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Human Dimensions of Natural Resource Management:

Emerging Issues and Practical Applications

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Workshop
February 1-3, 2000
Earle Brown Center
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Acknowledgments

Seventy-six managers, researchers, and administrators met at the University of Minnesota February 1-3, 2000, to discuss human dimensions issues confronting decisionmakers in Region 3 of the U.S. Fish and Wildlife Service (USFWS) as well as other public land management agencies in the Midwest. In the Human Dimensions of Natural Resource Management workshop, the primary objective was to identify, describe, and begin to prioritize critical social issues in need of solutions. Another workshop objective was to educate participants about new research and ideas concerning human dimensions and resource management.

The workshop was collaboratively sponsored and funded by the USFWS, the U.S. Geological Survey-Biological Resources Division (USGS-BRD), and the University of Minnesota, College of Natural Resources and Agricultural Experiment Station. Particular acknowledgment for aiding in the funding of the workshop goes to William F. Hartwig, Regional Director, Region 3, USFWS; Ronald Kirby, Center Director, Northern Prairie Wildlife Research Center, USGS-BRD; and B. Ken Williams, Cooperative Research Units Program, USGS-BRD.

The workshop was planned by an interagency committee composed of members from the sponsoring partners—USFWS-Region 3, the USGS-BRD, and the University of Minnesota. In April 1999 the steering committee began to guide the development and execution of the workshop. Committee members included: Joan Guilfoyle, John Schomaker, Rick Schuldt, and Tom Worthington from Region 3, USFWS; Rod Sando, USFWS and MN Department of Natural Resources; and Dorothy H. Anderson, David C. Fulton, David W. Lime, Kristen C. Nelson, and Jerrilyn L. Thompson from the University of Minnesota, College of Natural Resources.

The organizers and sponsors of the workshop express their sincere appreciation to all the participants who took time to attend and take part in the workshop discussions. Particular acknowledgment goes to the authors and coauthors that presented a session and prepared papers for these proceedings. Their presentations at the workshop and papers reflect a wide range of experiences concerning human dimensions of natural resource planning and management. The free exchange of ideas at the workshop led to a lively dialogue and contributed greatly to the development of a prioritized list of information and research needs that would aid resource management now as well as in the years ahead. These needs are specified in the first paper.

We would like to thank staff and graduate and undergraduate student volunteers for helping facilitate the nominal group sessions and taking notes during the workshop. Thanks to Cynthia Warzecha, Research Fellow; Joanna Rosendahl, undergraduate research assistant; and to graduate students Leigh Currie, Erin Dougherty, John Epton, Tom Fish, Samantha Hayes, E. B. James, Chad Pierskalla, and Liz Weaver

for serving as session and room hosts and “other duties as assigned.” You helped make this successful workshop!

A special thanks is due to Jerrilyn Thompson in the Department of Forest Resources and Teri Kanikula in the Department of Fisheries and Wildlife at the University of Minnesota for taking leadership in making arrangements and coordinating all phases of the workshop and preparation of these proceedings for publication.

Special thanks also is due to Clara M. Schreiber, Word Processing Supervisor in the Department of Forest Resources, who helped design the layout of this publication and reformatted and retyped all of the papers appearing herein.

Priority Issues and Future Directions in Human Dimensions Research[1]

David C. Fulton, Kristen C. Nelson, Dorothy H. Anderson, and David W. Lime[2]

Introduction

Workshop goals were twofold: (1) to identify, describe, and begin to prioritize research issues related to social, or "human dimensions," that confront managers and decision makers in Region 3—U.S. Fish and Wildlife Service (USFWS), and (2) to provide background information about human dimensions for USFWS employees and their colleagues from other federal and state natural resource and environmental management agencies.

Human dimensions research is the application of social science theory and methods to help understand the cultural, sociological, psychological, economic, biological, and physical aspects of natural resource management and environmental problem solving. During the past 30 years, there has been a growing interest in the human dimensions of natural resources due to fundamental changes in the management environment. For example, natural resource managers face an increasingly complex management environment that now includes many diverse public stakeholders who demand an active role in planning and decision-making. Also, natural resource agencies typically have a dual mission of protecting resources while providing benefits to the public. For such reasons, most natural resource managers are now aware that solving natural resource issues requires understanding the sociopolitical environment as well as understanding biological and ecological principles.

Despite the recognition that human dimensions information is important to managing natural resources, most natural resource professionals still lack specific answers to the practical question, "What can human dimensions information and research do for me?" The papers and other information presented in this volume begin to answer that

[1]Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime, eds. 2000. Priority issues and future directions in human dimensions research. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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question and provide future direction for natural resource professionals who want to begin integrating social science information into planning and decision-making.

Workshop organization

The workshop was organized around two thematic areas: *Human Dimensions of Visitors' Issues* and *Human Dimensions of Community Issues*. The first day of the workshop was devoted to the visitors' issues theme, while the second day focused on community issues. Plenary presentations each morning focused on providing an overview of research and knowledge gaps related to each principal theme. These presentations provided a starting point for small group discussions facilitated through a modified nominal group process to encourage discussion on the topic. The objective of these small group discussions was to identify USFWS research needs within each workshop theme. Following each small group session, workshop participants were reconvened and a representative of each small group presented a summary of the group's ideas.

The workshop afternoons were devoted to concurrent presentations that provided more in-depth discussion about topics introduced during the plenary presentations. While these sessions varied in format, each focused on issues and applications pertinent to that day's thematic area. The panel session on the final morning of the workshop focused on opportunities and constraints in pursuing research and programs related to the human dimensions of natural resource within the USFWS and other state and federal agencies.

Workshop products

These proceedings provide a means to distribute two products from the workshop:

1. State-of-knowledge papers from plenary and concurrent presentations
2. Set of recommendations for USFWS management and administration
   - Research needs
   - Research priorities

An evaluation of the workshop was performed and distributed earlier (Thompson et al. 2000).

State-of-knowledge papers

The papers developed for the plenary and concurrent sessions are presented in the remaining sections of this report. These papers are organized around the two thematic areas developed for the workshop and their titles and content are summarized below.

Human dimensions: Visitor issues

Six papers are presented addressing the general theme of the Human Dimensions of Visitor Issues. In the plenary paper, Joe Roggenbuck (Virginia Polytechnic Institute and State University) provides an overview of approaches and research for "Facilitating High-quality Visitor Experiences at National Wildlife Refuges." This paper identifies the key approaches to understanding natural resource recreation and what characterizes high-quality recreation. In addition, the role refuge managers play in supporting quality recreation experiences is discussed and research and information needs on this topic are identified.

The remaining five papers (presented in concurrent sessions) focus on additional information concerning research and application on the human dimensions of refuge visitors. Bob Manning (University of Vermont) provides an overview of the role of defining and establishing indicators and standards for providing quality recreation opportunities. Alan Bright (Colorado State University) highlights the key aspects of communicating information concerning wildlife and wildlife recreation to the public via communications campaigns. John Davis (Southern Vermont College) summarizes the current knowledge and techniques used for estimating visitor numbers and use levels. David W. Lime, Dorothy Anderson (University of Minnesota) and Theresa Wang (West Virginia University) describe a process for maintaining quality visitor experiences as well as the biophysical resources that support such experience opportunities. David Fulton (University of Minnesota) presents an outcomes-based planning framework for implementing management of quality recreation opportunities and experiences.

Human dimensions: Community issues

Cornelia Flora, in her plenary paper, discusses the research issues involved with measuring the community dimensions of managing natural resources with a focus on what sociological research can contribute to understanding refuge management. She provides a concise review of the concept of capital and the role of refuges and refuge management in building or enhancing various forms of capital. Further, she describes how sociological research can be used in planning, increasing progress, assessing performance, and reaching potentials to increase our accountability in management.

Five additional papers (presented in concurrent sessions) focus on the human dimensions of community issues. Pat West (University of Michigan) develops an agenda for research about minorities, social justice, and natural resource management. Don Field (University of Wisconsin) provides the perspective of applied demography in examining social change along the upper Mississippi. Kristen Nelson (University of Minnesota) and Berry Steiglitz (USFWS) provide a review of conflict management and community relations in the context of natural resource management. David

Bengston (USDA Forest Service) examines environmental values related to fish and wildlife lands, and Stewart Allen (USFWS) provides a framework for conducting social impact assessments of actions on USFWS lands.

Priority issues and future directions

An important product from the workshop is identification of priority human dimensions research needs within Region 3, USFWS. The modified nominal group sessions held after each plenary presentation were the primary means used to identify priority research needs for both of the workshop thematic areas. Results of the modified nominal group sessions identified priority research needs for both the human dimensions of visitor and community issues.

The five nominal groups considering research and information needs related to understanding visitors were asked to address the following question: *"What refuge problems could be helped by knowing more about visitors?"*

Common themes emerged from the lists enumerated by these groups (Table 1). These common themes include:

- How do we improve communication about the refuge system and its functions and benefits?
- What research can help us improve the match between refuge services and products and visitor motivations, expectations and knowledge (aka Marketing)?
- How can we balance use and visitor impacts on the resource?
- How can we address conflicts among users?
- How do we improve local community support?
- What can be done to increase use/access for diverse publics?
- How can we develop funding for facilities and staff?

