nature.

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Living Cultures—Living Parks in Alaska: Considering the Reconnection of Native Peoples to Their Cultural Landscapes in Parks and Protected Areas

Robert L. Arnberger

Abstract—With passage of the Alaska National Interest Lands Conservation Act in 1980, a new vision of management of traditional park values, of wildness and wilderness, was legislated where man was viewed not as apart from nature, but rather a part of it. A new challenge emerged for the National Park Service in Alaska and may serve as a model for "reconnecting" indigenous people with park lands and other wild lands of America. While not an agreed upon national priority or right, "reconnection" efforts may be stimulated through the observation of the successes in Alaska and equip the next generation of administrators, legislators, and leaders with new tools to engage the international debate over where man fits into the landscape and how we are part of parks and wild places.

The Organic Act of 1916, which established the U.S. National Park Service (NPS) to manage a national system of parks and monuments, provided an early conceptual foundation of resource preservation coupled with visitor use. The Antiquities Act of 1906 had already established an important set of mission values for national monuments defined as "objects of historic and scientific interest," but never mentioned use of the areas. Over the years, the "system of parks" and the "national service" mandated to manage it has evolved, matching society's interest and emphasis on the continuing evolution of protection of our national heritage.

Society's view of what "wildness" is relative to "wilderness," and what Homeland is relative to Wilderness, is also evolving. More frequent than not, native cultures within the "system of parks" were not seen by society as part of the parks. Certainly, native cultures within our wilderness units, which were to be "untrammeled by man," were never considered to be part of the landscape or had long been displaced through military, legal, or economic actions. In short, the preponderance of the body of law establishing protected landscapes in America excluded native cultures from these landscapes, viewing them, in most cases, as some sort of "interesting artifact" of the land, necessitating removal or continued exclusion in order to avoid marring the scenery. To quote the 1964 Wilderness Act, man now became relegated to the status of a "visitor who does not remain," rather than a harmonious occupant of the land.

It was not until passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 that an alternative management model for protected landscapes was prescribed. The new Alaska park lands created by this environmental legislative milestone are clearly an experiment on a grand scale. The 10 new National Parks, preserves, and monuments, including additions to three prior existing park areas, are the largest, most diverse, and most outstanding park lands yet put into the American park system. Congress also mandated that traditional uses would be coupled with resource preservation and traditional National Park values. A new vision of management of traditional park values, of wildness and wilderness, was legislated where man was viewed not as apart from nature, but rather a part of it. It was a view that did not separate man from the land, but rather, joined man's traditional activities with the land. The law also made it clear that park and preserve protection was not meant exclusively for natural and cultural resources—it was extended to people, their lifestyles, and intangible associations with the land.

A new challenge emerged for the NPS in Alaska: preserve the land and its resources while allowing for the subsistence harvest of wild resources, which will in turn help to preserve the cultural values of the people using the land. Title VIII of the Act makes it clear that the opportunity for those who traditionally have used these areas for subsistence purposes will continue to do so and that such use will be the priority consumptive use whenever restrictions on use are necessary. The opportunity for those who live in rural Alaska and depend on the land to maintain their subsistence lifestyle was recognized as a major value of these new park areas.

While traditional park values were not to be compromised, for the first time a congressional mandate for managing National Park areas recognized the continuum that exists where people and their uses of the landscape are concerned. Congress recognized that to artificially disrupt this continuum would, in fact, critically alter the very values most worth preserving in these areas. Congress also recognized the importance of maintaining unimpaired ecosystems and natural and healthy populations of fish and wildlife as a primary requirement to assure the opportunity for continued traditional uses. Consumptive uses, including traditional means of access for subsistence purposes and travel between villages, may continue. It was a view that consumptive resource use by humans could harmonize with the landscape as long as ecosystems continued in a natural and healthy state.

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Importantly, the Act did not distinguish between native indigenous peoples and other rural peoples. However, rural demographics in many areas are almost exclusively native Alaskan peoples. How does this "great experiment" in Alaska serve as a model for "reconnecting" indigenous people with park lands and other wild lands of America? While most Alaska Natives, by luck or an accident of history, were never forcibly evicted as they were elsewhere, indigenous peoples, by most measures, are not afforded this connection to most park landscapes in the rest of the country. Their "reconnection" is certainly not an agreed upon national priority or right. The historical record is generally one of eviction and culture devaluation, rather than one of connection and valuation. The public debate can be polarized and intense, promising no easy answers. This is an issue fraught with political, economic, social, and legal challenges. The NPS finds itself placed squarely in the middle of a complex social debate. It will present land managers with some of the most important emerging land management issues of the future.

Is the collection of eaglets in Wupatki National Monument by the Hopi Indians for religious purposes problematic? When the Mickosuki Indians create and improve a settlement in Everglades National Park, are there contentious issues? When the Timbisha in Death Valley National Park demanded the return of a homeland within the park, did they threaten traditional park values? When the Hualapai of the Grand Canyon asserted jurisdiction over NPS lands within Grand Canyon National Park, did it challenge administrators? Did each of these examples create complex legal and policy challenges? Yes, of course they did, including challenging the capacity of NPS administrators to find constructive resolution approaches because of an extremely limited "toolbox" of law and policy alternatives. Because of these challenges, do we refuse to engage potential solutions and deny cultural connections to homelands that existed before parks were established, or cultural practices that predate modern man? Do we relegate "living cultures" to the junk pile of "extinct cultures" because we choose not to engage the issue and look for possible resolutions? No, of course not—nor is anyone proposing that. Do we exercise care and deliberation, understanding each case, each people, each issue, and understanding that each resolution (if there is one) may be similar but always different? The affirmative answers are self-evident because these peoples already stand upon our doorstep, knocking on the door of many of our National Parks across the nation, demanding back something they have lost.

While the record is still evolving, it is clear that the Alaskan experiment establishes a precedent for study and comparison. Alaskans are assured of continued legal, cultural, and subsistence connections to the landscape. Our national conversation about man in wilderness and native homeland versus untrammeled Wilderness has been broadened and deepened. That is why ANILCA holds so much promise. Alaska is serving as a laboratory of how indigenous peoples and their cultures remain and are joined with the landscape—inseparable from it. They are a deeply held and important component of what parks and wild places are. They are not just a collateral value. In fact, the culture joined with the land is one and the same value. This model will be needed as the NPS struggles throughout our park system, engaging native peoples and their "reconnection" to the landscapes protected in these units, but frequently lost as traditional cultural landscapes.

Just as America presented the world with the first Wilderness Act in 1964, perhaps ANILCA can help redefine all peoples' relationship with the land throughout America and perhaps the rest of the world. It may be that the Alaska model equips the next generation of administrators, legislators, and leaders with new tools to engage the international debate over where man fits into the landscape and how they are part of parks and wild places. It may be that the wisdom legislated in Alaska, and the generational struggle to make the law work, will mature a society to honor the fact that man has always been part of the land. Because we evolved from the land, the land has always been with man. He has carried it with him during the long march through time. The land is not only in his DNA, but also in his heart and his spirit. If man is to succeed in this endeavor of living on the land, then he cannot be separated from it.

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3. Wilderness: Systems and Approaches to Protection

Viewing wildlife in the Shamwari Game Reserve (photo by Alan Watson).

An NGO's Contribution to Mountain Conservation in South Africa

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Abstract—The Mountain Club of South Africa (MCSA) is a non-government organization (NGO) with objectives relating to the enjoyment and conservation of local mountain areas. It is a national federal body comprising 13 autonomous sections distributed throughout South Africa, with a national central committee coordinating the Club's national operation. Key activities include mountaineering and rock climbing, search and rescue, securing access to mountains, conservation, and outreach. The MCSA has good linkages with national bodies such as the International Mountaineering and Climbing Federation (UIAA) Access and Conservation and Mountain Protection Commissions. The MCSA's involvement in conservation of the mountain environment includes the following initiatives:

- Watchdog function in terms of development proposals and land-use changes in mountain areas in South Africa.
- Environmental Management Plans for Club properties to protect the wilderness qualities of properties and to educate members regarding environmentally friendly behavior in mountains.
- Environmental Management Systems (according to ISO 14001 EMS guidelines) for sport climbing and mountaineering in the Cape Peninsula National Park, and ongoing conservation efforts to clear invasive alien vegetation and protea atlassing.
- Public participation regarding local, regional, and national environmental issues potentially affecting mountains and related communities.

The MCSA strongly supports initiatives to preserve mountain wilderness areas.

Introduction

The Western Cape Province of South Africa is blessed with great natural beauty. The rugged Cape Fold Mountains are attractive and impressive by any standards. It is perhaps not surprising, therefore, that shortly before the turn of the 20th century, some of the region's like-minded inhabitants, who displayed a natural desire to explore this mountain environment, decided to vest their activities with some degree of formality, and formed the Mountain Club of South Africa (MCSA). This occurred in 1891, and it is interesting to note that the formation of the MCSA took place at much the same time as other European mountaineering clubs, as the same needs were being experienced elsewhere. The MCSA is in fact one of the oldest mountaineering clubs in the world.

Today the MCSA's membership has grown to over 4,000 members in 13 autonomous sections countrywide, with the largest concentration of members in the Western Cape. The Club operates as a federal body with a central organization looking after its national and international interests. Due to its modest size, the Club makes use of only very limited professional help and relies largely on voluntary input from its members for its operation.

A fine distinction is drawn insofar as the MCSA is a "mountain club" rather than purely a "mountaineering club." This broadens the perspective, allowing the Club to participate in most things to do with mountains. While mountaineering and climbing are, and always have been, the Club's core interests, it also participates in many other mountain-related activities.

The objective of this paper is to briefly summarize the MCSA's range of activities, to describe its involvement in activities concerning conservation of the mountain environments in South Africa in greater detail, and to highlight some typical issues that are relevant to them.

International Involvement

Like many other sporting bodies, the MCSA experienced a degree of isolation during the apartheid era, manifested in the difficulties experienced when climbing overseas, particularly in the greater ranges such as the Himalaya and Karakoram. There was also very limited contact with other mountaineering federations, and the MCSA "missed out" on very significant steps in the development of mountaineering and climbing that occurred at the time.

That changed quite dramatically in the early 1990s when the Royal Dutch Alpine Club and the British Mountaineering Council put the MCSA forward for membership in the World Mountaineering and Climbing Federation (UIAA) and the MCSA was elected to that body.

With its UIAA membership and the changes that took place in South Africa's political fortunes, the international mountaineering community has gone out of its way to welcome the MCSA back into its ranks. In terms of mountaineering and climbing, this has been of immense benefit to the MCSA due to the opportunities that have been made

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available to its members. But a further benefit, which was perhaps not at first evident, has been the benefit derived in terms of the contact, information, and advice available through working with the UIAA's Commissions, which address specialized fields such as expeditions, training, medical matters, youth, and safety, among others. The MCSA is presently one of only two mountaineering federations on the African Continent that are members of the UIAA.

Activities of the MCSA

To give an overview of the full spectrum of activities in which the MCSA is involved, all its key activities are described here. These are expanded only where relevant to the objective of this paper.

Mountaineering and Climbing

The MCSA has a proud record of mountaineering achievements from expeditions made to mountain ranges outside South Africa's borders. These include many important ascents of mountains in ranges on the African, North and South American, and Asian Continents and elsewhere.

Mountain Club of South Africa members have also extensively explored the mountains of the many ranges inside South Africa, where Club members have made most first ascents of the mountains considered to be of major importance. Individual MCSA sections organize frequent Club meets that vary in nature and difficulty from simple hikes to scrambling and kloofing (canyoning). The MCSA's KwaZulu-Natal Section has organized an annual July (winter) Camp at various locations in the Drakensberg for the past 80 years. Other MCSA national meets also provide opportunities for members from sections around the country to climb and hike together. Besides all these organized meets, members organize many more of their own private excursions.

South Africa offers some of the best rock-climbing opportunities to be found anywhere in the world, and both traditional and sport climbing are major activities of MCSA sections. In traditional rock climbing (generally on longer multipitch routes), the leader and other members of the climbing party are protected by clipping the climbing rope into temporary protection (in the form of slings, chocks, and camming devices called "friends") placed over rock projections and in suitable cracks as the climbers proceed, with all of this equipment being removed when no longer required. In sport climbing, the routes are generally shorter and steeper, and protection is afforded by clipping the climbing rope into permanent preplaced anchors drilled into the rock. Unique access and environmental issues relating to sport climbing are addressed elsewhere in this paper.

Whereas mountaineering and climbing are essentially noncompetitive recreational activities, one of the more recent responsibilities that has evolved from the MCSA's membership of the UIAA is the promotion of competition climbing in South Africa. Climbing competitions are held on artificial (often indoor) climbing walls, and results are judged according to the difficulty of the preset routes and the competitors' achievements climbing them. A national ranking is established, enabling South African climbers to compete in international competitions.

Search and Rescue

In conjunction with other government bodies (such as the police or air force) and the statutory emergency services, the MCSA has over many years offered a highly effective voluntary mountain search and rescue service to provide assistance to hikers and climbers who get lost or suffer accidents in the mountains.

Training and Development

The MCSA recognizes the importance of safety in mountaineering and climbing and has over the years provided training in mountain leadership and in mountaineering and climbing skills, both for its own members and for nonmembers. More recently it has taken the initiative in forming the South African Mountaineering Development and Training Trust (MDT), of which it is the chief patron, to formulate and apply training standards. The MDT is now recognized both by the Government and by the tourism industry as the relevant authority in this field. MDT standards are fully documented and are in the process of being incorporated into the standards set by the Government's qualification authority.

The MCSA subscribes to the UIAA ethic contained in its "International Year of the Mountains 2002 Summit Charter" (UIAA Summit Charter 2002) that everyone should be free to enjoy the natural mountain environment and that mountaineering and climbing contribute to the human spirit and to human endeavor, as freedom sports with human and social values. Therefore, it is aware of the importance of providing opportunity to previously disadvantaged communities to use and enjoy South Africa's mountain environment in a safe and responsible manner. In order to introduce members of these communities to the mountain environment and to convey a message to them regarding the safety and responsibility aspects relating to going into the mountains, as well as the importance of protecting mountains, the larger MCSA sections operate outreach programs.

Access and Conservation

Probably the single most critical element determining the well-being of our Club's mountaineering and climbing activities in South Africa is the question of maintaining access to the mountains and to other climbing areas (such as river and roadside crags or sea cliffs). Both at sectional and national levels, enormous effort is put into ensuring that existing MCSA access arrangements are maintained and, where necessary, new ones are negotiated. The MCSA has over the years both negotiated access servitudes with landowners and purchased key properties to provide a guarantee of access in perpetuity, particularly in important mountain areas.

Mountaineering federations around the world report similar experiences in this regard, continually having to monitor and, where necessary, take action to preserve their members' access to mountains and climbing crags. Access is inextricably linked to conservation of the mountain environment, and the MCSA clearly recognizes this when dealing with access issues. In an effort to assist its member federations, through the dissemination of information on access

and conservation issues, the UIAA through its Access and Conservation Commission is compiling information from around the world on the current situation regarding access to mountains and climbing crags. This includes the legal status pertaining to access (and liability of the landowner) and particular access difficulties that exist, as well as the principal conservation issues affecting access. The MCSA has already contributed information to the Commission in the form of a State of the Nation Report (Shroyer 2001a) setting out the status in South Africa in this connection.

In order to retain the wilderness character of the mountain properties that it has purchased, the Club has adopted a policy restricting the construction of permanent shelters (mountain huts), encouraging its members to camp instead, making use of tents where necessary. Both on those few properties where shelters have been constructed and on properties without any such "improvements," the MCSA strives to apply the same environmental principles that it would expect others to apply on similar land elsewhere.

In the case of the Club's largest section in Cape Town, a detailed land management plan for the Club's properties is in the process of being drafted and implemented, and it is intended that the same provision will ultimately be applied to all the Club's properties.

The MCSA endeavors to become involved as an interested and affected party for any development proposal in mountain areas. Where practically feasible in terms of its resources, it adopts a monitoring role on all forms of proposed development that may pose a threat to the mountain environment, from proposed projects like the Witterivier and Visgat Dams in the Western Cape, to the Mnweni cableway in the KwaZulu-Natal Drakensberg, to major development plans in the Magaliesberg. In the case of the Table Mountain cableway upgrade, the MCSA played a proactive role in the public participation process.

In terms of one of its prime objectives, the Club strives to initiate and support actions toward preserving and protecting the natural beauty and wilderness character of the mountains and toward promoting their effective conservation management. The MCSA's specific goals in this regard are to:

- Prevent pollution of mountain environments.
- Maintain biodiversity of mountain ecosystems.
- Promote the sustainable use of resources.
- Support integrated environmental management procedures for development proposals or changes in land use in mountain environments (this includes environmental impact assessments and public participation).
- Motivate its own members and the public to conduct all activities in the mountains in an environmentally responsible way.
- Promote open communication on environmental issues within the MCSA and, where appropriate, between the MCSA and other parties.

The MCSA has adopted and strives to apply the UIAA's Environmental Guidelines (2002) in its various activities and actions. Club members serve as Corresponding Members on the Mountain Protection and Access and Conservation Commissions of the UIAA.

The MCSA places a high importance on the conservation of South Africa's mountain heritage. The Club's Cape Town Section initiated an active program for the removal of invasive alien plant species in 1945 and has ever since steadfastly continued its work, more recently joined by other younger sections in this conservation effort. Club members frequenting remote mountain areas have contributed significant effort to the recent Protea Atlassing Project in the country.

Potential for Change in the Mountain Environment

Increase in Number of Users

The number of people going into the mountains in South Africa is likely to rise dramatically. Although our mountains are presently not heavily used, they will become more so. An extreme example is the use of the Western Table on Table Mountain where tourist traffic has increased in a very short space of time. We should learn from other nations' experience how to manage these problems, although some of them are certainly unique to our situation.

One factor that may be unique to our situation is the likely transition in a large section of our country's population over a period of time from a survival lifestyle to one where people are relatively better off and will have the inclination and means to participate more in recreational activities.

The MCSA believes that education will be an important consideration in dealing with this increased interest. It is important that people appreciate and understand the mountain environment, learning to conserve it, as well as how to use it and enjoy it responsibly and safely. These are fundamental issues that the MCSA is already trying to address through its outreach programs and will hopefully, in the future, be able to address through the proposed development side of the MDT.

Invasive Alien Plants

The effects of the invasion of alien plant species have had a significant impact on native vegetation on some of South Africa's mountains. Members of our Club possibly appreciate more than others the extent of this problem, because they see first hand how these alien infestations are taking hold in some of our remotest areas. While the MCSA and a few other concerned parties have for many years operated plant conservation programs, actively participating in the eradication of alien plants in mountain environments, it is gratifying that there is now national recognition of the threat posed by alien vegetation in our water catchment areas, and very encouraging that a concerted effort is being made to commence redressing this problem.

With the limited resources that are available, it is going to take a huge effort to make this project a success. It is important that available energies are used to best effect, and we should ensure that expert knowledge available in bodies like the MCSA is put to best use. Too often we have seen a lot of time, effort, and money put into clearing projects, which have been wasted through incorrect techniques being applied.

Developmental Impacts

Various forms of development have made a significant impact on the mountain environment. For example, there is a proliferation of communication structures in our mountains. In themselves, these structures may have more of an aesthetic impact than anything else, but in cases where roads have been constructed to give access to the sites to facilitate building and maintaining the structures, there has often been severe environmental degradation. An example where this has happened is on Ben Heatlie, near Worcester, where an access road more than 20 km (12.4 miles) long has been built in extremely fragile terrain. The MCSA is running a project to compile information on existing communication sites in sensitive mountain environments to try to apply pressure to limit further degradation. Fortunately, new environmental legislation is now in place to ensure that new structures of this nature may be erected and other forms of development undertaken only after a proper environmental impact assessment has been done. But, it is still necessary to keep one's eyes open to see that the legislation is enforced.

Impacts of Users

An emotive issue relating to sport climbing (a comparatively recent development in rock climbing that has increased immensely in popularity throughout the world over a very short time) is the fact that sport climbing relies on the placement of fixed protection on the climbs in the form of anchor bolts drilled and glued into the rock. However, this is in fact a relatively insignificant impact in relation to the impact of access. Because most sport climbing areas are quite concentrated, with many climbing routes in a small area, the impact on the vegetation caused by the climbers moving between the routes and reaching the climbing area can be far more serious.

In the 1990s, European climbing federations experienced major problems with access to some of their climbing areas (specifically sport climbing areas) being completely closed down due to public pressure exerted on environmental grounds, partly for the reasons already set out here, but also due to possible disturbance of nesting birds, such as peregrine falcons. Largely from concerted efforts made by the German Alpine Club (DAV) and the Swiss Alpine Club (CAS), many of these constraints have now been removed. Dialogue was initiated by these federations involving all parties concerned so that the climbers' aspirations and needs and the environmental groups' concerns could all be heard and understood, and so that management plans appropriate for each particular area could be worked out and agreed upon.

This successful process resulted in an informative joint UIAA/World Conservation Union (IUCN) seminar held in Barcelona in 1998, following which valuable guidelines entitled "Access and Conservation Strategies for Climbing Areas" were published by the UIAA's Access and Conservation Working Group (UIAA/IUCN 2001).

Building on this experience and the information flowing from it, the sport-climbing community, supported by the MCSA, developed a management plan for sport climbing in the Cape Peninsula National Park (CPNP) that has now been accepted by South African National Parks and is being implemented via a Sport Climbing Working Group. It has been a very successful initiative and one that sets new standards for recreation management in protected areas. The MCSA is in the process of drafting proposals for a similar management plan for mountaineering in the Cape Peninsula National Park.

Challenges Regarding Wilderness Management

There are very few wilderness areas set aside in South Africa, particularly when we consider mountainous wilderness areas. The mountain wilderness areas that we do have and that are afforded an enhanced conservation status must be recognized as being extremely precious, and we should all do our utmost to ensure that these areas are preserved in a pristine condition for future generations.

There are other mountain areas that deserve recognition as wilderness areas too but that are not afforded any special conservation status. Such areas, together with their present form of ownership and conservation status, need to be defined and means sought to afford them with an enhanced conservation status before the window of opportunity is lost.

To promote a better understanding of the present conservation status of mountains in South Africa, the MCSA, together with the World Wide Fund for Nature—South Africa (WWF-SA), sponsored a research project conducted by Shroyer (2001b) entitled "Establishing the Status of Mountain Conservation in South Africa." The purpose of the research was:

- To provide an overview of the major mountain ranges in South Africa and their conservation status.
- To provide information about mountain communities living in them.
- To provide a brief analysis of the policies, legislation, and other "social contracts" affecting their conservation status.
- To highlight some of the key threats to mountain wilderness in South Africa.

Opportunities

The year 2002 offers South Africa a great opportunity to focus its peoples' attention on mountains through the United Nation's International Year of the Mountains (IYM 2002). The MCSA recognized this opportunity and lobbied the Minister of Environmental Affairs and Tourism, Mr. Valli Moosa, and his department at Central Government to set up a national IYM 2002 Committee to support and coordinate the country's efforts to make this event a big success, an action that the Government has already set in motion.

The MCSA will be liaising closely with this IYM 2002 Committee to promote a number of important national events that will take place during 2002. These will include the declaration of Mountain Protection Days over the weekend of September 14–15, when it is hoped that countrywide mountain conservation projects will be publicized nationally in the printed media and on television, as well as a

conference focusing on the KwaZulu-Natal Drakensberg Mountains, with the specific objective of contributing to the Protected Area and Parks Conference to be held in Durban in 2003. The Drakensberg conference, which will be supported by the UIAA as one of its international IYM 2002 projects, has exciting potential in view of the recent developments in the KwaZulu-Natal Drakensberg—the declaration of the Drakensberg as a World Heritage Site and the formation of the Maluti-Drakensberg Transfrontier Conservation Area.

In addition to the contribution that it will make on these projects, the MCSA is planning various other national events to celebrate IYM 2002, the most important of which will be:

- The publication of a book on the history of mountaineering in South Africa.
- Application made to the Post Office for a commemorative stamp issue in South Africa focusing specifically on mountains.
- The production of an educational video on the mountains of South Africa, emphasizing their importance and the need to conserve them,
- Through partnerships with organizations like Working for Water and Ukuvuka Firestop, undertaking special IYM 2002 projects (such as the high altitude clearing of alien vegetation) to publicize work done toward conserving mountains.
- The expansion of the Banff Festival of Mountain Films to a major national event in South Africa.

Conclusions

The MCSA, although a relatively small mountaineering federation, endeavors to play a role in the conservation of the mountains of South Africa, and this paper outlines the actions it is taking in regard to some of the issues involved.

Membership of the UIAA, the World Mountaineering and Climbing Federation, has provided useful guidance in helping the MCSA to resolve some of the conservation issues it has faced. Many of the problems in South Africa are not unique and have been thought about and often successfully addressed by our international friends. We should draw on this experience where appropriate and use the support that they are willing to give us.

Similarly, organizations like the MCSA should strengthen partnerships with other NGOs to achieve common goals relating to mountain conservation.

More work is needed, particularly with regard to defining and taking action where mountain areas should be recognized as wilderness areas and afforded enhanced conservation status. The International Year of the Mountains 2002 affords South Africa a great opportunity to highlight the importance of South Africa's mountains and the need to conserve them.

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Protecting and Sustaining Wilderness Values in the Muskwa-Kechika Management Area

Paul J. Mitchell-Banks

Abstract—The Muskwa-Kechika Management Area (M-KMA) encompasses more than 6.3 million ha (24,324 miles^2) of the Northern Rockies and Great Plains in northeastern British Columbia. The M-KMA is one of the most significant wilderness areas in North America, with extensive forests, spectacular geological formations, lakes, rivers, waterfalls, hot springs, subalpine and alpine areas, and major wetlands. It is home to a huge variety of wilderness and wildlife—much of the wilderness is ecologically sensitive and some of the wildlife is threatened or endangered. The M-KMA encompasses large oil and gas reserves, and the energy sector is a major employer in the area. The central and western areas of the M-KMA are high in metallic and nonmetallic resources. Exploration projects have been established, and there is small-scale mining of sand and gravel. Portions of the M-KMA have high timber values, with over 40 percent of the Fort Nelson (one of British Columbia's most northerly communities) economy being driven by the forest sector.

The management model at M-KMA is intended to establish a world standard for environmental and economic stability. The management intent of the M-KMA is to maintain in perpetuity the wilderness values, the diversity and abundance of wildlife, and the ecosystems on which it depends. There is significant ongoing research, inventory, planning, enforcement, education, and extension funded by a trust fund that can annually award up to $3 million to supplement government base funding in the area. Projects are awarded to government agencies, First Nations, nongovernmental organizations (NGOs) and the private sector to undertake work directly related to the M-KMA.

This paper will address the challenges of protecting and sustaining wilderness values in the Muskwa-Kechika Management Area while also attempting to manage multiple natural resource uses (trapping, hunting, oil and gas, mineral extraction, timber extraction, ecotourism, recreation, and so forth). Additional challenges stem from the commodity-based nature of the extractive industries within a global market and the uncertainties with respect to First Nations rights and claims. The paper will lay out the history of the M-KMA, review management challenges, and address five lessons learned that could apply to other such areas.

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History

The Muskwa-Kechika Management Area (M-KMA) can be considered a "child" of three Land and Resource Management Plans (LRMPs), which are large regionally based planning processes that involve multiple stakeholder participation in drawing up a plan that attempts to address the interests of all. The LRMPs can take from 3 to 7 years and involve multiple roundtable meetings that are facilitated and at which all participants are given voice. The three LRMPs and their completion dates related to the Muskwa-Kechika Management Area were the Fort Nelson LRMP covering 9.8 million ha (37,838 miles^2) (October 1997); the Fort St. John LRMP covering 4.6 million ha (17,761 miles^2) (October 1997); and the Mackenzie LRMP covering 6.4 million ha (24,710 miles^2) (November 2000). Each of these three LRMP processes essentially carved out an area of special significance that was, in turn, amalgamated to create the M-KMA (Land Use Coordination Office, Province of British Columbia 1997a, 1997b, 2000).

The 6.3 million-ha (24,324-miles^2) Muskwa-Kechika Management Area is unique within Canada and, indeed, the world. It is an area of incredible beauty that has been inhabited by First Nations for millennia and has been the home, workplace, and recreational area for local residents and international visitors for over a century. The M-KMA is:

> …one of the few remaining large, intact and almost unroaded wilderness areas south of the 60th parallel. It supports a diverse number of large mammals including moose, elk, mule deer, whitetail deer, caribou, plains bison, mountain sheep, mountain goat, wolves, black bears and grizzly bears in population densities of global importance. Few places in the world match the natural features of the Muskwa-Kechika Management Area in terms of species groupings, remoteness and minimal development. The area is also well endowed with rich energy and mineral resources. In general, oil and gas reserves dominate the eastern portion of the area while a variety of metallic and non-metallic resources can be found in the central and western portions of the area. Valuable timber resources are also present in the southern portion of the area (Land Use Coordination Office, Province of British Columbia 1997b).

The 1997 Muskwa-Kechika Management Plan sets out some ambitious objectives to address the unique beauty, biodiversity, cultural importance, and resource wealth within the M-KMA, specifying that:

> The management intent for the Muskwa-Kechika Management Area is to ensure wilderness characteristics, wildlife, and its habitat are maintained over time while allowing resource development and use, including recreation, hunting, timber harvesting, mineral exploration and mining, oil and gas exploration and development. The integration of

> management activities especially related to the planning, development and management of road accesses within the Muskwa-Kechika Management Area is central to achieving this intent. The long-term objective is to return lands to their natural state, as much as possible, as development activities are completed (Land Use Coordination Office, Province of British Columbia 1997b).

Legislation

Arguably the roots of the M-KMA lie within the three approved Land and Resource Management Plans. Specifically, however, it was a 1997 Order-in-Council (where ministers in the cabinet approve a decision without going to the legislature) that established the Muskwa-Kechika Management Plan (Land Use Coordination Office, Province of British Columbia 1997c).

The following year, the government passed Bill 37-1998, the Muskwa-Kechika Management Area Act, that directly addressed the specifics of the Management Area and Plan, provided for the establishment of the Muskwa-Kechika Advisory Board (a public advisory group) and the Muskwa-Kechika Trust Fund, and some general issues such as the power to make regulations. Both the Muskwa-Kechika Management Plan and the Muskwa-Kechika Management Act address the five required planning processes that are required to be undertaken with the area: (1) Recreation Management Plan, (2) Wildlife Management Plan, (3) Oil and Gas Pre-tenure Plans, (4) Parks Management Plans, and (5) Landscape Unit Objectives (for forestry planning). What was unique about these plans was the requirement for multiministry signoff, which was to assist in ensuring that planning was coordinated and addressed a broad range of issues and not necessarily just those of one ministry. With the new government, this has been scrapped, and now the plans are signed off by single ministries, with the Ministry of Sustainable Resource Management deemed to be a "neutral" ministry and responsible for Recreation, Oil and Gas, and Landscape Unit Objective Planning. The Ministry of Water, Land and Air Protection is responsible for Wildlife and Parks planning.

Another innovative aspect of the planning is the excellent working relationship between the local government managers who are the statutory decisionmakers. There is a teamlike arrangement, in which the managers not only focus on their own mandates but also work closely with each other to avoid duplication, conflicting programs, and uncertainty. The government managers and staff also have established close working arrangements with the M-K Advisory Board as a whole and certain board members who are active participants in various planning processes. While board participation does not replace public participation, it does provide a greater level of comfort that a wide range of values are being addressed.

Muskwa-Kechika Advisory Board

The Muskwa-Kechika Advisory Board is appointed by the Premier of British Columbia Province. Its role is to provide advice on the natural resource management in the M-K Management Area and to identify suitable projects and proposals consistent with the purposes of the trust to receive Trust funding (Minister of Environment, Lands and Parks 1998).

The board was originally established with up to 17 members to represent a broad range of interests, including but not limited to, First Nations, environmental, business, labor, and Fort Nelson and Fort St. John Land and Resource Management Plan participants. The current board is slightly larger, including the acting chair, seven First Nations representatives, three local government representatives, two members from the Oil and Gas sector, one mining sector representative, a forestry representative, one labor representative, two environmental representatives, one trapper guide member, a member of the British Columbia Wildlife Federation, a backcountry tourism representative, and the Muskwa-Kechika Program Manager (ex-officio position).

Over the past year, the Strategic Plan and Policy and Procedures Manual for the Board has been approved, and there has been a concerted effort to increase the levels of awareness regarding ongoing issues and concerns. Muskwa-Kechika Advisory Board meetings are held a minimum of three times a year, with at least one of the meetings being held deep within the M-KMA to help orient the board members to the issues and to increase their awareness about the Muskwa-Kechika Management Area.

Muskwa-Kechika Trust Fund

One of the unique legislative features behind establishing the M-KMA was creating the Muskwa-Kechika Trust Fund, which has two primary purposes: (1) to support wildlife and wilderness resources of the management area through research and integrated management of natural resource development; and (2) to maintain in perpetuity the diversity and abundance of wildlife species and the ecosystems on which they depend throughout the management area. The trust fund is currently annually provided with $1 million Canadian per year, as well as a project fund top-up allowance in which the government will match dollar for dollar contributions, to a maximum of $1 million. The base funding, as well as the maximum matching, creates a maximum annual fund of $3 million.

Every fall there is a call for project proposals that are submitted to the Muskwa-Kechika Advisory Board, subject to a number of review processes, and then reviewed by the Board with recommendations passed on to the trustee of the trust fund. After the trustee has reviewed and approved the recommended projects, management of the projects is then given to the Muskwa-Kechika Program Manager who serves as the trust fund projects manager and comptroller. Funding agreements addressing deliverables, reporting, and funding arrangements are negotiated and signed. Currently, there are five project funding envelopes under the trust fund: (1) building an information base, (2) supporting planning, (3) improving management, (4) advancing applied science (research), and (5) promoting awareness and involvement. Every year the Premier (head of the Provincial Government) is given a report from the Muskwa-Kechika Advisory Board regarding the activities of the Board and the highlights of the trust funded activities. There is ongoing research with wildlife and habitat, particularly for certain species such as grizzly, moose, elk, and Stone sheep.

Historically Significant Activities

Of all the activities within the M-KMA, it is the oil and gas sector that is currently the most active, the most visible, and that will likely create the greatest management challenges. With the recent sharp increases in both oil and gas commodity prices, there is renewed interest in investing in exploration and development, and this has led to a sharp increase in the number of seismic, drilling, facilities, and pipeline applications (Oil and Gas Commission 1999). The oil- and gas-rich Western Canada Basin extends into the northeast corner of British Columbia and extends west into the M-KMA. While to date the majority of the oil and gas activity is outside of the M-KMA boundaries, given the high prices, there is increasing pressure from industry and a desire by government to complete the pre-tenure planning within the M-KMA, and thus open planned areas to oil and gas development. During the fiscal year ending March 31, 1999, a total of 1,801 applications were approved, and for the fiscal year ending March 31, 2000, a total of 2,487 applications were approved—representing a 38 percent increase. Results are not available for the fiscal year that ended March 31, 2001, but an increase is expected again. One of the oil and gas exploration initiatives that received a high degree of review and discussion occurred at Chicken Creek in the Upper Sikanni area (one of the Resource Management Zones or management units on the southeast side of the M-KMA). This is an important wildlife area, and particular care is being paid to monitor any potential impacts.

Forestry is a bit of an anomaly within the M-KMA. Whereas the forest sector is one of the Province's largest and most ubiquitous industries, the Muskwa-Kechika Management Area is unique in that its timber resources are relatively limited. At this time, there is long-term planning for limited forestry development, with considerations such as road development limitations and costs, haulage distances, stand size, density, and piece size all limiting the development potential. It is possible that forestry development will be closely associated with the oil and gas sector and take advantage of roads approved for the oil and gas exploration and development. In the near future, it is quite likely that forestry will initially focus in promising areas located at the south end of the M-KMA in the Graham/North Resource Management Zone.

The vast area of the M-KMA has important mineral resource potential supported by a mineral occurrence database, existing tenure, and exploration and development activity. Historically, the area has received limited exploration, but there is significant opportunity for future mine production. One of the challenges that mining will face in the area is how to deal with the controlled access to the area—but there are opportunities to explore how to develop mines in conjunction with other industrial activities such as oil, gas, and forestry.

Trapping and guide-outfitting are historically important activities within the M-KMA. While the numbers of employees does not come close to approaching the oil and gas sector, there is still a strong commitment through both legislation and ongoing management and planning to ensure that these activities are supported and that their needs are considered among all of the industrial activities. Hunters, anglers, and backcountry recreationists have historically accessed the area, with users from the local communities as well as others traveling great distances to take advantage of the vast wilderness spaces found within the M-KMA. Obviously, wilderness values are important to these users.

Management Challenges

There are numerous challenges in attempting to effectively manage the M-KMA. The most obvious one is the sheer size of the area at 6.3 million ha (24,324 miles^2). Access is extremely limited (and controlled through Access Management) as directed by the LRMPs—with only a few roads, and trails that are accessed by horseback, snowmobile, or all-terrain vehicles. Government staff make extensive use of helicopter and jetboat transport to access the M-KMA because ground access is so limited. Fuel often has to be remotely cached for both helicopters and jetboats due to the long distances from staging points and the size of the M-KMA itself.

Along with the huge distances are the extremes in temperature, with seasonal fluctuations of 80° C not uncommon. At –40 °C (–40 °F), equipment is subject to heavy wear and it is trying on the staff as well—particularly if there is a breakdown or incident such as getting stranded. All staff carry emergency survival gear (cold weather sleeping bags, first aid kits, rations, satellite phones, and so forth) in vehicles.

Another management challenge is the long distance (approximately 1,300 km [808 miles] by road, 2 hours by air) from the Provincial Capital and the location of some of the senior government executive managers that are ultimately responsible for the success of the M-KMA. Extra care has to be taken to keep the "southern" managers up to speed on the issues and actions being taken by the "northern" statutory decisionmakers responsible for government management within the M-KMA. This can be occasionally frustrating for both "southerners" who are more aware of the machinations within the legislature and the "northerners" who are more focused on the local situation.

There is the ongoing challenge of attempting to address the overall intent of three Land and Resource Management Plans (LRMPs) in the planning for the M-KMA. The LRMPs tend to deal with generalities and do not give strong direction with respect to operational planning. This lack of specific guidance is further complicated with five required plans because the legislation provides no guidance as to what the plans should entail other than the broad activities (such as recreation or oil and gas development) that they are supposed to address. As if that were not enough challenge, there is also the overriding question of what exactly is wilderness. This is a very hotly debated concept and incorporates issues such as manmade impacts and the presence or absence of people, but in the case of the M-KMA, it was a key component of the legislation but is not defined. Wilderness remains an undefined concept 4 years later in the initiative.

One of the increasing challenges for the M-KMA is the growing public awareness and level of expectations about what "could" or "should" occur within the M-KMA. It is difficult to ensure that everything that is planned—or even more challenging, simply decided upon at a political level—

can be effectively implemented. The M-KMA, by its very nature of being a new approach to planning and management, demands that the government staff, board members, and public participants in the planning process attempt to address every challenge with a set of "fresh eyes" and often innovative approaches.

The final, and potentially greatest, challenge revolves around land claims. Treaty Eight was signed over a century ago, and three of the board members represent Bands that signed the treaty. The Kaska Dena Treaty is currently under negotiation, and the treaty discussions are wide ranging and at times very intense. Any legislation, decisions, or actions within the M-KMA are "without prejudice" with respect to a future treaty with the Kaska-Dena. Four of the board members represent Kaska Dena Bands (communities). A Letter of Understanding (LOU) was signed in 1997 between the Provincial Government and the Kaska Dena Council to permit land use planning and other government management initiatives to continue, pending the signing of a treaty. The LOU specifically:

> ...sets out a relationship between the two parties with respect to the planning and management of lands and resources in the LOU area from the date of signing of this Understanding until such time as it is terminated according to the provisions of this Understanding (Government of British Columbia and Kaska Dena Council 1997).

Planning and management is underway without any future certainty with respect to what lands the Kaska Dena may be awarded in the north and particularly in the Muskwa-Kechika Management Area.

Lessons Learned to Date

There have been five major lessons to date from the Muskwa-Kechika Management Area initiative.

Lesson One: There Is a Need for Adequate Data and Knowledge

The first lesson revolves around the challenges of having or obtaining adequate data and knowledge about the wilderness qualities, wildlife and habitat values, natural resource values, and land management challenges. The difficulties stem not only from the 6.3 million-ha (24,324-miles^2) size but also from the tremendous biodiversity, differences in physiogeography, and the problems of access to the area. Many of the Resource Management Zones (management units) are hundreds of kilometers dimensionally, and travel by either helicopter (running between $800 to $1,000 per hour) or jetboat (time consuming for staff) rapidly consumes limited budget dollars and staff time.

The LRMPs were completed under a previous government that was not as time or cost conscious as the current government. This has led to challenges when the successor government cut back on staffing and budgets, and so the same challenges remain with fewer resources to address them. A lesson here is to formally commit (through legislation) to adequately follow up on unique land management initiatives to ensure their successful implementation. Another strategy is to aggressively use triage and a project management approach to see what the critical steps are in the process that are time sensitive, and to focus on those and practice risk management with respect to the budget and timeline. In the case of the M-KMA, this requires cooperation between the Advisory Board and the Government that was not always in place, with both parties having differences of opinion with respect to priorities. In retrospect, the government should have mandated that all planning would be completed prior to the expenditures from the Trust Fund being used for any other approved purposes, such as training, extension, or noncritical research.

Lesson Two: There Is a Need for Accurate and Timely Analysis and Decisions

The second challenge is related to the previous lesson but centers around the challenges of accurate and timely analysis and decisionmaking. This challenge involves a number of components, including translating field data into the Geographic Information System (GIS), and devising adequate tools to verify, correct, analyze, manipulate, and map the output. A current initiative underway is determining how to undertake sensitivity analysis and scenario planning to permit the planners and management teams to have a better understanding of potential consequences or outcomes. GIS tools are being explored. GIS staff are in high demand from both the government and private sectors, and we have lost a number of high quality staff as a result of this—which has in turn led to losing institutional geographic familiarity, working relationships, technical skills, process memory, and having to repeatedly retrain staff.

There are also the challenges of timing with respect to planning requirements, implementation, and ongoing operational management. Politicians and industry can push a timeline to finish planning and create "certainty" that leads to challenges at best, and failure at worst, to complete planning in a comprehensive and integrated fashion. This becomes particularly frustrating with complex landforms and resource values, and also heavy industrial and economic development pressure—both of which apply to the M-KMA. Oil and gas development pressure is particularly strong, and remains so, with political instability in other oil-producing areas. A troubled forest economy and significantly reduced mining and fishing within a staples economy create fiscal pressures on the government, which seeks to fuel its treasury through oil and gas development.

There are ongoing challenges with respect to out-of-date inventories and missing inventories. Integrated and interactive planning tools, such as Conservation Area Design, are being completed on timelines that do not inform planning from the beginning, with the tools having to be creatively shoe-horned into the truncated planning timelines—which severely limit the benefits and values that can be obtained from the tool development and application processes. Ideally, a Conservation Area Design would be completed before any resource use was contemplated—and this is legislatively possible within the M-KMA—but due to heavy government and industrial pressures, the planning is accelerated, and planners and land managers make the best with what they have and can obtain within the planning timelines.

Similarly, incomplete and/or out-of-date inventories can severely constrain the accuracy or value of management decisions and planning. The adage "garbage in garbage out" applies to planning as much as it does to models and simulations.

There are a number of things that would greatly assist accurate and timely analysis and decisionmaking of the M-KMA:

1. Creatively retaining GIS staff through providing them with challenging and intellectually rewarding tasks. Take GIS staff out into the field; this not only gives them a greater understanding of the challenges but also the pleasure of getting out into the wilderness as well as an opportunity to see the wildlife. Often the expense of doing this is minimal, as the helicopter or jetboat is already paid for and the only cost is staff time.
2. Take a project management approach to the planning challenges and be certain to fully address the obvious and potential challenges of political and economic/industrial development pressures. This not only coordinates the activities of staff but also assists in expectation management and in establishing an effective communications strategy to keep all of the interested parties aware of progress.
3. Related to the previous point is the question of effective policy. There needs to be a process to be able to evaluate the short, medium, and long-term implications of planning actions or the lack thereof. It is tempting to think short term and focus on revenue generation, particularly when there are fiscal challenges for the government. Short-term solutions can result in inadequate planning, leading to financial losses through less than satisfactory resource planning (suboptimal planning for effective use or extraction) or greater costs (associated with environmental restoration and remediation). As importantly, and arguably ethically more so, there is also the potential for species and habitat losses. There is a strong argument that these should be fully incorporated in the thinking in any policy evaluation, development, and implementation/administration.

Lesson Three: There Is a Need for Adequate Resource Funding

The third challenge involves obtaining adequate resource funding for travel, sufficient staffing, equipment, and resources to effectively manage the area, and to be able to address not only ongoing management needs, but to also proactively address anticipated developments—such as oil and gas exploration and development continuing to increase in both scale and scope. Hiring freezes, challenges in finding and retaining staff, particularly those in the GIS area, compound this problem. The Trust Fund provides some security in potential funding, but all government-proposed projects seeking trust funding have to be vetted before the Advisory Board and receive recommendations prior to being approved by the Trustee (who is the Minister of Sustainable Resource Management). This has led to some frustration on the part of the Advisory Board as to what are government core responsibilities (which the trust fund is not supposed to give money for), and what are activities incremental to base funding. The frustration is mirrored by government staff, who "see" the money being potentially available in the trust fund, but not necessarily accessible for government activities.

There are a number of ways to reduce this occurring:

1. When drawing up the initial legislation or policy to establish the area, real attention should be paid to the future implications and costs of the planning and management required. In other words, if you are building a Rolls Royce, then budget a lot of resources to successfully do this—if a Volkswagon, then your resource requirements will be less.
2. Commit to finishing one initiative or related initiatives prior to taking on new challenges. Do not be tempted to spread resources thinly, attempting to do a little bit of everything. This relates to the project management argument—do the things that need to be done first, and make certain that they are done adequately well. You don't want to have an elegant planning process established with no data to feed into it, for example.
3. Ensure that there is a clear understanding through legislation and administrative procedure on how funds and staff time can be employed, and be consistent with the approach while being flexible to real emergencies and not just "nice to dos." The Trust Fund administration was clouded by some uncertainty with respect to how it could be used, and more importantly, what exactly were the government core responsibilities that were not meant to be funded, but which in reality often lacked funds and were key to making the M-KMA work.
4. Initiate a fund-raising strategy as soon as the area is established or the initiative implemented. Four years into this process, fund raising is only now beginning to be seriously looked at—and it is a case of being very late to start and having lost some very positive media opportunities while the initiative was still new.

Lesson Four: Politics and Agendas

Politics and agendas are the fourth challenge, and are an inherent part of the Muskwa-Kechika Management Area initiative. There are politics in the capital with politicians responding to lobbying and making decisions without consulting Government staff—often with very frustrating consequences, as the decisions are often made without any appreciation of the existing situation or resources available to Government staff. The Muskwa-Kechika Advisory Board is very political, with every member having a constituency and an agenda to address within the area. Government managers and staff are also political in that they have the mandate of their ministries to fulfill, and there can be clashes between the ministries with their conflicting agendas. One of the most challenging aspects of the Muskwa-Kechika Program Manager's job is to champion the Muskwa-Kechika Management Area initiative and to serve as a liaison between the various groups and promote effective communication, "buying" into a common vision and cooperation. This job plays a keystone role in not only holding the process together, but also encouraging it to progressively continue forward.

Politics are always a wild card. Politicians can be very challenging with respect to how they respond to perceived problems—but their perception is often heavily influenced by either key supporters, effective lobbyists, political assistants,

or general public opinion—all of which are quite capable of leading to decisions that do not support effective land use planning. Communication and documentation play a key role in setting the stage and making information and potential scenarios known—it is more difficult for a political decision to be made that is adverse to the land use management if key supporters of the initiative (both within and without Government) are aware of the facts and the situation, so that decisions are not made and observed in a vacuum. Management often involves a lot of time explaining to people what is going on, and as importantly, what might go on.

Lesson Five: There Is a Need to Define Roles and Responsibilities

The Muskwa-Kechika Advisory Board is unique in the Province not only for the scope of their advisory and monitoring function, but also in that they are the body that makes recommendations for a multimillion-dollar trust fund. Funding has grown increasingly scarce over the last decade, and the trust fund is drawing increasing attention from both within and without Government.

In many ways, it is the trust fund that can potentially serve the greatest role in ensuring that the Muskwa-Kechika Management Area is a successful initiative, and there needs to be a healthy appreciation between the Muskwa-Kechika Advisory Board and government staff in how to best apply the fund to complement existing government statutory responsibilities and initiatives. The trust fund is there to advance the Muskwa-Kechika Management Area with a view to maintaining the unique features of the area, while also permitting industrial and economic development over three-quarters of the area. This is a daunting, but not insurmountable challenge. It will require all parties and individuals involved to assume their roles and cooperatively work with everyone else to fulfill not only their individual responsibilities but also those of the group as a whole. There needs to be a greater accountability for decisions that are made and a greater attempt to let the general public know how the funds are being spent.

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National Landscape Conservation System: A New Approach to Conservation

Jeff Jarvis

Abstract—The U.S. Department of the Interior's Bureau of Land Management (BLM) has created a National Landscape Conservation System (NLCS) in response to their growing shift toward protection of special areas. This NLCS brings National Conservation Areas, National Monuments, Wilderness, Wilderness Study Areas, Wild and Scenic Rivers, and National Historic and Scenic Trails into a single network in order to improve protection of benefits and increase public awareness of scientific, cultural, educational, ecological, and other values.

Introduction to the Bureau of Land Management

The Bureau of Land Management (BLM) is responsible for more land than any other agency in the United States of America with over 260 million surface acres (1.05 million km^2). The vast majority of this land is located in the arid western third of the United States and in Alaska. These lands are the canyons, deserts, and cacti of the American Southwest, the open landscapes of the short grass prairie, the isolated tundra, the wide-open landscapes that surround Western towns, and the isolated retreats that often form the image of the American West. Public lands managed by the BLM are those Federal lands left over from the early years of Western expansion. In the country's first 150 years, our national policy was to dispose of these Federal lands to build a strong nation, raise funds, and encourage settlement of new territories. Lands were sold or given to settlers, homesteaders, veterans, towns, colleges, private corporations, and States. Some of the land was set aside to become National Parks, National Forests, Wildlife Refuges, Indian Reservations, or Military Bases. During the disposal era, over 1.1 billion acres (4.45 million km^2) of public lands were transferred out of Federal ownership.

The disposal era ended for the BLM in 1976 with passage of its organic act: The Federal Land Policy and Management Act. This law changed the course of BLM management in numerous ways including directing that public lands are to be retained in Federal ownership. The lands that remained are the 260 million acres (1.05 million km^2) of public lands that are now managed by the BLM. The BLM-managed public lands are a priceless legacy and a long-term investment for the American people. Prized originally for their commodity value, today the public lands offer much more: unparalleled recreational opportunities, wildlife reserves, and in the increasingly crowded American West, one of the last guarantees of open space.

Special Values Identified

In the 1960s, Congress began to recognize the need to protect some of the natural, historical, and cultural resources on these public lands. Efforts designed to raise awareness of the BLM started in 1964 when the lands were renamed the National Resource Lands. The need to protect the unique values of public lands was realized by BLM and Congress over the next decade. A major step in creation of a BLM land protection system was taken in 1970 when Congress created the King Range National Conservation Area on California's northern coast. This first National Conservation Area was designated to conserve and develop for the use and benefit of the people of the United States the lands and other resources under a program of multiple use and sustained yield.

Congress expanded the areas protected under national designations numerous times in the following decade. The 10.6 million acres (42,897 km^2) within the California Desert Conservation Area were set aside in 1976. The Steese National Conservation Area, which contains 1.2 million acres (4,856 km^2) in east-central Alaska, was designated in 1980 to protect wild and scenic rivers, crucial caribou calving grounds, and Dall sheep habitat. Additional protective designations were passed into law for the rugged lava flows on New Mexico's El Malpais "badlands" (1987), the rich wildlife and riparian area along Arizona's San Pedro River (1988), and other areas throughout the West. In total, Congress created 14 National Conservation Areas in eight Western States from 1970 to 2000.

In 1996, the BLM was entrusted with the responsibility of managing its first National Monument with the Presidential Designation of the Grand Staircase-Escalante National Monument in Utah. The Grand Staircase-Escalante National Monument was designated to protect the area's objects of historic or scientific interest, including geologic treasures, world-class paleontological sites, extensive archeological resources, and outstanding biological resources. Since then, the BLM's responsibilities have continued to expand. Congress and the President created an additional 14

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National Monuments in seven additional States from 2000 through 2001.

In addition to National Conservation Areas and National Monuments, Congress used a variety of protective designations to protect the natural values of other landscapes, including Wild and Scenic Rivers, National Trails, and Wilderness. This explosion in land protection led to numerous changes in the BLM. The agency began the slow process of changing from an agency responsible for developing commodities to an agency with an additional new mission, the long-term conservation of public lands.

These designations created a pattern of special areas where the overriding objective was long-term conservation, restoration of the land, and protection of biological diversity. A set of common management prescriptions emerged: the areas are withdrawn from disposal, there is more intensive management focused on providing visitor services and interpretation, and restoration is a priority. Many of the areas are also withdrawn from mineral entry.

During development of these conservation designations, Congress and the BLM learned that no single type of designation was appropriate for all situations and no single designation was adequate to protect all the landscapes that deserved protection. In some cases, Wilderness was the most appropriate designation. In other situations, a National Conservation Area designation did a better job of protecting an area's values while allowing certain existing uses. In some cases, it is appropriate to have more than a single designation for a special landscape. This most often occurs when a Wilderness, Wild and Scenic River, or National Trail is located within a National Conservation Area or National Monument.

National Landscape Conservation System

Although this expanding collection of special areas was managed under somewhat consistent prescriptions, the BLM did not have an organized approach to management of these areas. In the summer of 2000, the BLM responded to the growing concern over management of these areas with creation of the National Landscape Conservation System (NLCS). The NLCS brings into a single system BLM's most protected landscapes. By putting these lands into a single system the agency hopes to improve management of these special areas, improve public benefits that flow from a well-managed system of conservation areas, and increase public awareness of these areas' scientific, cultural, educational, ecological, and other values. The NLCS includes the BLM's National Conservation Areas, National Monuments, Wilderness, Wilderness Study Areas, Wild and Scenic Rivers, and National Historic and Scenic Trails.

Although the NLCS does not create any additional legal protections, the BLM manages these great landscapes of the American West with a set of common principles:

- The conservation of natural values is of primary concern.
- Areas are managed in partnership with surrounding communities. In developing management plans, the BLM is working with local communities, particularly with regard to amenities such as food services and lodging. The BLM does not provide food, lodging, and intensive visitor services within the areas. Instead, visitors are encouraged to see the landscape in the context of the history and tradition of the entire region. Intensive services are provided by the surrounding communities.
- Conservation Areas and Monuments often include within their boundaries Wilderness and Wilderness Study Areas or Wild and Scenic Rivers, where motor vehicles are excluded. Outside such areas, the maintenance of roads and the use of motor vehicles are managed to protect fragile soils, riparian areas and other plant communities, and wildlife habitat. Vehicles are restricted to designated routes.
- Valid existing rights such as existing mineral leases are recognized.
- Traditional uses such as grazing and hunting will continue, provided that these activities are consistent with the overall purpose of the area. The BLM recognizes that in many instances these uses can be compatible with good wildlife management, protection of biodiversity, and enhancement of natural values.
- Many of the areas are unavailable for development under the Mining Act of 1872 and various other general lands laws that are incompatible with long-term protection of our natural environment.
- Management plans should be prepared, or existing plans reviewed and updated, to reflect the importance of the conservation principles for which the place has been recognized.
- Acting with public and private partners, the BLM can be the paradigm of the Interior Department's motto: Communication, cooperation, and consultation all in the service of conservation.

Early Success

Although it is too early for an assessment of the NLCS, its creation appears to be a success. The BLM has improved management of these special areas. Improved management has in part been the result of an increase of approximately $9 million in operation funds and $4 million in planning. These funds have been used to increase staffing, improve visitor services and facilities, and provide public information. The benefits from increased emphasis on planning will take several years to show but will result in improved management of various uses, restoration of disturbed areas, and numerous long-term efficiencies in delivering public service.

Public interest and support has been outstanding. Numerous national publications, including the *National Geographic*, *Audubon*, *Sunset Magazine*, *Sierra*, *Sky Magazine*, *Wilderness Magazine*, *Backpacker*, and *USA Today*, as well as untold local newspapers, have celebrated formation of the NLCS and discussed some of the more outstanding landscapes protected under the umbrella of the system. And finally, public support is building. One example of this is public response to a series of letters sent by the Secretary of the Interior, Gale Norton, requesting the views of public officials regarding the management of the National Monuments. Over 7,000 responses have been received. The majority of these letters and E-mails addressed the overall topic of monuments, without focusing on a particular area, and

supported protecting all newly designated monuments. However, the majority who wrote about a particular area also supported the management and protection of the monuments. Similar to the creation of the National Parks in the 1900s, some of the areas have been controversial. The majority of Americans recognize the importance of these designations, however, and support their long-term conservation management.

The Future

In an increasingly crowded American West, NLCS lands are unique. They are havens of solitude and a reminder of the West as it originally was. The BLM is proud to be stewards of these special landscapes. As we continue to improve our long-term conservation management of these landscapes, we will assure the increased benefits that flow from a well-managed system of conservation areas.

Conservation Areas

With over 800 units in the NLCS, it is not possible to describe them all. Summarized below, however, are a few of the areas in the System:

National Conservation Areas

Black Rock Desert-High Rock Canyon Emigrant Trails (December 21, 2000)—This area includes nearly 800,000 acres (3,237 km^2) in northwestern Nevada. Ten Wilderness Areas provide additional protection to the rugged interior mountain ranges in the area. A National Historic Trail protects wagon wheel ruts and historic inscriptions, largely unchanged from when pioneers moved westward through the area in the 1800s.

California Desert (October 21, 1976)—This area's 10.6 million acres (42,897 km^2) feature vast desert areas with a myriad of wildlife and recreational opportunities. The desert's outstanding values are also protected within 65 Wilderness Areas, one National Monument, and two National Trails.

Colorado Canyons (October 24, 2000)—From saltbush desert to the spectacular canyons of the Black Ridge Wilderness, this diverse area in west-central Colorado encompasses over 122,000 acres (494 km^2), including more than 75,000 acres (304 km^2) of Wilderness.

El Malpais (December 31, 1987)—These 226,000 acres (915 km^2) of rugged lava flows in west-central New Mexico display some of the Nation's most significant geological, cultural, scenic, scientific, and wilderness resources.

Gila Box Riparian (November 28, 1990)—This 22,000 acre (89 km^2) desert oasis contains cliff dwellings, historic homesteads, Rocky Mountain bighorn sheep, and more than 200 species of birds in southeastern Arizona.

Gunnison Gorge (October 21, 1999)—A variety of natural and geologic features and unsurpassed recreational opportunities are on display in western Colorado's Gunnison Gorge, a 57,725-acre (234-km^2) area. This unit supports a diverse range of uses such as whitewater rafting, big-game hunting, and domestic livestock grazing. The inner gorge is designated Wilderness.

King Range (October 21, 1970)—West of Arcata, 35 miles (56 km) of remote coastline comprise the 57,000-acre (231-km^2) King Range, the nation's first National Conservation Area.

Las Cienegas (December 6, 2000)—This area's 42,000 acres (170 km^2) of desert grasslands and rolling oak-studded hills in south-central Arizona are home to a great diversity of plant and animal life, including several threatened or endangered species.

Red Rock Canyon (November 16, 1990)—This 197,000-acre (797-km^2) area outside of Las Vegas boasts unique geologic features, plants, and animals that represent some of the best examples of the Mojave Desert. The area offers spectacular climbing and hiking opportunities. The most remote mountain areas within the NCA are also designated Wilderness Study Areas.

San Pedro Riparian (November 18, 1988)—This 56,500-acre (229-km^2) area in southeastern Arizona supports over 350 species of birds, 80 species of mammals, and 40 species of amphibians and reptiles.

Snake River Birds of Prey (August 4, 1993)—Home to the largest concentration of nesting raptors in North America, this 485,000-acre (1,963-km^2) area in southwestern Idaho provides a complete and stable ecosystem where both predators and prey occur in extraordinary numbers.

Steens Mountain (October 30, 2000)—Officially called the Steens Mountain Cooperative Management and Protection Area, these 425,500 acres (1,722 km^2) in southeastern Oregon include volcanic uplifts, glacier-carved gorges, wild rivers, wilderness, and diverse plant and animal species.

Steese (December 2, 1980)—This 1.2-million-acre (4,856-km^2) area in east-central Alaska contains a Wild and Scenic River, crucial caribou calving grounds, and Dall sheep habitat.

Headwaters Forest Reserve (March 1, 1999)—These 7,400 acres (30 km^2) in northern California, comanaged with the State of California, protect old-growth redwood stands that provide habitat for threatened species such as the marbled murrelet, a seabird, and coho salmon.

National Monuments

Agua Fria (January 11, 2000)—An hour north of Phoenix, Agua Fria's 71,000 acres (287 km^2) host one of the most significant systems of late prehistoric sites in the American Southwest.

California Coastal (January 11, 2000)—This National Monument includes all the islands, rocks, and pinnacles off the 840-mile (1,352-km) California coast. These areas provide essential habitat for an estimated 200,000 breeding seabirds.

Canyons of the Ancients (June 9, 2000)—Located in southwestern Colorado, this 163,000-acre (660-km^2) area contains the richest known concentration of archaeological sites in the United States.

Carrizo Plain (January 17, 2001)—Remnant of a once vast grassland astride the San Andreas Fault zone, this unit's 204,000 acres (826 km^2) in central California are a critical refuge for several endangered and threatened animal and plant species.

Cascade-Siskiyou (June 9, 2000)—The convergence of geologically young and old mountain ranges gives this 53,000-acre (214-km^2) Monument in south-central Oregon an extraordinary degree of biological diversity.

Craters of the Moon (November 9, 2000)—The 272,000 acres (1,101 km^2) of this remarkably preserved volcanic landscape on Idaho's Snake River Plain contain an array of exceptional features, including cinder cones and vast lava fields.

Grand Canyon-Parashant (January 11, 2000)—This 808,000-acre (3,270-km^2) unit contains outstanding geological and paleontological features in northwestern Arizona.

Grand Staircase-Escalante (September 19, 1996)—Labyrinthine red rock canyons, high plateaus, and dramatic cliffs and terraces make up this stunning 1.9-million-acre (7,689-km^2) area in southern Utah. About one-third of the area is designated as Wilderness Study Areas.

Ironwood Forest (June 9, 2000)—This 129,000-acre (522-km^2) area protects a unique ironwood forest and a wide array of bird and animal life in southern Arizona.

Kasha-Katuwe Tent Rocks (January 17, 2001)—This area in northern New Mexico protects over 4,000 acres (16 km^2) of cone-shaped rock formations resulting from volcanic eruptions and erosion that first built up and then wore down this landscape.

Pompeys Pillar (January 17, 2001)—William Clark of the Lewis and Clark Expedition carved his name on this sandstone butte overlooking the Yellowstone River, adding to a rich record of historic inscriptions now protected as a 51-acre (21-ha) area in central Montana.

Santa Rosa and San Jacinto Mountains (October 24, 2000)—This 86,500-acre (350-km^2) congressionally designated National Monument in southern California hosts over 500 plant and animal species, including the Federally listed Peninsular bighorn sheep. The mountain core is designated Wilderness.

Sonoran Desert (January 17, 2001)—Wide valleys separated by rugged mountain ranges offer dense forests of saguaro cactus—excellent habitat for a wide range of wildlife species—in this 409,000-acre (1,655-km^2) area in southwestern Arizona.

Upper Missouri River Breaks (January 17, 2001)—The breathtaking limestone bluffs along this 149-mile (240-km), 377,000-acre (1,526-km^2) stretch of the Missouri River in central Montana remain almost exactly the same as when Lewis and Clark described them in their expedition journals. The opportunities for solitude are protected in several Wilderness Study Areas.

Vermilion Cliffs (November 9, 2000)—An outstanding assemblage of deep, narrow wilderness canyons make the 280,000 acres (1,133 km^2) in this northern Arizona Monument ideal for hiking and exploring.

Wilderness and Wilderness Study Areas

The BLM manages 148 Wilderness Areas with more than 6 million acres (24,281 km^2) and over 600 Wilderness Study Areas with18 million acres (72,843 km^2). Wilderness and Wilderness Study Areas are managed to protect their primeval character and influence.

Wild and Scenic Rivers

The NLCS includes 36 Wild and Scenic Rivers, accounting for a total of over 2,000 miles (3,219 km). These rivers, in four Western States and Alaska, offer unparalleled opportunities for recreation.

National Historic Trails

The BLM-managed portions of the National Scenic and Historic Trails are also part of the NLCS. Nine Historic Trails, including those followed by Lewis and Clark and pioneers heading to Mormon Country, commemorate the nation's cultural heritage, while the Continental Divide and Pacific Crest Scenic Trails offer 641 miles (1,032 km) of some of the country's most spectacular mountain settings.

The Wildlands Project Outside North America

David M. Johns

Abstract—The Wildlands Project seeks to create a connected system of protected areas across North America that will ensure the survival of all native species, including top predators and wide-ranging species, in the context of fully functioning ecosystems. Core protected areas are designated based on the biological needs of key species and the requirements of critical ecological processes. To work they must have, or will be restored to have, those attributes traditionally ascribed to wilderness. Some critics argue that The Wildlands Project model is inapplicable to other parts of the world, especially the developing world. The inapplicability is based on nonbiological considerations. The applicability of Wildlands type conservation outside of North America is examined in light of large-scale conservation work in Latin America and Asia. In both regions, conservation efforts similar to those of The Wildlands Project are underway and show promise. There are important differences, but the similarities are significant enough to suggest the approach can be applied. The similarities between conservation work in North America, Latin America, and Asia is attributable in some cases to Wildlands Project influence. In other cases, similarities are due to similar strategies emerging from similar conditions leading to species loss.

The Wildlands Project

The Wildlands Project has been working across North America for 10 years to address the current extinction crisis. In places like the "Yellowstone to Yukon" (Y2Y) and the Sky Islands Wildlands Network (SIWN)—both multinational efforts—conservationists are developing and implementing systems of connected protected areas. These regional projects are elements within a broader, continental program stretching from the Arctic to the Darien Gap. The continental scale is important not just because the threats to nature are continental. Threats aside, continents are evolutionarily and ecologically significant (Flannery 2001; Soulé and Terborgh 1999). Prefragmentation landscape level connectivity has played a major role in structuring communities, and it affects both top-down and bottom-up regulation of ecosystems (Clark and others 1999).

The Wildlands Project was created in response to accelerating species loss and massive landscape hemorrhaging. The effects of habitat loss and degradation were magnified greatly by the loss of connectivity. The legal boundaries of protected areas were becoming actual boundaries as development and conversion consumed intervening unprotected wildlands. These actual boundaries were biologically inadequate to sustain species and processes over the long haul, even within the biggest islands like Yellowstone National Park. This was especially true for wide-ranging species such as top carnivores, some ungulates, and others, and for important ecological processes like fire and succession (Noss 1992; Noss and Cooperrider1994; Terborgh 1999). It was clear to us that more and bigger protected areas were needed, and that natural connectivity also needed to be protected and restored.

We also recognized that responding to threats, while absolutely necessary, was not sufficient. We needed to create an alternative vision, a positive vision of a biologically healthy North America. We needed to be able to say that this is what we stand for, rather than simply opposing this or that development. The best defense, it has been said, is a good offense.

Almost since the beginning, there has been global interest in our approach as outlined in various publications describing it (Noss 1992; Soulé and Noss 1998; Terborgh and Soulé 1999; Terborgh and others 1999). There has also been skepticism about the application of our model outside of North America, or even English speaking North America. The question is important because the extinction crisis is global, not North American. We need answers about what works *now*. There are two ways to approach the question of the applicability of our approach. The first is to examine essential aspects of our approach and ask whether these can or should be applied elsewhere. This approach involves more than just thought experiments, but it certainly includes them.

Another approach, the one I will take, is simply to compare our approach as it has evolved with other efforts around the world. Michael Soulé (in press) has outlined our approach in some detail. In summary, our goal is to create systems of connected protected areas that have a very high probability over the long haul of protecting existing or recovered populations of key species, including wide-ranging animals and top carnivores; that encompass functioning ecosystems of all types; that allow processes to operate unencumbered; and that can accommodate climate change. At the heart of these protected systems are big cores that have, or are restored to, a wildlands state. By wildlands, I mean self-willed land—a landscape undominated. Humans are very poor ecosystem dominants and differ from other dominants (Rodman 1987). These goals reflect fundamental values about the intrinsic worth of nature and recognize the limitations of humans to substitute their brains for evolution. Another feature of our approach is the reliance on biology, ecology, and related sciences to tell us what types of areas we need to protect, how much, and where, in order to achieve our goals. Just as we

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must have a positive vision and not just respond, so we also cannot simply accept the leftovers of civilization. We must protect biologically valuable lands. As a species, we have choices and extraordinary flexibility. Other creatures do not.

Our goals (which may be informed by a range of values) and our reliance on science (which includes all systematized and testable knowledge) are invariant aspects of our approach. The variant aspects are the human dimension. Societies vary in their patterns of land ownership and use; attitudes toward nature and other creatures; population concentration and dispersal; economic development and geographic mobility; effectiveness of law enforcement; road type and density access to wildlands and to firearms; and in their organized and financial support for conservation. These are not totally independent of biology, but interact in the application of our approach. A society without firearms and extensive motorized access may require smaller buffers (for example Oates 1999). Lands of high agricultural value are usually also of high biodiversity value. This conflict is universal. But in societies where labor-intensive agriculture predominates, there are large numbers of people present, and this creates different kinds of pressures than in societies where technologically intensive agriculture dominates and fewer people are present, most having moved to cities (Houston 2001). Those remaining, however, are usually motorized and armed.

With this model in mind, I will examine large scale conservation in Latin America and Asia. Much conservation is not at a large scale, but it is important work. Without large-scale protection, however, much will be lost.

Latin America

The Ecological Corridor of the Americas (EcoAmericas) is an effort to create a system of linked protected areas from Tierra del Fuego to Alaska along the continents' mountainous backbone (Wildlife Conservation Society 2000a). Project goals include the designation of new protected areas, the expansion of existing protected areas, and the creation of linkages, all based on the principles of conservation biology. EcoAmericas is also seeking to strengthen the management of protected areas, improve their financial health, and improve cross-boundary coordination.

In the near term, EcoAmericas is working to consolidate 36 World Heritage Sites and Biosphere Reserves totaling about 45-million ha (173,746-mi^2) (Boza 2001). These sites are in 15 countries from Argentina to Mexico. Other current subprojects include: consolidating core areas and designating connections from coast to coast in the Talamanca region (Panama/Costa Rica border); creating a new park of 25,000 ha (97 mi^2) along the Costa Rica-Nicaraguan border to maintain connectivity along the MesoAmerican Biological Corridor; creating a major, 4-million-ha (15,444-mi^2) linkage zone called the Yungas Andinas Biological Corridor from Southern Bolivia to Northern Tucuman Province in Argentina; and consolidating management and enhanced protected status for Madidi National Park, Bahuaja-Sonene National Park, and Tambopata National Reserve, which are contiguous protected areas in Bolivia and Peru that lie in the 30-million-ha (115,831-mi^2) Vilcabamba-Amboro Conservation Corridor. Work, of course, continues on the MesoAmerican Biological Corridor itself.

Not surprisingly, there are similarities and differences between EcoAmericas south of Mexico and The Wildlands Project. (Mexico north, and Wildlands efforts such as the SIWN and Y2Y, are part of EcoAmericas.) The most important similarities are:

- Existing protected areas are too small and in many cases do not include the most biologically important parts of the landscape.
- New protected areas are needed and existing protected areas need to be expanded, based on the principles of conservation biology.
- Large-scale ecological and evolutionary process are a major focus in protected area design.
- Connectivity, based on genetic, migration, and dispersal needs of selected species, is a major focus.
- A transboundary approach spans both intranational and international borders.
- Human activities in buffer zones are limited to those that are compatible with the needs of species in adjacent protected areas, and that are sustainable.

EcoAmericas differs from the Wildlands model in that:

- Biodiversity is a major focus of protection, but wide-ranging species and top carnivores are not emphasized.
- Connections are not strictly protected in most cases, but will have the status of buffer zones.
- Providing for change is a focus, but climate change is not specifically mentioned. (The MesoAmerican Biological Corridor's predecessor, Paseo Pantera, does identify climate change as a major design criteria [Sanderson 1993].)
- Limits on roads and motorized access are not emphasized.
- The ability of protected areas to contribute to the economic well-being of the adjacent communities is stressed.

On the face of things it does not appear so very different. And it is too early to tell on the ground. I will hazard some early analysis. It is one thing for scientists and advocates to call for protection of lands adequate in type, size, and location to protect most species and processes; it is another to create a political coalition strong enough to create and enforce such a strategy. It is in implementation, which requires building coalitions of various kinds (grassroots and elite), where limitations become sharply defined and the choices are often stark and difficult. Humans often desire the same biologically valuable lands that other species need. This essential tension can make it difficult to designate protected areas and certain management regimes, or to meaningfully enforce those designations and regimes. Nonetheless, it is a very important accomplishment to have conservation planning and implementation moving forward at a continental, even multicontinental, level among over a dozen countries.

