

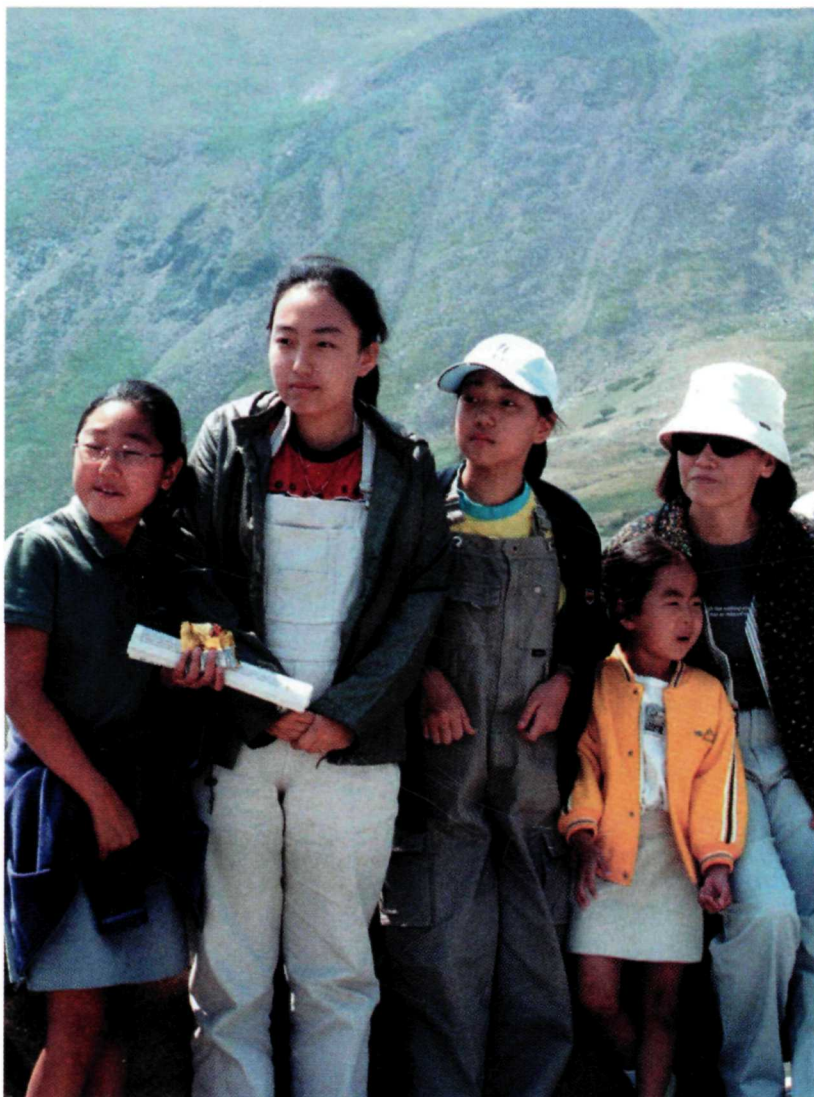
THE GEORGE WRIGHT

# FORUM

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THE JOURNAL OF THE GEORGE WRIGHT SOCIETY

Dedicated to the Protection, Preservation and Management  
of Cultural and Natural Parks and Reserves  
Through Research and Education

# The George Wright Society

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**On the Cover:** U.S. national parks must prepare to accommodate more minority-group visitors. See article by Myron F. Floyd, beginning on p. 41.

# Society News, Notes & Mail

## **Donahue Receives Mather Award for Protecting Big Cypress from ORV Abuse**

The immediate past vice president of the Society, John Donahue, was recently recognized by the National Parks Conservation Association (NPCA) for his efforts to protect Big Cypress National Preserve from the unregulated use of ORVs (off-road vehicles). As a national preserve, Big Cypress allows ORVs, but their use is subject to regulation. On May 18, NPCA recognized Donahue with its Stephen Tyng Mather Award. The award is given to park managers who risk their careers to protect park resources. Donahue, who assumed the superintendency at Big Cypress in February 2000, took a politically unpopular stance by insisting on a plan that limits ORV use to less-fragile areas and restricts them to established roads and trails. He also limited access to 14 designated points of entry, whereas previously ORVs could enter the preserve from any point. The plan aims to allow ORV access while restoring and conserving the vast natural and cultural resources of Big Cypress. The plan has been called a model of sustainable management for high-impact recreation in a fragile environment.

## **2001 GWS Conference Proceedings Due Out in December**

Seventy-three papers from the 2001 GWS conference will be included in the forthcoming proceedings volume, titled *Crossing Boundaries in Park Management*. The proceedings will be published as a softbound book and on CD. If you were a full-week or two-day registrant at the conference, you will get your copy (or copies) automatically. Otherwise, watch this space for availability. Or, if you'd like to be notified by e-mail when the proceedings are published, just send a note to [info@georgewright.org](mailto:info@georgewright.org).



# A Tribute to Robert Belous

After a 24-year career with the National Park Service beginning in Alaska, where his work strongly contributed to passage of the 1980 Alaska National Interest Lands Conservation Act, Robert Belous retired to Spokane, Washington. He died at his home on May 19, 2001, at age 66, after an illness.

Born in New York City in 1935, Bob was a multi-faceted man with a multi-faceted career. A 1960 graduate of the U.S. Merchant Marine Academy, he served as an ensign in the U.S. Navy; sailed to the Far East, Europe, and the Mediterranean as a marine engineer aboard ocean-going merchant ships; and worked as a nuclear engineer on submarine powerplants at Puget Sound Naval Shipyard.

In 1965 Bob left ships and the sea to become a freelance wildlife photographer and writer. Based at Jackson Hole, Wyoming, he spent much time in the field preparing his articles. His annual rambles through Alaska's remote regions included a 2-month trek through the Arctic Wildlife Range. The wonders of Alaska had taken him in tow toward the climactic phase of his career.

The Wyoming interlude had brought Bob and his wife Judy into close friendship with Margaret Murie—Alaskan pioneer, author, and inspiration to wildlands advocates across the country. The cabin that she and Olaus built in the Grand Tetons had become a shrine and a center for the Alaska conservation movement. This association with Mardy and her friends plunged Bob into that movement in the early stages of mobilization for the Alaska lands struggle.

To his Park Service work in Alaska, starting in 1972, Bob brought the precision of mind of an engineer, the artistry of a photographer, the coherence and communication skills of a writer and lecturer, and the drive of a man on a mission. As a plank member of the National Park Service Task Force in Alaska, he began by taking magnificent photographs of the proposed parklands, which the Congress would consider for enactment. These visions of grandeur and beauty, vitalized by wildlife and traditional people living off the land, evolved into traveling exhibits and slide programs that Bob and others presented before the Congress and in major cities across the country. These shows helped sway the nation to support the Alaska park proposals. "This last treasure of wild country," in Mardy Murie's memorable phrase, would more than double the area of the National Park System of the United States.

From the beginning, Bob's many talents and his immense capacity for work led to ever-expanding duties. He became park planner and on-site keyman for the Kobuk Valley and Cape Krusenstern proposals in northwest

Alaska. As chief liaison officer for the task force, he met with and communicated constantly with Native Alaskan organizations, the governor's office, the state legislature, and state agencies and boards of game and fish. And the same with Alaska-based and national conservation organizations. He was a persuasive participant in congressional hearings. He worked with members of Congress and their staffs in Washington, D.C. During their visits to Alaska he took them into the country to show them the resources and values of the proposed parklands throughout Alaska.

This impossible array of jobs and contacts, plus the then 5-hour time difference between Anchorage and Washington, meant that Bob often started his phone calls back East at 3 a.m. and finished his Alaska meetings at 10 p.m. "Nobody can do this," his colleagues used to say. Yet he did. And as those who worked with him still say: "No one will ever be able to measure Bob Belous' contribution to passage of the Alaska Lands Act." That single act of Congress added 41 million acres to the National Park System, and comparable immensities to the National Wildlife Refuge System.

Robert Belous was much more than a trouble shooter and marathon man. He was a thinker, who, with key colleagues in Alaska, fashioned the philosophical and operational base for the ongoing Native Alaskan presence in the new national parklands. This revolution in national-park law and management—prompted by the destructive impacts of industrial civilization on indigenous cultures around the world—changed the frame by including traditional and historical cultures and subsistence activities as nationally significant elements of the new parklands. This switch from the old practice of eviction makes possible the coexistence of ancient homelands and new national parks on the common ground they share. Native Alaskan support for the Alaska Lands Act, because of the subsistence provisions, was critical to its passage. That support is no less critical to continued protection of the parklands and refuges today.

For 3 more years after the lands act was passed, Bob worked as special assistant to John Cook, director of the new Alaska Region. The new parklands' acquisition phase had ended. Now they must be made operational. If anything, Bob's duties increased during this critical period.

Cook's philosophy was to move carefully and deliberately into the vast new land base, where the reigning social climate was strong opposition to the new parks and other national interest lands. After all, Alaska had changed in just 20 years from an "open range" federal territory to a "fenced range" of owned and designated lands divided between the state, the Natives, and the nation. To help Alaskans understand the new facts of life in Alaska wrought by the new laws that had made these changes, Cook needed to get out into the country, to meet and talk to the folks living in and near the new parks. Bob's

continuing liaison and many contacts in the Native community, in state government, and in the field proved instrumental in this effort—whose objective was peaceful coexistence for the present, leading to acceptance, support, and cooperation in the future.

In large measure, despite continuing opposition and inflammatory political rhetoric, the operational frame for the new parklands was set in the 3 years granted Cook's administration of the Alaska Region. Bob, acting as Cook's one-man brain trust, had a hand in every part of this work: federal and state agency coordination, subsistence programs, Native contacts, public involvement, tourism, and park operations and resource issues, to name a few.

In due course John Cook, his deputy Doug Warnock, and Bob Belous ran afoul of the Alaska congressional delegation, which ordered them shipped out to the Lower 48. Doug and Bob landed at Redwood National Park, where Bob served as management assistant and, later, as chief of resource management under Superintendent Warnock. Whatever Bob's title, he donned the usual multitude of hats at Redwood—one of the System's most complex parks—and his hand was in every phase of park operations, public affairs, and inter-agency coordination, including, for example, rehabilitation of watersheds and redwood forests impacted by logging.

Meanwhile, John Cook had served several years as superintendent at Great Smokies before returning for a second stint as Southwest Regional Director. In 1988 Bob Belous became Cook's special assistant, and eventually Associate Regional Director for Administration. Again, titles don't matter. The job sheets, however many responsibilities they list, can only hint at Bob's cohering style of work across the field of National Park Service concerns. And now he had the immense span of the old-line Southwest Region with 40 field units in 5 states and a \$45 million budget.

In 1990 Bob and Judy returned to New Orleans, a home port during his sailing days. Now he came as superintendent of Jean Lafitte National Historical Park and Preserve. This park is in fact a mini-region, with 10 units spread over half the state of Louisiana: from the French Quarter to the bayous of Barataria, from Chalmette Battlefield and National Cemetery to the American Indian site at Chitimacha, from Acadian cultural centers to Italian-American and German-American centers, from visitor centers in Lafayette, Eunice, and Thibodaux to the Environmental Education Center in the delta wetlands, from the Atchafalaya Basin to Jazz in New Orleans.

Given this galactic collection of units and sub-units, this sprawling pot-pourri, John Cook had only one choice for superintendent. It had to be Belous.

Added to the general complexity was a mega-million-dollar construction program, membership on the Delta Region Preservation Commission, and constructive relations maintained with 2 U.S. Senators, 5 members of the House, 9 State Legislators, and the Corps of Engineers. Bob termed this “a highly eclectic management responsibility.” Indeed. And Bob did pull it together, in six years, on the same 16-hours-a-day schedule as always. He got the job done, again, as always.

And then he retired, and he and Judy had some time for birdwatching. But not enough time.



Those of us who knew and worked with Robert Belous will always remember him with awe and affection.

He was so intelligent and vital and competent in everything that he did, so concentrated on getting the job done. He sometimes showed a gruff exterior—that rough edge that protected him from the usual palaver of mere mortals, *because he had so damn much work to do!* But inside lurked a loyal and gentle friend, with a sense of humor that kept us in stitches when he had the time to indulge himself and us with it.

So telling of Bob’s true character is the testimony of those bright and motivated young planners who joined the Alaska Task Force way back when. (Now they are in middle management or on the boards of conservation foundations.) For them he was a fount of knowledge about Alaska, freely given. He inspired them to good work then, and several of them went on to careers in the National Park Service or related conservation fields.

As Bob marked those young recruits, so he marked us all—we lucky ones who knew him and worked in his wide wake.

William E. Brown

*Memorial donations may be sent to the Alaska Conservation Foundation, 441 West 5<sup>th</sup> Ave., Anchorage, Alaska 99501-2340*



Introduction:  
Crossing Boundaries in Managing  
Recreational Use of National Parks  
and Related Areas

**T**he theme of the 2001 biennial George Wright Society conference was “Crossing Boundaries in Park Management: On the Ground, In the Mind, Among Disciplines.” As measured by conference attendance and the apparent enthusiasm of participants, this theme resonated with many planners, managers, and scientists both within and outside the National Park Service. More abstracts were submitted than the conference could accommodate, and there was standing room only in many of the conference sessions.

Those of us in the Park Studies Laboratory at the University of Vermont (faculty, staff, and students), along with colleagues with whom we work around the country, were especially excited to receive the conference announcement and the call for abstracts. Much of the research we conduct necessarily strives to cross boundaries in some fashion as management of recreational use of parks and related areas is inherently, unavoidably, and ultimately integrative. We were pleased when our abstract was accepted to organize and conduct a session on applying the conference theme to recreational use of national parks and related areas.

Our brainstorming about the multiple dimensions of the “crossing boundaries” theme identified nearly

a dozen papers that could and should be part of this session. (More papers than could be comfortably presented in one session, as those who attended the session will remember!) Dave Harmon of the George Wright Society was especially kind to offer us a special issue of THE GEORGE WRIGHT FORUM to properly present and document our thinking about this important topic. This special issue of the journal contains the papers that were prepared for our session.

Ten papers are included in this special issue. The paper by Lawson and Manning addresses visitor experiences in parks and wilderness, noting that such experiences are affected by the social, resource, and managerial conditions found. But

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how are these conditions related, and what are the inherent tradeoffs that visitors would prefer to make among potentially competing conditions? A stated choice model is applied to wilderness use of Denali National Park and Preserve to explore these issues. The paper by Newman et al. is related, but focuses more specifically on theoretical and methodological approaches to crossing the traditional boundary between the social and natural sciences. Recreational use of national parks and related areas has clear ecological and experiential implications, but how are these effects related, and how can they be analyzed and ultimately managed in an integrated fashion?

The papers by Floyd and Laven et al. address the increasingly important topic of cultural diversity and its relationship to national parks and related areas. Minority populations in the USA are traditionally under-represented in visitation to the National Park System, and this raises issues of social and environmental justice. However, minority populations may soon grow into the country's majority populations, with potentially profound political implications for national parks and related areas. Subsistence is another traditionally under-represented use of national parks and related areas. Both of these papers challenge us to integrate more directly into planning and management those uses and users that have traditionally been in the

minority.

The paper by Bacon et al. addresses the issue of integration across time. Many research studies, particularly in the social sciences, are cross-sectional surveys that capture a moment in time. But do conditions change over time, and, if so, how? A longitudinal study of wilderness use in Denali offers some empirical data on this question as well as a potential management strategy to minimize such changes. The paper by Borrie et al. addresses the subject of crossing methodological boundaries. Cross-sectional studies of recreation traditionally rely on quantitative research methods. However, qualitative methods have potentially important strengths, and might be combined with quantitative approaches to derive a more comprehensive understanding of park use and users. A study of snowmobiling in Yellowstone National Park illustrates this principle.

The papers by McCool and Cole, Warzecha et al., and Haas address the broad issue of planning and managing parks and outdoor recreation on a regional basis. Park and outdoor recreation planning and management, and accompanying research, have conventionally been conducted at the site or park level. However, these papers argue that an appropriate diversity of park and recreation opportunities will be forthcoming only if individual parks and related areas are considered within a broader

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geographic and institutional “visitation range.” Collectively, these papers address theoretical, empirical, and institutional perspectives on this subject.

The final paper by Budruk et al. addresses the issue of crossing programmatic boundaries. All organizations, including the National Park Service and other park and related agencies, are divided into divisions, departments, and, ultimately, programs for the sake of efficiency. However, there must be appropriate coordination across programs to ensure that broad agency missions are accomplished. This paper outlines several examples within the National Park Service where more coordination across programs might enhance the quality of visitor experiences in the National Park System.

I would like to thank all of the authors represented in this special issue of THE GEORGE WRIGHT FORUM. The authors presented their papers at the conference in a highly professional manner under harsh time constraints, and followed up their presentations with written papers in a timely fashion (with only modest prodding!). Thanks, too, to those who attended our conference session and contributed to the dis-

cussion. Special appreciation is expressed to staff in several parks where study data were collected, including Mike Tranel and Joe Van Horn, Denali National Park and Preserve; Laurel Boyers, Henrietta DeGroot, and Russell Galipeau, Yosemite National Park; Steve Ulvi, Gates of the Arctic National Park and Preserve; John Sacklin and Kristen Legg, Yellowstone National Park; Bruce Rogers and Dave Wood, Canyonlands National Park; and Karen McKinley-Jones and Jim Webster, Arches National Park. Several studies reported in this special issue were conducted under administrative auspices of the National Park Service’s Conservation Study Institute headquartered at Marsh-Billings-Rockefeller National Historical Park, and thanks are due to Nora Mitchell, Rolf Diamant, B.J. Dunn, and Mea Arego for their interest and assistance. Finally, thanks to Dave Harmon for allowing us to organize and publish our papers in this special issue of THE GEORGE WRIGHT FORUM. I hope readers find this collection of papers useful, and that it will help further our collective efforts at “crossing boundaries in park management.”

**Robert Manning**, Recreation Management Program, School of Natural Resources, University of Vermont, Burlington, Vermont 05405; [rmanning@nature.snr.uvm.edu](mailto:rmanning@nature.snr.uvm.edu)



Steven Lawson  
Robert Manning

## Crossing Experiential Boundaries: Visitor Preferences Regarding Tradeoffs among Social, Resource, and Managerial Attributes of the Denali Wilderness Experience

**W**ilderness management researchers and practitioners have long recognized that wilderness experiences are influenced by the social conditions experienced (e.g., the number of other groups encountered), the resource conditions experienced (e.g., the amount of human impact at camping sites), and the management conditions imposed (e.g., the number of backcountry permits issued; Hendee et al. 1990). Decisions about how to manage wilderness involve potential tradeoffs among these conditions. For example, the number of permits issued for recreational use of a wilderness area could be increased to allow more public access, but this might result in more resource impacts and encounters among groups within the wilderness area. Conversely, reducing the number of recreational-use permits issued might reduce resource impacts and encounters among groups, but would allow fewer people to enjoy the wilderness area.

The normative approach to recreation research has been used to study a broad range of wilderness management issues, including crowding, ecological impacts, and management practices (Manning 1999a). Normative research suggests that wilderness visitors have standards by which to judge recreation-related behavior and associated impacts (Shelby et al. 1996; Vaske et al. 1986; Vaske et al. 1993; Lewis et al. 1996; Manning et al. 1996; Manning et al. 1999). However, normative studies have conventionally been designed to provide information

upon which to define standards of quality related to a single management issue, without explicit consideration of related and potentially competing issues (Manning 1999a). Recent studies in outdoor recreation have suggested that normative research should more explicitly consider the tradeoffs inherent in park and wilderness management decision-making (Hall, in press; Lawson and Manning 2000; Manning et al. 1999).

This study takes an integrative approach to wilderness research by developing a decision-making model

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that considers the social, resource, and managerial attributes of the wilderness experience together. Specifically, stated choice analysis is used to evaluate the choices overnight wilderness visitors in Denali National Park and Preserve make when faced with hypothetical tradeoffs among the conditions of social, resource, and management attributes of the wilderness portion of the park.

#### Denali National Park & Preserve

Alaska's first national park, Mount McKinley National Park, was established in 1917. In 1980, with the passage of the Alaska National Interest Lands Conservation Act, the park was expanded from 2 million to 6 million acres, and renamed Denali National Park and Preserve. At the same time, the original 2 million acres of the park was designated wilderness. Today, this wilderness forms the core of Denali.

Visitor use of the Denali wilderness is managed through a permit system to maintain the area's primitive, undeveloped character. Through the permit system, the park administers strict quotas on the number of overnight visitors who are issued a permit for each of 43 wilderness management units. The quotas exist to prevent resource degradation and to provide visitors with opportunities to experience solitude. During the busy summer months, quotas for many of the management units are regularly reached and some

visitors interested in an overnight trip in the wilderness are turned away or forced to hike and camp in less-preferred management units.

The primitive character of Denali's wilderness is maintained through other management techniques as well. For example, traditional backcountry facilities such as bridges and trails are not provided in the Denali wilderness. Instead, visitors must navigate by map and compass, and visitors are frequently challenged with technical stream-crossings. There are no established campsites in the Denali wilderness, either. Visitors may camp anywhere within the management unit for which they were issued an overnight permit. As a result, visitors are often able to camp out of sight and sound of other groups, in places with little or no evidence of previous human use.

Park managers and planners are currently working on updating the wilderness management plan for Denali. Revision of the wilderness management plan will include making decisions to maintain, reduce, or increase the number of permits issued for each of the wilderness management units. Previous research conducted by Bultena et al. (1981) studied the extent to which wilderness visitors to Denali supported use limitations. The authors conclude that future decisions concerning use limitations will have to weigh the importance of protecting park resources

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and the quality of visitors' experiences against the benefit of granting more visitors access to the wilderness. This study uses stated choice analysis to provide Denali managers with information about overnight wilderness visitors' attitudes and preferences regarding these tradeoffs.

### Stated Choice Analysis

Stated choice analysis models have been developed in the fields of psychometrics, econometrics, and consumer marketing to evaluate public preferences or attitudes (Green and Srinivasan 1978). In stated choice analysis, respondents are asked to make choices among alternative configurations of a multi-attribute good (Louviere and Timmermans 1990a). Stated choice analysis is based on the decision-making framework of random utility theory, and is the basis of the analytical model used in this study (refer to Hanemann 1984 for a comprehensive presentation of the random utility framework). Each alternative configuration is called a profile, and is defined by varying levels of selected attributes of the good (Mackenzie 1993). For example, respondents may be asked to choose between alternative recreation settings that vary in the number of other groups encountered, the degree of impact to the natural environment, and the intensity of management regulations imposed on visitors. Respondents' choices among the alter-

natives are evaluated to estimate the relative importance of each attribute to the overall utility derived from the recreational setting. Further, stated choice analysis models are used to estimate public preferences or support for alternative combinations of the attribute levels (Dennis 1998). Stated preference methods, including conjoint analysis, are related to stated choice methods, and are also used to evaluate public preferences for multiple-attribute goods. Respondents to conjoint analysis studies are asked to rate or rank alternatives, rather than choose among alternatives. For a detailed discussion of conjoint ranking see Dennis (1998) and Mackenzie (1993); for conjoint rating, see Mackenzie (1993), Stevens et al. (2000), and Teisl et al. (1996).

Stated choice analysis has been applied to study public preferences and attitudes concerning a range of recreation-related issues. Louviere and Timmermans (1990a) suggest ways in which stated choice models can be used to evaluate alternative recreation policies. Specifically, the authors state that one of the strengths of choice models is their predictive ability. That is, choice models provide recreation managers with foresight about how the public is likely to respond to various policy alternatives. Further, choice models provide managers with information about people's preferences for arrangements of resources, facilities, and

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services that may not currently exist.

There is a growing body of literature describing the application of stated choice analysis to outdoor recreation management issues in parks (Louviere and Timmermans 1990b; Louviere and Woodworth 1985; Schroeder et al. 1990). Other natural resource-related applications of stated choice analysis include studies of river flow management (Adamowicz et al. 1994), tourism (Haider and Ewing 1990), recreational hunting (Boxall et al. 1996; Bullock et al. 1998; Mackenzie 1993), siting of hazardous waste facilities (Opaluch et al. 1993; Swallow et al. 1994), watershed management (Johnston et al. 1999), and wildlife management (Adamowicz et al. 1998).

### Study Methods

**Selection of attributes and levels.** Wilderness areas are managed, in general, to provide visitors with opportunities to experience solitude in a relatively unmodified natural environment with few management restrictions and facilities (Merigliano 1990). Substantial research has been conducted to identify social, resource, and managerial setting attributes that reflect these general management objectives and contribute to or detract from the quality of the wilderness recreation experience (Merigliano 1990; Roggenbuck et al. 1993; Shindler and Shelby 1992; Whittaker 1992). These attributes

are commonly referred to in the recreation literature as “indicators of quality.”

Manning (1999b) summarizes the results of a number of studies that have focused on identifying potential indicators of quality. Based on review of this literature, six wilderness-setting attributes were selected for this study to define the social, resource, and management conditions of the Denali wilderness setting profiles. Three levels were defined for each of the six attributes, based on recommendations from park staff. Table 1 lists the attributes and levels used to define alternative Denali wilderness settings in the study.

Pairs of hypothetical Denali backcountry settings were generated by combining the six wilderness-setting attributes at varying levels, based on an experimental design. The experimental design resulted in four questionnaire versions, each containing nine pairwise comparisons (Seiden 1954). An example of a typical Denali wilderness setting comparison is presented in Table 2.

### Results

**Survey administration.** Overnight wilderness visitors in Denali are required to obtain a permit and a bear-resistant food container from the visitor center prior to their backpacking trip. The stated choice analysis survey was administered to overnight wilderness visitors at the visitor center when they returned the food container at the end of their

## Managing Recreational Use

<p><b>Social conditions</b></p> <p><i>Number of other groups encountered per day while hiking:</i></p> <ul style="list-style-type: none"> <li>• Encounter 0 other groups per day while hiking</li> <li>• Encounter up to 2 other groups per day while hiking</li> <li>• Encounter up to 4 other groups per day while hiking</li> </ul> <p><i>Opportunity to camp out of sight and sound of other groups:</i></p> <ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups all nights</li> <li>• Able to camp out of sight and sound of other groups most nights</li> <li>• Able to camp out of sight and sound of other groups a minority of nights</li> </ul>
<p><b>Resource conditions</b></p> <p><i>Extent and character of hiking trails:</i></p> <ul style="list-style-type: none"> <li>• Hiking is along intermittent, animal-like trails</li> <li>• Hiking is along continuous single-track trails developed from prior human use</li> <li>• Hiking is along continuous trails with multiple tracks developed from prior human use</li> </ul> <p><i>Signs of human use at camping sites:</i></p> <ul style="list-style-type: none"> <li>• Camping sites have little or no signs of human use</li> <li>• Camping sites have some signs of human use — light vegetation damage, a few moved rocks</li> <li>• Camping sites have extensive signs of human use — bare soil, many rocks moved for wind protection and cooking</li> </ul>
<p><b>Management conditions</b></p> <p><i>Regulation of camping:</i></p> <ul style="list-style-type: none"> <li>• Allowed to camp in any zone on any night</li> <li>• Required to camp in specified zones</li> <li>• Required to camp in designated sites</li> </ul> <p><i>Chance of receiving an overnight backcountry permit:</i></p> <ul style="list-style-type: none"> <li>• Most visitors are able to get a permit for their preferred trip</li> <li>• Most visitors are able to get a permit for at least their second-choice trip</li> <li>• Only a minority of visitors are able to get a backcountry permit</li> </ul>

Table 1. Denali wilderness-setting attributes and levels.