To identify research and information needs and priorities concerning community issues, four separate nominal groups were asked, *"What information do we need to enhance USFWS work with communities?"* Common themes that emerged from these discussions (Table 2) include:

- How do we identify and define "community" relative to USFWS Refuges?

Table 1. Research and information needs concerning human dimensions of visitor issues.

Question 1: What refuge problems could be helped by knowing more about visitors?

Group 1.
1. Lack of public understanding of USFWS Refuge identity, functions, and past experiences with USFWS
2. Inadequate/non-existent information for visitors (e.g. orientation sites)
3. Poor visitor understanding of their impact (e.g. unleashed dogs, off-trail use, feeding wildlife, ORVs, horses, trespassing)
4. Public expectations that conflict with management objectives (e.g., timber, burning, firearms)
5. Defining satisfactory/unsatisfactory visitor experiences
6. Defining what makes USFWS a good neighbor.
7. Multiple Use Conflicts

Group 2.
1. The changing wants of the public and their misconception of what a refuge is and its appropriate use.
2. Tailor management to match the wants and needs of visitors.
3. Building congressional support and visitor ownership/support via volunteerism, public endeavors and lobbying.
4. The lack of budgets or funding to develop programs displays or accessible facilities
5. Conflict between users.
6. Better relationships with and acceptance by the local community.
7. Managing for the connection between visitor use and resource protection.

Group 3.
1. Lack of funding to support facilities and staff
2. Plans do not address user expectations
3. Accessibility to special populations (e.g., language, economics, physical, etc.)
4. Lack of recognition by the public
5. Compliance with refuge regulations
6. Programming that addresses needs of visitors
7. Impacts of secondary uses on primary refuge purposes

Group 4.
1. Marketing (mission, program support, funding healthy wildlife populations)
2. Management resource allocation considering visitor expectations
3. Influencing visitor expectations (tie with #4)
4. Habitat protection (acquisition, easement, etc.)
5. Lack of local support for refuge programs
6. Measuring how effective USFWS is with its message
7. Competition among users

Group 5.
1. Balance visitor choice and resource protection
2. Why do people come to refuges
3. What refuge experiences most foster caring about nature
4. How to deal with/conflicts between user groups/What changes in management would improve visitor quality/Understanding institutional obstacles affecting visitor use
5. How to market refuge to the public
6. Measure visitor understanding of refuge purpose/Why don't more minority groups visit refuges
7. Disjunct between visitor perception of how they want to use resources and manager perception of how they want to manage the resource

Source: From the Human Dimensions of Natural Resource Management Workshop, February 1-3, 2000.

Table 2. Research and information needs concerning human dimensions of community issues.

Question 2: What information do we need to enhance USFWS work with communities?

Group 1.
1. Who are "they"?—group relationships, leadership, goals
2. How to identify and measure USFWS contributions/benefits (human capital, economic)
3. Understanding of community values
4. Community perception and knowledge USFWS
5. USFWS fulfilling revenue sharing
6. Whose other resources can we build with?
7. Training in sociology/social psychology

Group 2.
1. Training on building mutual goals with multiple stakeholders
2. Who is the community?
3. What are the perceived attitudes of the USFWS
4. What does the community perceive as their assets and problems
5. Who are the opinion leaders in the community
6. Identify common values
7. What does the community perceive as their desired future condition

Group 3.
1. Real or perceived benefits and negatives of the resource or project to the community (tie with #2)
2. Who (local, stare, federal, congressional, NGO's, national, local, community, interest groups) supports/opposes/is neutral toward proposal
3. Community values, perceptions, expectations, needs, wants, and fears
4. Future county, state, federal, and NGO directions and plans
5. Who are political players at local/state/federal levels?
6. Local opinion leaders and editors
7. Community demographics and trends

Group 4.
1. Identification of community leaders, supporters, and detractors
2. Identify communities and stakeholders USFWS is dealing with
3. Identify current conditions and future trends in communities' economy, politics, and demographics
4. Knowing what the goals of the refuge are
5. Knowing community values, attitudes, and behaviors (why they live in the area)
6. Community values, attitudes, and behaviors regarding USFWS goals/Goals of the local community
7. Identify segments of community not currently served/Know effective communication media, content, style/Study and evaluate refuge establishment/CCP processes

Source: From the Human Dimensions of Natural Resource Management Workshop, February 1-3, 2000.

- Who are community opinion leaders (supporters/detractors) and what are their ideas and their influence on USFWS Refuge planning?

- What are current and future trends of community goals, values, attitudes, and behaviors relative to USFWS Refuges?

- What are the shared goals and values USFWS and the community?

- What are the future trends in community demographics, economics, and politics?

- How do we measure social capital/benefits and negatives of USFWS refuges?

- Training is needed on collaborative processes with communities/stakeholders, conducting natural/social science research projects, and application of social science research.

The common themes identified by the small groups represent workshop participants' priorities for human dimensions research. These lists can be used as a starting point for initiating human dimensions research relevant to the needs of Region 3, USFWS. It should be noted that these lists highlight the common themes found among the nominal groups. Furthermore, the order of the common theme does not indicate relative priority of the issues.

These themes also are relevant to the needs of all resource professionals who grapple with understanding the human dimensions of resource management. This information can be used to begin prioritizing research issues related to social or human dimensions in any agency, in any part of the country.

Opportunities for the future

The final workshop event involved a panel discussion among Bill Hartwig, USFWS, Regional Director, Region 3; Bill Schenk, NPS, Regional Director, Midwest Region; B. Ken Williams, USGS, Chief of the Cooperative Research Units; Darrell Lewis, Corps of Engineers, Chief of Natural Resource Management; and Barry Stieglitz, USFWS, Chief of Planning and Policy for Refuges.

Each panel participant provided a brief summary of issues concerning implementation of human dimensions research and practice in federal agencies. All speakers agreed that understanding the human, or social, dimensions of natural resource management was a requirement for effective management decisions. Each also agreed the agencies would continue to encourage human dimensions research and incorporate its results into agency decision-making because it was necessary to do so. However, each also acknowledged that incorporating human dimensions into their agencies will be an incremental process requiring some time to accomplish.

Three key strategies identified for furthering these efforts included: (1) more training and educational workshops focused on human dimensions for current agency employees, (2) recruiting and hiring more people with social science and other human dimensions backgrounds and creating jobs focused on these areas, and (3) supporting more research projects and management programs focused on human dimensions issues.

We believe the information and recommendations provided by the collected papers in this volume will prove to be useful in provoking ideas and dialogue among resource managers, planners, and policy makers about research and programs in the human dimensions arena. We hope the papers in this workshop proceedings reinforce the belief that social science makes essential contributions to resource policy, planning, and management.

Literature cited

Thompson, J. L., J. M. Rosendahl, and D. H. Anderson. 2000. Human dimensions of natural resource management: Emerging issues and practical applications, workshop evaluation. Report to the Biological Resources Division, US Geological Survey, Northern Prairie Wildlife Research Center, and US Fish and Wildlife Service. St. Paul, MN: University of Minnesota, Department of Forest Resources, Cooperative Park Studies Program. 36 pp.

Human Dimensions of Visitor Issues

Facilitating High-quality Visitor Experiences at National Wildlife Refuges[3]

Joseph W. Roggenbuck[4]

Introduction

The general goal of this paper is to review and summarize past approaches to understanding natural resource recreation and to make recommendations for facilitating high-quality visitor experiences at national wildlife refuges and other units of the U.S. Fish and Wildlife Service. More specific objectives are to:

- Identify the key approaches to understanding natural resource recreation;
- Identify the characteristics of high-quality natural resource recreation;
- Discuss the important person, social, and environmental and contextual variables that shape high-quality recreation;
- Discuss the role/capability of wildlife refuge managers to shape high-quality experiences; and
- Identify the general information/research needs to assess and increase the personal, group, and societal values of recreation on national wildlife refuges.

Defining natural resource recreation

Taking time to define what we mean by recreation seems at first glance to do the obvious. We all know what recreation is; it is fun. Engaging in natural resource recreation at a wildlife refuge is doing something fun that is dependent upon or shaped by wildlife values. But leisure theorists, recreation planners, and recreation providers, including wildlife refuge managers, have found that, while thinking of recreation as fun helps a bit, it fails to encompass the total meaning and value of recreation to individuals, groups, and society at large. Some have suggested that fun is a necessary but insufficient condition for an experience to be considered recreational. For

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[1]Roggenbuck, J. W. 2000. Facilitating high-quality visitor experiences at national wildlife refuges. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

[2]Professor, Department of Forestry, Virginia Polytechnic Institute and State University, Cheatham Hall, Blacksburg, VA 24061-0324.

example, some have suggested that, in addition to being fun, the experience needs to be re-creational of the mind, spirit, or body. Others have implied that for fun to be considered recreational, it must be an activity that has normative approval by society. In effect, it must be declared beneficial fun. Another complexity seems to be that some recreational experiences, or some parts of recreational experiences, do not seem like fun. For example, sitting in a duck blind in a cold rain with no ducks flying hardly seems like fun. But many duck hunters call that recreation, if not at the moment, then more likely when they reminisce about the experience from the warmth of their wood stoves in their homes. Also, two people can be engaging in the same recreational activity in the same setting, and one person may call it great fun, but the other person may feel bored or anxious. Another common scenario is that a given person can engage in the same recreational activity in the same setting over multiple episodes, but have somewhat different experiences each time. What a person brings to the recreational situation shapes in part the experience gained there. The human mind plays games with fun, and that makes it harder for us to understand recreation, measure it, and manage for it.