Russian Far East and Northern China

There are many landscape-level protection and recovery efforts underway in this region, but I do not know of any that approach being continental in scope. Scientists from the

World Wildlife Fund (WWF) and the Wildlife Conservation Society (WCS)—both groups have a permanent and long-time presence in Asia—have proposed a large-scale framework for tiger protection and recovery (Dinnerstein and others 1997). It includes the Russian Far East (RFE), India, Southern China, Indochina, and South East Asia. Within each of these regions, they have evaluated existing tiger populations, suitable habitat, and mortality pressures, and recommended priorities for protection. They propose clusters of core areas and connectivity among them to maintain tiger populations. Habitat fragmentation, as well as habitat loss, is considered a major immediate threat. The solutions they propose are transboundary.

Another large-scale effort involves increased coordination within Russia among Zapovedniks (Maleshin 1999; RCN Editors 1999b). Established over the decades, based on scientific findings of high biological value (ecosystem representation, not focal species), Zapovedniks have generally been managed fairly independently, notwithstanding centralized funding. In the last decade, a lack of funding from the central government has driven Zapovednik leaders to seek joint solutions to their problems. Notwithstanding the economic driver, discussions of biological problems and joint strategizing about dealing with islandization and other threats have occurred. Recognition of the importance of cooperation across Russian administrative boundaries and internationally has also increased.

Large-scale conservation planning and implementation in the RFE and Northern China is well underway. Interaction with similar efforts exists, but not day-to-day coordination. One of the more important efforts is being led by the Wildlife Foundation, headquartered in Khabarovsk, and founded by Alexander Kulikov and others (Wildlife Foundation 2000). The Foundation works with other regional nongovernmental organizations (NGOs), international NGOs, and government agencies in Russia, China, Mongolia, and North Korea. Their work emphasizes protection of the Siberian (Amur) tiger, Far Eastern leopard, Japanese and hooded cranes, and other rare, threatened, and endangered species.

Protection of core areas by Zapovednik or other designation, connectivity, and management of other areas for protection are primary tools. Extensive biological analysis of target species, prey populations, habitat cover, and other factors underlies the mapping and proposed management regimes. The Foundation also works to stop poaching, to cooperate with the Convention on International Trade of Endangered Species (CITES) and government agencies on illegal trafficking, and to find economic alternatives to the most destructive, extractive activities. The Khabarovsk Krai Government, due to the Wildlife Foundation, its cooperators' efforts, and WWF funding, has committed to protecting 10 percent of its land base in a system of connected cores.

Protection of the region's top predator, the Amur or Siberian tiger, has attracted many international NGOs and scientists. In 1995, Bruce Marcot identified three corridors that would link tiger habitat in the RFE and Northern China. The first, along the Sikhote-Alin Mountains, runs mostly north-south, linking various Zapovedniks, parks, and refuges. It also includes east-west linkages to important tiger habitat. Two other corridors are proposed: one linking tiger habitat in Khaborovsk with tiger habitat in Heilongjiang Province, China; and another linking habitat in Primorsky with that in Jilin Province, China, and North Korea.

Miquelle and others (1999) and Pikunov and Miquelle (2001) developed a more comprehensive proposal for Far Eastern leopard and Amur tiger conservation that stretches across Northeast China and the RFE. They have recommended connecting existing and proposed protected areas with a system of corridors to create a core network. They also recommend protecting all potential habitat outside the core through a zoning system to delineate and appropriately manage high-priority tiger habitat. They argue that all remaining tiger habitat must be retained to sustain a minimum population of at least 500 tigers. Habitat outside of the core system would be managed to provide for sustainable human use compatible with tiger and leopard protection. Restrictions would include limited road access, low-intensity logging, and well-controlled ungulate hunting. The plan calls for transboundary connectivity at three points along the Sino-Russian border. The first step toward creation of transboundary protected areas has been taken with the creation of the Hunchun Tiger and Leopard Reserve in Jilin Province, China. Khabarovsk has agreed to implement a refined version of this plan, while in Primorsky Krai, planning is still in the early stages.

As part of the same effort, Pikunov and others (2000) have proposed large, core-protected areas, connections, and regionwide zoning to ensure the survival of the Far East (Amur) leopard. They stress the problem of fragmentation and the need to protect very large areas and connect them. Without such action, human activity will continue to cause behavior changes and disrupted family structure that undermines successful reproduction, and the leopard will continue sinking toward extinction.

The Wildlife Conservation Society and the Heilongjiang Forestry Department sponsored a workshop in October 2000 to plan a transboundary tiger and leopard reserve and also to protect prey species (WCS 2000b). The New York Times reported on September 11, 2001, that a reserve was established on the Chinese side.

Large predators are not the only focus of conservation in Asian Russia. The two pieces of Khingansky Zapovednik—home to endangered cranes and storks, as well as over 1,000 vascular plants—have been connected by creation of a special purpose preserve (Andronov 2000). The Zapovednik was enlarged earlier so that it would be big enough to contain all of the essential elements of critical hydrological processes. Anthropogenic fires started outside the reserve are a real threat to forests, and management changes have been proposed to address this problem.

In Central Asia, where Russia, Mongolia, and Kazakhstan border each other, the Argali sheep has been confined to islands in the high mountain ranges. Historically, these areas were connected, and the sheep seasonally used the lowlands. Efforts are underway to expand the two Zapovedniks in Russia, create new protected areas, and provide connectivity (Paltsyn 2001). In northwest Siberia, the 5-million-ha (19,305-mi^2) Great Vasyugan Bog is home to high plant and animal diversity. A protection plan spanning several jurisdictions and watersheds is being implemented (Valutsky 2000). It includes several large core areas and connections.

In Kamchatka, the League of Independent Experts and others are proposing linkages among existing protected areas and the creation of many new protected areas (Russian Academy of Sciences 2000). Before the fall of the Soviet Union, most of Kamchatka was off limits to exploitation, and the region was shrouded in military secrecy. Since the Soviet demise, the region has opened up to exploitation while law enforcement has been weak. There is a tremendous urgency to do the scientific work necessary to identify areas needed for protection; work done to date suggests much critical fish, avian, and bear habitat are not protected.

This brief review of some major conservation work in Russian Asia and Northern China suggests some important similarities with North American conservation, including:

- Conservation has long been science based in Russia, perhaps back to the turn of the 19th century (Weiner 1988); other countries such as China, and Mongolia have moved in that direction.
- There is widespread recognition, in the face of increased development and other threats, that existing protected areas are too small and need to include additional critical habitat.
- New protected areas are needed, or absent that, zoning is needed that effectively manages additional important habitat for biodiversity.
- Buffer zones are used to limit human activities to those that are compatible with the needs of species in adjacent protected areas.
- Predators are frequently emphasized in conservation planning and implementation as both umbrella and flagship species.
- Top predators, and in some cases large-scale ecological and evolutionary processes, are a major focus in protected area design.
- Connectivity, based on genetic, migration, and dispersal needs of selected species, is a major focus.
- Transboundary approaches are common, spanning both intranational and international borders.
- Limiting roads and motorized or other illegal access are emphasized.

There are also important differences that cannot be minimized:

- Continental-level planning is not well developed, and where it is emerging, it is driven by the need to develop economic support for protected areas, rather than by a biologically based strategy.
- Broad, multispecies based reserve design is occurring in some regions, but not most.
- High quality habitat is in many cases not proposed for status as a core protected area, but is zoned for multiple use with management regimes aiming to prevent habitat degradation, poaching, and so forth.
- Climate and other anthropogenic change is rarely noted as a criteria for reserve and connectivity design and designation.
- The ability of protected areas to contribute to the economic well-being of the adjacent communities is often stressed in justifying their continued existence and/or in proposals for new protected areas.

It is not too surprising, given the many biological, demographic, scientific, and even cultural similarities between northern Asia and northern North America, that conservation efforts should also show similarities. Differences between the two large regions in economic stability, infrastructure development, effectiveness of law enforcement, role of international borders, and stable funding for conservation are real and important. They call for different strategies, if not for different goals. Continental level coordination may emerge in the future, but for now Asia, even northern Asia, is very big, very diverse, and resources comparatively limited.

South and Southeast Asia

The Wildlife Protection Society of India (WPSI), founded in 1994, identifies habitat fragmentation as a major threat to wildlife, along with direct habitat loss (WPSI 2001). Illegal trafficking, understaffed protected area management and enforcement, and extractive encroachment are also high on the list of threats. The thrust of much WPSI activity is on improved enforcement, especially poaching and international trade in tigers and tiger parts. Although committed to broad biodiversity protection, they see the Bengal tiger as a flagship and an umbrella species. By protecting tiger habitat much else is protected.

But tiger habitat is shrinking, not growing. Since 1973, India has lost one-half, or 50,000 km^2 (19,305 mi^2), of its tiger habitat (Sahgal and Scarlott 2001). The number of tigers is down from 4,000 in 1990 to 3,000 now, and only about 8 percent of the historic population of about 40,000 live in and around 26 reserves and parks. Like Yellowstone National Park, Glacier National Park, and the Bob Marshall Wilderness area, Indian reserves such as Ranthambhore and Sariska were once linked by 150 miles of forest, but they are no more. Increasingly, forests are cut right to reserve boundaries, and even beyond. Illegal woodcutting and edge effects are not limited to poor villagers and desperate poachers, but to industrial logging, industrial mining, and hydro operations—much of it driven by globalization and international financial institutions like the new, ecofriendly World Bank. The solution to this onslaught, Project Tiger advocates say, is bigger reserves and the re-establishment of connectivity.

Dinnerstein and others (1999) agree that existing reserves are too small and cannot function as islands. Buffers must be expanded, access by nearby large human populations must be limited, and dispersal corridors must be recreated if tigers are to persist. Voluntary resettlement of those living in protected areas is also considered essential, along with better enforcement: constant patrols, improved radio communications, armed backup, and an undercover strategy to tackle professional poachers and smugglers, many of whom are primarily drug traffickers (Kumar and Wright 1999). Providing local people with a share in protected area revenues is also seen as important in gaining their needed support.

Significant similarities exist between South Asian conservation work and North American work. Conservationists in southern Asia recognize:

- Existing protected areas are too small and in many cases do not include the most biologically important parts of the landscape.
- New protected areas are needed and existing protected areas need to be expanded, based on the principles of conservation biology.
- Top predators are important as umbrella and flagship species; they are also important ecosystem regulators.
- Connectivity, based on genetic, migration, and dispersal needs of selected species are critical in species survival; much if not most has been lost and it must be restored.
- A transboundary approach, spanning both intranational and international borders, is required.
- Buffer zones around protected areas must limit human activities to those that are compatible with the needs of species in adjacent protected areas, and be sustainable.
- Access to protected areas must be limited; economic activities in protected areas are incompatible with protection.

Unique characteristics of South Asia include:

- A greater emphasis is needed for improving basic enforcement in the field and in the courtroom.
- A greater emphasis is required for antipoaching and to crack down on illegal trade in species.
- The need for generating revenue in buffer areas for local residents is important.
- Less emphasis on multispecies approaches in large-scale conservation.
- Connections are not strictly protected in most cases, but will have the status of buffer zones.
- Providing for change is rarely noted as a focus of planning or protecting.

Again, I do not think these similarities should be too surprising. South Asia and North America share habitat complexity: thousands of miles of temperate and subtropical coast line, a vast range of ecosystems, variants and gradations from the subtropical to the montane, striking seasonal variation, and much more. South Asia, of course, has been settled longer and more intensively, and its indigenous cultural roots, notwithstanding British rule, still predominate in ways that cannot be said of much of northern Asia or North America. Although parts of South Asia are heavily populated, it is worth remembering that Florida and California, two of the most biodiverse areas of North America, are heavily populated and growing rapidly. Despite the population growth in both States—and all that entails in a country where giving birth to a child also means giving birth to SUVs, TVs, and a host of other goods—protected areas have increased and effective connectivity is being implemented (Barotz and Spitler 1998/1999; Preservation 2000/2001).

Other Areas

Conservationists in other parts of the world are also focused on predators, the large scale, and connectivity. Jason Badridze in the Caucasus, the European Environmental Network, and the Large Carnivore Initiative in Europe are examples. In 1999, the Ukraine committed to more than doubling the amount of land in protected areas and to creating biological connectivity (RCN Editors 1999a). The Kgalagadi Transfrontier Park in Namibia and South Africa consists of about 38,000 ha (147 mi^2) and reflects the underlying ecological unity of the area (Shroyer and others 2001). The park's aims include protection of wild ungulates, including their migration needs, and predation regimes. An agreement between South Africa and Mozambique will foster comanagement of Kruger National Park and adjacent areas across the border, expanding the area of backcountry protection. Several other transnational protected areas are under creation or being linked and comanaged, including efforts between South Africa and Botswana, and South Africa, Namibia, and Angola. Project Wild is restoring megafauna such as elephant to Angola in an effort to recover ecosystem functionality. Many of the National Parks and transboundary parks are specifically providing for wilderness—areas where humans will not visit in large numbers and management will be minimal. Due to the vast arid expanses of many parks and the presence of predators, jeep tracks, and some roads will be permitted, but access restricted.

Discussion and Conclusions

What is the source of the striking similarities found, first in the adoption of large-scale approaches, and second in their similarity? Some will suggest imperial influence. While human societies remain divided internally and among themselves, in patterns of structured inequality that are proving very difficult to change, I do not think looking for an explanation there will get us very far. Yes, there are more U.S. scientists in India than the other way around and that can make a difference, but not, in this case, an essential one.

All human societies share a single planet, and it is to the biotic and abiotic processes that we all owe our lives and livelihood. There is one nature, one Earth. All human societies, despite their many differences and positions in the international economic and political order, have directly or indirectly, from growth in numbers and consumption, degraded, destroyed, and fragmented habitat. The threats may vary in some detail, but the results are drearily the same. Thus, it should not be surprising that careful observers around the globe would come to similar conclusions: if we are to stop the current extinction crisis, enough of the Earth must be set aside to allow ecological and evolutionary processes to recover and maintain their health with a minimum of human intervention. Looking at wide-ranging species and top predators is an important part of this approach. Whether one looks at processes or species, large protected areas and connectivity seem little more than common sense.

Other steps are important to conservation, including making human societies more Earth friendly. And on this topic there is perhaps greater disagreement about strategies that must be pursued. But there is no substitute for basic and direct protection, and achieving it as I have just suggested involves some essential actions.

Lest I appear to be overstating the role of science, let me state clearly that science does not provide us with our conservation values; it can only suggest means for realizing goals chosen on the basis of values (Johns 1999). Are the values underlying large-scale conservation driven by power relations? It would be foolish to deny any influence, but I

think fundamentally it is not the case. Respect and love for nature exist in almost every culture to some degree, and our deep roots are all the same—we were once hunter-gatherers. Beyond that, I think it not surprising that there are many in every culture that feel very strongly the bonds with all life and seek to protect it.

While parallel evolution has thus contributed to the current convergence on large-scale conservation, diffusion of ideas has also played an important role. Foreman (1998/1999) and others (for example, Zahniser 2000) have set out the larger historical sweep of this; I want to focus more narrowly on the last couple of decades. I believe that The Wildlands Project has had a profound influence—far beyond its size—on the conservation movement. Sometimes our influence is acknowledged (Ankerson 1993; WCS 2000a,b), sometimes not. We, of course, have our own debts. And the process of influence is less linear than it is interactive.

Briefly sketched, the immediate origins of the Wildlands model went something like this: in the early 1980s, Larry Harris of the University of Florida proposed landscape linkages between reserves in that State. Reed Noss made a similar proposal for protected areas in Florida. In early 1985, Noss and Harris working together proposed a connected reserve network for northern Florida. Later that year, Noss developed a first Statewide map proposing connectivity across the entire State. In 1990, Archie Carr, also in Florida, but working on MesoAmerican conservation, conceived of Paseo Pantera. In 1991, the Paseo Pantera Project was born, and in the same year the first workshop was held that led to a $3-billion plan for acquiring land for reserves and connectivity in Florida. In 1992, Noss published his Land Conservation Strategy article in *Wild Earth*.

The human dimension,the way in which particular societies—and the way in which the global economy works through those societies—degrade the natural world, does vary. Political systems vary. Resources for conservation vary. These variances call for a variety of strategies and specific objectives on the road to more common goals. Even here, however, there are similarities:

- What it is currently possible to achieve in conservation is inadequate—we must change what is possible in order to achieve our goals. We must push, push, push and never let up.
- While humans appear to exercise great power over nature—at least destructive power—and hence appear to define the context for nature, this is only appearance. Nature is the foundation of and context for all that we do and are.
- If, in our hubris we ignore this, the great tragedy of extinction will continue.
- There are two kinds of human hope. One is based on our psychological need to avoid despair—we hope in order to keep from going crazy. Another kind of hope is based on an assessment of the state of things—are they moving in a direction we consider hopeful, that is, toward good? We need to create the basis for that second sort of hope. I think we have started to do that with efforts across the globe aimed at large-scale conservation.

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Personal and Societal Values, and Wilderness Stewardship

Perry Brown

Abstract—Wilderness values have always been of critical importance to guide questions of wilderness policy, allocation, and stewardship. The Pinchot Institute report, *Ensuring the Stewardship of the National Wilderness Preservation System*, is driven by these wilderness values and will, hopefully, become a catalyst for action in the United States.

Values of Wilderness

Over the years, researchers and essayists have identified a long list of values that people hold toward wilderness. I have tried to put them into a manageable list of 10.

1. Historical Value. Some of this value is embodied in our vision of untrammeled space that looks and feels like it did in times past. Some value also is embodied in historical uses that were made of wilderness.

2. Recreational Value. That people value wilderness for cherished forms of recreation is well known and observed. Primitive and unconfined forms of recreation are often associated with wilderness.

3. Ecosystem Integrity Value. It has been observed that people often envision wilderness as the place where ecosystems are least disturbed by humans and where natural physical and biological processes operate.

4. Environmental Value. In this value set, we have those environmental services and functions that wilderness provides so well, such as clean air and water, and diverse and naturally occurring wildlife populations.

5. Landscape Value. Wilderness is often a place of undisturbed landscapes and the backdrop of scenery for human observation from more developed and disturbed places. It is valued for its scenic and aesthetic qualities.

6. Scientific Value. Wilderness is valued as a place where baseline understanding of physical and biological processes can be obtained, and as a place where scientific experimentation and observation can be conducted without the confounding nature of other human activities.

7. Spiritual Value. Given its vastness of scale and its untrammeled nature, wilderness often is viewed as a place where one can feel close to a creator or to the abstract called nature. For many, wilderness provides opportunity for self-reflection, meditation, and communion with spiritual things.

8. Traditional Use Value. For some people wilderness provides the setting for playing out traditional uses of hunting, fishing, camping, and woodsman skills.

9. Intellectual Value. The intellectual value of wilderness is expressed in writings about it, in song and art, and in many forms of discourse among people. It often is valued for the freedom of intellect that it permits and fosters.

10. Economic Value. While most of the values ascribed to wilderness seem toward the anti-economic, wilderness also provides opportunity for employment and economic development. It generates economic value in that it attracts the interests of people for both on- and offsite use and consideration.

These values of wilderness are the fundamental factors that drive us to want to ensure that there is wilderness and that it is sustained over time. They are the values that should drive our consideration of principles used to guide wilderness stewardship, and they should drive our stewardship choices.

Pinchot Institute Report on Wilderness Stewardship in the United States

With these ideas about values of wilderness as background, I will turn my attention to the Pinchot Institute report, *Ensuring the Stewardship of the National Wilderness Preservation System*. While this report is specific to the U.S.A., much of its content is relevant to other locales because it is based on an understanding of many of the values of wilderness.

The Blue Ribbon panel that prepared the report was composed of 10 individuals from conservation organizations and academic institutions, and selected individuals retired from Federal agencies, including a former U.S. Secretary of the Interior who was in office when the U.S. Wilderness Act was passed. I had the pleasure of serving as the chair of the panel. It had two tasks:

1. Assessing the management of the National Wilderness Preservation System in contemporary society.

2. Making recommendations regarding the future of wilderness stewardship and the sustainability of the system.

Some of the questions asked by the panel were:

- Is wilderness taken seriously by land management agencies?
- Is the organizational location and level of wilderness stewardship positioned for real success?
- Are sufficient funding and staffing resources allocated to wilderness stewardship?
- Is stewardship clearly defined, and what kinds of stewardship are appropriate?

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- Is there collaboration, cooperation, and consistency in wilderness stewardship across management agencies?
- Are wilderness clients being well served?
- Can wilderness training and research be improved and better focused?

The panel focused on stewardship of a resource that has been growing in importance as a land use in the United States. The U.S. Wilderness Act passed Congress and was signed by the President in September 1964, 37 years ago. Since the passage of the Act, the system has grown from over 10 million acres (4 million ha) in 54 units, to over 105 million acres (43 million ha) in over 600 units. From surveys, literature, music, behavior, and experience, we know that wilderness is more important to the American people than ever before.

While the panel found that there were some very good examples of wilderness stewardship, it also found areas of major and minor concern. Some significant and serious contemporary dilemmas of wilderness stewardship were identified:

- Ensuring both naturalness and wildness.
- That wilderness is not isolated from its surrounding landscape.
- Manipulating wilderness conditions is philosophically and practically problematic.
- That the place of recreational use in wilderness has not been made very clear.
- That agency organization and commitment to stewardship are needed for success, but they often seem lacking.
- That excelling in an information exchange environment implemented through modern information technologies is new and challenging.

In reviewing the values of wilderness, the questions that emerged about wilderness stewardship, these contemporary dilemmas, and the track record of the wilderness management agencies over the past 37 years, eight *Principles for Wilderness Stewardship* were formulated by the Panel. We believe that these principles should guide all wilderness stewardship in the United States, and that most of them are applicable to wilderness stewardship anywhere it occurs. These principles are:

1. Adhering to the Wilderness Act is a fundamental principle for stewardship in the United States.
2. United States wilderness areas are to be treated as a system of wilderness.
3. Wilderness areas are special places and they are to be treated as special.
4. Stewardship should be science-informed, logically planned, and publicly transparent.
5. Nondegradation of wilderness should fundamentally guide stewardship activities.
6. Preservation of wilderness character is a guiding idea of the Wilderness Act.
7. Recognizing the *wild* in wilderness distinguishes wilderness from most other land classes.
8. Accountability is basic to sound stewardship.

These principles led the Panel to formulate a set of recommendations that, if implemented, would shape the future for success in wilderness stewardship. The six broad recommendations are:

1. Wilderness agencies and their leaders must make a strong commitment to wilderness before the wilderness is lost.
2. Wilderness agencies must organize to maximize stewardship effectiveness and to develop a fully integrated stewardship system.
3. Wilderness planning must be accelerated and plans prepared for the guidance of stewardship activities.
4. Science, education, and training programs should be enhanced to provide information, professional expertise, and public support for wilderness stewardship.
5. Wilderness agencies should create wilderness stewardship positions and career opportunities from top to bottom and deploy financial resources for the explicit stewardship and support of wilderness.
6. Accountability for the maintenance and sustainability of the wilderness system must be embraced by the wilderness agencies.

While we were critical of the state of the system and many of the things that are being done, and the absence of things that need to be done, we also found several activities ongoing today that are helpful in leading us toward wilderness stewardship. We need to accelerate them and more quickly learn how to steward our wilderness resource.

The Wilderness Information Network (www.wilderness.net) is one such activity. This Web site is a focal point for information about wilderness, wilderness training, and wilderness research. It is multiagency in function and support, and demonstrates how information can be managed and shared to provide a repository of wilderness information for everyone.

The Arthur Carhart National Wilderness Training Center and the Aldo Leopold Wilderness Research Institute are interagency centers advancing understanding of wilderness and the continuous training of wilderness professionals. Their success as interagency cooperatives has varied over time, but they demonstrate that it is possible to construct interagency, collaborative units. There are also several collaborating institutions in Alaska that provide examples of information and policy bodies that are instructive for collaborative work.

While there are good things happening today, the bottom line of our report is the need to forge an integrated and collaborative system across the four wilderness management agencies. This is something that we have not done in our 37 years of wilderness stewardship, since the passage of the Wilderness Act in 1964. Our agencies operate as if there were four wilderness systems, not one, and it is high time that we got on with developing one integrated system. To move in this direction we proposed four specific recommendations for the Secretaries of the Interior and Agriculture, the ministers who oversee the wilderness stewardship agencies.

1. The Secretaries should issue joint policies and regulations specifying common interpretations of law, and thus provide broad guidelines for the stewardship of wilderness.
2. The Secretaries should devise an organizational structure to make stewardship happen across the agencies so that a high quality wilderness system is continued in perpetuity.
3. The Secretaries should devise monitoring and evaluation systems to ensure that we know how well wilderness areas are being stewarded, especially in the context of a

system of wildernesses, and they should reinstitute regular reporting on the state of the system.

4. The Secretaries should develop a means of informing the American people about the National Wilderness Preservation System and about their wilderness heritage.

The same general needs likely exist for wilderness everywhere. They are to build and steward a system of wildernesses focused on the values that wilderness brings to the human condition, especially in the relations of humans to their sustaining environment.

The framework for action prescribed in our report is one that can lead to effective stewardship and development of a National Wilderness Preservation System. Recognizing the many good examples of wilderness stewardship that have been implemented over the past 37 years, we can adopt a set of principles for stewardship, implement actions that will shape the future for success, and work toward ensuring the existence of a truly integrated National Wilderness Preservation System. That is our challenge, as the values of wilderness become our stewardship responsibility.

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4. Protection of Coastal/Marine and River/Lake Wilderness

Storms River flows into the Indian Ocean – Tsitsikamma National Park (photo by Alan Watson).

Rationalization of the Commercial Afforestation Program on the Western Shores of Lake St. Lucia for Nature and Wilderness Conservation, KwaZulu-Natal Province, South Africa

William R. Bainbridge

Abstract—The purpose of this paper is to describe a recent initiative to rationalize the commercial afforestation program on the Western Shores of Lake St. Lucia. This initiative is believed to have considerable potential benefits for the conservation of Lake St. Lucia: to bring about a significant addition of conservation-worthy land to the St. Lucia Wetland World Heritage Site, to make important contributions to the conservation of the unique natural communities of the area, and to promote tourism in a portion of the St. Lucia system not previously available to the public. Overall, this is expected to create employment opportunities in one of the poorer parts of the country, stimulate the local economy, and benefit local communities in other ways. Commercial afforestation, combined with tourism (and ecotourism), will continue in portions of the system that are most suitable for these uses, but in a manner compatible with its World Heritage Site status. From a wilderness conservation viewpoint, it will add a protective internal buffer to the southeastern portions of the park, isolating the lake and terrestrial wildernesses from disturbance from the developed areas along the principal road and rail access routes to the west of the park.

Historical Perspectives

Lake St. Lucia, in the northeastern portion of KwaZulu-Natal Province, is the largest natural water body in South Africa. It has an international reputation because of its historical background, its considerable natural beauty and tourism appeal, and its significant natural resources, many of which have considerable scientific value.

These were among the considerations that led to the appointment of the St. Lucia Commission of Enquiry in 1964. The Commission was instructed to investigate alleged threats to the survival of plant and animal life of the lake, and factors causing high salinity levels in drought years, which at times were higher than that of the sea. The salinity regime is the principal physical factor that determines what species, and hence ecosystem states, that may occur in the system at any stage. The Commission was instructed to recommend a solution that would best suit the lake and surrounding agriculture, forestry, and domestic and commercial water needs in the total catchment area (Commission of Enquiry, Lake St. Lucia 1966; Taylor 1991).

The recommendations of the Commission were comprehensive and far reaching. Important recommendations included:

- The phasing out of plantations that had been established in the immediate vicinity of the lake, and consolidation of this land with other areas to increase the extent of the protected area surrounding Lake St. Lucia.
- Placement of the lake and the expanded protected area under a single management authority.

Unfortunately, these recommendations were largely ignored by the apartheid government of the day. The threats to the lake were in fact intensified in the early 1990s by the same government (Bainbridge 1993/4), when a proposal to implement dune mining in the coastal dune cordon on the Eastern Shores of the lake was given serious consideration (Tinley 1985). It was anticipated that this form of strip mining had the potential to cause significant negative impacts on freshwater flows into the lake. However, this threat was averted by concerted public opposition from local and international environmentalists (Bainbridge 1993/4; Brooks and others 1993; Dominy 1992; Leon and others 1993).

An important additional benefit of this campaign to prevent dune mining was the decision by the government to remove 5,600 ha (13,840 acres) of manmade forests from the Eastern Shores, which was in itself a noteworthy achievement for the environmental movement. However, this decision did not at that time affect any of the plantations on the Western Shores, despite the negative impacts on this sensitive environment.

Importance of the St. Lucia Wetland World Heritage Site

Importance for Nature Conservation

Lake St. Lucia is the estuary on the Mkuze River, but it also receives water from a number of other smaller rivers and streams. Although these are all relatively small rivers by African standards, St. Lucia is one of the largest, if not the

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largest, estuarine system on the African Continent. The lake is located in the Maputaland Coastal Plain at the southernmost extremity of the Mozambique Coastal Plain, which lies along the east coast of Africa between Somalia in the north and Zululand in the northeastern corner of KwaZulu-Natal Province in South Africa. Lake St. Lucia and its associated terrestrial, wetland, and marine environments have long been regarded as having major importance for nature conservation and tourism, and calls made for its protection (Bruton and Cooper 1980; Delagorgue 1990; Ellis 1975; Frost 1990; Taylor 1991). These are now protected in the most important coastal protected area in the country, known as the Greater St. Lucia Wetland Park, with an area of just under 290,000 ha (716,600 acres).

The importance of this area has been recognized for over a century. International recognition of the importance of the area was accorded when the area was included in two Wetlands of International Importance under the Ramsar Convention in 1975 (Jackson 1992a), and admitted to the World Heritage Site (WHS) list in 1999—the first South African site to be accorded this prestigious status (KwaZulu-Natal Nature Conservation Service 1999).

A complete description of the importance of the area for nature conservation is provided in its nomination proposal for WHS satus (KwaZulu-Natal Nature Conservation Service 1999). Among the many important attributes that should receive mention is the role of the lake as a breeding ground and nursery for marine organisms.

Wildernesses of the Park

There has long been appreciation that extensive portions of the park remain substantially unmodified by technological man, and still retain the near-pristine condition that pertained when the park was occupied by early hunter-gatherer people, well into the twentieth century. This is one of the last remaining coastal areas to survive with its wilderness character still largely intact, which is one of the reasons why the park was awarded WHS status (Bainbridge 2001).

A high proportion of the park has been zoned as wilderness by administrative arrangement for several decades, but these zones have been revised as part of the management plan for the WHS (LSDI 2000; Bainbridge and others 2000). Included in the wilderness zones are an extensive area of the eastern portion of the lake itself and a large area of land in the central portion of the park, together with adjacent marine sanctuary areas in both the central part of the park and in the north (fig. 1).

These are the only remaining coastal wildernesses in the country. It is envisaged that these wilderness zones will be entrenched in law, in terms of recent legislation. Although not yet afforded legal protection as wilderness areas per se, they enjoy secure legal protection in terms of several statutes, including the World Heritage Convention Act of 1999. The St. Lucia wildernesses are nevertheless vulnerable to disturbance from several quarters, especially from development in the western peripheries of the park. This explains the importance of the land-use rationalization exercise on the Western Shores.

Afforestation on the Western Shores

Extent of Western Shores Plantations

As noted above, the program to establish commercial timber plantations on State land on the Eastern and Western Shores of Lake St. Lucia was initiated by the (then) Department of Forestry nearly 50 years ago. There has been persistent public opposition to this program from the outset, since environmentalists were aware of the potential harmful impacts on the wetland systems and the lake itself. However, the environmental movement at that stage was not well organized, and this official arm of government remained impassive, so the program was continued and expanded. By the start of the present millennium, the total extent of the manmade forests on the Western Shores was approximately 23,700 ha (58,560 acres) (Zaloumis and others 1999).

Indications of the Impacts of the Western Shores Plantations on Freshwater Supplies to Lake St. Lucia

Typically, the lake has a highly variable salinity regime. During extensive periods of low rainfall, sea water moves into the system, and salinity levels may be as high as 90 parts per thousand. In wet seasons, the freshwater inputs from streamflow and seepage result in almost total flushing of the salt. These changes are accompanied by enormous and changing biodiversity. However, while halophylic species are able to retreat to the sea in times of low salinity, and are able to recolonize the lake when conditions favorable to them are re-established, survival options for freshwater species under hypersaline conditions are more restricted. Plants may recolonize the lake from the feeder rivers and swamps. Animals, however, are entirely dependent on refugia maintained in sites with adequate, permanent freshwater inputs.

A high proportion of the water in the lake system is derived from ground-water seepage and rainfall. From the above, it is obvious that in times of drought, the importance of freshwater inputs assumes critical proportions (KwaZulu-Natal Nature Conservation Service 1999; Taylor 1991, 1998). Tinley (1971) considered the ground-water seepage to be critically important for maintaining salinity at acceptable levels in periods of drought. Jackson (1992b) estimated that the desiccating effect of the plantations on the Western Shores has reduced dry season flow of freshwater from the Mpate River (the catchment of which is entirely contained in the Western Shores) by as much as 45 percent.

Decision to Privatize the Plantations of the Western Shores

The South African government has, in recent years, developed a policy to privatize a number of State assets, including the extensive timber plantations of the South African Forestry Company Ltd. (SAFCOL), which succeeded the previous Department of Forestry. Private forestry companies

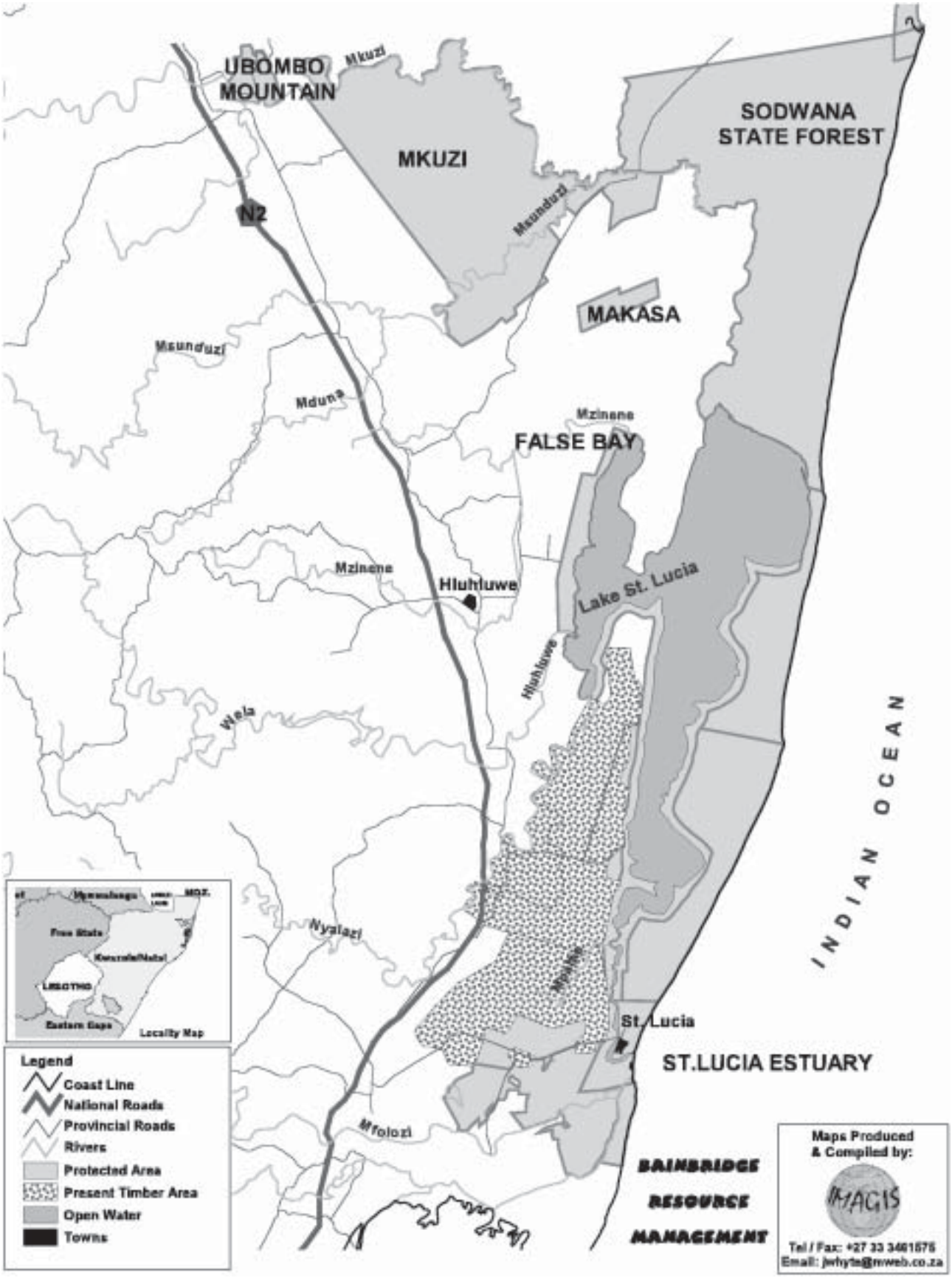

Figure 1—Western Shores afforestation, St. Lucia area.

were invited to submit tenders for various components of the national timber plantation system. A private company, Siyaqhubeka Ltd., with both forestry and ecotourism interests, was accepted as the preferred bidder for the Western Shores plantation.

Study to Rationalize Portions of the Western Shores Plantation

Initial Study and Zoning Proposals

At about the same time, the government established the Lubombo Spatial Development Initiative (LSDI), an arm of the Department of Environmental Affairs and Tourism, to develop a new access route between northeastern KwaZulu-Natal and Mozambique, and to promote economic development in this previously economically deprived area. Promotion of tourism was selected as one means of stimulating the local economy and creating jobs, and it was decided that development of the new World Heritage Site should form a part of this program. LSDI was also given responsibility for the establishment of a Park Authority in terms of the WHS Act, with responsibility for the development of an Integrated Development Plan for the park, which incorporates a tourism development plan (LSDI 2000).

Following the announcement to privatize the plantations of the Western Shores, LSDI was instructed by the government to commission a study to investigate the plantations. This study showed that certain portions of the plantations, especially those in the western extremity of the plantation area away from the park, were well suited for commercial afforestation and were not causing significant impacts to the park itself. In contrast, other portions in the immediate peripheries of the park were of similar character to the St. Lucia Wetland WHS in that they contained areas of conservation-worthy natural communities and wetlands, and also contained plantations that had been established on hydromorphic soils. In addition, as might be expected by virtue of its proximity to the park, the area was considered to have significant potential for tourism (Zaloumis and others 1999).

The study proposed a zoning system for the area to be privatized included two primary zones:

- A Commercial Afforestation Zone, comprising areas suited for commercial afforestation.
- A Natural Zone, comprising areas of conservation-worthy natural communities and incorrectly sited plantations capable of rehabilitation back to a near-natural state, for consolidation with the park.

These proposals had the effect of reducing the extent of the plantations offered out to tender by approximately one-third, but were nevertheless found to be acceptable by both the government and the preferred bidder. Acceptance by the latter was subject to the proviso that the area of plantation remaining should be economically viable. It was also based on the stated policy of the company to adhere to the principles and criteria for sustainable forestry set by the Forestry Stewardship Council (FSC) (FSC 1999). Inclusion of the proposed Natural Zone might have prejudiced their FSC accreditation (Bainbridge and others 2000).

The government subsequently instructed the parties to negotiate on the most acceptable means of delineating the two zones, with the aim of retaining plantations on nonsensitive sites and with the least possible impact on their economic viability; and selecting a consolidated natural area, as above, to be incorporated into the protected area as part of the WHS, and restored to its natural state by removal of the plantations present and implementation of a rehabilitation program (Zaloumis and Brummer 2001).

Delineation of a Boundary to Separate the Zones

A technical team comprising professional representatives of the principal stakeholders was appointed to provide delineation criteria for a boundary to separate the two zones. The recommended criteria included the presence of important natural communities, water source areas, and wetlands for the Natural Zone, and the presence of soils most suitable for afforestation for the Commercial Afforestation Zone. A reconnaissance study was implemented to identify broad groupings of these. The study suggested that a boundary following natural features would best satisfy these aims. A standard rectilinear artificial boundary proved unsuitable to separate the complex mosaic patterns of natural communities. The solution adopted was to site a natural boundary separating broad soils groupings (essentially the interface between dryland soils and wetland or hydromorphic soils), by use of soil augurs, as described in the Procedure for the Identification and Delineation of Wetland and Riparian Habitats (Land-Use and Wetland /Riparian Habitat Working Group 2001). The intention was to site the boundary on an alignment suitable for construction of a permanent road track, following the principles for establishment of valley bottom cutoff roads.

Conclusions

This curvilinear natural boundary has provided a satisfactory solution to separation of the two zones, and has been delineated over a distance of 158 km (98 miles) throughout the entire length of the Western Shores. It has been fixed by Geographic Positioning System points, and will be registered as the cadastral boundary for excision of the area for permanent inclusion within the park.

Summary of the Principal Achievements of the Initiative

The principal achievements of this planning exercise are:

- The South African government has decided to excise an area (fig. 2) of approximately 9,000 ha (22,240 acres), which is to be restored back to a near-natural condition and consolidated with the park. A time schedule of 5 years has been set for the removal of 2,000 to 3,000 ha (4,940 to 7,140 acres) of timber in this area and completion of the restoration program. This area contains important natural communities, water source areas, and wetlands, which will add

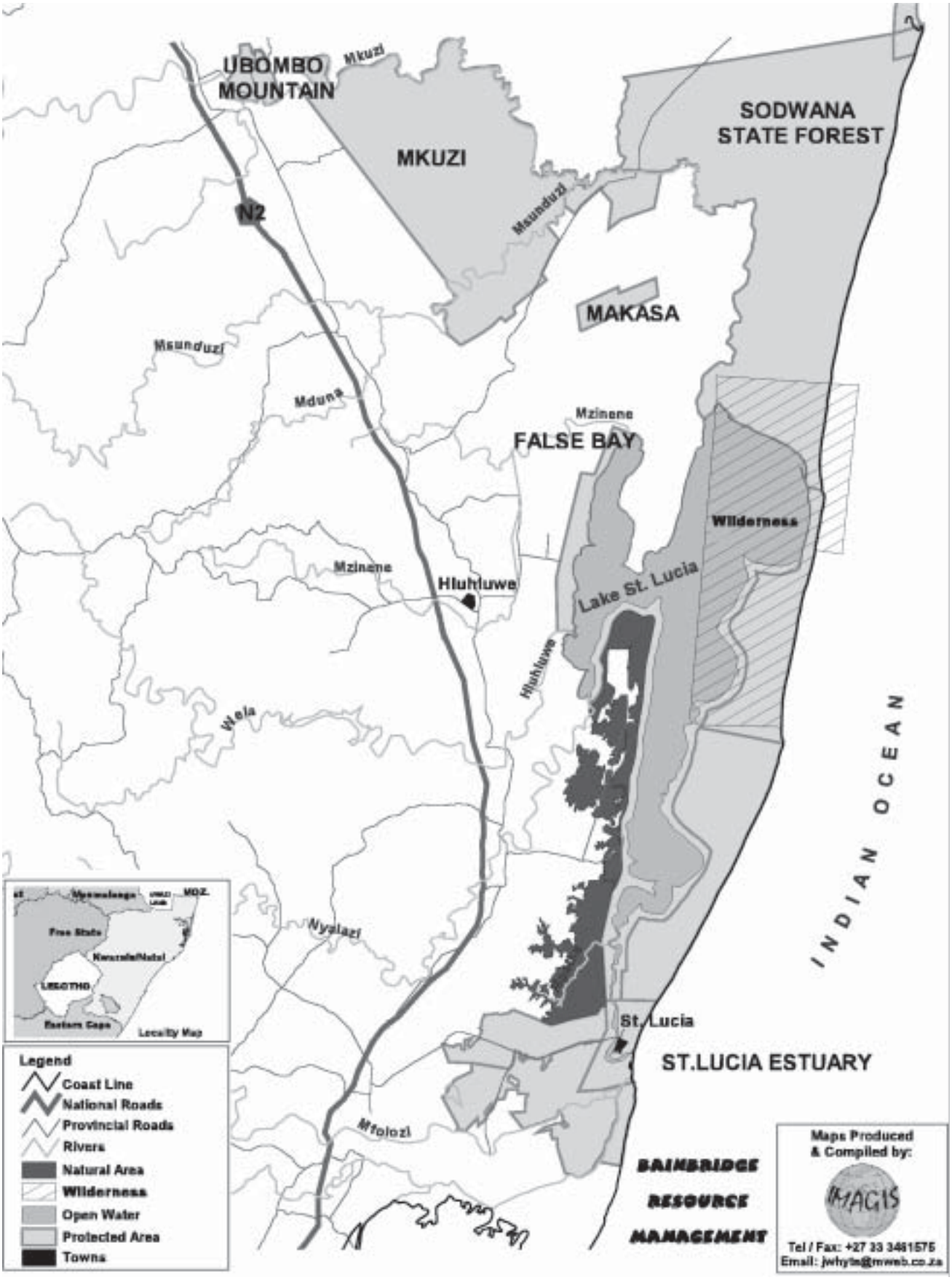

Figure 2—Natural areas in relation to wilderness areas, St. Lucia Wetland World Heritage Site.

significantly to the biodiversity resources presently conserved in the park. The area is expected to form part of the St. Lucia Wetland World Heritage Site, following completion of the restoration operations.

- The change in land use is also expected to benefit the WHS by improvement of crucial freshwater supplies into the lake following removal of the timber plantations, and by the provision of access for tourists for the first time to the western portions of the lake.
- The changes will also benefit the wilderness areas (fig. 1), since it will form an additional buffer within the park, to protect the wildernesses from development in the western peripheries of the park.
- The remaining plantations, with a total area of about 15,000 ha (37,000 acres), are considered to form an economically viable enterprise, and will constitute a sustainable land use in the peripheries of the park.
- The proposals conform to the requirements for the establishment of a Biosphere Reserve.
- The exercise will make important contributions to both the national and local economies, and provide a significant number of permanent jobs.

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Factors Influencing Experience Quality: Comparing User Groups and Place Attachment at the St. Croix International Waterway

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Jamie Hannon
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Abstract—Factor analysis identified three major underlying dimensions characterizing indicators of experience quality: careless or disrespectful resource impacts, solitude, and resource impact/development. Certain indicators of experience quality were found to be more important than others, depending upon user group. For example, experiencing solitude was much more important for boaters who used the full river or river and lake sections of the waterway, versus boaters who only used lake sections. Emotional/symbolic and functional place attachment were measured for different user groups. Lake users reported higher levels of agreement to emotional/symbolic and functional place attachment than river users. Compared to lake users with a relatively low emotional/symbolic attachment, lake users with high attachment levels indicated a stronger desire for solitude and experiencing an undeveloped area with lightly impacted campsites. Indicators of experience quality involving careless or disrespectful resource impacts was important regardless of type of user group, and it did not matter whether users had high or low levels of agreement to place attachment statements.

Introduction

The St. Croix International Waterway is a complex of lakes and river segments stretching approximately 115 miles (185 km) along the border of eastern Maine and New Brunswick. The waterway is comprised of three major geographic zones: (1) a headwater lakes and river section characterized by mostly undeveloped shoreline, (2) a lower river section of developed and industrialized river, and (3) a tidal estuary and bay system. This study is concerned exclusively with the headwater lakes and upper river section. This region is the longest stretch of undeveloped international waterway east of the Boundary Waters Canoe Area of Minnesota and Ontario (SCIWC 1998). It is listed as one of Maine's Twenty Outstanding Rivers, and it is officially recognized as the St. Croix Waterway Recreation Area by the Province of New Brunswick (fig. 1). Most significantly, the St. Croix was included in the Canadian National Heritage river system in 1991, the first such designation in Atlantic Canada.

Because the waterway is an international boundary, recreation and resource management is conducted by several agencies, including the International Joint Commission, the Bureau of Parks and Lands and the State Forest Service in Maine, and the Department of Natural Resources and Energy in New Brunswick. In 1986, a Memorandum of Understanding between Maine and New Brunswick created the St. Croix International Waterway Commission, an advisory agency, which has since taken the lead in studying waterway-related issues and coordinating planning for future waterway management needs. In a 1993 report, the St. Croix International Waterway Commission noted, "distinct land and water management policies are applied without integration on opposite sides of the waterway, leaving it vulnerable to incompatible uses and potential quality loss" (SCIWC

Figure 1—Originally intended to recognize multiple uses of the 32,000 miles of rivers and streams, the Maine Rivers Act (MRA) states the need for balance among various uses. The MRA specifically recognizes the need to protect outstanding rivers that provide unparalleled natural and recreational values, including unique recreational activities and solace from an industrialized society. Here, overnight canoeists travel the lower river section of the St. Croix International Waterway.

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1993). One of the key goals developed by the commission was to protect and provide for the continuation of quality recreational experiences, especially traditional backcountry canoe trips.

Providing quality recreational experiences while preserving the natural character of the St. Croix International Waterway poses some significant challenges (fig. 2). Primary among these is the unique combination of natural setting and accessibility, and nearness to major population centers in the United States and Canada. The waterway is within a day's drive of 32 million people, and is well known regionally as an excellent canoe trip with summer water and easy, enjoyable whitewater. No agency currently places any kind of entry fee or use regulation on visits to the waterway, and recreational use is essentially unmanaged.

Key to protecting backcountry experiences of the St. Croix International Waterway is an understanding of the different aspects of the visitor experience and recognizing which of these are important to visitors. These indicators of experience quality are measurable variables that help define the quality of the recreation experience and standards of quality that define the minimum acceptable conditions (Manning 1999). Good indicators are practical to measure quantitatively, sensitive to the type and amount of use, and potentially responsive to management control (Lucas and Stankey 1985; Watson and others 1998). They are used in managerial planning cycles such as Limits of Acceptable Change (Stankey and others 1985) or Visitor Impact Management (Graefe and others 1990) along with standards to guide the implementation of management strategies and monitoring efforts.

Several studies examining indicators of quality have revealed some variables to be more important than others (Manning 1999). For example, litter and other signs of visitor use impacts appear to be more important to recreation users compared to management-related impacts such as signs and presence of rangers. Social indicators of quality, especially those dealing with behaviors or types of other user groups at secluded campsite locations, are more important than ecological indicators. Visitors to more primitive areas or sites may be generally more sensitive to a variety of potential indicators of quality than visitors to more highly used and developed areas or sites. On the St. Croix International Waterway, users have unrestricted access to both primitive and developed sites and a wide range of water-oriented opportunities. The situation suggests the need to understand the diverse recreation experiences and indicators of quality.

Figure 2—Better access, light and durable canoes, and growing popularity of other self-propelled watercraft such as kayaks are a few reasons for the increased diversity of use and user groups. Here a day user runs the rapids at Little Falls on the upper river section of the St. Croix International Waterway.

Matching the experiences visitors seek with opportunity settings best suited to providing those experiences is one of the major challenges to the outdoor recreation manager (Clark and Stankey 1979). On one hand, a user allocates personal resources (primarily time and money) to produce a desired recreational experience (Jubenville 1986). Users engage in a leisure activity with the expectation that it will fulfill selected needs, motivations, or other desired states (Schreyer 1986). Daigle and others (2002) report that choice of a particular leisure activity may not only be closely related to the specific benefits people derive, or believe they derive, but also tied to the perceived likelihood that the benefits will be produced. On the other hand, a manager provides a site by combining various managerial inputs (physical development, regulation, resource management) with the specific environmental setting (Jubenville 1986). Identifying the consequences of management actions is extremely important because those actions can attract or deter a given clientele group to a particular setting (Clark and Stankey 1979). For example, while some users may approve of management actions (for example, easier access), others may disapprove and be forced to adjust expectations (for example, seeing more users). Increasing access may change the type or number of visitors, and that in turn may influence the likelihood of fulfilling certain user desires (for example, secluded travel and camping). In this scenario, a certain clientele group may be displaced because the setting is not likely to meet their needs. Understanding these dynamics may be especially important in terms of a "home range" for assessing relative availability of, and demand for, different types of place-related opportunities for activities and experiences sought within a particular region (Daigle and others 1994).

A number of studies have examined place attachment as a construct for understanding the relationship visitors have to particular settings and as a tool for resource planning (Moore and Graefe 1994; Warzecha and others 2000; Watson and others 1991, 1992; Williams and others 1992). Warzecha and others (2000) found that users of the Green and Colorado Rivers had different levels of agreement with emotional/symbolic and functional place attachment to each setting, as well as between settings. Place attachment is embedded in feelings for a specific place in contrast to specific attributes of a place necessary for a particular activity (Schreyer and others 1981). Users' opinions regarding place attachment to rivers appeared to be related to the levels of importance they attached to motives for taking the trip. In addition, users with high levels of agreement to place attachment with their respective rivers attached different levels of importance to motives. There was a stronger desire for wild land experiences and management actions that provide opportunities for those types of experiences at one particular setting. The authors conclude that in order to optimize the likelihood of

meeting visitors' needs at that particular site, it is appropriate to consider several different management strategies intended to provide a diversity of experience opportunities.

The purpose of this article is to examine experience quality domains and the relationship of these domains to different user groups and their place attachment to the St. Croix International Waterway. First, we answer the question, "Which indicators are important in defining the experience quality of St. Croix International Waterway visitors?" Second, we identify users' relationship to resource in terms of emotional/symbolic and functional place attachment for different groups. Rather than examining differing levels of agreement of place attachment for overall users to a specific place or compared to other places, we focus on the diverse users of the St. Croix International Waterway.

Methods for Experience Quality and User Group Comparisons

In response to the Waterway Commission's strong desire, among others, to protect opportunities for secluded backcountry canoe travel and camping, we employed a similar visitor survey approach conducted by Watson and others (1992). A random sampling scheme was utilized, and a modified Dillman (1983) mailing approach was implemented. The survey methodology has been described in detail elsewhere (Stacey and Daigle 2000). Approximately 404 useable questionnaires were returned, for an overall response rate of 62 percent. This extensive, self-administered, mail-back questionnaire was designed to provide information on a variety of variables related to use and user characteristics on the waterway.

Based on a literature review and feedback from resource specialists familiar with the St. Croix Waterway, we developed 22 items to assess social, resource, and management conditions that may affect the quality of visitor experiences. Respondents rated the significance of items defining the quality of experience on the waterway on a 5-point Likert scale ranging from "I care about the item 'not at all' to 'extremely'." The responses were subjected to factor analysis with varimax rotation, using principal-components extraction (SPSS 1999). The number of factors was determined by evaluating eigenvalues created from the factor analysis (Kaiser 1960) and examining "scree" or the break in the plotted line of eigenvalues (Kass and Tinsley 1979). The internal consistency of each experience dimension scale was assessed using reliability analysis (Cronbach 1951). Cronbach's alpha coefficients were computed for each set of items comprising each experience dimension.

Although the procedure maximizes the differences between selected factors while minimizing the differences within them, it does not express the magnitude to which respondents relate to a given factor. Based on variables defining each dimension, a mean scale score was developed as a "strength-of-importance" measure to compare the magnitude of importance of each dimension across user groups. As an example, we computed a mean scale score for the dimension we labeled "careless or disrespectful resource impacts" by first adding the scale scores for the variables that loaded for this factor [var1 (amount of litter I see on the riverbanks) + var2 (amount of litter I see around the campsite) + var3 (number of trees at campsites that have been damaged by people)] and then dividing the total score by 3, the number of variables in this particular dimension. Mean scale scores for the 3 dimensions were developed for the combined user groups, as well as for defined user subgroups.

In a previous publication based on data from this survey (Hannon and others 2002), we provided evidence for unique user subgroups of the St. Croix Waterway. The groups are distinguished by demographic and visit characteristics, mode of travel, and prior experience in the waterway area. They utilize distinct, sometimes overlapping zones within the waterway, each of which is defined by geographic features and accessibility. The first regional group is that which utilized the upper lakes, a diverse group of motorized and human-propelled visitors, about half of whom were overnight visitors. The next is that which utilized the lower lakes, primarily day-use fishers. The third is that which utilized only the upper river, a section typified by quick water and numerous, easy rapids. The fourth is that which utilized the full 40-mile (64-km) river section, combining the quick water of the upper river with a more remote and placid lower section. The final user group traveled on both a lake and the 40-mile river section and stayed out for 2 or more nights.

We used one-way analysis of variance to compare mean scale scores of the importance of experience quality for each factor across respondents in user subgroups. The comparison yielded insight on the variation of importance for certain experience dimensions among user groups. Tukey post hoc tests of pair-wise differences in means were used to identify significant differences in average degree of importance for the dimensions between user groups. Differences were reported at the $p < 0.05$ level of significance.

Results of Experience Quality and User Group Comparisons

The factor analysis of the 22 items related to the importance of items that influence the quality of respondent's experience on the St. Croix International Waterway suggests that they could be grouped into four dimensions. Kaiser's criterion of retaining factor eigenvalues ≥1 and Cattell's methods of retaining the number of factors above the break, or scree, were used to assist in identifying the four dimensions. Considering variables with factor loading ≥0.5, we labeled the four dimensions as (1) careless or disrespectful resource impacts, (2) management activities, (3) solitude, and (4) resource impact/development. For the four factors, total variance was 59.37 percent. The management activities factor, containing variables such as "water level for boating conditions" and "availability of a toilet, picnic table and firepit at campsite," was not retained for the other analyses because of a low Cronbach's alpha coefficient of items making up the factor. The item correlations were of an acceptable magnitude for the other factors (Alpha = 0.91, 0.85, and 0.78, for solitude, careless or disrespectful resource impacts, and resource impact/development, respectively). The items for each of these remaining factors were therefore averaged to form mean scale scores.

We compared mean scale scores for each factor on a user group basis (table 1). The dimension of careless or disrespectful

resource impact had the overall highest mean scale score (4.21) for the combined user groups. Statistically significant differences in levels of importance were demonstrated among Extended Trippers (4.50) and Lower Lakes (4.00) user groups. The importance of this factor as compared to the other factors for all user groups is consistent with other authors' findings that litter is the most highly ranked influence on experience quality (for example, Roggenbuck and others 1993; Whittaker 1992).

In contrast to the careless or disrespectful behavior factor, the importance of things that influence the quality of respondent's experience associated with solitude was more variable among user groups. Statistically significant differences in levels of importance were found between Full River (3.85), Extended Tripper (3.77) users groups, and Upper Lakes (3.01), Upper River (2.98), and Lower Lakes (2.46) user groups. In addition, statistically significant differences in levels of importance were found between Upper Lakes, Upper River user groups and the Lower Lakes user group. The mean scale score for the combined user groups was 3.15. The top three items in the solitude factor ("amount of noise associated with human activities on the waterway," "amount of noise associated with human activities away from the waterway," and "number of other groups that camp in sight or sound of my site") all rated more than moderately important. These top items are not related to numbers of encounters ("number of large groups that I see along the waterway," "number of boats I see along the waterway," and "the percent of time other people are in sight while I am boating"), but are indicative of *types* of visitor behavior, especially intrusive noise. This finding is consistent with that of several studies reported in Manning (1999), and that solitude or seclusion evaluations involve more than just the number of people met during a trip (Watson 1995).

The importance of experiencing an undeveloped area, lightly impacted campsite, factor was compared across the five user groups. Variables making up this factor included "forestry operations visible from the river," "the visibility of lights originating outside the waterway," "the visibility of camps and homes along the shore," "the amount of vegetation loss and bare ground around a campsite," and "number of makeshift camps created by visitors." Statistically significant differences in levels of importance for this factor were demonstrated between Extended Tripper (3.51), Full River (3.51) user groups, and the Upper Lakes (3.03), Lower Lakes (2.75) user groups. In addition, the Upper River (3.22) user group was found to be significantly different than the Lower Lakes user group. The three user groups that utilized the river for all or part of their trip placed much higher emphasis on the importance of campsite conditions in influencing the quality of their visit. Cameron and Stacey (2001) report that the campsites associated with the river are more heavily impacted by use than are the campsites on the lakes. Also, it is not surprising that the Lower Lakes user group placed little importance on the condition of campsites because only 24 percent reported an overnight stay.

We would like to note certain things that were important to all user groups but did not load into a distinct factor or there was poor inter-item reliability of variables making up the management factor. For example, "water level for boating conditions" and "the availability of a toilet, picnic table, and fire pit at a campsite location" were rated moderately to very important for all user groups. The Extended Trippers and Full River user groups had the most concern for solitude and naturalness conditions; however, similar to the other user groups, they thought these management activities were important things influencing experience quality. Finally, "bank erosion at campsites," which did not load into any factor was rated moderately to very important for all user groups.

Table 1—A user group comparison of mean scale scores related to importance of experience quality from a 1998 survey of St. Croix International Waterway visitors.

Importance of experience quality	N	User group	Mean scale score[a]
Factor 1: Careless or disrespectful impact	36	Extended Trippers	4.50[b]
	106	Upper River	4.35
	56	Full River	4.29
	142	Upper Lakes	4.06
	38	Lower Lakes	4.00[b]
	378	Overall mean	4.21
Factor 2: Solitude	56	Full River	3.85[c,d,e]
	34	Extended Trippers	3.77[b,f,g]
	138	Upper Lakes	3.01[e,g,h]
	104	Upper River	2.98[d,f,i]
	36	Lower Lakes	2.46[b,c,h,i]
	368	Overall mean	3.15
Factor 3: Resource impact/development	35	Extended Trippers	3.51[b,g]
	55	Full River	3.51[c,e]
	104	Upper River	3.22[i]
	131	Upper Lakes	3.03[e,g]
	37	Lower Lakes	2.75[b,c,i]
	362	Overall mean	3.17

[a] Means identified with the same letter are significant at the $p < 0.05$ level.

Methods for User Group and Place Attachment Comparisons

To measure emotional/symbolic and functional place attachment, our study used place attachment statements from previous research by Watson and others (1992) and similar to recent research by Warzecha and others (2000). Five statements measured emotional/symbolic attachment:

- This place means a lot to me.
- I feel no commitment to this place.
- I feel like this place is a part of me.
- I am very attached to this place.
- I identify strongly with this place.

Seven statements measured functional attachment:

- I would not substitute any other area for doing the types of things I did here.
- I get more satisfaction out of visiting this place than from visiting any other recreation place.

- I enjoy doing the types of things I did here in the area more than in any other place.
- This area is the best place for the things I like to do.
- The time I spent here could have just as easily been spent somewhere else.
- No other place can compare to this area.
- This place makes me feel like no other place can.

Respondents rated the place attachment statements for the St. Croix International Waterway on a 5-point Likert scale from "strongly agree" to "strongly disagree." A numerical value was assigned after respondents answered the statements to reflect the following scale responses (+2 = strongly agree, +1 = agree, 0 = neutral, –1 = disagree, and –2 strongly disagree). For each user group (Upper Lake, Lower Lake, Upper River, Full River, Extended Tripper), grand mean scores were calculated for emotional/symbolic attachment and functional attachment to determine the strength of respondents' agreement with the place attachment statements. (For analytical purposes, the 5-point scale was reversed for the statements "I feel no commitment to this place" and "The time I spent here could have just as easily been spent somewhere else" so it could be compared to the other emotional/symbolic statements and functional statements, respectively.)

We used 1-way analysis of variance to compare mean scale scores of the level of agreement for each place attachment between user groups. The internal consistency for the five statements measuring emotional/symbolic attachment and the seven statements measuring functional attachment was assessed using reliability analysis (Cronbach 1951). Cronbach's alpha coefficients were computed for each set of items comprising place attachment scales.

Similar to the Warzecha and others (2000) investigation, we sought to determine whether there was a relationship between high and low levels of agreement with place attachment statements and respondents' importance with certain experience domains. We compared the highest and lowest 25 percent of the mean scores for each type of place attachment for the Upper Lakes and Upper River user groups. (For analytical purposes, the other user groups were not part of this analysis because of the low sample sizes.) Utilizing the upper and lower limits allows us to examine both ends of the agreement spectrum. As Warzecha and others (2000) point out, the upper and lower limits do not represent the majority of the user groups, but they may serve as an important barometer in evaluating attitudes about resource management issues.

We used SPSS to run 2-tailed t-tests to determine whether there were statistically significant differences between respondents with high and low levels of agreement with emotional/symbolic and functional attachment statements and how they responded to statements of importance for experience domains. We examined differences in responses *within* the Upper Lakes and *within* the Upper River user groups, as well as *between* the Upper Lakes and Upper River user groups, for respondents demonstrating high and low levels of agreement with the place attachment statements.

Results of User Groups and Place Attachment Comparisons

Levels of emotional/symbolic attachment (rated on a 5-point scale, +2 to –2) were compared for the five user groups (table 2). Statistically significant differences in levels of agreement with emotional/symbolic place attachment statements were found between the Upper Lakes (1.01) and Full River (0.56) user groups. Inter-item reliability for the five statements, as reflected by the Alpha scores, ranged from (0.80 to 0.92).

Levels of functional attachment were compared across user groups (table 3). Statistically significant differences in levels of agreement were evident among the user groups. Mean scores were highest for the Upper Lakes (0.67) and lowest for the Full River (0.00) user groups. In addition, statistically significant differences in levels of agreement with functional place attachment statements were found between the Lower Lakes (0.54) and the Full River user groups. Overall, the inter-item reliability of seven statements for functional place attachment was slightly higher than the reliability of emotional/symbolic statements (0.87 to 0.92).

For both types of place attachment, respondents in the Upper Lakes and Upper River user groups with high and low levels of agreement indicated differences in the importance of items defining the quality of experience on the waterway (rated on a 5-point scale, 1 to 5). These differences were apparent both within the Upper Lakes and Upper

Table 2—Levels of emotional/symbolic place attachment for five user groups.

User group	N	Mean[a]	SD	Alpha
Upper Lakes	147	1.01[a]	0.83	0.92
Lower Lakes	39	.87	.83	.89
Upper River	104	.81	.83	.92
Full River	54	.56[a]	.57	.80
Extended trippers	36	.76	.64	.86

[a] Means identified with the same letter are significant at the $p < 0.05$ level.

Table 3—Levels of functional place attachment for five user groups.

User group	N	Mean[a]	SD	Alpha
Upper Lakes	145	0.67[a]	0.89	0.92
Lower Lakes	38	.54[b]	.88	.92
Upper River	102	.38	.84	.92
Full River	54	.00[a,b]	.67	.87
Extended Trippers	35	.20	.79	.91

[a] Means identified with the same letter are significant at the $p < 0.05$ level.

River user groups and between the Upper Lakes and Upper River user groups. For example, for both user groups the importance of experiencing solitude was rated higher for respondents with high levels of agreement with emotional/symbolic statements than for respondents with low levels of agreement (table 4). For functional attachment, however, no significant differences were detected between respondents with high and low levels of agreement for either the Upper Lakes or the Upper River user groups.

Strength of agreement also was associated with statistically significant differences in respondents' ratings of the importance of experiencing an undeveloped area and lightly impacted campsite (table 5). For the Upper Lakes user group, respondents with high emotional/symbolic agreement rated this factor higher than respondents with low agreement (3.17 and 2.67, respectively). Evaluation of functional attachment, as associated with this factor, revealed significant differences between respondents with high and low levels of agreement in the Upper River user group (3.46 and 2.88, respectively). In addition, experiencing an undeveloped, lightly impacted campsite was more important for the Upper River respondents with high levels of functional attachment (3.46) than for respondents in the Upper Lakes with high levels of agreement (2.90).

For both types of place attachment, respondents in the Upper Lakes and Upper River user groups with high and low levels of agreement did not differ significantly in the importance of careless or disrespectful behavior related to the quality of experience on the waterway (table 6). For example, not seeing litter or damaged trees at a campsite was rated similarly important for respondents in the Upper River group with low levels of agreement to functional place attachment (4.19), as compared to respondents in the Upper River group with high levels of agreement to functional place attachment (4.40). For both types of place attachment, respondents with the same high and low levels of agreement to statements did not differ significantly in the importance of the careless or disrespectful behavior factor. For example, not seeing litter or damaged trees at campsites was rated similarly important in the Upper River group with high levels of agreement to emotional attachment statements (4.11) as with the Upper Lakes group with high levels of agreement to emotional attachment statements (4.44).

Table 4—Importance of solitude for respondents with high and low place attachment on upper lakes and upper river sections of the St. Croix International Waterway.

	Emotional/symbolic attachment		Functional attachment	
	Upper Lakes	Upper River	Upper Lakes	Upper River
Low	2.46[a]	2.57[b]	2.77	2.73
High	3.32[a]	3.32[b]	3.23	3.24

Means identified with the same letter are significant at the $p < 0.05$ level.

Table 5—Importance of experiencing an undeveloped area, lightly impacted campsite for respondents with high and low place attachment on Upper Lakes and Upper River sections of the St. Croix International Waterway.

	Emotional/symbolic attachment		Functional attachment	
	Upper Lakes	Upper River	Upper Lakes	Upper River
Low	2.67[a]	3.03	2.81	2.88[a]
High	3.17[a]	3.53	2.90[b]	3.46[a,b]

Means identified with the same letter are significant at the $p < 0.05$ level.

Table 6—Importance of careless or disrespectful impacts for respondents with high and low place attachment on Upper Lakes and Upper River sections of the St. Croix International Waterway.

	Emotional/symbolic attachment		Functional attachment	
	Upper Lakes	Upper River	Upper Lakes	Upper River
Low	3.75	4.12	4.03	4.19
High	4.11	4.44	3.96	4.40

Means identified with the same letter are significant at the $p < 0.05$ level.

Discussion

Providing high quality, backcountry recreational opportunities on the St. Croix International Waterway has become more challenging over time as ease of access has increased and nearby population centers in the Northeastern United States and Atlantic Canada have grown. In this region, the majority of backcountry experiences occur on private or State-owned lands, most of which lack specific, codified guidance as to the type of settings or activities that managers should maintain. Also, the broad diversity of users at the St. Croix Waterway suggests that experiencing a remote or backcountry setting may not be a priority for all or even a majority of users. In these conditions, the risk of creeping product shift is great. The task of managing agencies becomes more complex as they try to provide for a spectrum of recreational opportunities while still maintaining high quality backcountry experiences. For example, recently, many campsites on the St. Croix International Waterway have been hardened and enlarged, with single-cell sites split into multiple adjacent cells (Cameron and Stacey 2001) (fig. 3). These steps were taken to meet a perceived need for durable camping spots, but the possible impact on traditional backcountry values was not considered. Understanding the users and their multiple definitions of a quality experience provides key information for meeting these seemingly conflicting goals.

Experience Dimensions

The results of the factor analysis can provide guidance for managing agencies of the St. Croix International Waterway. The analysis suggests that for some dimensions of

Figure 3—User groups of the St. Croix International Waterway were not as concerned with the number of others camped nearby as they were with specific behaviors. Multi-cell campsites recently established to accommodate more users at popular locations increase the likelihood of users experiencing disruptive behavior, such as noise from other campers.

Figure 4—Approximately 95 percent of the land in the State of Maine is privately owned. Consequently, most undeveloped recreation opportunities take place on these private lands. The undeveloped character of private lands, especially those located near water, is threatened by development pressure for second homes.

experience quality there is substantial agreement between all user groups about levels of importance. For example, the importance of careless and disrespectful impacts (litter, tree damage) were only significantly different between the Lower Lakes and Extended Trip user groups, and all user groups rated the items in this factor very or extremely important. This finding is consistent with that reported in other studies (for example, Manning 1999). Management-related activities (campsite amenities, water level management, interpretive sites, and programs) were also similarly ranked by all five groups, with a high importance placed on campsite amenities and on water level management, and a low importance placed on interpretive signs and programming.

Differences also emerge from the factor analysis, particularly regarding the opportunities to experience solitude and opportunities to experience lightly impacted campsites and a primarily undeveloped natural setting. The two groups of canoeists whose activities are most dependent on an undeveloped backcountry setting (Full River, Extended Trip) placed higher importance on the opportunity to experience solitude than did the other three user groups, and this aspect of the experience was significantly less important for the Lower Lakes user group than for all the other groups. The Upper River group was also different than the two other river-oriented user groups. This Upper River group contains a higher proportion of day users, and day use has been shown to be associated with lower importance for solitude (Cole 2001).

The importance placed on the opportunity to experience an undeveloped viewshed and lightly impacted campsites also differed between several of the user groups (fig. 4). Again, the two river-oriented, multinight groups of canoeists placed the greatest importance on experiencing natural conditions, and they are joined in this regard by the Upper River user group. All three of these river groups rate higher on this dimension than the two lake groups. This is not surprising because the two lake groups have a much higher proportion of day users (41 percent in Upper Lakes, 76 percent for Lower Lakes). Also, recent studies of campsite conditions in the waterway (Cameron and Stacey 2001) indicate that campsites on the upper river segment are in substantially poorer condition than in other waterway regions. Hendee and others (1990) report that visitors are usually less concerned with campsite conditions and other resource impacts, instead focusing on various social conditions. Watson and others (1998) have reported similarity in the rankings of social and resource indicators by wilderness boaters, even though users were found to have diverse motivations or experience preferences. Our findings suggest that on the St. Croix International Waterway, while differences do occur, all groups except the Lower Lakes users placed moderate to high importance on this experience dimension. Generally, most visitors are very concerned about certain kinds of resource impacts, and may be willing to tolerate more heavy-handed management to ensure the availability of high quality campsites.

Comparing these distinct user groups provides insight on potential management challenges and opportunities. While the five groups are unique in demographics, visit characteristics, and motives, their zones of travel often overlap. For example, the Extended Trip group travels through every zone of the waterway. These overlapping use zones are areas with a high potential for conflict. However, the groups that place the highest importance on the qualities traditionally defining a backcountry experience—solitude and natural conditions—also travel for at least a portion of their trip in sections of the waterway that could easily provide those conditions. These groups could benefit from the creation of certain campsites along the waterway specifically reserved for primitive camping and nonmotorized access. Areas of the upper lakes are especially well suited to this strategy because of the large number of islands, stretches of undeveloped shoreline, and numerous isolated coves. The lowest stretch of river might also be well suited for this kind of zoning

approach because it is already used primarily by those groups that place a high importance on maintaining backcountry values. Also, campsite restoration projects such as those needed in the upper river zone would benefit all user groups, regardless of trip type or motivation. The Lower Lakes group, which places the lowest level of importance on all three experience dimensions, utilizes a region that is not frequented by any other user groups. The variability between these five groups suggests most of all that any recreation management scheme for the waterway should be designed with the specific geographic zones and distinct visitor groups in mind. A blanket strategy would not meet the diverse needs and desires of the waterway users.