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<b>Backcountry Setting A</b>	<b>Backcountry Setting B</b>
<ul style="list-style-type: none"> <li>• Encounter up to 2 other groups per day while hiking.</li> </ul>	<ul style="list-style-type: none"> <li>• Encounter up to 4 other groups per day while hiking.</li> </ul>
<ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups <i>all</i> nights.</li> </ul>	<ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups <i>most</i> nights.</li> </ul>
<ul style="list-style-type: none"> <li>• Hiking is along continuous, <i>single-track</i> trails developed from prior human use.</li> </ul>	<ul style="list-style-type: none"> <li>• Hiking is along intermittent, animal-like trails.</li> </ul>
<ul style="list-style-type: none"> <li>• Camping sites have <i>some</i> signs of human use — light vegetation damage, a few moved rocks.</li> </ul>	<ul style="list-style-type: none"> <li>• Camping sites have <i>some</i> signs of human use — light vegetation damage, a few moved rocks.</li> </ul>
<ul style="list-style-type: none"> <li>• Required to camp at <i>designated</i> sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Required to camp at <i>designated</i> sites.</li> </ul>
<ul style="list-style-type: none"> <li>• Only a minority of visitors are able to get a backcountry permit.</li> </ul>	<ul style="list-style-type: none"> <li>• Most visitors are able to get a backcountry permit for their <i>preferred</i> trip.</li> </ul>

Table 2. Example of Denali wilderness-setting comparisons.

backpacking trip. The survey was administered from July 24 through September 2, 2000. The choice experiment was conducted as part of a larger study of Denali overnight wilderness visitors. Individuals who did not participate in other parts of the larger study were recruited for the stated choice experiment. Study participants were asked to complete one of four versions of the questionnaire on a laptop computer. In each of the nine choice questions, respondents were asked to read through each setting description (A and B) and indicate which they preferred. The response rate for the stated

choice analysis survey was 81.2%, resulting in a total of 311 completed questionnaires (approximately 78 respondents for each version of the questionnaire) and 2,799 pairwise comparisons.

**Study findings.** The responses to the stated choice questions were analyzed using logistic regression analysis. The regression coefficients for the Denali wilderness setting attributes, together with their standard errors, Wald chi-square values, and P values are presented in Table 3. All coefficients are significantly different than zero at <.001% level, except the coefficients on “Up to 2 other

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groups” and “Intermittent animal-like trails.” The overall fit of the model is supported by the results of the Hosmer and Lemeshow (2000)

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>Wald Chi-Square</b>	<b>P Value</b>
<b><i>Encounters with other groups per day while hiking:</i></b>				
0	—	—	—	—
Up to 2	0.0649	0.0433	2.2458	0.1340
Up to 4	-0.5044	0.0438	132.8263	0.0001
<b><i>Able to camp out of sight and sound of other groups:</i></b>				
All nights	—	—	—	—
Most nights	0.1452	0.0435	11.1482	0.0008
A minority of nights	-0.4404	0.0452	94.8138	0.0001
<b><i>Hiking is along:</i></b>				
Intermittent, animal-like trails	—	—	—	—
Single-track trails developed from human use	-0.0281	0.0443	0.4028	0.5256
Multiple-track trails developed from human use	-0.2912	0.0428	46.3399	0.0001
<b><i>Camping sites have:</i></b>				
Little or no signs of human use	—	—	—	—
Some signs of human use	0.2073	0.0440	22.1506	0.0001
Extensive signs of human use	-0.7896	0.0485	264.9717	0.0001
<b><i>Regulation of camping:</i></b>				
Allowed to camp in any zone on any night	—	—	—	—
Required to camp in specified zones	0.1398	0.0476	8.6202	0.0033
Required to camp in designated sites	-0.2117	0.0452	21.9484	0.0001
<b><i>Chance visitors have of receiving a permit:</i></b>				
Most get a permit for their preferred trip	—	—	—	—
Most get a permit for at least their second choice	0.1430	0.0443	10.4236	0.0012
Only a minority get a permit	-0.2157	0.0434	24.6555	0.0001

Table 3. Coefficient estimates for wilderness-setting attributes

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goodness of fit test ( $\chi^2 = 3.492$ ,  $p = 0.836$ ).

The magnitude of significant coefficients reflects the relative importance of the corresponding level of the attribute to Denali overnight wilderness visitors. The values of the coefficients in Table 3 imply that signs of human use at campsites influence Denali overnight wilderness visitors' utility or satisfaction more than any other wilderness-setting attribute considered in this study. Specifically, camping site conditions characterized as having "Extensive signs of human use" are evaluated less favorably than any other level. Additionally, camping site conditions characterized by "Little or no signs of human use" are preferred more than any level of any other wilderness-setting attribute.

The magnitude of the coefficient estimates in Table 3 indicate that solitude related attributes represent a second tier of importance to Denali overnight wilderness visitors. That is, while the number of encounters with other groups per day while hiking and opportunities to camp out of sight and sound of other groups are less important wilderness setting attributes relative to campsite impacts, they demonstrate a relatively large influence on Denali overnight wilderness visitors' utility. The extent and character of trails, regulations concerning where visitors are allowed to camp in the Denali wilderness, and the availability of back-

country permits are less important, relative to campsite impacts and solitude-related attributes.

The relationship between the levels of each wilderness-setting attribute and the average utility associated with all possible combinations of the six attributes are plotted in Figures 1a-1f. The values on the x-axis of each plot represent the level of the corresponding wilderness-setting attribute, and the values on the y-axis represent the amount by which the utility of the corresponding level of the attribute deviates from average utility or satisfaction. The values on the y-axis are expressed in units of utility, which is a measure of relative preference. Levels of attributes with high utility values are preferred to levels of attributes with lower utility values. The plots provide further insight into the relative importance of the attributes to Denali overnight wilderness visitors. For example, utility drops sharply as campsites change from having "Some signs of human use" (+0.2073) to "Extensive signs of human use" (-0.7896) (Figure 1d), whereas the loss of utility is less dramatic as the opportunity to camp out of sight and sound of other groups changes from "All nights" (0.2952) to "Most nights" (0.1452) (Figure 1b).

To test whether differences in utility associated with changes in the level of an attribute are significantly different than zero, two additional logistic regression analyses were

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performed. In them, the attributes were represented in the statistical model using *dummy* coding rather than *effects* coding. Results of the additional analyses indicate that the difference in utility associated with being “Allowed to camp in any zone on any night” versus being “Required to camp in specified zones”, and the difference in utility associated with “Most visitors are able to get a permit for their preferred trip” versus “Most visitors are able to get a permit for at least their second choice trip,” are not significantly different than zero. All other utility differences associated with different levels of the attributes were found to be significantly different than zero.

The results of the stated choice experiment suggest that Denali wilderness visitors support some level of management over where visitors may camp and a certain degree of visitor-use limits. Utility remains unchanged as regulations over where visitors may camp increases from “Allowed to camp in any zone on any night” to “Required to camp in specified zones” (Figure 1e). However, utility decreases to its lowest point with respect to camping regulations when visitors are “Required to camp in designated sites.” A similar trend is observed concerning overnight wilderness-use limits. Utility associated with this attribute is statistically the same whether use limits are at their least restrictive level (“Most get a permit for their preferred trip”) or at

the intermediate level (“Most get a permit for at least their second choice trip”) (Figure 1e). Use limits that result in only a minority of visitors receiving a permit lead to the lowest utility (i.e., the chance visitors have of receiving a permit). A possible explanation for these results is that visitors may realize that without certain management restrictions, the resource- and social-setting attributes of the Denali wilderness are likely to deteriorate beyond acceptable conditions.

An additional use of the model is to predict the preferences of visitors for alternative wilderness management scenarios. As an example, two hypothetical Denali wilderness management alternatives will be considered. The first will be referred to as the “Solitude Alternative” and the second as the “Freedom Alternative” (Table 4). Under the Solitude Alternative, overnight wilderness visitors would encounter no other groups per day while hiking and be able to camp out of sight and sound of other groups every night. However, the two management attributes would be at their most restrictive levels. That is, visitors would be required to camp in designated sites and only a minority of visitors would be able to get a backcountry permit. Under the Freedom Alternative, overnight wilderness visitors would be able to camp in any zone on any night, and most visitors would be able to get a permit for their preferred trip. How-

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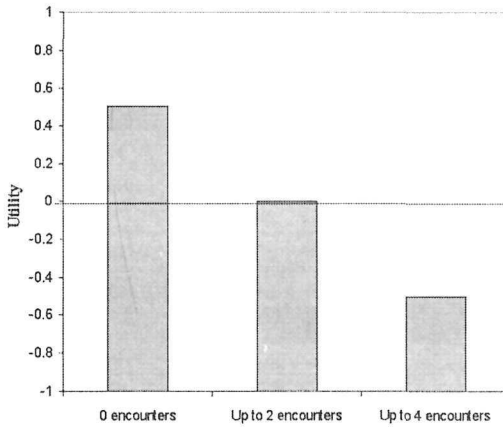


Figure 1a

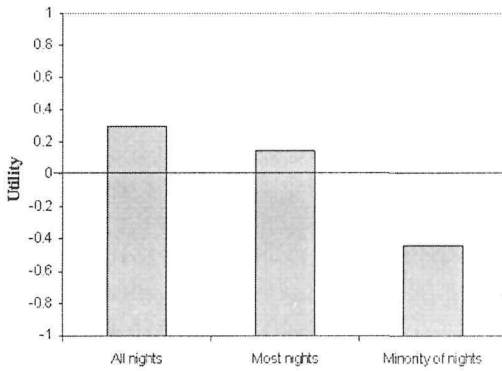


Figure 1b

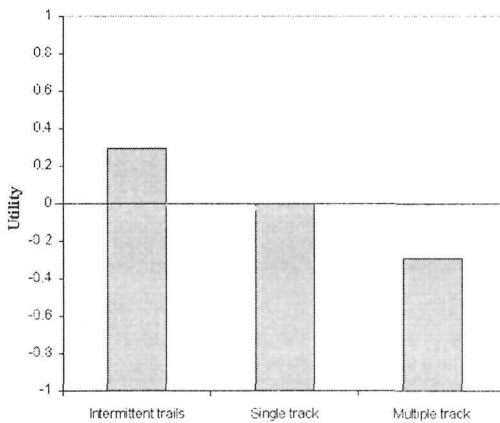


Figure 1c

Figure 1a-1c. Denali wilderness-setting attribute levels and corresponding utility. See text for explanation. [continued on the next page]

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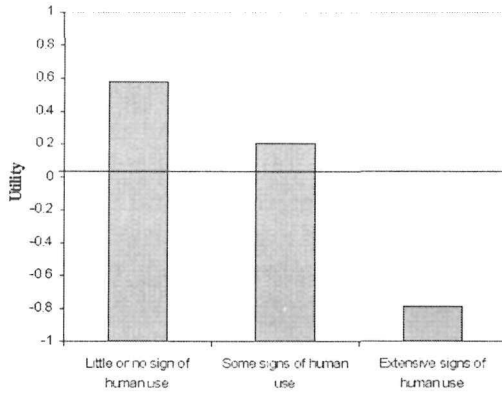


Figure 1d

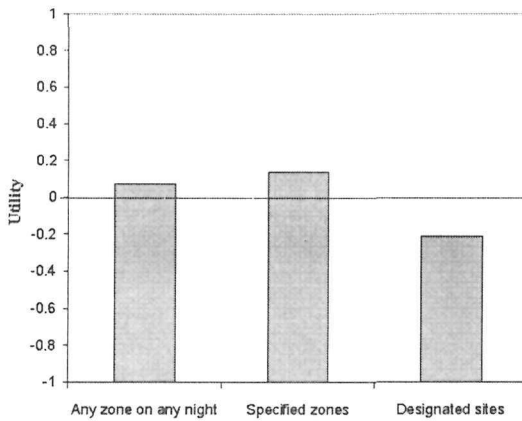


Figure 1e

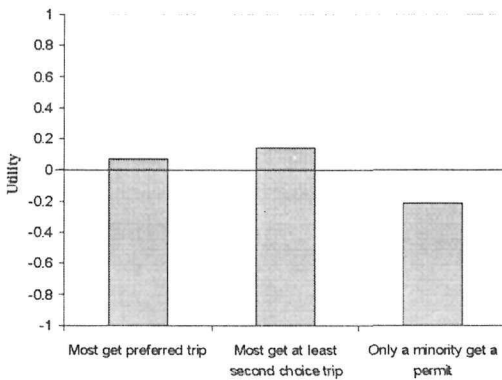


Figure 1f

Figure 1d-1f. Denali wilderness-setting attribute levels and corresponding utility. See text for explanation. [continued from the previous page]

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	<b>Solitude Alternative</b>	<b>Freedom Alternative</b>
Hiking Encounters:	0 other groups per day	Up to 4 other groups per day
Campsite Solitude:	All nights	A minority of nights
Hiking Trails:	Single track trails	Single track trails
Campsite Impacts:	Some signs of human use	Some signs of human use
Camping Regulations:	Designated sites	Any zone on any night
Availability of permits:	Only a minority of visitors receive a permit	Most get a permit for their preferred trip
Voting Proportion	75%	25%

**Table 4. Scores for two hypothetical Denali wilderness management alternatives.**

ever, visitors would encounter up to four other groups per day while hiking, and they would be able to camp out of sight and sound of other groups only on a minority of nights. In both alternatives, the extent of social trails, and the amount of impact to campsites, would be fixed at the intermediate level.

At the heart of the comparison between the Solitude Alternative and the Freedom Alternative are visitors' evaluations of the tradeoff between freedom of access to the wilderness and the opportunity to experience solitude. The model predicts that in a hypothetical referendum, 75% of Denali overnight wilderness visitors would choose the Solitude Alternative and only 25% would choose the Freedom Alternative (Table 4; see Opaluch et al. 1993 for a demonstration of the methods used to calculate estimated voting proportions for management alternatives). This re-

sult implies that, in general, Denali overnight wilderness visitors would prefer to forgo some freedom from management to improve opportunities to experience solitude.

### Conclusions

In this study, stated choice analysis has been used to integrate consideration of the conditions of social, resource, and managerial attributes of the Denali wilderness into decisions about how to manage it. The results of the stated choice analysis presented in this paper have several important implications for wilderness management in Denali National Park and Preserve.

First, consistent with the findings of previous wilderness research, Denali overnight wilderness visitors place particular importance on the extent of impacts at camping sites (Roggenbuck et al. 1993). Management actions that provide visitors

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with places to camp that have no more than some signs of human use will make substantial positive contributions to the quality of their wilderness experience, while those that result in sites with extensive signs of human use will greatly detract from the experience. Further, visitors place relatively high importance on having limited contact with other groups while hiking and camping.

Several aspects of the study's findings suggest that visitors would be willing to tolerate, and in fact support, management restrictions, including use limits, to achieve desired social- and resource-setting attribute conditions. For example, the results suggest that it makes no difference to visitors whether they are required to camp in specified zones (as current park regulations demand) as opposed to being allowed to camp in any zone on any night. Additionally, the results suggest that visitors' utility does not diminish if limits on the number of backcountry permits issued are increased from the least restrictive level considered in this study to the intermediate level, even though their chances of receiving a permit for their preferred trip would be reduced. As noted above, a possible explanation for these findings is that visitors might consider a certain degree of management regulation to be necessary to achieve desirable social and resource conditions in the Denali wilderness.

On a more general level, the

model allows managers to evaluate visitor attitudes toward alternative management scenarios. This allows managers to consider combinations of setting attributes that are not currently in place, but which may offer a better alternative than the status quo. Additionally, alternatives being considered under the new wilderness management plan can be generalized to the model, and managers can predict public response to each alternative. The results of the hypothetical application of the choice model provide further evidence that visitors are willing to trade off freedom from management restrictions for desired social conditions. Specifically, the results demonstrate that in a hypothetical referendum, visitors would prefer (by a margin of three to one) a wilderness setting that emphasizes solitude through relatively restrictive management actions over a more congested wilderness setting with limited management restrictions.

From a management perspective, these results suggest that the majority of overnight wilderness visitors support backcountry permit quotas to protect the primitive character of the park. A moderately restrictive quota system that is designed to enhance visitors' opportunities to experience solitude and to maintain relatively undisturbed campsite and trail conditions will receive the greatest support. However, the results of the hypothetical application of the choice model indicate that there is



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also a substantial proportion of visitors (25%) that places high importance on freedom from management restrictions despite reduced opportunities to experience limited contact with other groups while hiking and camping. This finding suggests that Denali overnight visitors are at least somewhat diverse in their attitudes concerning the management of the park's wilderness. Managers could address this diversity based on the concept of zoning to provide a spectrum of opportunities for visitors. For example, the system could be designed in such a way that quotas for most zones within the wilderness are set at levels that emphasize opportunities for visitors to experience solitude, while quotas for a few zones are set at levels that provide greater visitor access.

The results of this study indicate that certain conditions of each of the six Denali wilderness-setting attributes provide a greater-than-average level of utility to visitors. However, Figure 1 illustrates that when the conditions of the attributes deteriorate beyond "threshold" levels, they provide less-than-average levels of utility (e.g., when camping sites deteriorate from having some signs of human use to having extensive signs of human use). These findings imply that the wilderness experience in Denali can be substantially improved by restoring the social and resource conditions in the wilderness to levels higher than the threshold. Likewise,

the wilderness experience can be protected from substantial decline by keeping conditions from falling below the threshold.

The threshold levels for each of the six Denali wilderness-setting attributes, illustrated in Figure 1, could be used by park managers to help formulate standards of quality. For example, Figure 1a demonstrates that fewer than two encounters with other groups per day while hiking provides a greater-than-average level of utility to visitors, while encounters with more than two other groups per day provides a less-than-average level of utility. Therefore, a potential standard of quality for this attribute might be set at "up to two encounters with other groups per day while hiking." The use of stated choice analysis data to help formulate standards of quality for wilderness-setting conditions represents a potential improvement to the conventional normative approach in recreation research, in that resulting data reflect the tradeoffs visitors are willing to make.

A potential limitation of this study is that the relative importance of the Denali wilderness-setting attributes considered here are influenced by the levels of the attributes selected. Our findings may have varied if we had used different levels to represent the range of conditions for each attribute. For example, we may have found the relative importance visitors place on the chance of receiving an

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overnight backcountry permit to be greater if we had used the phrase "Visitors have a 5% chance of receiving a backcountry permit" rather than "Only a minority of visitors are able to get a backcountry permit." However, the levels of the attributes were selected to represent a realistic range of conditions for each, based on current conditions in the park. As a result, it seems reasonable to conclude that the results of this study realistically represent overnight wilderness visitors' attitudes and preferences concerning the conditions of social, resource, and managerial attributes of the Denali wilderness experience.

Previous recreation research indicates that attitudes and preferences concerning indicators of quality may be influenced by personal characteristics of visitors, such as the level of experience an individual has (Bryan 1977; Ditton et al. 1983; Graefe et al. 1986; Munley and Smith 1976). Further research could be conducted to examine differences in the way novice and experienced overnight visitors evaluate tradeoffs among the attributes of the Denali wilderness. This information would provide managers with a better understanding of the preferences of different

types of visitors and could be used to identify wilderness-setting conditions that are most suitable for each type.

The findings of this study reflect the attitudes and preferences of overnight wilderness visitors in Denali National Park and Preserve concerning management of the park's wilderness. The use of stated choice analysis should be considered for studies of visitors' preferences in other wilderness areas. Results of such studies would provide a basis for comparison of users' preferences for conditions across different types of wilderness areas. Further, while much attention has been focused on the preferences and attitudes of overnight visitors to wilderness areas, the amount of research focused on day-use visitors is more limited (Roggenbuck et al. 1994). However, day use constitutes a substantial proportion of visitor use in many wilderness areas (Lucas 1980; Manning et al. 1996; Roggenbuck and Lucas 1987). Stated choice analysis can further inform wilderness management decisions through studies of day-use visitors' preferences for the conditions of social, resource, and managerial attributes of the wilderness experience.

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## Integrating Resource, Social, and Managerial Indicators of Quality into Carrying Capacity Decision-Making

**A**s use of national parks, wilderness, and related areas continues to rise and visitors and types of activities continue to diversify, we are challenged to balance recreation use and preservation. This challenge forces managers and researchers to address both ecological and social issues when making management decisions. In park and wilderness management, integrating social and resource indicators is essential to meet park mandates that require the protection of both experiential and resource conditions. This paper addresses the challenges we face in integrating social and resource data and describes a current study in Yosemite National Park designed to accomplish such an objective. This study will develop and apply conjoint, or “tradeoff,” analysis that quantitatively integrates resource, social, and managerial indicators of quality. The study will also utilize a GIS framework to integrate resource, social, and managerial indicators of quality into carrying capacity decision-making. The capabilities and advantages of these integrative techniques are outlined.

### **Conceptual Background**

When facing management challenges, we look to planning and management decision-making frameworks to help organize our priorities and choose from competing alternatives. Two prominent management frameworks in the recreation management literature are the recreation opportunity spectrum

(ROS) and carrying capacity.

ROS is a land classification and recreation management framework developed during the late 1970s (Clark and Stankey 1979; Brown et al. 1978; Brown et al. 1979). It has generally been applied to inventory and allocate recreation opportunities through zoning in agency management plans. ROS comprises land

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classification categories that describe an array of recreation opportunities ranging from primitive to urban (Clark and Stankey 1979). Recreation opportunities are defined by linear relationships among three characteristics: the resource setting, the social setting, and the managerial setting. ROS facilitates the integration of alternative combinations of these attributes to define and manage for different recreation opportunities. For example, primitive recreation opportunities are defined by "natural" resource conditions, "low-density" social conditions, and "undeveloped" managerial conditions (Figure 1).

Carrying capacity is a more prevalent framework employed to address management concerns of increasing recreation use and associated deterioration in resource and social conditions. In its most generic form, carrying capacity refers to the

amount and type of recreation use that can be sustained in a protected area (Stankey and Manning 1986; Shelby and Heberlein 1986; Graefe et al. 1984; Manning 1997). Carrying capacity literature, like that of ROS, relates recreation management to resource, social, and managerial attributes. For example, there are inherent tradeoffs between the resistance and resilience of the resource, the amount and type of recreation activities, and the intensity of visitor and site management. Thus, carrying capacity has also been used to integrate resource and social considerations in recreation management decision-making. The most widely used contemporary carrying capacity frameworks in the USA include limits of acceptable change (LAC; Stankey et al. 1985) and visitor experience and resource protection (VERP; NPS 1997).

Research and management expe-

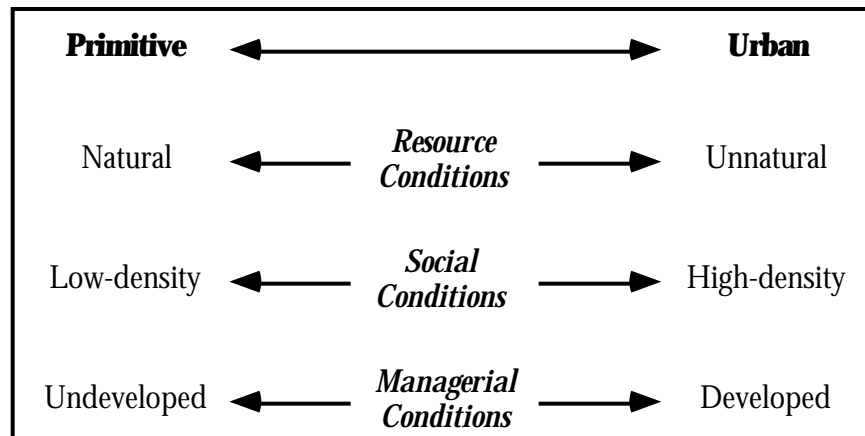


Figure 1. Linear relationships between the resource, social, and managerial conditions as suggested by the ROS (Manning 1985).

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rience reveals that carrying capacity can be determined only when prescriptive management objectives are explicitly defined, and that management objectives should be formulated and expressed in terms of indicators and standards of quality (Frisell and Stankey 1972; Manning et al. 1996; Manning 1998; Manning 1999). Indicators of quality are measurable, manageable variables that define the desired future conditions for resource, social, and managerial settings (Manning 1999; Merigliano 1990). Standards of quality define the minimum acceptable condition of indicator variables, or what is often termed the "limits of acceptable change."

These management frameworks provide a conceptual foundation for research to support an integrative approach to protected area planning and management. They suggest that planning and management of recreation must consider resource, social, and managerial attributes, and that indicators and standards of quality should be developed for these attributes. When standards of quality are violated, managers must act to manipulate elements of the resource, social, or managerial setting through management actions affecting visitors or the site.

#### Related Literature

Recreation experiences are composed of the resource, social, and managerial settings in which they

take place. This threefold concept intertwines ecological issues with social issues, making recreation management inherently integrative. However, integrating resource and social data into carrying capacity decision-making continues to challenge managers and researchers.

Although great strides have been made to increase and diversify public participation in park and wilderness planning and management, there remains room for improvement. Understanding the dynamics of the total system is often constrained by a lack of coordination among experts and the public. Emphasis should be placed on facilitated negotiation and consensus-building to develop a common vision and resolve conflicts (Stein and Gelburd 1998). Early and continuous public input will help incorporate the social dimensions of ecological issues into an integrative approach. Other important elements of successful public participation are using a variety of involvement approaches and giving constant feedback (Stein and Gelburd 1998). There is an on-going need to define mutual goals that integrate the social, ecological, and managerial systems in concert with those portions of the public involved with a particular project.

Public participation in park and wilderness planning and management will not be the cure for eliminating uncertainty; rather, it will help clarify points of dispute and identify



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knowledge gaps. The role of the public also helps clarify if there is some level of consensus on the “right” course of action, even in the face of uncertainty. Ultimately, considering “all relevant facts, knowledge, values and social interests” greatly improves the foundation for rational and integrative decision-making (Hennen 1999, 304).

Adaptive management is a way to address the “staggering information requirements” that stem from an integrative approach to wilderness planning and management (Cortner and Moote 1999). Adaptive management is an action-based process where information is continually collected and desired goals and outcomes are evaluated and adjusted—otherwise known as “learning by doing.” Management prescriptions are considered working hypotheses that are tested through management activities (Cortner and Moote 1999). Management efforts are designed as experiments, with monitoring (either in the field or through simulation modeling) being a key component to allow for redirection of strategies as quickly as possible. This type of strategy provides for “decisions that are informed; that gain understanding, acceptance and support by a wide audience; that recognize the uncertainty inherent in those decisions; and, that are adjustable in the face of surprise” (Lessard 1998). The iterative nature of hypothesis-testing

through monitoring and evaluation procedures leads to a proactive rather than reactive approach to planning and management.

Clark et al. (2000) suggest that integration is a good example of a “policy myth.” A policy myth tends to garner support and enthusiasm at the abstract level, but loses support when further definition is needed. Integration in protected area management illustrates such a dilemma. While at the theoretical level we understand the complexities involved in the human relationship with protected environments, we continue to be challenged to make integrative management tools operational in the field.