Thus, recreation seems a complex human activity. Leisure theorists continue to debate its meaning, function, and value. For the purposes of this paper, we view as critical four elements of recreation upon which most leisure theorists (e.g., Driver and Tocher 1970) agree. First, recreation is an experience; it takes place in the minds, bodies, and spirits of individuals. Second, recreation is intrinsically motivated; it is done for its own sake. Third, recreation involves personal and free choice. This means that the recreationist freely chooses the activity, and once engaged, has relative freedom to pursue the activity as the individual chooses. Finally, the experience must be enjoyable. What defines enjoyment in recreation is also complex, and as we will see, different conceptions of recreation and leisure approach the study of enjoyment in different ways. For example, theorists who emphasize the cognitive aspects of leisure suggest that the optimal experience of pleasure can be characterized as intense focus on a stimulus, an altered sense of time, and a loss of consciousness of the self (e.g., see Walker et al. 1998). Theorists who focus on the affective components of leisure focus on such pleasurable moods as being joyful, happy, excited, calm, friendly, cheerful, energetic, active, and alert (e.g., see Hull and Michael 1995; Hull et al. 1992; Hull et al 1996).

Recreation is thus an enjoyable experience, done for its own sake, freely chosen, and freely acted out. Natural resource recreation represents a class of such enjoyable experiences that occurs within, and is in some sense dependent upon, the natural environment. For the purposes of this paper, natural resource recreation represents a class of enjoyable experiences that occurs within wildlife refuges and is at least partially dependent on the wildlife values of the refuge.

Approaches to understanding and valuing outdoor recreation

Public policy discussion and scientific interest in the meanings and values of outdoor recreation in the United States began in earnest in the 1960s with the publication of the Outdoor Recreation Resources Review Commission reports. Since then, four primary perspectives have developed: recreation as supply of land and facilities; recreation as participation in activities; recreation as an experience; and recreation as personal, social and cultural, economic, and environmental benefits.[5] Approaching the study of recreation as an experience, the dominant academic and scientific paradigm today, can be further divided into three distinct but related perspectives: the experience outcome approach, the flow experience approach, and the lived and reflective experience approach.

Recreation as supply of land and facilities

Viewing recreation as acres of land or water, miles of trail or rivers, or number of swimming pools and ice rinks has been common in the past. For example, professional recreation societies, the now defunct federal Bureau of Outdoor Recreation, states, counties, and cities published standards of how many acres of what kind of land or water, how many miles of trail, and how many units of facilities were needed per capita for the population served. Leisure professionals typically developed these standards based on their own assessment of what was ideal or acceptable. What criterion they used is uncertain, but presumably the amount of land and facilities already being provided by the "better" recreation agencies served as a guide. A recreation agency could then judge its success and develop future plans based on how it stood against the recreation standards.

While standards have some general value in assessment of the recreation service delivery system, they have little or no value in assessing the quality and amount of the recreation service delivered to people. The supply approach studies the wrong population. It focuses on land, water, and facilities, not people. Recall that recreation is first and foremost an experience that occurs within the individual. Also, the presumption in the supply approach is that more is better, but this is not necessarily the case. For some kinds of recreation, fewer facilities are better. Finally, wildlife refuges exist for wildlife; counting wildlife refuge land as recreation land seems inappropriate

[3]Some might argue that a fifth perspective, the economic approach, deserves consideration, and indeed one of the first textbooks on the study of outdoor recreation (i.e., Clawson and Knetsch 1966) represents this viewpoint. However, while the notions of rational positivism, economic man, and consumer sovereignty have been powerfully influential in decisions on the supply of recreational goods and services in America, in the author's opinion, economists have not been big players in the development of leisure theory and research.

and to judge the success of the USFWS's recreation program based on its supply of land, water, and facilities. Thus, we will drop the supply view from further discussion.

Recreation as an activity

Viewing recreation as an activity is common, and it represents a marked improvement over the supply approach. At least it studies the right population, i.e., people. In this approach, recreation is considered doing activities that are considered fun. (There is also a tacit assumption, at least in the public policy arena, that these fun activities are socially acceptable.) In the case of outdoor recreation, we all know what these activities are; they are activities like hiking, camping, bird watching, hunting, and fishing. From this perspective, the measure of success of an outdoor recreation delivery system is the number of people engaged in the various activities, or better yet, the total amount of time that the number of people engaged in the various activities. The general assumption is that more people doing more recreation is better.

Given this perspective, recreation research and management agencies in the 1960s and 1970s spent considerable effort to develop strategies and technologies to estimate number of visitors, visits, and recreation visitor days on recreation land. Resource management agencies still typically use the activity counts as their primary measure of recreation output and struggle to this day to increase the accuracy of their counts. Recreation planners also buy into the approach when they do general population surveys of participation rates in the various activities to estimate system output. They are also accepting the activity paradigm when they use participation rates and population and other socioeconomic growth parameters to project recreation demand into the future.

But the activity approach is a necessary but insufficient approach to understanding recreation. It fails to measure the experience—a key element of what constitutes recreation. From the visitor counts, we do not necessarily know what happens in the mind, spirit, and body of the recreationist. We do not know whether the person has a satisfactory or high-quality experience. More is not necessarily better if individual recreationists are increasingly dissatisfied with the experience. Activity counts by themselves do not tell us whether all sectors of the population are being served, nor do they tell us whether the experience gained is the type desired by the recreation provider. For example, the USWFS presumably would not consider providing a large number of nonwildlife-dependent recreation visitor days an ideal target.

Recreation as an experience

By far the dominant approach to theoretical and practical understanding of recreation in academic circles in the last quarter century is the experience approach. This approach focuses on what happens inside the individual during the recreational engagement. Researchers of recreational engagement have typically studied the on-

site experience phase and have rarely included the anticipation and recollection phases. But since change, hopefully positive change, in the individual is the variable of interest, all phases of the experience would logically be of interest. With the experience approach, the measure of success of an outdoor recreation delivery system is the number of satisfactory or high-quality visitor experiences of the right type. Presumably, within legal and environmental constraints, the more of the right kind of high-quality experiences, the better.

While there is widespread agreement that we should view recreation as an experience, debate has raged on about what is high-quality recreation, how to measure it, and how to manage for it. To a lesser extent, the research community has looked at the extent to which the experience is resource-dependent, and that issue is no less thorny. Three related but distinctive perspectives on studying (and presumably managing for) recreation experiences have evolved: the experience outcome approach, the flow experience approach, and the lived and reflective experience approach.

The experience outcome approach. The experience outcome approach is the most researched, discussed, debated, and influential of all perspectives on recreation experiences. Championed by Driver and his colleagues (e.g., see Driver and Tocher 1970; Driver and Knopf 1977; Manfredo et al. 1983; Brown 1984; and Driver et al. 1991), this approach basically suggests that people are motivated to engage in recreation to fulfill needs that are unfulfilled during their nonleisure time. High-quality recreation exists when pre-existing needs or wants are satisfied by the leisure engagement. In early formulations, Driver based his conceptual model in personality theory (see Driver and Knopf 1977), and recreation engagements were seen as satisfying basic unmet needs of the individual. Thus, high sensation-seeking personalities would consistently tend to choose high adventure kinds of recreation.

However, this view of recreation seemed to be of little help in recreation resource management decisions (Driver et al. 1991), so Driver shifted the theoretical basis away from the trait-like needs of personality types to the expectancy-valence theory of human motivation and behavior (Lawler 1973, Ajzen 1985). This theory suggests that persons act to achieve certain outcomes, whether or what action is taken is shaped by the attractiveness (the valence) of the outcome and the expectancy that taking an action will achieve the desired outcome (the expectancy). The attractiveness or valence of the outcome is shaped by unmet needs or wants. These needs can be basic, but the wants and needs can be learned and highly situational or contextual. The expectancy component of the model can also be seen as highly variable. Thus, the attractiveness of a given recreational resource or activity and the decision to pursue it can be highly variable across individuals and within individuals across time.

For the model to have value for recreation resource planners and managers, other assumptions about human behavior must be made. First, people are able to know their wants or needs, they know what recreational opportunities are available, and they

know what activity/setting combinations have a high probability of meeting their wants or needs. Second, the setting and/or activity do make a difference in whether a given unmet need is satisfied. Third, people can and do make rational decisions to satisfy their individual needs.