Level of Attachment

Warzecha and others (2000) report that levels of emotional/symbolic and functional attachment were significantly different between visitors to developed and backcountry areas. They also report that these differences in levels of attachment were associated with differing levels of support for potential management actions on two Western United States rivers. Our results only partially concur. Levels of emotional/symbolic and functional attachment varied between the five user groups, with the two backcountry-oriented groups scoring the lowest on the scales of emotional/symbolic and functional attachment, but there were actually few significant differences. The five groups differ in many ways including primary activity, length of stay, mode of travel, group size, experience use history, and many other variables. They bring to the waterway a desire for a diversity of conditions and experiences. However, these results suggest that while the visitor groups may come to the St. Croix International Waterway desiring a diversity of conditions and experiences, nearly all users have a moderate to strong feeling of place identity and a moderate to strong belief that no other area can be substituted for this one. The uniformity and strength of feelings and beliefs held by the visitors about the waterway suggest that it is important for managing agencies to incorporate opportunities for public involvement in shaping recreation management goals and strategies for the waterway. Further, it requires that this public involvement be structured in such a way that it includes representation from each user group.

For two groups, we investigated the relationship between levels of attachment and importance of various experience dimensions. The strongest relationship was between high levels of emotional/symbolic attachment and higher importance of opportunities for solitude. A high level of functional attachment was also associated with a high level of importance placed on experiencing a mostly undeveloped setting with lightly impacted campsites. Level of attachment seemed to have no relationship with the importance of careless or disrespectful impacts encountered, suggesting that such impacts are very influential to all users, even those who have formed no attachment to either a specific place or a generalized setting. The two strong relationships suggest a perception by the user that the backcountry values—solitude, natural conditions—available at the St. Croix Waterway are not easily replaced. They also suggest the visitors' perception that the emotional/symbolic relationship with the St. Croix Waterway is a unique one, also not easily replaced. They further suggest that opportunities for experiencing solitude and natural conditions may be an important part of developing emotional/symbolic relationships with the resource, possibly an important source of satisfaction in itself for some users.

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Community Involvement in New Zealand Marine Reserve Management: Examining Practice

Laani Uunila

Abstract—The objective of this paper is to examine the management of marine reserve committees in New Zealand according to participatory theory. This analysis provides the basis for developing more effective and appropriate mechanisms to involve New Zealand's indigenous people (the Maori) and local communities in the management of marine reserves.

Case studies of New Zealand marine reserves are used to analyze the successes and failures of community involvement in marine reserve management. Preliminary findings indicate a lack of national direction on how marine reserve committees should function. In addition, a lack of funds available to committees limits the successes they can achieve. Despite weaknesses in format, marine reserve committees serve as a valuable link between government and community. Any attempt to create more meaningful participation requires committee restructuring from advisory bodies to those with more power and responsibility. However, this is not possible under current legislation and policy.

Introduction

This study examines the effectiveness of New Zealand marine reserve committees as a means for public participation. Marine reserve committees are advisory and advocacy bodies that incorporate local stakeholder representation. Case studies are used to examine marine reserve committees. The possible committee types are outlined prior to the presentation of preliminary findings and the subsequent discussion. Three themes exist: (1) little national direction, (2) inadequate funding, and (3) strengthening community relations. Before marine reserve committees are examined in detail, an overview of marine protected areas and participation provides a background for the discussion.

Objective and Methodology

The objective of this study is to examine public participation in the management of marine reserves in New Zealand. The main question to be answered is: *Are marine reserve committees an effective means to achieve participatory input in marine reserve management?* There are four case study marine reserve committees. The case studies are examined in three manners: interviews with Department of Conservation (DoC) staff, a mail survey to marine reserve committee members with followup interviews, and document analysis. Currently, the DoC interview phase of the project is complete, with questionnaires still being returned; as such, only preliminary results can be presented.

Marine Protected Areas

Marine protected areas (MPAs) are conservation measures with worldwide distribution. MPAs differ by nation, and even within nations in terms of the reason for establishment, degree of protection, and method of management. Agardy (1997, 1999) states that the term MPA is generic enough to encompass all forms of marine protection, from international biosphere reserves to small no-take reserves. In this research, MPA is defined as:

> Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment (Kelleher and Kenchington 1992: 7).

Kelleher and others (1995) state that the region containing the most MPAs, 19.9 percent of those in the world, is Australia and New Zealand. This fact is misleading for New Zealand because only 4 percent of New Zealand's territorial waters are protected under the marine reserve system. The New Zealand Government is not satisfied with the current status and is working on creating a national representative system (Parliamentary Commissioner 1999).

Legislation in New Zealand

Currently, there is little integration between marine protection initiatives across government agencies and levels. Thirteen central government agencies, 16 regional councils or unitary authorities, and 18 marine management laws have a role in marine protection (DoC 2000). The Department of Conservation is the key agency responsible for protected areas and species (DoC and Ministry for the Environment 2000).

The main mechanism for creating marine protected areas in New Zealand is the Marine Reserves Act 1971. Marine reserves are specified as areas of the territorial sea, seabed, and foreshore managed for scientific study and to preserve the marine habitat in its natural state. The Marine Reserves Act 1971 is fairly restrictive, as reserve status is for areas of demonstrable scientific value, with only secondary regard

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for natural, scenic, recreation, and cultural values (DoC 2000).

The majority of New Zealand's reserves are "no-take" reserves. Walls and Dingwall (1995) state that due to the fact that marine reserves are designed as no-take reserves, they are subsequently small in area. International recognition and praise are accorded to New Zealand marine reserves, as the majority of reserves are no-take, banning even recreational fishing (Boersma and Parrish 1999; Cole-King 1995; Shackell and Willison 1995). Currently, only one reserve, Kapiti, allows for limited recreational fishing (DoC 2000).

The Marine Reserves Act 1971 is under review to address several deficiencies, one of which is public involvement (DoC 2000). The Department of Conservation has requested feedback on how to strengthen the role of communities, Maori, and other stakeholders in the management of reserves. Currently, stakeholders can have some degree of management input through conservation boards (independent statutory bodies) or marine reserve advisory committees. Ultimately, however, the Department of Conservation is responsible for management of marine reserves.

Participation

The meaning of the term "participation," and the degree to which it is used, have little consensus among managers and planners. Using a term with many meanings can cause significant problems, as expectations and realities differ between groups. Dugdale and West (1991: 2) define public participation as:

> A two-way process of communication between planners and the community that promotes the exchange of information and ideas and seeks joint problem solving and the resolution of conflict in order to produce plans and policies that are acceptable to the community and which can be effectively implemented.

Participatory resource management and planning, therefore, is the inclusion of the public, either general and/or special interest groups, to help create socially acceptable resource management decisions via a communicative process.

There is a continuum of participation that ranges from extracting information to empowerment (Arnstein 1969; Chambers 1994; Michener 1998; Slocum and others 1995). In recognition of this continuum, Arnstein (1969) created a "ladder of citizen participation" that begins with nonparticipation methods, rises to degrees of tokenism, and ends with degrees of citizen power (fig. 1).

Arnstein (1969) cautions about the use of empty participation versus true power sharing. Various authors (Arnstein 1969; Duffy and Hutchinson 1997; Forester 1989) warn of the damaging effects of nonmeaningful participation:

- Frustration
- Mistrust
- Disillusionment
- Withdrawal of participation and/or consent

To create meaningful participation, Innes (1998) calls for the establishment of a stakeholder group that works in parallel to government, allowing community voices to be heard.

Donaldson (1994) identifies three types of groups that can be used in participatory resource management: (1) elite, (2) existing, and (3) new (table 1). Establishing a new group is the ideal, as such a group can be representative of the community; moreover, an established group may not be able to adapt to participatory techniques.

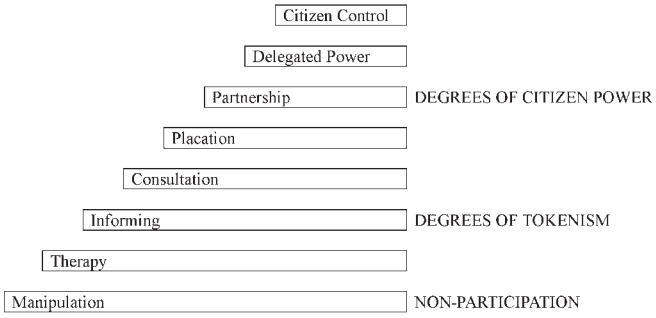

Figure 1—Arnstein's Ladder of Community Participation (source: Arnstein 1969).

Table 1—Types of committees[a].

Type of stakeholder committee	Elite	Existing	New
Stakeholders	Special interest groups (for example, industry, government, academia)	Existing group used	Anyone—inclusionary
Membership	Members invited	Group selected	Open
Weaknesses	Exclusionary; no community ownership or representatives	Problems with new mandates or structure	Group needs to develop cohesiveness
Strengths	Easy to identify stakeholders	Time saving	Group grows together —can include general public

[a] Source: Donaldson 1994.

There is not a homogeneous group that can speak to the needs of the community, as people no longer have the connection to each other and places that once existed (Beauregard 1996; Cowan 1997; Gikey Dyck 1998). Duffy and Hutchinson (1997) identify several ways for community to be represented: issue/common cause groups, target groups, geographical, spiritual, and nets of social relations. Resource managers and planners need to be aware of their definition of community when selecting partners for collaborative planning practices. In New Zealand, marine reserve committees represent a geographical and interest group definition of community.

Duffy and Hutchinson (1997) found that when groups are only given power at the operational level, not the strategic level, frustration arises, as members want to be involved in all levels of the process. Sharing of power and responsibility are key as:

> …the community can feel it "owns" the result, with most members of the community believing that they have had a chance to be involved, have a stake in the success of the result, and in which some do not feel personally disadvantaged while others have escaped disadvantage or have gained (Radford 1994: 395).

Participation at the earliest possible point, even before plan conception, allows participants to truly belong to the planning process, rather than being treated in a tokenistic manner (Healey 1997; Innes and Booher 1999).

Community Participation in Marine Protected Areas

The focus of marine reserve research has changed in the past decade. For example, Kennedy (1990) suggested improvements to the management of Mida Creek marine reserve; no mention was made of public involvement, save for educating locals and tourists. While experts and researchers are now recognizing the need for public participation, there are still several gaps in the studies that have been conducted. Much of the research on MPA effectiveness focuses on the implementation of policy, management practices, and monitoring (for example, Nicholls 1998), not on the effectiveness of public participation in influencing the management process.

Preliminary Findings

Until the new Marine Reserves Act becomes law, four types of marine reserve advisory committees can be created in New Zealand (table 2). Not all reserves are required to have an advisory committee. Despite descriptions of different possible committees that can be formed under legislation, there are no national guidelines for operating a marine advisory committee. In the mid-1990s, a discussion paper was circulated with the aim to create national principles for committees and the selection of members. Unfortunately, there has been no action on this paper.

The marine reserve committees examined as case studies are: Kapiti, Long Island-Kokomohua, Te Tapuwae o Rongokako, and Te Whanganui A Hei. An overview of each committee is presented in table 3. Marine reserve committees are a combination of Donaldson's (1994) *elite* and *new* groups. The majority of positions, which are not allocated to iwi (tribes), are for interest groups such as commercial and recreational fishers, environmental groups, and dive clubs. There is little or no representation of members of the general public. Three main themes have become apparent from interviews with DoC staff and the preliminary survey results: lack of a national approach, inadequate funding, and invaluable community relations.

National Direction

The first and foremost theme is that respondents perceive there is no nationally coordinated approach to participation in marine reserve management. This theme can be split into two subsections: (1) lack of national direction and (2) the need to be flexible to the community.

The functions of the case study committees vary, from a concentration on compliance and enforcement work, to raising public awareness, to approving applications for scientific research. The resources available to committees also vary, for example, some committees can claim travel expenses while others cannot, some committees have access to funds while others do not. These variations create an ad hoc system.

Committee membership, Department of Conservation staff, and external influences all play roles in determining the focus of the advisory committees. The differences appear

Table 2—Types of possible marine advisory committees.

Type	Advisory	Board subcommittee	Combined	Ad hoc
Powers	Advisory body to the Minister	Powers may be delegated by Conservation Board	Advisory body and delegated powers	No statutory power
Weaknesses	Does not allow for management planning or policy advice	Must act within mandate of Conservation Board	Operates under two different sections of legislation	No statutory power
Strengths	Relationship with Minster (via Regional Conservator)	Policy advice and planning role	Advantages of both advisory and subcommittee	Easiest committee to setup

Table 3—Marine Reserve Committee overview.

	Long Island Kokomohua	Te Whanganui A Hei	Kapiti	Te Tapuwae O Rongokako
Reserve establlished	1993	1992	1992	1999
Committee established	1993	1993	1993	2000
Type	Subcommittee	Subcommittee	Subcommittee	Combined
Members	8	8	8	9
Stakeholders	Conservation Board (2); iwi (4)[a]; dive club (2); Fisherman's Association (1);	Conservation Board (1); iwi (4); interest groups (3)[c]	Conservation Board (1); iwi (4); interest groups (3)[c]	Conservation Board (1); iwi (5); interest groups/public (3)
Iwi representation	Te Atiawa, Tangata whenua[b]	Ngati Hei	Ati Awa, Ngati Toa, Ngati Ruakawa	Ngati Konohi
Focus	Science research applications	Interpretation/ Public awareness	Compliance and law enforcement	Operational plan
Weaknesses	Lack of quorum and/or meetings in recent years	No long-term vision for the reserve	Compliance focus	Committee still learning the "ropes"
Successes	—	Interpretation kiosk created, snorkel trail	Hired advocacy officer 2001	—

[a] One of the Conservation Board representatives is also an iwi representative—meaning that the total number of places on the committee is only eight.
[b] "Tangata whenua" means "first people of the land."
[c] Includes a National Institute of Water and Atmospheric Research scientist.

to be random, with the personalities involved shaping the process. It appears that the individual interests and enthusiasm of the members are major factors in determining the actual tasks undertaken by a particular committee.

Each marine reserve and marine reserve committee is forging its own way, making mistakes and creating successes. The lack of communication between reserves is something mentioned by DoC staff in all interviews. Some staff members have attempted to create information exchanges, such as the request for an exchange of minutes between Long Island—Kokomuha and the Te Whanganui A Hei. These information exchanges are few and far between, and more often due to friendships with staff in other conservancies than to seeking out information from all reserves.

Regional differences do need to occur, as each committee is representative of the community and interest groups concerned with the reserve in question. Moreover, the rights of the Maori, New Zealand's indigenous people, must be respected. In addition to needing community support, marine reserves need the support of the local iwi, who give up their traditional fishing rights to the area. Due to the importance of iwi support, they often have at least 50 percent representation on the committees. Sometimes, as in the case of Te Whanganui A Hei and Te Tapuwae o Rongokako marine reserves, only one iwi is involved; however, other reserves require representation from several iwi.

Funding

Funding allocated specifically for marine reserves only came about in 2001. Prior to this, the budget for the reserves came from the conservancy budget. The lack of funds directly accessible to marine reserve committees is most likely the biggest cause of frustration to the committee members, as they cannot conduct all the activities that they would like. This inability reinforces their role as merely an advisory body to DoC, when they would like more of a hand in the management of the reserves. One respondent stated that the committee "would feel more useful if we could raise and hold funds for campaigns," because without funds members have little they can actually do. Some committees would like to seek sponsorship from outside DoC; but there is no consensus among conservancy staff if external sponsorship is permissible.

Community Liaison

Marine reserve advisory committees are a key link between DoC and members of the community. The link is strongest between iwi and specific interest groups, such as commercial fishers; however, in some reserves, the link is also established with members of the general public. DoC staff considers the committees to be "watchdogs" who keep pressure on DoC to uphold promises and ensure adequate management. In addition to advising DoC, the committees serve to provide a "reality check" and extra "eyes and ears" for management. The importance of iwi connections was emphasized by all DoC staff interviewed.

Discussion

In New Zealand, it appears that marine reserve committees, since they are only advisory bodies—equivalent to

Arnstein's (1969) rung of consultation, a form of tokenistic participation—have the potential to create feelings of disillusionment. For example, the Long Island-Kokomohua committee did not even meet in 2000. The lack of a budget for the committee and the fact that the reserve is not a high use reserve are two factors that may have contributed to nonparticipation. It is impossible to tell without further research if there are any other contributing factors to nonparticipation, in this reserve and others.

Committees can have feelings of frustration at their inability to act in more than an advisory manner. The focus on funding by both DoC and committee members suggests that this is an area where the participatory process needs to be improved. The marine reserve committees would acquire new capacity if they were to have an operating budget for activities that they desire to implement.

Not being able to create tangible benefits from their participation, some committees get a negative feeling about their ability to make an impact. For example, the Kapiti Marine Reserve Committee has focused on compliance and law enforcement for almost a decade, an area where the committee does not have any power to make a direct difference; as such, little successes are nonexistent. The committee, however, has made a significant contribution, adding extra "eyes and ears" to the reserve, in addition to pressuring DoC staff and head office to ensure that compliance work is being done and legal followthrough occurs. Tangible benefits from such activities are small, if at all apparent. Innovation is occurring in the Kapiti Marine Reserve, with extra funding requested, and received, for a temporary advocacy officer. The role of the officer is to liase with the marine reserve committee and aid in the creation of promotional material, as well as liasing with interest groups and members of the public.

Though there are faults in the current system, marine reserve advisory committees play an important role. They liase with members of the community, provide a network of people to assist in compliance activities, and are able to act as an independent body and advocate for the marine reserve through political channels. Without marine advisory committees, it is likely that there would be less community understanding of the actions of the Department of Conservation.

Summary and Conclusions

In New Zealand, national guidance is lacking in terms of how to incorporate communities in marine reserve management. There is no operational consistency between marine reserve committees, with differences in structure and contributions to management. Recognizing the fact that the needs of each community are different, it is not necessarily negative that each committee functions in a different manner. However, there should be better communication between the committees and reserve managers so mistakes are not repeated throughout the whole system and successes can be recreated.

Reserve advisory committees want to have funds available to them so they can implement promotional and advocacy programs without having to rely on the Department of Conservation. Becoming financially self-sufficient would allow the committees to become more effective in their roles. Financial self-sufficiency also means that they would have greater capacity, something that would require restructuring of current government philosophies in regard to public participation. Research into transferring the current paradigm of participation into one that creates more meaningful opportunities would be useful. Do marine reserve committees and Department of Conservation staff have divergent views on the current level of participation? Are committee members satisfied with the current process? If not, what improvements can be made to ensure continued community participation in marine reserve management? The need to see tangible benefits from participation is key, and independent funding is one way to create visible successes. As such, this is one area that requires future research.

This study contributes to more than marine reserve research, as the need to incorporate communities is a widespread phenomenon, be it in conservation or urban planning. The needs of each country, region, and community differ. However, the rights of people to participate in planning, and the need to incorporate the visions of the community are key if planning is to succeed.

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Ecological Implications of Water Spirit Beliefs in Southern Africa: The Need to Protect Knowledge, Nature, and Resource Rights

Penny S. Bernard

Abstract—This paper explores the ecological ethic intrinsic to the traditional cosmologies of the Southern African Bantu-speaking peoples, specifically in association with water sources and riparian zones. It details the complexity of beliefs regarding the water spirits, particularly related to the snake and the mermaid, and their role in the calling of traditional healers in Southern Africa. The implications of these beliefs with regard to water and riparian zone management are examined. The pools in which such spirits reside have sacred status and are of key importance in the training of healers, as well as being important sites for the performance of family rituals. Many of these sites are threatened with environmental degradation, mainly by agroforestry and dam-building programs. Over the last century, healers have been increasingly marginalized from such pools through the privatization of land and the former South African Government's apartheid policies. It is argued that to promote indigenous knowledge and wise stewardship of resources, adequate protection of such sites is essential, and mechanisms need to be explored whereby healers and their communities can be granted access to such features of the landscape.

Introduction

There has recently been a surge of interest worldwide in the way indigenous people interact with their environment and the value of their knowledge systems. Many international organizations, such as the Convention of Biodiversity (CBD-UNCED 1992), the United Nations Working Group on Indigenous Populations (WGIP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Working Group on Traditional Resource Rights (WGTRR), are calling for the recognition of indigenous peoples rights to self-determination, the value of their knowledge, and the need for strategies to protect and preserve this knowledge (Gray 1997; Posey 1999; Posey and Dutfield 1996). This has largely been precipitated by the global environmental crisis, which has revealed the shortcomings of an exclusively scientific approach, often within the western economic development paradigm, in solving the multitude of environmental problems facing present and future generations.

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There has been a corresponding awareness of the need to examine how indigenous people have managed to live in a sustainable way within their environments, both in the past and the present. The need to document and preserve such knowledge is thus seen as crucial for humanity's long-term survival on Earth. It is pertinent to note that much of this knowledge is intimately connected with the broader framework of peoples' cosmology and world view, which is embedded within their physical, spiritual, and social landscapes (Hirsch and O'Hanlon 1995; Tilley 1994). Hence, procuring and preserving existing knowledge, although crucial, is only one aspect of the equation. Knowledge is dependent on the protection and preservation of these broad features of the landscape, within which peoples' identity, cosmology, and knowledge are embedded. In terms of the physical landscape, protection and preservation are just one aspect of the solution. Ensuring indigenous people access to these sites is essential because such features are integral aspects of the nature, formation, and transmission of knowledge. Throughout the world, over the last 200 years these communities have become increasingly marginalized and denied access to such resources, with the resultant threat to their knowledge.

In South Africa, indigenous African peoples are emerging from centuries of alienation and marginalization imposed on them by their colonial and apartheid masters. In the last century, they were systematically denied access to a large percentage of their resources. The Land Act of 1913 is well recognized as the institutionalized mechanism that precipitated this, whereby it stipulated that over 80 percent of the population was to be confined to 13 percent of the total landmass of South Africa.

Since independence in 1994, efforts have been made to correct this state of affairs, but the present process of land restitution is slow, arduous, very expensive, and fraught with many difficulties. Many who were uprooted from their natural landscapes have lost their knowledge and traditions, or have repudiated them in favor of monotheism, capitalism, and globalization. These transformations, as well as the inevitable population pressures on the restricted resources, have led to behavior changes, which have resulted in environmental degradation and abandonment of much of the traditional ecological knowledge that is no longer relevant to them. These modern forces have all contributed to the "disenchantment" of the landscape, whereby the respect for the spirits of the land is rapidly disappearing and with it a powerful mechanism for limiting human behaviors that have negative ecological impacts.

Despite these threats to knowledge, however, there remains a strong body of beliefs among a core of African religious functionaries—the traditional diviner healers

(*amagqirha, izangoma*). Despite being heavily "demonized" by their Christian invaders, they continue to play a significant and influential role in their communities.

The following summary demonstrates the intimate connection that exists between the physical, spiritual, and social dimensions of Southern African spiritual healers' knowledge and practice, particularly with reference to water resources and the belief of water spirits. It must be noted that water sources provide just one aspect of the knowledge base. Plants, forests, and mountains are also integral to the training and practice of traditional healers. The data presented comes from research I have done among the Zulu-, Xhosa-, and Karanga/Shona-speaking groups over the last 4 years. These communities span a wide area of Southern Africa, extending across several thousand kilometers and over a number of State boundaries (South Africa, Mozambique, and Zimbabwe). It is worth noting that I have identified a common corpus of knowledge linking the African healing traditions with the water spirits over this whole region that is not exclusive to these groups only. It also features strongly in other Bantu-speaking groups in the region, such as the Swazi, Venda, Sotho, Tshangaan, Ndebele, and Tswana, and they are also prevalent amongst the earliest known peoples of Southern Africa, the Khoekhoe and the San.

Water Spirits in Southern Africa

Among many of the Southern African indigenous people (Khoisan- and Bantu-speaking people) there exists a set of complex beliefs regarding water, river systems, and riparian zones. The spirit world is regarded as the ultimate source of such life-sustaining resources. Water is the essence of both spiritual and physical life, and the spirit world is regarded as the ultimate source of such life-sustaining powers. Integral to such beliefs are various zoomorphic spirit manifestations, primarily the snake and the mermaid, who reside in or beyond the water and who interact with humans in a variety of ways. The rivers, wetlands, and the sea are the dwelling places of such manifestations and are of fundamental importance to many of the African healing traditions and their practitioners.

The snake and the spirits of the water are specifically associated with the calling of healers and are seen as the providers of wisdom and knowledge, which are given to chosen individuals. Water sources are essential parts of the landscape for conducting rituals to aid communication with the spirit world. Water in itself is regarded among many African religious functionaries as a living force, which has the power to transform us from one state to another at a spiritual or physical level. It has the power to purify and protect one from evil, or to heal and bring one from illness to health. It is thus a vital element in the performance of many religious and healing rituals.

Common Themes

What is remarkable about all the differing accounts of the water spirits are the similarities in the myths and core symbols. The central feature of these myths and rituals is the association with the "calling" of individuals to become diviners. This usually involves the physical submersion of the candidate under the water of a certain river pool or the sea (for a few hours, to days or even years) after which it is alleged that the individual emerges wearing the full regalia of a healer—a symbolic snake wrapped around his/her body and medicines. This experience of being taken under the water, often by a wind or a "snake" can happen in a dream, but this is merely notification that the individual's ancestors are calling him/her to become a healer. The "calling" is usually preceded by the candidate suffering an illness (*ukuthwasa*), although sometimes, especially in the case of children, they just happen to be playing near the water at the time. Individuals who have had such experiences commonly report seeing snakes, mermaids, or even their ancestors. Skills in healing, sacred knowledge, psychic abilities, and medicinal plants seem to be the gifts that are imparted to these chosen people by the water spirits. It is the spirits that choose the client, not the other way around, and resistance to the "calling" usually leads to misfortune. Relatives are not allowed to display any grief at the disappearance of one who has gone under the water or he/she may never be returned to the living. Anyone who enters these water sources without the calling of the ancestors will disappear, never to return.

Key symbolic images linked to objects seen under the water or to messenger animals that summon the "chosen" one to meet the spirits are remarkably similar within all the groups, namely, the snake or python, the water monitor (*leguuan*), the hippopotamus, the dolphin, the otter, the crab, the frog, the brown fly, and/or the horse fly. Among the Zulu, snakes (especially pythons), and crabs that visit people in their houses are regarded as ancestral manifestations and should not be harmed.

Certain places are more favored by the river spirits than others. They are believed to live in deep pools of certain rivers, often below waterfalls, fast moving "living" water, or in the sea. "Living" water is often associated with its ability to generate foam, and the foam appears to be symbolically important. Berglund (1976: 146) cites a diviner (*isangoma*) informant who said,

> It is as I said water that is living, running in the river. That is the living water. If the water had been in a dam as you asked (a while ago), then there would not be a snake in it. It is the living waters.

It is believed the ancestors, or spirits of the water, live in a dry area at the bottom of these pools and have a lifestyle very similar to people living on earth, in that they have houses, cattle, chickens, and so forth. They are prosperous, peaceful, happy, and in fact, lead an idyllic life.

The occurrence of certain plants near pools and river sources indicate the presence of the water spirits. Palmer (1996) notes that in the Eastern Cape the presence of the *umkumzi* (or *imkhamzi*) reed (*typha capensis*) on the edge of pools is seen as a sure sign of habitation by the water spirits. The reed is a key symbol in Zulu religion, and in one origin myth they claim that they emerged from a bed of reeds. The reed mat is an essential accoutrement of diviners, and this is directly linked to its association with water, healing, and creation.

For the San (/Xam) the presence of reeds and water-buchu indicates the location of the Water Snake's dwelling place (Hoff 1997). The foam generated from certain plants, the sacred *ubulawu*, is used by the Zulu and Xhosa for washing and eating in order to purify and connect an individual to the ancestors through dreams. Many of these species come from trees, bushes, and vines that grow near water sources (Hirst 1990). *Ubulawu* is very often administered to healers during rituals conducted in river pools. Significant cave sites, often with San paintings, are often found in close proximity to sacred pools, and many rituals for healing and rainmaking are performed at these sites.

There seems to be some discrepancy between the various areas as to whether the water spirits are regarded as shades (recently deceased relatives) of either paternal or maternal origin, or belong to a generalized amalgam of nonspecific or very old ancestors. In Natal, the water spirits, in the form of the snake, are referred to as the "*amakhosi*" (the great ancestors). They have explicitly stated that the snake is the metamorphosed amalgam of one's ancestors who live under the water. Both Berglund's (1976) informant and my informants suggest that they distinguish between the snake(s) that is/are a manifestation of the "family" (shade snakes), and the big one ("The one which is the Lord") representing the Supreme Deity. For instance, Berglund's (1976: 148) informant describes the python as *iNkosi yamadlozi* ("the lord of the shades" or "the one above") who resides in the pool.

The Zulu also recognize the existence of another category of nonhuman water spirits or semi-daemons that are half human/half fish (mermaids) and have stated that this is one of the forms the heavenly princess, *iNkosazana*, can take. These creatures often have transformative powers. For instance, *iNkosazana* can manifest as the mermaid, the snake, the rainbow, and gentle soft rain. The Shona are quite specific that the mermaids, known as *njuzu*, are alien spirits (*mashave)* of human and nonhuman origin (Aschwanden 1989). Certain mediums can be possessed by *njuzu* spirits who will give them healing powers. Mermaids are believed to come out of the water with their animals at night, and it is for that reason people are reluctant to go near rivers or the sea after dark.

Latham (1986), Aschwanden (1989), and Daneel (1971) have indicated the close link between the Shona/Karanga Supreme Deity, *Dzivaguru* (or *Mwari*), the original autochthon, from whence comes rain and fertility, and the spirits of the pool. The *njuzu* (mermaids), closely linked within the python and the puffadder, feature very strongly at the shrines to Mwari (Mlimo) at the Matonjeni Cave complex in the Matopos region of southwest Zimbabwe, as well as at the Nyamakati Pool shrine to Dzivaguru in northeast Zimbabwe. The aforementioned shrines are central to the rainmaking cult in the region. This link with the rainmaking forces and with fertility is a common theme throughout Southern Africa. Inkosazana, the Zulu heavenly princess, as the bringer of soft-soaking rains, is responsible for both agricultural and human fertility. Propitiation and appeals are made to her by virgins at the beginning of spring each year, appealing to her to bestow her gifts of fertility and to help them select a suitable husband.

There are many other rituals that are performed for the water spirits at rivers throughout Southern Africa. The purposes for conducting them and the ritual process may vary from group to group. They are mainly conducted for diviners at various stages of their training, but some households will propitiate periodically to appeal to the spirits to bestow them with wealth, rain, good harvests, and fertility.

Among some Nguni groups, propitiation rituals are still made prior to planting in spring. A portion of the seeds to be planted are placed on the surface of the sacred pools. The river spirits will accept half of them and return the other half to mix with the remaining seed to enhance its fertility and yield. If none of the seed sinks, but just spreads over the water, this is an indication that the ancestors and spirit world are offended by the misdeeds of the living. Should this happen, the participants will immediately seek to determine the cause of the ancestors' anger, and frequently confessions of social tensions and jealousies get brought to the fore. These are discussed and resolved as speedily as possible, often at the riverbank itself in the presence of the ancestors. This reaffirms the intricate balance that they perceive to exist between the social, spiritual, and physical worlds.

Sacred Pools, Behavioral Taboos, and Ecology

As a result of the profound sacred status that the many rivers, pools, and water sources hold for Southern African indigenous communities, there existed in the past, and to some extent today, a range of taboos surrounding their access and utilization. Pools, rivers, and expanses of water are held with a mixture of awe, fear, and reverence. Great care was taken in the past to avoid disturbing or angering the water spirits. Common people were forbidden to go near sacred pools where the snake, mermaids, and spirits were known to exist. This injunction was reinforced with the fear that uninvited people would be taken under the water never to return. Only healers, kings/chiefs, or those who are pure of heart are allowed to approach such areas.

I have accompanied the *izangoma* to a number of these pools, and they are always approached with singing and prayer. The healer will inform the spirits who is approaching and reassures them that they come as friends. It was strictly taboo for anyone to extract plants or resources from the water's edge. This could only be done by healers who were allowed plants for medicinal use. Traditionally, healers approach the plant with humble clapping of the hands and appeal to the ancestors to allow them to utilize the plant for healing purposes. After removing the plant, they replace it with white beads as a sign of thanks. Similarly, when approaching water they often make offerings of beads and silver money.

Killing or injuring any of the messengers of the water (such as crabs, snakes, frog, or water birds) is also regarded as a great offense, and there are many groups in Southern Africa for whom the eating of fish is strictly taboo. Transgression of such taboos could result in the drying up of the water source and droughts. Many groups limit the distance to which residential units can be erected near rivers and where cultivation may take place. Hoff (1997: 24) noted that the San prefer not to live very close to a water source because of their belief that,

> Water Snakes wander in the immediate vicinity of their homes, making these areas particularly dangerous.

In many places, the effects of modernity and the pressures for population resettlement have overwhelmed these traditional fears and restraints, leading to catastrophic results. Many people living in squatter settlements along rivers and streams in urban areas of South Africa have lost their lives and homes to flash floods in recent years.

The water spirits are generally believed to live in pools and swamps that never dry out. It is said that their role is to protect water sources and keep them alive. They can, however, be chased away by disrespectful behavior, social disharmony, or if the overharvesting of riparian zones take place. This will lead to the drying up and degradation of such rivers. Such forces are regarded as the guardians of fertility, morality, and life itself. Any disrespect shown to them may result in drowning, droughts, floods, and tornadoes. In Zimbabwe, Aschwanden (1989: 189) reports local opinion is that,

> In the past—before the arrival of the white man—there are said to have been more pools and springs with water snakes. The many noises that came with the Europeans made many *njuzu* leave their habitats forever, which caused aridity. However, disobedience by many people is also said to have prompted the *njuzu* to retreat.

Damming or channeling water from rivers can also upset the river snake. A well known example of this was the resistance given by the valley Tonga when Kariba Dam was constructed. Their main fears were that the great water serpent *Nyaminyami* would be angered. The many disasters that beset the project were largely attributed to *Nyaminyami's* distress from being separated from its mate downstream from the wall. The more recent Lesotho Highlands Water project encountered similar resistance from the local inhabitants, who attributed the seismic motions to the great snake's distress with the project.

How people harness the idiom of the water spirits to mount powerful community opposition to social, political, and developmental projects was clearly demonstrated in the *Ambuya* Juliana movement that swept through Southern Zimbabwe in the early 1990s. This was in response to certain environmental catastrophes such as severe drought and rodent plagues.

The movement was inspired by a prophetess by the name of Juliana, who claimed to be an emissary of the water spirits (*njuzu*), with whom she had resided under water for a period of 4 years. She made her first appearance in the Zvishavane Mberengwa region at the height of the drought of 1992. She attributed the drought to the breakdown of respect that people had for the Earth's resources, particularly water sources, for lack of social harmony and abandonment of traditional practices and beliefs, and for the failure of the government and state to acknowledge the role of the spirits in the War of Liberation. The major grievances of the *njuzu* were the construction of dams and the drilling of boreholes. She stated that the smell of cement drove away the *njuzu* who were pivotal in the provision of drinking water for the people. It was stated (Mawere and Wilson 1995: 255) that,

> The government is wrong in the manner in which they are blocking quite a number of streams to make dams. The government is also sinking boreholes and wells in a bad way, making explosions that frighten away the spirits and all other creatures.

She instituted a set of harsh taboos, which the community had to observe should they wish the drought to break, and to facilitate the return of the *njuzu* who would regenerate mountain springs, underwater, and surface rivers. Among these was the banning of the construction of dams and the drilling of boreholes, as well as the use of soaps or the immersion of metal or enamel containers into the rivers. It was also forbidden to kill any wild animal or to collect wild fruit or plants for sale, as these attract the rain.

The thousands of people who responded to her pronouncements, and adhered to the harsh taboos and restrictions which she imposed, is a graphic example of the great respect many people still hold for the water spirits in this region. Many taboos revealed a collective rejection of the modern economic forces of capitalism, agriculture, and religious (especially Christian) intrusion into the area. All these are seen as a threat to the maintenance of traditional practices.

This desire to return to tradition has been witnessed recently in the Mvoti valley area of the Kwazulu Natal Midlands, where certain rural communities have reinstituted the ancient day of rest for the heavenly princess, *iNkosazana*. This day was known traditionally as *lesuku lweNkosazana* and was regarded as the day when no one was allowed to utilize the river or to tend their fields. The reinstitution of this day of rest was in response to a claim made by a lady (*isangoma*) who claimed that *iNkosazana* had visited her while she was hoeing her field. She said her children's names were Saturday and Monday and that on those days no one should use the rivers but should leave them in peace to recuperate so she and her children could enjoy them. The message was to be relayed to all five chiefdoms in the area. Collecting water, washing, or utilizing any water directly from the river on her day (Mondays and Saturdays) is now strictly prohibited.

Connected with the taboos, in respect of *iNkosazana*, is the revival of the planting ceremonies for her in spring. In the Mvoti area, all members of the chiefdom have to contribute a portion of their crop seeds and some money to purchase a goat for the chief prior to planting. On a designated day, all the people in the chiefdom awake early in the morning. Taking with them their hoes and spades, traditional beer (*tshwala*), and sour milk (*amasi*), they congregate together in a forested valley above the river. The men demarcate a piece of land that is to be dedicated to *iNkosazana* and construct a fence around it. The soil inside the area is dug by all present. Then, the chief's mother and wife and all the elder women plant the grain collected from the households (households that do not contribute are fined).

Afterwards, a goat is sacrificed near the river, and an elder takes the bile from the gallbladder and sprinkles some of it into the river. He then ascends the mountain to the forest where the field is located and sprinkles the remaining bile on the field. I was told that this is a crucial part of the ritual because a connection has to be made between the water and the field. "This is done to show the significance that the garden, the goat and the river, all belong to *Nomkhubulwana*." Traditional songs are sung and there is much dancing performed. Following this, the women, dressed in leaves from the *Msenge* tree (cabbage tree), a tree sacred to *iNkosazana*, descend together to the river to take a bath. The *Msenge* leaves are stripped off their bodies and thrown into the water, and naked, the women wash themselves in the

water. No males—young or old—are allowed anywhere near the river at this stage. This is to emphasize respect for the women's bodies, as much as respect for the heavenly princess, the bearer of fertility. No woman is allowed to return home until she has taken the bath. The bath signifies the end of the ritual.

I conducted a small survey (n = 32) in this valley in early 2001 to evaluate how popular such rituals and constraints on using the river were to the local community. The majority of the respondents were very happy to be participating in the rituals, even though many of them did not have a clear idea of exactly who *iNkosazana* was, as these things had been long forgotten.

It was noted, however, that those who don't observe the day of rest or participate in the rituals have very poor and unproductive gardens. Those who had some hesitation or doubts about the practices were converted Christians, who claimed they had abandoned the ways of their ancestors. One such respondent even went so far as to say that these practices "were things of darkness," and that ever since she had met Jesus, she refrained from the practices of *Nomkhubulwana*. All the respondents endorsed their support for traditional leadership through the chiefs. This is of interest because I believe traditional governance through the chiefs has a powerful role to play in ecological management, particularly where it has been sanctioned by the spirit world.

While these examples can be seen as convenient idioms in which communities object to the forces of modernity, capitalism, monotheism, land invasion, and loss of control of resources, it cannot be denied that they have all experienced the negative ecological and social consequences that development has brought. These negative consequences merely confirm the community's conviction that the divine powers of the water have been disturbed, and this idiomatic expression is the most effective means by which protest can be voiced.

Environmental Threats to Sacred Pool Sites: Implications for Indigenous Knowledge

In the majority of the areas where I have conducted research, sacred pool sites of key significance for healers are being systematically threatened by development projects, mining, and modern agricultural practices. The privatization of land has led to many of the sacred pools being inaccessible to healers, and a number of healers have been arrested and imprisoned for crossing private land to get to the sacred pools. These restrictions can severely hinder a healer's training process.

Environmental damage through development initiatives also pose a great threat to both the physical and sacred status of pools. For example, in the Venda region of South Africa, a recent newspaper report has highlighted the environmental damage that is being inflicted on Lake Fundudzi (sacred to the Venda people) and other river systems in the region by large scale mining and chemical and industrial development projects in the area. Many of the rivers in the region are so polluted with chemicals and radiation that livestock and humans who drink from the water are suffering from multiple health problems, including birth defects. The newspaper, *Mail and Guardian* (Nkosi and Arenstein 2001: 4), reports:

> The threats to Lake Fundudzi were caused...because the province failed to allocate enough staff to its environmental impact assessment division and expected two staff to process 15 environmental impact assessments, 35 mining applications and roughly 15 other large development applications a month. The government therefore simply allowed subsistence farmers to invade and begin ploughing the steep hills above Lake Fundudzi on poorly constructed terraces without conducting environmental impact assessments or obeying other land use laws.

This report possibly overemphasizes the role of environmental impact assessments in curtailing such negative effects, and does not investigate disadvantages of such large-scale development projects in the region, or why there has been a need for local peasant farmers to move into the area in the first place. In the past, the region around the lake has been strictly monitored.

van de Waal (1997: 51) documents the difficulties researchers had in gaining access to the sacred lake, and he describes the "myths and superstitions" regarding it in the Venda region. These are completely in keeping with the general conceptions of the snake (python) and the water spirits that I have already outlined.

> This lake itself is alleged to be inhabited by the ancestral spirits of the Vhatavhatsindi people. Even today, the foreign public is not allowed access to the lake. Only Gota (headman) Netshiavha can give permission to visit the lake itself. In an attempt to conduct surveys on the lake, lengthy negotiations with the headman and his Tshivase Tribal authority at Mukumbane and Chief Tshivase himself were required, after which temporary permission was given to conduct a short pilot survey on the lake in 1988 which was later withdrawn.

The impact of large-scale agroforestry in many of the areas where sacred pools exist pose another serious threat to their well-being. The Mvoti River, which I have already discussed, is under serious threat by intensive agroforestry (pine, gum, wattle, and poplar plantations) and sugar cane farming. Most of the Upper Mvoti Catchment region, which feeds into this river, is now owned by a number of large, multinational agroforestry companies.

A report done on the status of this catchment area by MBB Engineering (Anon 1998) notes extensive afforestation, with marked reduction in streamflow. According to this report, a high density of alien vegetation presently exists in the riparian zones of the various subcatchments in the area. This is in direct contravention of the law, which in terms of the Conservation of Agricultural Resource Act (1983), states that no cultivation or soil disturbance may take place, and no trees may be planted, within a minimum distance of 30 m (98 feet) from the edge of any watercourse, stream or river, or within 50 m (164 feet) of any vlei, wetland, or spring. Furthermore, landowners are legally responsible for clearing aliens from riparian zones and for maintaining these zones in an "alien free" state. With regard to the Upper Mvoti Catchment, the report (E.1.3.) notes that,

> The Act is difficult to enforce and remote sensing studies in a number of catchments reveal great variation in the application of the law and numerous cases of flagrant disregard.

The general consensus of the community surveyed in the valley is that the water levels of the river have dropped

considerably in recent years, thus supporting the findings of the report.

Similarly, I am working in another area in the northeastern Cape where there is a pool of great significance to the local Xhosa/Mpondomise people. This pool is so sacred that no one is allowed to approach it unless being led there by children. The pool has recently become a popular trout fishing spot for many South African anglers, which has the potential to threaten its sacred status. Furthermore, this pool is now under threat from large agroforestry plantations that are being planted over an extensive area upstream in the river's main catchment area, which includes a significant wetland that has been nominated as a RAMSAR site (see http://www.ramsar.org/index_about_ramsar.htm#rd) worthy of protection. A hydrological survey conducted in this quaternary catchment in 1996 to 1997, to assess the implications of afforestation for the river, predicted marked reductions in streamflow of 18 to 31 percent in the next 10 years (Forsyth and others 1997).

At present, there are scarcely any mechanisms by which healers can appeal for protection of sacred water sites and ensure access to them. One option would be the introduction of "culture significance" legislation in line with sacred site protection laws that have been introduced in other countries, such as Australia (Ritchie 1994). The South African National Heritage Resources Act (www.acts.co.za/ntl_heritage_res/National: 1), 1999, has already established a framework in which such protection could be accommodated. It states that,

> For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resource authorities...the national estate may include...landscapes and natural features of cultural significance.

This may provide protection for sites, but in does not go far enough to ensure rights of access, particularly when it involves private land.

Potential legislative protection could also be afforded through the concept of the Reserve, as outlined in the National Water Act of 1998. The notion of the Reserve consists of two parts:

> 1. The quantity and quality of water required for basic human use (including religious and cultural needs).
> 2. The ecological Reserve, which is defined as the water required to protect the aquatic ecosystems of the water resource.

In addition to the Reserve, the National Water Act has promoted the development of Catchment Management Agencies and Water User Associations through the development of the Water Conservation and Demand Management Strategy. Such structures may also provide a framework through which claims to protection and use can be negotiated.

Conclusions

In conclusion, this paper has demonstrated the scope and complexity of common African perceptions of water sources in Southern Africa and the need to recognize the importance of indigenous beliefs and practices in issues of riverine management. The repository of much of this knowledge comes from indigenous healers, who are regarded as the custodians of very ancient traditional wisdom and knowledge. This transferred knowledge is augmented through spiritual insight and communication with the ancestral world, and passed on to future generations through rigorous systems of training and apprenticeship. This knowledge is dependent on the availability and accessibility of resources. Without the plants needed to get spiritual insight, or without the presence of healthy water sources where the spirit forces reside, access to such knowledge will be denied. Moreover, knowledge is now under tremendous threat of being discarded and forgotten, as many communities are abandoning their traditional ways in favor of western education and capitalist enterprise, where the priorities for individual accumulation override the collective needs of the group, with resulting devastating effects on the environment (both physical and spiritual) and the source of their knowledge.

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Zambezi River: Wilderness and Tourism Research Into Visitor Perceptions About Wilderness and Its Value

Sally Wynn

Abstract—This paper outlines the findings of questionnaire research undertaken by a conservation nongovernment organization (NGO), the Zambezi Society, to capture perceptions about wilderness and its values from people visiting four Zambezi River tourism destinations in Zimbabwe. The research was conducted during a tourism boom in the area when the Society was receiving complaints that the wild values of the river were being eroded by tourism malpractice.

The research produced a visitor-generated definition of "wilderness" in the Zambezi River context; a list of the attributes that make a place wild; an indication of the high value of a wilderness experience to Zambezi visitors; a list of factors that detract from people's enjoyment of a wilderness experience; a list of the wild areas most valued by visitors to the Zambezi; and some detailed observations about the Zambezi tourism experience, including problems at Victoria Falls.

The Zambezi Society recognizes the vital role that tourism must play in ensuring the survival of wild areas in developing Africa. Its research suggests that because such high value is placed on the Zambezi's wild nature by surveyed visitors, wilderness tourism should be promoted as the most appropriate and sustainable option for the area. However, this cannot take place without wilderness sensitivity being incorporated into Zambezi Valley tourism planning, management, and practice. The Society proposes a series of wilderness training workshops for the natural resource and tourism sectors in order to create awareness and establish guidelines for wilderness-sensitive planning, management, and practice at all levels. The Zambezi Society is seeking sponsorship to implement this plan.

Introduction

The Zambezi Society is a Zimbabwe-based nongovernmental (NGO) membership organization devoted to conserving the biodiversity and wilderness values of the Zambezi River in Central and Southern Africa, and to encouraging people to find ways of benefiting from the river's resources without destroying them.

During the latter half of the 1990s, the Society began to receive numerous complaints and concerns from various sources, implying that tourism was having a negative impact on the Zambezi River's wilderness values. The reports were wide ranging: unchecked commercialization, *ad hoc* development, tree cutting, border violations, unauthorized road and camp building, noise pollution, littering and abuse of camping sites, illicit tour and guiding activities, and so on. The overriding tenor was that the special "wilderness value" of the Zambezi River was being eroded by inappropriate tourism behavior and development.

To provide a balanced response, the Society embarked on a research project in 1998 aimed at capturing peoples' perceptions about wilderness in the Zambezi context, as well as providing a workable definition of the term "wilderness," its "values," and its importance to visitors to the Zambezi.

It was hoped that this information might also help The Zambezi Society to make a meaningful and practical contribution toward conserving Zambezi wild areas by influencing management authorities and tourism practice.

Methodology

Research was conducted by questionnaire interview in four main Zambezi Valley tourism destinations on the Zimbabwean side of the river: (1) Victoria Falls (fig. 1), (2) Kariba/Matusadona National Park, (3) Mana Pools National Park, and (4) Kanyemba/Mavuradonha Wilderness Area. Members of the Zambezi Society were also asked to complete a postal questionnaire.

A total of 1,524 people were interviewed via 633 questionnaires. A wide variety of visitor types were chosen, encompassing those staying in hotels, safari lodges/safari camps, self-catering/National Park lodges, on houseboats, and canoeing and camping.

Of visitors interviewed, 44 percent were of local/regional origin, and 56 percent were international. Zambezi Society members interviewed were mainly local.

Main Findings

Visitors to the Zambezi Value Wilderness Highly

- Ninety-eight percent of those interviewed felt it to be important that wilderness exists.
- Eighty-four percent said they value wilderness personally.
- Seventy-seven percent said they came to the Zambezi Valley for a wilderness experience.

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Figure 1—The Zambezi River at Victoria Falls (courtesy of The Zambezi Society).

Responses to the Questionnaire Provided a Fairly Comprehensive Definition of the Term "Wilderness"

This may be summarized as:

> …a natural, undeveloped and unpopulated landscape, which is scenically attractive or unusual, contains indigenous species, and induces an emotional state of mind in which the visitor may feel any or all of the following: in harmony with nature, freed from "civilization," inspired, refreshed, invigorated, challenged, stimulated, humbled, or spiritually fulfilled.

A detailed breakdown of responses to this question is provided in table 1. The definition had two basic components: physical values and nonphysical values.

Physical Values of Zambezi Wilderness

These appear to be especially valued by international visitors interviewed and include:

- Natural/unspoilt landscapes—wide open spaces, and a feeling that little has changed. (This is a fallacy, as nature is always in a state of flux, but nonetheless, the illusion is a powerful draw for wilderness appreciators.)
- Wild species—animals roaming free, indigenous plants.
- Lack of people—including the signs of their existence, for example, pollution, litter, vehicles, noise.
- Lack of development—wilderness is seen as an escape from/in direct contrast to urban civilization.
- Lack of commercialization—commercial tourism development/activities, and so forth, seem to be considered inappropriate to wilderness areas, whereas low-impact structures/activities in harmony with nature are considered appropriate

Nonphysical Values of Zambezi Wilderness

These are often neglected in tourism planning, but are particularly important to local/regional visitors for whom wildlife is less of a novelty, and for Zambezi Society members. They include:

- Peace.
- Solitude.
- Isolation.
- A feeling of harmony with nature.
- Spiritual feelings.
- Challenge.
- Adventure.

Areas of the Zambezi River Considered by Visitors To Be Most Important for Wilderness Appreciation

These include:

- Mana Pools National Park (fig. 2)/Chewore Safari Area — includes the Sapi Safari Area and Middle Zambezi (very high wilderness satisfaction level).
- Lake Kariba/Matusadona National Park—especially away from Kariba town (high wilderness satisfaction).
- Chizarira National Park/Mavuradonha Wilderness Area—Zambezi escarpment mountainous terrain, different from the Valley as such. Especially popular with local visitors (good wilderness satisfaction).
- Victoria Falls/Chirundu/Kanyemba—relatively settled/urbanized, but with pockets of important wilderness nearby (for example, Zambezi National Park near Victoria Falls). (Wilderness satisfaction is lower here than in other areas possibly due to the impacts of settlement and developmental infrastructure.)

Tourism Choices That Offer High Wilderness Value

These include:

- Canoeing.
- Boating on Lake Kariba.
- Safari lodges/bush camps, which offer guided walks and "close encounter" bush experiences.

Table 1—Visitor responses to question: What makes a place truly wild?

"Truly wild" values	Visitors interviewed in each location who cited each value					
	Victoria Falls	Kariba	Mana Pools	Communal lands	Overall	Zambezi Society Members
					(n = 435)	(n = 160)
				Percent		
Natural values	**85**	**96**	**95**	**100**	**93**	**97**
Presence of/proximity to wild fauna and flora	40	41	44	57	42	32
Animals roaming free/in natural state	11	18	18	0	15	12
Unspoiled, natural ecosystems/in "original state"	24	30	27	23	27	43
Scenic/landscape beauty	11	4	3	14	6	4
Large scale/size landscapes/open spaces	0	4	3	5	3	6
Undeveloped values	**46**	**44**	**60**	**43**	**48**	**66**
Lack of development/infrastructure/settlement	20	19	28	19	21	38
Undeveloped areas deliberately set aside	2	2	2	0	2	0
Nature-sensitive/simple/noncommercial development only	16	16	19	19	17	14
Lack of fences/roads/electricity, and so forth	7	7	11	5	8	14
Uncrowded values	**38**	**40**	**73**	**52**	**49**	**96**
Few/no people/tourists	15	17	35	19	20	46
Limited access (for example, vehicle restrictions/by foot only)	2	3	7	0	3	3
Lack of human activity (vehicles/pollution/litter)	3	12	19	19	12	34
Lack of human interference (controls/rules/signs)	15	9	12	14	12	12
Animals and people separated (guided tours only)	3	0	0	0	1	0
Small groups of visitors only	1	0	0	0	.5	1
Emotional/spiritual values	**17**	**23**	**25**	**29**	**21**	**60**
Silence (natural sounds only)	7	7	9	19	8	25
Feeling of being "at one with/in harmony with nature"	2	1	2	0	1	3
Peace/serenity	2	3	1	5	2	5
Solitude/seclusion	3	6	6	5	5	13
Remoteness/isolation	3	6	5	0	5	8
Feeling of mankind's insignificance	0	0	0	0	0	6
Challenge/adventure values	**3**	**4**	**6**	**10**	**5**	**6**
Presence of danger/feelings of fear	2	1	3	0	2	1
Rugged experience/sleeping rough/fending for oneself	1	1	1	5	1	3
Unpredictability/encountering the unexpected		2	2	5	2	2
Cultural encounter values	**4**	**1**	**0**	**0**	**2**	**2**
Opportunity to interact with local peoples/traditions	4	1	0	0	2	2
Management values	**3**	**2**	**3**	**0**	**4**	**3**
Efficient but unobtrusive management	2	1	3	0	2	3
High standards of guiding	1	0	0	0	1	0
Good standards of comfort/safety	1	1	0	0	1	0

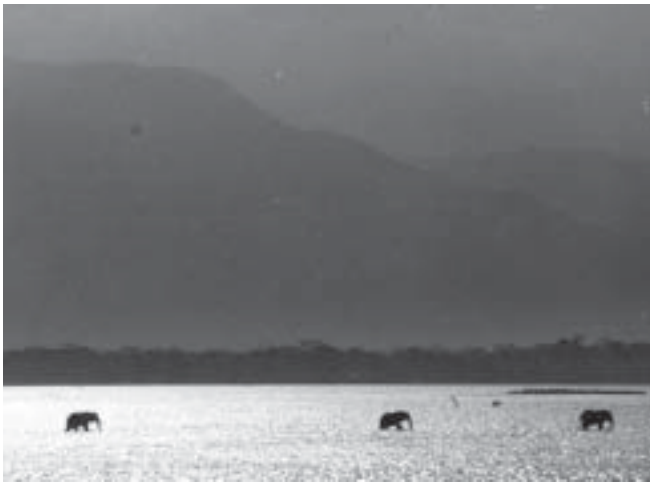

Figure 2—Elephants at Mana Pools National Park (taken by Dick Pitman of The Zambezi Society).

Tourism Activities and Their Impacts on Wilderness

The survey asked people to indicate what activities they had undertaken in their visit to the Zambezi. Depending on their perceived impact on wilderness, these activities were categorized into three groups (low/medium/high). Among the 10 most popular activities undertaken by visitors interviewed, seven fall within the low-impact category. They include: birdwatching, walking, photography, fishing (from land), swimming/sunbathing, and picnicking. The remaining three—sightseeing, gameviewing, and camping—are categorized as having medium impact. High-impact activities are mainly undertaken by visitors to Victoria Falls, Lake Kariba, and Kanyemba. None of the most popular visitor activities, nor those that are special to Mana Pools National Park (fig. 3), fall within the intrusive category. This may partly explain the reason for Mana receiving high ratings for wilderness experience.

Figure 3—The Zambezi River at Mana Pools (courtesy of The Zambezi Society).

Main Factors That Detract From a Wilderness Experience

These were identified in visitor responses to the survey. Table 2 details an outline broken down by areas of interview. To summarize, the main detractions are:

- Too many people—pollution/litter, unruly/insensitive behavior (such as harassing wildlife with too many tour vehicles), drunken/noisy behavior on river cruises, and harassment by vendors/dealers.
- Noise—human-generated (for example, loud radios/music in campsites), unnatural, mechanical noise (for example, generators near lodges/camps, motorboats/motorbikes/trucks/aeroplanes). Natural sounds appear to be quite acceptable.
- Overdevelopment—too much infrastructure, too many roads, lights, too many regulations. People appear to seek wilderness to get away from the hustle and bustle of urban civilization/development. Civilization detracts from wilderness.
- Commercial tourism—There is a strong feeling from visitors that low-key/low-impact infrastructure/activities designed to be nature sensitive are acceptable in wilderness areas. It is felt that commercial tourism is not, for example, big/luxury/high-rise hotels; insensitive architecture; advertising billboards on the edge of a World Heritage Site; inappropriate activities, for example, commercial sales outlets at the entrance to the "rainforest" at the Falls; and "tame" wildlife. Exploitation/extortion and harassment by vendors and dealers is seen as detracting from wilderness quality. These problems were of particular concern to visitors interviewed in Victoria Falls.
- Impacts on nature—damage to ecosystems, tree cutting/poaching, and presence of exotic species.

Some Hotels and Tour Operators May Be Contributing to the Erosion of Wilderness Quality—This was noted in highly commercialized tourism areas, such as Victoria Falls and Kariba town, where some tourism operations offer choices of activities as part of package tours that have high impacts on wilderness. Such activities include: scenic flights, river cruises, motorboating, golf, casinos, and tourist "traps" (for example, moneymaking activities considered inappropriate and insensitive to wilderness). Motorboating on the Zambian side of the river opposite Mana Pools National Park, for example, is mentioned as a considerable detraction to the wilderness experience of visitors staying at Mana. The presence of houseboats and the noise of their engines and generators are mentioned as detracting from the wilderness quality of the Matusadona National Park, especially in the Kariba Eastern Basin.

Wilderness Satisfaction Is Lower in Victoria Falls Than in Other Areas of the Zambezi River Used in the Survey—Sixty-nine percent of visitors interviewed in Victoria Falls were satisfied with the quality of their wilderness experience (as opposed to 92 percent in Mana Pools). It is possible that the quality of the wilderness experience in

Table 2—Visitor responses to question: What detracts from a place feeling truly wild?

Detractions from "truly wild" feeling	Percentage of visitors interviewed in each location who cited each factor detracting from the "truly wild" feeling					
	Victoria Falls	Kariba	Mana Pools	Communal lands	Overall	Zambezi Society members
					(n = 420)	(n = 160)
				Percent		
People/human activities	**61**	**66**	**88**	**43**	**70**	**98**
Too many people/mass tourism	38	34	46	43	38	40
Too many vehicles	8	10	13	0	10	17
Pollution/litter	7	13	13	0	11	21
Harassment by curio sellers/vendors/currency dealers	3	1	0	0	1	1
Unruly/insensitive visitors	3	4	9	0	5	11
Unruly/too many operators	2	4	7	0	4	8
Presence of security guards	1	0	0	0	1	0
Noise	**31**	**29**	**57**	**43**	**37**	**69**
General noise (unspecified)	4	10	14	5	9	29
Aircraft (including helicopters and microlights)	13	5	7	0	7	6
Motorboats/boats/kapenta rigs	3	8	15	0	7	10
Cars/buses	7	3	7	14	6	11
Trains	2	0	0	0	1	0
Music/radios	1	3	7	24	5	9
Generators	0	0	6	0	1	5
Construction companies	3	1	0	0	1	0
Development (general)	**38**	**46**	**62**	**57**	**48**	**72**
Too much development/infrastructure/settlement	23	30	33	43	29	39
Roads (especially tarred)	8	7	14	10	9	17
Fences	3	2	4	0	3	4
Lights/electricity pylons	2	3	6	5	4	7
Signs	2	2	1	0	1	1
Rules and regulations/restrictions/lack of spontaneity	1	3	4	0	2	4
Commercial tourism	**38**	**37**	**34**	**10**	**36**	**58**
Commercialization/big hotels/luxury lodges/tourist traps	26	27	26	10	26	36
Inappropriate/insensitive development/architecture	5	5	3	0	5	10
Inappropriate activities (for example, discos/casinos/video games)	4	2	1	0	2	8
Presence of "tame wildife"/feeding of animals	2	2	3	0	2	3
Exploitation/extortion	1	1	0	0	1	1
Impacts on nature	**9**	**7**	**13**	**14**	**13**	**27**
Ecosystem damage/tree cutting /off-road driving/etc.	4	1	6	10	3	15
Presence of exotic species	1	0	1	0	1	1
Lack of wild fauna and flora	3	3	3	0	3	4
Harassment of wild animals (for example, spotlights/radio collars)	3	0	1	0	1	2
Lack of environmental protection/management	0	1	0	0	1	4
Poaching	0	1	0	5	1	1
Animals suffering (starvation, etc.)	0	1	0	0	1	0
Burning	0	1	0	0	1	0
People walking about unrestricted	0	0	1	0	1	0
Other detractions	**2**	**4**	**0**	**0**	**2**	**6**
Poor management of tourism facilities	2	2	0	0	1	1
Presence of domestic animals	0	1	0	0	1	4
Lack of knowledgeable guides	0	0	0	0	0	1

the Falls is being eroded by some of the detractions identified by interviewees, in other words, commercialization, people, and overdevelopment.

Of People Interviewed in Victoria Falls, 58 Percent Were Visiting No Other Destination in the Zambezi Valley—The Zambezi Society believes that by experiencing a much-impacted wilderness, visitors to the Zambezi who only visit the Falls may be missing out on the true wilderness value of the River. This has implications for tourism marketing.

Provision of Tourism Information or Interpretative Material Is Inadequate—Visitors interviewed expressed this opinion, especially in Mana Pools and Kariba/Matusadona National Park.

People Visiting the Wilder Areas of the Zambezi River Expressed Themselves More Ready to Contribute Toward Wilderness Conservation Than Those Visiting More Heavily Developed or Impacted Areas—While less than half the visitors interviewed in Victoria Falls and 55 percent of those interviewed in Kariba were prepared in principle to contribute financially to maintaining wilderness areas, 70 percent of those interviewed in Mana Pools National Park and in Zambezi Valley communal lands expressed themselves willing to do so.

The Zambezi River Is Visited by a Significant Proportion of Independent Travelers (in other words, people traveling without a tour operator or guide). This Tourism Category Has No Current Representative Voice—Most people interviewed (73 percent) were visiting the Zambezi independently. Only 27 percent of visitors interviewed in all areas were accompanied on their holiday by a tour operator or guide. Although there are tour operator and professional guiding associations through which the interests of some Zambezi users might be represented, there is currently no association or organization representing the views of the independent visitor to the Zambezi.

Some Observations on Research Findings

The Zambezi Society survey clearly confirms the importance of "a wilderness experience" to people visiting the Zambezi. In view of the economic and investment benefits that international tourism brings to the region, this would seem to underline the need to ensure that the river's wild values are conserved and to promote wilderness-sensitive tourism in preference to other Zambezi tourism options.

However, there is a perception that setting aside wild places for the enjoyment of a few tourists and wilderness enthusiasts is a luxury that Africans can ill afford. Current land use pressures and other development priorities tend to push wilderness awareness, conservation, and management very low down on the planning agenda, and a tendency to maximize on short-term revenues at the expense of long-term sustainability is a problem becoming all too evident in tourism "hot-spots" like Victoria Falls.

This shows a singular lack of understanding, not only of the vital link between tourism and development, but of the true value of Africa's wild areas to the Continent's people. The developed world's astonishing record of environmental destruction now makes Africa's "pristine" wildernesses global assets of great value—both biologically and in terms of their economic potential from sustainable tourism. The Zambezi River with its tropical diversity, forests, birds, and large mammals has wilderness qualities that are unique in the Southern African region, and unlike other wild tropical rivers like the Congo, the Zambezi is an attractive tourism destination, being relatively accessible and safe.

Governments of developing nations are not unaware of this. The collapse of Zimbabwe's tourism industry as a result of recent political and economic turmoil has been a bitter pill to swallow. Its ripple effects have been felt throughout the Southern African region. In its efforts to recover, the industry is now considering new options, and is undergoing a process of creative planning and review that might not otherwise have occurred in the bustle of a thriving tourism marketplace. The Zambezi Society believes that its research on wilderness is well timed to take advantage of the current climate of review.

Recommendations

The Zambezi Society's recommendations resulting from the research, therefore, have two main messages:

1. Market wilderness and promote Zambezi Valley wilderness tourism.
2. Safeguard wilderness by incorporating wilderness sensitivity into all tourism planning, management, and practice for the Zambezi Valley.

Marketing Wilderness

Specific recommendations for wilderness marketing include:

1. Recognize the importance of wilderness and promote it.
2. Market a "Zambezi wilderness experience" and specific, low-impact wilderness activities to selected tourism markets.
3. Target tourism markets that specifically appreciate wilderness.
4. Provide more information/interpretation for visitors on the Zambezi River and its wilderness (preferably available free of charge).

Safeguarding Wilderness Through Sensitive Planning, Management, and Practice

Specific recommendations include:

1. Incorporate "the wilderness experience" into tourism planning.
2. Safeguard wilderness quality by developing wilderness-sensitive guidelines for conservation and tourism.
3. Ensure that tourism activities and facilities in priority wilderness areas are appropriate and wilderness sensitive.
4. Monitor effectiveness of and compliance with guidelines and visitor satisfaction with the wilderness experience.

5. Improve the quality of the wilderness experience at Victoria Falls.

6. Encourage wilderness visitors to contribute to maintaining wilderness areas.

7. Establish an association/organization to represent the interests of independent visitors to the Zambezi.

Followup

The Zambezi Society recently presented the findings of its research on wilderness values to Zimbabwean tourism policymakers, planners, and operators, as well as to the planning authorities, custodians, and managers of wild places along the Zambezi River. The Society pointed out the potential for wilderness-focused and wilderness-sensitive tourism all along the Zambezi Valley as being the most suitable, low-impact, sustainable option for Zambezi wild areas, and urged the authorities to incorporate this into their marketing strategies. However, the Society also underlined that such promotion will destroy the river's unique wilderness qualities unless wilderness-sensitivity is incorporated into the planning, management, and practice of all existing and future Zambezi Valley tourism.

The research findings were well received, and much interest has been generated. The Zambezi Society has been invited to contribute to the development process of Zimbabwe's Tourism Master Plan, which is currently under discussion. The Society attended the 7th World Wilderness Congress in South Africa in November 2001, sponsored by the WILD Foundation, and through this same sponsor was able to send the Acting Chief Warden of Zimbabwe's National Park's Department to the week-long, pre-Congress Wilderness Management Training Program. The Society specifically chose a candidate who would be in a position to influence future policy on wilderness management and tourism within this Parks Department, which is the statutory custodian of many of the Zambezi River's wild areas. As a result of the valuable learning experience afforded to its Chief Warden and through contacts made at the Congress, the Department has lent its full support to The Zambezi Society's efforts to develop its own program of wilderness management training for Zambezi wilderness custodians and managers in Zimbabwe, Mozambique, and Zambia.

The Way Forward: Training and Practical Guidelines

The Zambezi Society is now seeking urgent funding to hold a series of preliminary practical training programs and workshops with custodians, managers, and tourism practitioners operating in Zambezi Valley wild areas. The objective would be:

1. To underscore the significance and value of the Zambezi's wilderness areas.

2. To reexamine existing conservation and tourism policies in light of The Zambezi Society research.

3. To examine some examples of wilderness conservation and management from other parts of the world and assess to what extent these might be applicable in the Zambezi context.

4. To develop some practical ways of encouraging wilderness-sensitive management and tourism in Zambezi wild areas in the immediate future. (The Zambezi Society would, for example, like to publish a series of Guidelines or Codes of Conduct for management and tourism practitioners, which would be widely distributed throughout the tourism and resource management sectors.)

5. Spiritual Benefits, Religious Beliefs, and New Stories

WWC7 participants gather at the entrance to the Boardwalk, which served as the main symposium venue (photo by Alan Watson).

Preserving Paradise Through Religious Values of Nature: The Islamic Approach

Hafiz Nazeem Goolam

Abstract—At the root of our contemporary ecological crisis is a mindset that disregards the Lordship, Sovereignty, Power, Control, and Will of God in the universe. The Islamic world view and civilization centers around the Oneness of Allah or God. Nature is Allah's creation, it is a sacred gift for our living planet, and it is through the wonders of nature that one begins to appreciate the unique power and singular majesty of God. The human being, God's trustee on Earth, is responsible for treating the environment with care, love, and respect. In her/his capacity as God's trustee, the human being must ensure that natural resources are used in a judicious manner so that future generations will benefit from God's bounties.

The Islamic Approach

In Islam, nature is God's handiwork, which contains His bounties meant for human use and enjoyment within the limits set by Divine Law. Nature is therefore not a resource without an owner, for God is the Owner of nature. The *Qur'an* contains numerous verses (*ayat*) that reassert this idea that the universe is Allah's creation and that His Dominion over all that is created is absolute (Ali 1991). For example:

> To God belongs the dominion of the heavens and the earth
> And God has power over all things.
> (*Surah Ali-Imran*, [The Family of Imran], chapter 3, verse 189)

And again:

> Unto God belongs all that is in the heavens and all
> That is on earth.
> (*Surah Al Rum*, [The Romans], chapter 30, verse 26)

The *Qur'an* declares that the creation of the universe, of nature, and of the human being is purposive or teleological and that these are signs (*ayat*) of God's Existence, Power, Wisdom, and Purpose (Ali 1991). It states:

> Behold! In the creations of the heaven and the earth, and the
> Alternation of night and day, there are indeed signs for
> All who are endowed with insight.
> (*Surah Ali Imran*, chapter 3, verse 190)

And again:

> And in the succession of night and day, and in the means
> Of subsistence which God sends down from the skies,
> Thereby giving life to the earth after it had been lifeless
> And in the change of the winds: These are signs
> For people who use their intellect.
> (*Al Jathiyah* [The Kneeling Down] chapter 45, verse 5)

In the Islamic world view, the universe, the Earth and their contents are made subservient to the human being, but not in the sense that the human being can do with it what she/he likes. Rather, the position of the human being is one of trusteeship (*khilafah*), and this position carries with it great moral responsibility. As the trustee of God on Earth, the human being is responsible for treating the environment with care, love, and respect, as well as ensuring that the planet's natural resources are used in a judicious manner so that future generations will benefit from God's bounties. Again, the *Qur'an* speaks:

> O mankind! Worship your Sustainer, who has created you
> And those who lived before you, so that you may
> Remain conscious of your duty towards Him
> Who has made the earth a resting place for you and
> The sky a canopy, and has sent down water from the sky
> And thereby brought forth fruits for your sustenance.
> (*Al Baqarah* [The Heifer] chapter 2, verse 21-22)

Indeed, the erythrina leaf or Umsinsi, which is the emblem of the Wilderness Leadership School, symbolizes the relationships between homo, terra, and Deus (the human being, Earth, and God). To fulfill God's trust, in relation to both the environment and the community, the human being must abide by those values and principles of life and living that lie at the very core of God's eternal message to humanity. What this means is that mercy, love, and compassion should guide the human being in her/his interaction with the environment and the community. She/he should hold in check greed and avarice and that all too human tendency to pursue selfish interests to the detriment of her/his fellow human beings. A moderate lifestyle that reflects balance and equilibrium is the most cherished value of the Islamic world view.

This leads to the question: What is the purpose of the human being on Earth, what is the purpose of life? One cannot discuss this question in any detail in this paper, but suffice it to say that, in the context of the environment and of nature, the Islamic world view postulates that the life of the human being is subject to a perpetual test by God regarding the human being's behavior toward, and utilization of, all God-given, natural resources (both material and nonmaterial). Are there, then, any principles or values in terms of which the human being should be guided by in her/his utilization of the planet's natural resources?

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One—perhaps it is the essence—of the fundamental principles of Islam is Balance or *Meezan*. This idea, applied to environmental ethics, requires an equilibrium between material progress or economic development on the one hand and the protection and conservation of the environment on the other. Harith bin Khelef, the Chief Mufti of Zanzibar, pointed to the need of Islam to put human beings and other organisms in good order, balance. If not, then there would be mischief and disaster on our planet. Indeed, the fall of nations and kingdoms is, from an Islamic viewpoint, a consequence of the human being's ingratitude to God. An example is the parable of an ungrateful nation, the kingdom of Sheba in Southwestern Arabia. In the *Qur'anic* chapter, appropriately entitled *Saba* or Sheba, we find the following (Ali 1991):

> Indeed in the beauty of their homeland the people of Sheba had
> Evidence of God's Grace—two vast expanses of gardens
> saying,
> "Eat of what your Sustainer has provided for you, and render
> Thanks unto Him: a land most goodly, a Sustainer
> Much-Forgiving."
> But they turned away from Us, and so We let loose upon them
> A flood that overwhelmed the dams and transformed their two
> Vast expanses of gardens into gardens yeilding bitter fruits
> Tamarisks and a few lote-trees.
> (Verses 15-19; see also *Al Nahl* [Bees], chapter 16, verses 112–113)

The Islamic world view, through the principle or idea of *Meezan* (Balance), establishes an equilibrium between economic development and environmental protection. However, the practical implementation of this idea has declined within the Islamic world. What are the reasons for this decline? Very briefly, five reasons can be outlined:

1. Ossification within religious civilizations, which very often creates a situation whereby the underlying values and true spirit are forgotten or set aside and, instead, static laws and antiquated practices are projected as the defining characteristics of a particular faith.