The concept of integration is neither new nor limited to the study of natural resource management. Clark et al. (2000) traced the routes of integration to the concept of holisms. Holisms address functional relationships between parts and whole systems and the idea that the “whole is greater than the sum of the parts.” The idea of holisms is an inherent part of science from ecology to medicine (Clark et al. 2000). The concept of managing a system holistically by integrating and defining relationships between social systems and ecological systems has a long history, dating back to Aldo Leopold’s “land ethic” (1949).

The resource management literature suggests several frameworks that begin to address these issues.

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Ecosystem management (EM), integrated environmental management (IEM; Rabe 1986; Bartlett 1990; Born and Sonzogni 1995) and integrated resource management (IRM) (Yin and Pierce 1993) are a few of the frameworks that begin to address the maintenance of processes and functions that preserve whole systems for ecological integrity and for human cultural and economic benefits (Grumbine 1998). These frameworks include aspects of protecting ecosystems, maintaining biological diversity, protecting ecological processes and integrity, and accommodating human use (Brussard et al. 1998; Christensen et al. 1996; Grumbine 1994; Francis 1993; Lackey 1998; Yaffee 1999). Key elements include analyses on multiple spatial and temporal scales, disturbance regimes, and adaptive management (Boyce and Haney 1997; Grumbine 1994).

#### Analytical Integrative Models

Several models have emerged from the resource management literature that might help to make protected area management and research more integrative. For example, an environmental impact statement (EIS), mandated under the National Environmental Policy Act (NEPA, enacted 1968), combines social and ecological analyses to assess the potential impact of certain federal agency management actions. NEPA compliance has encouraged in-

creased public involvement in early stages of decision-making and development of multiple alternatives for management actions. These occurrences have fostered a more comprehensive consideration of ecological, social, and economic elements. Although this approach is integrative in nature, it is more multidisciplinary than interdisciplinary. EIS models generally lack the analytical power needed to fully address interrelationships between social and ecological conditions.

Spatial analyses conducted using geographic information systems (GIS) provide another tool for analyzing and visualizing relationships between biophysical resource characteristics and various social attributes. Traditionally, only resource data have been georeferenced within GIS systems. However, GIS has the capability to incorporate social data as well, thereby facilitating a more integrative analysis.

Conjoint analysis, also called trade-off or stated choice analysis, is used in marketing research to measure consumer preferences (Louviere 1988; Green et al. 1988), and has also been applied in non-market and environmental policy contexts (Opaluch et al. 1993; Dennis 1998). In recreation management decision-making, conjoint analysis can be employed to evaluate visitor preferences for trade-offs between various levels of access to protected areas, resource impacts, crowding, and conflicts,

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and site development or visitor regulation. Respondents are asked to choose between alternative scenarios that vary in their attributes (e.g., resource, social, and managerial conditions). Data are analyzed to determine the partial utilities for each attribute imputed from the overall trade-offs. Partial utilities can also be combined to estimate the relative preferences for any combination of attribute levels, thus providing an objective, quantitative mechanism for integrating resource-, social-, and managerial-setting elements.

### **Carrying Capacity of Yosemite National Park Wilderness: An Integrated Approach**

An integrated approach to carrying capacity analysis is now being undertaken in the wilderness portion of Yosemite National Park. This study has two specific objectives. First, selected ecological-, social-, and managerial-setting attributes that define the quality of wilderness experiences in Yosemite will be inventoried and mapped. Using GIS technology, overlay maps of these setting attributes will assist in determining the types and distribution of wilderness experiences and concomitant opportunity zones for the wilderness portion of the park. Second, park visitors will be surveyed to evaluate relative tradeoffs among the wilderness-setting attributes. Optimum levels of ecological-, social-, and managerial-setting attributes may not

be able to be achieved simultaneously. In such cases, tradeoffs must be made among these attributes. Analysis of visitor preferences regarding these tradeoffs will be used to inform wilderness planning and management decisions.

### **Study Methods**

This study is being conducted for the wilderness portion of the park. The principal research method is a survey of wilderness users. Sampling for the visitor survey portion of this study is being conducted in and around the wilderness permit stations in Yosemite Valley, Tuolumne, Wawona, and Hodgdon Meadows. The sampling universe includes all persons receiving a wilderness permit during the summer-use season of 2001. A stratified random sample will be selected from the sampling universe.

The research is being conducted in two phases corresponding to the study objectives. The first phase of research will inventory and map selected setting attributes of wilderness experiences using GIS. Setting attributes will be defined in terms of indicators and standards of quality, and will address ecological, social, and managerial components of wilderness experiences. Examples of indicators and standards of quality to be included in the study are shown in Table 1.

Workshops were held in Yosemite during fall 2000 with researchers

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Table 1. Indicators selected for the study.

<b>Component of Wilderness Experience</b>	<b>Indicator of Quality</b>
Ecological	<ul style="list-style-type: none"><li>• Signs of human use at campsites (e.g., size of barren core, root exposure).</li><li>• Signs of stock or stock use (e.g., trail impacts, tree scars, manure).</li></ul>
Social	<ul style="list-style-type: none"><li>• Encounters with other groups along trails.</li><li>• Encounters with other groups at campsites.</li></ul>
Managerial	<ul style="list-style-type: none"><li>• Camping regulation (e.g., designated campsites vs. freedom to camp anywhere).</li><li>• Availability of permits.</li></ul>

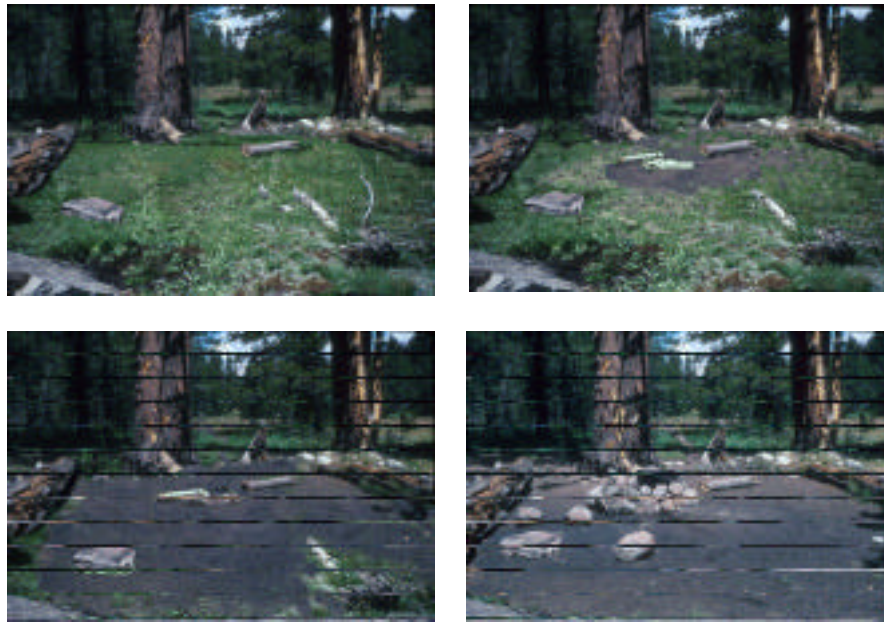
and over a dozen park managers and rangers. Over 30 potential indicators were discussed, covering resource, social, and managerial dimensions. Managers were asked to vote for the indicators they believed were the most pertinent and feasible. Based on a literature review and continued discussion with park managers, six indicators were chosen to represent the social, resource, and managerial conditions of Yosemite wilderness (Table 1).

Data on these indicators will be obtained through a visitor survey. This survey will be conducted as a "diary" where respondents will be asked to trace their daily route of travel and report and evaluate aspects of their wilderness trip as it is experienced. A diary approach permits data to be spatially referenced. Respondents will be asked to report the existing conditions of selected indi-

cators and to report their desired standards of quality. For example, a standard of quality for trail encounters could be a maximum of three other groups per day. Subsequent GIS analysis will permit development of maps displaying the current and desired condition of all indicators.

The second phase of research will address visitor evaluations of trade-offs among competing setting attributes or indicators and standards of quality. These tradeoffs will be explored through a visitor survey and application of conjoint analyses. The questionnaire will contain factorially arranged sets of questions specifically designed to enable the conjoint statistical analyses. A range of three standards of quality will be assigned to the six indicators (Table 2), followed by development of alternative scenarios representing all permuta-

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**Figure 2.** As part of a “diary” survey, wilderness visitors will use these computer-generated photographs showing increasing amounts of impact to assess the current conditions of campsites as well as minimum acceptable conditions of campsite impacts.

tions of such attribute levels. Respondents will be asked to rate the desirability of a subset of scenarios representing the full universe of possible permutations. The resulting data, through application of conjoint analysis, will be used to estimate the relative importance of each indicator and standard of quality.

Several conceptual and analytical frameworks will be used to integrate the data collected in this study. Importance-performance analysis is a framework that can be used to help formulate indicators and standards of quality (Martilla and James 1977;

Hollenhorst and Gardner 1994). Data can be graphically represented by plotting the importance that visitors place on indicators of quality against the perceived or preferred condition of each indicator relative to its current condition (i.e., its performance). Such plots reveal the relationships between importance and performance of indicator variables, and where management action might be focused (i.e., where importance is high and performance is low). Study data from the stated choice model will be used as the measure of the indicator importance, while diary

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Table 2. Yosemite wilderness-setting attributes and levels.

<p><b><u>Resource conditions</u></b></p> <p><i>Signs of human use at camping sites:</i></p> <ul style="list-style-type: none"> <li>• Photograph depicting low impact.</li> <li>• Photograph depicting moderate impact.</li> <li>• Photograph depicting high impact.</li> </ul> <p><i>Encountering stock or signs of stock use:</i></p> <ul style="list-style-type: none"> <li>• Never encounter stock groups or signs of stock use.</li> <li>• Encounter stock groups or signs of stock a minority of days.</li> <li>• Encounter stock group or signs of stock a majority of days.</li> </ul>
<p><b><u>Social conditions</u></b></p> <p><i>Number of other groups encountered per day while hiking:</i></p> <ul style="list-style-type: none"> <li>• Encounter fewer than 5 other groups a day while hiking.</li> <li>• Encounter 5 –15 other groups a day while hiking.</li> <li>• Encounter more than 15 other groups a day while hiking.</li> </ul> <p><i>Opportunity to camp out of sight and sound of other groups:</i></p> <ul style="list-style-type: none"> <li>• Able to camp out of sight and sound of other groups all nights.</li> <li>• Able to camp out of sight and sound of other groups most nights.</li> <li>• Able to camp out of sight and sound of other groups a minority of nights.</li> </ul>
<p><b><u>Management conditions</u></b></p> <p><i>Regulation of camping:</i></p> <ul style="list-style-type: none"> <li>• Allowed to camp anywhere.</li> <li>• Allowed to camp anywhere in a specified zone.</li> <li>• Required to camp in an assigned site in a specified zone.</li> </ul> <p><i>Chance of receiving an overnight wilderness permit:</i></p> <ul style="list-style-type: none"> <li>• Most visitors are able to get a permit for their preferred trip.</li> <li>• Most visitors are able to get a permit for at least their second-choice trip.</li> <li>• Only a minority of visitors are able to get a permit.</li> </ul>

data will provide the preferred condition or standard of quality for each indicator variable. Data from the importance-performance analysis will

generate an overall condition score that can be analyzed and reported within a GIS framework for all geographic areas within the wilderness

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portion of the park.

### Conclusion

As park and wilderness planning and management address more complex carrying capacity issues due to the growing popularity of these protected environments, a broader domain of information needs to be considered. There is also a corresponding increase in the need for greater management expertise to make use of this expanded range of information. The increase in complexity of management issues places a greater demand on managers, planners, and researchers to take a more integrated view to effectively meet the needs of agency missions and stakeholders (Walker 2001). This paper reviewed some of the traditional methods used to integrate data and outlined a current study at Yosemite National Park that employs some additional quantitative methods.

Conjoint analysis is well suited for soliciting and analyzing the preferences of stakeholders in environmental decisions that involve the achievement of numerous objectives (Dennis 1998). Conjoint ranking surveys can be employed to solicit and analyze public preferences for alternative resource, social, and managerial settings, permitting direct integration of their preferences into statistical models that can aid in management decision-making. Two principle uses include aiding managers in formulating indicators and

standards of quality and in gauging public preferences when selecting from among competing management interventions. The surveys employed in the current study at Yosemite National Park will provide an inventory of indicator conditions, information on the relative importance of alternative indicators and indicator conditions, and visitor preferences for standards of quality.

As suggested in this paper and illustrated by the Yosemite case study, several issues must be addressed to effectively combine and integrate various types of information critical to carrying capacity decision-making:

1. A collaborative scoping process to identify resource, social, and managerial issues by management zone.
2. A baseline map and georeferenced database of prioritized areas in need of resource or social mitigation.
3. Data on existing and preferred conditions derived from ecological assessments and visitor surveys, and an effective method for integrating such information.
4. Well-defined resource and social management prescriptions for each management zone.
5. Indicators and standards of quality for each management zone.
6. Monitoring protocols that encourage adaptive management through the testing of management prescriptions as hypotheses

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7. Models that link management activities with changes in selected indicators.

Key features of the integrative approach include broad and diverse public involvement, scale-relevant assessments for social, economic, and biological components of the management area, development of maps and databases (both spatial and non-spatial), and long-term performance indicators and monitoring protocols that facilitate learning from

experience. The results of this approach are improved data quality and access, more informed decisions in planning and management, improved collaboration, and more effective evaluation of decisions. The challenge for integration is to develop and refine tools that allow scientific data, professional expertise, and public perceptions to be integrated into a negotiation process that acknowledges the uncertainty, values, and assumptions that ultimately guide decision-making.

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## Managing National Parks in a Multicultural Society: Searching for Common Ground

**T**he people of the USA love their national parks. Approximately 300 million visits were recorded at national parks in 2000, the vast majority being domestic visitors. The love affair between U.S. citizens and national parks is so intense, in fact, that it is often stated that the parks are “being loved to death.” Of the many challenges facing the National Park Service (NPS) in the 21st century, engendering support for its programs from an increasingly racially and ethnically diverse society may be the most critical. Will the love affair between the people and their parks endure as Americans change in hue and heritage? In order for NPS to continue to enjoy the benefits of this relationship, it will need a better social scientific understanding of the factors underlying patterns of national park visitation among diverse ethnic minority groups. This paper reviews the major theoretical explanations employed to study racial and ethnic variation in national park visitation. Stated differently, the paper addresses the question of “Who has access to national parks, and why?”

Racial and ethnic minorities are largely absent among visitors to national parks (Goldsmith 1994). Several visitor surveys at parks throughout the country support this observation. The NPS Visitor Services Project (VSP) at the University of Idaho Cooperative Park Studies Unit conducted surveys at more than a dozen parks in which data on ethnicity were collected. One report stated that at nine NPS units (including Grand Teton National Park, Great Smoky Mountains National Park, and Gettysburg National Military Park) only 7% of visitor groups were ethnic minorities (Clifford 1994). A review of other VSP studies at other national

park units revealed that 90% of visitor groups were largely whites of European descent (Floyd 1999). Without understanding the factors that may inhibit visitation among minority groups, it will be difficult to develop strategies to engender support for national park programs among a broader and more diverse segment of the population.

### **The Future is Now**

The disparity in national park visitation between the majority and minority populations should be a major concern among NPS managers and policy-makers for at least two

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important reasons. First, racial and ethnic minority populations, particularly Hispanic populations, have dramatically increased their share of the U.S. population and will continue to increase over the next several decades (Figure 1). By the middle of this century the percentage of non-Hispanic whites in the population could be less than 50%, down from approximately 71% in 2001. Just recently, reports from the 2000 census indicated that non-Hispanic whites constitute less than 50% of the California population. In Texas, the

population currently characterized as “minority” will become the majority population by 2020 under a variety of population-growth scenarios (Murdock et al. 1997). The composition of the minority population has also been transformed. For the first time in history, the Hispanic population will soon supplant African Americans as the largest minority group in the U.S. population. Currently, these two populations are roughly even in number; Hispanics number 35.3 million, while African Americans number 34.6 million.

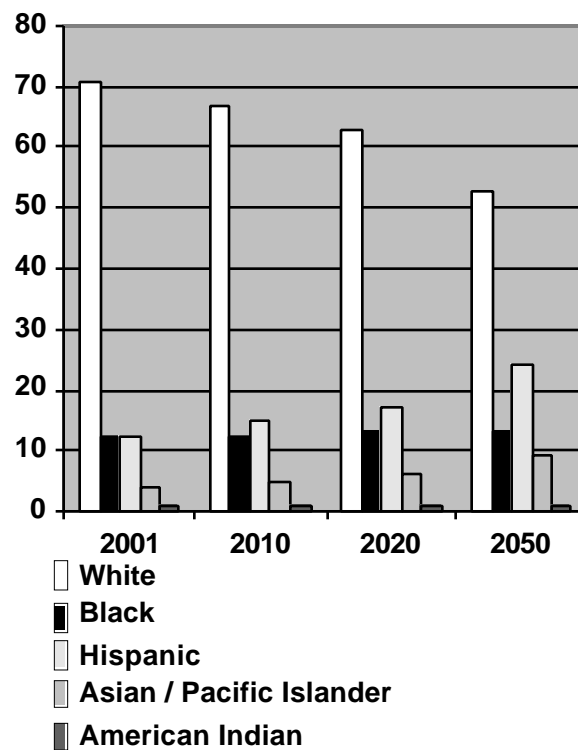


Figure 1. Percentage change in race and ethnic composition of the U.S. population, 2001-2050.

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Second, if current patterns of visitation persist into the future, along with current demographic trends, the probability of lower demand for national park experiences increases. If this should result, where will national park programs rank among other public policy priorities in a multi-ethnic and multicultural society? Without greater visitation and interest from among those populations that are growing most rapidly, national park programs over time are likely to be supported by a smaller and shrinking segment of the U.S. population. The major challenge for NPS, in light of these trends, is to make the national parks more accessible and appealing to an increasingly multicultural society. This necessarily involves understanding reasons for the disparity in rates of national park visitation between whites of European descent and people of color.

### Who Has Access to Nature and Why?

Since the 1960s social scientists have developed five hypotheses that speak to the question of minority access to the national parks. While these hypotheses are not completely independent, they are presented separately here for clarity. Each hypothesis carries with it a key assumption and suggests a policy implication that might inform strategies to increase diversity in park visitation. The discussion below draws heavily on the social science literature on ethnic patterns in recreation

behavior.

**Marginality hypothesis.** This hypothesis was developed to explain low participation in wildland recreation areas among African Americans (Washburne 1978). It holds that low rates of participation among African Americans result from limited access to socioeconomic resources which, in turn, are a consequence of historical patterns of racial discrimination. Stated differently, historical barriers in education and the labor market have negatively affected earnings, which in turn continues to affect disposable income available for recreation expenditures. Further, this hypothesis recognizes that past sanctioned and *de facto* discrimination prevented African Americans and other minority groups from full participation in the major social and cultural institutions of society.

A key assumption of this hypothesis is that majority- and minority-group members have an equal propensity to participate in wildland recreation. Thus, the removal of socioeconomic barriers should result in more "equal" rates of participation and more equal access. Moreover, in the long run, as minority groups experience greater social mobility, the disparity in national park visitation will decrease. The policy implication associated with this view suggests that programs that reduce or minimize socioeconomic barriers to park use would be effective in increasing access.

**The subcultural hypothesis.** This

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hypothesis directs research attention to the cultural factors associated with the formation of outdoor recreation preferences. It suggests that racial and ethnic differences in national park visitation can be attributed to divergent norms, value systems, and socialization practices adhered to by different racial and ethnic groups, independent of socioeconomic factors. On one hand, it has been argued that the values underpinning the attraction of European Americans to national parks engender indifference and antipathy toward parks among people of color. For example, Meeker (1991) argued that while European Americans view parks as places for refuge and escape from urban stress, African Americans and Native Americans display little enthusiasm for parks and wilderness because these places are reminders of their violent subjugation and oppression. Similarly, Taylor (2000) suggested that the 19th-century frontier experience and the Romantic and Transcendentalist traditions in which the national park idea emerged evoke contrasting images for whites of European descent and people of color. For the latter, slavery, sharecropping, forced relocations, and genocide are the images associated with the advancement of the national park idea. On the other hand, subcultural influences have also been interpreted as social-psychological processes leading to the preservation or maintenance of one's ethnic identity. For example, Washburne and Wall (1980) have

speculated on possible ethnic boundary maintenance functions of leisure activities. They suggested that the activities themselves, as well as the sites chosen for them, may be used by one ethnic group as a way to demarcate and contrast it from other groups. Some activities and sites might be defined by members of an ethnic minority group as inappropriate because the activities or sites do not reinforce the group's collective identity. More recently, other researchers have argued that leisure may play a critical role in maintaining subcultural identity in a multicultural society (Floyd and Gramann 1993). Because decisions about leisure activities are made in relative freedom and are less subject to conformity pressures associated with workplace, educational, and other settings (Kelly 1987), ethnic differences are more likely to be reflected in choices of leisure activities and settings. In light of Meeker's and Taylor's sociohistorical argument, the national parks historically have not reflected the collective identity of ethnic minority groups. Therefore, national parks may lie beyond the range of activities and settings that reinforce their collective identities.

Where the marginality hypothesis might assume that different racial and ethnic groups have an equal propensity to utilize national parks, the subcultural hypothesis suggests different groups have *unique* but not *inherent* cultural preferences. The policy implications of the subcultural hypothe-

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Figure 2. Minority populations are underrepresented in the national parks.

sis suggests that programs should be designed to meet the diverse needs of different racial and ethnic groups. It also suggests that regardless of increasing social mobility, minority-group members may not visit national parks at the same rate as whites of European descent. Of the 30-plus empirical studies on racial and ethnic patterns in recreation behavior reviewed by Manning (1999), over one-half reported evidence consistent with the subcultural hypothesis. Although these studies did not examine national park visitation, their findings are consistent with regional and statewide survey data showing that factors beyond income and education account

for racial and ethnic differences in national park visitation (e.g., Dwyer 1994; Gramann and Floyd 1991).

**Assimilation hypothesis.** Several studies have used assimilation theory to understand the role of ethnicity in recreation behavior. Assimilation refers to “the process of boundary reduction that can occur when members of two or more societies meet” (Yinger 1981, 249). Two types of assimilation have been examined in recreation research: cultural assimilation (also known as “acculturation”) and structural assimilation. These concepts have provided better insight into subcultural factors.

“Cultural assimilation” refers to

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minority-group acquisition of cultural characteristics of the majority group (or host society), such as language, diet, and religion (Gordon 1964). A commonly used indicator of cultural assimilation in social science research is language use: to what extent do minority-group members use their native language versus English (e.g., speaking, reading, or writing). "Structural assimilation" refers to the extent of social interaction between majority and minority groups in primary (e.g., family and friendships) and secondary (e.g., school, work, etc.) groups. Researchers have found these concepts particularly useful in studying the recreation behavior of Hispanic and Asian-origin populations (e.g., Floyd and Gramann 1993; Carr and Williams 1993).

The key assumption associated with this perspective is that greater assimilation leads to similarity between majority- and minority-group members. In the case of national park visits, the assimilation hypothesis suggests that as members of different ethnic groups interact in primary social groups, they will exhibit similar patterns of park visitation. In general, studies of Mexican Americans' use of national forests suggest that cultural assimilation is more important in predicting choices of activities, while primary-group assimilation is more important in understanding site choices (Floyd and Gramann 1993). An important implication demonstrated by this type of research is that

the Hispanic population is not a monolithic bloc. It can be differentiated according to language use, social group affiliation, nativity, and other characteristics. Thus, effective outreach or management activities designed for these populations must recognize this "internal" diversity.

The assimilation hypothesis may be particularly relevant to immigration trends. New immigrants and their descendants are projected to account for "approximately three-fifths" of the U.S. population growth through 2050 (Murdock 1995). Asia and Latin America account for 84% of immigrants to the USA; just 10% originate in Europe (Murdock 1995). This contrasts sharply with the massive European immigration of the 19th and early 20th centuries. Thus, the vast majority of "new Americans" come from countries where English is not the primary language and where Western European traditions do not form the foundation of societal culture. Two potential implications of this trend are worth noting. First, continual immigration flows sustain ethnic identity and slow the process of assimilation. Thus, recreation preferences of ethnic groups experiencing immigration will continue to be influenced by ethnicity or subcultural factors. Second, this trend may likely pose a challenge to resource interpretation and stewardship education.

Stewardship activities in the USA are based primarily on European American views of nature. Tradition-



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ally, such views make a sharp separation between humans and nature (Cronon 1996). In the case of wilderness, parks, and other protected areas, stewardship activities aim to limit, if not remove, the influence of humans. This orientation is far from universal. A number of writers have shown that Native Americans, Latinos, and some African tribal groups do not compartmentalize nature and human communities in separate domains (Burnett and Conover 1989; Lynch 1993; McDonald and McAvoy 1997). At the same time, there has been no research on attitudes and perceptions of recent immigrant populations toward park management practices.

**Interpersonal discrimination.** This term refers to actions carried out by members of dominant racial or ethnic groups that have differential and negative impacts on members of minority groups (Feagin 1991). Such actions take place between individuals or in small-group situations. It is generally assumed that perceived discrimination exerts a negative effect on park visitation. How much of a factor is it? While researchers and park managers often cite discrimination as a constraint on park use, documented evidence on the subject is limited. Anecdotal evidence suggests that members of ethnic minority groups may not feel welcome at remote na-



**Figure 3.** The national parks must become more personally and culturally meaningful to populations that have traditionally been in the minority.

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tional park settings. For example, in a *Los Angeles Times* article, an African American NPS superintendent suggested that the reasons blacks do not visit national parks in larger numbers ranged from “bugs to snakes to dirt to the idea that you might have to travel through rural America, where you might not be made to feel welcome” (Clifford 1994). In the same article, a Latina physician from Los Angeles who frequently visits parks in the Southwest expressed apprehension about visiting national parks outside the region:

I look Indian. When I go to one of the parks in Arizona, I'll stay at a hotel on the Navajo Reservation where I know people are going to think I am one of them. But I haven't gone to any of the parks in Wyoming or Montana, and I guess that has something to do with the feeling of apprehension about going into unknown territory (Clifford 1995).

Research conducted in other outdoor recreation areas offers additional insight on the nature of interpersonal discrimination in park settings. For example, in a study of Chicago's Lincoln park, Gobster and Delgado (1993, 78) reported that discrimination “has affected 1 in 10 minority users.” African Americans, followed by Hispanic Americans and Asian Americans, were most likely to report acts of discrimination. These acts included verbal harassment, physical gestures, assaults, nonverbal cues, and harassment from law enforcement

officers. A focus group conducted by Wallace and Witter (1992) revealed that a significant number of African Americans in the St. Louis metropolitan area did not camp because they felt vulnerable to racial intimidation. Floyd, Gramann, and Saenz (1993) found that perceptions of discrimination among Hispanics in Phoenix tended to decrease visits to 8 of 13 sites on the nearby Tonto National Forest. Finally, a study set in the Detroit area found that African American visits to regional parks were negatively affected by interracial conflicts with white park users (West 1989). The extent to which interpersonal discrimination carries over to national park visitation is not known. There is enough empirical evidence from other settings to suggest that it could be a factor.

Where interpersonal discrimination becomes an issue, managers must be sensitive to the social climate their park settings engender. Do they make members of different ethnic groups feel welcome? Settings with racially and ethnically diverse participants and staffs may provide a more comfortable setting and may attract diverse visitor groups.