While some doubt that recreational choices are so rational (Williams 1985), Stewart (1998) recently criticized the experience outcome approach as viewing recreation as too dispositional or trait-like, the approach has directly resulted in the most highly valued and frequently adopted innovation in recreation management in the last quarter century, i.e., the Recreation Opportunity Spectrum (ROS) (Brown et al. 1978). Much empirical work has shown that people often have different preferences (i.e., seek different outcomes) when they choose to engage in recreation. These include such expected and valued outcomes as nature enjoyment, physical fitness, escape physical stressors, outdoor learning, independence achievement, family bonding, making friends, and introspection (Driver et al. 1991). Some but not all these outcomes, or combinations of outcomes, have been found to be dependent upon recreation activity/setting combinations (Brown and Ross 1982; McLaughlin and Paradice 1980; Vogelsong et al. 1998; Shafer and Hammitt 1995; Floyd and Gramann 1997). The ROS provides a resource planning and classification scheme that describes the kinds of experiences most likely to be achieved in various land units, based upon the combination of biophysical, social, and managerial conditions found there and the empirically established relationships between resource settings and experience outcomes.

The flow experience approach. The notion of recreation experiences as flow rests on the contention that leisure offers opportunities for self-actualization that more constrained contexts do not (Kelly 1987). The psychologist Abraham Maslow defined self-actualization as " . . . the full use and exploration of talents, capacities, and potentialities" (Maslow 1970:150). He saw peak optimal experiences as moments of greatest maturity, individuation, and fulfillment (Maslow 1968, Csikszentmihalyi and Kleiber 1991), and these moments were most conducive to self-actualization. More recently, leisure theorists have called these ideal states of consciousness or flow experiences, because people in such enjoyable states feel like they are being carried along by a current (Csikszentmihalyi and Csikszentmihalyi 1988). Flow experiences are thus seen as the most enjoyable and fulfilling experiences of one's life, and ideal recreation or leisure can be judged on the extent to which it fosters flow.

Psychologists and theorists attempted to learn the essence of flow and what shaped flow through interviews with individuals who reported states of great joy while engaged in such active forms of leisure as rock-climbing. Somewhat surprisingly, people from a variety of cultures engaging in a variety of recreational activities reported the same experiential states during their peak experiences. The universal characteristics associated with such enjoyable experiences were (1) a matching of challenges and skills, with (2) clear goals and immediate feedback, (3) a depth of

concentration that prevents worry and the intrusion of unwanted thoughts into consciousness, and (4) result in a transcendence of the self (Csikszentmihalyi and Kleiber 1991). For example, a deer hunter might experience flow when the following conditions apply. The hunter decides how many deer (or accepts the number the refuge manager suggests) are likely to be seen on a given day. By counting and keeping track of the number of deer seen, the hunter has immediate feedback on the goal. The density of the deer population and the characteristics of the forest provide a challenge that matches or perhaps slightly exceeds the hunter's perceived skill level. If the challenge far exceeds the hunter's skill level, the hunter will become worried, frustrated, and anxious. If the hunter's skill level exceeds the challenge, then the hunter will become bored. But if the challenge of the forest and the deer numbers match the hunter's skill, then the hunter most likely begins to experience a depth of concentration on the activity at hand. Then the hunter begins to slip out of the duality of consciousness typical of ordinary life, no longer an outside observer of the forest and the deer. Instead, the hunter feels as one with the forest and the deer. When this happens, the individual has begun to experience flow. All irrelevant thoughts, anxieties, and fears of everyday life begin to slip away in this stage of high concentration. In this state, the hunter has at least for the moment transcended the boundaries of self. The experience is so absorbing that the individual forgets the confines of self-image and becomes part of a larger whole, in this case, a part of the forest. The individual is in flow. Finally, in this condition the hunter feels particularly free to grow. The hunter knows the deer hunt is not over-challenging (i.e., knows the goals, the rules of the game, has clear feedback, has matched skills with the challenge), is not worried about self-image, and is free to try some new techniques. It is this experience of high concentration and absorption into the environment and the activity, of loss of a sense of the constraints of self, and feelings of freedom to grow that makes for flow, self-actualization, or peak recreation. Of course, if the hunter does increase in skill through the freedom to grow and experiment, eventually the deer hunt will need to be more challenging.

The interest in recreation as providing opportunities for flow or self-actualization, and therefore as a condition to be highly valued, goes back a long way, perhaps even to the Greek philosophers (Hemingway 1988). The model was presented to me in my first university recreation course in the 1960s. Yet its potential to guide natural resource recreation policy, planning, and management remains largely untested. Only recently have wildland recreation theorists and researchers begun to explore its usefulness in helping us understand the meaning and value of adventure recreation (e.g., see Ewert and Hollenhorst 1989).

Recreation as a lived and reflective experience. This view of recreation as a lived and reflective experience is not so much a new approach to understanding recreation experiences as it is an extension and perhaps a critique of the two experience-based models described above. As such, it cannot yet be called a separate paradigm; it does not provide a new conceptual model of ideal recreation. Instead, its

main tenets are that a recreation experience is complex, dynamic, emergent, and embedded with personal stories (Stewart 1998). It in particular criticizes the experience outcome approach, at least as it has come to be operationalized, for viewing recreation as too deterministic (i.e., too determined by dispositional traits of the individual or by the characteristics of the recreational setting), for focusing too much on predispositions and outcomes and not enough on the actual experience as it unfolds, for focusing too much on need fulfillment and not enough on changed leisure states during the leisure engagement, and finally, for failing to recognize that recreationists construct and reconstruct stories of the experience to assign it meaning. These stories change the meaning and value of the experience as they are told and retold to self and to others. Thus, the recreation experience and its value extend and change beyond the on-site experience.

Viewing recreation as a lived and reflective experience thus recognizes the subjective nature of leisure experiences and adds considerable complexity to a recreation experience model. This seemingly would both make the task of managing for ideal recreation experiences much more difficult and also reduce the likelihood that recreation resource managers can facilitate high-quality experiences in any major or predictable way. But to this point, proponents of the lived and reflective experience approach are not focusing on managerial applications, but instead are calling researchers and theoreticians back to the as-yet unfinished task of developing a precise and accurate conceptualization of leisure (Stewart 1998).

Recreation as a benefit

A final and recent innovation in understanding recreation is to view recreation and leisure as producing personal, social and cultural, economic, and environmental benefits. This approach, rapidly becoming a separate paradigm, was initially called Benefits-based Management (BBM) (Lee and Driver 1996) and more recently the Benefits Approach to Leisure (BAL) (Driver and Bruns 1999). The BAL, developed by Driver and his colleagues, builds upon and extends the experience outcome approach to understanding recreation in two important ways. First, it extends the "chain of causality" of satisfying experience (as outlined by the experience outcome approach) to benefits accruing to the satisfied recreationist across time and space. Thus, the stressed CEO who goes fishing at a wildlife refuge may find stress relief and therefore have a satisfying experience. This satisfying experience may be called a benefit, but the benefit likely does not stop there. The CEO likely stays in a more relaxed state for some time after disengaging from the recreational activity. In addition, the increased stress relief may have other secondary benefits to the individual and to society. For example, because of the stress relief, the CEO may have better health, make better decisions on the job, and end up in the hospital less.

The second extension of the BAL over the experience outcome approach is the proposition that benefits of recreation accrue to society and the environment beyond

the primary and secondary benefits to the individual. Many of these benefits are economic, such as reduced health costs, less work absenteeism, local and regional economic growth because of tourism, or contributions to national net economic development. Social and cultural benefits of recreation include family bonding, community cohesion, cultural identity, cultural and historical awareness and appreciation, and community and national pride. Finally, natural resource recreation can help protect the environment by preserving natural areas, areas of biodiversity, areas of historical value, and can also foster understanding of the natural world, improved relationships with the natural world, and an environmental ethic (for a large list of the benefits of leisure, see Driver and Bruns1999).

The BAL approach seems to me to have conceptual value as a way of looking at the task of providing recreation goods and services. If recreation providers see their work as beneficial to individuals, society, and/or to the environment, that is very different from seeing the job as simply providing fun. This new perspective would likely have benefits to recreation providers, enhancing their sense of responsibility and status, and may result in more thoughtful decisions.

The BAL is also obviously designed to influence public policy decisions affecting the provision of recreation goods and services. If the recreation profession in general, and wildlife managers in particular, can make a convincing case that engaging in recreation has the purported primary, secondary, and tertiary benefits to individuals, and that recreation has economic, cultural, and environmental benefits, then recreation managers can expect to gain increased public funding. Some work suggests that there may be a "chain of causality" from experiences on the ground to off-site benefits described above, at least for some experiences and some benefits (e.g., see Stein and Lee 1995). But much work remains to be done.

Also, we need to ask ourselves whether the BAL really helps us to understand recreation and whether it helps recreation managers make better decisions on the ground. Because the BAL rests solidly on the experience outcome approach, it recognizes that benefit has its source in experience of individuals. As such, the BAL steers us in the direction of understanding the essence of recreation as we have portrayed it. But some benefits listed by BAL have little or no link to individual recreational experiences. For example, can we understand the process or meaning of recreation if we study acres of land protected for diversity; can we understand the meaning of recreation to the individual by studying local and regional economic development? I think not. Also, the BAL is subject to all the criticisms levied by the lived and reflective experience proponents on the experience outcome approach. A major criticism is not recognizing and measuring the dynamic and emergent nature of recreation experiences as they unfold. Finally, if managers' decisions on the ground are to make a difference in benefit, especially a predictable difference, then all the linkages between and among preferred outcomes, activity/setting combinations that meet preferences, satisfying experiences, first-order benefits, possibly second-order

benefits, and even third-order benefits must all function in the expected and known manner.