2. The dominant pervasive power and influence of Western secular civilization in the contemporary world. The secularization of society, which has its roots in the European Renaissance, reached its peak in the twentieth century with the acceptance that religion is a private matter and has nothing to do with issues in the public realm, including the community's relationship with the environment.

3. The rise of a secular world view has seen the dramatic expansion of a global economy, which emphasizes the maximization of profits, the penetration of markets, and the attainment of high growth rates with little attention being accorded to balanced development and ethical values.

4. Many of the elites in the South, who are either the direct products of colonial education or the indirect products of neocolonial cultural and media indoctrination, possess meager knowledge of what their religious philosophies say about the environment or about the human being's role as God's trustee on Earth, or about the nexus between God (the Creator), the natural environment, and human values. As a result, many planners, public administrators, academics, professionals, teachers, and journalists are in no position to address wilderness, environment, and development from a religious or spiritual perspective.

5. Even if there are groups capable of articulating the religious world view, there is no guarantee that they will rise to the defense of the environment or espouse the cause of balanced development, especially if their own interests or others associated with them are involved. Vested interests linked to wealth, power, and status have always subverted sublime values and altruistic ideals. This is why, in today's world, the greatest threat to the practice of harmonious relations with the environment is the demon of self-serving interests appearing in some guise.

Indeed, the degradation of the environment is the result of the human being's disregard of God's Guidance on the Management of His Resources. I believe that there lies within a God-centered world view an indisputable strength. This is why there should and must be a concerted effort to educate society on the significance of a God-centered world view, not just for the sake of the environment or for the sake of balanced development but, more importantly, for the sake of the future of humanity itself (Fatimah and Rahman 1995; Tyndale 2001).

What is urgently and desperately required in our world is a paradigm shift from a materialistic, secularistic world view to an integralistic, transcendentalist world view, a world view that all religions postulate (Hassan 1995). This paradigm implies, *inter alia*, that:

1. Human and natural resources are God-given bounties (*ni'mah*) and constitutive of the Divine Trust (*amanah*) held by the human being.

2. The concept of accountability is not confined to public accountability or accountability to human superiors, but is extended to include answerability to God.

3. The idea that *Allah* is the True Owner and Manager of His Resources liberates the human mind from the false sense of autonomy or dominion over the Earth's natural resources.

As the late Dag Hammarskjold (in Muzaffar 1995: 8) once couched it:

> On the bookshelf of life God is a useful work of reference,
> always at hand but seldom consulted.

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Sources of Spiritual Benefits of Wilderness: A Philosopher's Reflections

Baylor Johnson

Abstract—Social scientists have investigated the spiritual benefits reported by wilderness users. This paper draws upon both western and eastern religious traditions to suggest what features of wilderness are sources of these benefits. Poets and nature writers are used to support and enrich the paper. The God of western monotheism is portrayed as eternal, unchanging, and omnipotent. Buddhism suggests that everything is constantly changing and that this is an aspect of *duhkha* and our dissatisfaction. For if everything changes, then everything we love will perish. Through wilderness we can have intimate experience of powerful forces and ancient things, from the stars above and the mountains around, to the "eternal" cycles of nature. For many, these provide the closest approach to direct experience of God's power and eternity, and the spiritual comfort these can provide.

Just as we find features of wilderness that answer to our spiritual needs, so too our own psyches help to explain the peace of mind wilderness gives us. When we go into the wilderness we leave behind our normal cares and obligations, and live for a time a simpler life with simpler concerns, and we experience this change as a newfound peace of mind. We also challenge ourselves with material simplicity and physical exertion beyond our normal routine. In return we experience a kind of self-transcendence and renewal akin to the "rebirth" known in nearly every spiritual tradition.

Introduction

I am concerned with the wilderness as we imagine it, or in the current phrase, the wilderness we have "constructed." Scientifically verifiable features of wilderness inspire many of our spiritual experiences of it. If this were not true, then we would have these experiences as readily in a shopping mall as in wild places. Still, our minds contribute essential components to our spiritual experiences in wilderness, experiences to which we would remain blind if we lacked the needed sensitivity. As sight emerges only when something visible encounters an eye capable of seeing, so too spiritual experiences require both an inner and an outer dimension.

Who is the "we" who have these spiritual experiences of nature? First and foremost it is I, for this essay is necessarily autobiographical. My own wilderness journeys gave me the lens through which to see what others might find there as well. But if this were no more than an autobiographical report it would be of little interest. So, I have tried to find confirmation for my feelings in writers who have recorded their own responses to wild nature. Ultimately, I think the experiences of which I write are shared by many moderns, particularly those influenced by the history and literature of Europe and its satellite cultures. I have traced some elements of this experience beyond the western cultural tradition, and to me the experiences seem so deeply natural that I am tempted to think that anyone who is capable of opening himself or herself to nature must have them. I also know, however, that it is difficult to sort what we contribute to experience from what we find there, and so I will content myself with this narrower claim: I hope to have captured some central elements of the spiritual experience that many modern westerners have of wild nature. If these experiences are something that we share with our brothers and sisters born to other cultures, then that is good. But I do not claim to know enough to say that this is so.

Although I do not want to claim too wide a scope for the spiritual experiences I describe here, the spiritual yearnings that underlie them are transcultural. According to the teachings of Buddha, for example, at the heart of human existence lies *duhkha*. Though often translated as "suffering," a better rendering might be "unsatisfactoriness" (Hagen 1997). Buddha himself began his quest for enlightenment when, after an extraordinarily sheltered childhood, he discovered that disease, aging, and death are unavoidable for all living beings. Though *duhkha* is a multifaceted concept, a core element is the fact of change. Nothing abides. We ourselves and everyone we love will age and die. Every institution, every cause to which we devote our care and efforts will eventually decay and cease to exist. Wherever we seek, we can find nothing that remains stable and unchanging. As a result, all our mundane hopes are doomed to failure, for in the end, if everything changes, nothing can be accomplished—not, anyway, as a permanent achievement.

I think it is putting it mildly to say that this isn't a happy thought, as it is stating the obvious to say that the Christian idea of an eternal and unchanging God who blesses us with eternal life, reveals a western response to the same fear of impermanence. The solutions are different. Buddhism says that change and impermanence are ineliminable features of existence and counsels us on how to live in peace with them. Christianity says that they are illusions, and that the deepest reality is eternal and unchanging. But though the solutions are different, the stimulus, the disquiet we feel before the threat of impermanence, is the same.

The God of Christianity promises us eternal life. The God of the Old Testament, on the other hand, usually wore a sterner face. This is revealed nowhere more clearly than in the Book of Job (Holy Bible) where God's most faithful servant is visited with terrible afflictions. Job's friends tell him that he must have sinned and so deserved his punishment. But Job is

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clearheaded and knows he has done nothing to earn the suffering he endures. He calls upon God to give an accounting of Himself, and unlike the rest of us, whose sufferings include the abysmal silence of the Universe, Job gets a reply. God comes in the form of a whirlwind and speaks a great hymn, much of it devoted to wild nature. Here are a few excerpts (Job 38: 4–7, 18–21, 31–32):

> Where wast thou when I laid the foundations of the earth? Declare, if thou hast understanding. Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it? Whereupon are the foundations therof fastened? or who laid the corner stone therof; when the morning stars sang together, and all the sons of God shouted for joy?...
>
> Hast thou perceived the breadth of the earth? Declare if thou knowest it all. Where is the way where light dwelleth? and as for darkness, where is the place thereof, that thou shouldest take it to the bound thereof, and that thou shouldst know the paths to the house thereof? Knowest thou it, because thou wast then born? or because the number of thy days is great?...
>
> Canst thou bind the sweet influences of Pleiades, or loose the bands of Orion? Canst thou bring forth Mazzaroth in his season? or canst thou guide arcturus with his sons?...

The sense of this, I take it, is that Job is not the point of God's creation, but a weak, small, and ignorant fragment of the whole. Why should Job know the reason of his suffering? Why indeed should he think he should know? What he can know is his modest place in the order of things, and when he knows that, he will understand that he should praise God for the scraps of grace and understanding he has been granted rather than complaining that he does not understand what God alone can grasp.

These images of the human condition and of the divine lead us toward the first group of spiritual blessings we find in wilderness. The God who speaks to Job from a whirlwind is mighty beyond Job's imagining. Later, the medieval philosophers declared Him—God, I mean—infinite in wisdom, power, and goodness.

By definition, we cannot experience what is infinite, for "infinite" means "without limit," and what is literally without limit exceeds the compass of our senses. This is why God must appear to Job in the form of a whirlwind, as he appears to Moses in the form of a burning bush. He must assume finite form to be perceptible.

Like Job and Moses, if we are to experience God we must find Him in finite form, or perhaps better, in analogous form. Neither the whirlwind nor the burning bush is God, but each is godlike, in a way—in power and mystery perhaps. So, too, wilderness is godlike and answers to our craving for something enduring in the midst of change. As God reminds Job of his finitude—his ignorance, his weakness in comparison to the wonders of nature, the shortness of his life, and the inevitability of his death—so the wilderness reminds us of all these things too. Yet, as God comforted Job despite His awesome presence, so experience of the enduring and awesome faces of wild nature can comfort us and answer to our yearning to be part of something larger and grander than our puny, short-lived selves.

In wilderness we encounter, if not God himself, at least an experience with divine qualities. Wild nature gives us the divine in concrete, finite form. Rocks and rivers, if not eternal, are at least very old, and if each season is new and quickly fades, still the cycle of the seasons is, by comparison with our short lives, forever. I live and die in a few decades, but the giant sequoias stand for millennia. So, too, the geese I see winging overhead are as mortal as I, but the pattern of migration they enact is ancient and recurring. Whether because the Buddhists are right and nothing is truly unchanging, or else because the theologians are right and eternity, although real, cannot be given to the senses, we can never experience the full eternity of the divine. In wild nature, though, we encounter things and processes that are, from the perspective of puny human life, ancient enough to serve as stand-ins.

Immensity and power are also divine qualities found in wilderness. In the modern world few of us live with any real consciousness of the starry heavens above, but when we move into wilderness they replace the roadways of suburbia as our guides and companions. So, too, the immensity of the mountains, the power of rivers, the glaciers, the sea, are known directly when we travel in the wild. We crave these. And in a strange sense we crave even the knowledge that all of them are indifferent to the human realm—stern and unrelenting like the God of the Old Testament.

These—the eternity of wild nature, its awesome power, its indifference to human concerns—are what aesthetic theorists have called the "Sublime." Thoreau knew the experience of the sublime as well as any writer ever has. He encountered it when he was among the first white men ever to climb Mt. Katahdin in Maine, later writing (Thoreau 1972: 64):

> Vast, Titanic, inhuman nature has got [the beholder] at disadvantage, caught him alone, and pilfers him of some of his divine faculty. She does not smile on him as in the plains. She seems to say sternly, why came ye here before your time? This ground is not prepared for you. Is it not enough that I smile in the valleys? I have never made this soil for thy feet, this air for thy breathing, these rocks for thy neighbors. I cannot pity nor fondle thee here, but forever relentlessly drive thee hence to where I am kind. Why seek me where I have not called thee, and then complain because you find me but a stepmother? Shouldst thou freeze or starve, or shudder thy life away, here is no shrine, nor alter, nor any access to my ear.

Robinson Jeffers knew the sublime face of nature, too, and used it over and over again as a source of comfort. Here he is, for instance, in *Their Beauty Has More Meaning*, comforting himself against his own inevitable death (Jeffers 1963: 77).

> Yesterday morning enormous the moon hung low on the ocean,
> Round and yellow-rose in the glow of dawn;
> The night-herons flapping home wore dawn on their wings.
> Today black is the ocean, black and sulphur the sky,
> And white seas leap. I honestly do not know which is more beautiful.
> I know that tomorrow or next year or in twenty years
> I shall not see these things—and it does not matter, it does not hurt;
> They will be here. And when the whole human race Has been like me
> Rubbed out, they will still be here: storms, moon and ocean,
> Dawn and the birds. And I say this: their beauty has more meaning
> Than the whole human race and the race of birds.

And here he is in a mood many of us have shared in recent days, searching for some solace before the stupidity and cruelty of human doings (Jeffers 1963: 84):

Calm and Full the Ocean

Calm and full the ocean under the cool dark sky; quiet
rocks and the birds fishing; the night-herons
Have flown home to their wood…while east and west in
Europe and Asia and the islands unimaginable agonies
Consume mankind. Not a few thousand but uncounted
millions, not a day but years, pain horror, sick hatred;
Famine that dries the children to little bones and huge
eyes; high explosive that fountains dirt, flesh and
bone-splinters.
Sane and intact the seasons pursue their course, autumn
slopes to December, the rains will fall
And the grass flourish, with flowers in it: as if man's world
were perfectly separate from nature's, private and mad.
But that's not true; even the P-38s and the Flying
Fortresses are as natural as horse-flies;
It is only that man, his griefs and rages, are not what they
seem to man, not great and shattering, but really
Too small to produce any disturbance. This is good.
This is the sanity, the mercy.
It is true that the murdered
Cities leave marks in the earth for a certain time, like
fossil rain-prints in shale, equally beautiful.

E. B. White, took similar comfort, expressed in the following more gentle passage (in McKibben 1990: 85):

> With so much disturbing our lives and clouding our future…it is hard to foretell what is going to happen…I know one thing that has happened: the willow by the brook has slipped into her yellow dress, lending, along with the faded pink of the snow fence, a spot of color to the vast gray-and-white world. I know too, that on some not too distant night, somewhere in pond or ditch or low place, a frog will awake, raise his voice in praise, and be joined by others. I will feel a whole lot better when I hear the frogs.

Perhaps Howard Zahniser, who did as much as any single individual to bring about passage of the Wilderness Act of 1964, said it most directly (in Nash 1973: 214–215):

> To know the wilderness is to know a profound humility, to recognize one's littleness, to sense dependence and interdependence, indebtedness and responsibility.

In wild places, then, we can participate in something that is, if not truly eternal, at least very long enduring in comparison to human life, and this is a comfort in the face of our own mortality and the impermanence of all we care about. It is vitally important to recognize that it is not the abstract idea of the enduring that we encounter in wilderness, but experience of the enduring. Without the idea, our experience would be—as Kant (1929: 93) famously said—blind: "Thoughts without content are empty, intuitions without concepts are blind." But we can have the idea anywhere and anytime.

In wilderness we encounter the divine, or at least its analogue, because we come face to face with ancient things and timeless cycles there. You must be a clod indeed to sleep under the tent of stars every night and not be reminded of their age, and, indeed, of the immense mystery that enfolds our lives. To climb down the Grand Canyon—at least with a modicum of geological knowledge—is to feel oneself descending into the abyss of ages unfathomable. If we learn of these things through textbooks, we face them in the wilderness, and it is this face-to-face contact that makes a wilderness experience a spiritual experience.

The passages quoted above do not speak only of the timelessness of wild nature. They speak too of its vast size and power, and even its indifference to man. These impressions are as powerful to a person in the wilderness as any other. It can be a dangerous and scary place. Storms, the great predators, the huge forces of flood and avalanche, and even the very immensity of space all demand respect that edges easily into fear. Beyond that, they all remind us in a visceral way of our comparative weakness and vulnerability. As Zahniser says, wilderness engenders humility.

But what is it in us that responds to this humbling? Why does some part of us crave knowledge of forces and powers that belittle us? How is it a spiritual benefit to be thus humbled?

Humility is, of course, a virtue. It is good to know one's proper stature, especially in this time of so much human hubris toward nature. But though this may be a good consequence of being humbled by wild nature, it isn't what makes us feel so good, so blessed when we sojourn there.

The explanation of that, I think, is that wild nature humbles not only us as individuals, but all of human kind and all of its ambitions. To be insignificant in a human crowd is painful, for it reminds us that we have not achieved the fame and fortune that others have. To be insignificant in wild nature, by contrast, can be comforting, for wilderness dwarfs not only ourselves but fame and fortune, too. It provides a perspective from which we can dismiss concern with all such things and be content with whatever concrete joys life affords us. And in wilderness these joys seem abundant despite the simplicity, and even danger and deprivation, that wilderness travel can involve. There is a mystery to be solved here that is similar to the mystery of the comfort we find in nature's humbling of us. Why should the deprivation, exhaustion, challenge, and even danger we find in wilderness bring us spiritual joy and peace, a feeling of being fully alive?

Surely many different things interact to produce the answer. What we have said above may form a background. In wilderness we may already be feeling the comfort of identification with places and processes much grander and much more enduring than our individual egos, and feeling too that the defeats and frustrations of our normal lives are much less important than they seem from an office cubicle. Beyond that, the challenges we overcome in wilderness are empowering and invest us with a sense of our capability and worth.

It is important that these challenges do not typically throw one into competition with other people. Where we compete against one another, as willy nilly we must in modern civilization, there must be both winners and losers, and the losers must outnumber the winners. When, as we usually do in the wild, we compete only against ourselves, success is much more likely, if only because a defeat of one kind—failing to get to the mountain top, for instance—can be a triumph of another—for example, the wisdom of knowing when to turn back, or the knowledge of how to cope with failure. Indeed, perhaps in wilderness we can temporarily forget about competition and focus instead on competence—acquiring it, testing it, glorying in our possession and growth in it.

This sense that the wilderness is a place of testing from which we emerge strengthened and cleansed in spirit is not, of course, a modern invention, a kind of urban cowboy play for effete office workers only. The worldwide tradition of vision quests and initiation rituals requiring wilderness sojourns is a reminder of this. So, too, is the story that Jesus tested himself by a journey into the wilderness, which resonates with an even older tradition. Consider this passage from *Wilderness and the American Mind* (Nash 1973: 16):

> The Israelites' experience during the forty-year wandering gave wilderness several meanings. It was understood, in the first place, as a sanctuary from a sinful and persecuting society. Secondly, wild country came to signify the environment in which to find and draw close to God. It also acquired meaning as a testing ground where a chosen people were purged, humbled, and made ready for the land of promise.

The demands and challenges of wilderness experience focus the traveler's attention in the same way as activities that promote what Csikszentmihalyi (1990) calls "flow." Removal to wilderness has generally already pulled us away from the tensions and troubles of our anxious daily lives. And the life we lead in the wild is not only separate from the sources of our tension, it is also stripped down to basics. We live primitively (or at least did so until the first uncomprehending fool dragged his cell phone along), and the things we must do, though possibly challenging, are few and fairly obvious. But they are also important in obvious ways. We need to get to a camping place by sundown; we need our tents to stand up to the storm. We need to get up and over the pass before that storm breaks. We feel, not the acid stomach created by social anxiety, but the healthy thirst and hunger from bodies taxed by exertion.

All these elements—physical removal from sources of social anxiety, challenges that are few, focused, and deeply felt, the feelings of competence and worth that we get from meeting such obvious challenges—cooperate to drive ordinary anxieties from our mind, leaving us feeling peaceful, worthy, and open to the spiritual meanings of humility and eternity described earlier. I am not sure whether this is the Bible's "peace that passeth understanding" (Holy Bible, Philippians 4: 7), but it is at least akin.

I know that the beauty of wild nature is also important to the spiritual peace we find there, but this subject is so large that I shall pass it by with only this one sentence addition to what others have said. The beauty of the wild commands our attention, pulls us outward and away from our egos, and like the sublime, nurtures the self-forgetting that every spiritual tradition extols. Appreciation of the beauty of wilderness reinforces an effect that begins when we are humbled by wilderness and seek refuge in its timelessness. All of these pull us away from focus on ourselves as individual egos and toward identification with the larger world, toward, that is, the loss of self that spiritual humility demands.

In summary, I have suggested that in wilderness we experience an image or analogue of the divine that speaks to deep-seated spiritual yearnings. Ancient rocks and seas, the seemingly timeless rhythms of life and the seasons comfort us. They say that while individually we and all our earthly hopes are mortal, still we are part of something everlasting. The vast size and awesome power of wild places, and even their indifference to us, is, oddly, another source of spiritual comfort. For by comparison with wild nature our personal troubles, and even the troubling doings of the human race, seem petty enough to be forgotten. Another way of saying this is that wilderness encourages the self-forgetting that is extolled in every spiritual tradition. It pulls us away from our own small troubles and toward identification with a greater whole. This movement is strengthened by physical removal from the scenes and causes of our normal concerns, and by the demand that we focus attention on a few deeply felt and immediate concerns. Not least, though neglected here, the beauty of nature also consoles us, as all forms of beauty do, and pulls us outward away from self and into our surroundings.

I want to close with some questions to which I can suggest only brief and partial answers. As McKibben (1990) has suggested in *The End of Nature*, the wilderness landscapes that provide our spiritual experiences are endangered, and along with them the sense of nature as a scene of awesome forces and timeless cycles, a place untouched as petty human dramas play out their insubstantial plots. What will happen to this sense of wild nature as a perceptible analogue of the divine, as global climate change and other environmental threats change the very face of nature? A lot of the answer depends, of course, on what one thinks will happen. My own expectations are pretty grim. If we have to watch the death, not only of selected species, as we do already, but of whole ecosystems, if reliable patterns of weather and climate change, if even ocean currents and levels themselves alter with the melting of large permanent ice fields, then I think it will be hard to maintain the feelings about wilderness that I have discussed in this paper.

Air pollution creates beautiful sunsets, and so dying landscapes may still have their own stark beauty. There will still be places where humans are few. Titanic forces will still be at work in the world. Our doings do not yet trouble the stars, and so those will remain as symbols of eternity. The mountains will not grow younger because we have increased the atmospheric concentration of CO^2. Rivers and seas will still batter us about, indifferent to our wishes.

But these are further removed from the human sphere than the spring peepers E. B. White was waiting to hear. If the frogs are dying, if the dawn that Jeffers beheld recurs, but its birds have become extinct, will we still feel enfolded within the greater rhythms of nature? When what survives does so only by our leave, when the entire world is but a park, and a greatly impoverished one at that, will terrestrial nature seem to anyone divine? Can wild nature figure as a refuge from human mortality and failings when we know that the refuge is mortal and a victim of our failings?

I am pessimistic about the answer. I fear that future generations will soon be deprived of the spiritual comfort we have found in wild nature. It will, of course, still be possible to care about wild nature. But this caring will be from a different perspective than I have described in this paper. It is, I think, quite possible to care deeply about what depends on you, but it is very difficult to see it as an awesome, everlasting analogue of the divine. Wilderness can no longer be our refuge from the human sphere once its inclusion in the human sphere is obvious.

Ultimately, I think some of the spiritual benefits we derive from wilderness depend upon seeing it as other: wilderness

represents the natural versus the artificial, the everlasting versus the human and mortal, the all-powerful versus the petty sphere of mankind. The approaching global environmental crises will make it impossible to maintain these dichotomies, as wilderness is revealed to be not a realm apart from the human, but a part of the human realm, and without these dichotomies, our descendants will be deprived of at least some of the spiritual experiences of nature I have described in this paper.

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Our Real Challenge: Managing Ourselves Instead of Nature

David M. Johns

Abstract—As cultural animals we create meaning and order. Stories are the primary means our species uses to do this. Stories that rise to the level of myth exert powerful effects on behavior. The dominant myths that explain our relationship to the natural word have two serious failings: our self-importance and a superficial and simplified image of who we are. These stories obscure more than they enlighten, thereby preventing us from addressing the causes of the current extinction crisis. Conservationists can and must fashion new stories that take account of our disproportionate impact on the Earth and its origins in our behavioral plasticity, and that offer rules for constraining our destructive behavior. For such stories to actually work in constraining human behavior, they must be deeply internalized and socially reinforced within the framework of existing mythologies, both religious and secular. Two historical examples of how this has worked are examined, and specific recommendations are made for how conservationists can maximize their cultural influence through storytelling and mythmaking.

Introduction

When Margaret Thatcher was preparing for the Earth Summit in 1992, she called together a group of scientists to advise her on the condition of the natural world. She was uniformly told that things were grim and getting more grim. Extinction rates were climbing, ecosystems were unraveling, and humans were on a path that would lead to the destruction of the Earth. Depressed, she asked if anyone had any good news. James Lovelock spoke up and said he thought it was impossible for humans to destroy the Earth. No doubt, he said, humans were causing a great extinction episode, but five times previously great extinctions had occurred and each time the Earth and life had recovered. The Prime Minister was cheered and asked Lovelock about this recovery—just how long would it take? Based on past episodes, he answered, about 5 to 15 million years. Prime ministerial depression resumed.

The meeting in this story may have never happened, but it doesn't really matter. A story need not be true in every sense to make its point. This is especially true of the most important stories. But it's a truth that is often lost today.

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We are storytelling animals. We make sense of the world using story and metaphor. Even when we think we're being very literal, doing science for instance, rather than storytelling per se, we usually are relying on metaphor and story to understand and navigate as individuals, groups, and entire cultures. Stories are more than just a means of trying to *describe* the order of the universe, be it physical or social. They are also the primary way we *create* order and meaning. There is a real world governed by regularities, and we can discover those regularities and test the truth of our descriptions. But we must create meaning and purpose as individuals and societies; that order is not provided by our DNA for the most part. It is nonetheless real for being created by us. Our lives are shaped by human-created order from birth to death and on the far side of both events. The truth of this order is made real by our acceptance of it. We do not usually think of that acceptance as creating order. Rather, we regard the created order as natural as gravity. This sense of the natural and the proper gives the created order stability in the face of the challenge posed by alternatives that erode the created order as surely as entropy does complexity in the natural order. It is a perennial human problem (Rappaport 1999).

So, story is central in our lives because we are wired for it and we are wired for it because it's adaptive. Because stories are so central, it is important that we have good ones. If the map a story provides is bad and the rules inappropriate, our problem solving will suffer. We will suffer, and the Earth will suffer.

Good stories are stories that accurately reflect *or otherwise take account of* our circumstances. Good stories help us understand the regularities of the universe. Good stories help us create meaning, values, and a human order that sees beyond the short term and impulse. And, good stories reinforce as proper and right our caring for life and that which makes life possible—the Earth and evolution for instance.

There are lots of bad stories out there, and they are used to explain and justify our destructive behavior toward the natural world.

In some of these stories we are God's gift to the universe, special, and destined to rule. In secular versions of this story we are special because we have reason, but still destined to rule as evolution's gift to the universe. In some versions, we do great good and improve the world. In others, we are destructive and will bring ruin to creation and ourselves. In other versions, our drive to control and dominate is just natural—we aren't the only creature that affects its surroundings.

The problem with all of these stories is that they do not accurately reflect or take account of our circumstances. They do recognize our disproportionate effect on the world, but they do not recognize our limitations and frailties, nor where we are headed. They also fail to recognize that our disproportionate effect is a capacity, not a necessary aspect of our

existence. While there are stories critical of human hubris, they are not aspects of the dominant cultures.

Our disproportionate effect on the natural world is the result of our capacity for technological development and our capacity for changing our social organization. These two capacities allow us to adapt to virtually any ecosystem, and, more importantly, to alter and even destroy ecosystems and species to suit our purposes. The changes in social organization that marked the neolithic transition to civilization are especially important, for they gave rise to a human social dynamic of competition, conflict, and ever increasing intensification of exploitation that drives further manipulation and domination of ecosystems. The transition to hierarchy and civilization may initially have been driven by population increases and other factors, but once complex societies are in existence, internal and external conflict in the service of maintaining and extending control become major drivers in development (Adams 1966; Algaze 1993; Chang 1980; Harris 1977, 1979, 1989; Johnson and Earle 1987; Service 1975; White 1959, 1969, 1987).

Despite the cost to nature, most people would argue that civilization and development have been, on balance, good things. Most would also argue that our behavioral plasticity and our capacity for culture are remarkable adaptive mechanisms and good things. But capacity for culture, which underlies the behavioral plasticity evidenced in changing technology and social organization, clearly has some serious downsides. These include our capacity for lying, denial, distraction, alienation, and myopia. We do not see, or we can ignore, the destructive consequences of our actions, especially if they are long-term (Ornstein and Ehrlich 1989). Even in the best of circumstances, we usually cannot forecast intergenerationally. Hierarchy further magnifies these negative attributes because it means rulers are usually insulated from the consequences of their actions. The ruled and the natural world pay the price.

The price is high, both materially and spiritually. D. H. Lawrence (1968: 504) wrote that "we are bleeding at the roots, because we are cut off from the earth and sun and stars." Our capacity for love—that which bonds us to others, to life, to the Earth, withers "because we plucked it from its stem on the tree of life" and it can't "keep on blooming in our civilized vase on a table." We find ourselves members of societies locked into an adaptive strategy that not only is bad for nature but bad for us in so many ways. But just as a bad wound triggers a flood of endorphins so we don't feel the pain instantly, so the wound of our estrangement makes us oblivious to its causes. (Berman 1989; Shepard 1982) This allows business as usual to continue, which in turn keeps us estranged. It's not a vicious circle but a downward spiral.

We need stories, then, that take account of all this and that can guide us in the creation of societies and policies that care for the natural world. Herman Daly (1996: 59), quoting in part David Orr, put it this way. We need to manage ourselves, not the planet or nature, because nature is not the problem. "Our self-management needs to be 'more akin to child-proofing a day care center than piloting spaceship Earth.' We need a playpen in which we can be free but also protected from the excesses of our own freedom." We make poor dominants. We are not smart enough to manage nature.

To some, this sounds like a call for ecofascism. Perhaps it would be if we tried to impose it from the top down. I think any efforts in that direction would fail, and worse, would backfire.

There is another way. The ethnographic record is abundantly clear: stories deeply anchored psychologically and culturally can guide human action even in the face of human desires to the contrary, but mostly by affecting the desire in the first place. But it is not just any sort of story that can do this. Only stories that are part of a mythological structure, anchored in the sacred, have this influence (Campbell 1959; Evans 2001; Fulford 1999; Lakoff 1996; Levi-Strauss 1969, 1973, 1978, 1981).

By sacred, I do not necessarily mean religious stories, although they often are. Sacred is the quality of being unquestionable—the basic assumptions that each individual and all cultures necessarily possess at core. Sacred is that which is ultimately invoked to explain the meaning of it all. It is the basis for the human-created order and the particular interpretation of the nonhuman-created order. Some of you may have trouble conceiving of a secular sacred belief. I offer Einstein. He said that among scientists existed a fundamental belief that knowledge is good. He also noted that such a belief was not falsifiable, not subject to scientific testing. It was a basic assumption, used in turn to legitimize more specific axioms and rules for behavior. Many nonreligious people hold similarly untestable beliefs that the universe is good, or bad, or moral, or living.

Can we really consciously fashion stories that will be accepted and guide human behavior toward the natural world? Stories that would incline people, even motivate them, to actively support policies doing the same? (The ultimate test in America might be whether we could devise a story that would get people out of their cars.) There is good reason to think so and let me say why; first, by dealing with some objections, and then by giving some examples.

A first objection to such an effort is that the sacred has mostly been hijacked by ruling elites over the millennia to justify the social order they construct—orders that benefit them at the expense of everyone else and of nature. There is much truth to this. But the cultural arena remains contested territory more than the state or the economy. Wealth and political power are increasingly concentrated and built on the control and destruction of the natural world. Cultural autonomy itself is increasingly limited by the concentration of ownership of cultural institutions—they are at root just another profit making business. Autonomy is further limited because more and more cultural institutions are owned by corporations with a wide range of interests (nuclear power, weapons) they seek to protect by fostering legitimacy through shaping cultural content. But most cultural traditions, religious and secular, are diverse, home to both rigid dogma and hierarchical control on the one hand, and centers of creativity that are subversive of domination. Although conservation must be effective in the economic and political arenas, building this effectiveness depends on motivating and mobilizing people—getting them to act on conservation beliefs. Such beliefs are not now deeply enough anchored nor widespread enough to make the difference we need to make in policy.

A second objection is that it is ridiculous to assume that we can engineer fundamental beliefs. People do not easily change their world views once they have been internalized in the socialization and enculturation process (Erikson 1968;

Wallace 1969). Even effecting intergenerational change is difficult and takes enormous resources. Not even companies with billions to spend on public relations would try to start a new religion or equivalent—although in the space of a century consumerism may well have come to resemble one. Companies, in selling products or particular brands of products, do appeal to important human needs for belonging, emotional security, and status, but normally not the need for certainty of order that the sacred provides. It might be argued that consumerism strengthens various higher order beliefs that have helped to make it possible—humanistic or Christian notions of progress for instance. At the same time that material well-being undercuts religious fervor, it also has proved unsatisfying—it doesn't fulfill the needs it promises to. Sports team loyalty is a special case, because it can generate a sense of participatory community and even involves ritual. But it typically is made to carry a greater load than it can deliver in terms of meeting human needs, and ultimately feels more compensatory-like consumption—than genuine. In other words, both sports and consumption can be drugs used to create a state of well-being not anchored in actual conditions (Lasch 1978).

I acknowledge the difficulties and do not think we have to change people's most fundamental or sacred beliefs. Rapapport (1999), in his analysis of the structure of mythic systems, identifies a hierarchy of beliefs and stories. At the pinnacle are beliefs that are sacred in and of themselves, in other words, the unquestioned. They are anchored in ritual and the deepest layers of socialization. Invariably, he found them to be about immaterial things—literally. They were about the nature of God, the afterlife, trinities, the goodness of knowledge, or the evil of the loss of innocence through knowing. Their primary function is to provide a foundation of certainty—the unquestioned and the unfalsifiable—that is used to sacralize lower order beliefs: general principles about how the cosmos, nature, and society work; specific rules for everyday behavior in particular situations and circumstances and problemsolving; and, rules for recognizing certain states of the world as significant and requiring action. Part of what makes the sacred sacred is that it is viewed as unchanging. But lower order beliefs are susceptible to change, the more so as one moves down the hierarchy of general to specific. Change occurs continuously, increasingly in our era by design. It is worth noting here that the hallmark of what we call fundamentalism is the belief that lower order statements are in and of themselves sacred and not subject to change. Thus, some belief systems that regard divine creation as true can accommodate evolution because it is about the "method" of creation and thus a lower order belief susceptible to change; fundamentalists cannot. It is not their literalism that is the problem—they too cannot avoid metaphor—but their estimation that lower order beliefs are in and of themselves sacred and unchanging.

So, we do not need to change fundamental assumptions, the most sacred of stories. We need only change lower order stories and beliefs, and they are by their nature susceptible to change. To be successful in promulgating stories about how to behave better toward nature, we must make our stories compatible with the most sacred beliefs of particular groups. Sometimes even a word can make a difference, linking what we say to the maps and meanings people already possess. A few years ago, Michael Soulé got tired of explaining to audiences what biodiversity is. He started using the word "creation" or the term "living creation." Everyone, Christian and atheist, knew exactly what he meant.

Let me give two examples in which deeply rooted beliefs about the material world, sacralized by a variety of sacred assumptions, guided social movements in successfully constraining the behavior of dominant groups in the United States.

Throughout the last two-thirds of the 19th century, attitudes of economic laissez-faire were dominant in the United States and justified the ruthless exploitation of people and nature. Laissez-faire did not really exist, of course—the state intervened constantly in the economy on the side of capital. But the doctrine was used to justify to the public the lack of state intervention in response to demands for decent treatment of workers and others. Organized resistance that eventually brought about reform had many roots—populist, abolitionist, working class, middle class, and even upper class to a point. By the 1890s, demands for increased social and economic justice were making some headway, although it would be another 40 years before many goals were realized. This resistance and reform movement rejected laissez-faire as doctrine, called for regulation based on a different standard of justice, and changed policy significantly (Kolko 1967; Polyani 1944; Wolfe 1977). It was guided by nonelite cultural norms embedded in stories about justice. The power of these stories lay not just in the fact that they resonated with the experience of the exploited by calling their exploitation evil, or identified an alternative state of society where such exploitation was at least ameliorated, but also that they provided a guide to action (Sinclair 1915). Their power rested in the notion that these stories were right, in other words, they were situated within the context of larger stories and values that were not questioned.

More recently, in the United States there have been efforts to weaken the Endangered Species Act (ESA), one of the strongest pieces of conservation legislation in the world. The Republican Party leadership in the House of Representatives was brought to power without the help of organized conservationists and didn't need us to keep power. Indeed, they pandered to anticonservation interests. So our opposition was not important to them—they didn't have to listen to us. What helped to derail efforts to weaken the ESA was the Evangelical Environmental Network (EEN), a group of thousands of churches with more than a million members (Barcott 2001). Arguing that the natural world was God's handiwork and that it was therefore gross human arrogance to think that people could improve it by causing extinctions, paving it over, and so forth, the network undercut the sacred mantel that developers and despoilers often hide under. The beliefs of people leading this network in no way diverged from their basic core beliefs, although it clearly represented a change in the secondary and lower order beliefs, or a change in emphasis. (There clearly are elements in the Christian tradition that have been nature friendly, but they have never predominated.) Because these churches were part of the conservative coalition Republicans depended on, they could not ignore the EEN.

The same Christian groups, normally aligned with Republicans on many social issues, helped to defeat legislation that would have permitted drilling for oil in the Arctic National Wildlife Refuge.

Let me give one more example that does not demonstrate any effects I can prove, but does offer an example of how a story can get into the stream. Death is a profound event in the lives of humans. So much of our storymaking and telling is about trying to make some sense of death, trying to come to terms with the loss of loved ones, and with our own. A few years ago Terry Tempest Williams (1991) wrote a book about the death of her mother from cancer, called *Refuge*. The story of her mother's death, her family, her own story of coming to terms with the dying and the death, did what the most powerful stories do: link the particular with the universal, and allow us to find a place in it. Hundreds of thousands read her book because of this, not because of their feelings or Williams's feeling about conservation. But in this book about death Williams also talks about life, the life of the Bear River Migratory Bird Refuge, threatened by rising waters. This refuge was not just a refuge for nature, but for her as well. The very place she sought solace and nurture in the face of her mother's death was itself being threatened. The interweaving of these stories of maternal death and nature told nature's story to people who would have not otherwise sought it out and heard it. It allowed people to connect through something they were familiar with—loss of a loved one—with the natural world, something they may not have been so well connected with, and taught them to see its value, to care.

Conservationists were directly responsible for successful strategies to protect parrots in several Caribbean countries (Butler 1992). By making parrots a symbol of nationhood and thereby linking protection of parrots to national pride, conservationists were able to achieve a significant decrease in poaching and generate positive behavior to protect parrot habitat. This is what we need to be much better at.

We need to create, refashion, generate, and promulgate stories that will resonate with people to the point of becoming internalized. The likelihood of internalization will depend on several things. Our stories must:

- Be compatible with the varieties of existing sacred (highest order) beliefs, secular and religious.
- Work better than existing lower order stories; thanks to science and people's experience it's becoming clear to most that there's something seriously wrong with our relationship with nature; many current stories don't adequately explain why nor do they offer solutions.
- Speak to important emotional needs—aspects of our life cycle including transitions, the problem of alienation, connection and identity; we need to be able to find ourselves in them.
- Be emotionally honest; in speaking to our emotional needs they must arise from the genuine (Soulé 1988).
- Be good stories—compelling, enticing, well-crafted.

We desperately need powerful stories that will help develop broad-based support and action for conservation policies. We also need stories that will motivate people in their individual lives to make decisions that will make conservation possible. Policies that create protected areas will ultimately fail if we don't reduce consumption and population. We need stories that will lead us to:

- Limit our numbers.
- Limit our consumption.
- Leave much of the world off limits to human exploitation even though we want products nature can be converted into.
- Practice humility.
- Recognize the intrinsic value of nature.

We cannot confine our stories to the written and spoken word, although they remain in many ways foundational to the development of all story and even ritual. But they are not enough in the world of mass, electronic, semiliterate culture. Two of the most critical media for us—for anyone seeking to change stories—are film and music.

Film is a medium that is broadly shared and can form the basis for genuine and broad social interaction. A film can be seen by tens, even hundreds of millions of people in a relatively short time. Film, when it works as it should, is the perfect mythmaking form. It compresses into 120 minutes stories that can meld the now with the eternal, the architectonic with the particular, the familiar with the unfamiliar. Films do this with all of their attributes—script, acting, music—but above all by color, costume, camera, composition, and editing. We are primates, and vision is primarily how we know the world, literally and metaphorically. To know something with any sense, we almost always say, "I see." The technique of film easily takes us in—we gladly suspend our sense of reality to enter into a well-crafted story. We even give ourselves to poorly told and barely told stories. Film is nonetheless profoundly influential (Charney and Schwartz 1995; Kawin 1992; Nichols 1981; Rosenbaum 1997).

Music is another mass medium that has far surpassed writing in its ability to reach hundreds of millions of people in a relatively short time. Music ranges from 3-minute popular songs to multihour operas, but storytelling is usually an important element. But there is more. Music, especially if danced to but even if not, comes closest to generating a ritual-like experience. Ritual often includes singing and dance and these aspects anchor myth somatically, by virtue of the physiological states they induce through rhythm and repetition (d'Aquila and Laughlin 1975, 1979; Lex 1979; Radcliffe-Brown 1964; Turner 1969). Repetition is also important in that the same piece of music can be performed or heard on different occasions, reinforcing the message and the social bond that strengthens the constraining aspects of message and belief. Ritual also anchors itself through participation: participation in ritual is physical acceptance to be bound by the order it embodies (Rappaport 1999). Live music performances or dances, with or without live music, share some elements of this aspect of ritual as well (McNeill 1995).

Because of their intrinsic appeal, both film and music have enormous influence. People experience them as entertainment, not education. They are able, therefore, to engage in new or different ways of seeing things without the defensiveness that is often engendered when people feel others are trying to educate or persuade them. This is a fact we ignore at our peril.

Both film and song have short lives with some few exceptions. The market and narcissism have formed a happy marriage in which the value of the new as new is mutually reinforcing. Each year thousands of new songs and hundreds of new films are released. To be effective, we need to tell our story in many songs and films.

Our stories cannot be fashioned mechanically. There really is art involved. They must emerge organically. But we have master storytellers. Indeed, the most widely read scientists in the world are among the best storytellers. Admittedly, there are fewer songwriters and filmmakers who pursue a conservation agenda than writers or scholars or activists. We must address that weakness. But above all, we must make a conscious effort to craft stories that fit with the highest order beliefs of key constituencies.

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6. Personal and Societal Values of Wilderness

Delegates from Africa, Russia, Brazil, India, the United States, and Canada come together before the Congress for discussions (photo by Roseanne Clark).

Value of Wilderness Revisited

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Abstract—The preservation of wilderness and the wise management of resources are two aspects of conservation ethics spawned at the turn of the nineteenth century. They grew out of the devastation reaped by economic expansion set in place in the United States during the early to mid-nineteenth century, as public concern over the destruction of habitats and natural resources became more apparent. This dynamic continues today and not only demands a new look at the value of wilderness but also at the consequences of careless use and misuse of public and private property, of the dire consequences of unfettered growth, and of the overexploitation of finite nonrenewable resources upon which life on Planet Earth depends. After a brief historical review of conservation in the United States, we suggest ways to alter the self-destructive course followed for three centuries.

Value

What a mélange of being and meaning the word "value" conjures when we consider wilderness: the spiritual and biological worth of wilderness; the moral principles that guide its protection; the tone and quality of its sounds and colors; the priceless living systems; the beauty of it all. Our intent here is not to redefine those values elaborated so brilliantly by philosophers, scientists, and social scientists over the past century. Instead, we hope to emphasize that standing in opposition to the value of wilderness are values of an ever-expanding global economy in which wilderness is deemed important because of its potential extractable resources and devalued to the degree that it prevents the use of these resources for human utilization.

It is our view that the present course of the global economic system is not only opposed to conservation ideals but is contrary to the way the world was formed, an evolving world with internal limits that sustain rather than destroy the life upon which other life depends. To better understand the dire circumstances of wilderness today, we look first at the historical roots of conservation in the United States, particularly in the nineteenth century. It was then that the dynamic of economic expansion created the stem that would yield the two branches of conservation we recognize today:preservation and resource management. Secondly, we propose that our self-destructive course can be changed by making the ecological health of the planet the first order of business at all levels of society, and we offer suggestions for achieving this goal.

Building a Land Ethic

When settlers, such as Captain Arthur Barlow, first arrived by ship in the United States (1584), they felt they were approaching "some delicate garden abounding with odoriferous flowers" (Huth 1957: 1). At that time, there were hundreds of nations of indigenous people living in this "garden" in very diverse habitats. Whether they were perfect ecologists is debatable. What is undeniable is that American Indians, living in low density, were intimately related to the land. Their use of resources was ritually linked to their spirituality and carried important ecological knowledge and respect for wild nature.

In contrast, European settlers who first took up residence in America, often in separatist enclaves according to religious dogma, were joined by one common belief; they did not value wilderness. In fact, they saw it as a threat to their spirituality—evil, hostile, and unforgiving. They considered both "savages" and wilderness uncouth. Michael Wigglesworth described it as (in Huth 1957):

> A waste and howling wilderness/Where none inhabited/
> But hellish fiends, and brutish men/the Devils worshiped.

As colonization proceeded in the seventeenth and eighteenth centuries, orientation to the land varied between two extremes: (1) the pious, industrious, practical, and stern—an ethic that discouraged the pleasures of life; and (2) the wealthy, who enjoyed leisurely and lavish lives. Meanwhile, on the ecotones of civilization were those who chose simple subsistence and independence away from the pressures of organized society. As the fertility of the land became rapidly depleted from north to south, the frontier boundaries pushed westward carrying along these diverse settlers with immigrants drawn in by free land from all corners of the Earth.

The rudiments of nature appreciation and conservation were barely visible in these fledgling years of our nation, although a nature aesthetic was slowly creeping into language. But, for settlers, the worth of the land lay not in its beauty but in unrelenting clearing and cultivation (Huth 1957: 5):

> Then with the Ax, with Might and Strength/The trees so thick and strong…/We laid them all along…/Which we with Fire, most furiously/To ashes did confound.

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Nature appreciation finally blossomed as the alarming contrast between pristine nature and the slash-and-burn landscape became apparent. Natural history—especially botany as a hobby of the elite—flourished in the colonies, as well as in Europe. The influence of the "Lake Poets" of England, with descriptions of the peace found in nature and the development of a theory of aesthetics that classified landscape into the sublime and picturesque, furthered nature appreciation (Shepard 1954: 25).

During early colonialism, Imperial England dominated the seas and the fur trade as far west as the Mississippi River. But the great western expanse beyond Ohio seemed uninhabitable and nonagricultural, and was not seriously considered for fulfilling the agrarian dream of free land. Benjamin Franklin, one of the few who not only saw the potential in the land but also understood exponential growth, predicted in 1761 that the birth rate, under the influence of an abundant supply of vacant land, would double every 20 years (Smith 1970).

The key figures in the creation of the Articles of Confederation and the Constitution were propertied gentry, who met secretly "making history but not knowing the kind of history they were making" (Ellis 2001). Although they defined the rights of people everywhere, they also set in place forces of economic expansion that conflicted with the legitimacy of wilderness. The events that followed were explosive and unpredictable.

When elected to the presidency in 1801, Jefferson was determined to both find a waterway to the Pacific Ocean to establish commercial markets with the Orient and to assess and exploit fur and other resources in the West. With permission from Spain, he commissioned the Lewis and Clark expedition (1803–1806) to gather geographical information. A second covert goal was to usurp British sovereignty over the trans-Mississippi West (Smith 1970). The Lewis and Clark expedition, although unsuccessful in finding a commercial waterway, opened up possibilities for westward movement. As potential for development in western lands became more apparent, and as United States boundaries were extended with the Louisiana Purchase, a route for transport of materials and people became imperative.

In 1820, William Ashley and Jedediah Smith pioneered an overland route—through the Rockies, along the Platte River, and over South Pass—that became the Oregon Trail. By the 1840s, the fur trade was waning but travelers passing along the Oregon Trail gave little consideration to farming the Great Prairies. The soil was deep and rich, but trees—needed for fuel, fencing, and building—were scarce. In search of the commerce of souls, gold, and materials, they were headed for the Pacific where settlements and missions had been established during the fur trade, primarily by Spanish missionaries and expansionists (Shepard 1954).

George Catlin, a young Philadelphia lawyer who went West to paint portraits of American Indians in 1832, quickly acquired a passionate respect for his subjects and the "pristine beauty and wildness" in which they lived. Articulating a prophetic understanding of the value of wilderness and indigenous cultures, he said (Shepard 1954: 155–56):

> Many…wilds in Nature's works…are destined to fall before the deadly axe and desolating hands of cultivating man; amongst here ranks of *living*, of beast and human; we often find noble stamps…worthy of our preservation and protection.

In a reverie he looked into the towns and cities of the East where he "beheld buffalo robes hanging…for traffic…and the curling smokes of a thousand stills," and he asked, "O, insatiable man…Wouldst thou tear the skin from the back of the last animal of this noble race, and rob thy fellow man of his meat, and for it give him poison!" He proposed "a nation's Park, containing man and beast, in all the wildness and freshness of their nature's beauty."

Contemporaries of Catlin, such as the Hudson River Painters, and American writers such as William Cullen Bryant, James Fennimore Cooper, and John Greenleaf Whittier, who themselves were influenced by the Lake Poets of England, developed in their nature writing the rudiments of a preservationist ethic. Along with Catlin, artists such as Thomas Moran, Thomas Cole, and Albert Bierstadt brought romantic landscape paintings to the easterners and Europeans who would never see the West.

In spite of the logistical problems of wilderness and intermittent warfare for sovereignty between our fledgling nation, American Indians, and countries with holdings—and later our own Civil War—the western movement continued full force. The tremendous breadth of unoccupied westward expanses, like some huge vacuum, sucked people into its vast reaches from far and near in search of free land and a share of the takings.

Early nineteenth-century America, honed in an era of rural people living in low density on a landscape with unlimited frontier, experienced an "unprecedented era of economic and demographic growth" (Oelschlaeger 1991: 97). From 1820 to 1860 (a period of unrestrained urbanization of America) the proportion of Americans living in cities grew from 5 percent in 1820 to 20 percent in 1860—a four-fold increase. Westward movement increased in crescendo, leaving deep ruts in the Oregon Trail and a swath of denuded land 10 miles wide. Much deeper than the ruts was the disruption of American Indian cultures and ecological relationships on the prairies and in the mountain lands of the West

As the West became progressively more accessible, and settlements in the East became less desirable, nature appreciation and beautification projects in cities grew to counter pollution and slums. Tourism became popular as those of means fled to the countryside for relief. The New York Sportsmen's Association, like other hunters who noticed a decrease in wildlife, mobilized to halt exploitation and destruction of wildlife for profit. And in the 1840s, the Supreme Court passed a landmark decision that would become known as the Public Trust Doctrine, stating that all wild animals are the property of the people to be held in trust by the government. This doctrine, reinforcing the utilitarian benefit of wildlife to which all people should have access, paved the way for State and Federal agencies established in the late nineteenth and twentieth centuries to uphold this public trust.

President Lincoln signed the Homestead Act in 1862 that held that freeborn Americans had a right to a piece of land to live on. Although it brought thousands of people to the West to claim their 160 acres, in the end, agricultural development would not take the form of the agrarian dream embodied in the Homestead Act. Concentration and centralization of land and capital and the imperative toward mechanization would result in agribusiness. Agriculture would go the way of manufacturing.

In 1862, in the midst of this upheaval, Henry David Thoreau, advocate of wildness, died of tuberculosis at the age of 45. A prolific writer—his journals alone contain 2 million words—his ken was natural philosophy, a deep knowledge of the natural world as it related to human existence and spirit. He brought the human condition down to earth rather than reifying it. He foresaw the impact of civilization on nature, and warned that the preservation of the world rested in wildness. During his short lifetime, the population of America had grown from 7 to 31 million (Botkin 2001).

In 1864, Lincoln signed a bill that placed the Yosemite Valley in the care of California. This action represented a decisive step toward the preservation that Thoreau had proposed. The purpose of the "park," in the words of Frederick Law Olmsted, a leading advocate of the bill, was "as a playground for the nation…to be managed for the free use of the people" (Huth 1957: 149–50). By this time, the pace of economic expansion gave rise to a preservation reaction. Because of the precedent set by Lincoln, subsequent presidents would follow his example by signing bills and invoking executive power to set aside forest reserves, parks, and refuges for public use. Thus, presidents have contributed significantly to the cause of preservation when feet-dragging congresses influenced by commercial interests have blocked such legislation.

By the second half of the nineteenth century, as Catlin had forewarned, the prairie was littered with the bones of near extinct bison that had numbered in the millions. Sport hunting was not a major cause of their decline. The decimation occurred primarily for political and economic motivations. First, the demise of the bison would help solve the "Indian Problem," the acculturation of the Plains Indians by destroying their food source and making farmers of them. Secondly, it was a laissez-faire market reaction to the demand for bison hides for robes, their tongues as delicacies, and later, their bones for fertilizer.

George Perkins Marsh, a man of tremendous intellect and breadth of experience, in his book *Man and Nature*, set out the potential for ecological destruction (in Oelschlaeger 1991). He pointed out that the consequences of unmitigated growth—the squandering of renewable resources, bad forestry practices that compromised the health of watersheds, and species extinction—would eventually curtail economic progress.

Indispensable to market expansion was the completion of the transcontinental railroad in 1868. With the application of steam power, it provided an effective means of a two-way exchange of resources, goods, and people. Not only lumber, but also prefabricated houses could be shipped to North Dakota or Nebraska or the Central Valley of California from industrial regions that secured the timber from somewhere else. And as cities became more uninhabitable and fertile lands scarce in the East, western lands offered possibilities for grazing, dry-land farming, and farming with irrigation. During the decade after the Civil War, unprecedented growth spread like a cancer horizontally along railroad lines throughout the West, spawning unimaginative towns along its course (Jackson 1972).

The second half of the nineteenth century was one of the most critical ecological times in the history of America. Until the 1860s, very little government attention was paid to resource depletion and species decline or extinction although hunters, bird watchers, and mountaineering groups were expressing concern (Botkin 2001). By the end of the century, not only bison but also bowhead whales and salmon on the east coast and sea otter and elephant seals on the west coast had dangerously declined. From this time to just before World War I, public and political concern fomented environmental consciousness. At the same time, environmental organizations like the Audubon Society and the Isaac Walton League were chastised and challenged by radical environmentalists such as Roslie Edge. Awareness of critical ecological problems spawned a full-fledged conservation movement.

John Muir, an important actor at this time in conservation history, arrived in California when this movement was gestating (Fox 1985). Although he hated politics, he eventually determined to do something about "the gobble, gobble school of economics" (Jackson 1972: 86). With national visibility from essays that emphasized the spiritual nature of wilderness published in eastern journals, he became a leading preservationist. At the turn of the century, he was a consultant to conservation-minded people such as Gifford Pinchot, Theodore Roosevelt, Ralph Waldo Emerson, and George Bird Grinnell. He went nationwide with a struggle to stop the massive commercial exploitation of forest reserves and the transformation of the Yosemite Valley into an entertainment park.

The ideals of the frontier spirit, personified in Theodore Roosevelt, were translated into national policies to protect wildlife and forests. Conservation became institutionalized as a household word, but under the direction of Pinchot, Roosevelt's chief forester, its connotation clearly became one of "conservative *use*," the safeguarding and controlling extraction of resources for use by human society.

The two sides of the conservation ethic were clearly demarcated in preservationist Muir and resource manager Pinchot, who parted company over their disagreements about the building of the Hetch Hetchy Dam. Although its building was approved by Congress in 1913, it solidified a block of environmental organizations that had emerged in the latter nineteenth and early twentieth centuries. During this time, they cut their teeth on ethics, business management, and lobbying interests that helped make environmental organizations the critical force they are today.

In the 1930s, the New Deal Reformation combined social and conservation programs designed by President Franklin Roosevelt with the ecological insight of the Interior Secretary, Harold Ickes. The combined effects of a depression, drought, and depletion of land, which came home to rest graphically in a dust bowl, necessitated the revamping of government that became active as never before in the management of national lands. Political parties changed sides and became polarized, one favoring social intervention, and the other big business protection. Although citizen participation was included in advisory boards, these boards were primarily constituted, as they are today, to support the status quo and to commercialize rather than protect public lands.

After World War II, the government proceeded with its soil conservation and wildlife management programs. In his book, *A Sand County Almanac,* Aldo Leopold (1949) professed a new land ethic that would combine management and preservation. He had a foot in both fields; a creator of the profession of wildlife management, he was also a founder

and vice president of the Wilderness Society. The protection of wilderness demands, as Leopold stated, an understanding of the cultural value of wild things. It demands, as Frederick Jackson Turner stated in 1893, a realization that our American democracy arose not out of transplanted English institutions, but out of a mobile people's constant, vitalizing contact with the great wilderness.

Beginning with Rachel Carson's *Silent Spring* in 1962, that identified the destruction of wild species caused by the unmitigated use of DDT, reform environmentalism was reborn. Unprecedented legislation, including the Wilderness Bill and the Endangered Species Act that protected animals and habitats in their own right, was passed.

Today, we benefit from the strong and thoughtful critiques and reformation plans conceived in those days and refined today by men and women working in such fields as conservation biology, deep ecology, environmental justice, and steady-state economics. However, as time has progressed, necessity has directed much effort away from the source of the environmental problems and into mitigating their ill effects. This cursory review of the history of conservation in the United States shows us that resource management and preservation were conceived in the same crucible of conservation that arose from the exploitation of the rich continent we colonized.

Sustainability of Nature

Wilderness today stands as the icon of generative life in the continual process of evolutionary refinement. But no matter how much faith we have in this natural model, we cannot save and sustain wilderness or restore the health of the human-altered habitats at the rate we are now exploiting both. To survive spiritually and materially, we must acknowledge our dependence on the natural world. The frontier is indeed lost to history. There is no more free land. We have exceeded the limits. Our goal must be reduction, not growth.

We cannot turn the tide of ecological destruction and social disintegration without complete dedication and effort at all societal levels, from individuals to global economies. Such sea change requires a mindful reorientation to a world of finite resources. History suggests, and many contemporary authors agree, that such transformation is only likely to occur if we are forced to it by disaster—a very dismal prospect (McKibben 1989). We believe there are alternatives.

Open discourse is necessary if democratic action is to occur. Essential to such discourse is a self-critical examination of values held. Robert Brulle (2000: 278–282), with his suggestions for internal evaluation by environmental organizations, sets out an excellent model for reassessing priorities throughout society. Brulle suggests that for collective action to be effective, groups and individuals must be bound by "truth, morality, and authenticity." Expanding on this assertion, we suggest that collective action must be founded on authenticity, truth, and spirituality, and that each of these action bases must be infused with a deep morality directed at the "common good" as defined by environmental theologian John Cobb (1966), one that serves society while maintaining the ecological health of the planet.

When communities are founded authentically, the members work in a democratic rather than an oligarchic mode, at the grassroots level from the ground up, not from the top down. They remain representative and unconstrained. From local to national, all groups are active politically, with an abiding interest in electing intelligent and ecologically informed public representatives. Truth, as much as we can discern it by drawing from "special management, scientific, and legal capacities" (Brulle 2000: 278), provides the basis for ethically grounded action. The present conservation biology movement is a good model in this respect, where the most recent scientific knowledge is combined with a deep valuing of the Earth. Pure science, solely as empiricism, however, is suspect if not connected to moral application. Beginning with the atomic bomb and proceeding into the horrors of our day, we must understand the misrepresentation of objective, value-free science, which is only one piece of the puzzle that is truth.

The spiritual basis for ecological action, bound closely to ethics rather than religious institutions, must not be devalued because it cannot be proven empirically. Spirituality, infused with aesthetics and caring, provides the basis for action rising out of group consciousness and concern for Planet Earth and all her creatures. We do need animistic, theological, or aesthetic theories in order to sense the eminent creative force in a pristine habitat that indigenous people referred to as The Great Mystery. Whether chaos theorist or ordinary wayfarer, we feel the overall harmony of a dynamic system always in the process of righting itself. We must trust our hearts. Aesthetics or beauty is not enough if unconditioned by moral considerations. Consider, for example, the awesome symmetry in that mushroom cloud and the beautiful colors in striations of a strip mine or on the oily surfaces of polluted, toxic ponds. Beauty and spirituality cannot be context free; they are grounded, like activism, in the roots of communities, biological and societal.

Beyond agencies and organizations, we, in our daily lives, can make profound statements by living ecologically—curtailing our procreation, reducing consumption, cherishing nature, preserving its supreme manifestations in wilderness, and resurrecting our spiritual attachment to Mother Earth, as understood by our Pleistocene ancestors (Shepard 1998). Together we can erase consumer confidence as an indication of the health of a nation and replace it with ecosystem health as an indicator of the state of the planet. The reduction of population is a foremost global concern, we all agree. But we must also increasingly cherish the children we have and guide them in an ethic that cherishes wild over synthesized and domesticated nature.

It is useless simply to lecture to the poor about simplifying lives and limiting children. Their lives are already simple and their children are their only assets. We must, instead, be dedicated to social and environmental justice; the rights of humans to healthy work and home environments and to equitable treatment and benefits—to helping all peoples achieve a level of economic stability wherein they can make viable choices. Rather than the poor, it is we who are most involved in this global consumption frenzy and who can in our lifestyle alter the course of society. And we must demand that the perpetrators of power and growth follow suit and help us. At base, we must not forget that most problems of environmental and social justice are an outgrowth of depleted

and mismanaged natural systems, a problem that we must own up to and transform.

It should be clear to us that growth is not sustainable. No growth or diminished growth must be the goal. Nonrenewable resources are exactly that; they end as dispersed energy and rubbish. Prudence dictates that we develop renewable energy sources, such as nonpolluting solar and wind power, to replace nonrenewable resources at the rate they are depleted. Conservation practices—small-scale improved technologies, intensive but small-scale organic farming, pollution control, recycling and making do, and refurbishing rather than tearing down and building anew—are necessary priorities. Such practices renew appreciation for biodiversity and wilderness for which there are no substitutes.

Restoration will undoubtedly be the watchword of the coming century, as the role of resource managers in maintaining the health of wild and domesticated lands increases. Although management of all natural systems, including wild lands, is necessary, we believe it is often overapplied. The prevention of further degradation of ecosystems—especially remnants that now remain relatively pristine—is the first priority in considering resource extraction, control of pollution of air, water, and soil, and the restoration of depleted lands. We should understand by now there are no tradeoffs. Depletion of a habitat that developed over millions of years can never be adequately mitigated or restored. And even with the best science, we cannot foresee the consequences of our actions. Restoration is often needed to correct the effects of past mismanagement. Unfortunately, we still carry a belief in the superiority of "Lord Man," John Muir's name for our species. Our confidence in our infinite power and wisdom goes against us when, in many cases, the best alternative is simply to stop what we're doing.

At the national level, using the great conservationists as an example, we can become radical, insisting that our state and national governments stop their imperialistic, materialistic expansion. Competence and intelligence, ecological enlightenment, morality, and courage are qualities we must look for in leaders and develop in ourselves as citizens. Some economists believe that applying no-growth policies in the long term will create a more stable, equitable, and just society, but we face formidable opposition in achieving no growth, both in ourselves and in the multinational world.

In our personal goals, work, and businesses we can set limits to our own expansionary tendencies—limits to how much we accumulate in our lifetimes and how much is enough to insure a moderate standard of living that will sustain us to our end without dependence on others. And we should never exceed those limits. When assets grow beyond what is needed to live rightly, returning the surplus to the public trust or to worthwhile nonprofit organizations or charities makes good sense.

The same rules apply with small and large businesses. In the world of profit, competition creates large corporations like giant octopuses with their tentacles reaching into every sector of the world economy. A no-growth policy would encourage corporations to use assets to improve the lot of workers and redistribute wealth among them. Government intervention is necessary to set upper limits to both personal and corporate wealth and increase minimum wages to ensure this redistribution. Taxes, when properly applied, can expedite this effort, just as they can in limiting population. The same limits to growth must apply to governments and their agencies, and active citizen groups must constantly be the watchdogs of governing bodies to keep them honest and representative.

In a painfully real sense, we are no different from the pioneers who saw no limits to what the land could provide. The major difference is that today we have no intimate relationship to the land, and as a result we care less. But those of us who value complex and diverse relationships on Earth can strengthen our case by showing the worth of simplified, nonmaterialistic lives and the love of wild nature.

Conclusions

After the explosion of the first atomic bomb, the picture of the mushroom cloud rising, expanding, dispersing, carrying its load around the Earth, slowly sifting down deadly radiation, jolted us to a new level of reality. The power in the bomb was tremendous, but so were its lethal effects that could come home to rest on us. It was sobering for us to learn that the limitless power of the atom, unleashed, diminished our own freedom.

On September 11, we were handed another image, of two technological forces colliding, an airplane like many others that command the skies and a highrise, a monument to commerce so sturdy it was expected to last thousands of years. When these two icons of power and profit met head on, they imploded, starting a process that sent them tumbling down, carrying with them thousands of martyrs who in their human way had simply gone to work that day. All the magnificence of that creation, technological as well as human, lie intermingled in a decaying mass of rubble that came down on itself. We should ask ourselves not how we should seek revenge but why we are so hated. We should think twice about retaliation that destroys people and ecosystems that can never be replaced by so-called "aid."

This icon of disaster is not unrelated to our wilderness problem or to the problem that two centuries ago threatened the bison. The two are directly related. We are capable of taming, despoiling, and populating every inch of wild Earth. But unless we forestall the insidious, malignant growth mania that infects us, we will leave future generations a totally domesticated Earth, socially and biologically pathological, as well as absolutely boring. If wilderness is completely tamed, the creative spirit will also die. As Thoreau foretold in 1854, "We can never get enough of nature." We need wild places "where we can witness our limits transgressed" (Thoreau 1906).

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Contribution of Wilderness to Survival of the Adventure Travel and Ecotourism Markets

Peter B. Myles

Abstract—There is a global concern that ecotourism and adventure travel is becoming a mass tourism market rapidly losing its tourist appeal. Ecotourism is fast becoming "egotourism," and the benefits are not flowing back to the host communities, especially communities in rural areas where poverty alleviation is essential for the protection of the environment. Tourism in wilderness settings can make a valuable contribution by restoring an appreciation for an authentic nature-based tourism experience. This will require repositioning ecotourism and adventure travel in the marketplace by introducing elements of exclusivity, perhaps at a premium price, so that the true value of the outdoor tourism experience will be measured by learning from nature rather than by boasting of luxury lodges in exotic locations filled with noisy, adrenalin-pumping activities

Ecotourism: Curse or Blessing?

There are many different definitions of ecotourism, but most agree that it involves tourism into areas of great natural beauty or interest, with minimum impact on the environment and maximum benefit to local communities. The Ecotourism Society (1992) defined ecotourism as:

> ...purposeful travel to natural areas to understand the cultural and natural history of the environment, taking care not to alter the integrity of the ecosystem, whilst producing economic opportunities that make conservation of natural resources financially beneficial to local citizens.

Many commentators have criticized the use of the term ecotourism because it has been applied widely to cover all manner of tourism experiences with a vaguely "green" tinge, particularly nature-based tourism. The term ecotourism has many meanings. It can refer to a genuine attempt at environmentally sustainable tourism, or it can be used in a cynical way to try to attract greater numbers of visitors to an area. For example, the term ecotourism does not differentiate between:

1. A large group of people visiting a private game reserve, arriving at their destination by aircraft, staying in luxury accommodations, expecting to be pampered with all the modern conveniences, and spending very little money at the destination because everything is prepaid before departure; and

2. A low impact ecotraveler, backpacking or camping to save money on accommodations, but spending money spontaneously wherever they travel, pursuing a minimal impact experience in a wilderness environment.

These hypothetical examples illustrate that ecotourism can refer to a wide range of activities that might have different environmental impacts and attract people with different sets of values and motivations. Special interest and activity holidays represent the single largest growth area within the tourism industry.

Special interest travel is travel for people who are going somewhere because they have a particular interest that can be pursued in a particular region or destination. What sets special interest tourism apart from other forms of tourism is that the whole point of the trip is to exercise the mind and/or body in some fashion. It is interesting to note that in the year 2000, the year of millennium activity, global travel experienced its best growth in a decade, as many tourists selected destinations that they had identified with some body, mind, and spiritual experience.

Adventure Tourism

Activity-based tourism is another form of special interest tourism. There are so many examples of stress-related behavior in society such as road rage, air rage, family killings, and school rampages. The question that needs to be raised is, "why would anyone engage in a potentially dangerous activity as a form of recreation?" The common answer is, "adrenaline rush." While those involved in high-risk activities may welcome the initial adrenaline rush, such as whitewater rafting, bungee jumping and extreme sports, it is not possible for them to sustain the rush for any length of time, hence, the adrenaline junkies. One cannot help wonder if most adventure tourists are not substituting one kind of stress for another.

However, what is of greater concern is that many of these adventure tourism activities disturb the environment, causing noise pollution, visual pollution, and in some cases, even mud slides and avalanches. These activities are all marketed as ecotourism.

Nearly 80 percent of the world's population is now urban. Therefore, it is logical that urban dwellers need rural experiences for a change in daily routine. There is an old saying that says "a change is as good as a holiday." Humankind generally needs spells of solitude, peace, and tranquility, and an escape from heavily industrialized, overcrowded urban environments in order to relax and recover. A wilderness experience is far more therapeutic and ultimately beneficial

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to society than most of the ecotourism and adventure tourism activities currently offered. We need to put wilderness back into ecotourism experiences if nature-based tourism is to have a positive impact on society in general. We need to awaken a spirit of wilderness deep within the human psyche to restore sanity to the human race.

"Deep ecotourism" and "shallow ecotourism" are terms that can be used to differentiate between ecotourism that verges on a form of mass tourism, and genuine attempts at environmental tourism. Deep ecotourists should demonstrate in their lifestyles a true sense of values, that is, a philosophy of sustainability wherever they are.

Spiritual Leaders

All the great spiritual leaders who founded religions needed times of solitude in exclusive areas not only for prayer and meditation but also for stress relief. They were physically and mentally exhausted from the demands of their followers. They had to escape from crowds and get in touch with nature in order to recover. Mohammed went to the mountain, Jesus had both a wilderness and mountaintop experience, and Buddha recovered in retreats. Many people describe certain places with almost a spiritual reverence because the space, tranquility, and solitude provide a therapeutic benefit. They feel better after their visit. The karoo is almost a natural wilderness area and has been described as a place "where the land meets the sky." It is a place where the crisp clean air invigorates stressed minds and tired bodies in a silent world where it is said "you can hear God think."

A Healthy Society

Governments need to expand wilderness areas for the future mental and physical well-being of their citizens. However, keeping wilderness areas exclusive, pristine, and free from crowds means that they should remain relatively undeveloped. With limited infrastructure to generate income, it is difficult to make wilderness areas viable. Wilderness areas therefore need to be subsidized to survive, but there is a cost benefit. A financial contribution by Government dedicated for the expansion of wilderness areas will yield a good return on investment. This is mainly because a more balanced, considerate, relaxed, friendlier, and stable society will ultimately be a far less destructive force and therefore cost less in health maintenance, for example, lower medical bills.

Sustainable Development

The delicate relationship between tourism and the environment was highlighted by the Manila Declaration of the World Tourism Organization (1997), which stated:

> The protection, enhancement and improvement of the various components of man's environment are among the fundamental conditions for the harmonious development of tourism.

In the mid-1970s, sustainable development became a global buzzword, but since then it has become a concept much discussed, used, and abused.

The World Commission on Environment and Development (1987) first introduced the so-called "stewardship" role of sustainable development, aimed at maintaining resources in perpetuity and stated:

> Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Colin Hunter (1995) suggested in his Journal of Sustainable Tourism that over the short and long term, sustainable tourism development should:

1. Meet the needs and wants of the local host community in terms of improved living standards and quality of life.
2. Satisfy the demands of tourists and the tourism industry, and continue to attract them in order to achieve the first aim.
3. Safeguard the environmental resource base for tourism, encompassing natural, built, and cultural components, in order to achieve both of the preceding aims.

Perhaps the future survival of ecotourism as a unique, nature-based, outdoor experience has something to do with the implementation of the second point suggested by Hunter, that is, have tour operators gone overboard in their quest to satisfy the demands of tourists and the tourism industry? Has greed transformed ecotourism into "ego-tourism?" In many cases, ecotourism and all other forms of responsible tourism are little more than marketing ploys—mass tourism disguised as responsible tourism. There is a need to review ecotourism to address some of its negative perceptions.

Ecotourism and Protected Areas: Mutually Beneficial?

Tourism uses landscape, flora, and fauna as important natural attractions, while conservation of the built environment also provides tourists with sites of interest. Where conservation interests have been successful in designated zones from which all human activity is excluded, tourism interests are forced to compete with other excluded interests in the zones adjacent to protected areas. Under such circumstances tourism is often easily outmaneuvered, or outbid by well-organized interests such as mining or forestry.

A rather unusual variation on this theme is where ecotourism acts as the forerunner to alternative developments, as in the case of biotechnology prospecting, to seek out species that might provide genetic material to produce pharmaceuticals or other products. Bio-piracy is the theft of plant and animal species by unscrupulous biotechnology companies, including the theft of intellectual property, such as local knowledge of herbs and medicinal plants.

Most definitions of ecotourism include travel to "natural areas," or refer to "natural beauty" and "natural resources." Perhaps this is where ecotourism has deviated from its original purpose and the term nature-based tourism has become too wide in its interpretation. The International Union for the Conservation of Nature (IUCN) views a natural area as:

> …one where biological processes and geological features are still relatively intact and where the primary objective of the area is to ensure that natural processes remain as the dominant force in the system.