**Institutional discrimination.** The final hypothesis to introduce is institutional discrimination. Rather than drawing attention to individual and interpersonal interactions, institutional discrimination focuses on the “behavior” of organizations, bureaucracies, or corporate entities. This

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hypothesis assumes discriminatory practices are embedded in the structure, policies, or procedures of organizations. Of the major hypotheses advanced to explain the disparity in national park visitation between whites of European descent and people of color, institutional discrimination (historical or otherwise) has not been addressed in empirical studies. As a result, there have been no attempts to identify parameters for measuring the institutional discrimination in national park programs. Hypothetical examples of such parameters might include discriminatory pricing policies (Manning 1999), hiring practices, systematic exclusion of ethnic minorities in park media, or disparities in funding programs that have ethnic themes.

Historically, sanctioned segregation was practiced in national parks as units were designated in the South. According to Barry Mackintosh, an NPS historian:

The NPS had little presence in the South until the 1930s, when it received a number of historic battlefields and forts from the War Department and acquired land to establish Shenandoah, Great Smoky Mountains, and Mammoth Cave national parks. Following local custom, there were some segregated rest room facilities in the historical areas, and one of the campgrounds at Shenandoah was initially reserved for blacks. There were also black and white golf courses in the National Capital Parks in Washington, adminis-

tered by the NPS after 1933. Secretary of the Interior Harold L. Ickes (1933-46) moved to abolish what segregation existed in the parks, and it was largely if not totally eliminated by the mid-1940s (personal communication).

Research has not examined whether such historical practices are salient in the minds of actual or potential African American park visitors.

### Searching for Common Ground

While these hypotheses were presented separately, the relationships among the various ethnic factors and national park visitation is complex and not easily reduced to "single causes" with clear policy and management implications. Despite more than 30 years of research on racial and ethnic differences in recreation behavior, it is surprising that very few empirical studies of racial and ethnic variation in national park use appear in the literature. Clearly, in view of the present and future racial and ethnic composition of the U.S. population, a new program of research will be needed to inform park management decisions in the 21st century. Specifically, research which continues to explain established racial and ethnic patterns while exploring the implications of new sources of ethnic and cultural diversity for park visitation should receive greater attention.

A philosophical tenet implicit in the national park idea is that parks should be a "pleasuring ground" for people of today and tomorrow. However,

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research results from a number of visitor surveys around the country point to a considerable gap between this ideal and the reality of who actually derives pleasure from these national resources. That nearly one-third of the U.S. population (soon to be close to one-half of the population) are largely invisible in the national parks raises questions about the parks' future relevance, meaning, and protection in

an increasingly multicultural society. The disparity in national park use also raises questions about equity, fairness, and the ability of the NPS to find common ground with the people it is mandated to serve. Moreover, as this century unfolds, an equal burden falls on members of the research community to help create ways to transcend the boundaries that retard access to America's national parks.

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## Integrating Subsistence Use and Users into Park and Wilderness Management

Since its passage in 1980, the Alaska National Interest Lands Conservation Act (ANILCA) has mandated numerous National Park Service (NPS) units to manage for the continuation of customary and traditional subsistence opportunities in designated wilderness areas throughout Alaska. From its legislative history, it can be argued that ANILCA assumes that subsistence activities are natural components of ecosystems. As such, they are inherent in such concepts as “wilderness” and “wilderness preserve.” Many subsistence activities, however, rely on use of motorized equipment and involve harvesting of natural resources, activities generally prohibited in the “Lower 48” by the Wilderness Act of 1964. As a result, subsistence activities may affect the quality of recreational visitor experiences in designated wilderness areas in some Alaskan national parks. Along with potential effects of subsistence on visitors, interactions between subsistence users and park visitors may affect the quality of subsistence opportunities, which are mandated under ANILCA. Because the Organic Act of 1916 requires the NPS to manage for “natural” elements and public “enjoyment” of national parks and related areas, it is necessary to begin to analyze the relationship between subsistence use and recreation use in order to fulfill this dual and potentially conflicting management obligation.

ANILCA offers little legal guidance regarding the quality of subsistence opportunities to be provided. As a result, many national parks in Alaska have been reluctant to formally incorporate subsistence use and users into wilderness planning and management. Consequently, little theoretical or empirical work has been done to develop a conceptual framework allowing park managers to identify, monitor, and manage

for conflict reduction between recreation users and subsistence users. Although it is widely perceived that negative interactions between recreation users and subsistence users exist (Figure 1), no systematic management framework has been developed and implemented that identifies and monitors the quantity and effects of these kinds of interactions. The lack of such a framework suggests that indicator-based management

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**Figure 1.** Conflicts may arise between recreational and subsistence users of wilderness in Alaska. The sign reads: "To all sport fishermen. No sport fishermen on native allotments. We natives depend on wildlife that's around us. Only natives have a right!! By Land Owner."

approaches may be a useful conceptual starting point for addressing this issue.

### **Indicator-based Frameworks for Park and Wilderness Management**

During the last 20 years, several indicator-based park and wilderness management frameworks have evolved, including limits of acceptable change (Stankey et al. 1985; McCool and Cole 1997) and visitor experience and resource protection (Manning et al 1996; Hof and Lime

1997; National Park Service 1997). Developed from the concept of recreation carrying capacity, these planning and management approaches seek to define the level of resource protection and the type of visitor experience to be provided. In doing so, indicator-based planning approaches traditionally organize park and wilderness management into two components: resource and experiential. Once desired future conditions have been defined, indicators and standards of quality are developed to monitor recreation impacts and

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guide management actions in an effort to realize desired future conditions.

“Desired future conditions” are broad, narrative statements defining the level of resource protection or the type of visitor experience to be provided. “Indicators of quality” are more specific, measurable variables reflecting the meaning of desired future conditions. They are quantifiable measures of management objectives. Indicators may include elements of the biophysical and social environments that are important in determining either the quality of the visitor experience or the quality of the biophysical environment. “Standards of quality” define the minimum acceptable condition of each indicator variable.

Indicator-based planning frameworks provide management utility for at least two reasons. First, they require managers to identify and define desired future conditions. As a result, adopting an indicator-based planning framework can serve as a catalyst for the development of specific management objectives. For example, since ANILCA is vague on the point of establishing a management priority regarding the quality of subsistence activities to be provided, adopting an indicator-based planning framework may be desirable because it focuses attention on identifying this as a management objective. Second, from an experiential or social perspective, indicators of

quality provide an analysis of variables associated with the visitor experience. This analysis can help increase the quality of the visitor experience by providing managers with data to make informed decisions regarding carrying-capacity and visitor-use management issues in various recreation settings. In Alaska’s national parks, for instance, recreation and subsistence activities occur in many of the same places. Therefore, quantitative understanding of the experiential impacts between both kinds of users may assist in the management of these areas.

### **Integrating Subsistence Issues with Indicator-based Park and Wilderness Management**

Current models of indicator-based planning frameworks may not be fully adequate for addressing subsistence issues, for several reasons. As previously discussed, these frameworks conventionally divide park and wilderness management into experiential and resource components. Subsistence activities, however, are neither strictly resource nor experiential components of park and wilderness management. Unlike discrete recreation activities, subsistence activities are multidimensional in nature and reflect entire lifeway systems that may not be understood as individual activities. As a result, it may not be conceptually valid or appropriate to reduce subsistence activities into discrete components.



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Moreover, indicator-based management frameworks require quantifiable data to develop indicators and standards of quality. Attempts to obtain quantitative experiential data from traditional subsistence may prove challenging. Prior development of experiential indicators within the context of recreation management has relied on visitor reactions to scenarios that use text or photographs to describe various ranges of visitor-use levels and associated impacts. It is not clear these methods will work as well with subsistence users, some of whom are not accustomed to Western quantitative thought patterns. As a result of these factors, subsistence activities introduce considerable challenges into the application of current indicator-based management models.

Although significant, the challenges discussed above present several possibilities for adapting current indicator-based management frameworks to incorporate subsistence issues. First, researchers and management personnel need to develop appropriate methods for collecting baseline experiential subsistence-use data. Undoubtedly, a combination of qualitative and quantitative methodologies should be utilized in attempting to develop appropriate indicators of quality for subsistence activities. This includes developing qualitative methodologies that complement the conventional approach, which may be less meaningful to sub-

sistence users. Although developing integrative methodologies is challenging, studies from sociology demonstrate the use of quantitative analysis in a variety of cultural settings. For example, Krymkowski and Hall (1990) studied differences in values between ethnic groups in Kenya using a multivariate analysis. Although this was a quantitative study, the researchers thoughtfully selected a methodology and variables that were meaningful to both ethnic groups. Moreover, the paper by Borrie et al. (this issue) demonstrates how qualitative and quantitative research methods can be complementary.

Once appropriate methodologies have been developed, managers should begin to collect baseline experiential subsistence-use data in addition to visitor experience data. Valid experiential subsistence- and recreation-use data are essential for developing meaningful indicators and standards of quality. Moreover, these data will assist in determining whether subsistence activities have components that are affected differently by recreation use, along with potential impacts of subsistence activities on the recreation experience. If such impacts do exist, then indicator-based management approaches provide a useful conceptual framework for monitoring and managing them over time.

Second, managers must be willing to define desired future conditions or management objectives in

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terms of the quality of subsistence opportunities to be provided. Although not mandated in ANILCA, development of these management objectives is essential because they are a necessary element of any indicator-based management framework. Furthermore, a commitment to adopt an indicator-based management approach will serve as a management catalyst because it focuses attention on the development of management objectives.

Finally, integrating subsistence issues with indicator-based management frameworks should incorporate an adaptive management component. Adaptive management has been broadly defined as a process that enables “learning and experimentation” to occur (Lee 1990).

In managing subsistence issues, it is important to remember that numerous planning and management applications will be required because current indicator-based management frameworks may not be fully adequate for analyzing the relationships between subsistence and recreation users. Managers must be willing to apply current models with the intention of not necessarily making long-term management decisions, but rather learning from these applications. This learning can then be used to adapt the model to each site as needed. Over time, this process may lead to a better understanding of the interactions between recreation and subsistence users, as well as provide

insights into developing new methodologies that capture the strengths of both qualitative and quantitative research approaches. In turn, a better understanding of the relationship between recreation and subsistence activities will result in more effective management tools for providing the highest-quality experience for both user groups.

### **Application of Indicator-based Management at Gates of the Arctic National Park & Preserve**

NPS has recently been challenged to undergo a new round of wilderness planning in Alaska. In response, a study was conducted at Gates of the Arctic National Park and Preserve that considers the feasibility of integrating subsistence issues into indicator-based management frameworks (Vande Kamp et al. 2001). Among its findings, the report discusses several recommendations that Gates of the Arctic managers should consider to effectively integrate subsistence use and users into indicator-based management approaches. These recommendations include accurately describing current wilderness use, articulating goals and desired conditions based on park purposes, and shifting towards a less expert-driven, more transactive planning process.

**Descriptive research.** One of the primary ways descriptive wilderness use data can be useful is by identifying problem areas in which human

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use is having negative impacts on resources and experiences. Such problem areas are not only important issues that should be a focus of management attention, they may also serve as “bottlenecks” where human use has its greatest impacts. Because it is generally acknowledged that both the likelihood of encounters with other visitors and their impact on experiences varies across sites (Whittaker 1992; Graefe et al. 1984), social conditions at some sites may prove to be effective indicators of experience quality for much larger areas. For example, Tarrant et al. (1997) found that on the Nantahala River, North Carolina, use levels were more of a concern at rapids than at other locations. Identifying such bottlenecks in visitor-use patterns, using them as indicators, and setting standards for appropriate social conditions in those areas may provide managers with a more appropriate plan than the use of generic indicators, such as number of encounters per day.

When wilderness is to be managed as several zones, descriptive data can be critical in helping planners decide the appropriate zones for particular wilderness areas. Although all zones need not match existing use patterns, including any wilderness area in a zone that requires different social conditions than those currently in existence should occur only when the change in conditions is preferable and justified. Without

data describing existing conditions, unjustified changes are likely to be included in the plan, resulting in unnecessary impacts on users.

Furthermore, descriptive data are necessary to assess the potential impacts of planning and management decisions. For example, to assess whether a standard of five encounters per day will require management action, it is necessary to know the current number of parties that visitors encounter. By knowing the different characteristics of users commonly found at a variety of wilderness sites, Gates of the Arctic managers can assess whether planned policies will more heavily affect particular user groups.

In summary, descriptive research is necessary to document the use patterns by all groups, including recreational and subsistence users, and to investigate the extent of their interaction and its positive and negative effects on the quality of their experiences. Moreover, this research should focus on description of the system rather than on the collection of demographic information in order to study the relationships between various users and their social and physical environment over time. Such research will necessarily employ both quantitative and qualitative methods, and must investigate the activities and opinions of both groups if it is to be of maximum use.

**Articulation of management goals.** Along with conducting de-

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scriptive research, integrating subsistence issues into indicator-based planning requires the articulation of management goals. Four general goals of management at Gates of the Arctic have been identified:

1. Preserve park resources.
2. Provide high-quality subsistence opportunities.
3. Provide high-quality recreation opportunities.
4. Maximize recreational enjoyment of park resources.

Indicator-based management frameworks conventionally address the inherent tradeoffs between unrestricted park access and pristine park conditions. As previously discussed, these frameworks conventionally organize pristine conditions into biological and social components. In the management goals outlined above, unrestricted access is represented by the “maximize recreational enjoyment” goal, while the biological and social components of pristine conditions are represented by the “preserve park resources” goal and the “provide high-quality recreation opportunities” goal. Although subsisting indicators and standards of subsistence quality under biological or social components would retain the original structure of the planning framework, close examination shows that this is not feasible. Subsistence use is legally and managerially distinct from biological protection as well as from provision of quality rec-

reational opportunities. Subsistence users cannot be equated to grizzly bears or sport hunters. As a result, subsistence-use issues are conceptually different.

Integrating subsistence into indicator-based management frameworks will require more specific descriptions of management goals than the four generic versions presented above. In particular, the “provide high-quality subsistence opportunities” goal must be clarified. High-quality subsistence opportunities obviously require adequate chances to harvest desired species of plants and animals. However, the degree to which the experience associated with subsistence activity is legally protected is not clear. This uncertainty creates difficult choices for Gates of the Arctic managers attempting to determine whether the “maximize recreational enjoyment” goal conflicts with the goal of providing “high-quality subsistence opportunities.”

**Transactive planning** Finally, shifting towards a transactive planning approach may assist in the application of an indicator-based management framework at Gates of the Arctic. Transactive planning consists of a collaborative effort in which representatives of the public work closely with the planning team, sometimes serving as active team members. This planning approach is characterized by interpersonal dialogue and marked by a process of

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“mutual learning” (Hudson 1979). The importance of involving the public on a collaborative basis is stressed repeatedly in the literature as one of the primary factors determining the success of indicator-based management frameworks. McCoy et al. (1995) interviewed 50 indicator-based planning leaders and divided them into two groups based on whether or not their planning application utilized public work groups. They concluded that those indicator-based planning efforts “which utilize public work groups reported a higher compliance with the technical process as well as a higher level of satisfaction.”

Public participation is associated with successful planning because it forces justification of decisions, explanations of priorities, disclosure of biases, and clarification of proposed actions (McCool and Cole 1997). In addition, public participation has served as a source of institutional memory for agencies with frequent turnover of personnel. In their evaluation of indicator-based planning experience, McCool and Cole (1997) conclude that these planning approaches have benefited by moving from their original conception as an expert-driven process to a transactive process.

As previously noted, subsistence users who are not accustomed to Western quantitative thought patterns may be difficult to survey in the same way as conventional recrea-

tional visitors. By increasing public participation in the planning process to a level where subsistence users are well represented, Gates of the Arctic managers may avoid problems associated with not adequately representing the views of this group based on surveys or other quantitative measurement techniques.

Implementing a transactive planning process at Gates of the Arctic would require a substantial commitment of time and resources, relying on the collection of important social and natural science information for success. However, a transactive process might help park managers deal with a contentious legal environment and could encompass subsistence users who might be difficult to represent through other methods.

### Conclusion

Integrating subsistence uses and users into indicator-based planning and management frameworks requires development of new research methodologies, identification of management objectives, and adoption of inclusive and flexible planning and management strategies, such as adaptive management and transactive planning, that incorporate learning. Despite these challenges, indicator-based planning and management frameworks provide a useful conceptual starting point in the development of a systematic management tool capable of monitoring and managing the impacts of subsistence

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on recreation users and vice versa. At Gates of the Arctic, development of new research methodologies to describe current wilderness-use conditions, articulation of management objectives, and the shift towards planning and management strategies that encourage learning are likely to increase the chances of successfully integrating subsistence use and users into indicator-based management frameworks.

Beyond Alaska, the development of these management tools has international implications. As global populations continue to rise, along with sensitivity to native peoples, many new conservation areas will not be uninhabited. As a result, it will be important to develop and implement management frameworks that systematically measure and understand the relationships between visitors to and residents of such conservation areas.

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## Norm Stability: A Longitudinal Analysis of Crowding and Related Norms in the Wilderness of Denali National Park & Preserve

**V**isitor use of parks, wilderness, and related areas can cause impacts that degrade the quality of natural and cultural resources and the visitor experience (Hammitt and Cole 1998; Manning 1999). For example, visitors can compact and erode soils, reduce ground cover vegetation, pollute surface waters, disturb wildlife, and remove artifacts, as well as cause crowding and conflicts among alternative types of visitors.

A growing body of research on these issues has explored the degree to which visitors perceive and are sensitive to such impacts (Shelby and Heberlein 1986; Vaske et al. 1986; Manning et al. 1996; Manning et al. 1999). Recent research has focused on developing data that might be used to help develop standards of quality (minimum acceptable conditions) for relevant indicators of quality (measurable, manageable variables that help define desired future resource and social conditions). Indicators and standards of quality are vital elements of contemporary park and wilderness management frameworks, including limits of acceptable change (LAC; Stankey et al. 1985) and visitor experience and resource

protection (VERP; National Park Service 1997). Research has increasingly focused on “norms” or standards by which visitors might judge the acceptability of resource and social conditions found in parks, wilderness, and related areas.

A largely unexplored element of this body of research is the stability of visitor norms or standards over time. Generally, research on visitor norms or standards has simply not been conducted for a long enough time to examine this issue empirically. However, this issue is potentially important. If visitor norms or standards are relatively stable, then indicators and standards of quality and related park management may need only minor revisions over time.



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However, if visitor norms and standards fluctuate or evolve, then how should parks be managed? Should park management similarly evolve to keep pace with changing societal conditions? Or should park management strive to maintain a relatively constant set of indicators and standards of quality despite (and perhaps to counteract) a changing society? These questions have a strong philosophical component. However, they are predicated on the empirical question of whether or not park-related norms or standards of visitors *do* change over time.

A recent opportunity arose to explore the empirical element of this issue at Denali National Park and Preserve in Alaska. An early and important study of backcountry use and users was conducted at Denali in 1978 to support formulation of the park's original wilderness management plan (Womble et al. 1979). The park is currently engaged in developing a new wilderness management plan, and a similar study of wilderness use and users was commissioned and conducted in the summer of 2000. These two studies allow us to explore the stability of visitor norms and standards over a twenty-two year period.

### The Studies

**Study area.** Denali National Park and Preserve was originally established as Mount McKinley National Park in 1917. The park is lo-

cated in central Alaska and includes the tallest mountain in North America, Mount McKinley (now known as Denali) at 20,320 feet. In 1980, as a provision of the Alaska National Interest Lands Conservation Act (ANILCA), the park was expanded to over 6 million acres, 2 million of which were designated as wilderness. The research described in this paper focuses on overnight recreational use of the wilderness portion of the park.

**1978 study.** The study by Womble and associates in 1978 attempted to conduct a census of visitors receiving a mandatory permit for overnight use of what is now the wilderness portion of the park. Respondents were given a mailback questionnaire addressing selected aspects of themselves and their visit, including visitor characteristics, conditions encountered, perceived resource and social impacts, norms or standards (minimum acceptable levels) for recreation-related impacts, and attitudes toward alternative recreation management practices. Over 3,000 completed questionnaires were returned, representing a response rate of 79%.

**2000 study.** The 2000 study conducted a sampling rather than a census of those visitors receiving a mandatory permit for overnight use of the wilderness. Respondents were given both diary and mailback questionnaires addressing most of the issues included in the study by Womble and associates, replicating their question format and wording in

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most cases. A final sample size of 411 was obtained, representing a response rate of 79% for diary questionnaires and 59% for mailback questionnaires.

**Data analysis.** The data analysis presented in this paper is focused on comparisons between the 1978 and 2000 studies. However, this analysis is complicated by the fact that raw data for the 1978 study are no longer available (the data tape on which they were stored is no longer readable). However, the study completion report, along with associated published papers, include summary statistics (means, medians, etc.) for most variables. Unfortunately standard deviations or other measures of variance were generally not reported. In order to conduct tests of statistically significant differences between the two studies, variances associated with the 2000 study were assumed and adopted for the 1978 study. We believe this is a conservative assumption given the relatively large sample size of the 1978 study (2,829) compared with the 2000 study (411), and the relatively low variance that therefore would be expected in data from the 1978 study compared with those from the 2000 study.

### Study Findings

A comparison of all study variables is presented in Table 1 and is briefly described in the following subject categories.

**Visitor characteristics.** Selected visitor characteristics for the two studies are compared in the first section of Table 1. While most of the differences are statistically significant, they tend to be substantively small. The relatively large sample sizes associated with these studies result in very small differences being statistically significant. However, visitors in both studies average between 25 and 30 years of age, most are male, most are well-educated and -employed, between a quarter and a third are students, and the vast majority are U.S. residents.

**Visitor use.** Only one variable in Table 1 relates directly to visitor use: length of trip. While wilderness trips have gotten longer to a statistically significant degree over the 22-year period spanned by these studies, the difference is not substantively large (2.7 nights versus 3.2 nights). In both cases, trip length would be rounded to "about 3 nights." Data on visitor use are also available from park records of the number of visitor-use nights for the wilderness portion of the park (Figure 1). While this number fluctuates some from year-to-year from 1978 through 2000, use levels are nearly identical for the two study years.

**Conditions experienced.** Social and resource conditions experienced by visitors appear to have changed little or not at all. The average number of hiking parties seen per day increased slightly (from 0.7 to 1.1),

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**Table 1. Comparisons between 1978 and 2000 studies.**

<b>Variable</b>	<b>1978</b>	<b>2000</b>	<b>Prob.</b>
<b><i>Visitor characteristics</i></b>			
Age	25	30	0.00
Gender	70% male	66% male	0.00
Education	15.3 years	16.6 years	0.00
<b><i>Occupation</i></b>			
Employed	58%	60%	0.00
Student	35%	27%	0.00
<b><i>Residence</i></b>			
U.S.	93%	88%	0.50
<b><i>Visitor use</i></b>			
Length of trip	2.7 nights	3.2 nights	0.01
<b><i>Conditions experienced</i></b>			
Average number of hiking parties seen per day	0.7	1.1	0.00
Total number of hiking parties seen on trip	2.6	2.9	0.06
Largest number of hiking parties seen on any one day	1.6	1.9	0.06
Average number of campsites seen per day	0.3	0.2	0.16
Average number of nights camped where evidence of human use	0.4	0.2	0.00
<b><i>Standards of quality</i></b>			
Preference for number of hiking parties seen <sup>1</sup>	2.7	2.8	0.93
Expectation for number of hiking parties seen <sup>2</sup>	2.6	2.7	0.21
Perceived crowding <sup>3</sup>	1.4	1.3	0.01
<b><i>Degree to which respondents were "bothered" by selected resource impacts <sup>4</sup></i></b>			
Hiker-made trails	0.3	0.5	0.00
Hiker-made campsites	0.5	0.5	1.00
Campfire rings	0.7	0.8	0.48
Cut bushes or trees	0.8	0.7	0.42
Human waste	1.1	1.6	0.00
Toilet paper	1.3	1.4	0.48
Litter	1.5	1.4	0.27
<b><i>Attitudes toward management practices <sup>5</sup></i></b>			
All overnight hiking parties must obtain a backcountry travel permit	1.1	1.4	0.00
Backcountry travel permits only may be obtained in the Park	1.4	1.2	0.00

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Backcountry travel permits only may be obtained 24 hours in advance of one's trip	1.7	1.4	0.00
Overnight hikers only may camp in the backcountry zones specified by their permit	1.3	1.1	0.00
Overnight hikers only may camp in the backcountry on the nights specified by their permit	1.3	1.4	0.00
Overnight hikers may hike in zones other than those specified by their permit	1.3	1.1	0.00
Day hikers do not need travel permits	1.4	1.0	0.00
Hiking parties may camp most anywhere within their scheduled backcountry zones	1.1	1.7	0.00
Backcountry campsites must not be visible from the park road	1.1	1.2	0.00
Campfires are not allowed in the backcountry	1.4	1.2	0.00
Some areas of the backcountry are permanently closed to overnight hikers in order to protect fragile wildlife habitats	1.1	1.0	0.00
Some backcountry zones are temporarily closed to hikers in order to protect hikers from unpredictable wildlife	1.1	1.1	1.00
Capacities for backcountry zones are determined on the basis of individual hikers rather than by hiking parties	1.4	1.1	0.00
<b>Facility development<sup>5</sup></b>			
Developed hiking trails	2.4	2.5	0.02
Designated campsites	2.6	2.8	0.00
Tables	2.9	2.3	0.00
Shelters	2.7	2.5	0.00
Toilets	2.7	2.5	0.00
Fire rings	2.6	2.7	0.00
Bridges over rivers	2.4	2.9	0.00
Interpretive signs	2.5	2.7	0.00
Food caches for bear protection	2.3	2.7	0.00

<sup>1</sup> 1 = Saw too many, preferred seeing none; 5 = saw too few, preferred seeing many more

<sup>2</sup> 1 = A lot less; 5 = A lot more

<sup>3</sup> 1 = Not at all crowded; 7 = Extremely crowded

<sup>4</sup> 0 = Not bothered; 3 = Very bothered

<sup>5</sup> 1 = Support; 3 = Oppose

but the total number of hiking parties seen per trip and the largest number of hiking parties seen on any one day were nearly identical. There was no

statistically significant difference in the average number of campsites seen per day, and the average number of nights camped where there

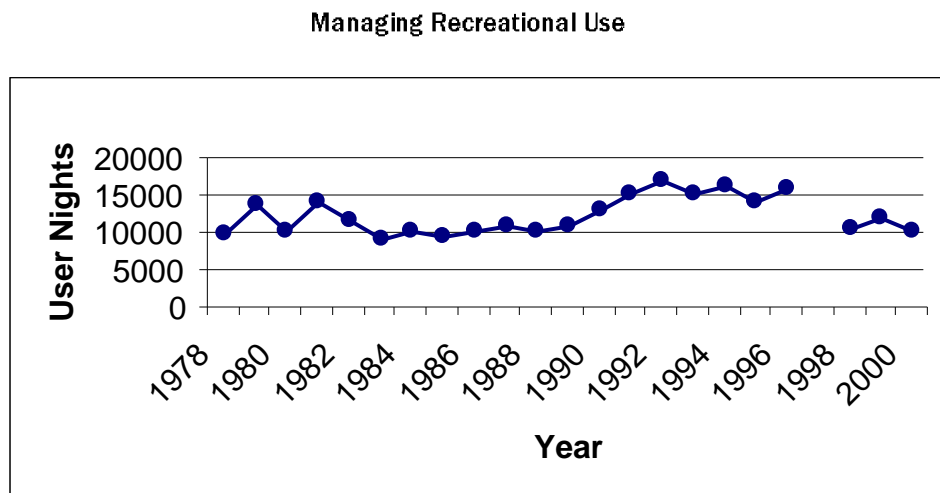


Figure 1. Wilderness use in Denali National Park and Preserve, 1978-2000.

was evidence of human use dropped from 0.4 to 0.2.