Predictors of recreation experience quality

While the serious study of outdoor recreation as an academic endeavor goes back only about 30 years in the United States, we do have general agreement on at least a few findings. First, people are complex manipulators of informational stimuli; they are active players in the construction of their own experiences. A deterministic, mechanistic, stimulus-response model of the recreation experience simply does not reflect reality. Instead, people filter the environmental, contextual, and situational cues that impinge upon them during the recreational engagement; they attend to some stimuli and ignore others. Thus, the experience and experiential outcomes have as much to do with the person as they do with the environment over which the refuge manager has some control. A second general finding is that "the average camper does not exist." This principle recognizes that there is much diversity in what recreationists seek and receive from a wildlife refuge visit, and that in responding to the average participant, the refuge manager may be responding to no one. Instead, the refuge manager needs to begin to think about providing a variety of opportunities for the diversity of experiences desired, expected, and enjoyed by recreationists.

We thus know that desired recreational experiences are varied and complex. But what shapes the experiences desired, and what shapes whether a high-quality experience is achieved? What can a refuge manager do to shape high-quality experiences? We begin with the first two questions.

Table 1 provides an overview of four types of variables that shape recreation participation and/or recreation experience quality. These include person, social/cultural, environmental, and situational/contextual variables. Which of these variables is considered most important depends on the conceptual model of outdoor recreation that one accepts. For example, the experience-outcome model places heavy emphasis on motivations and environmental variables, some emphasis on past experience and knowledge, and little emphasis on anything else. In contrast, the flow experience model contends that personality, skill level, and knowledge of the person, and the challenges provided by the environment, are most important, followed by some importance given to the person's past experience in the activity or place. The lived and reflective experience approach recognizes the primary importance of the situation and context when attempting to understand the rise and fall of recreationists' focus of attention and mood states during recreational engagements.

In general, outdoor recreation planners and managers have emphasized environmental variables above all others, and probably have overemphasized the role of these variables in the recreation experience. But this, of course, is to be expected. Land managers, and especially national wildlife refuge managers, know most about the

Table 1. General factors that shape outdoor recreation participation and recreation experience quality.[a]

Person variables	Social/cultural variables	Environmental variables	Contextual/situational variables
Demographics: Age Gender Race/ethnicity Education Personality: Gregarious - Solitary Extrovert - Introvert Sensation seeker or not Motivations (e.g., hunting[b]): Nature Escapism Shooting Skill Socializing Vicariousness Trophy display Harvest Equipment Past experience: Frequency of participation Length of time since first participation Knowledge/Skill Level	Background variables: Socialization Community Status group dynamics On-site Variables: Social group	Recreation Opportunity Spectrum Variables[c]: Managerial regimentation Interaction among user groups Evidence of human modification of the environment Size of the area Remoteness Facilities provided Other: Biodiversity of setting Challenge of environment	Weather Psychological State Length of Stay[d]

[a] Much information in this table is taken from Manning (1999).
[b] Hunter motivations were adapted from Potter et al. (1973).
[c] Recreation Opportunity Spectrum variables were taken from Brown et al. (1978).
[d] Williams and Knopf (1985) found length of stay and degree of whitewater to most affect experience quality on river rafting trips.

environment, and they have responsibility for and some control over this resource. The importance of the individual characteristics that recreationists bring to the recreational setting in shaping experiences is gradually being seen as more important. This is a welcomed development. Past experience, knowledge, and skill level profoundly affect recreational experiences. In addition, the natural resource recreation profession in general, and wildlife refuge managers in particular, need to devote greater attention to the age, gender, and racial/ethnic makeup of their visitors, if for no other reason than to determine whether the diverse populations that live near wildlife refuges are indeed enjoying them and receiving their benefits in appropriate numbers. That outdoor recreation managers have not focused much on contextual/situational and on social group variables is understandable. There seems little that can be done to shape the weather, the psychological state of mind a person brings to the recreational resource, or whether groups get along during their recreational engagement. But all these variables are really important in shaping experiences, and managers can in fact at least indirectly affect some of them.

Facilitating high-quality recreational experiences

Thus far I have tried to describe what is high-quality recreation, various conceptual models of recreation or leisure, and the multiple variables that shape satisfying recreational experiences. I will now draw on this content to suggest general ways that wildlife refuge managers can facilitate high-quality recreational experiences. I list recommendations with the proviso that nothing I say here should be seen as taking away from the Fish and Wildlife Service's efforts to protect wildlife and wildlife habitats. I recognize and support the mandate that any outdoor recreation on a wildlife refuge must be wildlife-dependent. But I also believe in the BAL enough to suggest that the right kind of recreation can provide satisfying experiences *and* foster such environmental benefits as knowledge about and care for wildlife.

Recommendation #1: Guard visitor freedom

Defining characteristics of recreation experiences are freedom and intrinsic motivation. Also, the models of recreation discussed here rest on the assumption that recreationists know their needs, can effectively evaluate their environmental options to satisfy their needs, and can and do act to achieve desired outcomes. Also, we know that recreationists are adept at constructing their own experience, sometimes on the land but more often in the mind. Given all this, my recommendation is not to attempt to overprogram the experience, and to take heed lest decisions made to achieve other multiple goals of a wildlife refuge unnecessarily restrict visitor freedom and choice. The beneficial aspects of recreational experiences for people, and the role of freedom and choice in achieving them, should be constantly in the minds of refuge managers and staff.

Recommendation #2: Make information easily available about recreational opportunities at the refuge

Conceptions of outdoor recreation going all the way back to the 1960s state that it has multiple phases (e.g., anticipation, on-site, recollection). Recreationists gain benefit from all phases, and information about the refuge and its experience opportunities can enhance all phases. Such information also helps recreationists make better choices. For example, with the experience outcome model, information about opportunities to achieve fulfillment of various motives, or motive packages, in various zones of the refuge could be provided. With the flow experience perspective, refuge managers could provide information on the challenge level and skill required to do various activities in various zones of the refuge; information would also need to be provided to help recreationists have clear goals about the experience opportunity. Without such information, both models of recreation suggest that the visitor experience is diminished. Providing this type of information to recreationists or potential recreationists is now entirely possible using the Internet and other computerized communication systems.

Recommendation #3: Identify wildlife-dependent experiences

Wildlife-dependent activities that occur at refuges include hunting, fishing, wildlife observation, photography, environmental education, and nature interpretation. But recall that we said that counting the number of recreation visitor days of hunting, for example, was not a sufficient measure of the meaning and value of recreation. Overall use numbers tell us little about the quality of a recreational experience for individuals. Also, as shown in Table 1, people engage in an activity like hunting for varying reasons, and people seeking different experiences may require very different social, environmental, and contextual/situational conditions if they are to be satisfied. Finally, some of these preferred experiences may differ in their dependency on wildlife, and refuge managers seem obliged to give preference to those experiences more wildlife-dependent. For example, people may go to the deer camp primarily for socializing and bonding with their mates. This experience, while likely most beneficial to the hunting group, seems less dependent on wildlife than developing such skills as stalking game.

Recommendation #4: Develop a defensible specification of high-quality wildlife-dependent experiences

Wildlife refuge managers must decide on which of the several perspectives on high-quality recreation laid out here seems most relevant and feasible to them. At least four perspectives seem possible. At the most basic level, quality might be defined as the extent to which recreationists doing various wildlife-dependent activities at the refuge express satisfaction. A better measure of quality would be the level of satisfaction with wildlife-dependent experiences. At a deeper and perhaps more ideal level, high-

quality recreation might be the extent to which people experience "flow" during the recreation engagement. With the experience outcome approach (by far the most developed application in outdoor recreation contexts), high-quality experiences result when the recreational engagement meets or satisfies the motives of the individual. Finally, while the BAL would generally define high-quality experiences the way the experience outcome approach does, it extends measures of the quality of a recreation program to include positive social, economic, and environmental outcomes beyond the individual. The satisfactions, flow experiences, experiences meeting expressed wants, and benefits must, of course, be wildlife-dependent.

Recommendation #5: Identify social, environmental, and/or situational elements of the resource setting that shape high-quality experiences

Ideally, managers would have at least some control over these important elements; the elements would be to some degree manipulatable, and they could be reduced to a manageable number. Simply looking for elements that shape satisfaction will probably prove futile because people engage in such activities as fishing for a variety of reasons. The experience of anglers seeking to catch lots of fish likely depends on different setting attributes than do anglers who want to experience the flow of the river. Thus, resource planners and managers seeking simply to manage for activity satisfaction are quickly drawn in deeper, most likely into an experience outcome or lived experience approach. The ROS approach represents one such experience outcome-based approach. This framework contends that amount and type of managerial regimentation of recreationists, amount and type of interaction among users, groups on the site, evidence of human modification of the environment, amount and type of facilities and services provided, size of the area, and remoteness all affect the nature of recreation experiences (see table 1). To this, others have added the type and size of the group the recreationist is with and length of stay. In the case of wildlife refuges, it seems that number, density, and type of wildlife, and characteristics of the wildlife habitat might also be important. Extending this to the flow models of recreation experiences, the challenge level of the environment for varying wildlife-dependent experiences would also be important.