Reinventing Ecotourism

According to international tourism consultant Dr. Auliana Poon (2001), there is a paradigm shift occurring in the tourism industry the world over. The golden age of mass tourism, of unlimited growth and disregard for the environment, and of standardized, rigidly packaged products and services is over.

A new tourism is emerging: sustainable, environmentally and socially responsible, and characterized by flexibility and choice. A new type of tourist is driving it: more educated, experienced, independent, conservation-minded, respectful of cultures, and insistent on value for money. Information technology is opening up an astonishing array of travel and vacation options for this new tourist. To remain competitive, tourism destinations and industry players alike must adapt. For many, the challenge is to "reinvent tourism." Market intelligence, innovation, and closeness to customers have become the new imperatives.

Taking a leaf from this book, perhaps we need to "reinvent ecotourism." And this is perhaps what we are trying to achieve in Africa by introducing our own unique brand of "Afrikatourism," that is, ecotourism that is unique to Africa.

Afrikatourism: Ecotourism Unique to Africa

Afrikatourism, drawn from Open Africa's vision (1994), is a restorative, sustainable, and profitable tourism sector, particular to Africa's circumstances and characteristics. It defines an entirely new, responsible, and essentially African industry, with community participation and conservation as its cornerstones. Afrikatourism highlights a niche for African supremacy in nature-interactive tourism. It can be found and experienced *only* in Africa. It also integrates perfectly with the political vision for an African Renaissance.

Conclusions

Ecotourism is, at its best, perhaps somewhere close to our ideals for responsible tourism. However, the difficulty is that there is nothing to prevent any operator, destination, or other "player" in the tourism industry from using any title they choose. Because there are no clear industry standards, there are no guarantees to the consumer that a particular tour to a particular protected area complies to any acceptable guidelines for responsible ecotourism. "Mass ecotourism" is already emerging, and many will say that ecotourism is not delivering on its promises. Ecotourism is therefore in danger of losing its integrity, and perhaps there will come a time when deep ecotourists will be prepared to pay a premium price for the exclusivity of a true wilderness experience. In this regard, it is imperative that large areas are set aside for wilderness.

To illustrate this point, the Eastern Cape is the poorest Province in South Africa in terms of the economy, but the richest in terms of biodiversity. Few people are aware that the Eastern Cape is the only Province in South Africa, and one of the few places on earth, where all seven biomes can be found as well as 29 Acocks Veld Types. However, 19 of these veld types are threatened and fall well below the 10 percent of each vegetation type that should be set aside for pristine or near-pristine use proposed at the Rio Convention.

Perhaps the answer lies in stimulating a desire amongst ecotourists and ecotourism operators for an authentic natural experience. This may mean that we have to awaken a "spirit of wilderness" in the human psyche.

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Wilderness Ecotourism and Education as a Means of Promoting an International Environmental Ethic

Laura M. Fredrickson

Abstract—At this present historical juncture, many would argue that there is an obligation to change our societal attitudes toward the environment, as well as to reassess human values and lifestyles with respect to ecology. To accomplish this task, societies must promote deep environmental awareness and respect for the Earth's natural systems and wilderness places. This environmental awareness effort must reach virtually everyone in the society, especially peoples from more developed countries (MDCs) who have the luxury of engaging in recreation and leisure. It is these recreationists who, while traveling in natural wilderness (or wildernesslike) settings, are most likely to come in close contact with nature, and thus acquire deeper environmental awareness. However, peoples from lesser developed countries (LDCs) must also be educated about the advantages of embracing *sound* forms of ecotourism as a viable means of economic advancement and long-term environmental protection.

Broadly defined, environmental education portends the message that: Earth's environment is not an object to be subdued by people, Earth's resources are not free of *cost*, Earth clearly has carrying capacity limits, and finally, the past paradigm of human domination over the planet is no longer valid, given the inarguable signs (for example, global climate change) that we are beginning to exceed Earth's carrying capacity.

Sound ecotourism activities (especially wilderness ecotourism) attempts to educate visitors from MDCs about the ecological and sociocultural impacts of their travels on the lands and peoples in various LDCs they visit, while at the same time educating indigenous peoples about alternative means of attaining long-term sustenance from their local surroundings through various sustainable development practices and ecotourism activities. Through a review of various case studies, this paper articulates the importance of the educational initiatives involved in *sound* ecotourism as a means of promoting a widespread international environmental ethic among peoples from both MDCs and LDCs.

Introduction

Early human attitudes toward the environment tended toward viewing Earth's resources as useful commodities that were more or less unlimited, or renewable, if not severely overused. Throughout history, human attitudes toward nature and the environment have tended toward utilitarian, that is, useful, rather than decorative or luxurious. From the planet's fertile soil, which produces the food that we eat, to the global hydrological cycle that ensures and regulates planetary moisture levels, most would agree that the Earth's resources are essential to life as we know it. Yet few people are truly aware of the danger present in the prevailing utilitarian approach toward the environment. The Earth's resources are limited and can be exhausted if overused or stretched beyond one's limit of adaptability. This attitude still prevails today among most development profiteers and policymakers concerned primarily with jobs and profits; the term "cornucopian" has been used to describe those who hold this type of environmental attitude. This sector views nature as a commodity to be developed and sold in the market place—the tourism sector notwithstanding—and the cost of maintaining the goods and services the environment supplies is frequently overlooked or viewed as a writeoff on some distant future debt.

The other extreme on the continuum of human attitudes toward the environment has been described as "green fundamentalism" (Lowenthal 1990), consisting of radical zealots and nature purists representing a societal reaction or backlash to the many environmental abuses that resulted from the onset of the Industrial Revolution, especially the environmental assaults that have occurred since the 1960s. It is an attitude that embodies the feeling that any form of human activity harms nature and fears a global integrated economy, assuming a nationalist, antifree market, antimaterialistic, economically self-sufficient, and protectionist attitude. In its most extreme form, green fundamentalism advocates an antidevelopment policy, halting all economic growth or curtailing present levels of economic activity in an attempt to protect the environment. Additionally, those who hold this attitude argue against private ownership of land and against human access to natural ecosystems, suggesting that these areas have to be protected from human impact, including nature travel and tourism. Some believe that the impact of tourism—nature tourism notwithstanding—should automatically be evaluated as negative, stating that the undesirable environmental externalities of tourism are inherently objectionable (Mieczkowski 1990). This ecological argument is supported by criticism of the sociocultural and economic problems associated with tourism.

However, both of these positions are extremist and untenable in the real world. There is nothing intrinsically wrong with development. To demonize any economic activity, such as ecotourism or nature tourism and travel, as *automatically* leading to decreasing environmental quality is shortsighted. Depending on the scale at which the development occurs and the degree to which local participation in the project occurs,

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these are more the pivotal elements that determine the overall success or failure of a particular development project, with regard to decreased environmental quality. The critical challenge is to develop systems and projects that ensure economic survival in a world where long-range sociocultural and environmental deterioration may ultimately result in economic disaster. Mainstream environmentalists don't believe in just any form of development—but specifically in sustainable development that operates within stringent environmental constraints that maintain and enhance economic prosperity and quality of life without environmental deterioration, in other words, development projects (including nature travel and tourism) that are done in an environmentally sound and aesthetic manner, enhancing their current recreation value while still leaving ecosystems fully functional and unimpeded.

The prerequisite for environmentally sustainable development is to remain within the limits of nature's carrying capacity, while minimizing the negative and maximizing the positive effects of human activity. Ultimately, the goal is to achieve economically efficient (working within economies of scale) sustainable development, and simultaneously a sustainable natural environment. Yet this approach—the *middle road* approach—must be undertaken in the spirit of balanced compromise, that is, recognizing the limits of both human ingenuity and the environment, and approaching development projects with a degree of educated respect, caution, and built-in flexibility. However, a firm pro-environment attitude must take precedence; one that accords basic priority to the ecology is imperative.

For a society, the middle-road approach requires a shift in societal values and attitudes, in world economic systems, in international conservation agreements, and by the granting and receiving of foreign aid for development projects. For the individual, it means curtailing our pursuit of economic and technological advancement so as to procure and maintain a lifestyle based primarily on the acquisition of material goods. Ultimately, where uncertainty exists regarding a specific environmental decision associated with development, it is most wise to give the benefit of doubt to nature and to side with conservation. In other words, it is wisest to err in favor of the environment than in favor of unmitigated development.

Importance and Application of Environmental Education Programming in Ecotourism Activities

As noted in the previous section of this paper, there is an obligation to change our societal attitudes toward the environment, as well as to reassess human values and lifestyles with regard to the basic ecology of the planet; perhaps most importantly is this attitudinal shift in the modernized West. One way in which to accomplish this task is to actively promote environmental education for peoples of all society, both those in more developed countries (MDCs) and those of lesser-developed countries (LDCs). Whereas many governments in LDCs promote various forms of nature tourism and travel as a means of economic development and the most prevalent connoisseur of this type of economic development are people at leisure, one must acknowledge the danger or costs associated when marketing an area's unique flora and fauna, not to mention the drawbacks of marketing an area's rich cultural heritage—when unmitigated, profiteering development is the driving force behind the enterprise.

In essence, it is those people who are traveling and recreating in an outdoor setting that are most likely to develop a sense of environmental awareness or ecological literacy (Orr 1992). The hope is that through repeated outdoor recreational experiences, the individual develops a level of sensitivity to the range of human impacts that threaten natural ecosystems—from seeing the effects of acid rain on a once lush evergreen forest to witnessing the lack of basic sanitation and its effect on a community of people in a remote village in the Himalayas. Seeing and experiencing these things will, over the long run, help the individual to develop an environmental ethic, or earth consciousness, that takes into account not only the basic principles of ecology but then also applies them to the realm of social systems and ongoing cultural advancement.

More specifically, participation in ecotourism activities, especially those based in remote or wildernesslike settings, combined with some degree of ecological training of ecotourism operators in LDCs, contributes to the development of an environmental ethic among the masses. The inference is that this will translate into political activism on matters of the environment, both domestically and abroad (Gunn 1988a,b; Jackson 1988; Pigram 1980).

Select Case Studies: Moving Toward Success

Annapurna Conservation Area Project, Nepal—The King Mahendra Trust for Nature Conservation established the 7,629 km^2 (2,946 $miles^2$) Annapurna Conservation Area Project (ACAP) in December of 1986. Its status as a multiple-use area, as opposed to the more restrictive national park model, is an innovative concept in achieving environmental protection along with sustainable community development. Multiple use is accommodated in part by the subdivision of the area into zones, including special management areas, intensive-use areas, limited use areas and wilderness areas (Gurung and DeCoursey 1994). Moreover, the project embraces traditional subsistence activities that are woven into a framework of sound resource management, supplemented by conservation, development, and alternative energy programs, to minimize the negative impacts of tourism and enhance the living standards of the local people.

The biological diversity of the Annapurna Region is equally rivaled by its rich cultural diversity. Since the first trekker came to the Annapurna area in 1957, the natural and cultural features of ACAP have made it the most popular tourist destination in Nepal, drawing more than 60 percent of the country's total trekkers. ACAP follows a grassroots philosophy of maximum peoples' participation, sustainability, and its role as a catalyst whereby the local people are involved in all aspects of the conservation and development processes, both as principal actors and prime beneficiaries.

ACAP is spread out in five districts of the Western Development Region of Nepal and covers 55 Village Development

Committees. ACAP is divided into seven units with conservation offices located in the field at Jomsom, Manang, and Lho Manthang in the north and Bhujung, Lwang, Sikles, and Ghandruk in the south. While the focus of Jomsom, Manang, and Ghandruk, which are also popular areas for trekking, is on integrated tourism management and agropastoralism, the program priorities for Bhujung, Sikles, and Lwang are poverty alleviation and integrated agriculture and livestock development, agroforestry, and community development, respectively. The focus in Lho Manthang, Upper Mustang, which came under the jurisdiction of ACAP in 1992, has been on managing controlled tourism on a sustainable basis, and promoting heritage conservation, which is the major tourist attraction along with alternative energy, resource conservation, and community development programs. The Conservation Education and Extension Project (CEEP) has been implemented in the entire ACAP and forms the backbone of all its conservation efforts in the region.

Implementation of ACAP was achieved through the King Mahendra Trust for Nature Conservation (KMTNC), a nongovernmental, theoretically autonomous, nonprofit organization, described as very effective because of its international connections, autonomy, international fund-raising capacities and ability to bypass the cumbersome bureaucracy frequently present in LDCs. The ultimate goal of the KMTNC is to see that the local people themselves, with minimal intervention from government and/or other institutions, manage ACAP. That is, ACAP was designed so that most startup costs would initially be borne by outside donors, but then financial stability would be gradually achieved through user fees charged to international visitors and placed in an endowment fund that would generate funds for future conservation efforts in the area. One of the major innovations of the ACAP is that local communities are expected to contribute, in money or in kind, at least 50 percent of the costs of any project, assuming that such financial contributions not only indicate a serious initial intent, but ensure a long-term community commitment because of the vested funds involved (Wells and Brandon 1992).

Tourism-related components of ACAP that emphasize active ecotourism initiatives aimed at the visitor include:

- Establishment and maintenance of visitor information centers to disseminate advice to trekkers, using videos, brochure and publicity materials, and other interpretive/educational sources.
- Litter and pollution control through the installation of toilets and trash receptacles in lodges and through the distribution of brochures directed toward changing the behavior of high-impact tourists.
- Lodgeowner training through a 1-week course, involving fuelwood savings and substitutes (as through the use of back boiler water heaters), hygiene, garbage disposal, and the formation of lodge management committees.
- Trekking guide training focusing on minimal impact camping protocol ("leave no trace" principles).
- Formation of local Lodge Management Committees (LMCs) who are heavily involved in the decisionmaking process as to how excess funds are distributed and reinvested in the conservation project.
- Search and rescue arrangements for emergency helicopter evacuation for visitors.
- Ecocamp site development in ecologically/culturally sensitive areas (based on "leave no trace" principles).

Conservation-related components of ACAP that emphasize education aimed primarily at the local population include:

- Conservation education classes in schools.
- Conservation awareness camps for local villagers.
- Village cleanup campaigns.
- Formation of local natural history museums and visitor information services, including an environmental resource library.
- Formation of extension and conservation education inhouse for Community Forestry Groups (CFGs).
- Implementation of the policy of incremental access through limited access permits into trekking areas.

Since ACAP was first implemented, many ecological and sociocultural improvements are evident: reduced firewood consumption, enforcement of kerosene-only policies (for cooking) in certain areas, a complete ban on hunting, cleaner lodges and enhanced sanitation systems, better waste management, economic diversification, and improved revenue retention. Since 1989, ACAP has charged an average entrance fee of 200 rupees (USD 9), yielding an annual revenue of 4 million rupees (USD 160,000), which has then been reinvested into various conservation efforts, as well as educational and social welfare initiatives, such as microlending programs, trekking guide training programs, and women's literacy programs. The revenues generated from ACAP are equivalent to approximately one-half the revenues of trekking permits for all of Nepal. Overall, a major accomplishment of ACAP has been the creation of an environmental ethos among locals and tourists (Buckley 1991).

Sunungukai Camp, Zimbabwe—On the banks of the Mazowe River is Sunungukai Camp, the first ecotourism project run by a small community of some 25 households in five rural villages (Kapandoro, Hodzi, Munando, Chidaramumba, and Mapini). Opened in March 1993, Sunungukai is run by a locally elected committee, under the Communal Areas Management Program for Indigenous Resources (CAMPFIRE), with funding and management training provided by the Zimbabwe Trust. The philosophical underpinning of this ecotourism venture was to solve the threat of unsustainable exploitation of natural resources by ensuring that local people reap economic benefits on nonconsumptive tourism activities. Visitors to the area come to enjoy mountain hiking and scenic vistas overlooking the river, fishing for a variety of game fish, or photography and viewing wildlife. Local guides take people to see nearby bushman paintings or to consult the traditional healer. Visitors camp or stay in traditional round huts and can make arrangements to share traditional meals with local residents.

CAMPFIRE, as the umbrella organization, facilitates the formation of Community Based Organizations (CBOs) for the purpose of natural resource management. Through the CAMPFIRE principles of decentralization and devolution, CBOs are formed and structures developed linking them to local authorities, ensuring local participation in decisionmaking

and hands-on management of the area's natural resources. Besides receiving benefits from the revenues of the camp, some locals have been trained (and now work) as guides. Others make handicrafts and souvenirs to sell at the camp. Community workshops and meetings are held to ensure that the locals can voice their opinions on the impacts of the ecotourism in their area.

Prior to the start of the project, access to and use of the area's natural resources in the Communal Lands of the Mazowe River Basin were unrestricted. This led to serious degradation of the natural environment. For example, demand for fuelwood led to the destruction of forests, poor agricultural practices led to serious soil erosion, and gold panning activities aggravated the problem of river siltation—issues not that uncommon in other developing countries. Add to this the problem of increased population density throughout the whole of Zimbabwe, and you've got an area that is teetering on the brink of ecological and cultural bankruptcy. The problem of environmental degradation is by no means confined to the Mazowe River Basin. On the contrary, it is a national problem for Zimbabwe where over 70 percent of the population is rural and depends on land resources for its livelihood.

Given that local communities were not compensated for nonuse of natural resources and the fact that the state had access to much needed resources under a principle of exclusion under the national policy of Protected Areas, the environment was severely compromised. Yet, if the clearing of woodland for agricultural production and harvesting of the forests for fuelwood and construction poles continued unabated, the forest resources would have been completely depleted, and the river would have silted beyond repair. With the silting of the river, the fish population would have declined, which could have then triggered game poaching as a source of protein (a practice that is frequently found in other parts of sub-Sahara Africa). In general, mounting environmental degradation had a direct and negative impact on economic development in the Sunungukai area.

Determined to bring change to their community, local villagers decided to establish an income-generating project. This was to build a camp, and a suitable site was identified in Kapandaro Village. An elected committee of local community members oversaw the construction and management of the site. Sunungukai Camp was built on one hectare (2.5 acres) of land, and the owner of the land is continually entitled to 10 percent of the camp revenues. Another 5 to10 percent goes to the Uzumba-Maramba-Pfungwe Rural District Council (UMPRDC), which serves as a link between the project and the central government and provides technical support on project implementation. Decisions about the remaining revenues are made by the management committee.

The camp consists of four roundavel lodges, each with its own grilling site, a reception/information building, communal kitchen, and a caretaker's room. The layout of the camp is based on traditional Shona architecture and was constructed using locally available materials with local labor provided by the community. All the bricks used in construction were made by the local people, and they provided thatching grass and poles for roofing. Cement, windows and doorframes were bought with cash provided by the Zimbabwe Trust, and fencing materials (to keep out unwanted wildlife) was bought with donated funds from the New Zealand High Commission in Zimbabwe.

Since its inception in 1993, the area has experienced a remarkable change in the way the community is actively involved in monitoring natural resource use and generating an income from ecotourism. This has led to controlled gold panning and better use of other resources, such as poles and thatch used in building construction. Additionally, members of the local community have received extensive training from the CAMPFIRE Association and other community conservation groups on natural resources management and ecotourism opportunities. Most of the money generated thus far has gone to pay staff and to continue with renovations and facility upgrades. One of the most pressing problems still facing beautiful Sunungkai Camp is that the area is not well marketed and remains somewhat underutilized. Future revenues are earmarked for marketing the site internationally and increasing the tourism management and training for the local labor force. Nonetheless, in the perspective of the community, "it is now true to say that the majority of our people have an increasing realization of what the environment means to them and to future generations" (Munasinghe 1995).

Tourism-related components of Sunungukai Camp that emphasize active ecotourism initiatives aimed at the visitor include:

- Formation of Community-Based Organizations (CBOs) that initiate and organize local communities around economic empowerment and resource conservation projects.
- Tour guide training focusing on minimal impact camping protocol and photographic safaris ("leave no trace" principles).
- Formation of the local Sunungukai Management Committee (SMC) who is heavily involved in the decision-making process as to how excess funds are distributed and reinvested in the conservation project.
- Eco-campsite development (no running water, no flush toilets, no electricity) in sensitive areas (based on "leave no trace" principles).

Conservation-related components of Sunungukai Camp that emphasize education aimed primarily at the local population include:

- Conservation awareness workshops for local villagers.
- Village cleanup campaigns.
- Drafting of the Sunungukai Management Committee Peoples' Constitution that monitors community natural resource use regulations and implements sanctions against offenders.
- Collection of user fees for use of natural resources by nonlocals.

Toledo Ecotourism Association: The Toledo Guesthouse and Ecotrail Program—The Toledo Ecotourism Association (TEA) is comprised of Mopan, Kekchi, and Garifuna (Carib/African) villages in the forgotten southern district of Toledo in Belize. This program was formed to enable the local peoples to directly plan, control, and profit from ecotourism. Profits from the TEA program go to a general fund, which contributes to village health and education, rainforest conservation, and central office operation.

More than 80 percent of all funds stay in the individual village that is visited.

Established in 1990 after the Toledo Home Site Farming and Ecology Center organized a series of free, community-sponsored public workshops focusing on profiting from *sound* ecotourism, TEA has, from the start, been a grassroots organization. Villagers who attended these initial workshops first developed the Toledo Guesthouse Program by building four simple guesthouses throughout the southern district of Belize where visiting ecotourists could stay. The original four TEA guesthouses were built by local community members and were constructed from local building materials in a style that matched traditional Belizean home design. Each guesthouse was constructed of palm leaf roofs, wooden walls, and dirt or concrete floors, and each guesthouse contained only four bunkbeds, thereby minimizing the number of people who could stay at one particular guesthouse.

Additionally, the guesthouses were designed to be environmentally low impact. The guesthouses do not have electricity but instead rely on traditional oil lamps. Restrooms consist of nonflush, composting toilets, and the washroom consists of a basin of water and a dipper and towel for bathing. Different host families prepare traditional meals, and it is expected that visitors rotate their visitation to individual homes for meals so as to economically benefit a greater percentage of the local community.

To date, there are roughly 18 guesthouses spread throughout the southern district of Toledo, and because each of the TEA villages are located within relatively close proximity to one another, visitors typically walk from one inland village to the next. Accompanied by local guides, the Toledo Ecotrail system allows visitors to travel through a diverse array of landscapes—from virgin jungles rich with over 500 species of tropical birds, 200 types of wild orchids and the elusive jaguar, to climbing in the foothills of the Maya Mountains that provide spectacular views of the rainforest below. While traveling inland, tourists make their way from one village to the next, incorporating visits to ancient Mayan wonders that have survived over a thousand years, such as Lubaantun or Uxbenka, both ancient Mayan ceremonial centers.

In striking contrast, the Ecotrail system travels through the beautiful fishing village of Barranco, which is a fine representation of traditional Garifuna culture. In striking contrast to the Mayan villages inland, Barranco offers a coastal setting and a rich culture derived from the Amerindian/African heritage of the region. Days in the coastal village of Barranco can be spent fishing in dugout canoes or visiting the Temash River Forest Reserve; nights come alive with Garifuna drumming and dancing.

The main objective of the Toledo Guesthouse and Ecotrail Program is to provide visitors to the area a glimpse into everyday life as experienced by the Mopan, Kekchi, and Garifuna peoples. Visitors to the area have the unique opportunity to observe traditional farming, cooking, weaving, and basketry; enjoy traditional dances, music, and storytelling; and, learn arts and crafts, such as backstrap weaving, embroidery, and jippy-jappa basketry.

Finally, all programming is locally supported and sanctioned by an elected village executive, who oversees the running of the program in each particular village. Additionally, there is a district executive, who is elected every 2 years, to manage and control the TEA program on a district level. The entire organization of 201 members, representing 10 villages, holds regular monthly meetings to decide long-term planning and strategizing.

Apart from providing a rich and memorable experience to the visitor, another important objective of the Toledo Guesthouse and Ecotrail Program is raising monies to help fund alternatives to slash and burn agriculture, the number one cause of deforestation in the Toledo district. As previously mentioned, approximately 80 percent of the monies raised through this particular program remain in each separate village and goes toward improving village health and education initiatives, as well as providing individual families who participate in the program with a source of personal income.

Tourism-related components of the Toledo Guesthouse and Ecotrail Program that emphasize active ecotourism initiatives aimed at the visitor include:

- Tour guide training focused on educating the visitor about the daily life practices of indigenous residents and their local relationship to the environment.
- Low impact guesthouse design (no running water, no flush toilets, no electricity) villages.
- Rotational work basis for tour guides, educating visitors about the importance of balancing traditional work with that of ecotourism activities.

Conservation-related components of the Toledo Guesthouse and Ecotrail Program that emphasize education aimed primarily at the local population include:

- Appointment of an elected village executive who initiates and organizes local community members around economic empowerment and resource conservation projects.
- Conservation awareness workshops for local villagers about proper guesthouse construction using locally available resources.
- Establishment of consistent user fees for individual households who host visitors to the Toledo district.
- Collection of user fees for use of natural resources by nonlocals.
- Appointment of elected district executives who are heavily involved in the decisionmaking process as to how excess funds are to be distributed and reinvested at the regional level in various health, education, and conservation initiatives.

Discussion and Conclusions

In all countries of the world, both poor and rich, wilderness ecotourism (or wildernesslike settings) has the potential of playing an outstanding role in educating peoples from both MDCs and LDCs about the importance of adopting an international and universally accepted environmental ethic. This international environmental ethic must include such things as:

- The recognition of the complexity of nature and a repudiation of the belief that we can scientifically understand and technologically manipulate nature without limit.
- Restraint in our behavior toward the natural world and restriction of our wants.

- The cultivation of a comprehensive sensibility toward nature that is equally far from the overly romantic, anthropomorphic view as from the utilitarian or cornucopian view of nature.

Moreover, this type of paradigmatic change in humans' views toward nature will not come about without also recognizing that ecological protection and cultural preservation are inextricably linked, and maintaining both are integral to establishing long-term ecological integrity.

Participation in *sound* ecotourism, combined with appropriate environmental education and ecological training (for example, "leave no trace" principles), can contribute to the development of a deep environmental ethic among people from MDCs who travel internationally to visit wilderness settings in various LDCs, while also increasing the sociocultural concerns for the lives of peoples living in close contact with these wilderness settings. In the long run, this translates to political activism on matters of the environment, in addition to matters of social equity for persons in LDCs whose lives are inextricably linked to wilderness settings. Yet, at the same time, only minorities of people in LDCs are educated to behave responsibly toward the natural environment. That is, the least environmentally concerned, due to their economic disadvantage, are residents of rural agricultural areas living in close proximity to wilderness (or wildernesslike) settings, and who are wholly dependent on the local flora and fauna for their sustenance. In many instances, inhabitants of these areas regard natural vegetation primarily as a source of food and fuel, and wildlife as a source of meat—or harbingers of destruction to agricultural crops. For many peoples in LDCs, the land is not an arena for leisure pursuits but a means of livelihood and survival. In other words, the very concept of nature and wilderness in most LDCs is very different than the environmental ethic that drives much of the preservationist and conservationist activities in MDCs.

Through the use of decentralized political and economic decisionmaking processes utilized in ecotourism development projects, local indigenous community members of various LDCs are becoming vested caretakers and stewards of their cultural heritage and the natural environs that support their given way of life. The three case studies described exemplify many of the positive outcomes of *sound* ecotourism activities.

In conclusion, however, those of us from MDCs ——who have the great luxury of travel to far off and distant wildlands—must ask ourselves the difficult question of whether we should stop traveling altogether. In the struggle to return control of tourism activities to the local communities in LDCs, we must increasingly scrutinize our motives for traveling, deciding whether we have the *right* as consumers to *buy* other cultures and environments, and yet still try to support responsible tourism.

In an age where the media dominates and shapes our view of the world, it is imperative that we utilize ecotourism as a means to communicate with one another. In fact, there is no better way to understand the global environmental crisis that we all face than through people-to-people contact and firsthand interaction. Through one-on-one meetings with people we encounter through our travels, we discover universal themes of human culture. In other words, we become acutely aware that no matter where we live, we are all confronting similar situations.

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Wildlife in Growing Cities: Eco-Socio-Cultural Considerations

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Abstract—Wild plants and animals share cities with people as survivors of urbanization processes or as later settlers. Only a few are recognized disease vectors, but many are seen as undesirable. City people prefer their homes free from centipedes, insects, spiders, scorpions, slugs, frogs, toads, snakes, lizards, birds, bats, and mice. Some people have never seen any of these "undesirables" in their lifetime. Fumigation experts are regularly employed or pesticides and insecticides applied as sprays, sometimes in aerosol form. Mechanical and chemical means of maintenance eliminate many harmless and nonvisible life-supporting forms, while unclean dumps shelter insects and rodents—food for city birds and homeless dogs and cats. The survival of growing cities depends on clean air and water, and on nature-conscious communities set on preserving areas as green belts, parks, "nature pockets," and tree-lined squares and streets. These attract wildlife and provide nature for some, while irritating others who prefer "sterile" surroundings. Efforts must be made so that city people do not become totally estranged from the rest of the living world. Urban naturalists must encourage people to notice, to observe, and to protect the forms of life that make a city alive and interesting, especially to tourists. It is desirable to carry out systematic surveys to determine trends in behavior and attitudes toward plants and animals, most of which are at risk in fragile urban habitats, with constant influx of new dwellers from rural areas into peripheral slums where they live crowded, threatened with violence, and lack basic facilities for healthy living. It is important to promote sustained efforts for teaching and applying bioethics under such precarious conditions to ensure proper survival for humans and other forms of life.

Growing Cities

The future of cities depends on choices about management of their green and wildlife heritage. Some make the wrong choices and tend to deteriorate, while others do all they can to pull themselves up by the bootstraps. While Curitiba, Brazil, is an example of people-oriented, ecologically positive development (Hawken and others 1999: 285–308), Santo Domingo, Dominican Republic, is now entering a negative phase. Santo Domingo, the only "gothic" town in the Americas, with 1 million people in l978, had an average of 4 m^2 (43 ft^2) of green space per inhabitant. In 1986, an additional green area for a large urban park was added, totaling 4 million m^2 (988 acres), but by that time the capital city had 2,700,000 inhabitants and thus it had only 3 m^2 (32 ft^2) of green area per person. The situation became worse when, in 2001, the city population reached 3 million, now with a total green area, including the green belt, of only about 8 million m^2 (1,977 acres)—only 2.96 m^2 (31.8 ft^2) per person (Hernandez 2001).

As we write this, parts of a valuable park are being transformed into installations for accommodating the Olympic games, at the dismay of local citizens. Some define it as "crimen laesae patriae" (Jakowska 2001f). At the same time, parts of the legally established green belt of the city of Santo Domingo with valuable natural vegetation is threatened unless it is possible to remove squatters to other areas. It is not easy to convince people to move away from illegally occupied land where they have been left undisturbed for a number of years. Besides, there are no places to house them anywhere else. Their continued presence within the space designated by law as the green belt affects the perception of the significance of these spaces for the future of the growing metropolis and promotes further law breaking that damages natural resources. Allowing things to continue as they are, with further intrusions into established parks by converting green space to other uses, makes it more difficult to achieve nature consciousness among urban dwellers and to provide them with healthy living conditions, even with a strong educational effort (Jakowska, 2001a,b,c,d,e,g,h).

More than 326 cities in the world, each with more than 1 million inhabitants, represent the chief source of environmental pollution. Urban history tells us that early in the 20th century there were dreamers who proposed a network of clean, self-sufficient "garden cities" for the United States of America, where the best social aspects of city life could coexist with the beauty of nature. They felt an urgent need to replace ill-ventilated, unplanned, unwieldy, and unhealthy cities—products of the industrial revolution. But cities today still do not sustain a more equitable society in harmony with nature and are more a caricature of the garden city ideal. Sustainable development, as conceived in the Brundtland Commission's report, *Our Common Future*, also remains an unfulfilled dream. In 1900, one-tenth of the world's population lived in cities; now, past the year 2000, half of the world's population are city dwellers. Major urban problems today are: air pollution, lack of drinking water, urban waste, transportation, poor city planning, and housing.

In l996, in Istambul, 171 nations and 579 cities met for the Second United Nations Conference on Human Settlements (Habitat II). Little has been achieved for lack of political will and money. The reports prepared for Istambul+5 indicate

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that globalization had a detrimental effect on the poor in slums and squatter settlements (Tibaijuka 2001). Unsustainable resource use poses a threat to the continued existence of cities. Perhaps it is easier now to starve in the countryside than in the city due to the destruction of agriculture as a direct source of food, resulting in food insecurity (Arputham 2001).

Be Nature Conscious!

Nature consciousness is a form of ecological literacy that is a natural quality of some cultures and communities that consider caring for the Earth as part of their way of life. In crowded cities, where landless farmers seek their fortune, it is difficult to find this form of sensitivity and even harder to find ways to instill it.

For many years, conservation-related groups and institutions have been trying to find paths to bring this "caring for the Earth and its creatures" into the way of life of people in cities and in rural areas. During the time when I started to serve in 1977, The World Conservation Union's (IUCN) Commission on Education, which has some of the best environmental education experts, tried changing names, approaches, and methods. Presently, and during the two terms served by Frits Hesselink, the Commission has called "on education and communication," an approach promoted by the Chair and by the special efforts of Wendy Goldstein, the IUCN Communication Officer. Both have been using different means of communication, starting innovative networks and internet consultations and debates, promoting films, television programs, and "summits." The present chair of the Commission, Denise Hamú, is expanding the promising ways of communication and maintains close links with members all over the world. Other similarly-minded organizations and institutions produce materials and programs to increase the transmission of necessary knowledge.

While we have better means of transmitting knowledge with electronic devices, what we cannot transmit, unless the destinataries have the right disposition, is empathy for the world we live in and for all the creatures that share the Earth with us. When there is no link of affection between people and nature, the best of environmental education (such as, teaching about biodiversity) is totally meaningless. But it is necessary to insist, no matter how deficient, on environmental awareness within school curricula on all levels, since it is never too soon or too late to confront environmental issues. It is important to continue harping at the root causes of biodiversity loss and the need to live "in peace" with Nature, even though we cannot always find this peace with our own kind (Wood and others 2000). Certainly, in crowded growing cities it is apparently more urgent to preach the message of "Peace with Nature" (Jakowska l989) in order to transmit the message of the importance of biodiversity in protected areas to millions of urbanites estranged from nature.

How to "plug in" the fashionable biodiversity into different methods of communicating and sharing values is the preoccupation of many authors of recent articles (Hesselink 2001a). Many good practical proposals have been offered (Hesselink 2001b).

Education involves not only the intellect but also the spirit. If the heart cannot be engaged, worthless are our efforts to promote the need to preserve nature in all forms and circumstances. This is especially difficult when interest clashes with good intentions. Nature consciousness, when sincerely achieved, obliges one to face the global, counter-nature trends and rampant consumerism that stresses or destroys the common good while making a play of "sustainability."

Nature-conscious people need green areas, friendly city gardens, plots to grow fruit, vegetables, and flowers. Unfortunately, well-intentioned people who seek the help of specialists to design their gardens often end up with manicured lawns, which are practically ecological deserts. The Polish press recently pointed out that insects, including mosquitoes, are just as important in an urban biotope as are the songbirds people enjoy. They serve as food to other species. But people who may wish to protect nature usually do not know what to do; the smaller the garden in the city, the greater the errors that are committed. People plan their gardens mostly for their visual pleasure, and forget that living creatures always serve one another, dead or alive (Jakowska l979, 1996), and that the natural food chains must be preserved for them to survive. City dwellers think of supermarkets, not of food chains, and have no qualms when buying products that may include genetically modified organisms.

"Food + Shelter = Survival" is a simple formula expressing the essential needs in order to preserve life. Entire populations live below that requirement, as starving homeless nomads, due to geopolitical circumstances. This may be said of plants, animals, and people. While other creatures continue to serve under the most difficult circumstances, in the case of the human race, poverty down to the extreme tears down physical structure starting before birth, and continues to erode the body, exposing it to stress and disease.

With all our present advances in science and technology, with fascinating medical advances to ease pain and prevent the spread of epidemics that used to ravage humanity in old times, we are still at a loss for the means to keep peace on Earth. Years of effort writing charters on human rights and creating laws and agreements to protect flora and fauna from destruction have not given us the formula to save us from the calamities, disasters, and wars resulting from the wrong applications of the technologies that should be the glory of our creativity. The horrors of violence, products of the culture of death, are instantly known today in all parts of the world. May we all learn to achieve peace within ourselves, our families, with our fellow creatures, and promote the civilization of love, which is the true destiny of humanity. Let us meditate with the young, whose time it is to start their nature apprenticeship, because it is never too late for us to learn (Jakowska l989).

Fear Us Not! Live and Let Live

Fear is one major factor in our relations with others. It is a quality that contributes to self-preservation through reasonable caution. It may become hysteria, panic, and violence. Much of the cruelty that we commit against living creatures is due to ignorance of their true role in the world and the wrong interpretation of their nature or their action. It is proper to teach from childhood to be careful with wild plants or animals due to possible rash or

infection, but one ought to teach from the start the love for all creatures as co-owners of our Earth, companions in the same spaceship, the Planet Earth, to which we are so much in debt. No creature that appears scary or repugnant by individual criteria need be considered as hostile or ugly.

Toads and bats have an unjust bad reputation, the first because of their wart-covered skin, and the second because they need to expose their teeth in order to perceive the environment. People associate bats with vampires, legendary creatures, while the one and only blood-sucking species of bats are never found outside Brazil or in urban conditions. Most people do not realize how vulnerable bats are, especially in their first weeks of life, and how helpless they may be, depending on the time of day when their metabolism may be down. Bat swarming may bring a whole town in Spain into a bat-killing frenzy, and as a first childhood experience it may be traumatic for life, as we have seen in documentaries. Other species of city fauna may also look repugnant, but need not be hostile and will go away when left alone.

It is correct to keep dwellings clean from "vermin," especially the insect vectors of known major diseases. The kissing bugs of Central and South America were present for years in cracks and crevices of homes, especially those of native materials. Their relation to the acute and chronic forms of illness caused by a trypanosome was not recognized until the start in Rio de Janeiro, Brazil, a hundred years ago, of the institute that bears the founder's name, "Instituto Oswaldo Cruz," with which the second author was associated as histology expert in the Entomology Department and where she continues her work in "active retirement." These bugs, as well as mosquitoes (potential vectors of different types of malaria, dengue, and yellow fever), are not welcome in homes for sanitary precautions. Similarly, different species of roaches that urban naturalists (Garber 1987) delight in describing are undesirable for their "dirty" habits that destroy and contaminate food and damage household objects.

I was surprised that my entomologist coauthor, who enjoys collecting and observing small ant-like embiids, could not put up with the sight of the large tropical roach, the "palmetto bug." Its attractive (to me) nymphal forms, of all stages, live in the garden under stones just outside my kitchen. We moved into the house in 1977 and started gradually liberating the ground of a heavy coat of cement. I am proud to say I have never used pesticides, weedkillers, or even chemical fertilizers in my small, fully-enclosed city garden. The first Christmas, just as a sign of "peace with nature," unexpectedly, there appeared lovely, bright, pink flowers from crocus-like bulbs that had survived for years under the cement, patiently awaiting liberation. I have since planted them in other places, and they continue to delight me.

Many "unwanted" plants appear in unexpected places—street drains, wall cracks, and on the edges of the sidewalks. Some are removed by the "tidy," just as are the beautiful little trees and bushes cast in the garbage when they outgrow the garden. We call these "orphan plants," and take them in whenever we can place them in our care.

Tropical climates provide for a greater variety of domestic flora and fauna. The speed with which vegetation grows after destruction by people or by natural disasters leads to attitudes that do not promote friendship across evolutionary levels. The household lizards of different species, whose chief enemies are playful well-fed cats with persistent hunting instincts, are, in the absence of insect-eating bats, some of the best and "simpatico" pest controls. There is no reason to fear them. But many people have a natural fear of snakes, justified in places where, unlike on the island where I live now, there are no poisonous species and all of them are useful in rodent control, though unjustly destroyed. In the residential part of Santo Domingo in the late l970s and early l980s, local species of snakes made frequent appearances in the closets of the residence of the French ambassador. They were collected and placed in safety by the best Dominican herpetologist, who was always willing to oblige. In some cultural settings it is hard to imagine this kind of attitude and gentle treatment of a dangerous snake but, perhaps, it may be instilled gradually from childhood, teaching and learning to live in peace with the whole world, the great desire of all, especially in our age of violence (Jakowska l989).

I know of giant centipedes, 12 inches long, first identified by Linnaeus with an elegant Latin name, living in the Colonial City of Santo Domingo. Their minor relatives of unidentified species, less than 2 inches long, keep hatching seasonally in my house surroundings. We try to transfer them to safety whenever possible, and there is always a feeling of a "life lost" when we hear the familiar crunch while walking in the dark. There are also lovely spiders, hard working like the mythological Arachne, who build attractive webs from bush to bush, while others contribute to insect control in the home, capturing flies and nondesirable termites during swarming, and whose work we occasionally destroy where it would give a bad testimony to our housekeeping.

In our "live and let live" community, there are scorpions of different kinds, interesting but potentially dangerous; ticks that infest the dogs; and ants of all sizes, from the microscopic ones forming a tightly packed circle around a single sugar crystal left on the sink, to some big, biting ones among the organic matter on the ground and under the stones. Ants also feed (and are fed on by lizards) on the fallen mango fruit and figs we leave to the poor city birds who suffer the effects of their preference for "sterile" urban dwellings with tiled or cemented garden spaces.

We have the pleasure of regular visits from the palm chats, national birds of the Dominican Republic, who come to feed on the fruit of the royal palm, the national plant of this country, which their ancestors originally planted in our garden about l977. The second smallest humming bird in existence also lives on this island and occasionally visits our garden to drink the nectar of the flowers. Every day I have contacts with all forms of life besides the dogs and cats we have as pets. My days are a constant canticle of the creatures and a prayer of thanksgiving for all the joys and benefits life continues to offer as I approach my 80th birthday.

Realistic Bases for Hope

Poverty, characteristic of the periphery of growing cities (Tibaijuka 2001) is not exclusively limited to humans. The forces that shape the state of the world today are mostly of our making, and impoverish natural resources at every level

of evolution, as well as the nonrenewable ones which, when exploited directly or indirectly, affect all creatures.

Nature has been betrayed by globalization, sustainability, green science, green production (Anastas and Warner 1998), green organizations, and green politics of doubtful interests, and, on a personal level, by the acceptance by most of us of a consumerist approach to life.

Wildlife seems to have no place in this scheme of things except as a negotiable item, especially in countries that try to imitate First World habits. Robert Shapiro, chairman of the Monsanto Corporation, is quoted as saying in l997 (Ayres l999) that the most fundamental issues facing the world at the start of the new millennium is "living within your energy income, not expending more energy than the sun provides, and not putting out waste products faster than nature makes them harmless." Industrialists seldom speak in those terms and cannot afford to live up to such principles, which sound like "small is beautiful" (Schumacher 1999), or like the eco-village mentality (Jakowska 2001a,b,c,d,e,g,h). It seems in conflict with the present energy consumption of Monsanto, largest producer of the herbicide Roundup, difficult for Nature to absorb.

With demographic predictions that world population will double around 2030, Shapiro warns that we will end up as "a few islands of privilege and prosperity in a sea of misery and violence. The world is headed either for famine or for ecological catastrophe." It need not be so if we share "good" knowledge before, as someone said, it becomes an endangered species, and apply this knowledge to a remedial mode of action. But the public is easily confused by occasional, supposedly green, leaders and organizations which, for example, send out reports that the rising carbon dioxide level is good for us because it helps grow vegetables. But we also know that it fosters the spread of malaria and crop-killing weeds and pests (Moser and Mathers 2001). These authors warn, in the official organ of the Union of Concerned Scientists, that scientists ought to debunk such statements by "climate skeptics" urging us to "learn to distinguish the real science from the junk science" in respect to the use of fossil fuels and genetically modified organisms.

Only through the acceptance of "God's last offer " to defend our world, rather than our bank accounts, might we have any real chance of saving our world, not just ourselves (a foolish consideration), and regain the sense of personal and family security we care about so deeply (Ayres 1999). In making choices, we must select reliable consultants such as the Union of Concerned Scientists, Friends of the Earth, or other equally worthy organizations. As we face the problem of violence that, especially in our times, pollutes nature and human souls (Jakowska 1998) and assaults the dignity that is the essential feature of humankind (Jakowska 2000), we must turn to eco-spirituality, the humble way of caring for the Earth (Jakowska l996) and help the survival of as many creatures as possible that share our world, to ensure our own dignified survival. We must draw upon Bioethics, the global bioethics built by recently deceased Van Rensselaer Potter on the "Leopold Legacy," as indicated by the subtitle of his second major contribution (Potter 1971, 1988). The paper Potter wrote for the Policy Forum Section of the journal *Science*, was received by the Bioethics Core Group and Working Group of Affiliates in mid-May of 2001. It ends with the following statement:

> We are indeed losing the war to save the planet and the future of humanity. To win the war we need scientists who are not avoiding the ethical issues. Sustainability Science [the last word underlined by Potter] is not enough. We need to launch the Crusade of the 21st Century under the banner of Bioethical Sustainability.

May this dream come true! We must also seek alliances where inter-religious dialogue raises voices of hope in the struggle to save the planet (Hope and Young 2000). Some of our considerations were inspired by our personal experiences in the big cities of the Old and of the New World.

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Management Actions to Protect Wilderness Experiences and the Resource

Les Wadzinski

Abstract—Wildlands continue to be challenged with the pressures of modern society as more people use and impact these special areas. Complicated issues create situations where managers must strike a balance between offering a wilderness experience and protecting wilderness resources. Nine years ago, the Charles C. Deam Wilderness in the Midwestern United States provided just such a challenge to wilderness managers at the U.S. Department of Agriculture (USDA) Forest Service, Hoosier National Forest. This small wilderness had a very long list of problems that made this area bear little resemblance to the wild area for which it was intended. Several management actions were implemented to move this area to a wilderness condition. These actions resulted in improved trail conditions, better opportunity for solitude, fewer impacts from horses, less depreciative behavior, reduced user conflict, and a stronger appreciation of wilderness by users. Managers found a surprising degree of success in implementing some controversial changes, and attributed that success to two factors: extensive involvement by the public in the development phase of these changes, and the implementation of several concurrent management actions.

Introduction and Background

The Wilderness Act of 1964 defines wilderness in the United States as "…an area where the Earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Such an area is to be a place where natural forces are dominant and one may find opportunities for solitude. This concept is supported by challenging visitors to cope with nature on its own terms. Modern conveniences such as developed facilities, the use of mechanical or motorized equipment, and roads are generally prohibited.

This wilderness character may be somewhat easier to achieve in the Western United States due to the remoteness, size, and original pristine condition of those areas. In contrast, eastern wildernesses are sometimes located near large metropolitan areas with accompanying overuse problems and evidence of past land abuses. Such factors often prevent a wilderness from providing the primitive character for which it was intended. The Deam Wilderness, although created by Congress in 1982, was suffering from these ills, and managers were doing little to offer a wilderness experience or resource protection.

The Deam Wilderness is a relatively small wilderness located in south-central Indiana in the midwestern area of the United States. The area covers almost 13,000 acres (5,261 hectares) and is bounded on three sides by road and one by water. The terrain is rugged by midwestern standards with steep ravines, and is heavily forested predominantly with hardwood species and also nonnative pines. In the 1930s, it was occupied by 78 homes or farms and was laced with 57 miles (92 km) of roads. It is currently managed by the USDA Forest Service, and is part of the 198,000-acre (80,128-hectare) Hoosier National Forest. Popular recreation uses include: hiking, horse riding, backpacking, and deer hunting.

Problems

The Deam Wilderness was plagued by a number of issues, with overuse as the overriding factor. A variety of seemingly unrelated conditions were occurring simultaneously, but together were degrading the wilderness experience and the wilderness resource. These conditions and their effects are summarized below.

Lack of Public Land

Indiana is a very poor State in terms of public land available for outdoor recreation, with only 4 percent of the land base titled to a government entity. This is in sharp contrast to Western States where public land ownership often exceeds 50 percent. In addition, the Deam is the only wilderness in Indiana offering those seeking wilderness no other choice without traveling long distances. Indiana is also a densely populated state, resulting in a situation where there are many people wanting to use a small amount of public land.

Location and Access

Although wilderness is supposed to offer solitude, the location of this wilderness made it too easy for people to visit, thus encouraging overuse. The area is located adjacent to a busy State highway and a very popular reservoir, is within easy driving distance of several large metropolitan areas, and is bisected by a graveled county road. Another factor was an overabundance of access points into the area. Sixty-four access points were inventoried that further increased the ease in which large numbers of people could visit (USDA

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Forest Service 1993). It was believed that visitors came to the Deam Wilderness simply because of the convenience rather than for a wilderness experience.

High Trail Density

A wilderness should also offer challenge, but in this case over 109 miles (175 km) of trail were available in this small area, creating a trail density of 5.35 miles (8.6 km) of trail per square mile (2.5 km^2) of land (USDA Forest Service 1993). Numerous short loops were everywhere and required little endurance or navigation skill to use. Such a density would be more appropriate in an urban setting than a wilderness.

Poor Trail Conditions

Most of the 109 miles (175 km) of trail were not designated trails that were built and maintained by the Forest Service. Rather, they were "user made" trails that simply formed from repeated use by horse riders. As a result, many were located on steep slopes or poorly drained low areas, and on fragile soils creating severe erosion problems and muddy quagmires.

Intense Horse Use

For over 50 years the area was popular for horse riding. Horses can be extremely damaging to soil types found in this area. Their relatively small hooves, coupled with their great weight, create a gouging action as they use the trails. This problem is compounded when it occurs on wet and fragile soils or on steep slopes. In dry times, the trail tread is pockmarked, and in wet times it becomes a muddy bog. The effect is severe soil erosion and a very unpleasant experience for those using the trail for hiking. A large Forest Service public camp known as the Blackwell Horsecamp served as a major trailhead and access point, and was the source for most of this horse use.

Inadequate Management

For whatever the reasons, previous managers of the area did not intensively manage the land. As a result, few rules or regulations were in place or enforced, no staff was assigned, little money was budgeted, and no trail system was designated or maintained. Users could ride their horses wherever they wished, litter was common, and crimes such as drug use, excessive drinking, and fighting were prevalent at the Blackwell Horsecamp.

Lack of Wilderness Values

The concept of wilderness was new to most people in Indiana, and many had no idea that a designated wilderness was a special place that required special behavior. In fact, many complained about the lack of facilities and couldn't understand why the use of mechanical equipment was prohibited. Many visitors were simply looking for a place to drink beer, ride horses, and shoot guns. They did not seem interested in the wilderness values of solitude, challenge, and closeness to nature.

User Conflict

Hikers objected to damage caused by the horses, and some reported that horses interfered with their enjoyment. The horse clubs, on the other hand, became inflamed at even the hint of regulation. A study by Watson, Niccolucci, and Williams (1993) indicated that separate trails for each use was generally supported by hikers but not by horse riders. The Forest Service seemed caught in the middle as the hikers accused the Forest Service of siding with the horse people, and the horse clubs accused the Forest Service of being anti-horse. None of the groups were talking to each other. At a public meeting, the Forest Service suggested a compromise to limit horses to 60 miles (96.5 km) of designated trail. The result was a roomful of angry people, all feeling betrayed by the Forest Service. As one manager described it, Forest Service officials had "their backs to the wall and a long way to the exit" (Slover 1996). Other user groups, such as hunters and environmentalists, had their own concerns as well. It seemed everyone wanted the wilderness managed, but only for his or her activity.

Roads and Cemeteries

Ideally, a wilderness should not contain roads or permanent reminders of human influence such as cemeteries. However, as in all things, there are exceptions and this wilderness had plenty of them. This wilderness is actually divided into two segments, separated by a county road. This road functioned as an unofficial 5-mile (8-km) linear campground and attracted more than its share of unsavory characters and law enforcement problems.

There are also five cemeteries within the wilderness boundaries, with one of them privately owned and therefore exempt from wilderness regulation. A 1.5-mile (2.4-km) road leads to this cemetery, and access is guaranteed by the legislation that created the Deam Wilderness. The owners of this cemetery regularly drive back there to mow it with power mowers and occasionally conduct a burial. The remaining cemeteries have abandoned access roads in very poor condition but also are mentioned in the legislation as having access permitted. Several citizens not able to walk long distances have requested motorized access to these cemeteries so they could visit the graves of their loved ones. This was a particularly challenging problem due to the fact that very extensive work would be needed to bring the roads up to a usable condition, not to mention the conflict between wilderness values and the humanitarian need to allow gravesite visitation.

Working Toward a Solution: Citizen Involvement

The challenges facing managers of this area were indeed formidable. In 1992, several new Forest Service staff members were hired and upon arrival immediately saw a great need for change. This author was personally motivated after viewing the scene at the Blackwell Horsecamp the first weekend on duty in May 1992. Over 300 horse trailers were squeezed into a 40-acre (16-hectare) field, goats and pigs were running loose, teenagers were racing horses, loud

music and alcohol was everywhere, and many riders sported pistols. It looked like a scene from a movie about the Wild West. This horsecamp was the main entry into the wilderness and obviously contributed little to instill wilderness values.

The new managers inventoried the problems and arrived at the list previously described. It quickly became apparent that many forces were at work in preventing this wilderness from being wild, and there would be no single or easy solution. Forest Service officials knew that a "big picture" approach was needed but were not sure where to start. The biggest obstacle to proceeding with any changes to date had been the animosity of the user groups, both among themselves and with the Forest Service. For any changes to occur it would be critical to have support of the user groups, so the journey started there.

Forest Service officials had several options. They could simply ask a few users for opinions and then decree some changes based on what they thought was best. However, the public meeting previously described proved that approach was ineffective. Another option was to simply do nothing. After all, the wilderness had been managed in this manner since 1982, and in fact, some users liked it the way it was. Fortunately, Forest Service managers felt they had a greater responsibility. Yet another option was to embark on a methodical planning process that would involve the public, analyze multiple alternatives, and result in a clearly defined plan. It was no secret that if the users were part of that process they would be much more supportive of the outcome. For that reason, the Forest Service selected a process known as the Limits of Acceptable Change (LAC) as described in Stankey and others (1985).

LAC is an alternative to carrying capacity, designed to determine how much change is acceptable before management actions are needed to mitigate impacts. In this case, a citizen's task force was formed to implement the process. Interested parties could apply to be on the task force, and people in leadership positions from the user groups were encouraged to apply. This process brought the wilderness users together, and forced them to sit at the same table and work out their differences.

The process ultimately resulted in implementing management actions designed to promote a wilderness environment. The Forest Service cannot abdicate decisionmaking to nongovernment entities, so in this case the task force only provided recommendations. They developed three alternative solutions, with a variety of management actions in each. One alternative favored recreation, another favored the resource, and a third alternative offered a compromise of the two.

The Forest Service went forward with additional public involvement using the compromise recommendation as a starting point. The process included numerous mailings and open houses to ensure that all citizens, not just those on the task force, had an opportunity to comment. Based on this additional input, managers analyzed the alternative management actions and incorporated most of the recommendations. Ultimately, some of the more significant management actions were incorporated into an amendment to the Forest Land and Resource Management Plan. This plan provides long-term guidance for management of the forest that managers are required to follow. Additional management actions were also implemented through rules and regulations and by incorporation into other action plans.

Even though Forest Service officials were the final decisionmakers, there was good support from the public because they participated directly in the development process. Some actions were effective, some were not, and some were influenced by factors beyond anyone's control. The management actions and their effects are discussed below.

Working Toward a Solution: Management Actions

Basic Strategy

It was recognized early on that the area was being overused, and mostly by people that were not really there for a wilderness experience. Rather, they wanted a convenient place in the woods to recreate. Therefore, the strategy focused on redirecting many of those users to nearby nonwilderness areas. The Forest Service certainly wanted the Deam Wilderness to remain open and accessible, but only to those willing and desiring to cope with the inconveniences and challenges of a wilderness experience.

Designated Trails

One of the first orders of business was to designate a formal trail system and limit the number of trail miles. This was a drastic change from historical use, but users surprisingly accepted the change. The total number of trail miles in the wilderness was capped at 40 (64 km), down from the 109 miles (175 km) inventoried. It is encouraging to note that this number is far less than the 60-mile (96.5-km) "compromise" that initially met with such opposition. Managers attribute this success to the fact that the public had a chance to participate in the process. A 36-mile (58-km) route of several large loops was officially designated based on the recommendations of the LAC task force, leaving a 4-mile (6-km) buffer for future uncertainties. Five of these miles (8 km) were set aside for hikers only, although hikers may also hike off trail if they choose. The large loops were selected to provide a challenge and discourage those users that were not seeking a wilderness experience. Short, easy loops were provided nearby at a trail in a nonwilderness area to serve those users.

The next step was to improve trail conditions, which was accomplished through additional funding. This included rerouting some poor trails, installing drainage devices, and hardening the trail with gravel in some instances. Signs were installed so users would know which trails were official.

Horse users were then required to ride only on this designated trail system. A regulation was implemented requiring this, and riders found off trail were fined. This action forced riders to stay only on trails that were properly located and maintained, and could sustain the impact. For the most part, riders observe this rule although there is still some evidence of user-made trails.

Staffing Changes

To help accomplish the above actions, personnel were reassigned from other jobs to the wilderness. A large Forest Service campground outside the wilderness was changed from a Forest Service operation to a concession, thereby freeing up Forest Service staff for wilderness work. A staff member was appointed to the position of wilderness ranger and worked full time in the wilderness. Other technicians were assigned to help as needed. Duties consisted of enforcing rules, performing trail maintenance, and simply being visible so the public knew that the agency cared enough about the area to be present. Forest Service law enforcement staff also increased patrols of the area.

Use of Work Animals

A horse and mule augmented the staffing. In accordance with wilderness law, even the Forest Service as the managing agency may not use modern equipment for maintenance. Therefore, it is beneficial to resort to older and more primitive means of assistance such as the use of animals. All trail work is accomplished using a plow and grader pulled by a mule, and equipment and supplies are packed in using the animals. Although a common feature in Western States, this wilderness was believed to be the first to use animals east of the Mississippi River.

The horse is used mainly for patrol and provides two major benefits. First, it is an efficient means of travel and has been very helpful in search and rescue and enforcement of rules. Second, and perhaps more significant, it provides credibility with the horse community. When the Forest Service is a horse owner just like the users, the users are more apt to accept the Forest Service opinion on issues involving horse use.

Redesign of Horsecamp

The Blackwell Horsecamp was redesigned to decrease capacity but improve the experience. Large, fenced exclosures were installed to decrease the available area, thus limiting the number of campers that could crowd into the camp. This action is allowing vegetation and badly needed shade trees to return to the area. Aging restrooms were replaced and small corrals were built. Law enforcement patrols were stepped up, and regulations were implemented and enforced. In one short year, this campground turned from a party spot to a family campground. To help serve those users who did not like the changes at the Blackwell Horsecamp, the Forest Service worked with adjacent private horsecamp owners to provide access to the nonwilderness trails on the Hoosier National Forest. These camps offered more amenities such as water, electrical hookups, short loop trails, and so on, and were able to attract and provide for those users not seeking a wilderness experience.

Reduction of Access Points

The problem of too many access points and the problem with camping along the county road was eliminated by limiting wilderness access points to five trailheads. All others were closed, and parking and camping was limited along the county road only to those designated sites. While ultimately successful, there was initially a jurisdictional conflict with the county. County officials and some citizens opposed the restrictions based on their belief they had control over a right-of- way extending beyond the edge of the road. The Forest Service prevailed, and the restrictions remained in place. This action greatly reduced the number of people coming to the area for a nonwilderness experience. The Forest Service publicized information on alternative areas nearby where visitors could still find a roadside camping opportunity.

Improve Wilderness Awareness

The problem of lack of wilderness knowledge or ethics was addressed through an educational program and facilities. For the first few years, the forest entered into an agreement with Indiana University to provide a wilderness education specialist. This person roamed the wilderness providing a wilderness message, and also had an active program in local junior high schools. Selected classes participated in a five-part series of field trips and classroom exercises, and at the end held a wilderness summit where students developed their own solutions to ongoing management issues. After that program was completed, the Forest Service kept up the effort through volunteers and seasonal employees.

The forest also moved an old log cabin from a remote location to an entry into the wilderness. The cabin serves as a visitor contact station for wilderness users, and is staffed by volunteers who provide a message on wilderness values. Other educational efforts included the development of bulletin boards and wayside exhibits at each major trailhead. There, visitors are able to obtain a wilderness ethics message, as well as information about the area and rules. A high quality map available for a modest fee was developed that showed the trails and topographic details of the area, and also included a wilderness message. A free handout map was also developed with a similar theme, and the same information is also available on the Hoosier Forest website at: www.fs.fed.us/r9/hoosier

Develop Cemetery Access Policy

The cemetery access issue proved to be particularly challenging, but a workable solution was found. The portion of the Deam Wilderness legislation that addressed cemetery access was vague, and required a good bit of legal analysis. At issue was the conflict between wilderness values (no roads or motorized equipment) and the rights of families to visit their loved ones. It was determined that the Forest Service did indeed have an obligation to provide access. The problem, however, was that hundreds of thousands of dollars would be needed to bring the roads to these cemeteries up to driveable standards. The forest was reluctant to get into the business of rebuilding and maintaining an extensive road system in a wilderness, and did not have the resources for such an undertaking.

A cemetery visitation policy was developed and has been successful thus far. The forest first cleared all the roads to cemeteries to make them at least minimally passable during dry times. If a visitor requests motorized access, the forest

first determines that the request is legitimate. The forest will then set up a time to have a Forest Service official provide transportation to the cemetery using an all terrain vehicle or four wheel drive vehicle. This access is dependent on the weather, however, because the roads are not passable when wet. Fortunately, there are only one or two requests a year, and people seem to be satisfied with this arrangement.

Other Management Actions

Additional management actions have also been implemented to deal with the other issues raised during the public involvement process. A 10-person party limit is in effect to promote the concept of solitude. Hunting is still permitted, but target shooting is not allowed in order to promote a quieter environment. Camping is prohibited within 100 feet (30.5 m) of water sources. Horse users are required to purchase a daily permit for $3 or annual permit for $25, with the revenues used for trail maintenance.

What's Next?

Overall, the Deam Wilderness can be said to be vastly improved from its 1992 condition. The trails are in much better condition, erosion has been greatly reduced, it is possible to find solitude, and users seem at least a little more aware that the wilderness is a special place that requires special treatment. Progress has been made on the goal of reducing use and impacts.

However, the area is still a long way from being a true wilderness. Unlike the pristine western wildernesses, this area has a lot of healing to do because of the many years of human influence. Nature will have to play a lot of "catch up" to be the dominant force as described in the Wilderness Act of 1964. Fortunately, the recent management actions implemented by the Forest Service are providing a good start to the process. Not so fortunately, though, some conditions remain that will make the job inherently difficult and may never be resolved. For example, the lack of public land, proximity to large populations, and the cemetery issues will likely be around for some time.

Most visitors appear to be happy with the situation and few complaints are received. Some dissatisfaction remains, such as the few hikers who don't want horses allowed at all, and the few horse riders that want more trails. All new concerns and suggestions are considered, although the Forest Service intends to continue to use the current guidance unless new information or changed conditions become apparent.

In summary, Deam Wilderness managers attribute the accomplishments thus far to the big-picture approach to problem solving, and focusing on a variety of issues simultaneously. One significant component of this approach was the high degree of public involvement. The situation would not have changed without public support, even if new rules and regulations were applied. Rather, because the users themselves actually helped form some of the policy, the Forest Service was able to make the sweeping changes that improved the Deam's wilderness character. Wilderness managers plan to continue this approach, keeping in mind the ultimate goal of providing a quality wilderness experience while protecting the wilderness resource.

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Antarctica: Tourism, Wilderness, and "Ambassadorship"

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Abstract—Antarctica, as a continent, is one of the most beautiful, remote places on the planet. For many people Antarctica is a place of mystery, a place of historic exploration, discovery, and suffering. Antarctica is where huge icebergs sweep by populous penguin rookeries, and where majestic albatross sweep along on wind curling off the polar plateau. These preconceptions are perhaps why Antarctic tourism has grown substantially over the past two decades, now numbering nearly 15,000 visitors each year. Antarctic wilderness is vast, its flora and fauna not diverse, but plentiful and unique. The questions are now whether (1) tourism and wilderness are compatible, (2) tourism can support and conserve the Antarctic wilderness, and (3) Antarctic wilderness can support current or increased tourism. This paper is an attempt to reveal and combine some of the known information, but also acts as a call for further empirical research, including that proposed by the authors.

Antarctica: Tourism

> We cannot build a barrier around the Antarctic and keep tourists or the science community out. The Antarctic Treaty grants us all freedom of access to Antarctica. With that freedom comes a responsibility which we all share (Landau 2000: 15).

Travel and tourism is the world's largest industry, transporting 528 million people and generating $322 billion in receipts in 1994 alone (WTTC, WTO, EC 1995). By 2005, estimates are that tourism will have a gross output of $7.2 trillion, create 305 million jobs, and account for 11.4 percent of the world's Gross Domestic Product (WTTC, WTO, EC 1995). Global tourism is growing 23 percent faster than the world economy, and by the year 2010, 937 million tourists are expected to travel each year (Shackley 1996).

Tourism in Antarctica has traditionally been defined to include:

- Commercial sea-borne operations, accessing coastal sites.
- Private yacht visits.
- Continental overflights.
- Flights to King George Island, Patriot Hills, or the South Pole for land-based operations.
- Special interest tourism (adventure, scientific, ecotourism, private expeditions).
- Visits by media, government dignitaries, and other politicians.
- Base personnel on their free time (Benson 2000).

However, argument over such an inclusive definition can and does occur in previous research (Bauer 2001; Benson 2000; Enzenbacher 1992; Hall 1992; WTO 1999).

Antarctic tourism is not a recent phenomenon: 130,000 tourists have visited since 1965, but it is small in scale compared to global tourism. While often portrayed as a new pressure on the southern polar region, it is quite possible that tourism activity has simply been overlooked until the huge growth of the past two decades. Lars-Eric Lindblad began large-scale, ship-borne tourism in 1966, but tourists had made landings on Sub-Antarctic Islands as early as 1882, and by 1933 most large Sub-Antarctic Islands surrounding the continent had been visited (Headland 1994).

In the 1990/1991 season, 4,842 tourists visited Antarctica. This total of Antarctic visitors was less than two-thirds of all the visitors to Maria Island, the least visited tourist destination in Tasmania, Australia's smallest State (Herr 1996). In the 1999/2000 season, 14,762 tourists traveled to the ice (IAATO 2001). This figure includes all land-based tourists, small ships, yachts, and even large cruise vessels that do not land passengers. Looking into the future, a total of 26,000 tourists are expected for 2005/2006.

Visitors to Antarctica today are from a wide variety of nations, but are still typically first-world citizens. In 2000/2001, 47 percent were from the United States, 13 percent from Germany, 10 percent from the United Kingdom, 8 percent from Australia, 4 percent from Canada, 3 percent from Japan, 2 percent from the Netherlands, and the remaining 13 percent from other countries or nationality unknown (IAATO 2001). Typically, these tourists are tertiary educated, well traveled, have high disposable incomes, and are looking for a unique nature-based experience (Kriwoken and Rootes 2000). Geographically, visits to the continent are highly concentrated, with less than 0.5 percent of the continental area visited; this is an area measuring only 56,000 km^2 (21,622 $miles^2$), which is roughly the size of Sri Lanka (Cessford 1997). Overall, the sites are widely dispersed around the continent, but the Antarctic Peninsula takes 90 percent of the tourist activity (Cessford 1997). A quick comparison underscores the bias towards peninsula visits. The "most visited site" in the peninsula region is Port Lockroy, which receives upward of 7,500 visits per year,

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while the most visited site in the Ross Sea region is Terra Nova Bay, which is currently seen by approximately 800 tourists per year (IAATO 2001).

Governance of Antarctica falls under the Antarctic Treaty System (ATS). Regulation of tourism has fallen to the ATS because the relatively minor levels of tourism activity and numbers in Antarctica make it uninteresting to large tourism organizations and regulatory bodies; in turn, the ATS simply sees tourists as "other visitors" (Herr 1996). In 1961, the ATS was a group of 12 signatory nations, but today consists of 43 nations representing two-thirds of the world's population. Although the ATS has treated tourism in Antarctica as a minor inconvenience, if Antarctica is now in the "tourism period," as White (1994) has speculated, the ATS may have no choice but to face tourism issues head-on. This creates an interesting dilemma: Should tourist activity be managed, exploited, or completely shut out?

One of the original signatories, New Zealand, is a staunch supporter of a pristine and conserved Antarctica (Dingwall 1992), although it allows tourist cruises to depart from its ports. Another original signatory, Chile, has pushed hard to exploit the destination for its economic means (Pinochet de la Barra 1992). For political compromise and international relations, there is an increasing need for agreement on tourism issues. As Mickleburgh (1988) states, "If we cannot succeed in Antarctica we have little chance of succeeding elsewhere," and, as suggested by Landau (2000) above, responsibility regarding access to Antarctica must be shared.

Antarctic tourism can be meaningfully divided into the categories of ship-borne, land-based, and airborne tourism (Hall and Johnston 1995). These will be discussed immediately below.

Ship-Borne Tourism

In 1970, Lars-Eric Lindblad built the *Lindblad Explorer*, the first polar vessel constructed specifically for tourist purposes (Benson 2000). Having gone through various name and ownership changes, the *M/S Explorer* still remains a leader in Antarctic tourism (Headland 1994). Two other important vessels in Antarctic tourism history are the *Bahia Paraiso* and the *Kapitan Khlebnikov*. The *Bahia Paraiso* was an Argentine naval resupply vessel that additionally carried tourists between Ushuaia and King George Island in the South Shetland Islands chain, and the *Kapitan Khlebnikov* was the first vessel to circumnavigate Antarctica after 2 months at sea (Splettstoesser and others 1997).

On January 28, 1989, the *Bahia Paraiso* became grounded in Arthur Harbor near the U.S. Palmer Station, was then abandoned, and eventually sunk (Headland 1994). The logistics of rescue and tourist management during this incident led to a closer examination of Antarctic tourism and, in turn, likely spurred the formation of IAATO in 1991 (Splettstoesser 1999).

The *Kapitan Khlebnikov*, affectionately referred to as the "*KK*," continues to carry passengers to the ice to this day. The *KK* is an ex-Russian research vessel, and some growth of tourism in Antarctica in the early 1990s can be attributed to the commercial availability of such Russian ice-strengthened research vessels and icebreakers after their conversion to tourism use (Cessford 1997). Given the interest shown by tourists on these cruise vessels, it is likely that circumnavigation of the continent or at least partial circumnavigation will increase in popularity. Such cruises allow visitors to see both the historic sites of the Ross Sea Region and the wildlife of the Antarctic Peninsula (Mason and Legg 1999).

With closer proximity and less time crossing the Southern Ocean, ship-borne tours to the Antarctic Peninsula are much cheaper and friendlier, in terms of comfort, than those from New Zealand or Australia to the Ross Sea Region (Hall and Wouters 1995). The ease of transport, distance, and a milder marine climate have led scientists to refer to the peninsula as the "Banana Belt" (Campbell 1993), and with the buildup of tourism, the peninsula has also been dubbed the "Antarctic Riviera" (Hart 1988). From Ushuaia, the Antarctic Peninsula can be reached in as little as 48 hours, whereas from New Zealand and Australia to the Ross Sea Region, the voyage may take as long as 10 days (Suter 1991).

Also possible in the peninsular region are private yacht tours, with 237 tourists electing to take up this option in the 1999/2000 season (IAATO 2001). Yacht tours create a difficult situation for IAATO and the ATS because their numbers are increasing and the activity of yachts is much more difficult to regulate and monitor (Splettstoesser 1999). Yacht tours will remain popular in Antarctica because of price and flexible schedules, but to many ATS signatories such tours are much more of an environmental threat than any other type of tourism (Splettstoesser 1999).

Land-Based Tourism

The building of a 1,300-m (4,265-ft) hard runway at the Chilean Tiente Rodolfo Marsh Station, on King George Island in 1979/1980, signaled the ability for land-based and airborne tourism to be able to operate in the Antarctic (Benson 2000). On January 8, 1982, a group of 40 tourists flew to Marsh Station to stay prior to boarding a cruise (IAATO 2001; Swithinbank 1992). From 1982 to 1992, Chile operated the "Hotel Estrella Polar," a converted 80-bed, military barracks at Marsh Station, which served as a rest spot for tourists between cruise ships and tourists' flights to King George Island (Headland 1994). Both the Chilean military and commercial operators offered flights in to the "hotel," and from there excursions to nearby attractions were conducted. Following the cessation of Chile's polar hotel operations, Argentina began flying tourists to its base on Seymour Island, but today all such accommodations have reverted back to official use. The claim of sovereignty to the Antarctic Peninsula by Chile and Argentina have often led to bolstered tourism or population efforts by these two nations (Hall and Johnston 1995).

In 1989, the Australian House of Representatives Standing Committee on Environment, Recreation and the Arts (HRSCERA) heard a unique land-based tourism proposal. "Project Oasis" was submitted by Helmut Rohde and Partners and was a detailed plan to operate a facility near Davis Station in the Vestfold Hills (HRSCERA 1989). The project was to contain an airport, visitor education and research centers, accommodation, hospital, search and rescue capabilities, and ATS administration facilities (HRSCERA 1989). Estimates indicated that up to 16,000 people per year could use the facilities, with 2 flights per week to and from

Australia. The maximum number of people projected to be onsite at any time would be 588 (344 tourists, 70 researchers, and 174 staff) (HRSCERA 1989). "Project Oasis" never proceeded past the proposal stage, but it gave an interesting, and to some, alarming insight into the possibilities and implications of future land-based tourism in Antarctica.