**Standards of quality.** There were very few differences in the ways in which visitors evaluated the conditions they experienced, suggesting that standards of quality have changed very little over the 22 years spanned by these studies. Respondents generally preferred and expected to see about the same number of hiking parties they actually saw. While average scores on the perceived crowding scale were different to a statistically significant degree, this difference is not substantive. There was no statistically significant difference in the degree to which respondents were “bothered” by five of the seven resource impacts studied. However, respondents in the 2000 study were significantly more bothered than respondents in the 1978 study by hiker-made trails and human waste.

#### **Attitudes toward management.**

Two batteries of questions explored visitor attitudes toward management. The questions first asked visitors the extent to which they supported or opposed a series of wilderness management practices. Although there are statistically significant differences between the two studies, these differences are generally small and unsubstantive. An exception may be attitudes toward the issue of camping within a backcountry zone; attitudes of visitors in the 2000 study were more restrictive. The second battery of questions asked visitors the extent to which they supported or opposed development of selected facilities in the wilderness. Again, there are statistically significant differences between the two studies, but most of these differences are small and unsubstantive. Visitors in the 2000 study were less favorable than visitors in the 1978 study toward six of

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the nine facilities included in the questionnaire.

#### Discussion

Only recently have studies of visitor use and users been conducted for a long enough period to begin to explore the degree to which visitor norms and standards are stable. The two studies of the wilderness portion of Denali described in this paper, conducted over a span of 22 years, suggest that there may be substantial stability in such evaluative measures. Visitors in 2000 appear to be quite similar to visitors in 1978, experienced a similar set of resource and social conditions, evaluated those conditions in a similar manner, and reported similar attitudes toward park management practices. Thus, this paper begins to bring some empirical evidence to bear on the issue of the stability of visitor norms and standards over time.

However, the management context at Denali may have influenced these findings. The wilderness portion of the park is explicitly managed for a relatively well-defined recreation experience characterized by a natural, undeveloped environment and opportunities for solitude and self-reliance. The park's wilderness management plan specifies that overnight visitors must obtain a permit, and the number of permits is limited by wilderness zone. Moreover, there are no maintained trails, campsites, or other visitor facilities. The explicit

character of these management objectives may contribute to the fact that the wilderness portion of the park maintains a relatively consistent set of resource and social conditions, continues to attract a relatively specific and defined type of visitor, and that crowding and related visitor norms and standards appear to be relatively stable over time.

These findings are similar to the limited research that has been conducted on this issue. For example, a 1977 study of crowding norms of boaters on the Rogue River, Oregon, was replicated in 1984 (Shelby et al. 1988). No statistically significant difference was found for the number of acceptable river encounters. However, camp encounter norms were found to be significantly higher, or more tolerant, in the latter study. A similar study conducted in three wilderness areas over a longer time found few clear, consistent trends in tolerance for inter-group contacts, but concluded: "Little evidence supports the idea that the visitors of today or the trips they take are substantially different from those of a decade or two ago" (Cole et al. 1995).

As suggested above, the relatively consistent pattern of norm stability found in the Denali studies may be enhanced by the park's explicit management objectives and associated management program. Use levels and recreation-related resource and social conditions have remained

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**Figure 2. Trail (l) and campsite (r) encounter norms have remained relatively stable over time at Denali National Park and Preserve.**

relatively consistent over the past 22 years. This suggests there has been little reason for visitors to be displaced or adopt other “coping” mechanisms in response to changing use conditions (Robertson and Regula 1994; Kuentzel and Heberlein 1992; Manning and Valliere, in press). Displacement is a widely hypothesized coping mechanism whereby some visitors may become dissatisfied with increasing use levels and the resource and social impacts that result, and alter their use pattern, perhaps ultimately moving on to other, less-used areas. Displaced visitors may be replaced by visitors who are more tolerant of higher use levels and associated impacts. Displacement and other coping mechanisms may contribute to evolving crowding and other recreation-related norms and standards. However, the mandatory permit system and other management practices at Denali may minimize displacement and other coping mechanisms,

thereby contributing to the stability of crowding and other recreation-related norms and standards.

Despite the relative consistency or stability of the data reported in Table 1, there are some statistically significant (and potentially substantive) differences between 1978 and 2000. For instance, the average number of hiking parties seen per day has increased from 0.7 in 1978 to 1.1 in 2000. While this is a very small increase in absolute terms, it represents more than a 50% increase over this 22-year period. The degree to which hikers are “bothered” by hiker-made trails and human waste has also risen to a statistically significant and perhaps substantive degree. The types of longitudinal data collected in studies such as these can be useful in monitoring resource and social conditions and suggesting where management attention might most appropriately be directed.

While data from the Denali studies may help shed light on the

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issue of the stability of recreation-related norms, they offer less advice on whether or not indicators and standards of quality should be revised in concert with evolving visitor norms. However, they may help to render this issue less cogent and urgent. If visitor norms are relatively stable, as suggested in this study, then there may be little need to revise indicators and standards of quality, at least not frequently and not substantively. Some may argue that standards of quality for resource and social conditions in parks and wilderness should be absolute and unchanging in order to preserve such areas and the experiences they offer. Others would argue that parks, wilderness, and related areas are ultimately "social constructions," concepts created and defined by society, and that they should be managed in concert with contemporary norms and social standards (Cronon 1995). However, if such norms and social

standards are relatively stable over time, then this issue may be less polarized and contentious than it first appears.

### Conclusion

Studies conducted at a 22-year interval in the wilderness portion of Denali suggest that crowding and related norms and standards of visitors are relatively stable over time. The explicit wilderness management objectives developed for the park, and the associated program of management, may contribute to this stability by offering a distinctive, well-defined visitor opportunity and attracting a particular and consistent type of visitor. Development of management objectives and an associated program of management may be an effective strategy to maximize the stability of crowding and related norms and standards and minimize the need to revise indicators and standards of quality.

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## Crossing Methodological Boundaries:

Assessing Visitor Motivations and Support for  
Management Actions at Yellowstone National Park Using  
Quantitative and Qualitative Research Approaches

**W**inter use of Yellowstone National Park has given rise to a complex of management issues, including rapid growth in recreation demand, environmental impacts of snowmobiling, and a string of litigation against the National Park Service (NPS) designed to both protect park resources and maintain public access (Sacklin et al. 2000). The intertwined character of these problems suggests that none can be resolved independently of the other, that policy must be comprehensive in nature, and that many sources of knowledge may be required to effect their resolution.

Winter use of Yellowstone has grown significantly since snowmobiles were first permitted, up 300% since 1971 to 120,000 visits annually (Sacklin et al. 2000). Of these visits, about 60% are by snowmobilers, 30% by traditional automobile passengers, and 10% by passengers on commercial snowcoaches. By definition, winter use of the park occurs during the time of the year when effects on wildlife could be significant, through disturbance that could draw down scarce energy reserves. While there is considerable scientific and public debate about snowmobiling and its effects on wildlife in particular, snowmobiling provides outstanding recreational experiences and provides an opportunity for

thousands of visitors to appreciate the park in winter. The debate over snowmobiling encompasses both biophysical and social dimensions. How the issue is resolved will carry significant implications for both park resources and park visitors.

Of particular interest at the time of the research described in this paper was the relationship between the movement of bison herds within the park and the grooming of roads for snow machine travel. This issue was heightened to national levels when approximately one third of the bison herd died in the winter of 1996-1997. While some bison starved due to harsh winter conditions, federal and state wildlife officials killed many because they strayed from the park

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and were believed to pose a potential source of brucellosis for surrounding livestock (Sacklin et al. 2000). Grooming roads for snow machine use may provide a network of corridors that enable bison to leave the park.

The purpose of our research was to develop an understanding of (1) winter use and users and (2) visitor attitudes toward park management practices designed to mitigate recreational impacts on bison and other wildlife. The complexity of the Yellowstone policy environment required an understanding of visitor support (or lack thereof) for alternative park management practices, as well as an understanding of why visitors feel the way they do. Therefore, our challenge was to develop a methodological complement that would meet the needs of depth and breadth. For this reason, we chose to develop and apply both quantitative and qualitative research methods.

### Understanding Visitor Use and Users

A dominant approach to understanding visitor use and users treats recreation as individual subjective experiences (Tinsley and Tinsley 1986; Mannell and Kleiber 1997; Samdahl and Kleiber 1989). This experiential approach to outdoor recreation was first conceptualized by Driver and associates, and represents a shift from focusing primarily on recreation activities to providing

appropriate conditions for satisfying recreation experiences (Driver and Toucher 1970; Driver 1975; Driver and Brown 1975; Driver 1976; Driver and Bassett 1977; Driver and Brown 1978; Haas et al. 1980; Driver and Rosenthal 1982; Schreyer and Driver 1989). This approach to understanding and managing recreation recognizes that the motivations people seek to satisfy through recreation can be fulfilled by a number recreation activities (Mannell and Iso-Ahola 1987). Two general research approaches have been developed to study visitor use and users from this experiential perspective (Mannell and Iso-Ahola 1987). The first is called "product-based" research and relies primarily on quantitative research methods. The second is called "process-based" and relies primarily on qualitative research methods.

**Product-based research.** This research approach proposes that by identifying the motivations and experiences visitors seek to fulfill, managers can provide recreation opportunities designed to meet these needs (Manning 1999). The predominant method used to measure these motivations and experiences is through the use of recreation experience preference (REP) scales developed by Driver and associates (Manfredo and Driver 1996). REP scales measure the importance of a range of potential motivations for recreation. These scales have been applied to visitors to

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many different parks and related areas (Manning 1999). This research suggests that a wide diversity of motivations are sought by park visitors, even within a single recreation activity.

While a dominant and productive research approach, product-based research may have limitations (Patterson et al. 1998, Mannell and Iso-Ahola 1987, Schreyer et al. 1984, Williams and Patterson 1996, Virden and Knopf 1989). For example, product-based research may document that a motivation such as "enjoying nature" is important to visitors, but it may not fully explain what it means to "enjoy nature" (Patterson et al. 1998). Moreover, product-based research may measure the degree of support or opposition to a proposed management action, but it may not explain why visitors support or oppose this action.

**Process-based research.** Other researchers have encouraged a process-based approach to study recreation experiences (Schreyer et al. 1984). This approach focuses on the nature of the recreation experience and emotional states of visitors during recreation. Borrie and Roggenbuck (2001), for example, measured recreation experiences in the Okefenokee Wilderness in Georgia and found these experiences to be dynamic and emergent across the course of the experience. Holbrook and Hirschman (1982, 137) further suggest that an exploration of the

true nature of experience warrants a qualitative research approach focusing on "the purely subjective aspects of consciousness." For example, Arnould and Price (1993) studied whitewater rafting on the Colorado River to record "subjective aspects of consciousness" of river rafters. Because of the inherent complexity of the recreation experience, "the narrative of the experience is central to overall evaluation." Patterson et al. (1998) also utilized a process-based approach in their qualitative study of the nature of wilderness experiences in the Juniper Prairie Wilderness Area, Florida. They examined the meaning of the experience visitors had and how that recreation experience is recollected. According to this study, the experience as a whole is different and more valuable than the sum of its parts.

Product- and process-based research approaches have both strengths and weaknesses. The quantitative nature of product-based approaches allows for the empirical assessment of the degree to which selected motivations contribute to the quality of recreation experiences and the extent to which visitors support or oppose alternative management practices. Process-based research approaches provide insights into the nature of recreation motivations and why visitors might support or oppose alternative management practices. By using a combination of these research approaches, a more

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complete understanding of winter use of Yellowstone might be possible.

### Study Methods

Both product-based (quantitative) and process-based (qualitative) research methods were used to understand visitor use and users in Yellowstone, and user attitudes toward alternative management practices designed to reduce the impacts of recreation on bison. The product-based approach employed a mail-back survey of 1,505 visitors who were systematically sampled at the park's four entrances on randomly selected days from January through March 1998 (Borrie et al. 1999). The survey questionnaire included the REP scales described above and a battery of questions designed to measure visitor support for selected management practices. A series of follow-up mailings to non-respondents was conducted, as recommended in Dillman (1978), and yielded 1,064 completed questionnaires for a response rate of 71%.

The process-based approach employed open-ended, in-depth interviews with 93 visitors at six sites within the park (Davenport et al. 2000). Interviews lasted between five and 30 minutes, and each was tape-recorded and transcribed. Two primary issues were addressed in the interviews: the character of the Yellowstone winter visitor experience, and visitor support for proposed

management actions.

### Study Findings

**A quantitative assessment.** Respondents were asked to rate the importance of 40 potential motivations (REP scale items) for visiting Yellowstone. A five-point response scale was used that ranged from 1 ("Very Unimportant") to 5 ("Very Important"). Findings are shown in Table 1. These data strongly suggest the importance of nature, scenery, and wildlife to the quality of the visitor experience. "Enjoy natural scenery" was the highest-rated motivation for visiting Yellowstone, "view wildlife" was the second highest, and "view bison in natural setting" was the fourth highest.

Respondents were also asked the extent to which they agreed or disagreed with a series of eight potential management actions to "better protect the bison herd." A five-point response scale was used that ranged from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Findings are shown in Table 2. These data suggest that visitors are not very supportive of such management actions; most respondents "disagreed" or "strongly disagreed" with most proposed management actions.

How can these findings be reconciled? Most visitors highly value the natural beauty of the park, including its remarkable bison herd. However, most visitors do not support measures designed to protect

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**Table 1. Motivations for visiting Yellowstone National Park. 1=vu (very unimportant); 2=u (unimportant); 3=n (neither unimportant or important); 4=i (important); 5=vi (very important). Avg score = average score on the 1-5 response scale.**

<i><b>Motivation</b></i>	<i><b>Importance (percent of respondents identifying each level)</b></i>					<i><b>Avg score</b></i>
	<i><b>1-vu</b></i>	<i><b>2-u</b></i>	<i><b>3-n</b></i>	<i><b>4-i</b></i>	<i><b>5-vi</b></i>	
Enjoy natural scenery	1.1	0.1	1.0	16.4	84.4	4.8
View wildlife	0.7	0.5	1.9	28.8	68.1	4.6
Have fun	1.3	1.4	4.5	44.8	44.0	4.4
View bison in natural setting	2.5	2.5	10.4	39.5	45.1	4.2
Get away from the usual demands of life	2.3	2.7	11.2	38.6	45.2	4.2
Experience the tranquility	2.2	3.4	10.8	41.1	42.4	4.2
Snowmobile or ski in wild/natural setting	6.8	2.5	9.1	31.7	49.9	4.1
Experience new and different things	2.2	2.7	13.3	49.6	32.1	4.1
Do something with family	7.5	3.9	9.4	33.1	46.1	4.1
Have adventure	2.7	3.8	13.3	48.0	32.2	4.0
Learn more about nature	2.2	3.8	15.8	46.5	31.6	4.0
Learn about natural history	2.2	4.1	17.7	45.8	30.1	4.0
See Old Faithful	5.1	5.0	17.4	34.3	38.2	4.0
Experience peace and quiet	5.9	6.3	21.0	36.9	29.9	3.8
Be with people who enjoy same things	5.8	7.8	18.8	37.4	30.2	3.8
Be with members of my own group	7.3	8.8	19.4	30.5	34.1	3.8
Get away from crowds	6.5	9.1	21.1	37.2	26.2	3.7
Do something creative	4.8	8.9	23.9	40.3	22.0	3.7
Experience excitement	5.8	9.2	24.5	40.8	19.7	3.6
Bring my family/group closer together	10.2	8.4	22.3	32.7	26.4	3.6
Experience solitude	8.9	10.5	23.6	35.3	21.8	3.5
Learn more about cultural history	5.0	12.0	30.7	35.9	16.4	3.5
Feel healthier	9.7	9.7	27.7	32.4	20.4	3.4
Be in an area where wolves exist	15.1	10.0	21.9	23.1	29.9	3.4
Help reduce tension	14.7	11.5	25.6	30.9	17.3	3.2
Allow my mind to move at slower pace	14.8	11.2	27.0	30.0	17.0	3.2
Promote greater environmental awareness in own group	14.3	11.5	33.4	22.3	18.5	3.2
Be challenged	11.1	13.9	37.5	26.8	10.7	3.1
Have thrills	13.8	16.0	31.6	25.1	13.5	3.1
Reflect on and clarify personal values	13.5	16.0	34.2	25.6	10.7	3.0
Share what I have learned with others	15.7	16.4	31.9	23.4	12.6	3.0
Keep physically fit	14.5	19.9	34.4	21.9	9.3	2.9
Talk to new and varied people	13.5	22.0	38.0	20.3	6.3	2.8
Rest physically	16.8	20.1	36.7	18.9	7.6	2.8
Feel more self-confident	19.6	17.1	38.5	17.5	7.3	2.8
Be at a place where I can make own decisions	22.9	16.7	36.3	16.0	8.0	2.7
Help others develop skills	23.1	17.6	36.8	15.7	6.9	2.7
Develop skills	19.4	26.2	34.4	16.5	3.4	2.6
Be more productive at work	17.0	19.1	35.8	12.3	5.9	2.5
Escape family temporarily	40.4	23.3	26.3	5.6	4.5	2.1

these animals. Why not? A qualitative assessment provides some insights into this issue.

**A qualitative assessment.** Like the questionnaires described above, the in-depth interviews suggested the

importance of natural scenery and wildlife to the recreation experience. However, the interviews went further by revealing what it is about natural scenery and wildlife that is so important. We learned that for many

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Table 2. Level of agreement with proposed management actions to protect the bison herd. 1=sd (strongly disagree); 2=d (disagree); 3=n (neither disagree or agree); 4=a (agree); 5=sa (strongly agree). Avg score = average score on the 1-5 response scale.

Proposed management action	Level of agreement (percent of respondents identifying each level)					Avg score
	1=sd	2=d	3=n	4=a	5=sa	
Limit size of groups	15.2	21.0	22.4	20.3	11.0	3.0
Travel only in specific areas	21.3	19.8	18.2	30.8	9.9	2.9
Watch 30-minute video	24.1	27.2	24.4	17.9	6.4	2.6
Wait up to one hour before travel	35.4	35.0	25.6	2.7	1.3	2.0
Travel only at particular time of day	34.1	36.3	17.1	10.0	2.5	2.1
Travel only on particular days of the week	39.0	35.9	16.0	6.8	2.3	2.0
Travel only in shortened season	36.9	31.8	17.6	10.3	3.5	2.1
Obtain a required permit	45.3	27.7	16.7	6.7	3.6	2.0

respondents it was not just seeing wildlife, but seeing an *abundance* and *diversity* of *unique* wildlife *in a natural setting*. For example, Max and Nora had this to say about their experience:

**Max:** They [the bison] were standing in the hot spring, steam rising. We were right there. It was awesome, beautiful.

**Nora:** We don't have them in California. And the elk, we don't have elk either, very awesome. It's just a treat because in California we don't have this.

**Max:** When we're snowmobiling [in California] there's no animals around. It's just really neat seeing the wildlife.

(These names, and all those that follow, were chosen by respondents to uniquely identify their responses, but do not necessarily reflect their real names.)

When asked to describe their visit to Yellowstone, many respondents listed the species of animals they saw. Visitors seem to keep track

of their wildlife observations, similar to avid birdwatchers or other wildlife enthusiasts. The abundance of bison, elk, and waterfowl was noted by a number of visitors interviewed. Stan listed the kinds of wildlife he saw:

We saw more animals. From the littlest to the biggest, a lot of buffalo, a swan, coyotes. The coyotes are funny when you come to a stop. They just look at you, and they wanted to stay and stop and [they] had a buddy, a raven, that looked like they were working that particular stop. We saw a couple of swan, a lot of elk but I was impressed with the buffalo.

For many visitors, however, it is the natural conditions accompanying that opportunity that are most remarkable. The thrill of watching wildlife interact in their natural habitat resounds from many of the respondents stories. Those who observed such interactions felt lucky to have those opportunities in Yellowstone. The following excerpt is an example of one impression a participant had with regard to wildlife and

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natural conditions.

Alice and her boyfriend took a wildlife tour guided by a naturalist into the Lamar Valley, where they got a rare glimpse of wolves feeding on an elk carcass. She described the fierce scene as thrilling and more than surpassing her expectations.

Yesterday we took the wildlife tour guided by a ranger naturalist ... and we saw a whole wolf pack. And we saw them, either they had killed a bull elk or a ranger had shot a bull elk who was injured, but she set up her scope so that we could see the kill site. And then we saw a bald eagle that was munching away on something. And we saw the various wolves as they were coming to take turns. The whole pack, you know, sitting up like a quarter of a mile away and then they take turns coming down ... kind of in priority of their, I suppose their hierarchy. And then we saw a bunch of them, you know, just lolling on their backs, probably with very full bellies, but that was very thrilling. So the park ... I think in the winter has more than fulfilled our expectations. We're really having such a good time here.

Given the apparent importance of nature and wildlife to the park experience, as suggested by both the product- and process-based research approaches, why aren't park visitors more supportive of proposed management actions designed to protect bison? Further findings from the in-depth interviews are suggestive. During the interviews, respondents were asked to discuss why they supported or opposed the potential

management actions included in the mailback questionnaire. Four distinct themes were evident in their comments.

**Public access as a role of Yellowstone.** Among those who opposed management actions designed to protect bison, some believed that the park's primary role is that of a place for recreation, and people have a right to visit the park. These respondents were against almost any kind of restriction on public access. For example, Wendy (a snowmobiler) recognized the advantage of protecting the bison by restricting visitor access to them, but contended that seeing them is too important. She explained, "No, I think that just from the environmental standpoint it's nice to have all these animals have this nice seclusion, but nobody gets to see them. I wouldn't want to do that to myself or anyone else."

Another visitor on snowmobile, Roberta, saw the value of nature lying in human enjoyment of it. She asked succinctly, "Why have nature, if people can't be around to enjoy it?" Jake also toured Yellowstone on a snowmobile. He was not in favor of any of the management actions designed to protect the bison herd. He stated "It's a people's park and all people ought to be allowed."

**Lack of a credible problem.** Commonly, visitors who described their close encounters with wildlife remarked at how indifferent bison appeared to be to visitors. Although



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some respondents noted that bison seemed to be agitated, many felt like their encounter had little or no effect on the bison. This was a predominant theme in the data as illustrated by Greg:

I don't really know what the problems with the bison are. They don't seem to mind the snowmobilers. They'll stand right there by the side of the trail and go right by them real slowly. They don't even mind that you're there it seems like. I don't even think that they care if we're out here.

However, many respondents admitted that if they had proof of environmental degradation, they would support restrictions on use.

**How will management actions affect the recreation experience?** As our product-based survey illustrated, visitors have clear motivations for their visit to Yellowstone. Several respondents to the in-depth interviews contemplated how specific management actions would change their recreation experience. Respondents considered how their experience would be restricted in terms of access, time, and freedom. While these visitors weren't necessarily against wildlife preservation, they were hesitant to support such actions when this might diminish the quality of their own experience. Many visitors said they "like the way the park is now" and were wary of change.

Caren, who snowshoed in Yellowstone, was not aware of any problems with the protection of the

park's resources. Here's what she had to say about limiting visitor group size.

I don't know, because my whole family, there's five in my family, so if we couldn't come as a family, I would not be happy about that. But, I would be for doing something like, course I don't know if cars, see I don't know much about that issue and ... what they would do to protect bison and how that would affect me to comment on it. I think they should cut down on the cars in the summer too. So I would be for some kind of mass transportation in, as opposed to everybody bring their personal vehicles into the park. I don't know how that affects bison though.

**Are recommendations based on science or opinion?** A few participants stressed the importance of scientific proof and questioned the capability of the park's decision-makers to explore all other management options before restricting visitor use. For example, when Michael was asked about the possibility of shortening the winter visitor use season, he replied:

Before they do that, I think they ought to determine that this is, the common problem. What is the problem with bison wandering out of the Park? Are they carrying that disease and is it safe? To what extent do the bison wandering out of the Park; is their migration affected by the groomed trails? You can count that. You can count the bison and find out where they are, and another question would be are there some simple things you could do, like certain trail

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**Figure 1. Winter visitors to Yellowstone value seeing wildlife, but may not support management practices designed to protect bison.**

points, where you could keep the bison from getting that trail. I think get some wildlife biologists involved and they can do it.

Valerie, a visitor on snowmobile, also mentioned cattle guards when asked about her support for closing some sections of groomed roads to oversnow vehicles to protect the bison herd. When asked if she would support management change if she had better proof of impacts, she replied:

True. It's easy to take a management action with no clear objective and some

generalization, but the results may not be what you expect. Measure the environment before you take the action. Measure after you take the action to see if it's good. If you see the effects you desired, or you could have the exact opposite.

Eve stressed the importance of good relations between park management and the public. When it was suggested that the Park Service should close some road sections to oversnow vehicles, she said:

I'd be sad about it, but if it was necessary then I'd support that. I just don't want it to become political to the point

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where it's closed for political reasons and not true wildlife management reasons.

Eve demanded scientific proof of degradation. It seems as though she was also skeptical of the Park Service's agenda. Eve was asked if there were particular road sections that she would want to remain open. She answered:

I don't think it would be up to me whatsoever. It would be up to what is truly needed to manage wildlife. It doesn't have anything to do with which ones I would be interested in.

So while Eve didn't perceive a problem with the protection of wildlife, she would support necessary actions if such proof were forthcoming. Furthermore, she thinks that these decisions should be based on science and not on politics or visitor opinion.

Randy, who toured Yellowstone on skis, was asked if he would be supportive of restrictions on the times that visitors could be in the park to protect wildlife. He answered, "I guess I'd have to defer. The answer is yes, deferring that decision to those professionals that are trained in the habitat and how different species react to man."

Sarah, a visitor on snowcoach, said she would support restricting the times visitors could be in Yellowstone in the winter. Here's how she explained this:

Well, because I would trust that they wouldn't do such a drastic thing unless they had good reason to. I certainly

would not want them to just do it because somebody got the idea that it might be nice to give the animals a break. I mean how do they know. But if they can convince the people that they know what the animals need better than the rest of us, then I think they ought to do that. But I'm not sure.... I don't know what the animals need, but maybe somebody else does. If the animals are showing signs of stress, well, they should have a break.

## Conclusions

Why does the public visit Yellowstone in winter, and what management actions do these visitors support or oppose? These are vital questions to park managers who are challenged to provide high-quality visitor experiences while maintaining protection of important park resources. Research can help answer these questions through both product-based (quantitative) approaches and process-based (qualitative) approaches. We used both in a complementary fashion to help answer these questions and to rectify study findings.

Initial quantitative research indicated that seeing and experiencing nature and wildlife, especially bison, were central to many park visitors. However, these visitors generally did not support a variety of proposed management actions designed to protect the bison herd, a park resource that had been substantially diminished in recent years.

Follow-up qualitative research helped to clarify these findings in two

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ways. First, visitors value seeing many species of wildlife in their natural setting. Thus, while wildlife is important, the park serves a very different role than a zoo. Natural processes may be at least as important to visitors as the natural objects of those processes.