Recommendation #6: Inventory and classify wildlife refuge lands and waters based on experience-affecting resource attributes

Such inventory and land classification activities would be an overlay to more basic wildlife habitat and wildlife protection mapping. Certain zones of the refuge might therefore be closed to all recreational use. But when recreation is appropriate, the range of values of critical factors that shape wildlife-dependent experiences would be inventoried and mapped. Professional judgment, along with public input, would be used to demarcate the range of values among the important factors most conducive to

facilitating a given kind of high-quality experience. Through this means, a map of multiple overlays would be developed which would denote a range of different experience opportunities on the refuge. One such zone on a refuge providing deer hunting experiences might offer a high challenge experience for stalking deer, with few management restrictions, with little chance of seeing other people, and moderate chances of seeing deer. To make this manageable to resource professionals and the public alike, there should be relatively few experience-based opportunity classes, and they should be given names descriptive of the opportunity and meaningful to potential visitors.

Once such experience opportunity zones are established, they would be communicated to the public as called for in Recommendation #2.

Recommendation #7: Monitor experience quality

Monitoring is one of the most neglected aspects of all resource management activities, and this is certainly the case for the outdoor recreation service delivery system. But in both an ideal and a very practical sense, public policymakers and resource managers need to know how many people are engaged in outdoor recreation on wildlife refuges, who are and are not enjoying the wildlife refuges, what experiences visitors are seeking and receiving, and whether experiences received meet some acceptable level of quality.

Thus, counting the number of refuge visitors who engage in a variety of recreational activities is a necessary but insufficient measure of program output. In addition, refuge managers must specify the types of wildlife-dependent experiences to be provided at the refuge, determine number of people gaining those experiences, and measure the quality level of the experiences received. Quality might be measured by level of satisfaction with prescribed wildlife-dependent activities, or better yet, by satisfaction level with prescribed wildlife-dependent experiences. Another approach would be to determine whether the recreationist receives a designated level of joy, happiness, calmness, energy, or alertness during the wildlife-dependent activity or experience. An even more precise measure of experience quality might be to measure the extent to which recreationists achieve appropriate preferred and expected experiences, or the extent to which they experience flow, peak experiences, or self-actualization. Another type of measure of the value of recreation on a wildlife refuge, albeit perhaps even harder to track, is to look to off-site benefits. These benefits might include health benefits to recreationists, community pride from knowing the wildlife refuge is there, economic benefits to the community from tourism, or the existence of an environmental protection ethic that might logically flow from visits to the refuge.

Needed research

In this call for greater attention and commitment to the provision of recreational experiences on wildlife refuges, I have given broad-brush coverage to the nature of natural resource recreation experiences, to the characteristics of what might be called ideal or high-quality recreation experiences, and to approaches that scholars have used to study outdoor recreation. From this analysis, I have given my best educated guesses on what most shapes the nature of leisure experiences, and then made recommendations on how refuge managers might facilitate the delivery of high-quality recreational services to visitors and the public. I acknowledge that there is much we do not know about the meaning and value of outdoor recreation, what most affects its quality, and why some people engage in it but other segments of the American population do not. As the Fish and Wildlife Service moves forward to provide more and better outdoor recreation opportunities for more segments of the American people, critical information will be needed to make the best possible decisions. I close then by listing a series of questions important to recreation resource management about which a social science program of research could shed more light.

- What is the nature of recreational experiences on wildlife refuges? Are these experiences wildlife dependent?
- What is the diversity of wildlife-dependent recreational experiences sought and achieved at wildlife refuges?
- What is the process recreationists use at wildlife refuges to judge the quality of their experiences? Are wildlife refuge visitors receiving high-quality experiences?
- How do wildlife refuge recreationists construct their experience during all phases of the recreational experience, but especially during the on-site and reflective phases?
- What conflicts, if any, occur among recreationists seeking wildlife-dependent experiences on wildlife refuges?
- What benefits do recreationists receive from their engagement in recreational activities at wildlife refuges?
- What person, social, environmental, and situational variables most shape recreational experiences? Which of these can resource managers most influence for better or for worse?
- What are the critical variables affecting recreational experiences that should guide a recreation resource inventory, classification, and mapping system?

- What kinds of information should be communicated to potential or actual wildlife refuge recreationists to most enhance their experience and facilitate recreational choice?

- How and when should this information be communicated to recreationists?

- What segments of the population are over-represented and under-represented among wildlife refuge visitors? Why do some segments of the population visit refuges in low numbers?

- What are the social, cultural, and economic benefits and costs of recreation on wildlife refuges to adjacent communities, to the region, and to the nation at large?

- Finally, what are the benefits and costs of recreational visits to wildlife refuges to environmental protection, management, and care?

Planning, organizing, and funding a program of research to begin to answer these questions is, of course, a long-term effort. But if we have clarity of purpose, clear feedback on our journey to achieve our goals, and if we are able to construct the challenge to match or slightly exceed our communal skills, then at least one theory of human behavior would suggest our experience will be optimal. Such an effort would also enhance the provision of high-quality recreational experiences and the protection of wildlife on our national wildlife refuges.

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Defining and Establishing Indicators and Standards of Quality[6]

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Growing interest in outdoor recreation on public lands has given rise to a substantial body of scientific literature on management of parks, wilderness, and related areas. While this literature is diverse in terms of its scope, methodology, and geographic application, several frameworks have been developed to help guide planning and management of outdoor recreation. These frameworks include Limits of Acceptable Change, Visitor Impact Management, and Visitor Experience and Resource Protection. A central focus of these frameworks is formulation of indicators and standards of quality of the visitor experience. Indicators of quality are measurable, manageable variables that define the quality of the visitor experience. Standards of quality define the minimum acceptable condition of indicator variables. Once indicators and standards of quality have been formulated, indicator variables are monitored and management action is taken to ensure that standards of quality are maintained.

The purpose of this paper is to describe the concept of indicators and standards of quality, and how the concept can be used to manage outdoor recreation in parks, wilderness, and related areas. An application of indicators and standards of quality to Arches National Park, Utah, will be used for illustration. Specific objectives of the paper are as follows:

- Define indicators and standards of quality and their role in contemporary outdoor recreation planning and management frameworks.

- Illustrate the formulation and application of indicators and standards of quality at Arches National Park, Utah.

Evolution of indicators and standards of quality

The question of how much recreation can be accommodated on public lands is often framed in terms of carrying capacity. The concept of carrying capacity has a rich

[6]Manning, R. E. 2000. Defining and establishing indicators and standards of quality. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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history in the natural resource professions, where it has been interpreted primarily from a biological or ecological perspective. In particular, it has proven to be a useful concept in wildlife and range management, where it refers to the number of animals that can be maintained in a given habitat before undue biological or ecological impacts occur (Dasmann 1964).

Carrying capacity has obvious parallels and intuitive appeal in the field of outdoor recreation. Carrying capacity was first suggested in the mid-1930s, as an outdoor recreation concept in the context of the national parks (Sumner 1936). However, the first rigorous applications of carrying capacity to outdoor recreation did not occur until the 1960s.

The early work on carrying capacity has since blossomed into an extended literature base on outdoor recreation and carrying capacity (Lime and Stankey 1971; Stankey and Lime 1973; Graefe et al. 1984; Manning 1985, 1999; Shelby and Herberlein 1986; Stankey and Manning 1986; Kuss et al. 1990). But despite this research base, efforts to determine and apply the concept of carrying capacity to public lands have remained problematic. The principal difficulty lies in determining how much impact, such as crowding, is too much. Theoretical development, backed up by empirical research, generally confirms that increasing contacts or encounters between visitors leads to increased perceptions of crowding. But how much crowding should be allowed? This basic question is often referred to as "the limits of acceptable change" (Frissell and Stankey 1972). Given substantial demand for outdoor recreation on public lands, some decline or change in the quality of the visitor experience (e.g., some crowding) seems inevitable. But how much decline or change is acceptable or appropriate?

Definition of indicators and standards of quality

Answers to the above questions can be found through formulation of management objectives and development of indicators and standards of quality (Shelby et al. 1992; National Park Service 1997; Roggenbuck et al. 1993). This approach to carrying capacity and outdoor recreation focuses principal emphasis on defining the type of visitor experience to be provided and maintained, and then monitors conditions over time to assess whether acceptable conditions have been exceeded. Management objectives are broad, narrative statements that define the type of visitor experience to be provided. They are based on review of the purpose and significance of the area under consideration. Formulation of management objectives may involve review of legal, policy, and planning documents; consideration by an interdisciplinary planning/management team; and public involvement.

Indicators of quality are more specific measurable variables that reflect the essence or meaning of management objectives; they are quantifiable proxies or measures of management objectives. Indicators of quality may include elements of both the physical and social environment that are important in determining the quality of the

visitor experience. Standards of quality define the minimum acceptable condition of indicator variables.