Today, land-based tourism in Antarctica centers around one particular company, Adventure Network International (ANI). ANI operates a tented summer camp at Patriot Hills in the Ellsworth Mountains, which can accommodate 50 people and takes advantage of a natural, blue ice runway to land large Hercules aircraft (Benson 2000). From Patriot Hills, ANI operates a service, via Twin Otter and Cessna, to Vinson Massif, the South Pole, and numerous glaciers and Emperor Penguin colonies (Benson 2000; Kriwoken and Rootes 2000). Polar Logistics, the logistical arm of ANI, also operates flights from Cape Town, South Africa, to a blue ice runway at Holtfjella (Blue Ice I) located 200 km (124 miles) inland of the Russian Novolazarevskaya base in Dronning (Queen) Maud Land (Benson 2000; Kriwoken and Rootes 2000). In 1997/1998, ANI carried 131 passengers to Antarctica with eight Hercules flights being made between Punta Arenas and Patriot Hills (Swithinbank 1998). Two years later, 1999/2000, ANI only carried 139 of the total 14,762 tourists to Antarctica, and estimates for the 2000/2001 rises to just 200 tourists (IAATO 2001).

Airborne Tourism

Ship-borne and land-based tourism may include elements of airborne tourism. Air travel from ships is limited to those vessels equipped with helicopters such as the *KK*, with these helicopters being used to increase the range of sites available for tourism (Cessford 1997). ANI's airborne tourism is primarily a means of transporting visitors and goods rather than offering sightseeing as found on overflights (Benson 2000).

This category of tourist travel currently consists primarily of continental overflights from Australia, and in the past from New Zealand and Chile. Overflights began in 1956 with LAN Chile flying over the South Shetland Islands (Stonehouse and Crosbie 1995). In 1957, a rare landing was made by a commercial flight at McMurdo Station. No regular flights were made over Antarctica until February 1977, when both Qantas and Air New Zealand began operations (Kriwoken and Rootes 2000; Swithinbank 1992). Both companies flew extensively through 1979, with a total of 16 flights in 1977/1978, 17 in 1978/1979, and 7 in 1979/1980, for a total of 11,145 passengers and 43 flights (Reich 1980). The journey involved in these overflights was 11 hours in duration from New Zealand or Australia; the actual overflight of the continent lasted a total of 90 minutes (Reich 1980). Overflights ceased dramatically on November 28, 1979, when Air New Zealand DC-10 flight TE901 crashed into Mt. Erebus on Ross Island, killing all 257 passengers and crew aboard (MacFarlane 1991).

Resuming in 1994/1995, overflights are now being organized by Croydon Travel in Victoria, Australia, and departing aboard Qantas Boeing 747s from Melbourne, Sydney, or Adelaide. Such flights fly for 11 to 12 hours at a minimum altitude of 3,050 m (10,000 ft) above sea level, or 610 m (2,000 ft) above the highest ground within 185 km (115 miles) of the aircraft's position (AAD 1997; Benson 2000). As well, aircraft must run their engines at one-third full power in order to reduce noise and pollution (AAD 1997). In the first five seasons since resuming operations, it has been estimated that over 13,000 passengers have taken part. From 1996 to1998, over 10,000 passengers flew over the continent from Australia (IAATO 2001). Beginning in 1998/1999, the Chilean airline, Avant, offered overflights of the peninsula region, and carried approximately 1,000 passengers in its maiden season.

Antarctica: Wilderness

Antarctica, as a wilderness area, covers 50 million km^2 (19.3 million $miles^2$), including the surrounding Southern Ocean (Kriwoken and Keage 1989). The continent alone is 14 million km^2 (5.4 million $miles^2$), which is roughly the size of the United States and Mexico combined (Cessford 1997). Of the entire continent, 98 percent is covered with ice that is an average of 2 km (1.2 miles) thick (Rubin 1996). With Antarctica's ice sheet holding 90 percent of the world's fresh water supply, not only is it majestic in size and beauty, but also extremely important with respect to the global environment (Kriwoken and Rootes 2000). Antarctica has a harsh climate, exemplified by the fact that the minimum temperature ever recorded (–89.6 °C, or –129.28 °F) occurred at Russia's Vostok Station (Rubin 1996). In addition to the harsh physical climate, Antarctica is notable for its unusual ecology. Consider these facts:

- From diatom (a one-celled organism), to the largest of all animals (the Blue Whale), there is only one step in the food chain.
- If one leaf of one Amazonian Palm was counted for mosses, fungi, lichens, mites, and insects, there would be more species on it than are found on the entire Antarctic Continent (Campbell 1993).

What the Antarctic ecosystem lacks in terms of diversity, it makes up for in numbers. Chester (1993), quoting the Scientific Committee on Antarctic Research (SCAR), states there are the following populations in Antarctica:

- 1 million pairs of breeding king penguins
- 2.5 million pairs of Adelie penguins
- 7.5 million pairs of chinstrap penguins
- 3.7 million pairs of rockhopper penguins (mainly in the Sub-Antarctic)
- 315,000 pairs of gentoo penguins
- 12 million pairs of macaroni penguins
- 200,000 pairs of emperor penguins
- Between 250,000 and 800,00 Weddell seals
- 200,000 Ross Seals
- 30 to 70 million crabeater seals
- 400,000 leopard seals
- 600,000 southern elephant seals
- 2 million Antarctic fur seals

These numbers do not even consider the numerous populations of whales, albatross, petrels, krill, or even mosses and grasses found in the Antarctic. In addition, Antarctica is a weather factory of winds and ocean currents, which through many series of events may have driven speciation even in the distant tropics (Campbell 1993).

Politically and managerially, wilderness in Antarctica is unique among other continents. Antarctica is a neutral territory with no military presence other than that used to support scientific research (Mason and Legg 1999). Although claims of national sovereignty have been made, these have been held in abeyance for several decades, and Antarctica is currently under the international regime of the ATS. The ATS governs Antarctica above all national claims, laws, and conflicts, creating a unique wilderness management situation. As described by Davis (1992: 39), the Antarctic Treaty is today "one of the most successful international regimes of our time." In terms of management for the Antarctic wilderness, there are several specific international agreements, aside from the ATS, which cover additional avenues of concern for Antarctica.

The ATS was established by the United Nations, following the International Geophysical Year (IGY 1957–1958). Set up to allow for free scientific discovery, the ATS now indirectly encompasses much more, including tourism legislation and environmental protection. The Antarctic Treaty System provides legal status to all land and resources of the entire Antarctic continent (Hall and Johnston 1995). As a management regime, the ATS allows Antarctica to be recognized as a shared resource for all humankind to promote peaceful and scientific purposes (Rubin 1996).

In 1964, the ATS adopted the first major Antarctic conservation regime, the Agreed Measures for Conservation of Antarctic Flora and Fauna. Under this regime, two types of special conservation areas were considered: Specially Protected Areas (SPAs) and Sites of Special Scientific Interest (SSSIs). Specially Protected Areas preserve both unique and representative examples of the natural ecological systems of areas, which are of outstanding scientific interest. Sites of Special Scientific Interest protect any kind of scientific investigation or set aside undisturbed reference areas for the needs of a particular science. These sites can only be designated where there is a demonstrable risk of harmful interference. These designations are relatively small in size and number, with little management planning and effective implementation (Lucas 1995). Thus, successive additional designations and governance of Antarctic wilderness has been and is necessary.

The Protocol on Environmental Protection (Madrid Protocol) is an agreement by ATS nations that deals with the specifics of environmental management, and promotes Antarctica as a scientific vessel for global understanding. The Protocol sets regulations regarding activities, duration, impact, protection, and adverse effects and change for a number of areas. Essentially, it enhances environmental standards set out in the ATS. Originally drawn up in 1991, the agreement was not ratified by all Antarctic Treaty Consultative Parties, until Russia signed in 1997 and Japan in 1998.

Annex V of the Madrid Protocol sets out the types of values to be considered when deciding whether an area warrants special protection. It also describes the process for preparing and submitting a draft management plan through the Committee for Environment Protection (CEP) to the Antarctic Treaty Consultative Meetings. Annex V is expected to come into force by 2002, and thus areas in Antarctica will fall under a new system of protected areas, designated ASPA and ASMA.

Antarctic Specially Protected Areas (ASPAs) are intended to protect:

- Areas to be kept free of human impact for comparative purposes
- Representative examples of major ecosystems
- Places with important or unusual animal or plant communities
- Type localities or only known habitats of species
- Places of value for scientific research
- Places with outstanding landform attributes
- Areas of outstanding aesthetic and wilderness value
- Places of historic value

Specially Protected Areas and Sites of Special Scientific Interest will be combined as Antarctic Specially Protected Areas (ASPAs).

Antarctic Specially Managed Areas (ASMAs) provide a framework for managing activities so as to improve coordination of different activities and minimize environmental impacts. They may include areas where activities pose risks of mutual interference or cumulative environmental impacts. They may also include places of historical significance. Antarctic Specially Managed Area status is available under Annex V to assist in the coordination of activities and the minimization of environmental impacts for areas of greater activity, or areas where more than one operator is active.

Before the Protocol, international concern about fishing rights and catch sizes led to the 1980 Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), while possible mineral exploitation led to the 1988 Convention to Regulate Antarctic Mineral Resource Activities (CRAMRA) (Benson 2000). The idea of a Worldpark became a significant Antarctic conservation issue between 1981 and 1984 at successive IUCN meetings with Nongovernmental Organization (NGO) support (Lucas 1995). The Worldpark designation would have provided overriding protection of Antarctica, although its failure likely sparked some of the debate that led to the Madrid Protocol.

Many nations who have signatory status in the ATS also have specific domestic laws to regulate their citizen's activities in Antarctica. Regulations in the United States, for example, include aspects of environmental protection, but focuse more on issues such as theft, land purchase, and general conservation regulation.

Research in Antarctica has regulatory bodies such as SCAR and the Council of Managers of National Antarctic Programs (COMNAP), while the tourism industry is self-regulated, mainly through the auspices of IAATO. These regulatory bodies generally cooperate to issue guidelines, such as those for tourist behavior jointly agreed upon by IAATO and the ATS, as well as guidelines for the implementation of a framework for Antarctic Protected Areas (COMNAP and the ATS). While there is cooperation, there is also occasional conflict that leads to difficulties in enforcement. These conflicts emphasize the impression that international agreements or regulations regarding Antarctica lack "teeth."

Antarctica: "Ambassadorship"

> The mighty sea and monstrous icebergs are playing their giant's games under the grey and lowering sky, caressing or fighting, and in the midst of these marvelous manifestations of nature, which are not made for man, we feel that we are merely tolerated, although a kind of intimacy may be created between us and our magnificent hosts (Charcot 1978: 289).

Tourists enjoy an Antarctic experience with views and awe much like Charcot's, but what values do they then place on the continent? Is a bond formed between the tourist and the continent similar to the tolerance and intimacy Charcot expresses? With no scientific results from tourist visits, what possible benefits do they have for the ice? Unfortunately, very little rigorous research has been aimed at answering these questions. Tourism may help to preserve the character of Antarctic wilderness (Suter 1991), but tourists may also simply leave their mark on the environment and never think of it again (Campbell 1993).

"Ambassadorship" is a difficult term to define. It can quite easily be synonymous with advocacy, stewardship, and the like. Quite often, and in other geographic settings, it is used interchangeably with these terms, but in the Antarctic context, "ambassadorship" appears to be the term of choice. As stated by the Honorable Mark Burton (2000: 6), "ambassadorship" is the process of advocating the "preservation of the continent [by] those who have been to the 'ICE' and so have a first hand experience of the values [being sought] to protect."

With no empirical research on the specific definition and actions associated with "ambassadorship," it is necessary to try to synthesize other theories and ideologies from a number of disciplines. "Ambassadorship" appears in the literature and studies of many Antarctic writers and tour operators (Heritage Expeditions 1997; Kershaw 1998; Suter 1991; Thomas 1994). Tourist operations draw a connection between visiting the continent and subsequent "ambassadorship." Heritage Expeditions (1997: 7), for example, suggests that tourism creates

> "ambassadors" by raising awareness...through sharing with them the unique natural history of Antarctica and the Sub-Antarctic, allowing Expedition members to visit historic sites and discussing with them the conservation issues confronting the Antarctic Continent.

Yet this may or may not be the case. Research simply has not been conducted that would support or disconfirm this view.

To date, research on "ambassadorship" in Antarctica focuses on IAATO and what the tour operators' association is doing to conserve and protect the Antarctic wilderness (Splettstoesser 2000). IAATO works hard to create conservation-focused guidelines and to educate the tourist public. Individual tourists and their "ambassadorship" are only briefly examined by Marsh (1991, 2000) and Bauer (2001). There is little doubt that people (operators, national programs, tourists) want to keep Antarctica pristine, but combining the commercial nature of tourism and the wilderness values being sought to protect is difficult. With little to no research findings available, the debate over tourism and its justification and place in Antarctica goes around in circles. Science accuses tourism of disturbing the wilderness and vice versa, everything is focused on the negative impacts, but what of the positive, the benefits and theoretically the "ambassadorship"?

In conservation, benefits, and sociological literature, research has been done on similar or synonymous ideas, but are the results adequate to explain "ambassadorship"? Worldwide and polar case studies indicate that a conservation benefit may accrue to parks or protected areas via tourism (Boo 1990; Marsh 2000; WTO 1999). Boo (1990) explains that tourists become emotionally attached to an area and will thus contribute funds to protect it or improve its conservation status. Cessford (1995) generated research findings that suggest that among tourists visiting the remote islands of Little Barrier and Tiritiri Matangi, there is conservation benefit. Cessford (1995) indicates that insight into a particular ideal or having a particular experience does, in fact, aid in learning about conservation, change visitor opinion, and create a commitment to conservation. Marsh (1991) has shown initial research findings in this area regarding Antarctic tourists, but his sample was relatively small and mainly consisted of a single nationality. In addition to Cessford's (1995) study, the work of Cessford and Dingwall (1996) suggests that satisfaction and positive experience create a personal value shift. Boo (1990) concludes that for conservation management to succeed, tourism must be a tool to educate, thus creating real benefits for a geographical location. Findings from general benefits research (Anderson and others 2000; Bruns and others 1994; Driver and Bruns 1999; Kelly and Brown 1981; Manning 1999) support the above studies.

In popular literature (Rowe 1990; Searle 2000), the idea that wilderness holds value for people, and that peoples' values are affected by experiencing wilderness, is common. Research studies into the connection between outdoor recreation and environmental attitudes has been done (Dunlap and Heffernan 1975; Theodori and others 1998; Van Liere and Noe 1981), but with little concrete results transferable to an Antarctic context.

Conclusions

The authors of this paper propose research aimed at understanding "ambassadorship" as a cycle, inclusive of tourist's anticipation, onsite experience and behavior, and benefits realized through recollection. Such research would relate to the tourist's travel process and answer the following vital research questions:

- What are the Antarctic tourist's expectations prior to visiting Antarctica?
- What is the tourist's pre-existing world view regarding the environment and conservation?
- What is the tourist's experience while in Antarctica?
- How does the tourist behave in Antarctica?
- What is the tourist's world view following a visit to Antarctica?
- What are the perceived benefits the tourist has following their visit to Antarctica?
- Do these perceived benefits extend beyond the individual (in other words, conservation benefits)?
- Are the perceived benefits put into action?

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7. The Role of Science, Education, and Collaborative Planning in Wilderness Protection and Restoration

Congress venues ranged from bushcamps to convention halls (photo by Alan Watson).

Ecological Research and Educational Programs to Support Protected Area Management: Lessons From the United States Experience

David N. Cole

Abstract—Ecological research is needed to provide a foundation of knowledge for appropriate management of protected areas. Basic ecological research on the phenomena that exist in protected areas is important, as is applied research that will contribute to protection of these resources. Research on animals, plants, soil, ecological processes and their interactions, as well as threats to these entities are all needed. Using research on recreation ecology as an example, this paper describes how a foundation of knowledge was built and suggests important lessons that can be applied to development of protected area research and educational programs. In particular, it seems important (1) for researchers to be protected area researchers first and disciplinary specialists second, (2) for research to be cumulative and long term, (3) for research to be conducted and integrated across varied scales, and (4) to engage and integrate a broad range of disciplinary specialties.

Protected areas are designated because they provide a wide array of benefits to society, including the benefit of preserving nature for its own sake. The goal of protected area management should be to maximize these benefits. This requires understanding the resources within protected areas, increasing societal benefits that accrue from these resources, and protecting these resources from threats. Research, education, and management are all necessary. The purpose of this paper is to discuss how ecological research can best contribute to the education of protected area managers and the improved management of protected areas, drawing particularly from the perspective of experience gained in the United States. I will begin broadly, describing the breadth of research that seems worthwhile, offering remarks about where progress has been substantial and where it has not. Then I will use examples from my personal experience, conducting recreation ecology research, to make more specific observations and recommendations regarding development of the knowledge base for high quality protected area educational and management programs.

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Basic Ecological Research in Protected Areas

Traditionally, most of the research conducted in protected areas has involved basic studies of the biological phenomena found in protected areas. In most of the National Parks in the United States, for example, there have been studies of individual animal species and of plant communities. At Yellowstone National Park, individual scientists have spent much of their career studying grizzly bear populations, bison, and vegetation patterns. This type of research is probably most common because it is most consistent with the disciplinary organization and orientation of academia. Most students are trained within departments that emphasize basic rather than applied research and single rather than multidisciplinary studies.

This research has contributed significantly to the education of protected area managers, the management of protected areas, and the benefits that accrue to society. It should be encouraged and continued, as there is much more that needs to be learned about ecological phenomena in protected areas. Beyond being receptive to such research, however, there may be little need for protected area management programs to promote such research. Scientists working within traditional biological disciplines will continue to work in protected areas, when they are the best places to study certain phenomena. However, there may be more need to promote basic research that (1) is of a long-term nature, (2) is interdisciplinary in scope, and (3) is designed to make use of wilderness as a baseline or reference, for comparison with more manipulated and disturbed landscapes. All of these types of research are critical to realizing the values and benefits of protected areas, but none are common. Existing institutional structures and funding mechanisms tend to present formidable barriers to research of this type.

Threats-Based Ecological Research in Wilderness

Recently, substantial ecological research has focused on threats to the integrity of ecosystems in protected areas, direct and indirect effects of human activities both internal and external to protected areas. This research is critical to developing the knowledge base needed to truly protect lands designated for protection. Research is needed to understand a wide variety of threats to diverse protected area resources.

Significant threats to wilderness lands in the United States, for example, include recreation use, fire management, livestock grazing, introduction and invasion of alien species, diversion and impoundment of water, emission of atmospheric pollutants, and management of adjacent lands (Cole and Landres 1996).

Research conducted by specialists from a wide variety of disciplines needs to be applied to the development of this knowledge base. Moreover, as is the case with basic research, there is particular need to design long-term studies that utilize interdisciplinary approaches. In the rest of this paper, I will discuss how research related to one of these threats—recreation use—has developed, particularly in the United States. Based on this perspective, I will offer some recommendations regarding how research can best contribute to the effective education of protected area managers.

Development of Knowledge in Recreation Ecology

The field of recreation ecology is primarily concerned with assessing the responses of ecological systems to recreational use and disturbance, usually for the purpose of understanding how to manage recreation within protected areas. Although recreation ecology research can be traced back at least to the 1920s (for example, Meinecke 1928), it was in the 1960s and 1970s that interest in recreation ecology intensified. Management agencies—such as the Forest Service and National Park Service in the United States—recognized that increasing recreation use threatened the integrity of both their facilities, such as campgrounds, and the biophysical resources of the areas they were to protect. Increasingly, they funded research projects that described recreation impacts and suggested means of mitigating those impacts.

Initially, studies were short-term, descriptive case studies that provided a wealth of site- specific insight for the funding agency but that did little to develop general knowledge. In the mid-1970s, the first syntheses of recreation ecology were compiled (for example, Liddle 1975; Speight 1973; Wall and Wright 1977). Not surprisingly, these syntheses were largely confined to description of the impacts of different types of recreation on different impact parameters. There was little rigorous documentation of how impacts were changing over time, and little understanding of how impacts relate to factors that influence the magnitude of impacts. Consequently, little of this research was capable of developing general principles and strategies to guide management.

This began to change in the late 1970s and 1980s with the development of long-term, cumulative recreation ecology research programs, first in the Forest Service and then in the National Park Service. With these programs it was possible to develop long-term studies to identify trends over time, as well as to replicate studies in different places to assess the generalizability of results. Multiple methodologies were applied, providing richer insights than those provided by single methodologies. For example, in their study of campsites at Delaware Water Gap National Recreation Area, Marion and Cole (1996) assessed changes over a 5-year period on long-established campsites, recently opened campsites, and recently closed campsites, as well as on plots subjected to experimental trampling.

By the late 1980s, general principles of recreation ecology were emerging. In a synthesis paper, for example, I (Cole 1987) postulated that the magnitude of impact was largely determined by amount of use, type of use, season of use, and environmental conditions, and provided empirical examples of the effects of each of these influential variables. I developed simplified models, in which it was possible to manipulate variables one at a time, to show the general influence of these variables on amount of impact (Cole 1992). Subsequently, Kuss (1986), Leung and Marion (1996), and Liddle (1991) have summarized information about how impact varies with environmental conditions.

Equally significant has been work that relates empirical research findings to general management strategies. The factors that influence magnitude of impact can each be modified by management so that impact is minimized. A handbook that summarizes the likely effectiveness of alternative management strategies, based on empirical research has been developed (Cole and others 1987). In their recent synthesis of recreation ecology, Leung and Marion (2000) organized much research around these management strategies. The content of low-impact (Leave No Trace) educational messages have also been based on the results of empirical studies (Cole 1989). Experience with descriptive studies of impacts has been used to develop monitoring methods, most notably in the work of Marion (1991). Finally, recreation ecology has provided a foundation for developing indicators and standards for contemporary recreation planning frameworks, such as Limits of Acceptable Change (Stankey and others 1985).

Once a discipline matures to the point where general principles emerge and management applications of those principles have been explored, education becomes much easier and more effective, and transfer of information to managers is facilitated. Starting in the late 1980s, now that principles derived from recreation ecology research had been postulated and interpreted within management contexts, more generally useful recreation ecology textbooks were written (Hammitt and Cole 1987; Hendee and others 1990; Liddle 1997). The availability of textbooks and also popular books on low impact education for the public (Hampton and Cole 1995) further increase the effectiveness of education.

Important Findings of Recreation Ecology

To illustrate the linkage between recreation ecology research and management of protected areas, six of the most important general principles derived from recreation ecology are described below:

1. Many of the impacts of recreation are positive feedback loops. For example, trampling eliminates vegetation cover, which in turn reduces inputs of organic matter into the soil and alters the microorganisms that live in the soil. Because soil organic matter and microorganisms are critical to the establishment and growth of vegetation, vegetation may be extremely slow to recolonize damaged recreation sites, even in the absence of further trampling. Managers must sever this positive feedback

loop by artificially amending soils with the organic matter and microorganisms that vegetation needs to establish and grow.

2. Impact is inevitable with repetitive use. Numerous studies have shown that even very low levels of repetitive use cause impact. Therefore, avoiding impact is not an option unless all recreation use is curtailed. This means that managers must decide on acceptable levels of impact and then implement actions capable of keeping use to these levels—the approach at the core of the Limits of Acceptable Change and related planning frameworks.

3. Impact occurs rapidly, while recovery occurs slowly. This principle underscores the importance of proactive management, since it is much easier to avoid impact than to restore impacted sites. It also suggests that relatively pristine places should receive substantial management attention, in contrast to the common situation of focusing most resources in heavily used and impacted places. Finally, it indicates that rest-rotation of sites (periodically closing damaged sites, to allow recovery, before reopening them to use) is seldom likely to be effective.

4. In many situations, impact increases more as a result of new places being disturbed than from the deterioration of places that have been disturbed for a long time. This principle also emphasizes the need to be attentive to relatively pristine places and to focus attention on the spatial distribution of use. It suggests that periodic reinventories of all impacted sites are often more important than monitoring change on a sample of established sites.

5. Magnitude of impact is a function of frequency of use, type and behavior of use, season of use, environmental conditions, and spatial distribution of use. Therefore, the primary management tools involve manipulation of these factors.

6. The relationship between amount of use and amount of impact is curvilinear (asymptotic). Where use is light, even small differences in amount of use can have profound effects on amount of impact. Conversely, where use is heavy, even substantial differences in amount of use have little effect on amount of impact. This principle has numerous management implications and is also fundamental to many Leave No Trace educational messages. It suggests that it is best to concentrate use and impact in popular places and to disperse use and impact in relatively pristine places.

Recommendations Based on Lessons Learned

Over the past several decades, advances in the educational and management utility of recreation ecology research have been made. The progress that has been made is largely a result of (1) researchers framing their issues in terms of protected area management rather than more traditional issues of ecological research and (2) researchers being given the opportunity to conduct sustained research programs that are accumulative. Progress would have been even greater if (1) research spanned a broader array of scales and (2) more disciplinary specialists were involved. Therefore, my recommendations for a protected area research program in support of education and management revolve around the following four points:

1. Researchers should be protected area researchers first, with their allegiance to an academic discipline of secondary importance. What is critical is that the questions being addressed through research are framed within the context of protected area management rather than those of an academic discipline. For example, many of the biologists who first studied the relationship between amount of use and amount of impact, found that magnitude of impact was linearly related to the logarithm of amount of use (for example, Dale and Weaver 1974; Hylgaard and Liddle 1981). The primary goal of their research was to describe the relationship between use and impact. Trained to present their results in as succinct and elegant a manner as possible, they showed that their data fit a log-linear relationship—providing the most parsimonious description of the relationship—and they were done.

In contrast, I first studied the relationship between amount of use and amount of impact—not for its own sake, but to understand the relative effectiveness of concentrating versus dispersing use (Cole 1982). In my work, I have also consistently found that a log-linear relationship can be fitted to data relating use to impact. However, by describing the relationship as curvilinear or asymptotic, rather than log-linear, the management implications of the relationship are much more apparent. Research leads more directly to the development of principles and to management application.

A protected area researcher is also more likely to work in an interdisciplinary fashion and to seek opportunities to work collaboratively with management. Many protected area issues require integration of both social and ecological science. In addition, research can often contribute most to management if there is an iterative relationship between the two. Clearly, scientists within traditional academic disciplines can contribute to the knowledge base needed to manage protected areas. However, I think that progress would be greater if resources are allocated first to scientists whose self-identity is highly associated with protected areas.

2. Researchers should be given the opportunity to do accumulative work. Often research funding sources are such that scientists must jump around from one short-term, site-specific, low-budget project to another. Along with the tendency of many scientists to be opportunistic and to enjoy dabbling in many different areas, much research does not accumulate into a well-established body of knowledge that can be generalized into principles or applied to significant management issues. The limitations of earlier research cannot be overcome unless scientists have the opportunity to refine their techniques in subsequent projects. Ideas generated by earlier work are frequently lost when funding for additional work is not there. The projects undertaken tend to not be very ambitious or innovative.

For example, the opportunity I have been afforded to pursue a career in recreation ecology has allowed me to conduct long-term studies and to identify long-term trends in the conditions of protected areas. I have been able to work at multiple spatial scales and to use multiple methodologies as a means of triangulation. I have been able to replicate studies in different environments to assess the generality of earlier findings and to gain insight into how to adapt monitoring methods to different situations. I have been able to study all the various factors that influence amount of impact, including amount of use, type of use, and environmental conditions. All

of these opportunities increase the ability to move from research results to overarching principles and management application, making transfer of knowledge through education to managers much easier.

3. Research should be conducted at multiple scales. Most scientists have focused on mesoscale phenomena, those that are readily observed. They have tended to study individual animals and species, populations of plants and animals, and communities. As a result, we have generally done a good job of describing the impacts that occur at the human scale. However, lack of research at other scales hampers our ability to restore damaged sites or to gain perspective on the extent to which recreation impacts impair the integrity of large protected areas.

Relatively little work has been done at the microscale, looking at soil biota, for example, or at soil-plant interactions. Many protected area managers have closed damaged sites and are attempting to restore them. But the physical, chemical, and biotic properties of soils on these sites have been altered. Physical impacts—such as soil compaction—can be temporarily alleviated through scarification, but soils are prone to being compacted again in the absence of vegetation and desirable soil biota. Vegetation can be planted on damaged sites, but plant growth can be poor and mortality high if soils are compacted and lack desirable soil biota. Solving these problems is hampered by inadequate research at microscales.

Inadequate research at large spatial scales is equally problematic. Our current inability to develop general principles regarding recreation impacts on wildlife may largely result from this inadequacy. Hundreds of short-term, site- and species-specific studies of behavioral responses to recreational disturbance have been conducted. However, the lack of research at population or community scales makes it impossible to know how significant these impacts are. Similarly, the intense impacts on vegetation and soil caused by recreation at the scale of the site may be insignificant when viewed at larger scales.

4. Researchers, with tools from a wide array of disciplines, need to contribute to protected area research. Resources to be protected include air, water, animals, vegetation, soil, and rock, not to mention cultural resources and human experiences. These resources are threatened by a wide array of influences, of which recreation is just one. A much wider array of scientific expertise needs to be devoted to these issues than is currently the case. Within recreation, for example, the preponderance of researchers with botanical training means that our understanding of impacts on vegetation is much greater than our understanding of impacts on soils, animals, or water.

Conclusions

Effective management of protected areas is dependent on managers obtaining adequate training from educational institutions, with both education and management grounded in a solid research program. Both basic and applied research is needed. Protected area research in the United States has made some advances over the past few decades, but is still woefully inadequate for dealing with the array of issues that confront protected area managers. It has been most successful where (1) researchers are protected area researchers first and disciplinary specialists second, (2) research has been accumulative and long-term, (3) research has been conducted and integrated across varied scales, and (4) a broad range of disciplinary specialties have been involved and integrated.

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From Scholarship to Stewardship: Opportunities and Challenges in Wilderness Research, Education, and Management

Stephen F. McCool

Abstract—The special places that comprise our National Parks, wildernesses, and protected areas represent a profound symbolic commitment of society to protect the natural world from the excesses of human activity. Gazetting of these special places is accompanied by a social expectation that the values contained within them will be sustained by the administrative agency charged with their stewardship. In the United States, we have learned much about managing wilderness and other similar areas. This paper summarizes (1) elements of protected areas that make dissemination and application of social science particularly difficult, (2) some of the learning about this application, and (3) potential strategies for initiating wilderness research in Southern Africa, based on the United States experience.

Introduction

The special places that comprise our National Parks, wildernesses, and protected areas represent a profound symbolic commitment of society to protect the natural world from the excesses of human activity. These places also provide opportunities for people to engage in the critical recreational, learning, spiritual and inspirational experiences required for healthy humans and their communities. Gazetting of these special places is accompanied by a social expectation that the values contained within them will be sustained by the administrative agency charged with their stewardship.

Moreover, we have learned that simply designating boundaries around these exceptional landscapes is, by itself, insufficient to sustain the superlative values contained within them. Natural processes occurring outside of their boundaries often influence wildernesses and protected areas. The human activity—recreation, management actions, and communities—located within them also may pose significant threats to these values. The economic, administrative, and political policies frequently developed elsewhere often impact these special places. Good stewardship compels that these activities and influences be addressed through research, education, and management, so they do not threaten the values for which the areas were originally established.

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Wilderness stewardship requires a vigilant public to provide funds and oversight, a management organization that applies its technical expertise to safeguard important values and benefits, a research program that develops both basic and applied knowledge, and a tertiary education system that disseminates such knowledge to both professional managers and members of the public. Ideally, these components operate in an integrated, or at least compatible, fashion to ensure that these special places receive the competent attention they deserve. The research needed to sustain the qualities of these special places encompasses both the biophysical and social sciences. Stewardship is as much about the management organization, the visitor, and threats to wilderness integrity as it is about the landscape and its biophysical structure, composition, and function, and thus requires different types of knowledge.

The social sciences—economics, anthropology, political science, sociology, geography, and psychology—have long been involved in research and development in, about, and for wilderness in the United States (U.S.). These scientific traditions, in combination with research in the biophysical sciences, have led to important advances in wilderness stewardship. These advances are both conceptual, such as new insights into the symbolic significance of wilderness or innovative ways of defining the benefits of natural environments, and practical, such as the design of planning systems that integrate various disciplines and types of knowledge in planning and management.

Beginning in the 1960s, many U.S. universities had developed 4-year programs in recreation resources management, and some offered focused study on wilderness and National Parks. In many cases, faculty in these programs often engaged in research on wilderness issues, frequently funded by grants, cooperative agreements, and contracts supplied by Federal Government agencies. The mandate within the U.S. Wilderness Act of 1964, to provide "outstanding opportunities for solitude and a primitive and unconfined" experience, stimulated a great deal of research and debate over how to best manage recreational use of wilderness. While many social scientists have broadened their research interests beyond solitude and recreation over the last decade, this research experience, and its consequent impacts on higher education, provide important lessons for other countries that have wilderness and protected areas and are developing research and education programs on this topic.

I was asked to reflect on that experience while preparing this paper. As a social scientist who has participated in both research and higher education dealing with wilderness for 35 years, I have had the opportunity to conduct a variety of

research and to provide educational opportunities for some of today's wilderness managers. First, I will describe some of the particular elements of wilderness and protected areas that make development, dissemination, and application of knowledge especially challenging. These elements provide a context within which managers manage and scientists research. Second, I will briefly describe some of the learning that has occurred in the pursuit of excellence in wilderness scholarship and stewardship. In the concluding section, I tread out onto thin ice, suggesting several strategies that newly initiated wilderness research programs may want to consider to advance the effectiveness of their scientific effort and its relationship with not only broader society, but with higher education as well. These observations are necessarily impressionistic and based solely on my reflections as a wilderness scientist engaged in scholarship, education, and stewardship.

Characteristics of Wilderness and Protected Areas That Make Development and Dissemination of Knowledge Challenging

Wilderness research and education occur within a poorly understood, unpredictable, and volatile political and social environment that influences what questions scientists explore, the methodologies scientists employ, how results are interpreted, and the constraints and effectiveness of research applications. There are four particularly notable elements of this environment that need to be recognized in any research, education, and applications program.

Wildernesses Are Embedded in a Dynamic Social and Biophysical Context

We are all familiar with the complexities and volatility of social and political systems in an era of change, turbulence, and transformation. The notion of congressionally established wilderness in the United States emerged during an era of widespread social reform that marked the beginning of many political, economic, and social changes, and thus reflected changing social relationships with wild landscapes. Also important are significant global changes in climate that will likely lead to changes in biophysical conditions and processes in wilderness.

The dynamic environments in which wilderness is embedded means that management goals often lack the agreement among stakeholders necessary to provide the consent required for management organizations to find and organize resources for stewardship. There is also frequent disagreement among scientists about cause-effect relationships. Such disagreements lead to uncertainty about future conditions and contexts, creating anxiety at the least, and often paralysis in decisionmaking.

Traditional, expert-driven, scientifically based planning processes used alone (that assume a single decisionmaker, operating in a closed setting, attempting to optimize attainment of a single goal, with unlimited time and information available) are inadequate to deal with management challenges typified by these settings (Forester 1989; Stankey and others 1999). These factors suggest that wilderness planning must emphasize learning and adaptation to deal with uncertainty, and collaboration and consensus building to address conflict.

Wilderness Ecosystems Are Loosely—Rather Than Tightly—Coupled

Within a wilderness area, cause-effect relationships are often typified by temporal and spatial discontinuities, and linkages frequently demonstrate a probabilistic rather than a deterministic character. In these situations, the system is termed "loosely-coupled." Tightly coupled systems are those with linkages that are highly time dependent and invariant in terms of sequences of actions (Perrow 1999). They lack capacity to tolerate delays and are rigidly structured in terms of how objectives are achieved. Wilderness systems tend to be of the former type: there are a variety of means of achieving objectives, there are often temporal delays between actions and consequences (such as, tourism promotion and increases in visitation), and sequences for actions are often unknown or make little difference in outcomes.

In loosely coupled systems, relationships between causes and effects, for example, recreation-setting attributes and visitor experiences, are only probabilistic. That is, managers provide only the opportunity (through manipulation of settings) for visitors to experience certain outcomes; they do not determine what those outcomes will be. The delays and the second- and third-order effects make understanding system processes and implementing effective management actions difficult, simply because of the complex relationships existing between causes and effects.

Thus, loosely coupled systems are not only difficult to understand, but challenging to manage. Learning about them requires adaptive approaches; management will be treating actions as experiments to understand outcomes.

Wilderness Ecosystems Tend to be Nonlinearly Dynamic

Small events, floods, fires, or developments, often lead to large effects. For example, we understand that relatively small levels of recreation use can result in disproportionately large biophysical and social consequences (Cole 1987). There may be thresholds beyond which significant consequences occur. This nonlinear characteristic requires managers to identify potential thresholds and determine if exceeding them leads to irreversible effects. It requires that we consider both the resistance of systems to impacts and their resilience in response to disturbance. It may require more conservative approaches to management actions that potentially lead to long-lasting effects. Understanding this characteristic is important in management, but it is also important for science to discover this relationship.

Combined Social-Biophysical Systems Are Characterized by Uncertainty

Social-biophysical systems are not only complex, but because we do not fully understand how they function, or the consequences of management interventions, decisionmaking is characterized by uncertainty. Uncertainty may be defined as not knowing all the effects that follow from decisions, nor the probability distribution of those we are aware of. Adaptive, even experimental, approaches to management are called for in these situations. Monitoring of consequences is also an important component of management.

The combined effect of these characteristics makes both the conduct of science and the consequential learning demanding. The implications for both science and education are extraordinary, requiring a transformation in how issues and challenges are framed, how science is conducted, and how the public and potential managers are educated. In these situations, collaborative, interactive approaches to management and science may be effective. Such approaches involve a variety of stakeholders, different forms of knowledge, and potentially different scales of analysis. The focus of management in the dynamic environment characterizing today's wilderness may be learning. This means that hypotheses are indeed tentative statements, evolving as we learn in response to new knowledge and changing models of how systems function. For example, our experience with the concept of carrying capacity suggests, after about three decades of research, that the relationship between use level and biophysical impact is far more complex than assumed by this approach (Stankey and McCool 1984). By examining our research findings through new lenses, we may discover alternative and more useful approaches to managing visitors and their impacts.

Learning is a process where there is an accumulation of knowledge, there is deliberation about the meaning of that knowledge, new insights are gained about the interactions between people and their environment, and we act upon that knowledge. Because wilderness management is basically a "messy" problem, the mental models (Senge 1990) we use to organize and behave in the real world will not only have to change, but must remain adaptive in response to social change and new knowledge. In summary, protected area management situations are rich in challenge, ripe for the experimentation needed for learning, and fruitful locations to enhance our understanding of how people can interact with resources in a sustainable way. This learning occurs at a variety of scales, and the lessons from it may serve as a foundation for new research programs.

Lessons Learned From Social Science Research in, About, and for Wilderness

The United States has been blessed with a relative abundance of scientific and technical expertise, managerial experience, and a tertiary educational system that is well integrated. Currently, the Federal Government administers nearly 650 designated wilderness areas covering about 47 million hectares (nearly 105 million acres) of land. This experience is only about 40 years in length, and therefore may still be thought of as in a formative stage. However, the lessons learned in the United States experience may serve as a foundation for other countries struggling to protect wilderness values. The learning that has occurred involves both the content of research and the context within which management, education, and research occurs.

Content Lessons

Knowledge About Wilderness Experiences, While Growing, Is Still Limited in Scope And Depth—We have not discovered or understood the depth, quality, or richness of the recreational, inspirational, spiritual, or learning experiences that occur within these special places. The power of wilderness to create these experiences is well known, at least anecdotally. For example, conservation pioneer John Muir (1911: 110) argued:

> Climb the mountains and get their good tidings, Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you and the storms their energy, while cares will drop off like autumn leaves. As age comes on, one source of enjoyment after another is closed, but nature's sources never fail.

While Muir and others like him have long provided rich, powerful, anecdotal, and emotional based descriptions of wilderness experiences, science has taken a number of empirical, and largely quantitatively based, approaches to better understanding them (Borrie and Birzell 2001). These approaches have evolved over time. As one approach has been found wanting, we have learned, other models and processes have been developed, applied, and evaluated.

While science has dramatically increased our knowledge of the dimensionality of wilderness *recreational* experiences, the capacity of these places to inspire the human spirit, provide the tranquility and serenity needed to maintain human health, lay a foundation for human progress, and educate about natural processes has generally not received the same level of attention. The anecdotal and emotional based metaphors long used by conservation writers and naturalists do not necessarily match with the more abstract empiricist descriptions of the scientist—at least the empirical findings are not as rich. More importantly, our ability to apply these findings in routine decisionmaking about wilderness and visitors has been hampered by the lack of articulate, yet salient, guidelines for incorporating these values and benefits. Perhaps in our haste to protect the biophysical aspects of wilderness, we have adopted an empirically based research and management paradigm for practicing stewardship that is not necessarily appropriate for wilderness experiences.

While the results of some research approaches may be transferable from one wilderness to another, this has generally not occurred in the United States. Each wilderness is often viewed as unique, implicitly requiring new studies of biophysical and social processes and expectations. As a result, management may not fully account for the fundamental power and capacity of wild places to affect human beings in decisionmaking, leading not only to significant and

contentious conflicts but also to inadvertent marginalization of the power of wilderness in helping create not only better people but also a better world.

We Have Learned That Human Behavior in Protected Areas Is Extremely Complex—The constellation of motivations influencing choices to visit wilderness and other protected areas results in human behaviors that are difficult to understand and appreciate. Such understanding is a necessary prerequisite to management of the people who visit wilderness, not only in terms of implementing actions that are effective, but also in sustaining opportunities that are valuable and beneficial to participants. Understanding what makes a visit to a wilderness a "quality" one has dogged scientists since the Wilderness Act was passed in 1964. While a considerable amount of this research has been focused on use density and perceptions of crowding, Manning and Lime (1999) argue that research is needed to identify other specific indicators of quality.

As a result of learning that human behavior is complex and not necessarily predictable, there is a much greater appreciation for models and approaches that are not as reductionistic as the "hypodermic needle" approaches that assumed that all that was needed to change peoples' behavior was a dose of appropriate information. Such approaches to management not only led to simplistic information campaigns but also have been largely ineffective (Cole and others 1997; McCool and Cole 1999; Vander Stoep and Roggenbuck 1996).

We Have Learned That It Is Critical That the Objectives for Protected Areas Be Specifically and Explicitly Stated—Objectives are needed to set the management agenda and develop social consensus around our visions of the future. How would we know we have accomplished what we have set out to do without specific and explicit objectives? However, broadly and vaguely stated objectives continue to plague management of wilderness and protected areas. Such broadly written objectives (such as, "protect the resource," or "provide a diversity of recreation opportunities") serve as poor benchmarks against which to identify what outcomes specific wildernesses should provide, determine the acceptability particular management actions, and measure progress. Vaguely written objectives tend to hide disagreements that do not arise until different interpretations occur.

Long ago, Shoemaker (1984) argued that objectives should have five characteristics: (1) specific; (2) output oriented; (3) quantifiable; (4) time bound; and (5) attainable. Unfortunately, many wilderness management objectives do not meet any of these criteria, leading to a situation where almost any management action can be judged successful regardless of the anticipated and unanticipated consequences that result. Of course, administrators may oppose objectives that meet these criteria because the specificity forces them to become accountable for their achievement.

We Have Learned That the Producer and Consumer of a Recreational Experience Is the Same Individual—Recreationists seek certain values and benefits when they choose a wilderness area to visit. The outcomes of these benefits are influenced by the social, managerial, and biophysical conditions experienced during an engagement within the area, and by expectations developed prior to the visit. These propositions form the basis of such management approaches as (1) the Recreation Opportunity Spectrum (Driver and others 1987), which seeks to provide diversity in setting attributes, and (2) normative approaches to wilderness quality (Manning and Lime 1999), which attempt to define what indicators of wilderness managers need to identify. Both approaches implicitly recognize that managers provide opportunities for certain outcomes, experiences, and levels of quality. But both also implicitly assume that these outcomes are produced and consumed by the individual recreationist.

In a sense then, wilderness and protected area managers provide a setting ("warehouse") consisting of a variety of attributes ("factors") from which visitors create experiences ("products") of varying quality. Not all factors will be used by all visitors to create any given experience. However, some factors, or attributes, such as use density, may be used more than others. Thus, we need to understand how visitors use setting attributes.

Managers serve as important intermediaries in this production process, for it is they who provide the setting attributes, regulate access to them, monitor their condition, and respond accordingly. Such a critical role in the production process requires research to further identify the character and intensity of linkages between setting attributes and recreational experiences.

Context Lessons

We Have Learned That It Is Important to Employ Time and Personnel Judiciously in Framing Wilderness Problems Appropriately—The wicked and messy character of wilderness and protected area management requires that problem framing take on special significance. The dynamic and fluid character of wilderness management situations, as well as the crisis-driven nature of many issues, often leads to inadequate problem definition. As Bardwell (1991) observes, in these conditions more resources are needed to understand the problem. An example of inadequate problem definition concerns defining use impact problems as that of exceeding a biophysical or social carrying capacity. Such a problem definition is an exceedingly reductionistic way of conceiving how the multiple expectations of visitors, the presence of competing management objectives, and the complex relationships between use and impact interact. As a result of defining use impact problems as exceeding an area's carrying capacity, we have engaged in an often fruitless endeavor of establishing such "carrying capacities" for protected areas. Rather than focusing limited resources on determining the desired, appropriate, or acceptable conditions required in organic legislation or as interpreted by visitors and administrators, the search has often been for "magic numbers" reflecting an inherent capability to support recreational use.

We Have Learned That Protected Areas Occur Within the Context of Regions or Systems of Areas, and Management Actions in One Area Affect What Happens in Another—Wildernesses and protected areas exist within the context of a system of areas (McCool 2001; McCool and Cole 2001): what happens in one area, in terms

of the condition of site attributes, management actions, and use characteristics, affects what happens in other areas within the region or system. For example, when a policy limiting recreational use is implemented in one area, visitors may be displaced to other areas. These other areas may then experience use impact problems, and they may or may not have adequate managerial capacity to address these problems.

Social science research has frequently focused on visitors to specific sites. While this research is often helpful in addressing site-specific questions, the lack of complementary regional scale research inadvertently leads to homogenization of opportunities over a region and eventually suboptimization of recreational experiences, because current site users are preferenced in such studies. Other users (visitors who are dissatisfied, people that prefer other types of settings, and future visitors) are generally not represented in such studies. McCool and Cole (2001) argue that management of wilderness must consider both regional and local scales to avoid homogenization of experiences and displacement of problems. Cooperation and coordinated management have typified a number of transagency management efforts, and such effort has led to more streamlined administration. Cooperation and coordination are necessary but not sufficient conditions for ensuring that a diversity of recreation opportunities exists at the regional level.

We Have Learned That to Make Progress in Understanding the Social Dynamics of Protected Areas, We Need Research That Is Cohesive and Integrative Over Time, Space, and Methodology—We have begun to understand how quickly and unpredictably things change. What visitors once felt was desirable, may now be only acceptable. What visitors now feel is unacceptable may in the future be desirable. The current dominant research paradigm is to conduct individual case studies of visitors to specific areas at one point in time. Studies that examine visitors over time, or research that investigates populations and how they interact with wilderness over time, are scarce. In Watson's (1999) recent review of trends in wilderness visitors, he could cite only a few studies in which visitors to a specific wilderness had been repeatedly studied over time. In the majority of these studies, such visitors had only been sampled twice. In general, the period between sampling was lengthy. For example, Lucas (1985) studied visitors to the Bob Marshall Wilderness in the State of Montana, but the period between sampling was 12 years.

Such studies sample visitors to the areas at two, or rarely, three points in time, but such visitors are most likely different individuals. Thus, these studies are not really studies of trends in how specific visitors access, use, or feel about a wilderness, but are more likely samples of different people at different periods of time. Thus, scientists are confronted with the plausible hypothesis that differences found are a result of sampling different visitors rather than changes in the visitor population.

While one-shot case study designs are interesting, their results tend to reinforce the status quo. In the case of visitor studies, they tend to privilege current users over past and future users in decisionmaking. For example, studies of visitors to an area will generally not sample those who find current conditions unacceptable. Since these conditions are unacceptable, these individuals do not visit the site, and thus are not sampled.

We Have Learned That While It Is Easy to Compartmentalize Management Actions and the Institutions That Implement Them, Stewardship Requires More Integration of Disciplines and Functions—Compartmentalization of functions is a common bureaucratic approach to ensuring that routine tasks are dealt with competently and efficiently. In wilderness and protected area management, we often segregate wilderness functional areas (recreation, fire, wildlife management) into different organizational components, or separate planning from management and management from science (Hof and Lime 1997). While this approach to governmental management has some important benefits, it may result in duplication, inconsistent or even conflicting actions, or in gaps in our knowledge and application. As a result, we may be surprised when management actions lead to unanticipated consequences, and find that the organization has limited capacity to respond.

We have learned in this respect that agency environments and cultures influence how problems are defined, priorities set, and management is implemented. Often agency cultural norms are so much a part of what an agency does, they are difficult to identify from within. Values, such as professionalism and empiricism of strongly held cultures, permeate decisions.

Conclusions

Probably most fundamental of the lessons learned is the importance of problem framing. How research questions and management challenges are defined determine what solutions are identified. Often, this stage in the research process gets short shrift as scientists attempt to respond to managerial crises, publication timetables, and tenure decisions. Managers may define a problem in such a way that it is a symptom of a more fundamental, systemic level challenge. Research on the symptom may not lead to appropriate managerial reforms, or may lead to research results that are simply too abstract for definitive application.

The particular social and political environment in which wilderness and protected area management occurs must be more explicitly recognized in research programs. This is not a call for the politicization of research. Rather, it is a recognition that these special places and the actors that shape and influence them are ultimately not only the clients for research and education, but they also reflect and symbolize the social values that influence management, research, and education priorities. Research, management, and education often take place in highly politicized environments, where the test of their utility is often how well they serve certain purposes that may not be directly relevant to wilderness management. This does not invalidate research. It only makes its design, conduct, and application more demanding and requires it to be responsive to social needs. Obviously, these factors vary from nation to nation.

What research is conducted, how, and where it is applied are major questions confronting development of any new science program. There has been a tendency in the United

States for wilderness social science research, particularly in higher education, to be opportunistic rather than programmatic. Given the highly decentralized nature of U.S. higher education, wilderness, and protected area management, this is to be expected. While we have learned a great deal from wilderness research in the United States, one can only speculate how a more structured investment in research would have advanced the state of the art of both scientific scholarship and managerial stewardship. Of course, there must be opportunities to engage in research determined by a cohesive plan of action, as well as research that is responsive to unforeseen issues and challenges.

Such goals can be achieved by following an approach that contains several strategies. I suggest these strategies as if I would have the opportunity to build a national wilderness research program in a setting where little such work had been conducted previously. These strategies represent no particular agency philosophy or plan; they are my thoughts alone. They are designed to address the need to build a political constituency; develop ownership in research by scientists, wilderness stewards, and affected publics; provide a financial footing; increase capacity; and ensure saliency and timeliness.

Strategy 1: Build a Strategic Plan

A strategic plan identifies a vision, mission, and way to the future. It would be designed to allocate research funding to problems and questions of national significance, as well as to those that confront individual managers. By involving various stakeholders—scientists, managers, and interested members of the public—a cohesive plan of research can be developed in which the learning from various research projects build upon each other. Part of this process would consist of meetings with stakeholders to not only generate issues, questions, and information needs, but also to build ownership in the research process. Part of the strategic planning process would be "situation assessments," formalized documents that synthesize existing literature with tentative propositions that direct individual research programs and projects. Done with the input of the public, the outcome would be a set of problems framed to ensure social and managerial relevancy. From this process, a series of research programs could be developed, each of which focuses on a question that is addressed over the long term, thus ensuring a cohesive science process.

Strategy 2: Develop a Wilderness Research Center Staffed by a Small Complement of Scientists

This strategy is designed to provide focus and identity for the wilderness research program, develop a centralized source (initially) for credible information, and stimulate research partnerships with university, governmental, and nongovernmental entities. The center, if appropriately funded, would have funding to spread its efforts to relevant scientists, thus leveraging scarce research support. This process then involves broader amounts of scientific expertise and allows managers from different units to participate in research programs. By so doing, additional ownership in wilderness research is developed. In addition, the credibility and relevancy of research is expanded.

Strategy 3: Develop Teams of Scientists to Investigate Research Questions, and Partnerships to Apply and Evaluate Results

Few questions and information needs are solely the domain of a single discipline. Many problems require scientists from different disciplines to jointly frame questions, identify methodologies, interpret findings, and apply results. Involving science teams, again, increases the breadth of involvement and provides the foundation for better results. Such a team orientation will also help build the capacity of the center to conduct research—which initially may be problematic if the scientific expertise is not available.

Partnerships can be developed in any number of ways, but one method that might be particularly useful is through the use of wilderness management and research demonstration areas. In these situations, research is conducted, implemented, and evaluated in a public setting for a specific resource in order to encourage learning and adaptation. Such areas have only rarely been used in wilderness research in the United States, but where they have, knowledge and science has been advanced.

Strategy 4: Ensure the Continuing Financial and Technical Capacity to Conduct Research and Apply Findings

The abundant and attractive physical resources often existing within a country are often not matched by the availability of long-term funding to support research. A research program—versus individual questions—implies a long-term commitment. One way of achieving this commitment is to build financial endowments from which the interest can fund research. This method of financing insulates the research center from year-to-year differences in political philosophies. Building an endowment does require a considerable financial commitment—but through some innovative financing and a politically active constituency, it may be possible.

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Role of Science in Sustainable Management of Yosemite Wilderness

Jan W. van Wagtendonk

Abstract—Since its earliest occupation by Euro-Americans, scientific information has been instrumental in the designation and management of Yosemite as a National Park and as Wilderness. Descriptive at first, but increasingly sophisticated as theories and methods evolved, science has been the underpinning of the protection and sustainable management of Yosemite National Park and the Yosemite Wilderness. As visitor use increases, it will be critically important that the wilderness resource and the wilderness experience be perpetuated unimpaired for future generations. This paper traces the role science has played in the history of the Park, in the current management of the Yosemite Wilderness, and the role it might have in the future.

Introduction

Science has been instrumental in the management of Yosemite since before its designation as a National Park in 1890. It has played a role in the various legislative acts that designated the area as a National Park, and subsequently as a unit of the National Wilderness Preservation System. That role intensified as back-country use increased in the 1970s and wilderness was designated in Yosemite in 1984. Since then, the wilderness management system there has been adjusted and refined as research and management methods have evolved. This trend should continue into the future.

Historical Perspective: Yosemite National Park and Yosemite Wilderness

Yosemite has come full circle from when it was managed by Native Americans for subsistence and shelter. It has passed through a period of legislation that established and adjusted the boundaries of the Park for visitor benefit and enjoyment, and finally to designation of a majority of the park as wilderness to preserve wilderness resources and values.

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Native American Management

Native Americans have been present in the Yosemite region for over 3,000 years. During this time they did more than inhabit the landscape, they also shaped its ecological relationships (Anderson 1996). They tilled the soil for bulbs and corms, burned meadows for basketry materials, hunted for deer and other game, and gathered seeds and acorns. All of these practices were based on an inherent scientific knowledge of ecology. The wilderness that faced the first European invaders was, in part, a landscape managed for the needs of diversity and abundance (Anderson and Nabhan 1991).

Early Park Legislation

Early legislation relating to Yosemite includes:

- The1864 act that set aside Yosemite Valley and the Mariposa Grove as a State Reservation.
- The 1890 act that established Yosemite National Park.
- The 1906 joint resolution that ceded the Yosemite Valley and the Mariposa Grove back to the Federal Government and changed the boundaries of the park.
- The 1916 act that established the National Park Service.

Each of these acts was based, to a greater or lesser degree, on scientific information.

Yosemite Valley Grant Act of 1864—The act that granted Yosemite Valley and the Mariposa Grove to the State of California was the first act by a national government to establish a park. Huth (1948) considered the Yosemite Valley Grant Act as the birth of the "National Park" idea. The act specified that the purpose of the park was for public use, resort, and recreation, and that it should be inalienable for all time. Although the legislation was not directly based on scientific studies, the impetus behind the act was to prevent destruction of the scenic and natural values of the Valley and the Grove.

Yosemite National Park Act of 1890—The nation's first preserve consciously designed to protect wilderness values was established in 1890, when the mountains above Yosemite Valley became a National Park (Nash 2001). John Muir received much of the credit for bringing about the establishment of Yosemite National Park. Although not considered scientific writing by today's standards, Muir (1890a,b) wrote eloquently about the treasures and features of the proposed park. These descriptions were based on Muir's detailed observations of natural phenomena of the area including meadows, rivers, mountains, and glaciers (fig. 1). Nowhere is his scientific expertise more evident than in the passages in which he describes the

Figure 1—The area above Yosemite Valley is a vast wilderness landscape of domes, mountains, glaciers, rivers, and waterfalls.

value of protecting the wilderness above the Valley as an integrated harmonious unit rather than protection of an unsustainable fragment.

Joint Resolution of 1906—Preceded by the cessation of Yosemite Valley and the Mariposa Grove by California to the Federal Government, the Joint Resolution of 1906 accepted those lands as part of Yosemite National Park and adjusted the boundaries of the new park. The cessation was deemed necessary because development and commercialization were impacting scenic and natural values. The boundary adjustments were based on a report by Chittenden (1904) and included deletions and additions, with a net result of a 30-percent reduction. He conducted a 2-week study of the park and concluded that lands containing substantial private claims, mineral-bearing ores, or commercial timber should be excluded from the park and added to the forest reserves. The addition included the remainder of the Tuolumne River drainage, making it possible to manage the entire watershed.

National Park Service Organic Act of 1916—Fifty-two years after the Yosemite Grant Act, 44 years after the Yellowstone National Park Act, and 26 years after the Yosemite National Park Act, the National Park Service was finally established. The new bureau had the responsibility for managing the National Parks to:

> Conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (Sellars 1997).

Science was not specifically mentioned in the act and could not be inferred from the language in any of the sections (Sellars 1997).

Wilderness Legislation

Two acts were instrumental in designating wilderness in Yosemite:

- The Wilderness Act of 1964, which established the National Wilderness Preservation System.
- The California Wilderness Act of 1984, which specifically designated the Yosemite Wilderness.

Wilderness Act of 1964—Although the Wilderness Act originated out of dismay over trends affecting roadless areas on National Forests, it also was applied to lands of the National Park Service because of concerns about the erosion of roadless blocks within units of the National Park system (McCloskey 1994). The National Park Service was never an active proponent of the Wilderness Act (Sellars 1997). For the National Park Service, opposition to the Wilderness Act centered on the question of discretion. The 1916 Organic Act gave no clear guidance on the question of how much park wilderness should be protected. The scenic, natural, and cultural features were to be protected, while at the same time providing for their use and enjoyment. As administratively interpreted, the Organic Act gave discretion to the Park Service to strike a balance between maintaining wilderness and providing facilities that were accessible by modern means of transportation. The Wilderness Act changed that by specifying that wilderness zones in parks would have added protection from roads, commercial facilities, motorized vehicles, and mechanized equipment. The Act also specifically mentioned science as one of the purposes of wilderness.

California Wilderness Act of 1984—Legislation to extend wilderness was introduced in every Congress between 1974 and 1982. Not until the debate concerning the adequacy of Forest Service recommendations for wilderness in the State was resolved in 1984, did the California Wilderness Act finally become law. The Act designated 646,700 acres (261,710 ha) of Yosemite Park as Wilderness and 3,500 acres (1,416 ha) as potential wilderness additions. Congress directed the Park Service to produce maps and descriptions of the Wilderness area as soon as practicable after passage of the Act. This task was assigned to the Park's Science Office and completed with input from all staff associated with wilderness. A Geographic Information System (GIS) analysis of the boundary, based on 7.5-minute quadrangle maps, showed that there were 704,624 acres (285,151 ha) of Wilderness and 927 acres (375 ha) of potential wilderness in the Congressionally designated Yosemite Wilderness, comprising 94.2 and 0.1 percent of the park, respectively.

Science in Support of Management of Yosemite Wilderness

During the late 1960s and the early 1970s, the proposed wilderness areas of Yosemite experienced a dramatic increase in use (fig. 2). When a scientist was assigned to the park in 1972, work began immediately on a program to support management of the proposed wilderness. By the time the California Wilderness Act passed in 1984, the

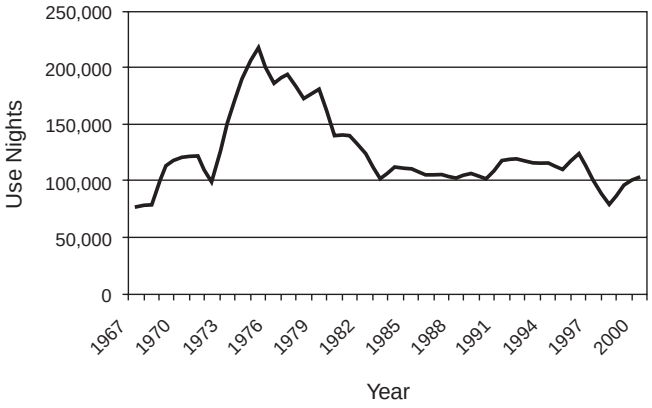

Figure 2—Visitor use nights in the Yosemite Wilderness increased rapidly in the early 1970s and then dropped to about 50 percent of the peak level.

results from this research had already been applied. Evolving use patterns and new research techniques prompted a resurgence of research designed to refine and improve management of the Yosemite Wilderness.

Early Programs

For many years, use figures were determined from voluntary campfire permits from which subjective estimates of total use could be made. Implementation of a mandatory permit system in 1972 for all overnight users alerted managers of the magnitude of wilderness use and its rate of increase. Within 1 week after the program was established in Yosemite that year, the scientist was assigned the task of inspecting conditions in the backcountry and assessing use. From these initial observations, a plan was developed to investigate impacts, determine use limits, and design a system for controlling use through permits. In addition, investigations into the role of fire in wilderness ecosystems were to be initiated.

Visitor Impacts—Holmes and others (1972) inventoried trails and campsites in the backcountry for human-caused impacts and found hundreds of campsites around popular lakes, trampled vegetation in heavily used areas, and eroded and multiple trails throughout the proposed wilderness. Guided by results of the survey, Parmeter (1976) conducted studies of human impacts on vegetation, soil, water, and microclimates. Experiments were also conducted to quantify direct impacts from trampling and urine (Holmes 1979). These studies concluded that although impacts increased as use increased, the relationship between use and impacts was influenced by many other factors and that the determination of acceptable impacts was a subjective decision.

On the other hand, Keay and van Wagtendonk (1983) found a positive relationship between use levels and incidents with black bears and recommended that use be reduced in areas of high conflict. Availability of food from human sources, however, was believed to be the primary cause of the conflict. Hastings and Gilbert (1987) also studied the interactions of bears and humans and offered a partial solution; a bear-resistant food canister that could be carried by backpackers.

Social impact studies were also conducted to determine the relationship between use levels and the wilderness experience. Lee (1977) and Absher and Lee (1981) interviewed visitors about their attitudes toward crowding, resource impacts, and satisfaction. They also observed the same visitors in the backcountry and concluded that there was no relationship between expressed attitudes and behavior. Enjoyment was affected more by human behavior and resource condition than by total number of people encountered (Absher and Lee 1981). For example, visitors were willing to encounter more people if they were friendly than if they were not.

Use Limits and Permits—Since use had obviously exceeded acceptable levels in some areas, interim use limits were applied while the ecological and sociological studies were being conducted. In 1973, overnight capacities were set for travel zones within the proposed wilderness based on the area of the zone, the number of miles of trails it contained, and its ecological fragility (van Wagtendonk 1986). The larger an area, the greater its ability to absorb use, and because trails disburse use, more trails allow additional visitors to be accommodated. Ecological fragility scores were used to reduce the limit of a zone based on its rarity, vulnerability, recuperability, and reparability.

Zone use limits were implemented through permits that were issued to each backpacking party. If a proposed zone had reached its capacity, the party was directed to camp in another location. Adjustments were made to the use limits based on data that showed that 8 percent of the parties did not get permits and that, on average, trips were shortened by one-half day (van Wagtendonk and Benedict 1980). The use limits were effective in shifting use from peak summer months and from heavily used travel zones without reducing overall visitation (van Wagtendonk 1981). Based on 4 years of data collected from the permits that related zone to trailhead use, a trailhead quota system was implemented in 1977 (van Wagtendonk and Coho 1986). Trailhead quotas allow visitors the maximum amount of freedom and ensure that the wilderness resource and experience are maintained.

Refined Programs

After the initial surge of research, management of the Yosemite Wilderness proceeded with only minor adjustments made each year based on observations and feedback from wilderness rangers. By the mid-1980s, however, long-term monitoring of trail and campsite impacts indicated that conditions were changing and that efforts might be necessary to restore certain areas (Sydoriak 1989). Restoration programs were followed by additional monitoring of campsites and meadows that were being grazed by recreational packstock. New methods of sociological research also made it possible to integrate resource, social, and managerial components into carrying capacity decisions.

Trail and Campsite Restoration—As a result of monitoring programs, campsite restoration programs were started in 1987 at three subalpine lakes in the Yosemite Wilderness (Hadley and Moritsch 1988). Moritsch and Muir (1993)

evaluated the effectiveness of the revegetation efforts at those lakes and found that transplanting locally collected native plants contributed to vegetation recovery on some sites. The effects on species richness were clearer than those on species cover. Based on these results, the campsite restoration was expanded to other areas of the wilderness. Trail restoration efforts were also underway.

Severely eroded trails and trails with multiple ruts were prevalent in many heavily used areas. Figure 3 shows an area near Tuolumne Meadows as it appeared in 1973. Restoration experiments were begun that year by Palmer (1979) and were completed in 1988 (Alexander 1989). Figure 4 shows the area as it appeared in 2001. Eagan and others (2000) restored the natural hydrology and soils to a similar 0.8-mile (1,300-m) section of abandoned trail that had two to six 11.8-inch (0.3-m) deep ruts. Fill material from nearby ephemeral drainages was used to bring the ruts up to grade. Plants from locally collected seeds and transplanted sod from between the ruts were used to replant the trails. Both were equally effective, but the transplants were less costly. These restoration projects showed that it is possible to restore areas that had not recovered naturally.

Campsite and Grazing Monitoring—The 1972 and 1986 surveys showed the value of repeated monitoring for detecting changes. A third 10-year monitoring cycle was completed in 1999 using a subset of sites and measurements (Boyers and others 2000). The initial results indicate an overall improvement in conditions due to the restoration program, decreased use, and increased visitor education. While the number of moderately and heavily impacted sites decreased in comparison to the two previous surveys, lightly impacted sites increased. Some of these sites are probably new, although many are restored sites that are still discernable. The monitoring program also alerted managers to the fact that off-trail use is increasing.

Although recreational livestock grazing impact surveys had been conducted in Yosemite in the 1930s through the 1960s, no systematic method of monitoring using standard measurements existed. Moore and others (2000) began a study in 1994 to establish a relationship between grazing intensity and meadow response. They found a consistent negative relationship between utilization and productivity, and a variable response between utilization and species composition. These findings will be incorporated into a meadow monitoring plan for use by wilderness rangers.

Carrying Capacity Decisionmaking—As new sociological theories and tools became available, Yosemite managers decided to take a new look at carrying capacity issues. Echoing the results by Lee (1977), Manning (2001) found that visitors to Vernal Falls had an absolute tolerance for four times as many people in the viewscape as their stated preference (fig. 5). Specifically, they wanted to integrate resource, social, and managerial considerations into their deliberations. Although conceptualized by van Wagtendonk (1979) as early as 1976, the managerial component of carrying capacity had not been incorporated into previous models. Newman and others (2001) are currently conducting a study that includes all three indicators of quality into a decisionmaking framework. The first phase of the project will inventory and map selected setting attributes of wilderness experiences using a Geographic Information System. Workshops with managers and scientists were held to define indicators and standard of quality. The second phase will ask visitors to evaluate tradeoffs among competing setting attributes or indicators using surveys and conjoint analysis. This research will enable managers to weigh the effects of use limits based not only on the effect visitors will have on resources and each other, but also on the effect the management action might have on either.

Figure 3—Multiple ruts in a trail near Tuolumne Meadows as it appeared just prior to restoration experiments in 1973.

Figure 4—The same area near Toulumne Meadows as it appeared in 2001 after restoration efforts were completed in1988.

Figure 5—Although visitors to Vernal Falls preferred to have relatively few people in their view, they were willing to tolerate many more.

Future Direction

Science has been an integral part of the management of the Yosemite Wilderness since before its designation. This role is expected to continue as increasing population pressures increase demand for recreational experiences. Dramatic growth has occurred in communities within 2 hours driving time of Yosemite National Park, much of it in populations that have not been traditional users of wilderness. Science will be called upon to help managers meet the challenges of a shifting cultural base. The appropriateness of new technologies will have to be investigated from legal, environmental, and sociological points of view. Perhaps most importantly, the changing role of wilderness in society will need exploring. Callicott (2000) suggests that wilderness areas might best be considered biodiversity reserves where species that do not coexist well with humans could be protected. Such designations would necessitate a science program of both basic and applied research in the field of conservation biology. If, on the other hand, the vision for wilderness is more in line with Foreman's (2000) view that wilderness should continue to provide opportunities for primitive recreation while at the same time protecting biodiversity, the science program will have to also include a sociological component. Either way, science will play an essential role in the management of wilderness.

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Investigating the Environmental Cause of Global Wilderness and Species Richness Distributions

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Abstract—Environmental factors that affect the distributions of wilderness character and the species richness of mammals, birds, flowering plants (angiosperms), and conifers and cycads (seed-bearing plants) were investigated at the global scale using national species richness data and a continuous wilderness quality grid. Principle Component Analysis and Multiple Regression were used to develop environmental characteristic models that are straight forward to interpret. High elevation and high latitude were key to the distribution of wilderness quality, conifers, and cycads. The most important determinants of species richness, however, were found to be low latitude and "good" climate (high precipitation and constant warm temperature). Understanding factors that influence presence of wilderness today will help plan for its protection on a large scale. Appreciating how the same factors affect the distribution of species richness will aid in conservation of biodiversity, particularly that in protected wilderness requiring pristine habitat.

Introduction

Wilderness inventories and assessments frequently use biophysical naturalness as an indicator of wilderness quality. For example, the Australian National Wilderness Inventory (ANWI) describes biophysical naturalness as "the degree to which the natural environment is free from biophysical disturbance caused by the influence of modern technological society" (Lesslie and Maslen 1995). However, it is proposed that biophysical naturalness is not an adequate measure of biodiversity and, consequently, can underestimate the true biological value of environments with wilderness qualities. Furthermore, within the study of wilderness science it is contended that there is insufficient regard for biodiversity issues although it is assumed that wilderness offers unique biological protection opportunities. It is argued that more accurate measures of biological values should be incorporated into wilderness assessments in addition to the appraisal of biophysical alteration. It is proposed that a reason for the lack of incorporation is the paucity of available biodiversity information, particularly at a large scale. Furthermore, this may be exacerbated by a lack of understanding of the contribution of wilderness environments to biodiversity and how certain environments are conducive to the persistence of wilderness.

A research analysis strategy has been designed to determine the extent to which environmental factors explain variation in the distribution of species richness and wilderness at the global scale. Also, this research explores whether species richness makes a contribution to the distribution of wilderness and vice versa. This research began with analysis at the global scale, and so it was considered important to determine precisely which environmental factors might be responsible for the distributions of wilderness and species richness. There has been considerable research into the causes of species richness variation, for example, latitudinal gradients (Rohde 1992) and water energy dynamics (O'Brien 1998), and although theories are still being debated there is at least some consensus about the main causes in this variation. In the field of wilderness science we have not attempted to explain the patterns of wilderness distribution, although we may be able to intuitively describe the characteristics of the environments in which it currently exists. It is important to distinguish between factors responsible solely for wilderness, such as remoteness, and those related to species richness, such as soil type, and those that may serve to affect both. These key variables have been isolated and are shown in the conceptual model (fig. 1).

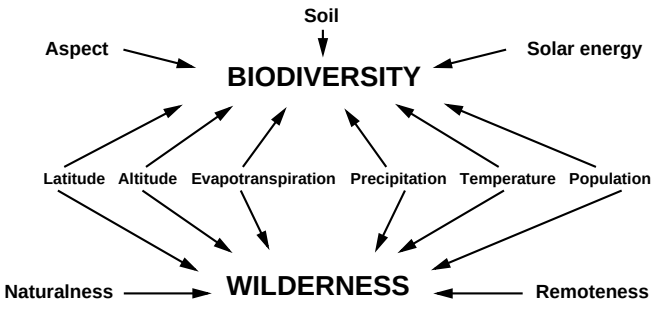

Figure 1—Conceptual model: factors identified as important for the distribution of biodiversity and wilderness.

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Global Hypotheses

Using the global biodiversity and wilderness conceptual interaction model (fig. 1) as a starting point, it was possible to define a series of research hypotheses and these are summarized in table 1. These hypotheses have determined the content of this analysis. However, because it is not clear which factors are most important, the process has been inductive, allowing the data to shape the conclusions without being confined by the hypotheses.

Method for Global Analysis

Table 2 lists the data used for the global analysis. While nationwide or even continental databases of species richness doubtless exist, for example the North American Breeding Bird Survey, such information is rarely available from a single source for the whole World. The national data from Groombridge (1994) proved to be the most appropriate source of global species richness data for this analysis. We considered it important to use taxa that have been relatively well inventoried, and for this reason mammals and birds were chosen. However, some indicator of phytodiversity needed to be incorporated because case studies at smaller scales included tree and plant diversity. As a result, the flowering plant (angiosperms) and conifer and cycad (seed-bearing plants) groups were also incorporated from the Groombridge (1994) data set.

The use of national species richness data necessitates some consideration of the relationship between species and area. While there are grounds for presuming a linear relationship between species richness and area on a logarithmic scale (MacArthur and Wilson 1969), there has also been considerable debate about nonlinear relationships between the richness of individual groups and area (for example, Rahbek 1997). In this work, however, the $\log_{10}$ of species richness has been regressed against the $\log_{10}$ of country area, as an independent variable. Thus, we can quantify the extent that species richness depends on area for these groups. The residual values produced from the regression models indicate how far removed from expected each of the

Table 1—The basic research hypotheses generated from the conceptual model.