Second, there are at least four important reasons why visitors may not support proposed management actions designed to protect resources that are important to the quality of the visitor experience. Park managers are challenged to deal with these issues in a way that will not only protect important park resources, but will also convince visitors and other interest groups to support appropriate management actions. Specifically, how can park resources be protected while offering reasonable public access to the park? Can needed park management actions be designed and implemented in ways that minimize their impacts on the quality of the visitor experience? Can proposed

management actions be justified on “scientific” rather than “political” grounds, and are there viable alternatives to restricting visitor access and freedom? To the extent that such questions can be answered successfully, there is likely to be a stronger relationship between visitor motivations and visitor support for proposed park management actions designed to protect resources that serve as the foundation for such motivations. And, ultimately, park management is likely to be more successful and less contentious.

The findings from this study are informed by alternative research approaches, each complementing the strengths and weaknesses of the other. “Crossing boundaries” in methodological approaches can build a more complete understanding park use and users, answering questions of both “what” and “why”, and ultimately informing park management.

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## Thinking and Acting Regionally: Toward Better Decisions about Appropriate Conditions, Standards, and Restrictions on Recreation Use

**R**ecreation managers make and act on decisions, often implicit, about the conditions, management approaches, and visitor experiences that are most appropriate for the individual recreation areas they administer. As demand for recreation, particularly in wilderness, backcountry, and wild river settings, has increased, such decisions have become more difficult, complex, and contentious. We believe that managers, while charged with deciding what is appropriate in the individual places they manage, need to make decisions that are also appropriate within a regional context. A fundamental objective of recreation management is to maximize the values and benefits that accrue to the public from a system of recreation areas (Wagar 1966). Consequently, managers need to make decisions that maximize the values and benefits that accrue from that system, not just the individual areas for which they are responsible.

Backcountry settings are not only scarce—in terms of their acreage—but they are also highly demanded as locales for recreation and tend to be sensitive to recreation-use impacts. In responding to growth in demand for recreation in these settings, managers must make tradeoffs between access and provision of optimal biophysical and experiential conditions. One relatively popular management approach is to limit the amount of recreation use allowed in an area. This policy was first implemented for whitewater rivers of the West in the early 1970s, but the practice has since been adopted, in one form or another, in dozens of terrestrial backcountry areas. Manag-

ers have usually developed use limits on an area-by-area basis (e.g., the managers of one backcountry area develop their plan with little knowledge of the demand, supply, and opportunities provided in nearby areas). In addition to their intended protective effects, use limits have a number of unintended and potentially irreversible consequences, notably the displacement of visitors and impacts to other areas, the preferencing of one type of visitor over another, and the reduction of access and recreational opportunities (Freimund and Cole 2001).

In this paper, we argue that the systemic failure to both think and act regionally has resulted in the homog-

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enization and suboptimization of recreation opportunities, and the displacement of problems from one area to another. In presenting this argument, we use the example of recreation-use limit policies to explore more completely the issues raised by the “area-by-area” management approach. We contend that a regional approach to planning and management is needed to reverse the trend toward homogenization and suboptimization. We discuss barriers to regional planning for recreation, and conclude with ideas about the basic outline of a regional analysis framework and suggestions about research questions that must be addressed. While we have more questions than answers, our intent is to point out the limitations of current science and management, and suggest a direction that might lead to better future decisions.

### Suboptimization and Homogenization

Protected areas in the USA are each part of a larger biosocial region or system. Management actions developed for one area inevitably affect conditions and management in a nearby one. Area-by-area implementation of management actions is an example of incremental decision-making. Such decision-making focuses on the “art of the possible” but without reference to the long-term or spatially expansive consequences of this approach. A common outcome

of incremental decision-making is that even though each manager may be acting responsibly for the area under his or her jurisdiction, the cumulative effect of individual, apparently unrelated decisions may be a situation that was never explicitly intended and is difficult to reverse. In particular, such decision-making tends to displace use and diminish important values, effects that result in the homogenization of conditions and suboptimization of the aggregate value and benefit of recreation systems.

To clarify our terminology, we offer the following definitions. “Displacement” is a process in which recreationists and their impacts move from one place to another, in response to management action (or lack of action). By “homogenization,” we mean a decrease in the diversity of recreational opportunities that a region offers—again as a result of management action or inaction. By “suboptimization,” we mean that a regional recreation system offers less than optimal value and benefit, primarily because the management actions taken (or not taken) do not adequately serve the diversity of recreation tastes in the region. It should be noted that, while these processes and effects result from management, they are typically unintended.

To illustrate the processes of displacement and homogenization, consider the multi-day wilderness-like whitewater river trips in the Colo-



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rado Plateau country of Utah and Arizona—particularly on the Colorado River in Grand Canyon, the Green River in Desolation and Gray canyons, and the San Juan River between Bluff, Utah, and Lake Powell. This example was selected because displacement and homogenization occurred rapidly in these areas, with readily apparent results. We contend that similar processes are occurring—perhaps more slowly and subtly—throughout our parks and wilderness areas.

Recreational use on each of these Colorado Plateau rivers increased throughout the 20th century, but most explosively on the Colorado River. As of 1965, only about 1,000 people had ever gone down the Colorado through Grand Canyon. Just seven years later—in 1972—more than 16,000 people went down the river in a single year. Solitude and pristine environments were suddenly lost. People were no longer able to experience the conditions they preferred, and—in 1973—the National Park Service (NPS) implemented a management program that limited use to the 1972 level. Launches were limited such that typically 6-8 groups per day start down the river. Demand for the Grand Canyon rafting experience continued to increase, however. By 1980, the wait to obtain a noncommercial permit reached 10 years. Today, the number of people on the waiting list is so large that it would take 20 years to accommodate

them all.

Grand Canyon managers were forced to make a tradeoff between legislated mandates both to provide preferred experiences and unimpaired environments and to provide access to park resources. Their choice—as the most appropriate course of action for Grand Canyon—was to select a compromise that provides (1) conditions that are still acceptable to most visitors but more crowded and less pristine than most prefer and (2) an ability to gain access that is much less frequent than desired but not as infrequent as it would be if use levels were even lower. They rejected alternative compromises such as (1) preferred experiences and virtually no access and (2) even less-preferred experiences and more frequent access.

Boating had also been increasing in the 1960s and early 1970s on the Green and San Juan rivers, but nothing like it did after floaters could no longer freely access the Colorado. Boating on the Green River through Desolation and Gray canyons increased 250% from 1973 to 1974, the year after use limits were imposed at Grand Canyon. Opportunities for experiencing solitude and pristine environments were lost here as well, and, by 1980, use was limited on the Green. Launches were limited to 6 groups per day. Today, the odds of obtaining a permit in a lottery during the prime use season are about 5%. Here—as on the Colo-

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rado—managers chose the compromise of acceptable rather than preferred experiences (with use densities comparable to those on the Colorado) and infrequent access.

Demand to float the San Juan River increased more slowly than on the Green River. However, by 1980, managers chose to limit use to about 6 launches per day. Initially, permits were easy to obtain. Today, however, the odds of obtaining a permit are poor here as well. Consequently, the San Juan River—like the Colorado and the Green—provides acceptable experiences and is difficult to gain access to.

The choice made by managers appeared to be a reasonable one for each of these rivers. In fact, with only a few exceptions, managers of all whitewater rivers offering multi-day trips through primitive environments have made similar choices. There are about 5-8 launches per day, resulting in a situation in which use densities are not extremely high but experiences are far from those that are preferred, and permits are extremely to moderately difficult to obtain. On all of these rivers, managers—individually deciding what is most appropriate for the river they manage—have made nearly identical choices. Their decisions have affected each other, as both floaters and visitor impact problems have been displaced from one river to another. The result is a recreational system that is neither very good at providing access nor at

providing preferred experiences. Such a homogeneous system is suboptimized because many of the values these rivers originally provided (e.g., preferred experiences and ready access) have been lost from the entire system.

In contrast, consider the situation on three river segments in Idaho: the Selway, the Middle Fork of the Salmon, and the Lower Salmon. These rivers were also experiencing rapid increases in use in the 1970s. Limitations were imposed on the Middle Fork of the Salmon in 1972, a year before Grand Canyon, with managers selecting a use level of 7 launches per day. The current odds of obtaining a permit on the Middle Fork during the prime use season are 3%. Thus Middle Fork managers made choices similar to virtually every other river manager. Managers of the Selway chose something different, however. They decided to provide opportunities for high levels of solitude (preferred experiences), even though it would be very difficult to gain access to that experience. Only one launch per day is allowed—providing a very different experience on the Selway. The likelihood of obtaining a Selway permit is even lower than the odds of obtaining a Middle Fork permit.

The managers who made the decision on the Selway are revered in certain circles for their foresight in preserving something that is scarce, the opportunity for a preferred experience.

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rience on one of these rivers. The same reverence should be given as well—though we seldom hear it—to the managers of the Lower Salmon River who have also tried to preserve something scarce, a river that you can float when you want to. Despite increasing use, resulting in increased use-density, managers of the Lower Salmon have not limited use. As a result, the conditions found along the system of rivers in Idaho have not been homogenized to the extent that they have been elsewhere (Allen 1991). There are rivers that offer preferred experiences (the Selway), rivers that offer acceptable experiences but somewhat easier access (the Middle Fork Salmon) and rivers that provide the opportunity to go floating, admittedly often under crowded circumstances, when one is not lucky enough to obtain a permit elsewhere. This system, we contend, provides more value and benefit, and is not as suboptimized as the system of rivers on the Colorado Plateau.

These two examples illustrate how the choices individual managers make—when deciding what is appropriate for the individual areas they manage—determine the aggregate value of the regional system of recreation areas within which individual areas are nested. Each individual decision affects neighboring areas, through displacement (or attraction) of use and impact, and either contributes to homogeneity or adds diversity to the system. Thus it

is critical that managers make choices that maximize the value of the system at least as much as the value of their individual river.

Homogenization of recreation opportunities—as has occurred almost everywhere on rivers—is troublesome because many opportunities are increasingly scarce relative to demand, and because the lost opportunities are not easily recovered. It is unlikely that the managers of other river settings would lower current use limits to an equivalent level, even given the tremendous unsatisfied demand represented by applications for floating the Selway River. It is equally unlikely that managers on other river segments would raise use limits to accommodate the ever-increasing demand for river recreation. Managers—and the public—have been victimized by a “tyranny of small decisions” (Kahn 1966), each representing a tradeoff for any given setting, but in sum not maximizing the benefits of a system.

In most cases where use has been limited, the limit has been set at current use levels. Management actions that are based on preserving current conditions privilege current users over other users. Current users are found at recreation sites because the biophysical, social, and managerial conditions there provide the opportunity they seek—or are at least willing to tolerate in order to gain access. Maintaining current conditions thus protects what current users seek, re-

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ardless of other demands existing within a population. The needs and desires of those who prefer other conditions—and either have chosen not to visit or who still come to the area but in small numbers—are marginalized, perhaps inadvertently. While managing for the average current visitor may be appropriate, at least some recreation managers need to provide for the preferences of other users or the system will become ever less diverse and less beneficial.

In summary, wilderness and backcountry areas exist not on a site-by-site basis, but within the context of a region where such areas constitute a system. Management actions in one area affect use patterns, biophysical and social conditions, and eventually actions in others. Area-by-area approaches to management ultimately result in homogenization and suboptimization of recreation systems. Regional analysis and planning, in contrast, would increase the likelihood that individual decisions lead to diversity and optimization instead.

#### Barriers to Thinking and Acting Regionally

Our observations about the regional character of recreation management are not new. Managers and scientists have argued for 25 years that management must occur at a regional level. Lime (1976) suggested that a “full range of recreation op-

portunities within the *region* to satisfy the diversity of recreation tastes is desirable” (emphasis added). Bruns (1984, 82) argued that one value “of the system of rivers concept is that it provides a framework for managers to actively plan for providing specific recreation opportunities rather than simply responding to whatever visitation occurs.” Others have noted that management of recreational use must occur within the context of a regional system of opportunities, and that limiting recreational use in one of these areas without considering the management regime in others carries a variety of significant negative consequences (e.g., Stankey 1977; Schreyer 1977).

Thinking and acting at a regional level is not easy, as the evidence suggests. There are a number of significant barriers to doing so. A major barrier results from the number and variety of agencies often involved in providing backcountry opportunities. Each agency (U.S. Forest Service, Bureau of Land Management, NPS, state park agencies) operates under different mandates, policies, and priorities. Agency managers may simply be unaware of the consequences of their actions on other backcountry managers. Incentive systems are narrowly defined: protecting the area under one’s jurisdiction takes priority, not areas managed by other managers or other agencies.

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**Figure 1.** Parks within a region should provide a diversity of recreation opportunities.

To think regionally, managers require institutional environments to encourage such activity and venues for doing so. Venues that encourage “working through” regional analyses, conflicting priorities and agendas, and differing missions (Yankelovich 1991) are rare. A venue would require participation of all relevant agencies, scientists and users (and others with interests in the parks). These interested parties should be able to interact in a non-threatening

environment and in such a way that implications (benefits, costs and tradeoffs) can be described at a regional scale.

Another barrier to regional planning is the lack of social science research approaches capable of providing a strong empirical foundation for local decisions that optimize regional recreation values. Currently, the most prominent social science input to the decisions individual parks and wilderness areas must

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make about appropriate conditions, experiences, and management programs is generated by surveys of current visitors to individual areas. The way that the results of this research are frequently applied to park management has contributed to suboptimization and homogenization in at least two ways.

First, although social science research conducted on an individual-area basis provides managers with useful information, it only provides information about the preferences of those currently visiting an area. Dissatisfied users or those seeking opportunities no longer provided by the area will not be sampled; thus their preferences will be inadvertently marginalized. As a result, such research usually shows support primarily for current conditions. Second, the practice of focusing most research attention on central tendencies (to simplify interpretation of the data) contributes to a predisposition to manage for the average visitor. A substantial and long-established literature (e.g. Wagar 1966, Shafer 1969) has developed showing that the average visitor simply does not exist. The population of outdoor recreationists consists of a series of segments, none of which account for the majority of participants. By directing management at a mythical average visitor, the needs and desires of few visitors are met (Wagar 1966). Returning to our rivers example, traditional visitor surveys will tend to

suggest that every river should be managed for the average current visitor, meaning most rivers will be managed like the Middle Fork, with few rivers managed like the Selway or the Lower Salmon.

These limitations result, in part, from asking too much of science—a common malady in this era of so-called science-based management, in which descriptive data are frequently confused with prescriptive action. Managers need to develop *prescriptions of what should be* (desired or acceptable social and biophysical conditions at a site), but social science research can only provide *descriptions of what is* (visitor preferences and opinions). Some scientists have tried to get around this limitation by using evaluative or even prescriptive phraseology in their questions—asking visitors what is acceptable or what management should do. But, the tabulated responses to such questions are still merely descriptions of the opinions of a select group of stakeholders (average current on-site users). Information about this group enriches decisions about appropriate conditions but it suggests little about what the ultimate decision should be.

Several studies have attempted to develop a regional perspective by aggregating the results of several area-specific surveys conducted in the same region. Bruns (1984) was perhaps the first to do this. While these regional analyses recognize the

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need to think regionally, they can still contribute to the problem if managers are not attentive to their strengths and weaknesses. Warzecha et al. (1998; and the article in this volume), for example, present the results of visitor surveys conducted on three river segments on the Colorado Plateau. The results are more striking in their similarity than in their differences, with the mean number of acceptable watercraft encountered per day varying between 8 and 11 on the three rivers. This study provides useful descriptive information; there is little difference in the acceptability judgments of the average current visitor on each of these three rivers. However, if decisions about conditions are largely based on such results, managers of all three river segments are likely to make similar choices about social settings, leading to homogenization of opportunities. Site-specific studies of visitors—even aggregations of several sites in a region—cannot provide an empirical basis for taking the risks associated with managing for preferred experiences or managing to provide access as frequent as desired. If we want to provide a scientific basis for decisions that lead to diversity and maximum aggregate value of recreation systems—instead of homogeneity and suboptimum value—we need more science that can explicate tradeoffs and consequences at large spatial scales and that can provide more insight into the needs of par-

ticipants other than the average current users of an individual park, wilderness, or river.

In addition to new research approaches, thinking regionally requires research funded across agency administrative functions and boundaries and at longer time frames than is currently the case. Development of regional-level recreation research would require new ways of thinking, innovative conceptual frameworks, and approaches to technology transfer that are not readily accessible in today's managerial environment. Regional-level analyses are likely to require more time to plan, implement, and evaluate, a situation in conflict with today's "need it now" drive for information.

#### **Toward a Regional Approach**

The first step toward a regional approach to recreation decision-making is to recognize the problems and consequences associated with not doing so. Our fundamental contention is that—in the absence of a regional perspective—individual managers are likely to make decisions that, while appropriate for their individual park or wilderness, may be inappropriate for the systems of parks and wilderness areas that recreationists use. Uncoordinated individual decisions will result in a relatively homogeneous system that gives preference to the needs and desires of a minority—those with needs and desires close to those of the mythical

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average recreationist.

Given our current understanding about how to conduct a regional approach that will minimize displacement, reduce suboptimization, and counteract the trend toward homogenization, the primary objective of this paper has been to point out the significance of these problems. However, in the following pages, we will present some initial ideas about a framework for regional analysis and identify some of the important research needs related to such a framework. Changing the questions that science asks and developing research approaches capable of addressing these critical questions is a necessary step. In addition, institutions will have to change in ways that encourage regional planning and management. This is critically important—and challenging—although we do not attempt to offer insights into how to do this.

The framework we envision is founded on two types of definitions. First, the region to be analyzed needs to be defined. This involves developing a better understanding of how areas and populations interact. Second, definition and classification of the range and types of recreation experience is needed. Levels of demand for these different experience types, within the population of the region, needs to be assessed.

Once the regions, types of experience, and demands have been identified, the places capable of providing

these experience types need to be identified and mapped. The relationship between supply and demand for various experience types will suggest which types are relatively scarce, in the sense that there is high demand for a limited supply. Multi-day whitewater boating, through largely natural, undeveloped landscapes, is a good example of a scarce recreational opportunity. For scarce opportunities, it will be necessary to further subdivide recreational opportunities along a spectrum from places that provide preferred conditions but infrequent access, to places that provide conditions that are acceptable but not preferred and opportunities for more frequent access.

The next step of the framework involves allocating experiences—a series of prescriptive decisions driven primarily by concerns about suboptimization. Suboptimization is minimized by allocating experience types such that they are distributed in proportion to demand for them. It is further minimized by making sure that, within any individual experience type, there are opportunities for both preferred experiences and for frequent access (i.e., not every place makes the same compromise between these two goals). Finally, it will be necessary to allocate specific places both to experience types and position on the spectrum from preferred to acceptable conditions. For example, the Selway River has been allocated to nonmotorized whitewa-



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ter recreation as opposed to motorized whitewater recreation. It has also been allocated to the preferred-experience, limited-accessibility end of the spectrum within that experience type.

Moving toward this type of framework will require new scientific approaches. Currently, the primary scientific approach is to conduct surveys of current visitors to particular parks, wildernesses, and rivers. Questions about preferences for or acceptability of conditions are used to make decisions about what is appropriate in that place. As noted before, we contend that using this approach *for this purpose* can contribute to suboptimization of the system—even if these results are aggregated in regional analyses illustrating differences between individual places within a region. Information about the preferences of current visitors to a specific place is useful in identifying alternatives and in evaluating the consequences of alternative decisions. Our intent is not to suggest that this research is not valuable for these purposes. Rather, our point is that this research approach is not very helpful in deciding among alternatives. Other research approaches are more likely to contribute a stronger empirical foundation to decisions about appropriate conditions.

Traditional research provides important insights into such questions as (1) how many current users' preferences can be met given a particular

management alternative? (2) how far are proposed conditions from most current users' preferred condition? and (3) are proposed conditions still within the tolerable range of most current users? However, while this type of research might suggest the right approach to satisfy the most current users in any single place, it will often not be the right approach for the recreation system as a whole.

To make good prescriptive decisions about what is appropriate, we need to consider more than visitor preferences. We need empirical studies of demand and supply and to consider legislative mandates and administrative policy. We need science directed at regional populations of participants to complement research on area-specific visitors. Much as the biological sciences have profited from studying phenomena at multiple scales (from landscapes to communities, populations, individuals and cells), the social sciences could profit from studying phenomena at all scales, from the regional population of participants to the individual participant and his or her experience. Studies of individuals provide a richer vocabulary for describing larger-scale systems, while studies of regions provide a context for decisions about populations and communities.

The following five topical areas of research seem particularly important to the development of regional analyses. First, we need to understand the

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appropriate scale of a regional analysis, the emergent properties of a region, and how one would make decisions about the appropriate boundaries of a region. Regions may be best defined in terms of the supply of recreation areas capable of meeting the demand for particular recreation opportunities. The appropriate scale of a regional analysis probably varies with the scarcity of supply, or how specialized the opportunity is, or both. For example, the size of the region needed to assess mountain biking opportunities may be much smaller than that needed to assess mountaineering opportunities. Much as the emergent properties of large biological systems only became apparent recently, with the blossoming of landscape ecology, the emergent properties of regional recreation systems will not become apparent until they receive serious study. Such studies are likely to require new concepts, jargon, and measurement protocols.

Second, we need more research at smaller scales—research on individuals and on subpopulations. More in-depth study of individuals might contribute a richer vocabulary for describing recreation experiences than our current reliance on such vague terms as a “wilderness” experience. Ideally, we can learn how to describe experience opportunity types in terms of what is experienced, complementing our current ability to describe experiences in

terms of activities or as setting attributes that we assume influence experiences. This should lead to better categorizations of the experience opportunities that could be provided regionally. It should also increase the ability to study relationships between setting attributes—which managers can readily influence—and experience opportunities managers are trying to provide.

A third type of research involves describing the distribution of preferences for experience opportunity types across the regional population. This research needs to build on categorizations of experiences developed from a richer understanding of the recreation experience. How large are the various subpopulations that seek different recreation experiences? One challenge with this research is to identify ways that measures of demand can be more readily related to measures of supply. Typically, demand is articulated in visitor-days, occasions, or as a proportion of the population interested in a particular recreational activity or experience opportunity. Estimates of supply are typically expressed in units of area such as acreages. If we are to effectively match supply to demand, better ways of relating one to the other are needed.

It is also important to conduct research that will help in making decisions about how to allocate recreation resources along the spectrum from preferred experiences to mini-

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mally acceptable but readily accessible experiences. This research would address such questions as, "what is the minimally acceptable condition, below which denial of access is preferable to further degradation of the experience?" Together, studies of the "costs" of experiencing acceptable conditions as opposed to preferred conditions, along with studies of the "costs" of being unable to gain access to a desired activity, might suggest approaches to allocating resources along the spectrum. For example, should we have one Selway, ten Middle Forks and one Lower Salmon, or should the allocation be something different?

Finally, research is needed to guide the allocation of specific places to the various niches in the regional system. We might decide that the benefits of a system would be optimized by allocating 20 river segments to motorized recreation and 20 to non-motorized and then, within the non-motorized category, to allocate four segments to preferred conditions, six to ready access and ten to a compromise between these two. However, criteria are needed to decide which four places should be devoted to preferred conditions. Clearly, legal mandates, institutional policies, and existing conditions will play a large role. Descriptive information in traditional visitor surveys can help evaluate the consequences of alternatives. Finally, studies of place and place attachment would

improve our understanding of the socially important values that may be present at particular places.

### Conclusion

Our fundamental assertion is that the systemic failure of planners and managers to think and act regionally, and of researchers to conduct science relevant to regional approaches, has resulted in the loss of recreation values and scarce experience types. Individual managers continue to make decisions about experiences, conditions, and management actions that, while perhaps appropriate for their individual area, may be poor decisions for the system of recreation areas that serves society. Incremental, area-by-area decisions lead to problem displacement, homogenization of recreational opportunities, and suboptimization, reducing the flow of benefits from publicly provided recreational settings. The resulting loss of value, both at individual areas and within the system, is not easily recoverable. Social science research has inadvertently assisted in this process, since most research is conducted on current visitors to individual areas, with little research devoted to larger spatial scales, other populations, or even identification of the diverse tastes of subpopulations.

Our assertion is not new. The early literature on recreation management noted the importance of regional thinking and the shortcomings of area-specific survey research.

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However, the lessons from that era have seldom been acted on, perhaps because institutions do not provide appropriate incentives for regional research or regional planning and management. Therefore, it seems timely to reassert the importance of regional analysis. We need to ask more questions about our responsibilities as managers and scientists in

terms of how we can optimize the flow of benefits from a regional system of recreation areas. Regional thinking requires some revision of institutional structures and incentives, development of venues for the “working through” needed at the regional level, and innovative approaches to social science and its application.

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## Diversity in Outdoor Recreation: Planning and Managing a Spectrum of Visitor Opportunities in and among Parks

### Diversity in Outdoor Recreation

Outdoor recreation emerged as a scientific field of study in the 1960s, and over the last four decades, numerous studies of park and wilderness visitors have been conducted. While the objectives, scope, and methods of these studies are highly variable, at least one general finding has been pervasive: outdoor recreation is diverse. This is a recurring theme whether in regard to recreation activities, socioeconomic and cultural characteristics of visitors, attitudes about policy, preferences for services and facilities, sensitivity to crowding and conflict, experience level, and motivations for and benefits received from recreation participation. Diversity in tastes for outdoor recreation is found equally in studies of developed campgrounds and investigations of wilderness hikers. For example, an early study of users of vehicle-access campgrounds concluded that study data “illustrate the characteristic heterogeneity of camping as a recreation activity and the multitude of reasons people may have for camping. Diversity in the kinds of facilities provided is an important consideration in recreation planning” (King 1966, 2). A study of wilderness hikers concludes similarly: “Wilderness visitors are not in any sense a uniform or homogeneous population.... Represented among wilderness visitors are value systems that cover a wide and often conflicting range” (Stankey 1972, 92).

Research points out that not only are there differences in taste among people, but that people’s tastes change over time as well. A study in the Pacific Northwest found that the type of camping chosen (wilderness camping, automobile camping, or some combination of the two) was strongly related to changes in the

stage of the family life cycle (Burch 1966). A nationwide panel study of campers found similar relationships between camping activity and the family life cycle (LaPage 1973; LaPage and Ragain 1974). Based on these relationships, it has been suggested that “the forest camping system is like an omnibus—the seats are

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often full but often occupied by different persons as they adjust to the flow of time" (Burch 1966).

Diversity also is evident when the "averaging issue" in outdoor recreation is recognized. An early, important report on outdoor recreation was pointedly titled, *The Average Camper Who Doesn't Exist* (Shafer 1969). The potential problem of relying too heavily on averages has been illustrated as it might apply to camping (Wagar 1963; Wagar 1966; Lime 1974). Studies show that some campers prefer very elaborate facilities for comfort and convenience, while others prefer relatively simple facilities. Moreover, there is a wide range of opinion between these extremes. Providing a single, uniform type of camping opportunity—near the midpoint of the range based on averages, indeed at *any* point along the range—will leave many campers, quite possibly even the majority, less than fully satisfied. However, by offering a range of possibilities, more campers' preferences can be met.