An example of management objectives, indicators, and standards may be helpful. Review of the Wilderness Act of 1964 suggests that areas contained in the National Wilderness Preservation System are to be managed to provide opportunities for visitor solitude. Thus, providing opportunities for solitude is an appropriate management objective for most wilderness areas. Moreover, research on wilderness visitors suggests that the number of other visitors encountered along trails and at campsites may be important in determining the quality of the visitor experience in wilderness. Thus, trail and camp encounters may be key indicator variables and help to make the general management objective of solitude operational. Further research suggests that wilderness visitors often have normative standards about how many trail and camp encounters can be tolerated before the quality of the visitor experience declines to an unacceptable degree (Heberlein et al. 1986; Vaske et al. 1986; Whittaker and Shelby 1988; Roggenbuck et al. 1991; Shelby and Vaske 1991; Lewis et al. 1996). This type of information can help managers formulate standards of quality. By defining indicators and standards of quality, carrying capacity can be determined and managed through a monitoring program. Indicator variables can be monitored over time and once standards have been reached, carrying capacity has been reached as well. This approach to carrying capacity is central to contemporary outdoor recreation management frameworks, including Limits of Acceptable Change (LAC) (Stankey et al. 1985), Visitor Impact Management (VIM) (Graefe et al. 1990), and Visitor Experience and Resource Protection (VERP) (National Park Service 1997).

Application of indicators and standards of quality

The VERP framework noted above was developed by the National Park Service to guide carrying capacity and related outdoor recreation. VERP was initially applied at Arches National Park, Utah. Visitation to Arches increased 91 percent in the decade of the 1980s, and the park now receives more than three-quarters of a million visits annually.

A social carrying capacity research program at Arches was approached in two phases. Phase I was aimed at identifying potential indicators of quality of the visitor experience (Manning et al. 1993). Personal interviews were conducted with 112 visitors throughout the park. In addition, another 83 people expressed their views during 10 focus-group sessions with park visitors, park staff, and local community residents. Respondents and participants were selected through a purposive rather than random sampling procedure. Thus, data are primarily qualitative in nature. The purpose of this exploratory effort was to begin learning about a variety of human-use aspects of visitation to Arches and to develop insights into potential indicators of the quality of the visitor experience. Interviews and focus-group sessions were guided by a standardized questionnaire.

The questionnaire contained two major sections that focused on identifying potential indicators of the quality of the visitor experience. The first section contained a battery of open-ended questions that probed for park conditions and issues that visitors and others considered important to determining the quality of the park experience. The second section of the questionnaire contained a battery of closed-ended questions that also probed for indicators of quality. Fifty-three wide-ranging park conditions or issues were presented to respondents, who were asked to indicate whether each item was considered a "big problem," a "small problem," or "not a problem"; a "no opinion" option was also presented. The items were developed based on literature review, discussion with park planners and staff, and personal observations in the park.

Findings from this first phase of research provided important insights into park conditions and issues that add to or detract from the quality of the visitor experience at Arches National Park. Potential indicators of quality range widely, spanning a variety of categories, including:

- orientation, information, and interpretive services;
- visitor facilities;
- visitor crowding;
- visitor behavior and activities;
- resource impacts of visitor use;
- park management activities; and
- quality and condition of natural features.

Phase II research had two objectives: (1) to determine the relative importance of indicator variables, and (2) to assist in setting standards of quality for selected indicator variables (Lime et al. 1994). A survey of park visitors was conducted at several locations throughout the park. The survey was administered to a representative sample of park visitors and was conducted by means of both personal interviews and mail-back questionnaires.

The survey instruments contained two major sections related to carrying capacity. The first section focused on determining the relative importance of indicator variables identified in Phase I research. Fourteen indicator variables were distilled from the previous phase of research and respondents were asked to rate the importance of each variable in determining the quality of their experience at the particular location in the park where they were interviewed. This section of the questionnaire was needed for two reasons. First, Phase I research was qualitative in nature; its purpose was simply to explore for potential indicator variables. Phase II research had to be quantitative: respondents were asked to rate the relative importance of these potential indicators of quality. This required a larger and more representative sample. Second, investigators hypothesized that indicator variables might vary by location within the park. Sampling was conducted in all of the major zones within the park and questions were keyed

directly to those specific areas. Study findings helped identify the most important indicator variables in each area of the park.

The second major section of the survey questionnaires was directed at determining standards of quality for selected indicator variables. Three indicator variables received special attention: (1) the number of people at one time at major attraction sites within the park, (2) the number of people at one time along trails, and (3) the amount of environmental impact to soil and vegetation caused by off-trail hiking. All three of these variables were addressed by a series of photographs that illustrated a range of impact conditions. Photographs were developed using a computer-based image capture technology (Chenoweth 1990; Lime 1990; Nassauer 1990; Pitt 1990). Base photographs of park sites were taken and these images were then modified to present a range of impact conditions. A set of 16 photographs was developed for each attraction site and trail. Each photograph presented a different number of visitors present. An analogous set of photographs was developed for a range of environmental impacts caused by off-trail hiking. Respondents rated the acceptability of each photograph. Representative photographs are shown in Figure 1.

Study data were used to help select standards of quality for each zone within the park. The following example illustrates the nature of these data and how they can be used in setting standards of quality. Delicate Arch is a major visitor attraction in the park. Because of its importance and uniqueness, this feature, along with the trail corridor serving it, was established as a separate zone within the park. Study findings suggested that the number of people at any one time at Delicate Arch is an important indicator variable. Thus, a series of 16 photographs presenting a wide-ranging number of people at one time at this feature was developed as described above.

Respondent ratings of these photographs are graphically illustrated by Figure 2. The line presented in this figure is a regression line representing the best fit between the number of people in each photograph and acceptability ratings. There is a strong relationship between these variables, with the number of people in the photographs explaining 49 percent of the variance in acceptability ratings ($F < 0.0001$). The type of curve shown in Figure 2 is generally referred to as a social norm (Shelby and Heberlein 1986; Vaske et al. 1986). Social norms can be useful in helping to formulate standards of quality. This is especially so when, as is the case with Delicate Arch, there is a considerable consensus among respondents about the social norm.

The literature on social norms suggests three potential points along the norm curve that might be used to help formulate a standard of quality. The first point is defined as the highest point along the curve, and might be referred to as the optimum. Study findings from Delicate Arch indicate that photograph 1 (Figure 2), with no visitors in the scene, is rated as most acceptable; thus, zero people at one time might be considered a standard of quality. However, this clearly is not feasible given the demand to see this popular feature.

A **B**

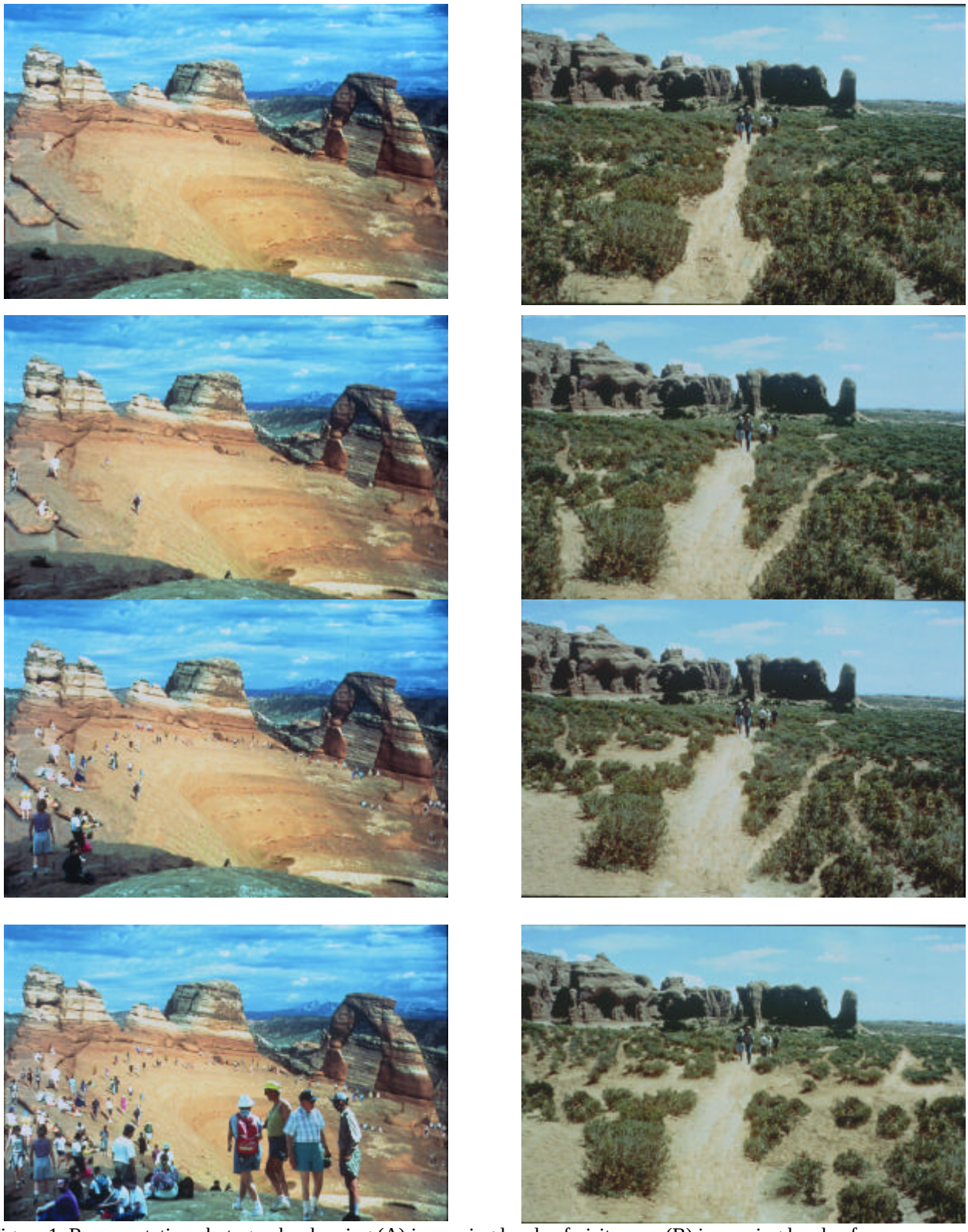

Figure 1. Representative photographs showing (A) increasing levels of visitor use (B) increasing levels of environmental impact