Species richness is high in areas with:	Wilderness quality is high in area with:
Low latitude	High latitude
Low altitude	High altitude
Low water deficit (AET = PET)	High water deficit
High precipitation	Low precipitation
Moderate to high temperature	Extremes of high and low temperature
Moderate to high population	Low human population

Table 2—Data type and source for the global analysis of environmental factors influencing the distribution of wilderness and species richness.

Environmental factors	Data requirements	Data source
Wilderness	Global wilderness inventory	Polygon coverage, McCloskey and Spalding (1989);
	Continuous wilderness grid	22 category wilderness grid, WCMC (2000); Lesslie (2000, personal communication)
Species richness	Global species richness for flora and fauna	Mammals, birds, flowering plants, and conifer and cycads national species richness data, Groombridge (1994)
Population	National population statistics	1995 mid-year population estimates, Census Bureau of the U.S. (1995);
	Rural:urban population proportions per country	Urbanization estimates, United Nations Population Division (1998);
	Urban area per country	Global Land Cover Characterization, U.S. Geological Survey and others (2000)
Latitude	0.5 decimal degree resolution grid	Created in Arc Grid
Elevation	High resolution global digital elevation model	5-minute resolution DTM5, Skellern (1999) derived from ETOP05, NGDC (1988)
Climate	Global precipitation grid	30-minute monthly means, Leemans and Cramer (1991);
	Global temperature grid	30-minute monthly means, Leemans and Cramer (1991);
	Global potential evapotranspiration grid	30-minute monthly means, Ahn and Tateishi (1994a);
	Global actual evapotranspiration grid	30-minute monthly means, Ahn and Tateishi (1994b);
	Global water deficit	Calculated from Ahn and Tateishi (1994a,b)

national richness values are. In further analyses, these residual values have been used as the measure of species richness.

Only one global wilderness database has been published (McCloskey and Spalding 1989) (fig. 2). However, its classification criteria are very strict, as clearly seen by the absence of wilderness in the contiguous 48 States of the United States, although there are many protected wilderness areas there. Individual nations that protect wilderness define allocation criteria that are applicable to their country. For example, some countries enable cultural issues to be incorporated. This process means that there is a wide difference between the real nature of wilderness in each of the countries that have protected it. A worldwide wilderness assessment, such as McCloskey and Spalding (1989), is useful because it applies the same criteria ubiquitously. However, this inventory does not facilitate the identification of areas with wilderness qualities that are less remote from human features. To be able to identify wildernesslike environments in every country, a "sliding scale" of wilderness, or decreasing levels of wilderness quality, need to be determined. In conjunction with the World Conservation Monitoring Centre (now UNEP-WCMC), Lesslie (personal communication) has replicated the procedures for the Australian National Wilderness Inventory (Lesslie and Maslen 1995) using the Digital Chart of the World as the major data source (Defense Mapping Agency 1992). The product is a grid-based continuous wilderness database that defines 22 wilderness quality classes and can be seen in figure 3. Unlike the ANWI, the global wilderness grid was not constructed using biophysical naturalness as one of its four criteria, as there is a lack of global data of this type.

Data for each of the environmental factors are available from grid-based maps, commonly at a resolution of 0.5 decimal degrees (dd) or 30-minute interval. The species richness data are only available nationally, which means analysis must occur at this scale. To compensate, a series of summary data have been compiled for each climatic and geographical factor in order to account for the wide variation in conditions experienced within the countries. The summary statistics of mean, minimum, maximum, and range were calculated for each variable. For the population data, density and rural population density were calculated using the Global Land Cover Characterization (USGS and others 2000) and rural to urban population proportion data (United Nations Population Division 1998).

Principal Component Analysis (PCA) was applied to each of the groups of summary variables to reduce the total number of variables to be tested. For example, mean, range, maximum, and minimum elevation data were reduced to a single axis or factor. This new axis accounts for the variation found within the four summary statistics. In this way, the variation is integral to the analysis and not unnecessarily oversimplified. Because the climatic variables of temperature, precipitation, and evapotranspiration (actual and potential evapotranspiration and water deficit) are closely related, we decided that they should all be entered into a PCA model to derive one axis that summarizes all of these variables. In this way, the assumption of linear regression that the predictor variables are independent is upheld. The new axes from the PCA were used in a series of backward stepwise multiple regression models to investigate the contribution of each environmental factor (independent) on species richness and wilderness (dependent factors). This facilitates the analysis of whether species richness directly affects wilderness and vice versa. Furthermore, the regression coefficients (B) from the models indicate by how much and in what direction (positive or negative) the independent factor is influential.

Figure 2—Reconnaissance inventory of the amount of wilderness remaining in the world (McCloskey and Spalding 1989). Each wilderness polygon must be 400,000 ha (1 million acres) in size and at least 6 km from features such as roads or other development (reprinted with permission of AMBIO, the Royal Swedish Academy of Sciences).

Figure 3—Global grid-based wilderness continuum at a resolution of 0.5 decimal degree (30 minute) (Lesslie 2000, personal communication). High quality wilderness is in black, with grey representing low quality wilderness—urban and developed areas (printed here with kind permission of Rob Lesslie).

Results of Global Analysis

Results From Analysis With all Climate Variables Combined

Table 3 summarizes the results of the regression models by showing the dependent variable, the predictor variables remaining after the final step of the model, and the adjusted R^2, which indicates how much variation is explained by the predictor variables. The results indicate that climate is important for the distributions of mammalian, avian, and angiosperm species richness. Latitude is identified as a predictor for the pattern of mammalian, avian, and seed-bearing plant species richness. We could argue that climate and latitude are the most important determinants of species richness, as they are identified most frequently in these models. The results indicate that the models are much better at predicting the causes of mammalian and avian species richness (variation explained is 42.0 percent and 36.2 percent, respectively) than of phytodiversity (flowering plants, and conifers and cycads, 16.7 percent and 16.6 percent, respectively). This may be due to the quality of the data used for these groups, as both the mammal and bird groups are proportionately better inventoried than the other two groups.

The normal probability plot of the residuals from the angiosperm regression revealed that this group does not share a linear relationship with area, as assumed. Without this relationship with area, the regression procedure will not be able to explain this group well. Conifers (seed- bearers), unlike the other groups, have a particular geographic distribution, with species richness being higher at low latitudes and very few of their form found in the tropics. For cycad richness the reverse is true, but there are few species in this subgroup. The group is therefore biased toward temperate locations, and again the procedure used here is not good at dealing with this pattern.

For wilderness, an interesting trend in the determinants emerges through this analysis. At high levels of wilderness quality, both from the McCloskey and Spalding inventory (1989) and Lesslie's continuum (2000), a combination of climate, elevation, and population are significant predictors. For categories 1 and 2, latitude is also identified as an important determinant. Consultation of maps of the various wilderness quality classifications indicates that Lesslie's categories 1 and 2 are higher in wilderness quality than McCloskey and Spalding's polygon wilderness. The maps also reveal that quality category 3 most closely approximates the polygon inventory. At this level, latitude ceases to become important, and predictors of the Lesslie continuum once again match the McCloskey and Spalding predictors. Climate, elevation, and population continue to drive the distribution of the quality categories of 7 and 11. At category 15, the explanatory power of the model peaks at 37.9 percent, and latitude replaces climate as a predictor variable. For the lowest quality wilderness (17–21), elevation is the only predictor that significantly shapes the distribution, indicating that this also determines the nature and extent of human activity that is the basis for this evaluation of wilderness.

Results From Analysis With Climate Variables Included Independently

The use of a single-climate axis does not facilitate the identification of the individual facets of climate included in the research hypotheses. In addition to the first model run, the results of which are shown in table 3, a second run of the regression models was carried out where each of the climate variables were entered separately. Instead of combining temperature, precipitation, and evapotranspiration into one PCA axis, each of these factors, consisting of their respective summary variables, were inputted into their own PCA run

Table 3—Results from the stepwise multiple regression of environment factors against species richness residuals for four major groups and wilderness from the McCloskey and Spalding (1989) polygon inventory[b] and various wilderness qualities from Lesslie (2000, personal communication), where Quality 1 is high and Quality 21 is low[c]. Each quality category consists of the proportion of land of that quality, in each country, plus all that at higher levels (cumulative). LAT = latitude axis, ELEV = elevation axis, CLIM = climate axis (sum of temperature, precipitation, and evapotranspiration), and POP = human population axis. + and – symbols indicate whether the predictor contributes positively or negatively to the dependent variable. [a]Adjusted R^2 equals the amount of variation explained by the model.

Dependent variable	Predictors in final model	Adjusted R^2
Mammal richness	LAT^{-}, $CLIM^{+}$	0.420 (42.0%[a])
Bird richness	LAT^{-}, $CLIM^{+}$, POP^{+}	.362
Flowering plant richness	$CLIM^{+}$	.167
Conifer and cycad richness	LAT^{+}, $ELEV^{+}$	.166
Polygon wilderness[b]	$CLIM^{+}$, $ELEV^{+}$, POP^{+}	.371
Quality 1 wilderness[c]	LAT^{+}, $CLIM^{-}$, $ELEV^{+}$, POP^{-}	.121
Quality 2 wilderness	LAT^{+}, $CLIM^{-}$, $ELEV^{+}$, POP^{-}	.187
Quality 3 wilderness	$CLIM^{+}$, $ELEV^{+}$, POP^{-}	.206
Quality 7 wilderness	$CLIM^{+}$, $ELEV^{+}$, POP^{-}	.297
Quality 11 wilderness	$CLIM^{+}$, $ELEV^{+}$, POP^{-}	.363
Quality 15 wilderness	LAT^{+}, $ELEV^{+}$, POP^{-}	.379
Quality 17 wilderness	$ELEV^{+}$	.210
Quality 19 wilderness	$ELEV^{+}$	.174
Quality 21 wilderness	$ELEV^{+}$	.153

to define three new axes. Although this method does not ensure that the independent variables are truly independent, it does facilitate the identification of the individual climatic variables that are contributory to the distributions of the dependent species richness and wilderness variables. The results of this analysis can be found in table 4 in the same format as table 3. This analysis reveals that the climatic variables most responsible for the distributions of species richness are in fact precipitation, and for the plant groups of flowering plants and conifers and cycads, temperature is also important. Precipitation is also identified as important for all of the wilderness categories with the addition of evapotranspiration, and for wilderness quality categories 11 and 15, temperature also contributes.

Table 4—Results from the stepwise multiple regression of environment factors against species richness residuals for four major groups and wilderness quality where the climatic factors have been included individually; these factors are indicated in italics. LAT = latitude axis, ELEV = elevation axis, POP = human population axis, EVAP = evapotranspiration axis, PPT = precipitation axis, and TEMP = temperature axis, + and – symbols indicate whether the predictor contributes positively or negatively to the dependent variable. [a]Adjusted R^2 equals the amount of variation explained by the model.

Dependent variable	Predictors in final model	Adjusted R^2
Mammal richness	LAT^{-}, PPT^{+}	0.479 (47.9%)
Bird richness	LAT^{-}, PPT^{+}	.381
Flowering plant richness	$TEMP^{-}$, PPT^{+}	.284
Conifer and cycad richness	LAT^{+}, PPT^{+}, $TEMP^{-}$	.284
Polygon wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}	.446
Quality 1 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}	.189
Quality 2 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}	.274
Quality 3 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}	.313
Quality 7 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}	.400
Quality 11 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{+}, POP^{-}, $TEMP^{+}$	.527
Quality 15 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}, POP^{-}, $TEMP^{+}$	.523
Quality 17 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}	.283
Quality 19 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}	.233
Quality 21 wilderness	$ELEV^{+}$, $EVAP^{+}$, PPT^{-}	.207

Does Wilderness Contribute to the Distribution of Species Richness and Vice Versa?

To test whether wilderness quality can actually explain any of the variation in the distribution of species richness and vice versa, each must be incorporated as independent variables into the regression process. To do this, the models where climate is represented by one independent axis were rerun with the addition of species richness in the dependent wilderness models and wilderness in the dependent species richness models. The results indicate that high quality wilderness (category 3) does explain a small percentage of the variation in species richness of the mammal, flowering plant, and conifer and cycad groups, respectively. An additional 5.9 percent, 4.8 percent, and 2.5 percent of the variation is explained.

We might expect an environmental state, like wilderness, to influence the patterns of species richness in the same way that temperature makes a contribution. However, it is difficult to be sure of any contribution of species richness to wilderness. It is perhaps only through the analysis of different groups of species that this might become meaningful. However, the results indicate that for high levels of wilderness quality, mammalian and angiosperm species richness, in particular, do explain some of the variation in the proportion of wilderness at these qualities. For example, mammalian richness adds 10.9 percent to the success of the model to predict the variation in the distribution of wilderness quality category 2. The situation is reversed when the conifer and cycad group is used as an independent predictor of wilderness because it only adds to the explanatory success of models of low wilderness quality. Here, it contributes a further 17.6 percent to the success of the wilderness quality 17 category.

Discussion

The results reveal that different factors are responsible for the distribution of each of the species groups, and some groups are better explained than others. For wilderness quality there is also a fluctuation in the ability of the models to explain the distributions. As quality changes, so do the factors that are considered contributory. The second run of models, where climate variables are entered individually, reveal that only certain aspects of climate contribute to the explanatory power of the models. It is hard to ascertain which of the hypotheses set at the beginning of the research are appropriate without considering the direction of the relationships between the predictor and dependent variables. Included in tables 3 and 4 are an indication of whether each of the predictor variables contribute positively or negatively to the distributions.

The models show that latitude negatively contributes to the distribution of mammalian and avian species richness; low latitude is important for these groups. Latitude does not seem to be important for angiosperm richness, whereas "good" climate, and in particular high precipitation, is important. The model revealed that temperature negatively contributed to angiosperm richness, which is unexpected, but the B coefficient was very low (B = 0.0062). Climate was also important for mammals and birds, and high precipitation was confirmed as important. The pattern is reversed for the conifer and cycad group; latitude positively contributes to richness, high elevation, high precipitation, and low temperatures.

At high levels of wilderness quality (categories 1 and 2), high elevation, high latitude, low precipitation, and low population all contribute to variation. By definition, wilderness is devoid of human features and, therefore, of resident population, so it is to be expected that low population is important in the models. As wilderness quality decreases, high elevation and low precipitation continue to be important contributors to the distributions. For models with climate variables entered together, the lowest wilderness quality categories (17–21) are only explained by elevation.

We can conclude that mammalian, avian, and angiosperm richness prefer low latitudes, whereas high wilderness quality is associated with high latitudes. Altitude was not found to affect the patterns of species richness for these three groups but was an important predictor variable for all of the wilderness categories. Evapotranspiration (actual and potential axis) was not found to be influential to the variation in species richness groups but was repeatedly recognized as important for wilderness. Further interpretation is needed here to elucidate the real meaning of the PCA axis that summarizes this complex interaction. High temperature was found to influence patterns of angiosperm richness but not mammalian or avian richness. In general, temperature was not found to affect the distribution of wilderness. In contrast to the other species richness groups, the seed-bearing plants (conifers and cycads) were positively influenced by latitude and elevation and prefer low temperatures, indicating an affiliation for poor climate. It is possible, therefore, that optimal conditions for this group are characteristics akin to those for high wilderness quality.

Different environmental characteristics appear to shape the distribution of wilderness and the species richness of the groups investigated. At the onset, it was hypothesized that approximately opposing characteristics were responsible for patterns of wilderness and species richness, and it has been shown that to some extent this is true. It has also been found that wilderness environments contribute in a small way to the variation in species richness for some groups. Counter-intuitively, species richness also plays a part in the distribution of wilderness, but we suggest that this may be more correlation than causation. The fluctuation in environmental conditions preferred by the different taxa examined is to be expected and illustrates how important the use of more than one group is to this investigation. National species richness data has constrained this work, and it is expected that should grid-based biodiversity information become available, it will enhance the accuracy of research of this kind. A grid-based wilderness continuum has been useful in improving the quality of global wilderness distribution data.

Further Research

The next step in this research is to identify factors that influence the relationships between species richness and wilderness quality at smaller scales. Access to the 1998, United States Department of Agriculture, Forest Service,

Southeast Alaska Inventory, has facilitated analysis of the effect of distance from human features on species richness on Prince of Wales Island, Tongass National Forest. More indepth field data have been collected to investigate the impact of recreation trails, as a common wilderness impact, on species richness.

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The Shack Revisited: Aldo Leopold's Perceptions of Wilderness From a Historic, Legal, and International Perspective

Till M. Meyer

Abstract—Aldo Leopold (1887–1948) was one of America's most renowned ecologists and nature writers. His family's weekend home, "the Shack," provides the narrative backdrop for describing Leopold's perceptions of wilderness. This paper traces the evolution of Leopold's wilderness concepts through natural history, contemporary history, and cultural history. It also describes his influence on conservation jurisdiction and the globalization of wilderness concepts.

By examining both the natural history of the Shack vicinity and the pivotal historic periods Leopold lived in and stemmed from, many of his insights into conservation can be better understood. Two factors stick out that affected his attitudes the most: Leopold came from a culturally rich European-American background (Flader 1994), and was tremendously influenced by his journeys. Illuminating the larger contexts of Leopold backgrounds, it becomes evident that the history of the conservation movement in America cannot be told without looking beyond the nation's geographical and cultural borders.

As I will show in my paper, quite a few of the motives behind wilderness conservation developed in Europe as a part of the Romantic Movement. Along with the mass immigration from Europe, many of these motives were exported to the United States where they matured and became "America's best idea" (Lötsch 2001). Aldo Leopold was one of the leading figures to carry this idea into effect by way of wildlife management, restoration ecology, and wilderness conservation.

Method

I traveled to the Aldo Leopold Memorial Reserve (LMR) many times between 1989 to 1999 and also visited the Shack and the University of Wisconsin Arboretum. My initial reason for visiting involved the publication of the German translation of *A Sand County Almanac*. As I researched some of the foundations of this book I became interested in the history of conservation. Subsequently, Leopold, his quotes, insights, and teachings funneled into my growing awareness of the interconnectedness of history, culture, and ecology. This became the subject of numerous articles of mine between 1989 and 2001. As a staff editor and freelance writer for the magazines *Natur* and *Natur & Kosmos*, I often report on the development and practical consequences of various concepts of wilderness in Germany and abroad. In this paper, I am also summarizing many of those details and correlations that I found through my journalistic investigations.

Introduction

"If there are cracks in time, Aldo Leopold fell through one," a book reviewer wrote in the journal *American Forests* (Kaufman 1991). Indeed, Leopold began his journey through time in the historic realm of the "Wild West" (fig. 1). Then, strongly influenced by conservation politics and attitudes of the 1930s and 1940s in America and Europe, he proceeded to leave his imprint by creating the conceptual foundations of wildlife management and restoration ecology.

Aldo Leopold's most challenging visions were the ideas that environmental degradation and local loss of species do not necessarily present a one-way street, and that wilderness and civilization need not antagonize each other. The major tools to change the course—wilderness conservation, restoration ecology, and wildlife management—were pioneered by him.

Figure 1—Leopold poses in full cowboy regalia, in Springerville, Arizona, age 22. He arrived here by stagecoach on July 18, 1909, bringing his notion of the West as a wild wonderland, as well as a set of acute senses, a restless curiosity, and an ample young ego (Meine 1988) (photo courtesy of the Aldo Leopold Foundation archives).

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Whereas wildlife management is a widely practiced art and science in many countries today, restoration ecology is not.

Leopold's perhaps most influential achievements came after his untimely death in 1948. His classic, *A Sand County Almanac*, was first published in 1949. This book had considerable influence on conservation, environmental awareness, and institutional policies during the 1970s, 1980s, and 1990s. Finally, with the turn of the millennium, Leopold evolved into a leadership figure of postmodern resource management, not only in the United States but in many other countries as well. For instance, Germany's first International Master of Science Program in Sustainable Resource Management opened as recently as October 2001, at the Technical University of Munich. The course work includes wildlife management and restoration ecology. The program owes its existence partly to the initiative of United States-educated wildlife biologist and Leopold scholar, Wolfgang Schröder (2001, personal communication). This new program presents but one example of the long-lasting transatlantic traffic of conservation ideas.

Figure 2—Aldo and Estella Leopold in front of the Shack, 1942, showing the added bunk wing (photo by A. Carl Leopold).

Natural History

"Wilderness is a resource which can shrink but never grow," wrote Leopold (1949: 199) in *A Sand County Almanac*. Although this remark is widely cited by many wilderness enthusiasts, it should be noted that later in life, Leopold did everything in his power to invalidate this axiom. By spearheading the art and science of environmental restoration, he attempted no less than to prove that environmental destruction could be reversed and, consequently, lost wilderness could be rehabilitated.

The Shack and the land on which it stood had belonged to a bootlegger, who, according to Leopold (1949: viii), "hated the farm, skinned it of residual fertility.... We try to rebuild with shovel and axe what we are losing elsewhere." This and the following sentence summarize what later would become the central thesis of ecological restoration: "The time has come for science to busy itself with the earth itself. The first step is to reconstruct a sample of what we had to start with" (in Flader and Callicott 1991: 211). To initiate these processes of healing the land, Leopold suggested that it would be necessary to retain representative samples of intact ecosystems as a sample of normality. Leopold acknowledged the ecological-scientific value of wilderness as places of reverence for ecological restoration and that one could not study the physiology of Montana in the Amazon, as each biotic province needs its own wilderness for comparison of used land to unused land. Today, the concept of "place of reference" is a backbone to modern restoration ecology, as it presents a genetic resource base for restocking, a place to gain understanding of ecological processes, and a measuring rod for restoration success.

In 1935, Leopold purchased 80 acres (32 ha) of derelict farmland on the Wisconsin River. This land included the burned remnants of a farm building and an old chicken coop, which later would become "the Shack" (fig. 2). The same year he began to work as director of the University of Wisconsin Arboretum. In this position, he strove for a reconstruction of the original Wisconsin rather than a collection of imported trees (Meine and Knight 1999). Both projects, the farm restoration and the University Arboretum (fig. 3), marked the beginning and signal moment of the conservation movement and the first systematic attempt to reassemble disturbed ecosystems (Jordan 1990; Jordan and others 1987). With the purchase by Leopold began a new attitude toward the land, whereby landowners started to reverse the process of land deterioration and to build it back to something like presettlement condition.

Leopold would hardly recognize his farm today. It is a diverse landscape with woodland, oak savanna, prairie, and wetland, managed as the 1,400-acre (566.5-ha) Aldo Leopold Memorial Reserve (LMR). Following is a partial list of plants that can currently be seen on the LMR. They were not recorded by Leopold, who kept meticulous notes, so they were probably not there during his occupancy: Indian paint brush (*Castilleja coccinea*), wild iris (*Iris Virginica*), wild quinine (*Parthenium inegrifolium*), purple coneflower (*Echinacea purpurea*), gayfeather (*Liatris pycnostachya*),

Figure 3—Charles Bradley, Nina's husband, examines prairie plants raised to supply seeds for restoration (photo by Till Meyer).

gerardia (*Gerardia tenuifolia*), turtle head (*Chelone glabra*), and fringed gentian (*Gentiana crinita*). Birds and mammals that can be seen more frequently within the boundaries of the LMR are: the great horned owl (*Bubo virginianus*), ruffed grouse (*Bonasa umbellus*), sandhill crane (*Grus canadensis*), beaver (*Castor canadensis*), and river otter (*Lutra canadensis*) (Ross and Ross 1998).

Such successes in conservation and restoration ecology can be easily attributed to Aldo Leopold and his ecological insights and foresights. They also represent the results of the continuing efforts of his children, especially his daughter Nina (fig. 4) and her family and friends, as well as many members and affiliates of the Aldo Leopold Foundation. I want to reflect throughout most parts of this paper on some of the historical and cultural (nonecological) roots of these conservation successes. Sometimes I find myself musing about the possibility that the wild irises, indian paintbrushes, and cranes found at the LMR might represent more than what we had thought up to now. Acts of divine creation—yes, very likely. Examples of the great American natural and national heritage—yes, for sure. Increasingly however, I feel that they also may owe their existence to the rich cultural heritage that America shares with the "Old Country."

Aldo Leopold probably would have had some sympathy with the interdisciplinary approach which I'm about to take on the following pages. During his trip to Germany in 1935 (fig. 5), at a quiet moment in his hotel in Berlin, he jotted down the following words under the heading of "Wilderness" (Meine 1988: 359):

> One of the anomalies of modern ecology is that it is the creation of two groups each of which seems barely aware of the existence of the other. The one studies the human community almost as if it were a separate entity, and calls its findings sociology, economics, and history, the other studies the plant and animal community, [and] comfortably relegates the hodge-podge of politics to 'the liberal arts.' The inevitable fusion of these two lines of thought will, perhaps, constitute the outstanding advance of the present century.

Contemporary and Cultural

Figure 4—Nina in her backyard prairie garden (photo by Till Meyer).

Figure 5—Leopold in Berlin, 1935, where he visited the renowned School of Forestry in Tharandt near Dresden (photo courtesy of the Aldo Leopold Foundation archives).

History

The year 1935 was a busy one for Aldo Leopold. He helped to organize the Wilderness Society, worked as the Director of the Wisconsin Arboretum, and traveled to Germany for more than 3 months (Meine 1988). As the Leopolds renovated the chicken coop and created a weekend home, they called it "the elums," then "Jagdschloss" (hunting chalet), and finally "the Shack" (Meine 1988). The outhouse was referred to as "the parthenon." These humorous namegivings not only illustrate the gay family atmosphere of the Leopolds but also show that they were (and still are) a culturally sensitive bunch, open to influences from the Old Country.

"This sand farm in Wisconsin," Leopold (1949: ix) wrote in *A Sand County Almanac*, was "worn out and then abandoned by our bigger-and-better society." These words are a concise, almost poetic comment on the roaring twenties, to which he also referred to as being heedless and arrogant.

Ecoculturally, this period was characterized by the first assault on land by mechanized agriculture. In the United States, the Dust Bowl, and to some degree the Great Depression, can be considered historic consequences of the attitudes and practices that Leopold criticized.

After his trip to Germany in 1935, Leopold noted that one of the most insistent impressions received from traveling in Germany was the lack of wilderness in the landscape (Flader and Callicott 1991). Meine writes, "This realization haunted Leopold and strengthened his determination to avoid the same fate in America" (Flader and Callicott 1991: 226). Leopold wrote,

> I hope that we may begin to realize a truth already written bold and clear on the German landscape: that success in most over-artificialized land uses is bought at the expense of the public interest (Flader and Callicott 1991: 228).

In *A Sand County Almanac,* he referred to his German experience:

> Ability to see the cultural value of wilderness boils down, in the last analysis, to a question of intellectual humility. The shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important; it is such who prate of empires, political or economic, that will last a thousand years (Leopold 1949: 200).

And:

> In human history, we have learned (I hope) that the conqueror role is eventually self-defeating. Why? Because it is implicit in such a role that the conqueror knows, *ex cathedra,* just what makes the community clock tick, and just what and who is valuable, and what and who is worthless in community life. It always turns out that he knows neither, and this is why his conquests eventually defeat themselves (Leopold 1949: 204).

Leopold wrote these sentences shortly after WWII, thus not only remarking on the cultural roots of ecological degradation but also on the attitudes of the political leaders of Nazi Germany.

Meine even suggests, however subtly, that the prevalent political attitudes in Germany of 1935 furnished a strong metaphor to Leopold's own political *and* ecological attitudes:

> For him, a further 'lesson in naturalism' was the ties that bind together our communities—human and natural—are often poorly recognized, understood, or appreciated, and that they are severed at our own risk. Turned around, that meant that when we conserve our communities, we conserve ourselves as well. It is a lesson we still struggle to heed (Meine 1994: 9).

Leopold's sensitivity regarding the cultural arrogance of man vis-a-vis the land emerged neither in Wisconsin nor in Germany, but while he was in New Mexico and Arizona, where he began his career as a forester in 1909. Leopold's concern about soil erosion developed while he was in the Southwest and later found focus in Wisconsin. He returned to the United States determined to avoid the overly artificial management of land and wildlife that so profoundly unsettled him in Germany (Flader and Callicott 1991). Apparently, Leopold applied to one region that which he had learned from another.

Even though he romanticized the American Wild West to a degree early in his career, he also criticized the ignorance of this era that led to unwise land use. He did this at a time when conservation was practically unheard of in America, and when the Wild West's classical heroes, the cowboys, the loggers, the forty-niners, the hunters, and the trappers, were mystified in many parts of North America and Europe. That these characters of the Wild West more often than not acted as agents of environmental destruction had escaped most Wild West aficionados. In fact, large-scale mining, grazing, hunting, and logging at the turn of the century had already left many a mark on the land. Sadly, Leopold (1949: 148–149) wrote:

> Man always kills the things he loves, and so we the pioneers have killed our wilderness. Some say, we had to. Be that as it may. I'm glad I shall never be young without wild country to be young in.

It can be safely said that Leopold's wilderness attitudes were also a result of the historic periods that occurred decades before his lifetime. When he graduated from Yale in 1909, National Parks such as Yellowstone (1872), Yosemite (1890), Mount Rainier (1899), Crater Lake (1902), and Wind Cave (1903) had already been established. Conservation was "in the air," and legal protection of wild nature was supported by a considerable part of American society. During the presidency of Theodore Roosevelt (1901–1909), for instance, more than 312,500 miles^2 (809,371 km^2) of National Forests, National Monuments, National Parks, and wildlife refuges were proclaimed as public domain. Roosevelt also appointed several prominent commissions, through which he shaped a coherent national conservation policy (Meine 1988). From abroad, these conservation successes were seen with envy. In 1913, James Bryce, Historian and British Ambassador to the United States, called National Parks, "America's best idea" (Lötsch 2001).

Much of the motivating force behind "America's greatest idea" came from *inside* America, from the rapid exploitation of American landscapes and resources by European settlers in the 1800s, as well as the rise of industry and the automobile culture in the late 1910s and 1920s (Meine 2001, personal communication). Leopold (Flader and Callicott 1991: 131) wrote,

> Do not forget that the good roads mania, and all forms of unthinking boosterism that go with it, constitute a steamroller the like of which has seldom been seen in the history of mankind...and unless the wilderness idea represents the mandate of an organized fighting and voting body of farseeing Americans, the steamroller will win.

"America's greatest idea," however, also had distinct foreign components to it. On the following pages, I want to talk mostly about some of the motivating forces for the Wilderness Movement that came from *outside* America. The story of the American Conservation Movement would only be half told if it were examined just by looking within the boundaries of the United States. The picture becomes more complete when the evolution of conservation in America is also regarded as the outcome of a transatlantic mixed bag of ideas, historical forces, and cultural frictions.

Leopold's ancestors came to the United States from Germany between 1834 and 1848 (Meine 1988). Historically, these journeys were a part of a greater immigration pattern from Europe; between 1820 and 1929, 32,129,908 Europeans immigrated to the United States, 5,881,032 of these were of German nationality. They, in fact, comprised the

largest national group (Helbich 1985; Wittke 1939). Sauk County, Wisconsin, which now harbors the LMR, had a particularly high immigration rate from Germany. By 1890, over 60 percent of the population of this County were German born (Zeitlin 1977). It should be noted here that Leopold's ancestors first settled in Iowa.

The reasons behind this immigration were manifold. During the late 18th and early 19th century, immigrants often left to escape political suppression and economic injustice—societal obstructions, such as virtually impenetrable class distinctions, paralyzed thoughts, speech, and movement. Even at the end of the 19th century, Germany still consisted of a loose conglomeration of several dozen distinct territories ranging from free cities and dwarf duchies to giant states such as Prussia. There were plenty of Kings, Dukes, Earls, and Lord Mayors to impose restrictions. Pastimes such as hunting, fishing, or even walking leisurely in the woods often were highly punishable as trespassing acts of traditional feudal rights. These humiliations and deprivations of physical and intellectual freedom in the Old Country resulted in the establishment of a great many "free thinking societies" in the "New Country," which were often associated with the Turnverein (gymnastic societies). Its objective was to stress physical and social improvement (Wittke 1939; Zeitlin 1977).

It would be misleading to think that 19th and early 20th century nature lovers in Europe were kept from enjoying nature altogether. Some more advanced cultural centers had begun to build metropolitan parks such as the "English Garden" in Munich, which was completed around 1816. These English Landscape Gardens were especially designed for the enjoyment of all the people and not just the old guard, thus marking the societal changeover of the period (Freyberg 2000). Janson (1977) writes that the English Landscape Gardens were carefully planned to look unplanned, with winding path, irregular spaced clumps of trees, and little lakes and rivers instead of symmetrical basins and canals. They were designed to seem as unbounded, and full of surprise and variety, as nature itself. In many ways, English Landscape Gardens anticipated the aesthetic and democratic appeal of what would later become part of wilderness conservation and restoration ecology in America.

It should also be noted that English Landscape Gardens increasingly became regarded as a sort of aesthetic antidote to the "over-artificialized" landscapes. Leopold acknowledged:

> And this calls to mind what is perhaps the first element in the German deficit: their former passion for unnecessary outdoor geometry... Most German forests, for example, though laid out over a hundred years ago, would do credit to any cubist.... I also saw many a creek and rivulet laid out as a dead snake, and with masonry banks to boot. I'm depressed by such indignities, and I have black misgivings over the swarm of new bureaus now out to improve the American countryside (Flader and Callicott 1991: 227–228).

The passion for unnecessary outdoor geometry is very much a part of German forestry tradition. Lowood (Harrison 1992: 123) states:

> The German forest became an archetype for imposing on disorderly nature the neatly arranged constructs of science. Witness the forest Cotta chose as an example of his new science: over the decades, his plan transformed a ragged patchwork into a neat chessboard. Practical goals had encouraged mathematical utilitarianism, which seemed, in turn, to promote geometric perfection as the outward sign of the well managed forest; in turn, the rationally ordered arrangement of trees offered new possibilities for controlling nature.

Heinrich Cotta (1763–1844), parenthetically, was a forest scientist and founder of the School of Forestry in Tharandt near Dresden, which Leopold had visited in 1935.

"Mathematical utilitarianism" and the "rationally ordered" naturally presented pet peeves for many romantics of the same period in which Cotta lived. This dualism comes out very well in the lamentations of the poet Caroline von Günderode (1780–1806). In her poem *Former Times, New Times*, she writes:

> A rough and narrow path that crossed the earth,/overseen by mountains and the gleaming skies above,/A gorge on its side was hell,/and many a path would deviate into abyss and into heaven.//All this has changed now,/The skies have fallen,/ the gorge is filled up, and covered with reason.//The highs of faith have been demolished./Purpose is walking on the flattened earth,/And it is measuring the universe in feet and yards (Wolf 1981: 10).

Even though aesthetic, intellectual and physical frustrations were a continuing motive behind immigration, toward the end of the 19th century, it became overlaid more and more by mass unemployment, poverty, and social upheaval, which resulted from the Industrial Revolution. The shadier aspects of the Industrial Revolution, sometimes referred to as the "Machine Age," also presented considerable motivating power for the Romantic Movement. In Europe and later in the United States, with the rapid spread of cities, factories, and their attendant social dislocations, people came to question whether the Industrial Revolution really represented progress. Locked in the drudgery and grime of manufacturing communities, more and more people followed poets and philosophers in embracing nature as an avenue of escape. The Romantic Movement, for example, in its praise for the strange and mysterious in nature, by definition preferred landscapes only suggestive of human occupation (Runte 1987).

Caroline Günderode's English contemporary, George Gordon, alias Lord Byron (1788–1824) writes in similar, yet less metaphorical verse than Günderode:

> There is a rapture on the lonely shore,/There is society, where none intrudes,/By the deep sea, and music in its roar/ I love not man the less, but Nature more,/From these our interviews, in which I steal/From all I may be, or have been before,/To mingle with the Universe, and feel/What I can ne'er express, yet cannot all conceal (from the poem *Childe Harold's Pilgrimage Canto iv,* verse 178, quoted in James Fenimore Cooper's *The Deerslayer* [1963: 9]).

This neatly illustrates the mutual crosspollination of wilderness attitudes—a European romantic's (Byron's) poetic attitude toward wilderness was used to describe the wilderness longing of (Cooper's) American legendary frontiersmen, Leatherstocking. This legend is then later re-imported to Europe, where Leopold noticed that, "the Germans are still reading Cooper's Leatherstocking and Parkman's *Oregon Trail* and still flock to wild-west movies" (Flader and Callicott 1991: 227). He wondered why this fascination with wilderness did not have practical consequences, and "why people did not flock to [the] forest to camp out, as in America" (Flader and Callicott 1991: 227).

This predisposition to admire nature originated in the Romantic era. Fernández-Armesto (1995) noted that Europeans who traveled to America during earlier periods were hardly inclined to awe at landscapes, and that only after transformation by the sentimental cult of the 18th century did the American landscape find its place in romantic imagination. This change of attitude from the rationalistic and detached to the passionate and enraptured was notably excited by the 1789 French Revolution and its "marvelous promise of freedom" (Cardinal 1975). It tremendously influenced a wide variety of fields such as literature, art, science, and politics, and lasted well over one hundred years before it disintegrated with the "Stahlgewitter," (the Steel-Storm of WWI) (Fernández-Armesto 1995).

Incidentally, the end of the 19th and beginning of the 20th centuries also saw the publishing of the *Encyclopedia of the German Language* by Jacob and Wilhelm Grimm (1960) in 16 Volumes (1838–1960). Most of it was published and compiled posthumously. Volume 14 features a seven-column entry on the meaning and usage of "Wildnis" (which is the German translation of "Wilderness") and quotes more then 160 examples and sources. In the history of literature, the Grimms are considered representatives of the "Hochromantik" (High Romantic). More widely of course they were renowned for their fairytales (published 1812–1815). Much less known is the fact that they both also cared for the conservation of wilderness for national identity. In 1812, the brothers published a journal entitled *Altdeutsche Wälder*, or *Old German Forests*, which explicitly linked German forests to the genesis and continuity of authentic German culture (Harrison 1992).

The entry for *wilderness* in the Grimm's encyclopedia was compiled in 1913, just 1 year before politics brought an end to the Romantic era. A closer investigation of this entry reveals that many of the quoted authors such as Heinrich Heine, Gottfried Herder, Friedrich Hölderlin, Bettine von Brentano, and Richard Wagner are considered representatives of the Romantic era. The fact that many authors have noted that it is virtually impossible to think of German fairytales without thinking of a forest (Schama 1996) further suggests that a vague, perhaps even subconscious, longing for wilderness preoccupied many Europeans when they finally decided to immigrate to the United States. The exodus from Europe was slowed down significantly in 1924 when America introduced an immigration quota for Europeans (Henningsen 1974).

The composer Richard Wagner (1813–1883), mentioned above, was considered both a revolutionary (for partaking in the German Revolution of 1848) and archetypal representative of the Romantic era. He also was a wilderness buff and an avid mountaineer. In 1853, during a lengthy trip through the mountains of Switzerland, Wagner talked enthusiastically about the "sacredness of wild country." His opera Rhinegold (premiering 1873), for instance, bemoans the deflowering of pristine and untouched nature by materialism and an unrelenting lust for gold (Palm-Beulich 2002, personal communication). Wagner was also characteristic of the romantics' inclination to somewhat idealize America. His strong and enduring interest in the seductions of the New World, emigration to the United States, and the gold rush is easily demonstrated (Hörisch 2001) and not particularly original. Wagner had a thorough knowledge of the works of a number of authors, such as Goethe, Achim von Arnim, Johann Gottfried Herder, Nikolaus Lenau, Jean Paul and Ludwig Börne, Heinrich Heine, Heinrich Zschokke, Karl Gutzkow, and Gottfried Keller, who were fascinated by America before the gold rush, and independently of it. That America had it better in many respects than the tired old continent of Europe became an often quoted maxim of Wagner's youth thanks to the following verses of Goethe (1749–1832) from 1831 (Hörisch 2001: 58):

> To the United States: America you have it better/Than our continent so old./You have no ruined castles,/No basalt hard and cold.//Within nothing daunts you/In the prime of life;/No useless memories haunt you,/nor any futile strife.//Enjoy—and use—the present!/And if your progeny writes,/May their tales not tell of ghouls,/or damsels, thieves, or knights!

To sum up, the Wilderness Movement in the United States was in part fired up by the same motivating forces that acted earlier on the Romantic Movement in Europe (Meyer 2001). Both the movements were expressions of heartfelt deficits and frustrations born out of the Industrial Revolution and an overload of old tie-down-traditions. Both were the product of a growing sense of alienation from nature and a loss of authenticity; and both finally, presented an "avenue of escape" from the various dire aspects of society. In curious ways, both the Romantic and the Wilderness Movements were reacting against a society that was changing too slowly and at the same time changing too fast.

Through letters from immigrants that reached the Old Country (Helbich 1985; Wittke 1939), news spread rapidly that America was indeed a great place to live. Societal values such as democracy and freedom (also fostered by many romantics) were in a promising fledgling state in many parts of the New World. Also, stories that told of spectacular scenery and the promise of bountiful natural resources added to the sense that a veritable paradise lies just across the ocean.

It is easily understood that many a frustrated soul of the Romantic Movement longed to sail to America, which presented a "projection screen" (Naumann 2001) for ideals and desires that could not be fulfilled in Europe. This makes the Romantic Movement in Europe a contributory branch to the American Wilderness Movement, as Nash (1982) suggests. But there is one major difference between the American Wilderness Movement and the European Romantic Movement, which should be noted: The latter traditionally consisted of longing, but not quite arriving. Cardinal (1975) notes that Romanticism is rooted in a sense of rift between the actual and the ideal. Romantic painting, poetry, literature, music, and dance were all, in a sense, expressions of unmet desires, practicing the cult of the unreachable, which was so characteristic of the Romantic Movement (Fernández-Armesto 1995).

The Wilderness Movement, in stark contrast to this, was and still is, aimed at identifying, protecting, and recreating *real places* and not *imaginary* ones, however sophisticated. This is what makes the Wilderness Movement so uniquely American after all: Americans just don't have a tradition of enduring centuries of frustrated longings without doing anything about it! The constitutional right to the *Pursuit of Happiness* is ingrained in the movement to preserve Wilderness.

This almost, but not quite, answers the question why National Parks, and consequently wilderness, evolved to be "America's best idea." There was more: Runte (1987) notes

that unlike established European countries, which traced their origins far back into antiquity, the United States lacked a long artistic and literary heritage. The absence of reminders of the human past, including castles, ancient ruins, and cathedrals on the landscape, further alienated American intellectuals from a cultural identity. By the 1860s, in response to the *constant barbs* about these deficiencies from Old World critics and New World American apologists, many thoughtful Americans had embraced the wonderlands of the West as replacements for manmade marks of achievement. The agelessness of monumental scenery instead of past accomplishments of Western Civilization was to become the visible symbol of continuity and stability in the new nation. The *constant barbs* were almost a trademark for many German newcomers. Many Americans took offense that amongst them (the immigrants) were many Catholics, some socialists, and no few cultural chauvinists (Helbich 1985).

In other words, the alleged and perceived lack of culture in America partook in giving rise to the culture of wilderness preservation. Leopold (1949) felt that the ability to see the cultural value of wilderness boiled down, in the last analysis, to a question of intellectual humility. One cannot help but speculate that Leopold too must have been aware of European cultural chauvinism.

Legal Aspects

Among many wilderness enthusiasts, Leopold is known for initiating administrative protection for the world's first designated wilderness area, the Gila Wilderness Area in New Mexico, established June 3, 1924. As much as Leopold believed in the scientific and ecological value of wilderness, he had a special interest in wilderness for recreation. This partiality is evident not only in Leopold's writings but also in the Wilderness Act, the legislation which established the National Wilderness Preservation System in 1964. The Wilderness Society, of which Leopold was a founding member, played an important role in the creation of this act.

In 1984, the World Conservation Union (IUCN) adopted some of the phrasing and contents from the Wilderness Act as a model for creating a new subcategory for protected areas: Wilderness Area, IUCN category 1b (IUCN 1984). This not only illustrates a breakthrough in international conservation thinking, it also shows that the social assets of wilderness finally became recognized on an international level. Today, this recognition of the value of wilderness for societal reasons very often adds the needed impetus to protect wilderness, since moralistic or scientific argumentation alone often does not present ample enough reason for lawmakers to support wilderness (Easley and others 1990).

According to Leopold (1949: 194), some of the basic criteria for an outstanding wilderness recreation experience were the exclusion of mechanized tools, motorized vehicles, and good roads. He explained why this was important: "Recreation is valuable in proportion to the intensity of its experiences, and to the degree to which it *differs from* and *contrasts with* workaday life. By these criteria, mechanized outings are at best a milk-and-water affair" (italics are Leopold's). About gadgets he said: "I'm not such a purist as to disdain all of them, but I do claim, that the presence or absence of gadget inhibitions is a delicate test of any man's outdoor education" (Meine and Knight 1999: 44).

Indications of Leopold's bias against gadgets can readily be seen at the Shack today (fig. 6), where electricity and plumbing are still absent. Leopold (1949: viii) would often refer to the Shack as "the weekend-refuge from too much modernity." Though he readily used many modern conveniences during his everyday life, Leopold valued equally the ability to go without them, and fostered a "healthy contempt for the plethora of material blessings" (Leopold 1949: ix). The special psychological and physiological faculties that enable humans not only to endure but also to enjoy wild places make wilderness conservation a social asset. Leopold wrote:

> Wilderness is a resource, not only in the physical sense of the raw materials it contains, but also in the sense of a distinctive environment which may, if rightly used, yield certain societal values (Meine and Knight 1999: 107).

Kellert (1996) describes nine basic values of nature: (1) utilitarian, (2) naturalistic, (3) ecological-scientific, (4) aesthetic, (5) symbolic, (6) dominionistic, (7) humanistic,(8) moralistic, and (9) negativistic. Two of these, dominionistic and negativistic, deserve some attention here because they are double edged and easy to misunderstand. Nevertheless, I find that they especially pertain to Leopold's perceptions of wilderness.

About the negatavistic value Kellert (1996: 26) writes:

> Dreading certain aspects of nature may be essential in developing a sense of awe, respect, and even reverence for the natural world. For nature has the power to humble, overwhelm and even destroy human life. People would hardly manifest a healthy deference for the natural world if it lacked the capacity to frighten or intimidate. Has there ever been a god who did not possess the power to terrify as much as express love and compassion?

In regard to the dominionistic value Kellert (1996: 20) states:

> Survival, even in the modern era, is still a tenuous enterprise necessitating some degree of human capacity for endurance and mastery. The ability to subdue, and the skill and

Figure 6—The Shack in 1991. Although modern conveniences such as electricity cannot be found at the Shack, many species of plants and wildlife that were absent in Leopold's time can be discovered in the surrounding landscape (photo by Till Meyer).

> prowess honed by an occasionally adversarial relationship with nature, remain essential ingredients in developing the human capability to survive. Perhaps this may explain why people often feel compelled to keep this aspect of the human spirit alive even when it seems superfluous."

Leopold (1949) thought that public wilderness areas were primarily a means of perpetuating, in sport form, the more virile and primitive skills in pioneering and subsistence. The cultivation of these primitive skills did not have much tradition in Germany.

The current legal definitions of wilderness reflect most, if not all of the nine basic values described by Kellert. Leopold's original attempt to define wilderness emphasized negativistic and dominionistic values. Comparing this with the legal definition of wilderness in the U.S. Wilderness Act, as well as with the IUCN Wilderness Category, certain similarities emerge. Also, the phrase "should offer outstanding opportunities for solitude" was used in both the U.S. Wilderness Act and the IUCN category, suggesting that there must have been some legislative cross-fertilization.

The societal value of wilderness becomes more evident because the Wilderness Act requires that visitor freedom should be a management goal (The Wilderness Society 1984). This reminds us once more of the romantic roots of the Wilderness Movement. The ideas that human beings should not be alienated from nature (public access) and that personal freedom should be valued were ingrained in the Romantic Movement as well. Here we should recall that the Romantic Movement, together with the immigration wave of the late 19th and early 20th centuries, were both efforts to escape mentally, as well as physically, unbearable conditions such as crowded cities and streets and restricted freedom to move about.

The idea that a respite from crowds, cities, streets, and restricted living conditions could be *earned* by declining certain conveniences of civilization is very much a part of the American Wilderness Movement. Many Americans recognize that wilderness stands for self-restraint (Freimund 2001, personal communication), but it does not stand for restriction. While self-restraint has definite societal value, restrictions exerted by power of authority do not carry much ethical value. This difference is important to notice. Even though the IUCN categories universally recognize wilderness as a place to offer "outstanding opportunities," most countries do not yet do this (Martin and Sarathy 2001). Germany is one such country. It has resisted repeated efforts to make wilderness a part of its legal conservation framework (Voss 2001, personal communication). Reichholf (Stampf 2000) points out that many conservationists in Germany even harbor misanthropic motives, as they regard conservation as a tool to protect nature *from* the people and not *for* the people. Reichholf also suggests that there is a latent tendency for devotion to authority in many German conservationists. Kellert (1996) noted that many Germans expressed an unusual willingness to subordinate the practical needs of people to maintain pristine nature or to protect wildlife.

Thus, quite inadvertently, many German conservationists fell back into the Romantic "cult of the unreachable," mentioned previously, and the pre-Romantic and prerevolutionary subservience to authority. At the same time, they fail to recognize some of the more important humanistic aspects of their Romantic heritage. The hard-gained freedom to move about, the intensely romantic notion that man should not be alienated from nature, is jeopardized by relentless conservation jurisdiction and attitudes, as is the great ideal of the age of enlightenment—that people should be treated as responsible citizens. The currently revised Federal Act of Nature Conservation is attempting to do away with this anachronism by paying more attention to recreational use of protected natural areas. Yet it still does not recognize wilderness as a management category for protected areas (Deutscher Bundestag 2001). This jurisdictional deficit was also noted at the 7th World Wilderness Congress and ultimately publicized as Resolution #25 on November 8, 2001 (Sarathy and others 2001).

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Aldo Leopold was first brought to my attention in 1977, by my instructor, Bill Perine, during a course in wildlife management at Hocking Technical College, Nelsonville, Ohio. At that time, however, I did not yet know about *A Sand County Almanac*. That book was pointed out to me in 1983 by Wolfgang Schröder, a professor of wildlife management at the University of Munich. Leopold biographer, Curt Meine, then helped me get in touch with Brend Haglund from the Sand County Foundation in Madison, Wisconsin, who in turn helped me to establish contact with the Leopold family in Baraboo. To all of the above people, I owe my sincere gratitude.

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Norwegian "Friluftsliv"—"Environmental Education" as a Lifelong Communal Process

Børge Dahle

Abstract—The term "friluftsliv," coined by Henrik Ibsen, refers to the outdoor life which has characterized Norwegian culture. This paper considers the role of friluftsliv in maintaining traditional cultural relationships with the Norwegian landscape, in the light of more recent developments, particularly international adventure sports (such as snowboarding) and the adoption of friluftsliv in schools. This paper uses examples to illustrate how friluftsliv traditions find diverse expression in nature-based experiences based on informal social relations and the family, and how it is shaped by everyday access to the natural and cultural landscape. This is contrasted with contemporary trends to institutionalize friluftsliv and contemporary outdoor recreation-based equipment and expensive travel. The comparison suggests that attention should be paid to how institutional and commercial forms of friluftsliv may erode the role of tradition in maintaining a strong connection between cultural identity and environmental sustainability, and provides some insights into how environmental education can be considered as a lifelong, communal process rather than something concentrated in the school.

Introduction

For me, contact with nature and participation in sports and friluftsliv (open-air life) were a natural part of growing up. I first learned to see friluftsliv as something to be *taught* through my studies at the Norges Idrettshogskole (Norwegian University of Sports). There I met my advisor, Nils Faarlund, and as a result of our initial meeting I saw for the first time the link between friluftsliv and nature protection.

I have tried, through teaching friluftsliv in tertiary colleges and the Trondheim Tourist Association, to foster interest in friluftsliv. My studies in biology helped me to understand some of the negative ecological effects of outdoor recreation and left me determined to find ways to prevent them. From time to time, I have found it difficult to balance the use of the outdoors in an ecophilosophical way (best described as "the way is the goal," where the way is to maintain harmony with nature) against my misgivings about exposing plant life to more damage and increasing disturbance to wildlife as a result of this increased traffic.

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Because I recognize that humans are part of nature, and also because I have come to understand that there is a connection between taking action to protect nature and experiencing the joy of being in nature, I remain committed to using education as a means for socialization into friluftsliv and to encourage active protection of nature.

Taking a historical view of the factors which influence an individual's involvement in friluftsliv and of the opportunities for socialization into friluftsliv, we find that things are very different from even one generation ago. The simplicity of friluftsliv is challenged by a higher standard of living and by the amusement parklike repertoire of outdoor offerings. Socialization into friluftsliv as a normal part of everyday life can no longer be taken for granted. We can no longer assume, for example, that families go on walks on Sundays, as was the case during my childhood—today there are many alternative leisure activities.

Friluftsliv can be reinforced in these changed circumstances through the realization that these changes have gone too far. More and more of those now living apart from nature have a sense that something is missing in their lives, as if life without nature is meaningless. In this situation the greatest challenge is to find and implement effective ways to socialize children into friluftsliv.

What Is Learning?

Life-long-learning—humans are in a continual learning process. Experiencing is the basis for learning—one learns through experiencing surroundings and through experiencing the cooperation between the environment and oneself. The basis of the internal learning process is reflection. The result of learning is an acknowledgment that is exhibited in experiencing the mastering of the surroundings and the ability to think in new ways and to behave in new ways. Organizational development—the learning organization is an organization that is able to change based on self-acquired knowledge and experience (Senge 1990).

Humanity, seen as a variety of organizations that live under different life conditions, has developed a variety of cultures because it has always had the ability to function as a learning organization. Meetings between cultures have opened ways for exchange of knowledge and experience. This development has acquired new inspiration.

Culture changes have principally been shown to be irreversible. This also applies to cases where attempts have been made to stop or reverse the development to an earlier stage. This, therefore, puts much responsibility on those who are in a position to lead the change processes. They must be able to see the short- and long-term consequences of their change tactics.

If we focus on the long lines of the "history of learning" we, here in the year 2001, are perhaps returning to an understanding of learning where the essential basic principles in the learning process can be reflected in the history of humankind. With the exception of a short period in human history, where organizations' responsibility for self-learning was replaced with the introduction of institutions that had separate responsibility for knowledge administration, groups of people have taken a general responsibility for learning. Humans have sought knowledge and have had knowledge delivered in order to survive and to further develop society, their own cultures, and themselves.

Learning has been a strong and necessary force for individuals and for a "self-subsistence society" (Kvaløy 1975). In modern times, learning has been disconnected from the natural knowledge-seeking situation. The learning situation is constructed and "the teacher" has responsibility for teaching the students "knowledge and ways" taken from the teacher's own understanding of reality. What is correct and what is acceptable, sound general knowledge, and what is "the custom"?

In extreme situations this understanding of learning led to missionaries traveling to other continents, to towns and outlying areas in order to first unlearn established knowledge and thereafter to force learn vigorous cultures—a foreign knowledge.

The Norwegian Prime Minister Bondevik, in his 2000 New Year's speech, certainly asked the Sami people for forgiveness. But does Bondevik understand what he was really asking forgiveness for? Behind the "Norwegianification" of the Samis is a way of thinking about learning and development that has permeated the modern world for many generations and that shows its best failures in the most extreme circumstances.

With this apology, Bondevik recognizes, not only an injustice against a people, but also a way of thinking about development and learning that has entailed injustices and the deterioration of the life quality of the individual and peoples in all parts of the world. I believe that learning is an important life skill for humans, when learning is based on the individual's power to create their own life and to give this life quality based on their own understanding and with a background in their own resources.

Of course in a modern society there must be institutionalized learning of knowledge and skills. It is a misunderstanding, however, to believe that an institution such as a school can take responsibility for people's development and training in all areas. Friluftsliv, for example, is a cultural phenomenon where the school can hardly be the central arena for socialization. The connection is simple, friluftsliv first and foremost in arenas outside the school.

What Is Friluftsliv?

The mystery of music.

Rhythm, melody, harmony. People need language in order to receive information. Music for feelings. Rhythm steers our life. People have a need to take part in something, to share experiences. Rhythm lies in our heartbeat—the rhythm of life. Rhythm imitates what we hear around us. The sound of nature. Relief in experiencing wide horizons in nature. Nature sounds—orchestrating nature. Music is the difference between life and death.

The melody we are all touched by.

Music comes from the heart. Before, the experience of music (before it could be recorded) was only here and there. Music must be simple, it must be remembered in order to be sung by everyone. Music gives identity. Music is the language of the soul. In music we hear the song of life, nature's song.

Consonance-dissonance in the meeting between people.

Through music we experience earlier events. Without being able to sing or play we understand the language of music. We learn music as we learn language. Music resonates with hormonal power and sexuality. Harmony brings forth passion. There is a connection between the response to music and the life we live. Modern music does not let us forget the core of music—rhythm. Music soothes people as a part of nature. Life's rhythm (Martin, personal communication).

In his hunt for the mystery of music, Martin is searching to understand human nature and its relationship with nature. It perhaps should be obvious to a group working with friluftsliv that the explanation of the mystery of friluftsliv probably lies in humans and their relationship with nature. Music therefore has some things in common with friluftsliv—friluftsliv being understood as an expression of people's joy of being in nature and that the experience can be expressed and shared with others as part of an international common culture.

A master's student defending his thesis closed the defense by asking, "Why has 20 years of research in friluftsliv not managed to capture the essence of the phenomenon of friluftsliv?" Perhaps the student is right, or perhaps he has not found the right sources. But the question at least is interesting. What is the essence of the cultural phenomenon—friluftsliv?

I believe that friluftsliv, first and foremost, is about feeling the joy of being out in nature, alone or with others, feeling pleasure and experiencing harmony with the surroundings—only being in nature and doing something that is meaningful for me—here and now.

What Is the Essence of Norwegian Friluftsliv?

A description of people's practice of friluftsliv can be structured in the following way: The clearly dominant form of Norwegian friluftsliv is that people, starting from their own home or cabin, go out into nature on walks alone or together with others, family and friends, in order to come back later in the day to their own home or cabin. The motives for these walks are often many and complex—to experience nature, to be sociable, physical activity, and so forth (Dahle 1989). The walks are often longest on Saturdays or Sundays, but are often taken during the week. This is "daily walk friluftsliv."

When the typical Norwegian friluftsliv person goes out, they are often on foot or, in winter, on skis. A small group bicycle, and even fewer use other means of transportation such as boats, canoes, and skates. In addition to the nature wanderer satisfying the previously mentioned motives, a relatively large group, as a part of their walk, want to

practice other interests such as fishing, hunting, berry picking, mushroom gathering, photography, looking at plants and birds, and so on.

Another important part of the practice of Norwegian friluftsliv is a tour over several days, staying overnight in tents or cabins. These trips are during the weekends and vacations, "vacation friluftsliv." The motives are the same as for "daily walk friluftsliv."

The Norwegian tour culture has been passed on from generation to generation, and it has its own rituals, which must be learned. Following are some examples of the Norwegian friluftsliv tradition:

Day trip 1: Breakfast together on Sunday morning. Everyone knows that the family is soon on its way to the woods. The thermoses are filled with coffee or tea for the adults and, with hot chocolate for the children. The necessary clothing and equipment for the temperature and weather are found. Some extra clothes are put in the backpack. In a short time, without any particular discussion or planning, the family is out walking in the forest. We meet neighbors and acquaintances, stop for a chat. We look at and talk about phenomena in nature and the cultural landscape. We take off and put on clothes. Then comes the social high point of the trip: we sit down, take out the thermoses and lunch, perhaps light a fire, and talk in friendly tones about things that have happened, future plans and dreams. Then the trip home starts. We have become warm and sweaty. It is good to get home, to take a shower, and to have dinner together, followed by "lounging" on the sofas or on the throw rugs.

> Friluftsliv needs the family to continue to be a living cultural phenomenon and the family needs friluftsliv to ensure good forms of being together (Børge Dahle).

Day trip 2: In Tuesday's newspaper there was an article on where "Wednesday's exercise" would meet. This is this week's tour. Most of the group are single retirees. For most, "Wednesday's exercise" is perhaps their most important social network. Every Wednesday at 10:30, throughout the year, 40 to 70 happy walkers meet. The tour goes to one of the cabins in the forest. The path varies from time to time. These are people who have practiced friluftsliv throughout a long life, and friluftsliv is the basis for their experience of the quality of their life, also in this last phase.

Overnight tour 1: A group of women teachers have talked for a long time about taking a common tour in the mountains. They have used many work breaks to plan, they have looked forward to it, but have also considered the challenges. They have to find a time that suits leaving their children and husbands. They ask themselves, am I in good enough condition—do I need to train a little bit before the trip?

Now the day is here. The backpack is carefully packed. Some experienced mountain backpackers still have their old "pink" anorak (wind jacket)—this makes the group feel confident. But some have a new multicolored anorak and are pretty excited about how the tour will be. They get on the train. At last they are on their way to the first DNT (Norwegian Tourist Association) cabin. They walk and talk excitedly. They worry about their husbands and children, stop often, eat and talk, look at the magnificent landscape. Now they feel free, they manage to forget children, husbands, and the worries from a long and tiring school year. They get a four-person room in the cabin, where the conversation continues. They put on clean sweaters they have knitted on their breaks and go down to be served dinner, coffee, and cake in front of the fireplace, massage their sore thighs, and are ready for the next day.

> Friluftsliv gives us breathing room in a busy world. Friluftsliv gives us an experience of freedom (Børge Dahle).

Overnight trip 2: He has read books about hunting and fishing during the entire winter. He has tied some flies. He doesn't meet his old school friend very often, but the yearly fishing trip holds them together. They can talk for a long time on the telephone. The conversations have to do with last summer's fishing trip and mostly about the big one that got away. What will next summer's fishing trip be like?

The day is here. This year both take their sons with them. They drive a long way to get to this year's spot. They buy food on the road. With heavy bags they arrive at the "fishing water." They set up camp. It doesn't take long before all of them are at the water with their fishing poles in hand. It has been 30 years since they met at elementary school, but now it is as if time has stood still. Family, colleagues, economic problems, and stocks are forgotten. There is only one thing important in the world. The situation is here and now—the boys that need to be taught, the friend from school, the fishing pole, and the trout that will soon take the fly.

> Friluftsliv gives us excitement. Friluftsliv gives us dreams. Friluftsliv is a gift from me to my children (Børge Dahle).

Norwegian friluftsliv tradition can be characterized through many such stories, but there are common elements in the stories. What characterizes this cultural phenomenon and what separates it from an international leisure time culture in nature is, among other things:

- Experiencing nature is key.
- Practicing friluftsliv is not dependent on large costs for traveling and equipment.
- The natural and cultural landscape used is easily accessible from permanent residences and cabins.
- The passing on tradition is strongly anchored in natural social groups such as family and friends (Dahle 1989).
- Friluftsliv is not dependant on organizations—it is possible for individuals to choose their own time and place for practicing it.

In addition to the Norwegian tradition of friluftsliv, we also see that the international leisure activity culture in nature has spread in Norway. The international "outdoors activities" are first and foremost activity motivated and tied to facilities in nature. The activities are most often organized through commercial interests or institutions that run educational programs or short courses. The leisure activity culture is often a part of the commercial travel industry and is organized as long trips, expeditions, or "adventures." They sell an experience package.

The international activity culture has gained much of its inspiration from well-known persons who have made expeditions. Central in Norway are the role models of Nansen and Amundsen on their Polar expeditions, climbing expeditions to Mount Everest, Åsheim, Ausland, Ulvang and Dæhli. They have also gained inspiration from military survival

and from travel writings of canoe expeditions through, for example, Canada's deep wilderness areas.

It is unfortunate, but understandable, that universities and colleges that have a special responsibility for arranging individual Norwegian day trips and for celebrating friluftsliv have let themselves be inspired by the international leisure activity culture. Leisure activity culture and "expeditions" through the education of teachers has been further taken into the state school system. Under the theme friluftsliv, ski days are arranged with Telemark and snowboards, along with canoe expeditions and surviving/overnighting in snow caves in the mountains. Is this the way to learn the key elements of Norwegian friluftsliv tradition?

What is worrying the institutions protecting friluftsliv is that young people to a greater degree than earlier are missing traditional friluftsliv, and they are participating more in the international leisure activity culture. To what degree this concern is based on qualified research results or only on a feeling of a situation is somewhat unclear. The leisure time patterns of youth must be mapped. Many function to different extents in different cultures.

The adult's view of what is the dominant youth culture varies in relation to which arenas the adults look to for themselves. It is not possible to ignore the fact that some leisure activity leaders and friluftsliv leaders, because of their own interest areas, "stay put" in arenas that are dominated by activity trends. The forms of activity for the selected arenas for these leaders become very visible. There are often large groups of people who gather at such places. Other arenas, such as traditional friluftsliv, for these leaders can be much more visible. Remember that traditional friluftsliv is unorganized and is practiced in small local nature areas spread over the whole country.

What is possible to assert is that childen socialized in the Norwegian friluftsliv return to this tradition when they themselves establish families (Dahle 1989). The same phenomenon can be seen in sports. Sports culture is a youth culture where the largest group of "sports youth" are those who have quit sports when they turn 19 (Center for Children's Research, UNIT). Young people who are active in sports in their youth often return to their childhood friluftsliv after they finish their sports career.

Perhaps, therefore, there is no basis for much worry about the leisure time patterns of young people seen in relation to maintaining our friluftsliv. This can be described as a pedagogic error of linkage if we mean that friluftsliv must adjust to the modern youth culture such that the basic values for these cultures are to be recognized in new variations of the Norwegian friluftsliv. The effect of such a strategy will most likely be the opposite of what is desired—the Norwegian friluftsliv tradition will be weakened.

In order to maintain Norwegian friluftsliv tradition, the most effective way will be to ensure that children are socialized within traditional friluftsliv while they are at an age when their leisure time is spent together with their parents. Traditional friluftsliv is open for all and can be practiced throughout one's lifetime. Seen from health, quality of life, and economic perspectives, it makes economic sense that the public sector should first and foremost invest in initiatives that give families with children good opportunities for enjoying traditional friluftsliv.

Meanwhile, it is important to differentiate between primary socialization arenas and arenas that support a socialization process around friluftsliv. The primary socialization arena, in this connection, will be practicing of traditional friluftsliv in a family connection. Important initiatives can be:

- Those that stimulate families with children to practice "daily walk friluftsliv."
- Those that stimulate families with children to practice "vacation friluftsliv."

An important initiative will be to help parents to be good "guides" for their children. This can be done by, among other things:

- Inviting parent groups to courses in tour guiding (for their children, families, and friends).
- Arranging tours where family is invited.
- Having child care centers and schools arrange tours where the family is involved.
- Preferring areas that stimulate families with children to go on tours (such as Children's World of Nature in Rennebu) (Dahle 1989).
- Giving special prices for families with children who are taking trips between cabins in the mountains (perhaps heavily reduced prices for children at DNT's cabins, as now we have free fishing licenses for children under 16).
- Developing programs especially for single parents.
- Arranging for courses in photography, mushroom gathering, and so on.

Arenas that support the socialization process for friluftsliv could be:

- All forms of physical activity, especially done outdoors.
- All forms of physical activity that improve children's coordination so that their ability to go out into nature is improved.
- All forms of activity that increase knowledge and the experience of being out in nature (for example, play in "hundred meter forest" will increase physical capacity, improve coordination, and increase a child's knowledge about and experience of being out in nature) (Fjørtoft 2000).
- "Outdoor pursuits."

Important institutions that could participate in such work are:

- Child care centers and schools.
- Friluftsliv organizations.

The authorities must direct the use of resources at the most effective initiatives to ensure that the traditional friluftsliv tour is available to most people. The authorities must also direct their resources at the organizations that are able to develop effective programs that maintain or increase the practice of friluftsliv in the population.

We will probably see in the future that there is potential for increasing "vacation friluftsliv." It would then be important to stimulate the Tourist Association to work with creating tour opportunities for families with children. The leisure activity culture will increasingly present new trends, and commercial interests will keep these activities alive. Public resources must be directed at broad groups of people

and the groups that have a weak position in the fight for leisure resources. (Swedish surveys from the end of the 1980s show that the Swedish Social Democratic Government used about 90 percent of their resources on leisure sector activities that were used by about 10 percent of the population.) It will always be the case that strong groups push forward with their special interests.

An important side of the Norwegian friluftsliv tradition is that all social groups participate. Of course, high status groups in some special arenas also dominate friluftsliv, but traditional friluftsliv is one of the few arenas for physical activity with participation from a broad base of the population. Traditional friluftsliv does not need physical facilities; everyone can practice it close to home, at the time they want, and with the equipment they feel most comfortable with.

What Is "Knowledge Status" for Norwegian Friluftsliv?

A great deal of work has been carried out to try to understand Norwegian friluftsliv in a historical perspective, particularly when it comes to an understanding of friluftsliv in relation to the Romantics, friluftsliv as a part of the Norwegian identity, Nansen's meaning of friluftsliv, and so forth.

I believe that historically we have put too little weight on the Norwegian people's general close relationship to nature throughout time—perhaps especially country people's relationship. The understanding of this "people of nature's" closeness to nature is a pretty good basis for understanding what happened in the building of the Norwegian identity related to friluftsliv and Norwegian nature, for the position Nansen gained and has as an ideal by the Norwegian people, but perhaps most importantly, for the weight friluftsliv had and still has in Norway.

That friluftsliv still has a large following in Norway can first and foremost be explained by the fact that friluftsliv is a deeply established common culture, where the practice of friluftsliv "tacit knowledge" is still passed on from generation to generation.

Additionally, our settlement structure is decisive. At the beginning of this new century, all Norwegians still have a very short distance to nature and cultural landscapes where friluftsliv can be practiced. The patterns of friluftsliv by the Norwegian people have been constant and are still relatively stable. It is still the simple foot tour and ski trip based on motives of enjoying nature, health, and camaraderie, and on developing nature interests that are strongly dominant. The "people's friluftsliv" is still highly alive, but a lifestyle with stress has meant that some people's practice of friluftsliv is substantially reduced.

Pressure on the traditional patterns of friluftsliv has been great in past decades. The general development of society and new and varied leisure time are some of the more important reasons for this. But pedagogic institutions have also worked to create new forms of friluftsliv activities. A "sportification" of friluftsliv has occurred. In the competition for students, colleges, folk colleges, and sports institutes have needed to target themselves at youth groups, and they have chosen to emphasize trends in outdoor activities and "adventure" tours, even to foreign countries.

Throughout, the pattern of friluftsliv has shown itself to be relatively stable. This can be explained by the fact that youth groups have never been and are not currently a decisive factor for Norwegian friluftsliv. It is the age groups before and after adolescence that are dominant and decisive in friluftsliv. Friluftsliv is an activity form that is practiced from birth to the grave.

Teenagers try out many new leisure time opportunities, either in sport or other leisure activities. Some youth groups, in spite of everything, are very active in the traditional friluftsliv, but they are disorganized and are not very evident. Some youth groups are partly active in friluftsliv, and some are occasionally active. But this pattern is normal and should not be worrying to those who protect Norwegian traditional friluftsliv.

It can also seem as if the pattern of friluftsliv is changing more than it really is. This can be a result of the media's need to focus on the extreme "elite" friluftsliv. It is also probably not too bold to assert that the "celebrity culture," especially within the media, is also "stuck" in the modern youth culture.

We have accumulated a great deal of experience in pedagogic work with friluftsliv over the last 30 years. Different pedagogic methods have been tried. "Conwaying" has become a term and in many ways its own culture within friluftsliv. It represents its own "school" in friluftsliv pedagogy that has been shown to function very well in certain pedagogic situations. Perhaps the use of conwaying should be differentiated to a greater degree for different target groups. (Note: "Conwaying" is defined as sharing the experiences of free nature in accord with the patterns of thought/paradigm and values of the Norwegian tradition of friluftsliv in smaller groups for the joy of identification, as well as for inspiring route-finding in modernity toward lifestyles where nature is the home of culture.)

The "conwayers" position in too many instances has been too dominant in the learning situation. Participation in the practice of friluftsliv demands a fundamental education, a resonance for nature, that requires a free and independent development over time. The core of this development as a sounding board for nature is the experience of being in a rich natural and cultural landscape. We must create a good "learning room" for friluftsliv.

"Advice" for Further Work With Friluftsliv

It will not succeed and will result in a dead end if, through administrative strategies and pedagogic activities, we try to change the traditional friluftsliv patterns by adapting them to values that have their basis in some of the most conspicious parts of modern youth culture. Teenagers have their "sagging pants" and snowboards, but they also go on skiing and fishing trips.

When it comes to people's health and quality of life, it is positive that new activities and forms of play will increasingly pop up. But some forms of activities that have nature as an arena must, when it comes to nature and the environment, be concentrated to limited areas.

There will be continually increasing fights for access to nature and cultural landscape areas. The pressure will be a

result of increased leisure time, increased wealth in the Norwegian population, and increased tourist traffic based on the use of nature. The leisure use of nature areas in the future must, therefore, be limited when it comes to forms of use. General rights must be limited to certain uses of nature. Established uses of nature that have a gentle effect on nature and that have broad roots in the people must be prioritized. Remember that changes in culture are irreversible. A strongly rooted culture that is too weakened or is given a new content will take a long time to build up again to a "self-sustaining" culture, such as Norwegian friluftsliv is today.

Friluftsliv should continue to be available to all. The individual's physical condition and personal wealth should not be deciding factors for participating in friluftsliv. With the development of sport in mind, all attempts that could threaten the "daily walk friluftsliv" or "vacation friluftsliv" should be opposed. Friluftsliv must not be for the elite. A "sportification" of friluftsliv will be destructive. Let friluftsliv avoid becoming a spectators sport.