This line of reasoning has been used to develop a definition of quality in outdoor recreation based on diversity (Wagar 1966; Manning 1998). The difficulty in distinguishing between the quality and type of recreation opportunities has been a persistent problem for both visitors and park managers. It is common to be quite subjective when associating certain types of recreation opportunities with high quality. Those

whose recreation tastes are oriented toward the remote and primitive, for example, may consider wilderness recreation to be of high quality and vehicle-access campgrounds as something less. But high quality can and should be found among all types of recreation opportunities. From the perspective of the individual, quality is most appropriately defined as the degree to which a recreation opportunity meets one's needs. From a broader, societal perspective, quality in outdoor recreation can be equated with provision of a diverse spectrum of recreation opportunities.

Diversity in outdoor recreation also has been rationalized in economic terms using an example of a hypothetical undeveloped recreation area (Wagar 1974). If the area were to be used for wilderness recreation, it might support 3,000 visitor-days of recreation each year. If intensively developed, it might support 300,000 visitor-days of recreation. But the decision between these two alternatives should take into account the issue of scarcity. If developed recreation opportunities are relatively plentiful and wilderness recreation scarce, society may place more value on creating additional wilderness recreation opportunities even though they will accommodate fewer visitor-days. This is in keeping with the economic theory of marginal utility: the more we have of some good or service, the less value or importance is placed on each additional unit.

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This economic rationale has been borne out in an empirical test of Colorado deer hunting that explored public willingness to pay for selected types of hunting opportunities (Miller et al. 1977). The value of deer hunting was found to vary among types of hunting opportunities and types of hunting groups. From this, it was demonstrated that total satisfaction of hunters (as measured by willingness to pay) could be increased by providing a spectrum of hunting opportunities.

Diversity also has been rationalized in political terms (Burch 1974). It can be argued that without broad political support, parks and outdoor recreation areas are not likely to be maintained by society at large, and that this support is not likely to be forthcoming if outdoor recreation areas do not serve the needs of a broad spectrum of the population. Therefore, park managers should strive to serve this diversity and not necessarily adhere too closely to the preferences or tastes of any one group or type of visitor.

### Conceptual Frameworks for Providing Diversity in Outdoor Recreation

A number of reports in the outdoor recreation literature have emphasized that a systematic approach to outdoor recreation management is needed if diversity is to be designed appropriately. It would be difficult for a single park or recreation area,

regardless of size, to provide a full spectrum of recreation opportunities. Examining each park or recreation area in isolation may lead to management decisions favoring the majority or plurality of potential visitors. While justified in many cases, this process will ultimately result in an entire system of park and recreation areas designed for the average visitor while neglecting a desirable element of diversity. Instead, each park or recreation area should be evaluated as part of a larger system of areas, each contributing as best it can to serve the diverse needs of the public. In this way, low density and other minority recreation opportunities can be justified. It has been suggested that this systematic approach be applied on a broad, regional basis; this way management can best ensure "a diverse resource base capable of providing a variety of satisfactions" (Stankey 1974).

Recognition of the need for diversity has led to a number of suggested classification or zoning systems for recreation areas. Very early precursors to recreation opportunity classification systems suggested that different types of forests be planned and managed to meet the needs of alternative recreation activities (Marshall 1933; Marshall 1938), and that recreation opportunities should range "from the flowerpot at the window to the wilderness" (Wagar 1951). One of the earliest, more formal suggestions was contained in a handbook

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on wildland planning which suggested seven zones ranging from “wilderness” to “semi-suburban” (Carhart 1961). Just a year later, the Outdoor Recreation Resources Review Commission included among its major recommendations a proposal for a six-fold classification system for recreation areas, ranging from high-density use to extensive primitive areas, to be applied to all federal recreation lands (ORRRC 1962).

More recently, two conceptual frameworks—the recreation opportunity spectrum (ROS) and carrying capacity—have emerged in the outdoor recreation literature that help guide design and implementation of a diversity of outdoor recreation opportunities. In the broadest sense, ROS is a conceptual framework for thinking about recreation opportunities (Driver et al. 1987; Driver and Brown 1978; Clark and Stankey 1979; Brown et al. 1978; Brown et al. 1979). It explicitly recognizes that experiences derived from recreation are related to the settings in which they occur, and that settings in turn are a function of environmental, social, and managerial attributes (e.g., degree of environmental impacts, visitor-use levels, and regulation of visitor behavior). By describing ranges and alternative combinations of these attributes, ROS illustrates the potential diversity of recreation opportunities.

Similarly, contemporary ap-

proaches to carrying capacity also emphasize the desirability of a diverse array of recreation opportunities, both within and among parks and related areas. Carrying capacity frameworks such as limits of acceptable change (LAC) (Stankey et al. 1985) and visitor experience and resource protection (VERP) (National Park Service 1997), suggest that recreation opportunities should be defined through formulation of indicators and standards of quality for the resource, social and managerial components of recreation experiences. Moreover, such recreation opportunities should comprise a broad range of experiences at both the park and regional levels. For example, LAC suggests use of ROS in planning recreation opportunities within wilderness and related areas, and also suggests a regional analysis of the supply and demand for alternative types of recreation opportunities. Similarly, VERP advocates analysis of a range of visitor experience and resource conditions, and recommends that such an analysis include a strong regional component by noting that “a range of recreational opportunities in a region is desirable to satisfy the diversity of recreation tastes (National Park Service 1997, 49).

### Empirical Approaches to Planning and Managing Diversity in Outdoor Recreation

It is clear from the proceeding sections of this paper that a diversity



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of recreation opportunities is a desirable element of a system of park and recreation areas. But how can such a system of recreation opportunities be designed empirically? This section of the paper presents a series of studies conducted at both the park and regional levels that illustrate how empirical data might be used to help guide planning and management of a spectrum of visitor opportunities at park and recreation areas.

#### **Hiking on the Colorado Plateau.**

In the early 1990s, an initial application of the VERP framework was conducted at Arches National Park, Utah (Hof et al. 1994; National Park Service 1995; Manning et al. 1995; Manning, Lime, and Hof 1996; Manning et al. 1996). This work was supported by a program of natural and social science research designed to help formulate indicators and standards of quality (Manning et al. 1993; Lime et al. 1994; Belnap 1998). Initial social science research found that visitors were sensitive to the number of other people using the park, including the number of people encountered along trails and at attraction sites. Thus, the number of people at one time (PAOT) seen along trails and at attraction sites was adopted as an indicator of the quality of the visitor experience. A second phase of research focused on setting standards of quality. Several series of photographs were developed using photo-editing computer software to show a range of visitor-use levels at

selected trails and attractions throughout the park. Four representative photographs from the two series of 16 photographs used at Delicate Arch and North Window are shown in Figures 1 and 2. Representative samples of visitors were asked to judge the acceptability of these series of photographs. Study findings indicate that maximum acceptable levels of crowding vary among study sites. For example, the point at which aggregate visitor judgments of crowding become "unacceptable" is approximately 20 PAOT for North Window and is approximately 30 PAOT for Delicate Arch. These and related data provided an empirical basis for formulating alternative standards of quality and an associated array of recreation opportunities within the park.

More recent studies have begun to expand this research to other parks in the Colorado Plateau region (Lime et al. 2001). For example, representative samples of hikers to four Colorado Plateau parks—Arches National Park, Capitol Reef National Park, Colorado National Monument, and Natural Bridges National Monument—were asked to judge the acceptability of a series of 16 photographs showing a range of visitor use levels along a 100-meter section of trail representative of the high desert environment of the Colorado Plateau. Representative examples of these photographs are shown in Figure 3.

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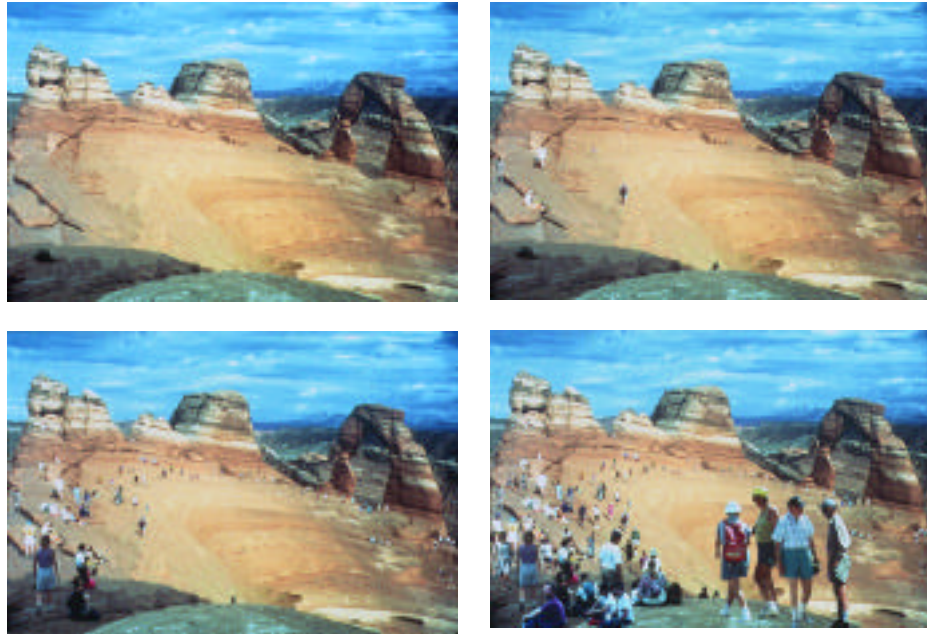


Figure 1. Sample photographs of a range of visitor-use levels (PAOT) at Delicate Arch.



Figure 2. Sample photographs of a range of visitor-use levels (PAOT) at North Window.

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Figure 3. Sample photographs of a range of visitor-use levels (PAOT) along a generic section of trail.

Study findings, as shown in Figure 4, suggest that visitors to all four park areas judge the acceptability of the photographs in a similar way. However, rather than manage all four parks at a similar crowding-related standard of quality (for example, in the range of 8 to 12 PAOT, the point at which aggregate visitor judgments of crowding cross the line from the acceptable into the unacceptable range), hiking standards in each park might be based on resource sensitivity, accessibility, or simply the management objective of providing a diverse set of recreation opportunities within a region. The data graphed in Figure 4 begin to provide an empirical basis for such decisions. For ex-

ample, PAOT-related standards of quality for the study parks might be set at any point in the “acceptable” range of the curves shown in Figure 4 (i.e., at any point between 0 and 8-12 PAOT).

Further studies have begun to refine this type of research (Lime et al. 2001). For example, representative samples of visitors to the four park areas noted above were asked to examine the series of 16 photographs of trail use described above and select the one that represented the maximum acceptable level of use. However, this series of questions incorporated four dimensions of “acceptability” (Manning et al. 1999). The first question asked: “Which photo-

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graph looks most like the number of people you would *prefer* to see at any

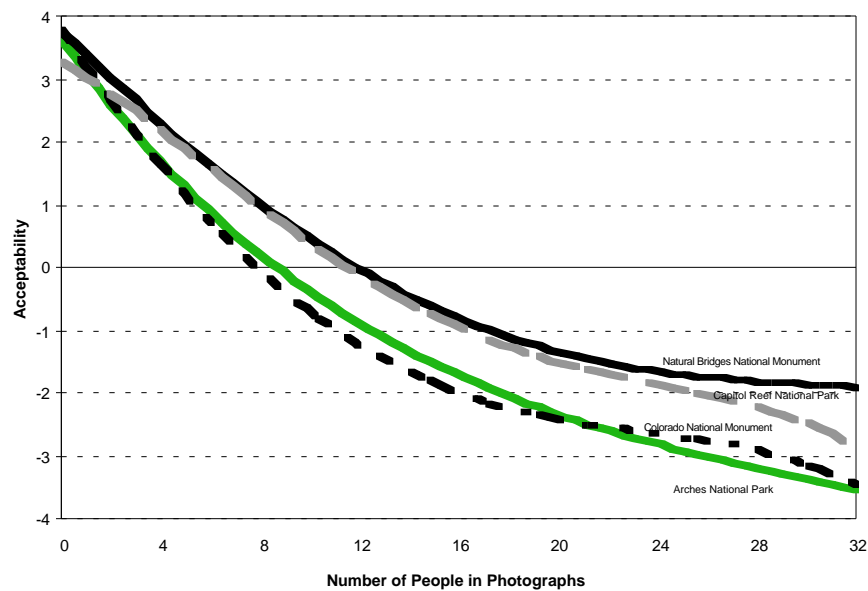


Figure 4. Visitor acceptability ratings of photographs of a range of visitor-use levels (PAOT) along a generic section of trail.

one time along this section of the trail?” (This dimension is called “preference.”) The second question asked: “Which photograph looks most like the highest number of people that you think is *acceptable* to see at any one time along this section of the trail?” (This dimension is called “acceptability.”) The third question asked: “Which photograph looks most like the highest number of people at any one time along this section of the trail that is *so unacceptable* that you would *end your hike sooner than planned?*” (This dimension is called “tolerance.”) The fourth question

asked: “Which photograph looks most like the highest number of people at one time that the National Park Service *should allow* along this section of trail?” (This dimension is called “management action.”)

Study findings are shown in Table 1, and once again suggest there is considerable similarity and consistency among visitor judgments of all four dimensions of acceptability across the four study parks. These data help provide an empirical foundation for formulating an array of crowding-related standards of quality and an associated spectrum of rec-

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recreation opportunities. Hiking in one or more parks, for example, could be managed for high levels of solitude (i.e., the “preference” dimension of acceptability) while other parks might provide hiking opportunities that are lower in solitude, but accommodate relatively large numbers of visitors (i.e., the “management action” or even “tolerance” dimensions of acceptability). In this way, a diverse spectrum of outdoor recreation opportunities might be provided within and among a regional system of parks.

**Boating on the Colorado and Green Rivers.** Recent research at Canyonlands National Park explored use and users of the Colorado and Green rivers system, including the four dimensions of acceptability (described in the previous section) towards seeing other watercraft (Warzecha et al. 1998). The Green River, which flows southward to merge with the Colorado River deep within the park, is a flatwater stretch that was found to be popular with canoeists and kayakers. The flatwater stretch of the Colorado River, north

of the confluence with the Green River, and Cataract Canyon, the whitewater stretch of the Colorado River below the confluence, were found to receive more commercial use (guided trips) and more motorized use than the Green River.

As an alternative to judging the acceptability of a series of photographs, representative samples of river users were asked to answer a set of questions addressing the four dimensions of acceptability toward seeing other watercraft: “About how many watercraft would you have *preferred* to see *today*?” (“preference”), “What do you think is the *maximum number* of watercraft that would have been *acceptable* to see *today*?” (“acceptability”), “What do you think is the *maximum number* of watercraft the National Park Service *should have managed* for you to see *today*?” (“management action”), and “What do you think is the *maximum number* of watercraft that you could see *today* before you would *consider not visiting* this river again?” (“tolerance”). On each day of their trip, using a diary format, river users were

Park	Dimensions of Acceptability			
	Preference	Acceptability	Management Action	Tolerance
Arches	5.5	13.2	23.3	18.2
Capitol Reef	8.2	11.8	13.7	23.2
Colorado NM	2.9	9.7	13.6	24.0
Natural Bridges	9.6	11.8	16.4	22.5

Table 1. Crowding-related standards of quality (maximum POAT along trails) using four “dimensions” of acceptability.

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asked to record a number of watercraft for each of the four questions as these questions applied to the specific stretch of river they had floated that day.

Study findings, shown in Table 2, indicate variations in acceptability for seeing other watercraft based on the stretch of the river system respondents were traveling. The data from river users provide support for developing a spectrum of recreation opportunities congruent with the resource and its users. For example, the maximum numbers of watercraft reported by Green River users, along with the physical characteristics of the river, suggest the potential appropriateness of managing that stretch for flatwater, nonmotorized, low-density recreation opportunities. In contrast, the maximum numbers of watercraft reported by river runners in Cataract Canyon suggest the appropriateness of that river stretch for whitewater, relatively high-density opportunities that provide an element of "safety in numbers" for a variety of watercraft types. This type

of research could be extended beyond park boundaries to complement larger-scale regional planning and management efforts for the Colorado and Green rivers system.

### Conclusion

Diversity is a desirable element of a system of park and recreation opportunities. Moreover, several conceptual frameworks have been developed in the scientific literature, including ROS and carrying capacity, to help encourage and guide efforts to plan and manage parks and related areas for diverse recreation opportunities. However, it is not feasible for any one park to provide a full spectrum of recreation opportunities. This suggests that efforts to meet the needs of a broad range of park visitors will require a regional approach to recreation planning and management that spans parks and even systems of parks and related areas.

Initial research on hiking and boating in parks within the ColoradoPlateau suggests that empirical data can be developed to support a

River stretch	Dimensions of Acceptability			
	Preference	Acceptability	Management Action	Tolerance
Green River flatwater	2.0	7.5	8.4	14.7
Colorado River flatwater	3.2	9.6	10.2	19.4
Cataract Canyon	3.6	11.1	11.5	24.1

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**Table 2. Crowding-related standards of quality (maximum number of watercraft) for a regional river system using four 'dimensions' of acceptability.**

regional approach to park and recreation management. At the park level, study findings helped planners and managers at Arches National Park design alternative recreation opportunities at major hiking-related attractions (National Park Service 1995). An extension of this research provides an empirical foundation for designing a broad spectrum of hiking opportunities across several National Park Service areas within the Colorado Plateau. Similar research is contributing to a new river management plan for Canyonlands National Park that specifies three distinct types of boating opportunities on the Colorado and Green rivers system.

The research described in this paper is clearly preliminary, and needs to be expanded to other elements of park and recreation experiences and other parks and geographic regions, and might be augmented by other research approaches. For example, the data described in this paper apply only to crowding-related issues. Both ROS and carrying capacity explicitly recognize that recreation opportunities are defined by a variety of resource, social, and managerial attributes. Empirical research should be ex-

panded to address a broader range of these attributes. Moreover, the studies outlined in this paper are limited to a few areas managed by the National Park Service within only one geographic area. Clearly, this research needs to be extended geographically by incorporating more parks, other geographic "clusters" of parks, and perhaps even regions administered by multiple park and recreation-related agencies. The recent administrative evolution of the National Park System into geographically-linked "clusters" of parks, along with the multi-agency nature of the evolving system of Cooperative Ecosystems Studies Units (CESUs), suggests enhanced feasibility for regional approaches to the research, planning, and management needed to design and maintain a diversity of visitor opportunities in and among parks.

Finally, analysis of regional supply of and demand for selected types of park and outdoor recreation opportunities, as suggested by McCool and Cole in a companion paper in this volume, would augment the usefulness of the type of data illustrated in this paper.



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## Conserving Recreation Diversity: Collaborating Across Boundaries

**T**he word “diversity” is defined as “the quality of variety” (Merriam-Webster 1991). Diversity has become an important concept and a highly desired characteristic in many aspects of our daily lives—financial portfolios, communities, classrooms, work places, and the natural environment. This paper discusses the concept of outdoor recreation diversity, the appropriate scale to plan and manage for diversity, factors that contribute to the loss of diversity, and ways to effectively collaborate across agency boundaries to provide and maintain diversity in outdoor recreation.

### **What is Recreation Diversity?**

Recreation diversity can be defined as the type, variety, distribution, quality, and abundance of outdoor recreational opportunities. Further, a “recreation opportunity” is defined as an opportunity for a visitor to participate in a type of recreation activity in a specific setting defined by its important physical, social, and management attributes, in order to realize a particular type of experience and subsequent benefits.

Figure 1 is a matrix for understanding recreation diversity. It borrows from the concepts of the recreation opportunity spectrum and recreation demand hierarchy (Driver and Brown 1978; Clark and Stankey 1979). The vertical continuum reflects the “setting” component of recreation diversity and is a spectrum ranging from an urban human-built setting to a remote natural setting.

The horizontal continuum reflects the “experiential” component of recreation diversity and includes the activity, experience, and benefit dimensions of a recreation opportunity. Thus, the conservation of recreation diversity requires due consideration of diversity in activities, settings, experiences, and benefits.

Figure 1 is also a visual representation to help understand demand for and supply of recreation diversity. On the demand side, an individual, family, social group, or community has a preference or demand for the package of recreation opportunities (i.e., activities, setting, experience, and benefits) they would like to participate in or have available. The demand for a particular recreation opportunity can be described and located along the desired portion of the opportunity spectrum.

On the supply side, Figure 1 is

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useful to array the current or existing recreation opportunities being provided by the public, private, and non-profit sectors. This can be useful to help the recreation providers define their niche and appreciate their important contribution, to see the system of diverse opportunities in an area, and to identify what demand might be unfulfilled and an opportunity for some potential provider.

Figure 1 can also help to visually understand and track past and future change in recreation diversity. Individuals, families, age cohorts, social groups, communities, and regions evolve in their recreation interests and participation. Recreation change is to be expected, and change is af-

ected by trends, fads, affluence, age, health, interests, skills, economics, popularity, management interventions, population shifts, ethnicity, and many other factors. In some instances, change is a natural and appealing part of personal growth and choice, while in others, it is a misfortune because it precludes options and freedoms. The former is commonly referred to as "recreation succession"; the latter, "recreation displacement." The best examples of succession and displacement can be found by reflecting upon how the reader's personal recreation interests and participation have evolved over the years.

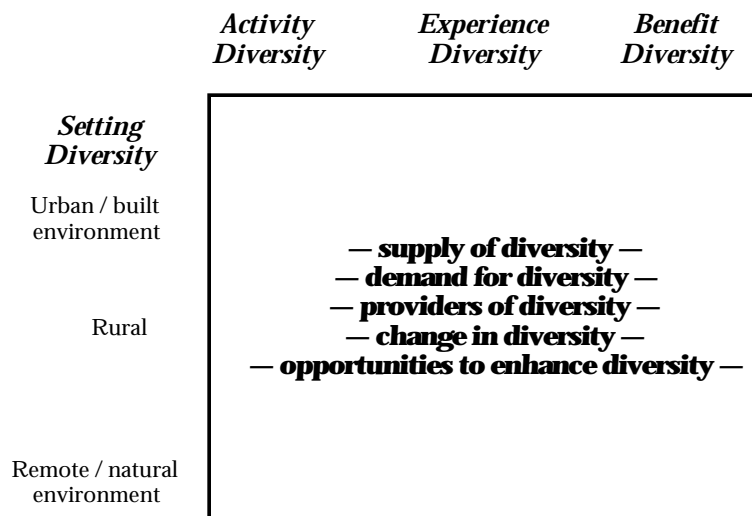


Figure 1. A matrix for conveying recreation diversity.

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### The Goal of Recreation Diversity

The conservation of recreation diversity should be a national goal because of the profound and significant benefits that accrue to individuals, communities, and the nation from outdoor recreation and nature-based tourism. These benefits are diverse and have been well chronicled (Driver 1999), including physical exercise, increased self-confidence, self-actualization, leadership, creative expression, inspiration, humility, reduced hypertension, family bonding, community identity, economic impact and growth, environmental stewardship, increased environmental knowledge, biological diversity, respect for other cultures and times of history, and personal happiness. Furthermore, the vast diversity of tastes and preferences among Americans, coupled with the desire to make outdoor recreation opportunities available to all, adds justification for the conservation of recreation diversity.

Conserving recreation diversity will require recreation planning and management to embrace several more specific operational goals:

- Plan for an integrated system of diverse recreation opportunities involving the collaborative efforts of the private sector, non-profit sector, and local, state, and federal governments;
- Manage and maintain the integrity of the natural and cultural resources, and the integrity of the

recreational opportunities for which the area was planned or intended to provide;

- Monitor, learn, and adapt in order to achieve a balance between recreation supply and demand, while maintaining the integrity of the resource.

### The Appropriate Scale for Planning for Recreation Diversity

An appropriate scale of analysis is one that assures adequate consideration of all factors important to the purpose of the analysis (CEQ 1993). Theoretically, the scale could range from a site to a management unit or zone, region, nation, or beyond. The appropriate scale should be large enough to include all parts of the system in question, while recognizing that all scale levels are interconnected and require due consideration. For example, biologists manage wildlife in the context of a species' home range, hydrologists manage a river in the context of its watershed, and ecosystem managers plan in the context of bioregions.

Thus, it is proposed that the appropriate scale to plan and manage for recreation diversity is the "visitation range." A visitation range is a geographic area which has (a) a recognizable recreation identity, character, or sense of place; (b) a variety of primary and secondary destinations, recreation and tourism providers, communities, travel routes, and support services; and (c) is generally of a size that requires an extended

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stay or repeat visits to fully appreciate. The appropriate scale will be larger than a site, zone, management unit, or any single administrative agency. It will be a geographic area comprising private, non-profit, and public providers of recreation opportunities, along with support services related to marketing, retail, medical, food service, and others. Examples of a visitation range might include the Adirondacks, Poconos, Outer Banks of North Carolina, Ozarks, Black Hills, Four Corners area in the Southwest, Columbia River Basin, Michigan's Upper Peninsula, and Greater Yellowstone area.

### **Reasons a Regional Scale Can Help Conserve Recreation Diversity**

The conservation of recreation diversity will require collaborative planning and management at a regional scale, or, more specifically, at a visitation range scale. This scale will not be easy to implement, and, without more experience and empirical evidence, there needs to be reliance on what has been learned from such fields as urban, land-use, and transportation planning. A regional scale will help conserve recreation diversity because it:

- Allows a more holistic view of the recreation system and of the connectivity among providers and opportunities across the visitation range;
- Helps build a socially and politi-

cally powerful regional alliance of stakeholders;

- Helps planners and managers see a larger visitor population than just today's on-site visitor, including those previously displaced local visitors or those who have the will but not the way;
- Allows for a spatial and visual representation of a recreation system, which benefits such purposes as mapping, inventory, simulation, transportation modeling, displaying alternatives, visitor itinerary planning, and public communications;
- Helps managers understand the importance and complementary role or niche of each collaborating provider, and strengthens the resolve of individual managers to maintain the integrity of the collective system;
- Helps build a "seamless" regional delivery system of recreation opportunities through a coordinated and consistent program involving such elements as marketing, message development, public education, interpretive services, visitor management policies, scheduling of special events, construction projects, area closures, and visitor reservation or limitation systems;
- Helps the visiting public become more discerning in deciding among the available recreation opportunities (i.e., type, location, distance, costs, other factors);
- Helps identify private-sector in-

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vestment opportunities to develop and manage recreational or supporting services;

- Helps to fairly and equitably distribute recreation opportunities, benefits, costs, and impacts among communities, businesses, and local residents (i.e., helps achieve distributive and environmental justice);
- Helps planners and managers consider recreational opportunities and benefits for the least-advantaged and -engaged publics (i.e., helps achieve social justice);
- Helps increase the efficiency, effectiveness, and support for inter-agency regional efforts such as marketing, facility maintenance, volunteer programs, fund-raising, monitoring, and scientific study;
- Helps identify the type and location of sensitive, unique, highly valued, or at-risk natural and cultural resources, at-risk recreation opportunities, and locations for restoration and rehabilitation;
- Helps identify locations to expand, reduce, alter, or restore a particular type or amount of recreation opportunity;
- Helps identify important future resource acquisitions in order to increase or protect supply of available opportunities (e.g., land acquisition, water rights, development rights, easements);
- Helps justify recreational constraints in a specific location, when a reasonable set of recreation

choices, freedoms, and options are still accessible;

- Helps mitigate the imposition of visitor limits when capacity of an area is threatened or exceeded, by identifying similar or alternative opportunities, alternative locations or times, and staggered or sequenced limits; expanding the supply of opportunities in the region; developing a real-time visitor-use and -capacity information system; and by other means;
- Helps locate current or future land-use conflicts, and to determine how to spatially mitigate and consider tradeoffs (i.e., recreation restoration, conservation easements);
- Helps to anticipate and understand where and what change is taking place in the system, how it will affect other components, and how to respond.

### Factors Contributing to the Loss of Recreation Diversity

The factors contributing to the loss of recreation diversity are daunting, and give pause to the reasonableness of a national goal of recreation diversity. Yet, there are signs of change, and we can best prepare and affect change by understanding factors impeding it.

**Fragmentation.** Planning and managing at a site- or unit-scale level has value, but the conservation of recreation diversity requires a larger landscape scale. A recreational expe-

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rience begins before people arrive at a specific site or jurisdiction, and continues upon departure. Visitors visit more than a site, and thus the concept of a visitation range. Yet, each individual agency understandably focuses on its own domain of responsibility, thus causing geographic fragmentation and affecting the connectivity among other recreational opportunities and support services needed to assure a quality visit.

There is also recreation opportunity fragmentation. First, there is a tendency to take a singular activity planning approach without due recognition that visitor participation is often multidimensional. Visitors often have several primary and secondary activities, along with different settings, that they desire to experience. Second, there is a tendency to define a recreation opportunity as simply a recreation activity, although the profession recognizes that a visitor will participate in a specific activity in a particular setting in order to realize a particular experience and subsequent benefits.

**A maturing recreation profession.** A mature profession is one that has coalesced around a basic set of values, concepts, terms, and tools. The recreation profession, and more specifically public land agencies, are not at this point. There remains much discussion and debate about many fundamental elements: how do we define "recreation," what are the benefits of recreation and tourism,

how to measure demand and supply, are we managing for an activity or an experience, should we measure recreation capacity, what is an "appropriate" activity, how do we define a "recreation experience," how do we determine and manage different segments of recreation visitors, what should go into a management plan, what planning process should be used, what should be our guiding principles, and so forth.

**Expanding built environments and infrastructure.** The USA's population is expanding and so is the size of the human footprint. While the space being allocated to homes, factories, highways, and schools is understandable, the net effect is a loss of potential diversity for outdoor recreation and nature-based tourism opportunities.

It is common to hear about population shifts, urban development, loss of agricultural land and open space, and urban sprawl. This phenomenon is both a bane and blessing for recreation diversity. There are many examples of urban redevelopment projects which have brought outdoor recreation opportunities back to urban residents. Urban rivers and coastal areas have been restored, near-urban agricultural operations are being protected through conservation easements, community development ordinances now often require mitigation of environmental losses, and subdivision developments are being planned with



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open space and recreational opportunities. With due diligence, expanding built environments and infrastructure can be an asset to recreation diversity.

**Resource loss, deterioration, and change.** Changes in the type, variety, distribution, quality, and abundance of natural and cultural resources are inevitable. With changes in resources will come changes to recreation diversity. While natural change is to be expected and is desirable, it is the unnatural or human-induced change that is of particular concern.

The scale of resource loss or deterioration can range from large airsheds, viewsheds, watersheds, and fisheries, to individual plants, animals, campsites, and spiritual sites. Many types of recreation opportunities are dependent on specific natural and cultural resources, and thus, when resources are at risk, recreation opportunities are at risk.

**Imbalance in recreation demand and supply.** It was noted earlier that our current measurement tools are not adequate to assess recreation demand and supply. Current assessments focus on specific activities, facilities, and acreage, and do not reflect the demand or supply of settings, experiences, or benefits. This measurement limitation will affect diversity.

Another imbalance is the uneven geographic distribution of recreation facilities. Of course, some distribu-

tion is a function of where the resources are, but other distribution factors can include past historical use, unplanned recreation developments, local community interests, the existence of willing sellers, political interests, and agency tradition.

There are many examples of imbalances in visitation, both over time and space, such as among park campgrounds over the summer weekends. Visitor conflicts and overcrowding are common indicators of an imbalance. This imbalance can have a direct effect on the type and quality of the desired recreation opportunity the area is being managed for. Without a visitor capacity that numerically defines how many visitors an area can accommodate, the intended recreation opportunities are at risk (Haas 2001).

**Competing and conflicting land uses.** The desired goods, services, values, and opportunities that the public wants from resources are expanding and changing. By analogy, more and more people want a piece of their pie. There was a time when the size of the pie could feed everyone, but that is no longer the case. We increasingly must decide who gets to sit at the table, who eats first, and who gets what size and part of the pie.

Natural resource planning has become a basic allocation exercise. Twenty years ago, the allocation issue focused across such products and services as recreation, timber,

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grazing, mining, and wildlife. Today, recreation allocations must consider not only other traditional land uses but also the many diverse and evolving recreation interests and opportunities. New technology, such as motors and climbing equipment, new values, such as the desire for natural soundscapes, and new land-use designations, such as nontraditional national monuments, require a level of adaptive management that is beyond our capability to respond to. Increased competition, conflict, and complexity are factors working against the conservation of recreation diversity.

### **Insufficient marketing, public information, and visitor education.**

The actual provision of diverse recreation opportunities will be for naught unless the public is aware of and understands their choices. The public can be discerning visitors if they have enough information to understand their choices and available combinations of opportunities. Public- and private-sector coordination on a comprehensive marketing and information system is important to the conservation of recreation diversity.

Likewise, visitor behaviors can contribute to the loss of recreation diversity (e.g., large group sizes, loud music or generators, litter or human waste, walking in fragile areas). Public education programs can help visitors understand how they can have a low impact on the resources

and other visitors, and how they can help management leave the area better than when they arrived.

**Fee-based recreation management.** The federal government has initiated the Federal Recreation Fee Demonstration Program, which includes increased use of fees paid by visiting recreationists. The program has been well received by visitors and managers alike, in part because some 80% of the revenue remains with the administering unit of collection. These monies are combined with annual appropriations to finance operations. The danger lies in management becoming complacent and dependent on these monies, and making “hard” and long-term commitments on what are, in effect, “soft” monies. A danger lies in favoring those recreation opportunities that maximize net revenues, thus shrinking recreation diversity.

**Insufficient monitoring, science, and adaptive management.** The number of academically trained recreation professionals employed in federal management agencies is very small, as are the resources allocated to recreation planning, management, and science. The extent and quality of monitoring is also very small, with a recent federal interagency workshop estimating that less than 5% of parklands, forest, refuges, and rivers having any monitoring effort. Moreover, agency and academic science programs are often not aligned with management needs and the re-

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wards to the scientific community for field monitoring and technology transfer can be low. Lastly, adaptive management is a relatively new concept, and the practicality of adapting plans and programs given new information will take some time to be accepted. These factors will contribute to the loss of recreation diversity.

### Recommendations for Working Across Agency Boundaries

Efforts to work across agency boundaries on recreation-related issues seem to be increasing. Examples include the National Recreation Lakes Study Commission, Interagency Council to Protect Wild and Scenic Rivers, Interagency Task Force on Visitor Capacity on Public Lands, and the Advisory Council on Historic Preservation.

Of particular relevance to this section has been the work of Interagency Ecosystem Management (IEM) Task Force (1996). Former Vice President Al Gore advanced a National Performance Review, which called for federal agencies to adopt a proactive approach to ensuring a sustainable economy and environment through ecosystem management. In response, the IEM Task Force was initiated in 1993 to test the efficacy of an ecosystem approach in seven demonstration projects: Anacostia River watershed, Coastal Louisiana, Great Lakes basin, Pacific Northwest forests, Prince William Sound, South Florida, and

Southern Appalachians.

Table 1 contains recommendations for working across agency boundaries, based primarily upon the finding of the IEM Task Force and the author's personal experience as chairperson of the federal Interagency Task Force on Visitor Capacity on Public Lands.

### Conclusion

The wisdom of the conservation of recreation diversity through a regional planning approach is not new. In 1928, federal and state leaders convened the National Conference on Outdoor Recreation. The conference outlined the elements of a federal recreation policy that included the following:

The initiation, through inter bureau cooperation, of regional studies and planning to determine the policy which should govern forms of use, occupancy and management which will most completely realize the potential educational, scientific, inspirational and recreational values of the national parks and forests (National Conference on Outdoor Recreation 1928, 140).

In 1962, the Outdoor Recreation Resources Review Commission proposed the following management guideline:

All agencies administering outdoor recreation resources—public and private—are urged to adopt a system of classifying recreation lands designed to make the best possible use of available resources in the light of the

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### **Federal Agency Coordination**

- Get effort authorized and endorsed by the Administration, Congress, governors, mayors
- Garner strong top-down support and encouragement for new thinking
- Encourage regular collaboration among high-level decision-makers
- Establish strong technical recreation-planning support with people committed to new ways
- Create joint planning structures, such as task forces, central offices, and joint staffing
- Decentralize and delegate appropriate authority and resources to interagency structure
- Consider boundary adjustments or reciprocal shifts in responsibility

### **Partnerships with Nonfederal Stakeholders**

- Develop a shared regional vision (avoid imposition of federal vision)
- Assure full and equal participation with private, non-profit, and public sector
- Amend the Federal Advisory Commission Act to accommodate an easier exchange of views, information, and advice
- Establish advisory committees for large regional projects
- Offer technical assistance to private sector involved with planning effort
- Encourage local grassroots efforts to collaborate as full partners

### **Communication with the Public**

- Develop communication plan and educational materials
- Train employees in collaborative planning, community relations, and public education
- Develop interagency communications teams and go to the communities
- Use the thoroughness and legal sufficiency of the National Environmental Policy Act process
- Monitor and evaluate public collaboration effort throughout process

### **Resource Allocation and Management**

- Coordinate budget proposals to parallel cooperative roles
- Consider a new budget structure or organization if it would be to advantage
- Integrate field-level managers in budget planning and look long-term
- Use short-term personnel exchanges to infuse new ideas, skills, and increase flexibility
- Consider pooling budget and personnel for large complex efforts

### **Role of Science**

- Support regional natural and social science teams
- Translate science to everyday language and reward technology transfer efforts
- Develop standards for monitoring and scientific studies
- Use external scientific and expert panels for advice and recommendations
- Monitor all efforts as requisite to adaptive management
- Ensure that research programs address primary ecosystem values, and are responsive to change

### **Information and Data Management**

- Create a system for data sharing
- Collaborate on regional data collection and management activities

### **Flexibility for Adaptive Management**

- Develop common monitoring and evaluation standards and procedures
- Provide sufficient incentives, authority, and responsibility for adaptive management
- Make long-term commitments to fund necessary monitoring and research

**Table 1. Recommendations for crossing agency boundaries.**

needs of people. Present jurisdictional boundaries of agencies need not be disturbed.... Implementation of this system would be a major step forward in a coordinated national effort. It would provide a consistent

and effective method of planning for all land-managing agencies and would promote a logical adjustment of the entire range of recreation activities to the entire range of available areas (Outdoor Recreation Re-

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sources Review Commission 1962, 7).

Today, there remains little institutional leadership and activity in multi-jurisdictional regional recreation planning. While many public land recreation managers and planners speak to its need, the authority and support is absent.

Two recommendations might help resolve this dilemma. First, since the early 1960s, state park and recreation agencies have been developing Statewide Comprehensive Outdoor Recreation Plans (SCORPs) in response to the funding requirements for the Land and Water Conservation Fund Act. These plans are, of course, constrained by political boundaries and have largely lacked the collaborative planning spirit popular today. Nevertheless, some 30 years of large-scale statewide recreation planning should provide many insights. There would be merit for the Secretary of the Interior to authorize a national blue-ribbon program evaluation to determine what lessons and benefits have accrued from SCORP planning.

Second, the seven ecosystem management demonstration projects

previously mentioned were selected because they encompass traditional land uses, including timber production, fisheries, grazing, agriculture, and watershed management. We learned a great deal from this effort. Given the magnitude—and in many cases, the dominance—of the social and economic benefits rural America derives from recreation and tourism, a demonstration project is needed to determine if similar benefits accrue to a service industry dependent on public natural and cultural resources. There would be merit for a presidential Executive Order or congressional direction to implement a similar demonstration project for outdoor recreation and nature-based tourism, perhaps fittingly called the Outdoor Recreation Resources Regional Planning (ORRRP) Demonstration Project.

Recreation diversity, or the quality of recreation variety, is a strength and a profound benefit to American society. Yet today, even with some 75 years of notice, the conservation of recreation diversity is at risk unless we expand our scale of vision and collaborate across boundaries.

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## Crossing Programmatic Boundaries: Integrative Approaches to Managing the Quality of the Visitor Experience

**T**raditional approaches to organizational theory suggest that as organizations initiate new programs and grow in size, they must divide work into specific jobs and employ new specialists to achieve desired goals (Hage 1965; Hage and Aiken 1967; Lawrence and Lorsch 1967; Thompson 1961). Termed “complexity” or “specialization,” this process has characterized development of most organizations, including the National Park Service (NPS). For example, during the tenure of the agency’s first director, Stephen Mather, the NPS created at least nine administrative branches (Olsen 1985). By 1980, the agency had established ten different operating regions and over 41 mid- to high-level administrative entities (Olsen 1985).

Along with specialization, however, organizational theory recognizes the need for integration across specialized job types, or programs. A number of scholars have addressed this issue. For example, Lawrence and Lorsch (1967) conclude that organizations in diverse fields must be highly specialized and highly integrated. Hall (1980) argues that complex organizations face the problem of integrating diverse ideas from different organizational members. Hall’s “problem” reflects the challenge of balancing the need for specialized job functions as well as integration as the “key management problem of the 1990s and beyond”

(Banner and Gagne 1995). Ashkenas et al. (1995) conclude that although specialists are still needed, their ability to function as an “integrated whole” is necessary to achieve desired goals.

The inherent tension between specialization and integration is manifested in all complex organizations, including the NPS. As noted above, NPS has been organized and subdivided into many programs, all of which are designed ultimately to pursue the agency’s two-fold mandate in the Organic Act: to protect natural and cultural resources of the National Park System, and to provide for visitor enjoyment and appre-

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ciation of this system of parks and related areas. It may seem ironic that no one organizational entity of NPS is directly responsible for accomplishing either of these mandates, particularly the latter. This suggests that the agency may be wise to search for ways to integrate across programs for purposes of efficiency and, ultimately, to further its most fundamental mandates. This paper briefly describes several examples of ways in which NPS programs might be integrated more closely to manage visitor use and protect the quality of the visitor experience.

### **Carrying Capacity: Development and Application of the Visitor Experience and Resource Protection Framework**

The increasing popularity of outdoor recreation and the national parks has led to concerns about the impacts of rising visitation. Initial concerns focused on impacts on environmental resources. However, it soon became clear that the quality of the recreation experience was affected too. In his monograph titled "The Carrying Capacity of Wild Lands for Recreation," Wagar (1964) noted that increasing visitor use affected not only environmental resources, but quality of the visitor experience as well. The notion that there is some type and level of visitor use beyond which the quality of natural resources and the recreation experience diminishes to an unac-

ceptable degree forms the basis of the concept of carrying capacity. Based on this concept, a number of planning and management frameworks that address carrying capacity have been developed.

The visitor experience resource protection (VERP) framework has recently been developed by NPS (National Park Service 1997; Manning 2001). Under the National Parks and Recreation Act (1978), NPS is required to address carrying capacity issues in park general management plans. VERP provides the logic and rationale for making carrying capacity-based decisions. It comprises a series of nine iterative steps, the main elements of which are description of desired future conditions for park resources and visitor experiences; identification of indicators of quality of visitor experience and resource conditions; establishment of standards that define minimum acceptable conditions; formulation of monitoring procedures to determine if and when management action must be taken to keep conditions within standards; and development and implementation of management actions to ensure all indicators are maintained within specified standards. VERP may be viewed primarily as a planning framework, but it is also a monitoring and management framework, and will require consideration, assistance, and implementation by many NPS program areas if it is to be fully successful.



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In this paper we explore potential integrative relationships between VERP and two other programs within the NPS: transportation and the Natural Resource Challenge. Coordination—"crossing boundaries"—among these programs may lead to more efficient and effective visitor management and protection of the quality of the visitor experience.

### Transportation Planning

Transportation planning within national parks dates back to the early 1870s and the creation of Yellowstone National Park. The railroads promoted Yellowstone, realizing that more visitors meant greater revenues. This policy was supported by early preservationists who appreciated that political support for parks would increase only if people could access them. Later, as automobiles became commonplace, these too were increasingly allowed into parks. In 1914, Yosemite National Park received fewer than a thousand cars. Within two years this figure grew to nearly 15,000. Today, hundreds of millions of visitors enter the National Park System by automobile, and this raises a number of management challenges. Park access has been limited or impaired due to traffic congestion, adversely affecting park resources and the quality of the visitor experience. Further, there are limited opportunities for nonmotorized travel or alternative transportation modes.

In 1997, the Secretary of Interior and Secretary of Transportation signed a memorandum of understanding (MOU) addressing transportation issues in national parks. Under this MOU, the two departments were to work together to reduce traffic-related noise, congestion, and pollution, as well as parking shortages in the parks. One of the strategies outlined involved the development of alternative transportation systems.

Alternative transportation systems may mitigate traffic congestion, alleviate parking problems, reduce adverse effects of vehicular traffic on sensitive resources, and offer possibilities for interpretation and information dissemination. However, such systems could potentially affect carrying capacities of parks by altering the number and distribution of visitors at attraction sites within the parks. Variations in fleet size of alternative transportation systems (number of vehicles in fleet and capacity of each vehicle), scheduling, and routing are ways in which transportation systems can affect carrying capacity. This is illustrated in the following example.

In a study of carrying capacity in Yosemite Valley, visitors at the base of Bridalveil Fall were asked questions regarding park conditions that added to or detracted from the quality of the visitor experience (Manning et al. 1999). The number of persons at one time (PAOT) at the

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fall emerged as an important indicator of experiential quality. Visitors were also asked a series of questions about the maximum acceptable number of people at this site. Using these data, managers have an empirical basis to help formulate standards of quality and, ultimately, carrying capacity.

Using a computer-based simulation model of visitor use at this site, PAOTs were plotted against time in minutes as a simulated summer day progressed. Figure 1 shows PAOTs during a representative simulation model run for a typical summer day. The line graph indicates the numbers of visitors the model estimates at the fall at one time through a simulated day. The model records the number of people at the fall each time a simulated visitor enters or leaves the area. In this way, the model predicts the number of other visitors each visitor would see while viewing the fall. Therefore, there are more data points when the simulated fall viewing area has a larger numbers of simulated visitors. The mean PAOT (69) is represented by a horizontal line. By keeping constant the total number of daily visitors to the fall, variations in the rate of delivery of persons were simulated, and PAOTs were again plotted against time. Results indicate that variations in the rate of delivery of persons led to sub-

stantive changes in average PAOT at the fall. Figure 2 shows PAOT conditions with visitors delivered in large groups every 30 minutes, as they might be with a public transit system such as buses. Here, mean PAOT dramatically increased to 98. Figure 3 indicates PAOT conditions when visitors were delivered in smaller, more frequent groups every 7.5 minutes, as they might be using smaller buses or vans. Here, the mean PAOT dropped to 62.

These results suggest that PAOT, which is a salient indicator of the quality of visitor experience, is transportation-dependent. Infrequent, large groups can increase average PAOT, thereby decreasing carrying capacity. More frequent, moderately sized groups, can decrease average PAOT, thereby increasing carrying capacity.

There appears to be a potentially strong relationship between carrying capacity and transportation planning. Transportation systems, depending on how they are designed and operated, can increase or decrease social carrying capacity, and may affect resource-based carrying capacity as well. Carrying capacity-related information can be used to help design more informed transportation systems. Clearly, integration between carrying capacity-related programs and transportation-

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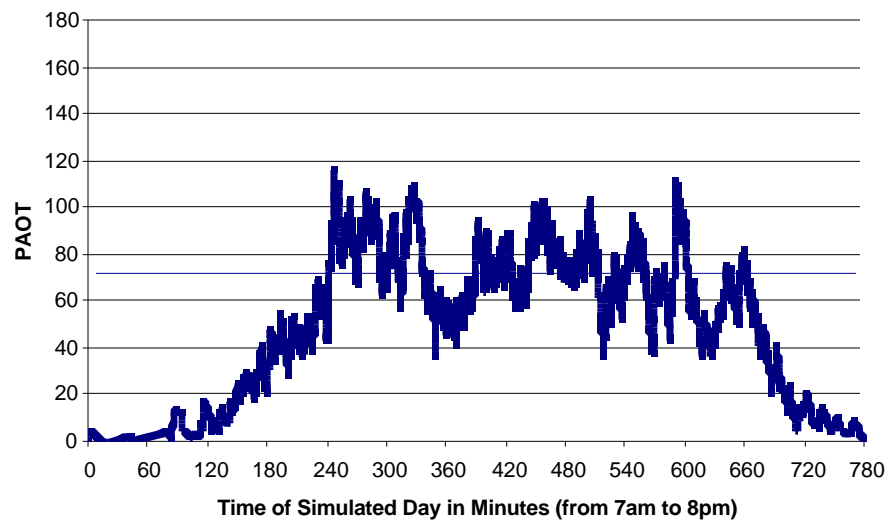


Figure 1. Simulation of current conditions at the base of Bridalveil Fall.

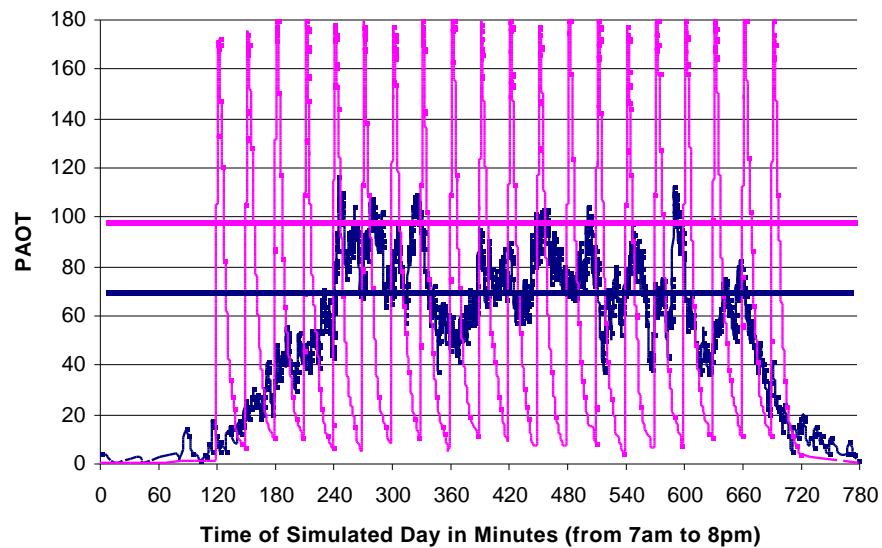


Figure 2. Simulation of current conditions and 30-minute scheduled alternative transportation system at the base of Bridalveil Fall.

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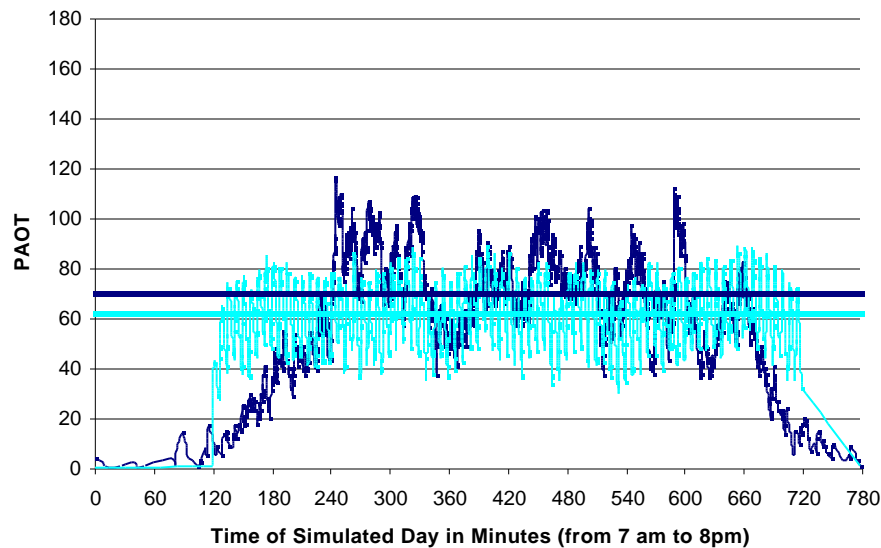


Figure 3. Simulation of current conditions and 7.5-minute scheduled alternative transportation system at the base of Bridalveil Fall.

related programs is warranted.

#### Natural Resource Challenge

Effective park management requires knowledge of current conditions of natural resources. Increasing park-use levels, as well as other cross-boundary pressures such as invasive species, air/water pollution, and incompatible resource use, have led to environmental resource degradation and associated impacts on the quality of the visitor experience. Protecting such resources requires an understanding of plants, animals, ecosystems, and their interrelationships, along with knowledge about current natural resource conditions. In order to do so, however, managers

must inventory and monitor these resources. NPS policy provides the institutional mandate to inventory and monitor current resource conditions. For example, the National Parks Omnibus Management Act (1998) states that the Secretary of the Interior "shall undertake a program of inventory and monitoring of National Park System resources to establish baseline information and to provide information on the long-term trends in the condition of National Park System resources."

In August 1999, NPS created a new initiative, the Natural Resource Challenge. The Natural Resource Challenge is a strategic action plan aimed at balancing resource preser-

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vation with park visitation and facilities development. It envisions that all park units that contain significant natural resources will possess the basic resource information needed for effective, scientific management decisions and resource protection. The plan outlines the need for “inventorying natural resource conditions, monitoring how those conditions change over time, and developing standards to evaluate changes in condition and the effectiveness of management actions” (National Park Service 1999b, 10). Inventories will provide baseline information about natural resources, while monitoring will track any changes to these resources.

With nearly 400 park units—and limited staff, budget, and time—such an exercise is a formidable task. It is impossible to inventory and monitor all natural resources in a park. However, by selecting a set of vital indicators that best meet management and monitoring objectives, it is possible to evaluate changes in resource conditions and the effectiveness of management actions. This is where integration with a program like VERP may be beneficial.

VERP and the Natural Resource Challenge share a number of common elements. Both require that indicators of resource or experiential quality be identified and selected, standards of resource and experiential quality be set, and indicators be monitored. Managers can therefore

potentially use the VERP framework to help formulate indicators and standards of resource quality. They may also use the Natural Resource Challenge to help monitor indicators of quality to ensure that standards are maintained.

### Conclusion

Specialization, subdivision, and creation of new programs are ways that organizations typically deal with growing responsibility and complexity. However, there can be a natural tension between proliferation of programs and accomplishment of fundamental organizational mandates. Over the years, NPS has created a number of programs that are ultimately designed to further its twofold mission of protecting significant natural and cultural resources and providing opportunities for high-quality visitor experiences. Consequently, there are significant opportunities to integrate these programs in ways that will most efficiently and effectively further agency objectives. This paper is suggestive of such opportunities.

Integration across programmatic boundaries may be especially warranted with regard to visitor-use management and protection of the quality of the visitor experience. No organizational entity or program within NPS has been explicitly assigned the overall responsibility for visitor use management. There are specific programs for natural and

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cultural resource management, but across agency programs that relate to not for the visitor experience component of the agency mandate. visitor-use management and the quality of the visitor experience may Therefore, efforts to coordinate be especially needed and productive.

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