Additionally, an international and ecological perspective should be taken regarding the social and ecological consequences of friluftsliv that is based on extensive travel activities, use of nature areas, and consequent unfortunate assaults on local cultures. Places of teaching, administrative institutions, and organizations that are supposed to take care of friluftsliv should make their responsibility evident and focus on the Norwegian friluftsliv tradition. It is natural that persons who work especially in the field of friluftsliv (colleges, sports institutes, or research and administrative environment) often consist of people who have a particular interest in friluftsliv. They often have special physical abilities and possibilities to practice a broad spectrum of forms of friluftsliv, including some that are extreme or very resource demanding. These people often appear in professional and social situations that support their way of thinking and behaving. Their understanding and analysis of the friluftsliv phenomenon can be different from what, therefore, is the reality. Dogmatic opinion and self interest is taken to some degree into their professional work, and certain opinions, values, and ways of behaving are carried over to the recruitment process.

It is important to undertake frequent critical evaluations of our own activities within administrative, organizational, and pedagogic institutions that work with friluftsliv. There should be a continual dialogue about what is the core of traditional friluftsliv and examination of this core in relation to our own activity. Without a clear understanding of friluftsliv's core content, it will be difficult to develop effective socialization and recruiting strategies and learning programs for a friluftsliv that is to adapt to the new challenges that will always result in a changing society.

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Overcoming the Taxonomic Impediment to Sustainable Development: BioNET-INTERNATIONAL, the Global Network for Taxonomy—A Successful Networking Model for Capacity Building in Developing Countries

Nicholas King

Abstract—BioNET-INTERNATIONAL is the Global Network for *capacity building* in taxonomy for sustainable development. Taxonomy (or biosystematics) is the basic underpinning science of all biology—and thus of all environmental management. Without sound taxonomy, no knowledge is available on living organisms, and if you don't know what you have, you cannot determine how to manage, conserve, or sustainably use biological resources. The Global Network is comprised of a number of interlinked regional Locally Organized and Operated Partnerships (LOOPs) of developing country institutions, supported by a consortium of developed country institutions. Its purpose, through South-South cooperation and North-South partnerships for institutional strengthening and human resource development, is to enable developing countries to achieve self-reliance in taxonomy to support regional and national programs for eradication of poverty, via sustainable agricultural development and use of natural resources, and by full implementation of the Convention on Biological Diversity.

The network's success is attributable to two key components. The first is local ownership of the process, including governmental endorsement of the need for such a capacity-building network, whereby needs are identified and prioritized by member countries themselves. The second is a tried and tested mechanism whereby a lack of individual country capacity is overcome by pooling, optimizing, and sharing regional capacity on a reciprocal basis between member countries. It provides a very useful model for other capacity-building initiatives in developing countries, as well as for North-South and South-South collaborative partnerships for capacity building.

Introduction

Whether it is called taxonomy, systematics, or biosystematics, this branch of science is dedicated to discovering, identifying, naming, and classifying organisms and elucidating their relationships. As such, the discipline is fundamental to our attempts to understand biodiversity, and the sustainable use thereof, and assess the impacts of any form of activity involving, or using, natural resources.

What began at the Stockholm Conference on Man and the Environment (1972), as a mildly keener appetite for taxonomy, was transformed at the Earth Summit in Rio (1992) into an insatiable hunger, just as the scientific resources to satisfy it began to become scarce. Today, it is doubtful if there are any scientists within the realms of zoology, botany, ecology, agriculture, or impact assessment who do not have some taxonomic requirements. Identifications in particular are urgently needed in ever-increasing quantities worldwide by natural scientists of every inclination—not the least of those in the biodiversity-rich but resource-poor countries of the developing world. Without correct identification, all access to knowledge pertaining to that organism is denied.

In these nations, whose biodiversity is seen to be vital to the world's well-being and constitutes the Earth's richest genetic resource, there is little, and in some cases no, taxonomic capability. This is largely a consequence of history and of recent financial policies of developed countries. From early colonial days, and especially from the turn of the century until very recently, the taxonomic needs of these developing countries had been met by free taxonomic services provided by the major world centers of expertise. These services, with particular emphasis on providing authoritative identifications and related advice, continued uninterrupted as colonialism fell away and countries gained their independence. While these services lasted, there was no cause or motivation for developing countries to invest their scarce, high-level manpower and financial resources in developing expensive taxonomic capabilities. It would have been economic folly, perhaps, in view of competing demands on national budgets, to attempt to create sufficient local capabilities in this very specialized field while such services were freely available elsewhere.

Sadly, this comfortable arrangement was not to last. In 1993 to 1994, as a result of a worldwide recession and the advent of new financial policies that required developed country institutions to become income earning and self-supporting, the free services of the expert centers were withdrawn. They were replaced by a system of graduated charges for identifications and for all other services rendered, which, while favoring developing countries and being modest relative to the actual costs of providing them, proved to be beyond the means of developing countries.

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As a result, developing countries found themselves to varying degrees devoid of taxonomic services at the very time when they most needed them, that is, when they, as adherents to Agenda 21 of Rio, and as signatories to the Convention on Biological Diversity, were attempting to meet their international obligations as well as national needs for development. They were faced with a taxonomic crisis, and a taxonomic impediment was created to the pursuit of national programs for food security, sustainable agricultural development, conservation and sustainable use of natural resources and biodiversity, human health and control of disease, and impact assessment.

This was not unexpected. It had been foreseen in the late 1980s when donor assistance had been sought in vain to subsidize the services needed. It was indeed out of growing concern for a solution to the forthcoming crisis that in 1991 an answer that proved acceptable to donors, expert centers, and developing countries alike was devised in the form of a global network for taxonomy. This was launched in June 1993 in the form of BioNET-INTERNATIONAL, an initiative for enabling developing countries to establish and sustain realistic self-reliance in taxonomic services, and to do so in the technically best and most cost-effective way.

Purpose

The Global Network for Taxonomy, in the form of BioNET-INTERNATIONAL, is focused on assisting developing countries to acquire and maintain the scientific skills, the collections of organisms and their related knowledge, and the technologies needed to provide the vital taxonomic support for national programs for conservation and sustainable use of their natural resources and biodiversity and sustainable agricultural development. The Global Network is also a facilitating mechanism for the broader interventions needed to assist developing countries to achieve full implementation of the Convention on Biological Diversity.

The Global Network is a mechanism based first on subregional self-help, that is, South-South cooperation, to mobilize, pool, and optimize the use of existing resources, and second, on North-South Cooperation to transfer knowledge, skills, and technologies to developing subregions. The Global Network concept also envisages the provision of essential taxonomic services to developing countries during their transition to self-reliance, with donor support being provided to the LOOPs as integral parts of national sustainable development programs.

Structure

The Global Network is comprised of a series of interlinked subregional networks (Locally Organized and Operated Partnerships [LOOPs]) of developing country institutions, supported by a consortium of developed country expert institutions (known as BIOCON) and managed by the BioNET-INTERNATIONAL Consultative Group (BICG) and its Technical Secretariat (TecSec) (fig. 1).

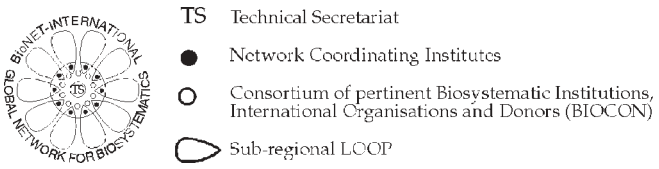

Figure 1—Conceptual model of the global network.

Organization

Locally Organized and Operated Partnerships (LOOPs)

The LOOPs are the very core of the Global Network. They are based on the United Nations concept of Technical Cooperation Networks (TCNs) and are dedicated, through South-South cooperation, to mobilizing, pooling, and optimizing the use of existing taxonomic skills and resources within the subregions for the benefit of all LOOP members. The Global Network subregions accord closely to those prescribed by the United Nations. Management of LOOPs is founded on four functional levels:

1. National Institutes (NIs) are the relevant bodies within individual countries that work together as a national network and implement work programs.
2. National Coordinating Institutes (NACIs) are the single institutes in member countries designated to coordinate the activities of the National Institutes (NIs).
3. The LOOP Coordinating Committee (LCC) is the governing body of the LOOP and is comprised of the NACIs together with any other invited bodies.
4. Network Coordinating Institutes (NECIs) are the single member institutes of the LCC, elected to coordinate and manage the affairs and work of the LOOP.

Consortium for North-South Technical Support (BIOCON)

This consortium (BIOCON) of the world's major centers of taxonomic expertise and resources is designed to provide the information, skills, materials, and technologies needed by developing country subregions to achieve realistic self-reliance in taxonomy. It is the source of technical support for donor-funded programs for capacity building and human resource development in the BioNET-INTERNATIONAL LOOPs of the developing world (North-South cooperation.

This consortium is being created worldwide as developed country institutions begin to collaborate to make their diverse resources available. The first subregional consortium, EuroLOOP, with some 100 institutions spread throughout 25 countries was established in 1994 and is now expanding as it embarks on the task of inventorying the resources it has to offer to developing country LOOPs. A second BIOCON LOOP is contemplated in the Australasia region to serve the needs of the Pacific and Asian LOOPs of the Global Network.

LOOPS Work Programs

The subregional LOOPs are initiated with four priority work programs:

Establishment and Enhancement of Information and Communication Services

The need often exists to update and expand hard copy library resources at designated centers of excellence (CEs) of LOOPs (such as with major reference works, taxonomic monographs, and relevant serial journals), and information technology infrastructure may need to be provided to these CEs for intercenter networking and linkages with the Network Coordinating Institutes (NECI) and TecSec. Databases and database access arrangements with major world centers need to be established, and Internet access, including e-mail facilities, are often required.

Broadly speaking, an efficient information service providing all relevant new and existing knowledge is needed covering traditional taxonomy, molecular techniques, new records, current biodiversity distribution maps, quarantine pest lists, incidence and threats of alien invasive introductions, and relevant information on natural enemies and biological control. To facilitate this, TecSec has recently formed a strategic partnership with the United Nations Food and Agricultural Organization based ECOPORT initiative (http://www.ecoport.org) as the primary future tool for capture, management, and dissemination of taxonomic information and knowledge for all levels of user groups.

Taxonomists and Technicians Training

This, the most substantial program of the LOOPs for the foreseeable future, will involve:

- Updating and upgrading of existing expertise through appropriate training of the present subregional specialists at local subregional academic and scientific centers and/or at overseas universities and institutions. Also, supplementary training is needed in specialized taxonomic areas, such as specific groups of economic importance, agricultural pests, invasives, natural biocontrol agents, and endangered species. In particular, invasives are by definition a transboundary problem, and require multilateral collaboration for proactive solutions. Such solutions are a classic "weakest link" problem, being at the mercy of the lowest national capacity to implement agreed activities on control of invasives' movements and establishment.
- Training of technical support staff in preparatory techniques and curatorial practices, collection management, database management and information retrieval systems, illustrative techniques, and development of electronic products. Electronic teaching courses and training material need to be provided to the CEs, and TecSec has recently commissioned production of training manuals on CD-ROM in order to facilitate this.

Rehabilitation of Collections and Establishment of New Resources

These major programs address the inadequacies and needs of existing preserved and living reference collections and facilities, including buildings, storage units, working amenities, security, curatorial techniques, and the sustainability of the physical condition of collections and their attendant records. These programs also address the taxonomic needs of collections to optimize their value as working resources for LOOPs.

Development and Application of New Technologies

These programs aim to make new and existing user-friendly taxonomic tools, for example, electronic aids to identifications, and compendia, available to LOOP specialists, and to enable LOOPs to commission and/or develop products that are tailor made for their own requirements. More electronic and paper-based identification aids need to be commissioned, and new tailormade products need to be developed jointly by overseas specialists and subregional taxonomists for their own requirements.

The achievement of BioNET-INTERNATIONAL's objectives within the 10-year time horizon can only be contemplated because of, and through, the use of new technologies — not the least electronic aids to identifications. These require first and foremost the availability of keys written by world experts for the groups of organisms concerned, which can then be converted into electronic forms suitable for a whole spectrum of users—from the upstream researchers and taxonomists to more downstream practitioners in areas such as human and animal health and disease services, conservation biology, plant protection and biological control, quarantine, control of invasives, and development planning.

These technologies make taxonomy more available to, and more useable by, a much larger community of scientists and technicians, and enable them to become competent in identifying the organisms of relevance. Experience has shown that as such keys become available their impact leads to a demand for others, and as these keys ultimately depend on the skills of the traditional taxonomist, the demand for these experts is also increasing. The need for taxonomists has never been greater, and their role in improving the welfare of humankind and of future generations has never been as well perceived as it is today.

Progress

Locally Organized and Operated Partnerships have been or are being established in the following sequence:

1.	Caribbean	**CARINET** (22 countries)	1993
2.	Europe	**EuroLOOP** (25 countries)	1994
3.	Southern Africa	**SAFRINET** (15 countries)	1995
4.	South East Asia	**ASEANET** (10 countries)	1996
5.	East Africa	**EAFRINET** (6 countries)	1998
6.	West Africa	**WAFRINET** (18 countries)	1999
7.	East Asia LOOP	**EASIANET** (5 countries)	2001
8.	Northern South America	**ANDINONET** (5 countries)	2002

9.	South Asia LOOP	**SACNET** (9 countries)	2002
10.	South Pacific	**PACINET** (26 countries)	2002
11.	North Eurasia LOOP	**NEURASIANET**	2003

with others to follow.

By the end of 2002, BioNET-INTERNATIONAL LOOPs will have been established or activated by governments in the Caribbean, Africa, Asia, the South Pacific, and Latin America, embracing some 140 countries.

Funding and the Future

A very supportive group of donors, including the United Nations Development Program (UNDP TC/DC) and the bilateral agencies of Denmark, the Netherlands, Sweden, Switzerland, and the United Kingdom, plus the intergovernmental agencies of the Commonwealth Secretariat, have enabled the Feasibility Studies and LOOP Formulation Workshops needed to establish subregional LOOPs. In this way, these LOOPs have been created with full and formal support by the governments concerned. They are thus accorded some priority in the national development plans of those who own them. Donor funds are now forthcoming from such agencies as the Swiss Development and Cooperation Agency (SDC), the Department for International Development (DFID) of the United Kingdom, and the European Union's Center for Technical and Rural Cooperation (CTA) to enable the implementation of the work programs of established LOOPs. In addition, a contribution of SFr 2.9 million by the SDC to the BioNET-INTERNATIONAL FUND has enabled the initiation of a BioNET-INTERNATIONAL Fellowship Scheme, an Information Support Service, and has assisted the operations of the Technical Secretariat and Network Coordinating Institutes.

The response of the international donor community to further substantial funding proposals suggest that the basic Global Network could be in place within the next 3 years, and full development may be completed by 2005. By that time, there should be established within the subregions of the developing world a substantial taxonomic resource to support national and regional programs of sustainable development.

Finally, in the last few years, a number of related international initiatives have developed as recognition of the taxonomic impediment has spread. The Conference of the Parties (CoP) on the Convention on Biological Diversity (CBD) has formulated the concept of a Global Taxonomy Initiative (GTI) to promote a concerted effort between international funding agencies, national governments, and NGOs to link taxonomic capacity building to the effective implementation of the CBD. BioNET-INTERNATIONAL is working closely with such initiatives to harness synergies and prevent duplication of efforts in building the required taxonomic capacity. Together such international initiatives may be able to overcome the Taxonomic Impediment.

Closure of Trails: A Restoration Strategy or Lack of Management?

Teresa C. Magro

Abstract—A 22-km (13.6-mile) trail in Itatiaia National Park (INP), Brazil, was closed for restoration in 1990 due to severe environmental impact. Park experts considered temporary trail closure the most suitable measure to allow recovery of the excessively damaged area. Nevertheless, during periodic visits to the trail, it was clear that the expected recovery had not taken place. To the contrary, problems became even more severe at the most affected sites even after 10 years of restricted access. The problem appears to be a lack of financial resources, the constant change in park management, and insufficient INP staff training.

During the previous 10 years it was difficult to convince the public that trail closure was necessary. This area attracts many visitors. Large-scale erosion has been a serious management problem. Temporary trail closure to protect it from visitor impacts was in reality a substitute for more labor-intensive, effective actions that would conserve natural resources while also permitting public use.

Introduction

Among the recreation management strategies to minimize impact, access restriction has been the most popular measure among Brazilian park administrators. Usually these actions have been adopted as emergency measures before the actual causes of the problem have been identified. However, conditional closing of large park areas has often prevented other strategies from being adopted. Alternative actions, including those more appropriate for recovery of wild areas, have not usually been considered. Lack of human and financial resources has aggravated the protection of natural areas.

The justification for area closures is more often that these impacts are generated from public use. When an area is opened for visitation, environmental alterations are foreseen and are inevitable. Many times the only alternative considered has been complete closure, often including campsites. Hammitt and Cole (1998), however, specified that permanent area closures should occur only where this drastic measure is the only option for recovery.

Before public use of natural areas became intense, trail, campsite, or area closures within some National Parks did not generate public reaction or discussion. Currently, significant increases in public use of parks and recreation areas have generated pressure, and public access is often reestablished quickly. Public pressure to expand access to new areas and new activities, often from those involved in "radical" sports, has also increased.

There was once a certain public lethargy regarding public use of National Parks, but now the situation is far more dynamic, with greater public participation. Public displeasure is commonly expressed when certain restrictive restoration measures are established, especially if they become permanent. Examples of this displeasure include electronic "chat groups" such as the São Paulo Excursion Center (céu@yahoogroups.com) and the São Paulo State Mountaineering Federation (femesp@yahoogroups.com).

At Itatiaia National Park (INP), restriction on long-distance trail access was implemented in 1990 for some of the more popular trails. However, those users with access permission (researchers, conservationists) noted that recovery was extremely slow, and in some places the erosion problems had increased. Methodologies for public use management, such as Limits of Acceptable Change (Stankey and others 1985) or Visitor Impact Management (Graefe and others 1990), have clearly shown that the most efficient way to solve the problem is to identify the root causes before methods are adopted for environmental restoration.

In the case of INP, failure to understand contributors to trail degradation on the Rebouças-Headquarter Trail resulted in the selection of a less efficient and unpopular solution (Magro 1999). Trail closure failed to demonstrate significant trail recovery, as this report will illustrate.

Study Area

From Initial Settlement to a National Park

The Federal Government acquired the lands of INP in 1908 for the creation of two colonial towns. These towns were composed mainly of European immigrants, most commonly from Finland. Due to steep hillsides, these towns were not successful, and the land was returned to the Ministry of Agriculture. In 1929, a Biological Research Station was created that was administered by the Botanical Garden of Rio de Janeiro (IBDF 1982). In 1937, this land became the first Brazilian National Park, Itatiaia National Park (INP). It is located in southeast Rio de Janeiro State, directly south of Minas Gerais (22nd 15'S and 22nd 25'S and 44th 35'W - 44th 45'W), and the Park covers an area of 30,000 ha (116 miles).

The Rebouças-Headquarter Trail, where the study was performed, was open for about 100 years, and initially represented the only way to INP Administrative Headquarters (altitude about 700 m or 2,297 ft) and to the Park plateau

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(maximum altitude of 2,787 m or 9,144 ft). This trail was used initially by those who moved to the town of Mauá, and was used by visitors who hiked or scaled one of the highest peaks in Brazil, Agulhas Negras. Later, cattle that invaded the high altitude pastures and the military that used it for training exercises degraded this trail. Most of the time, INP administrative maintenance practices amounted to weeding and cleaning of trails. Improvements, such as opening and cleaning of drainage channels, were rare events. Such activities, when they occurred, were more frequent before the opening of BR-485, an alternative road that would eventually become the main access to the plateau.

The specific objectives of INP, established in the 1982 management plan (IBDF 1982) were: (1) to protect fragments of the Atlantic Rainforest, (2) to provide opportunities for recreation and tourism in a natural way, (3) to protect ecological diversity, (4) to provide opportunities for environmental education, (5) to control erosion and conserve water and air resources, (6) to conserve natural scenic beauties, (7) to provide opportunities for scientific research, (8) to protect animal species in the area, and (9) to make possible public use activities linked directly to area resources, as compatible with other objectives mentioned above.

By 1990, the trail had suffered serious erosion problems, with some travel being very risky. The management solution adopted by INP administration was to close the trail to visitor use. Garcia and Pereira's technical report (1990) was used as justification for this action. These specialists in soils considered the main problem with the Rebouças-Headquarter Trail to be furrow erosion that caused severe gouging. According to these authors, the largest erosion caused along this trail was 7 m (23 ft) in depth and started from a point that was not drained properly. Until 2001, the Rebouças-Headquarter Trail could be used only with special permission from INP.

Another backcountry area was temporarily closed to the public in 2001 after a fire consumed about 600 ha (2.3 miles^2) of natural vegetation. Again, a technical report on this fire was used as justification for area closure. According to Ribeiro (2001), closing the burnt area to visitation was a crucial measure to guarantee recovery until an action plan was developed. The report recognized that closure had impacts on the local economy, such as with hotels and specialized guides, and suggested that this strategy be used only temporarily. This recent closure, as well as closure of the Rebouças-Headquarter Trail, generated a lot of criticism and protests from excursionists and mountaineers.

Methodology

Institutional Capacity to Administer the Area

We considered the administrative or institutional capacities as the ability of INP to successfully solve challenges related to the Park mission. The fundamental maintenance objectives for Brazilian National Parks, according to the National System of Parks and Conservation Units (MMA 2000) are: preserving natural ecosystems of great ecological relevance and scenic beauty, facilitating scientific research, developing educational activities and environmental interpretation, and increasing public contact with nature, which includes ecotourism.

Once the INP mission was defined during park creation in 1937, management actions should respect these goals. However, considering the current situation in restricted areas, INP administration has not been successful. We observed that the lack of Park financial resources, constant administrative changes, and insufficient training of Park staff have contributed to this failure. Administrative documents were analyzed to identify Park management activities that could have contributed to attaining their mission.

Thirty-four annual reports were consulted, which contained details of management actions executed from 1937 to 1983. In addition to these documents, three former Park Directors were interviewed: Mr. Wanderbilt Duarte de Barros (1940 to 1956), Mr. Pedro Eymard Camelo Melo (1991 to 1995), and Carlos Fernando Pires of Souza (April to September, 1995). Visitor registrations at the "Apple Tree Shelter" were used to estimate trail users from 1928 to 1934, and from 1936 to 1950, and information related to the frequency and form of use of the Rebouças- Headquarter trail was obtained. In these books, INP service and trail maintenance activities were also noted.

Results and Discussion

Park Maintenance and Administration

The first INP administrators presented annual reports to the Forest Service. These documents contain information that shows changes in management and the historical development of public use in this area, including current conditions. These documents establish approximate dates for construction of existing trails, shelter construction, and area maintenance. Using this data, we were able to correlate some problems with the Annual Maintenance Reports (AMRs).

Annual Maintenance Reports from 1937 to 1983 were consulted. From 1940 to 1960 there was a certain regularity and uniformity for the presentation of information. Unfortunately, the regular reports stopped in 1970. Documents for 1953, 1961, 1972 to 1978, and 1980 to 1982 were not present in the official files. To obtain complementary information, we consulted other documents, such as requested services, employee problems, or visitor complaints, in addition to spreadsheets with visitor numbers. Less simple than AMR analysis, but indispensable for our conclusions, was information about institutional parameters.

In the first years of INP, emphasis was on areas near the administrative building, such as the gardens, surrounding reforestation and general maintenance. This was probably due to two factors: the need for headquarter establishment and the agricultural focus of the previous immigrant colony. Area recovery occupied much time; besides planting arboreal species, the gardens, filled with rosebushes, had to be maintained. Seedlings produced in the Park nursery for restoration and horticulture, including many exotic species, were donated to local institutions and to the Forest Service Administration in Rio de Janeiro. These activities demanded time and consumed many resources.

The need to maintain the administrative headquarters and permanent infrastructure in good condition was also important. The Vargas Presidency (from 1930 to 1945) used the Park as a showplace for diplomats who visited Brazil. When the Federal Capital was in Rio de Janeiro, INP and Serra dos Órgãos National Park represented an excellent view of wild Brazil. Many authorities and diplomats entered the Park while visiting Rio de Janeiro, as verified by reports and the visitor registration books.

Other community services were also noted, such as an elementary school, church, electric and phone facility maintenance, internal roads, and access to the city of Itatiaia. Horses and mules were used in Park maintenance and surveillance, and feeding of these animals was often by natural foraging as well as by raising corn. The garden, whose maintenance was time and labor intensive, was reformed in 1943, to simplify and conserve operations.

On the other hand, few maintenance activities on the plateau were required, and those that were focused mainly on the studied trail. When this trail was the fastest way to the plateau, it was maintained with certain regularity. However, when the highway was opened with access to the Agulhas Negras, the importance of the trail decreased. Employee records indicated that maintenance of the Rebouças-Headquarter trail was sporadic after BR-485, the new road to the plateau, was opened.

Severe erosion, especially the 7-m (23-ft) gully that had motivated trail closing happened by 1979, according to an employee annual report. Beginning in 1971, the AMRs do not mention trail maintenance activities. Employees probably cleared vegetation, mainly in forest areas, but the activity was not constant. Contributing to erosion were fires that hindered vegetation recovery.

Is Visitation in Itatiaia National Park Really a Problem?

Serrano (1993) found a series of historical documents regarding the first Park users. Using Park registrations, about 2,700 people entered INP from 1925 to 1947. Unfortunately, this number does not accurately represent visitations because many people did not sign the visitor books. In addition, several documents that contained this type of information have been lost. Within Park registrations, origin or nationality was possible to verify, and most visitors at that time were foreigners (70 percent).

Between 1937 and 1947, INP AMRs showed an average of 30,049 visitors annually. There were only 4,523 visitors in 1946, but there was a jump of 10,000 visitors in 1947. As observed by Wanderbilt Duarte de Barros, a former INP administrator, soon after the Second World War visitation of INP increased markedly.

From registrations and other documents, we estimated visitation from the creation of INP (fig. 1). The data corresponding to 1951, 1961, 1966, 1971, 1972, and from 1976 to 1985, however, were not found in INP files. Visitation values from 1990 to 1997 are more reliable (fig. 2) due to better control at the main Park entrances. However, the values reflect people that paid to enter INP and not the total number of visitors. Those under 10 years old, adults above 70 years, school excursions, researchers, and authorities are exempt from paying the entrance fee.

People who hiked the Itatiaia plateau represented about 10 percent of total Park visitors. This is due not only to the attractiveness (waterfalls) of the surroundings of the headquarters, but also the limited infrastructure for receiving visitors and the difficulty of access to the plateau. Access can be better in autumn and winter with the onset of rain.

The Itatiaia National Park is strategically located between Rio de Janeiro, São Paulo, and Belo Horizonte, and attracts a larger number of tourists than the Park can handle. But visitation can be considered low when compared with other Brazilian Parks, such as Iguaçu or Tijuca National Parks that receive about a million visitors annually. However, the visitation in Itatiaia is limited to few sites, on weekends, holidays, and school vacations. Part of the low capacity of INP is due to the small staff and limited financial resources.

Military Training and Cattle

There are controversies regarding the effects of military training on current conditions on the Rebouças-Headquarter Trail. The Agulhas Negras Military Academy has been

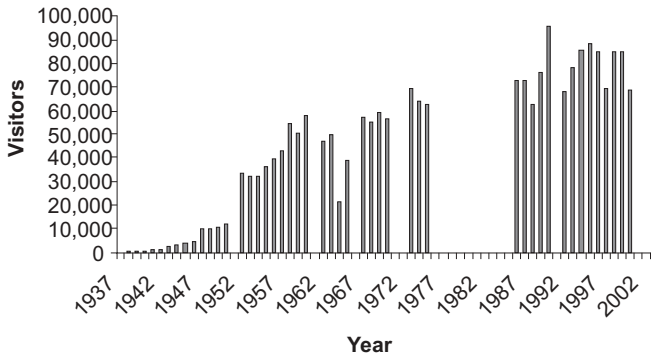

Figure 1—Total visitation in Itatiaia National Park from 1937 to 2000. Registrations corresponding 1951, 1961, 1966, 1971, 1972, and 1976 to 1985 were not found (source: INP Administration).

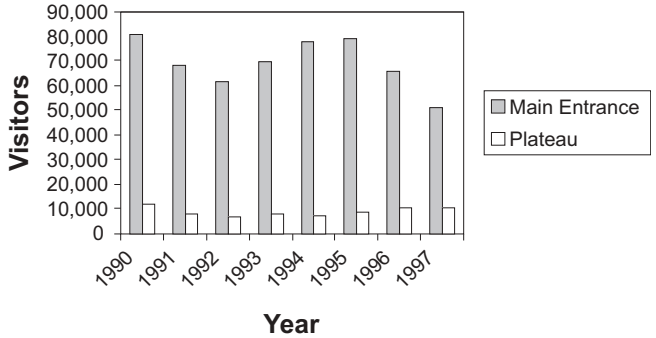

Figure 2—Visitation to Itatiaia National Park from 1990 to 1997. Total number refers to visitors who paid to enter in the park (source: INP Administration).

the most frequent trail user since 1956. Park employee depositions have indicated that many impacts were caused by troops, numbering more than 500 men at a time, who used the plateau for military training. A colonel interviewed for this research argued that the training did not happen on trails, but was dispersed and occurred mainly in the Rebouças Shelter. However, we found old artillery pieces, such as rifle cartridges and a cannon reducer, on the trail, indicating that some activity happened on the trail and its environs.

Use of heavy boots, bulky equipment, and food by the military during training has aggravated problems here. Certainly the continuous use of the trail contributed to soil compaction and trailbed damage in the most susceptible passages, where it is steep with high soil clay content.

The use of the area as a natural cattle pasture and the constant fires that happened during the drought also contributed to the damage in some less resilient sites. In addition, frost also exists here, leaving the vegetation more drought and fire susceptible, and less resistant to trampling by cattle. Dusen (1955) studied the flora of Itatiaia in 1902, and indicated that fire was used as a technique for maintaining cattle pastures. The researcher observed the effect that fires had on vegetation, and he noted that the common frosts usually dried and damaged local flora. Some plants occurred in great abundance in burned areas, while in the areas without burning, there were only two sterile species. Dusen considered that plant development favored the burned areas because the black soil would absorb larger amounts of heat, in comparison with areas that were not burnt.

Successive trampling and soil compaction by cattle, along with decreased trail maintenance, were probably responsible for soil structure destruction and increased susceptibility to erosion. Cattle tracks concentrated water toward the main trail, reducing drainage. Another factor linked to trail damage was mule and horse use for transport in the area. Besides the use of horses to carry luggage, construction materials were also transported. According to the 1949 AMR, mules made 1,460 trips to transport the construction material required to build the Massena Shelter, located on the INP plateau.

Political Changes and Park Administration

Finally, we considered the Park as a whole—its history, use, management, and politics, including political administrative changes during the last decade. The Itatiaia National Park had been endowed with a representative infrastructure, employee houses, well-equipped hiking shelters, a restaurant for the staff, laundry, museum, and a set of roads and trails to permit multiple use. When Rio de Janeiro was the Federal capital, more attention was given to INP, and it was easier to obtain the necessary financial resources.

In 1964, the Federal capital was moved to Brasília, and the importance of INP decreased markedly. Once the capital was no longer Rio de Janeiro, the Park stopped attracting national and international attention. Park administration began to receive fewer resources, and had less political weight with politicians in Brasília.

According to reports by former employees, the situation in INP worsened during the Military Regime (1964 to 1985) because many bureaucratic positions, such as in the Brazilian Institute of Forest Development (IBDF, now the Brazilian Environment and Renewable Natural Resources Institute, IBAMA), were held by generals or military officers with no training or understanding of the environment. With no sensitivity to conservation of natural resources and without the necessary technical knowledge required to manage a park, problems began to multiply. There was no fuel money for park surveillance vehicles, no new employees were recruited after older employees retired, and there was no money for maintenance. In addition, park vandalism increased due to lack of surveillance and the increase of unemployment.

During this period, 12 new National Parks were created, and it was necessary to divide the maintenance resources between the new National Parks and 15 Parks already in existence. Employee recruitment was centralized and only performed in Brasília. This estrangement between Federal bureaucrats and the INP administration (who previously answered only to their superiors in Rio de Janeiro) prevented efficient INP management.

Federal Government bureaucratic growth during the Military Regime caused IBDF to become swollen with many employees, complicating simple decisions. This meant that while INP lacked active employees, many supervisors and administrators remained in Brasília or Rio de Janeiro, decreasing park efficiency. Money collected from entrance and parking fees went to Brasília and was effectively lost—few of these fees were returned to INP for improvement and maintenance of existing infrastructure.

Budget cuts were more drastic during the New Republic, starting in 1985. Even with the increased concern by the Federal Government for the environment, there were large budget cuts, with "bureaucratic downsizing," necessitated after the excesses of the Military Regime. Employee numbers were reduced so that today there are only 33 permanent employees to take care of 30,000 ha (116 miles^2), and most of these are administrative employees. In addition, there has been very little investment in employee training and ongoing education, which has also harmed the efficiency of area maintenance. Happily, this situation is reversing currently.

Conclusions

There was not a substantial recovery in the Rebouças-Headquarter Trailbed following its closing in 1990, and in some places problems were accentuated. We consider two main reasons for lack of success: (1) no attempts were made to increase vegetation recovery, and (2) the trail was never really closed, remaining open for special groups and military training. Analysis of documents and administrative reports revealed events that allowed continuous trail use and poor decisions made by INP administrators. Besides physical limitations, institutional parameters are necessary for the evaluation of public use impact in natural areas. These factors, planning, and maintenance techniques are essential if correct decisions and appropriate practices are to be established.

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Seedbank as a Tool for Choosing the Better Strategy for Trail Recovery

Teresa Cristina Magro
José Leonardo de Moraes Gonçalves

Abstract—Many trails in the Brazilian National Parks system have been closed due to the impact caused by increasing and continuous use. Some of the trails will take a long time to recover, and some may even show worse conditions after a few years. The ability to choose the best strategy to restore vegetation and soil quality will help managers save scarce financial resources that can then be used in other conservation actions. A seedbank test, together with soil analysis, seems to be helpful in this task. Most currently used management actions are not specific to different sites on the same trail. In this study, results of a seedbank test showed the sites that recovered best were those with soils containing a high concentration of organic material and nutrients. Sometimes only the presence of organic material was enough to enable recovery, showing that fertilization is not always necessary. We also identified areas where more active restoration was needed, including soil transplanting. Considering all the results, we were able to recommend the best management strategy for each site, and which we expect to achieve the best results in trail recovery.

Introduction

Closure of trails and camping sites are used to help recovery of highly impacted sites where continued use would be limiting to the success of recovery management practices. Despite the use of specific techniques, which may range from soil quality enhancement to seedling transplanting and irrigation, the results vary considerably from area to area.

In general, restoration techniques, other than simply closing areas, are costly. These expenses vary from high costs, such as the establishment of an irrigation system to promote plant growth, to low costs, such as fence or barrier construction (Hammitt and Cole 1998). When management practices are based on evidences of their success, the recovery of impacted sites can be faster and more efficient. During the past few years, several scientists have investigated how the factors inherent to an area respond to management practices. This knowledge can provide useful indicators for the selection process of the most adequate recovery technique for individual sites.

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Zabinski and Cole (2000) addressed this question in a study that identified the limiting factors to revegetation success in impacted recreation sites. They selected high altitude sites, with characteristics of moderate to high stress, short growth period, and poor soils that could be limiting to all revegetation stages. Results showed that revegetation was limited by a combination of several factors. One factor was availability of propagules, since there was an increase in seedling numbers when seeds were added. There were noticeable limitations during seed germination and seedling initial establishment, suggesting that environmental conditions are important to this stage's success. Soil treatments had no significant effect on seedling numbers and growth, indicating that microclimatic differences, including light patterns and water drainage, may be the primary limiting factor.

Cole and Spildie (2000) also provided additional information about factors limiting natural recovery rates and the efficacy of selected techniques in accelerating recovery. They evaluated the influence of specific techniques: (1) soil amendment through organic matter use, specifically sewage and soil inoculation; (2) transplanting and seeding using native local species; and (3) application of a superficial litter layer on the establishment, survival, and growth of the vegetation. Campsites investigated were closed and signed, and no apparent indication of use was observed during the study period. The results obtained indicated that, in general, adopted recovery techniques were highly effective. The superficial litter layer did not have a clear effect and varied with plant growth seasons. According to the authors, climatic conditions could have influenced the results obtained.

Hammitt and Cole (1998) suggested that recovery periods are highly variable. The recovery period includes vegetation reestablishment, and in some cases, even recovery of the soil's physical conditions, such as elimination of soil compaction.

The results from the studies above, in conjunction with our field observations, lead us to believe that local conditions strongly determine the success or failure of restoration techniques. In addition to local conditions, the intensity of which soil characteristics are modified may also yield different results. In all restoration projects in mining areas or trails, the preliminary and foremost step to guarantee plant establishment is the recovery or enhancement of the soil's physical and chemical conditions.

Generally, soils of severely impacted areas have low organic matter and high soil compaction, which restrict plant development. Furthermore, a poor or nonexistent seedbank will influence the results of recovery strategies. Campsites and trails that are closed with no other improvement measures taken can exhibit a negative result and a longer recovery time.

Study Area

In 1937, Itatiaia National Park (INP) was the first park created in Brazil. It is located southeast of Rio de Janeiro State and directly south of Minas Gerais (22° 15'S and 22° 25'S and 44° 35'W - 44° 45'W); the Park covers an area of 30,000 ha (116 miles^2).

The study was conducted in the Itatiaia plateau, which presents an annual average temperature of 11.4 °C (53 °F), a maximum temperature of 21.4 °C (71 °F) in February, and a minimum temperature of –6.4 °C (20 °F) in July. Intense frosts are common during the winter season, often with hail and rare brief snowfalls (IBDF 1982). The average precipitation is approximately 2,400 mm (94 inches). The region's original vegetation has been under intense human influence, mainly between 1908 and 1918, when there was an agrarian colony where the INP area is today. Meadows in the plateau region have been successively burned to improve cattle pasture (IBAMA 1994).

Vegetation in the uplands is typical of the meadow ecosystem, considered a fragile ecosystem for anthropogenic uses. Its floristic composition varies according to ecological conditions, consisting predominately of grasses but also containing a great number of bromeliads, cactuses, and orchids (IBAMA 1994). There are some endemic species, such as the bromeliad *Fernseca itatiaia*, a threatened species, and a monotypic endemic genus *Itatiaia cleistopetala*. Other important species are *Chusquea pinifolia*, *Cortaderia modesta*, *Cladium eusifolium*, *Baccharis discolor*, *Roupala impressiuscula*, *Rapanea gardneriana*, *Viscuia micentra* e *Buddleia presciosissima*, *Pepalanthus polyanthus*, a heavily collected species for dry flower arrangements, *Baccharis platypoda*, and *Hydrocotyle quinqueloba* (IBDF 1992; IBAMA 1994).

This study was conducted at Rebouças-Headquarter trail, which was opened approximately 100 years ago and was the only access from INP administrative headquarters (altitude about 700 m [2,297 ft]) to the park plateau (a maximum altitude of 2,787 m [9,144 ft]). Horses were used to carry luggage, equipment, and materials for shelter construction. Researchers and the first alpinists in search of one of the highest peaks in Brazil, Pico das Agulhas Negras, most intensively used the trail. Trail maintenance was achieved through weeding and construction of rainwater drainage channels. Also, military operations were stationed in the area for decades, with up to 500 troops. Nowadays, these activities are restricted to few troops. Trail use by tourists has been prohibited since 1990 due to its degradation.

Besides the factors listed above, the use of the area for cattle ranching and the constant fires during the dry season have contributed to environmental impacts in less resistant areas. In addition, the occurrence of natural frosts in the region causes vegetation to be dry and more susceptible to fire and cattle trampling (Magro 1999).

Methodology

Field surveys were carried out during 1995 and 1996 at Itatiaia National Park. Seedbank germination tests and soil analysis were conducted at Escola Superior de Agricultura Luiz de Queiroz in Piracicaba, SP, Brazil. Transects were installed along a 6,500-m (4-mile) section, selected from the total 22 km (13.6 miles) Rebouças-Headquarters trail.

Trailbed Characteristics

Part of the soil samples collected for the seedbank trials were used in the physical and chemical analyses. Several soil characteristics were evaluated: pH in CaCl2, organic matter, available P$^{(2)}$ (P-resin), exchangeable base-forming cations (K, Ca, and Mg), exchangeable H and Al, sum of bases$^{(2)}$, cation exchange capacity (T$^{(4)}$), base saturation (V$^{(5)}$), Al saturation, particle size analysis, bulk and particle soil densities, and total soil pore spaces.

Soil textural classes were classified by percentages of sand, silt, and clay found (Curi 1993). The identified classes were described as (a) sandy clay loam: soil with 20 to 35 percent clay, less than 28 percent silt and 45 percent or more sand; (b) clay loam: soil with 27 to 40 percent clay and 20 to 45 percent sand; (c) sandy clay: soil with 35 percent or more clay and 45 percent or more sand; and (d) clay: soil with 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

To measure the topsoil's mechanical resistance, a Lang penetrometer was used. The penetrometer is a standard, cone-tipped rod that is pushed into the soil. A ring is displaced while the rod is driven into the soil and a scale at the top of the rod gives the measurement. Numbers 1 to 19 indicate the resistance level to penetration. The higher the number, the harder the topsoil (1–4 or 0–14.4 Kgf/cm^2 = soft; 4–7 or 14.4–25.09 Kgf/cm^2 = moderately soft; 7–16 or 25.09–57.37 Kgf/cm^2 = medium; 16–18 or 57.3–64.5 Kgf/cm^2 = moderately hard; and 18–20 or 64.5–71.7 Kgf/cm^2 = hard). The average of five measurements in each sampling unit was calculated. Measurements of soil compaction were not taken in vegetation sampling areas to avoid damage or disturbance to plants being used in monitoring studies.

Parallel declivity was measured in degrees along the trail, following a walking direction. Declivity was measured by placing an Abney level on top of a piece of wood parallel to the trail. Perpendicular declivity was taken transversely to the trail's walking direction, also in degrees.

Seedbank

To evaluate the vegetation's regeneration capacity along the bed trail, germination tests were conducted using seedbank samples collected in permanent sampling units during 1996. In each plot there were three samples in a 20 x 20 x 5 cm area. The topsoil layer was scraped in case branches; stones and live or dead plants were found. Part of the collected seedbank soil was submitted to physical and chemical analyses. The resulting data were then compared to the seedbank germination results.

Samples were submitted to germination tests and kept in rectangular aluminum trays (15 x 27.5 cm [6 x 11 inches]), totaling 39 plots (13 treatments x 3 repetitions). Trays were air exposed and sprinkler irrigated twice a day. The number of germinated plants in each tray were counted weekly and classified as: (1) monocotyledonous, (2) dicotyledonous, or (3) moss. Observations lasted 14 weeks and were concluded as soon as the number of plants per tray began stabilizing or decreasing.

Contamination in the nursery was prevented by periodically monitoring three control trays containing washed and sterilized sand, distributed among the samples.

Results and Discussion

Trailbed Characteristics

Compaction, topsoil erosion, and the decline of vegetation cover along trailbeds contributed to a substantial reduction of organic matter content in the soil. In high declivity areas, the establishment of new plants was difficult, in part, due to removal of seeds and plantlets by the rain. The few seedlings able to survive could not find favorable establishment conditions because of low water and nutrient availability, caused by soil erosion and compaction, which in turn, reduced the water infiltration rate.

Table 1 shows that samples with the least bare soil tended to be less steep areas and also have less superficial soil compaction. Physical characteristics are shown in table 2. These relationships will be discussed later with the results obtained in the seedbank analysis.

Settergreen and Cole (1970) observed that recreational use pressure affects soil characteristics differently; these differences will define certain limitations to normal vegetation growth and development. The most significant differences were soil compaction and the elimination of vegetation cover that protects the soil surface. Soil compaction and stone buildup in heavily visited areas have characteristics similar to those of impervious surfaces, therefore reducing water infiltration capacity and increasing erosion caused by runoff. These authors believe that topsoil compaction has a greater effect on smaller grasses and herbaceous species than on trees and shrubs.

Results obtained by Takahashi (1998) indicated that soil resistance to penetration 5 to 10 cm (2 x 4 inches) deep in Salto Morato Natural Reserve, in the State of Paraná, was the variable that best distinguished the trail from an area with no use. This result corroborates other findings demonstrating that soil's resistance to penetration is a sound and valuable indicator for monitoring soil conditions.

Table 1—Trail conditions on Rebouças-Headquarters trail measured in 1996.

Sample number	Trail width	Bare soil	Slope along	Slope across	Penetration resistance—trail	Penetration resistance—out of trail
	------- *cm* -------		--------- *degree* ---------		---------- *Kgf/cm²* ----------	
1	140	75	0	1	35.85	24.74
2	183	50	0	0	64.90	29.40
3	340	22	11	20	54.50	32.99
4	181	80	0	1	56.65	23.66
5	480	70	0	0	62.03	34.42
6	405	0	8	9	46.25	22.95
7	163	61	1	4	44.82	34.06
8	125	0	0	8	40.16	30.48
9	292	52	.5	2	48.76	21.87
10	396	47	2	11	58.08	41.59
11	1,030	270	14	25	58.80	52.35
12	323	87	20	24	51.27	32.27
13	297	0	1	3	39.80	18.29

Table 2—Physical characteristics of soil on the Rebouças-Headquarter trail in Itatiaia National Park in 1996.

Sample number	Soil fabric	Density		Total porosity	
		Soil	Particle	Value	Level[a]
		-- *g/cm³* --			
1	Sandy loam	1.1	2.4	54	A
2	Sandy loam	1.4	2.7	48	A
3	Sandy loam	1.0	2.6	61	H
4	Sandy clay	1.1	2.6	57	H
5	Sandy clay loam	1.1	2.5	56	H
6	Sandy clay	.8	2.2	63	H
7	Sandy clay loam	1.0	2.5	60	H
8	Sandy clay loam	.8	2.2	63	H
9	Sandy clay loam	1.3	2.9	55	H
10	Sandy clay loam	1.0	2.6	61	H
11	Clay	1.1	2.6	57	H
12	Sandy loam	1.0	2.6	61	H
13	Loam	.9	2.5	64	H

[a]Classes of total soil porosity: VL = very low, less than 35 percent; L = low, 36 to 45 percent; A = average, 46 to 55 percent; H = high.

Even though decreases in water infiltration capacity will likely increase erosion in high declivity areas, we consider bed trail compaction an unavoidable consequence of heavily used trails. Trail management practices will also determine whether continuous use may cause an undesirable level of impact for specific site conditions. Management options include construction of rainwater drainage channels, periodic maintenance, construction of ramps in flood-prone clay soils, as well as others.

The intensity of compaction can also be a good indicator of management practices in an area. Despite constant use on the Rebouças-Headquarters trail, some areas presented serious erosion problems, whereas others were perfectly conserved. This is due to the trail's large soil spatial variability and to declivity.

Seedbank

Identified species are listed in table 3; some of them were identified only at the family level. Germination test results confirmed field observations regarding the trail's regeneration potential. In sites where runoff removed topsoil, germination was not significant (point 9) because it also removed seeds and nutrients essential to plant development and growth. On the other hand, large soil surfaces were covered by vegetation in sample points 6, 7, 8, and 13 (table 4). Because the germination of *Phyllantus tenellus* and *Chanaesyce hirta* was detected in the sterilized sand control tray, the possibility of soil contamination with seeds from adjacent areas exists.

The majority of species in the seedbank germination test grew either in clusters or parallel to the soil, a strategy that favors their development in the trailbed. These strategies allow some plants to better survive trampling, as noted by Liddle (1991) and Cole (1993), and could explain the higher frequency of *Plantago* and *Guaphalium spathulatum* Lam. in the center of the trail. The following species belonging to the Plantaginaceae Family were identified: *Plantago dielsiana* Pilger, *Plantago guilleminiana* Decaisne, *Plantago hirtella* Kunth, and *Plantago tomentosa* Lam.

Table 3—Seedling occurrence in the nursery experiment.

Family	Species	Sample
Asteraceae (Composta)	*Baccharis* cf. *caprariaefolia* A.P.DC.	2,6
Asteraceae	*Guaphalium*	7
Cyperaceae	*Fynbristylis*	8
Convolvulaceae	*Dichrondra sericea*	7
Euphorbiaceae	*Phyllantus tenellus*	1,2
Euphorbiaceae	*Chanaesyce hirta* (L.) Lillsp.	1
Iridaceae	*Iris*	6
Poaceae (Graminea)	*Eragrostis*	8
Poaceae (sp1)		7,8
Poaceae (sp2)		12,13
Poaceae (sp3)		6
Polygalaceae	*Polygala glochidata* H.B.K.	13
Rubiaceae		13
Scrophulariaceae	*Linderia crustacea* (L.) F. Müll	6
Not identified		7

Table 4—Seedling density (m^2) in the nursery experiment after 14 weeks.

	Seedling/m^2			
Sample	Monocotyledon	Dicotyledonous	Moss	Total
1	12.79	101.01	—	113.80
2	91.58	58.86	—	150.44
3	8.08	27.48	25.87	73.87
4	8.08	18.18	16.16	42.42
5	41.55	145.52	24.23	211.30
6	233.11	712.05	16.20	961.36
7	95.76	343.47	36.92	476.15
8	95.18	357.61	49.66	502.45
9	8.08	8.08	8.08	24.24
10	8.08	66.40	8.08	82.56
11	16.20	48.45	—	64.25
12	24.22	46.88	—	71.10
13	58.14	227.08	—	285.22

Tables 5 and 6 show that at locations with higher germination success, the chemical analysis revealed soils with medium and high P, K, Ca, and organic matter contents essential to good plant development. Also, soil organic matter and nutrients were not carried by runoff in these three points because of the low parallel declivity of the trail: 0, 1, 0, and 1, respectively (table 1).

Table 7 shows the results of the analysis of correlation between the number of plants in the seedbank and the most important physical and chemical soil characteristics for plant growth. Parameters were analyzed using Spearman's coefficient of rank correlation. There was a positive correlation between (1) seedling density and organic matter content and (2) P availability in the soil. The correlation between the number of plants and soil compaction was not evident in this analysis probably due to other more limiting soil characteristics. Chappell and others (1971) verified that N and P contents were not significant in three zones under different trampling intensities. Similarly, the pH, C/N ratio, iron content, and ammonium-nitrate balance were not significant in these areas.

Takahashi (1998) verified a high correlation between the natural regeneration of vegetation and carbon content and soil density. On the other hand, the author did not find a strong correlation between regeneration and soil compaction intensity. According to her, it is likely this factor has not yet caused a noticeable regeneration decline in the studied area.

One management practice used in compacted and low regeneration areas is topsoil scarification to stimulate a rapid plant cover development. In dry areas, a water increase has a beneficial effect on plants in compacted soils; however, compacted soils may continue to be a limiting factor to seedling establishment (Liddle and Greig-Smith 1975). These authors recommend lessening the tension in the trail's topsoil layers as a recuperation technique, even though the subsoil might still be compacted.

Table 5—Chemical characteristics[a] of the soil samples (0–5 cm layer) collected along the Rebouças-Headquarters trail in Itatiaia National Park in 1996.

Sample number	Plant density	pH $CaCl_2$	SOM[b]	Available P[c]	Exchangeable K	Exchangeable Ca	Exchangeable Mg	Exchangeable Al	CEC[d]
	Pl/m²		*g dm⁻³*	*mg dm⁻³*	*mmol$_c$ dm⁻³*				
9	24	4.2	9.2	3	0.8	0.6	1.0	12.2	77.4
4	42	4.3	0.0	3	1.9	1.0	1.0	37.8	135.9
3	61	4.3	0.0	4	2.2	.3	1.0	25.0	80.5
11	65	4.4	2.3	3	.8	.5	1.0	2.4	42.3
12	71	4.6	3.5	3	.5	.2	1.0	0.6	29.7
10	82	4.2	6.9	4	1.2	.5	2.0	18.4	96.7
1	114	4.3	57.8	3	1.0	1.0	1.0	29.0	140.0
2	150	4.3	13.9	3	.8	.2	1.0	18.8	86.0
5	211	4.3	11.6	3	1.0	.1	1.0	27.0	123.1
13	285	4.3	46.2	3	2.2	1.0	1.0	7.6	92.2
7	476	4.1	13.9	4	1.3	3.0	3.0	47.8	192.3
8	502	4.0	73.9	8	1.4	5.0	2.0	37.2	193.4
6	961	4.2	57.8	9	3.2	6.0	4.0	29.2	60.2

[a] Following methods described by Raij and others (1987).
[b] SOM = Soil organic matter.
[c] P = P-resin.
[d] CEC = Cation exchangeable capacity.

Table 6—Plant number and interpretation[a] of the chemical characteristics of the soil (0–5 soil layer) in the Rebouças-Headquarter trail in Itatiaia National Park, sampled in 1996.

Sample number	Plant number	Acidity (pH)	SOM[b]	Available P	Exchangeable K	Exchangeable Ca	Exchangeable Mg	Exchangeable Al	CEC[c]
	Pl/m²								
9	24	VH	L	L	A	VL	VL	H	H
4	42	VH	L	L	H	VL	VL	H	H
3	61	VH	L	L	H	VL	VL	H	H
11	65	H	L	L	A	VL	VL	L	A
12	71	VH	L	L	L	VL	VL	L	L
10	82	VH	L	L	A	VL	L	H	H
1	114	VH	H	L	A	VL	VL	H	H
2	150	VH	L	L	A	VL	VL	H	H
5	211	VH	L	L	A	VL	VL	H	H
13	285	VH	H	L	H	VL	VL	A	H
7	476	VH	L	L	A	L	A	H	H
8	502	VH	H	A	A	A	L	H	H
6	961	VH	H	H	H	A	A	H	H

[a] VL = very low; L = low; A = average; H = high; VH = very high.
[b] SOM = Soil organic matter.
[c] CEC = Cation exchangeable capacity.

Table 7—Relationship between seedling density in the greenhouse experiment and soil characteristics.

	Compaction	Bulk density	Organic material	P	K	Ca
			g dm⁻³	*mg dm⁻³*	*mmol$_c$ dm⁻³*	*mmol$_c$ dm⁻³*
Seedling density	–0.3626	0.4293	0.8220	0.5237	0.3961	0.4626
(Significance)	(0.2233)	(0.1431)	(0.0006)	(0.0662)	(0.1803)	(0.1114)

Conclusions and Recommendations

The low presence of vegetation along Rebouças-Headquarters trailbed is due to a poor seedbank (nonexistent in some parts) and to a soil poor in nutrients and organic matter. The fact that seeds did not germinate in some trail parts, even though they germinated in trays, is probably associated with highly compacted soils and a nutrient-impoverished environment. Topsoil removal in the germination tests decreased trailbed compaction, which in turn, might have favored germination of some plants. To recover vegetation in trails with little or no seedbank present, we recommend direct seeding or planting of seedlings collected in nearby areas, following topsoil scarification (approximately 20 cm [8 inches]). Planting should be conducted with good soil temperature and humidity conditions. Establishment of monitoring plots to evaluate vegetation recovery is recommended.

Management and Future Use

For trail recovery and maintenance we recommend these practical suggestions:

Bed relocation at problematic sites—Even with trail use evenly spread on trails, there are sites in good condition and sites in critical shape. Some trail sites should simply be abandoned, while others should be opened, avoiding, however, high declivity areas sometimes prone to erosion. Runoff should be diverted away from the trailbed, thereby reducing eventual soil losses and providing better conditions for vegetation recovery.

Trail and bifurcations' recovery—Some trail and bifurcation recovery practices include monitoring revegetation, soil scarification, seeding, fertilizing, and transplanting. In addition, barriers or burlap installed on seeded or transplanted areas can increase recovery success and at the same time discourage area use.

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Where in the World Wide Web Is Wilderness?

Charles Besancon
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Abstract—Wilderness information on the World Wide Web has developed considerably in the past 5 years. What was once dominated by the equivalent of electronic brochures has developed into interactive information resources that together provide a wide range of useful information. Web sites specific to the concept of "wilderness" are dominated by United States organizations. The term "protected areas" is better suited to find the sites of the major global organizations that influence the conservation of wilderness. While there are many good sites on the Web, it is still challenging for a person to find relevant topical information at a global or regional level. Search results also suggest that the technical network developing around the terms "wilderness" and "protected areas" remain separate. We evaluate several scenarios for the development of a more coherent global presence of protected areas and wilderness on the Web. We also suggest the development of a global clearinghouse that approaches the global supply of information about wilderness and protected areas from the user perspective rather than from the agenda of the organizations that are producing the information.

Introduction

Freimund and Queen (1996) argued that Web-based mass communication could have a profound effect upon developing a wilderness constituency and culture. After reviewing many wilderness related Web sites on the World Wide Web (WWW), they called for an integrated online strategy to facilitate communication across the Internet. The end result of this strategizing was the creation of the Wilderness Information Network (http://www.wilderness.net). This Web site has been very effective in bringing information about wilderness areas to the World. With over 6,000 hits per day, the Web site has provided an important niche to people interested in wilderness information.

In this paper, we wish to reexamine the presence of wilderness on the WWW. Our goal is to identify which sites are being used and what the purpose of these sites are, including mission, audience, and financial support.

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In 1996, there was a sense that many people needed to be persuaded of the benefits of the Web. Given the success of the Wilderness.Net project and the proliferation of wilderness-oriented Web sites, we no longer feel that need.

Resources

Searching for Wilderness on the World Wide Web

It is no surprise that the resources on the WWW have proliferated at an amazing rate. Human behavior, on the other hand, has not dramatically changed, and most Web visitors are only willing to scan a couple of pages of results from a search when seeking information. Given the increasingly commercialized use of the Web, Webmasters have become increasingly savvy on techniques to improve the chance of being rated toward the top of a search. In other words, the sites that appear at the top of a search engine do not necessarily reflect the value of the site.

To address these issues, researchers at Stanford University have developed Google.com. Google uses a rating system that is based on the number of times a site is linked to and the popularity of the sites doing the linking. For example, the Wilderness.Net site rates very high because it is linked to by many well-established wilderness organizations or agencies. Likewise, it provides links to other sites that are highly used and rated. Google has remained detached from the influence of advertising or other commercial interests to provide a site that is a high-integrity research tool. Thus, a search on Google, while not perfect, often returns a set of discrete sites that are specifically related to the topic and are highly used.

Wilderness Sites—Our first search was simply on the word "wilderness." The top site returned was from the Wilderness Society. The second was Wilderness.Net, which provides access to a consortium of wilderness organizations, including the Aldo Leopold Wilderness Research Institute, the Arthur Carhart Wilderness Training Center, and the University of Montana's wilderness programs. The next two sites were not related to wilderness in terms of land designation. The remainder of the sites in the top 10 included: the Southern Utah Wilderness Alliance, Wilderness Inquiry, the Chicago Wilderness Page, the Wild Wilderness Home Page, and two non-American sites—the Wilderness Society of Australia, and the Canadian Park and Wilderness Society. Included in the top 10, therefore, were a host of interests (federal and university) represented by Wilderness.Net, six advocacy organizations—with two of those being non-United States, an adventure travel organization, and two sites totally unrelated to wilderness as a land use.

International Wilderness Sites—To add context to these initial results, we searched on the words "international wilderness." The first site retrieved was the WILD foundation, followed by the International Journal of Wilderness, Wilderness.Net, and the Wilderness Society's Global page. These sites were followed by Sunrise Expeditions to Arctic Canada, the Word of Life Fellowship International Wilderness Ministries, International Wilderness First Aid, North Carolina Outward Bound, and the Listening Point Foundation. Again, the top results were dominated by United States organizations that represent a wide variety of interests in wilderness.

Protected Areas Searches—Recognizing that many other large international players in wilderness conservation did not surface near the top of these searches, we decided to narrow our lexicon from "wilderness" to "protected areas." Through this term we accessed a very different set of results. At the top of the list was the array of resources offered by the World Conservation Union (IUCN) World Commission on Protected Areas. The Marine Protected Areas site provided by the National Oceanic and Atmospheric Administration (NOAA) followed. Next was the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre and the Protected Areas Conservation Trust of Belize, Central America. This initial search was filled out by the Science and Management of Protected Areas Association, which is based in eastern Canada. Searching on the term "protected areas," therefore, provided a list of sites more focused on protection mechanisms than the wilderness concept.

Review of Selected Protected Area Web Sites

To better understand the design and range of content now available on the Web, we conducted a review of selected sites. The sites were chosen based on the large amount of information to be found there and the relative importance of the organization or coalition that compiled the information. The sites reviewed here represent the best global Web sites the authors could find for detailed information about protected areas (including wilderness). The specific Web sites listed should not be considered the only resources available or the best. They simply reflect sites that ranked highly using the Google search engine and some we discovered by following links on other Web sites. The sites selected for review were the World Commission on Protected Areas (WCPA), Wilderness.Net, World Heritage Information Network (WHIN), EarthTrends from World Resources Institute, and the UNEP World Conservation Monitoring Centre (WCMC).

As a first step in our review, we tried to answer the following questions:

- What is the mission of the sponsoring organization?
- What is the function of the site?
- How is the site organized?
- Who is/are the audience(s)?
- Who funds the organization/Web site?
- How can we categorize the site?

World Commission on Protected Areas (http://wcpa.iucn.org)—This site is sponsored by the World Commission on Protected Areas, part of the IUCN. The mission of the commission is to:

> …promote the establishment and effective management of a worldwide representative network of terrestrial and marine protected areas, as an integral contribution to the IUCN mission.

Members of the WCPA are the audience for this site, and the site includes many documents for download, including guidelines for creating and managing protected areas, funding them, and evaluating the effectiveness of management. This site details plans for increased interactivity, but in its current form, acts as an online brochure for WCPA.

Wilderness.Net (http://www.wilderness.net)—This site is managed by the Wilderness Institute at the University of Montana, U.S.A., with support from the four Federal agencies that manage congressionally designated wilderness in the United States, and their training (Arthur Carhart Wilderness Training Center) and research (Aldo Leopold Wilderness Research Institute) organizations. The mission of the site is to "heighten the wilderness dialog worldwide." The Web site is organized by content areas, including education, research, and the National Wilderness Preservation System. Audiences include managers, scientists, educators, students, legislators, and the general public. Many interactive features can be found here, including a library of full-text research publications, lesson plans for students and teachers about wilderness, wilderness news, and discussion forums.

World Heritage Information Network (http://www.unep-wcmc.org/whin/index.html)—This site is sponsored by the World Heritage Convention through the United Nations Educational, Scientific and Cultural Organization (UNESCO). The mission of the site is to act as:

> …a clearing-house for information about the natural and cultural sites identified as being of "outstanding universal value" and inscribed on the World Heritage List by the Intergovernmental World Heritage Committee.

The clearinghouse is set up as a searchable index of partner Web sites that house information about World Heritage sites. Interactive features on the site include the ability to add your resource to the searchable index of World Heritage sites and to search other partner sites.

EarthTrends (http://earthtrends.wri.org)—This site is sponsored by the World Resources Institute (WRI), "an environmental think tank that goes beyond research to find practical ways to protect the Earth and improve peoples' lives," and acts as an environmental information portal. The content is organized around themes including coastal and marine ecosystems, climate and atmosphere, and biodiversity, and protected areas. For each theme there is a searchable database, data tables, country profiles, maps, and features.

UNEP World Conservation Monitoring Centre (WCMC) (http://www.unep-wcmc.org)—The WCMC Web site was another ambitious undertaking involving many interactive features including databases and online mapping, as well as many static Web pages with supporting information. The content is organized around resources, habitats, species, regions, climate change, protected areas,

conventions, and agreements. This site also hosts the Protected Areas Virtual Library. This library is a database of information about all areas that meet the guidelines put forth by the IUCN in 1994. This database does not currently operate as intended, but comes with a disclaimer explaining its shortcomings and plans for the future. The interactive maps on this site are of high quality and utilize the latest in online map browser technology: ARCIMS.

Looking at the matrix of Web sites we reviewed (table 1), it is evident that the era of "brochure" Web sites is over. All of the Web sites reviewed contain a great deal of information and most utilize built-in search engines, enabling Web site visitors to quickly find what they are looking for. The intended audiences for these sites range from the organization members (WCPA) to the WCMC that hosts very specialized content for technical audiences, including avian biologists. EarthTrends and Wilderness.Net contain information for many different audiences. Two of the sites listed offer the added feature of Web pages and documents in languages other than English.

Three of the sites have interactive resources that help to build community among Web site visitors (Wilderness.Net, EarthTrends, and WCMC). These community-building resources include discussion forums, Listservs, and news delivered through e-mail. Other interactive resources we found were online databases and geographic mapping engines (WCMC).

In general, we found good resources containing information on many topics. However, the fact that so many resources exist creates in itself a problem. Fulfilling specific information needs from within such an array of possibilities can be frustrating or impossible. It is now like walking into a library that has no librarian.

Wilderness Versus Protected Areas Disconnect

As mentioned earlier, there seems to be two discrete sets of results when using Google to search for "wilderness" and "protected areas." While the term "wilderness" refers to more than land-based protected areas, "protected areas" is more likely to lead to sites explaining protection mechanisms. Individuals seeking high-quality information about mechanisms for protection of wilderness, policy documents, and so forth, may not understand this distinction.

Toward a Strategy of Protected Area Information Coordination

The libraries of documents on these sites reflect the affiliations and work being conducted by the host organizations. While the content is often excellent, and in many cases is supplemented by Web links to other organizations with similar content, the onus of responsibility for finding good information is put on the Web site visitor, the very person for whom the information was put online in the first place.

What is missing is a coherent, searchable global resource or some other form of guide to the galaxy of wild lands and the Internet. The WHIN project comes the closest to making this need a reality, at least for World Heritage sites. By collecting information about World Heritage resources on the Internet, and indexing those sites, the WHIN project allows Web visitors to search through one interface—many hundreds of external Web pages and documents.

A coherent, searchable global resource could take resources from any content source, gather those resources in one location, and organize the content based on content type, audience, and level of intended specificity. In addition, such a resource could help to simplify and indeed blur the lines between the institutions and organizations that produced the information. This is especially important to the uninitiated who may not be familiar with all of the jargon inherent in a complex concept like wilderness.

The current challenge is to develop an efficient structure for the many types of wilderness or protected area Web sites that exist. Such a structure would organize and add value to individual sites. The demand is there; currently the onus is on the suppliers to provide a more efficient resource that will be visitor centered and contribute to the global community engaged in the conservation of wilderness and protected areas worldwide.

Investing in a Global Resource

A discussion of the development of a global protected area and wilderness network must include attention to the institutional capacity, demands, and commitment it would require. Communicating with a global audience must be central to the institution's mission. The technical sophistication to understand what kind of commitment they are engaging in is also needed. Channeling scarce resources

Table 1—Protected area Web site content matrix.

	General resources				Interactivity			Community building	
	Downloadable documents	Links to external sites	Online maps	Multiple languages	Search engine	Searchable databases	Interactive mapping	Discussion forums	Listservs, e-mail news
World Commission on Protected Areas	X	X			X				
Wilderness.Net	X	X	X		X	X		X	X
World Heritage Information Network		X		X	X	X			
EarthTrends from World Reources Institute	X	X	X		X	X			X
UNEP World Conservation Monitoring Centre	X	X	X	X	X	X	X		X

toward a global audience may appear at first glance to be a nice thing to do but not a central necessity for many organizations, especially when budgets are tight. Committing to the development of a Web-based information resource also requires a substantial commitment to ongoing maintenance. For whom is there an incentive for such activity? Each of the Web resources reviewed above would meet these institutional capacity criteria.

Each year, participants in protected areas seminars call for improved access to the information and creative ideas to problem solving that are generated around the World. Issues related to inventory, monitoring, planning, the use of science, visitor management, and education are among the types of issues that there is a global bank of knowledge to tap. Unfortunately, people have a difficult time accessing the information. Developing countries, even those with Web access, are often hampered by slow connections and an overwhelming amount of data to sift through.

Technical Capacity

Assuming that institutional support for a global protected area information network could be established, there are then a series of technical constraints that would need to be evaluated before deciding how such an information resource could be practically developed. These are the nuts-and-bolts issues that mediate the interaction between the user (information demand) and the technicians and institution who become the providers of the supply. The developer of the supply must consider cost, infrastructure, human resources, and the ever-changing hardware and software. From a user perspective, issues of speed, applicability, and comprehensiveness are critical to making a site meaningful.

Overall Cost: Initial and Long Term—These criteria refer to how much money it would take to operate a Web site. Initial costs are usually higher than long-term maintenance costs.

Infrastructure—Refers to the capacity of the institution to work in the electronic age. Questions asked here include:

- Does the institution operate networked computers?
- Do they currently operate a Web site?
- Does the building where the institution is housed have a high-speed internet connection?

Human Resources—This is potentially one of the greatest expenses in Web site operation. As the level of complexity of the Web site grows, so too does the need for more highly specialized persons (both in number of employees and skill level) to develop and manage the site.

Hardware and Software—As the complexity of the site grows, more specialized hardware and software is necessary to maintain operations. This includes additional Web servers, database servers, backup systems, and all the affiliated software, both to operate the hardware and develop the Web content.

Usability

Speed—Refers to the speed of the Web site. It tells how fast users can find information they are looking for.

Applicability—Refers to how useful the information is for the audience. The assumed audience for this column is individuals seeking information at a regional or national level.

Comprehensiveness—Refers to the depth of information one may find at the Web site. Again, the assumed audience for this category is individuals seeking information at a regional or national level.

Possible Scenarios

Following are a series of scenarios (table 2), listed in terms of their complexity, that will be used to illustrate those practical considerations associated with building Web-based resources:

- The first scenario (links Web site) is a Web site composed of many Web site links in the form of a comprehensive categorized list of links to international protected area Web sites and other related resources. The overall cost of creating a Web site of this type is very low, with greater initial costs at startup (that is, purchasing Web server, initial development time) and lower long-term costs. The infrastructure, human resources necessary, and hardware/software needs would be moderately low for this type of project. In terms of usability, the site would produce fast results for end users and would have a great deal of applicability, but because of the single resource found here (links only), the overall value of this type of resource, in the absence of any additional resources, is negligible.
- The second scenario (searchable index of other sites) is the development of a Web site that allows the end user to search the entire contents of other protected area

Table 2—Evaluation of four approaches to organize wilderness and protected area data worldwide.

	Technical capacity					Usability[a]		
	Overall cost		Infra-	Human	Hardware/		Applica-	Comprehen-
Web site scenarios[b]	Initial	Long term	structure	resources	software	Speed	bility	siveness
Links Webs site	2	1	2	2	1	5	4	2
Searchable index of other sites	3	2	3	3	2	3	1	2
Regional protected area networks	5	4	5	5	5	3	5	5
Master protected areas database and site	5	5	5	5	5	3	4	5

[a]Numbers denote Web site scenario practical considerations, ranging from very low (1) to very high (5).
[b]Scenarios are listed in order of complexity with links Web site being the least complex.

Web sites. The site acts as a search engine that, instead of searching the entire WWW, only searches protected area Web sites chosen by the Web site administrator. The overall costs of this site are slightly higher than the links Web site, but far less than the following scenarios that involve interactive databases.

- The third scenario (regional protected area networks) is the development of a comprehensive, database-driven, dynamic Web site with protected area information of all types for a given region, country, or continent. The best existing example for what this might look like is the Wilderness Information Network (Wilderness.Net). The overall costs for this scenario are high because considerable hardware, software, and human resources are necessary to complete it. The only criteria that receives a lower score for this scenario is "speed" because of the intensive use of database queries to provide information. Somewhat slower speed is to be expected of Web sites with this level of comprehensiveness. This type of Web site is envisioned as part of a larger strategy to provide these "regional" sites that would eventually encompass protected areas throughout the World. Some of the higher costs can be offset because considerable work has already been completed for Wilderness.Net (wilderness areas in the United States), and this work can be adapted and made to fit situations in other regions and countries.
- The last scenario (master protected areas database and site) encompasses all of the other scenarios together under one "master" Web site as an entry point. Under this scenario, the system of regional protected area Web sites is assumed to be in place and functionally working together through shared databases and close cooperation among all institutions and government entities. In addition to what has already been mentioned in the above scenarios, language translations would be available for Web site visitors to utilize. The one factor in this scenario that received a somewhat lower score (besides "speed" for the same reasons as in scenario three) is "applicability," because many users of this site may only need information from one geographic region rather than the entire system of worldwide protected areas. In other words, this site may provide too much information for some users, thus making it too unwieldy for them.

Conclusion

It is now possible and practical to routinely view wilderness and protected area conservation in a global context. Resources are currently being developed to provide growing access to information resources at regional and organizational levels. A global resource would assist in integrating the communication communities that are currently centered on Wilderness, Protected Areas, and other land use designations. It would also promote discussion and understanding of the finite scope of the Earth and the role of land conservation within it. Offered here are four scenarios for potential action, each requiring varied amounts of institutional support and technical capacity. We urge the global conservation communities to engage into a dialog that could promote one of these or a similar scenario. There is a growing demand for informed decisionmaking. In many cases, the information is available but inaccessible. It is now time to begin organizing that information and efficiently putting it into the hands of the people who need it on a daily basis.

Reference

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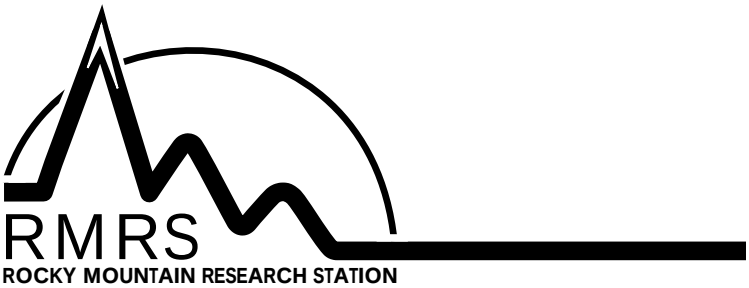

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