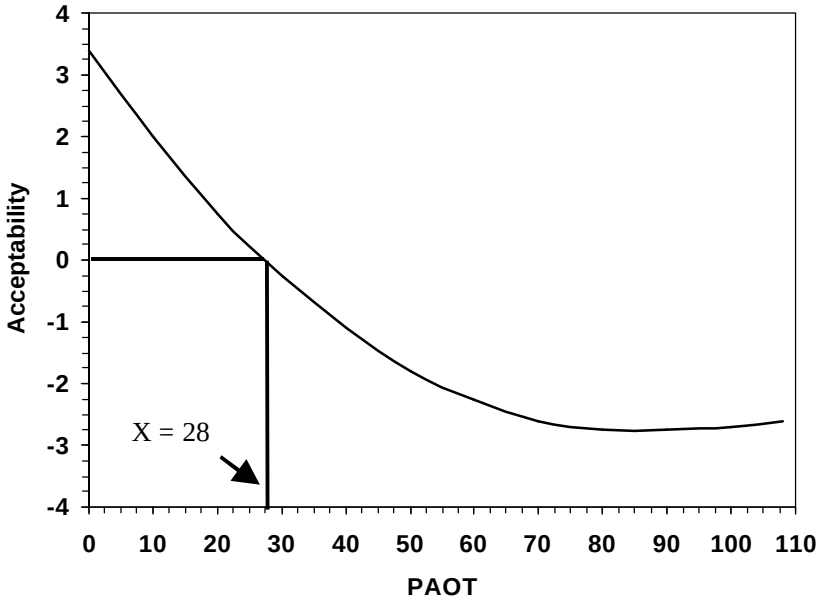

Figure 2. Relationship between number of people in photographs and acceptability ratings for Delicate Arch,

The second point is defined as the point at which the norm curve crosses from the acceptable range into the unacceptable range. This might be called the minimum standard of quality. For Delicate Arch, the norm curve crosses into the unacceptable range at 28 people at one time, as indicated in Figure 2.

The third point that might be used to help formulate a standard of quality is defined by any inflection points along the social norm curve. An inflection point is a point along the norm curve that falls (or rises) especially steeply. Inflection points may represent thresholds of tolerance (or preference) among the sample population. However, there are no inflection points along the norm curve for Delicate Arch.

Given the above findings, a standard of quality of maximum of 30 people at one time was set for Delicate Arch. This was based on the figure of 28 people at one time, as noted above, but rounded up slightly to reflect the extreme demand to see this important natural feature. Study findings were used to help set other standards of quality throughout the remaining zones in the park.

Conclusion

Indicators and standards of quality can play an important role in the management of outdoor recreation on public lands, and are the focus of contemporary carrying capacity and related outdoor recreation management frameworks, including Limits of Acceptable Change and Visitor Experience and Resource Protection. Indicators of

quality are measurable, manageable variables that help define resource conditions and the quality of the visitor experience. Standards of quality define the minimum acceptable condition of indicator variables. Indicator variables are monitored and management action is taken to ensure that standards of quality are maintained. Research at Arches National Park illustrates how indicator and standards of quality can be applied to outdoor recreation management.

Research is warranted on several aspects of indicators and standards of quality. First, more research is needed on identifying and formulating indicators and standards of quality. Within the biophysical domain, what variables best reflect the integrity of natural and cultural resources? Within the social domain, what variables best reflect the quality of visitor experiences? Once indicators of quality have been identified, how can research be used to guide formulation of appropriate standards of quality? Second, research is needed on developing and testing monitoring techniques and procedures. Monitoring indicator variables can be time-consuming and costly. How can monitoring be made more efficient and effective? Finally, more research is needed on testing the effectiveness of alternative outdoor recreation management practices. Management is needed to maintain a standard of quality. But which management practices are most effective, and under what conditions do they apply?

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Communication Campaigns for Wildlife Management[8]

Alan D. Bright[9]

Communications generally inform, educate, or persuade their audience. The most common function of communication for wildlife agencies is to inform the public of management practices and to educate about biological processes (Stout and Knuth 1993). Wildlife recreation information often includes available opportunities, regulations, ethics, and techniques for participating and may even work to change the public's beliefs and attitudes toward management methods or goals. Some communication efforts have had enormous influence (Rice and Atkin 1994), illustrated by the dramatic public awareness of Smokey Bear after extensive informational campaigns (McNamara et al. 1981). However, such success is usually limited by time and money (Pierce and Manfredo 1997). The purpose of this paper is to review a process for developing an information campaign that may be applied to wildlife management.

Developing an information and education program for wildlife viewing

The conceptualization, development, implementation, and evaluation of an information program can be described using six phases.

Phase 1. Determine the Objectives of the Information Campaign
Phase 2. Identify Target Audience(s) in the Campaign
Phase 3. Define the Target Audience Response to the Campaign
Phase 4. Develop the Message
Phase 5. Select the Media Strategy and Implement the Campaign
Phase 6. Evaluate the Information Campaign

This process is applicable in determining the overall communication plan for wildlife management and in developing the individual information products. For example, state wildlife viewing guides have become one of the important products and symbols associated with agency viewing programs. However, their production requires two questions that are often overlooked. First, how does the viewing guide fit within the

[8]Bright, A. D. 2000. Communication campaigns for wildlife management. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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overall or statewide plan for the agency's viewing program? Second, what are the objectives for producing the guide and how can they be addressed within the guide using good principles of communication and information design? Most viewing guides follow a typical format, describing wildlife which may be viewed in the state and where. While this information addresses a specific need, it may be advantageous to identify whether other information should be included (e.g., general guidelines on viewing), whether there are ways to increase interest (e.g., including other photos and pictures of viewers in the field), and an actual evaluation of its effectiveness. It should also be considered whether other types of information about wildlife viewing should be provided using media other than the traditional viewing guide. Similar questions should be addressed for other types of information programs.

Phase 1. Determine the objectives of the information campaign

This phase addresses the question: *Why are you providing information?* Objectives provide the starting point for developing the campaign strategy and establishing the standards by which success of the campaign can be measured. Objectives also may indicate the connection between the information program and the service philosophy of the wildlife agency. Objectives should be realistic, measurable, precede decisions about messages or media, and specify a completion date.

Phase 2. Identify target audience(s) in the campaign

This phase addresses the question: *To whom will the information be provided*? This involves identifying specific target audiences and determining whether those target audiences are relevant to the goals and objectives of the information campaign. This information is used to determine the strategy that will be used to provide information about wildlife viewing.

Segmenting target audiences. Target audiences may be described in terms of "target descriptors" of individuals making up that segment. Target descriptors can relate to geographic (e.g., residence), sociodemographic (e.g., age or gender), psychographic (lifestyles, benefits desired), and behavioral (e.g., skill level or season of participation in wildlife related activity) characteristics.

Criteria for viable target segments. The public may vary from several target segments to only one. Regardless of the number of segments, it is important to determine what segments are useful as target audiences for a particular information and education program. For a single segment to be useful it must exhibit five characteristics. First, target audience segments must be *pertinent* to the goals and objectives of the agency and the information campaign. Second, the agency should be able to measure the characteristics by which the segment is based (*measurability*). Third, the segment must be reachable with communications (*accessibility*). Fourth, the segment should be large enough to merit spending resources on the information

program (*substantiality*). Traditionally, "large enough" suggests the segment be profitable. However in a social marketing sense, large enough means that the social need of providing the information to the segment, regardless of size, be considered. Fifth, the most crucial criterion is that segments respond differently to a communication strategy (e.g., they are looking for different experiences from hunting).

Strategies for reaching the target audience(s). There are several kinds of strategies for reaching your target audience(s). In an *undifferentiated strategy*, the target audience is treated as one group with similar needs and interests. Under a *differentiated strategy*, distinct target audiences with varying needs and interests receive information that differs in content and/or media channel. In a *concentrated strategy*, differences among target audiences and their needs and interests are served with information targeted to only some segments. For example, an information campaign about wildlife viewing experiences might be developed and focused solely on ecotourists. The decision about the appropriate strategy is based primarily on the nature of opportunities available, wildlife viewing audiences, and available funds. For example, an agency may choose a concentrated strategy because it does not have enough resources to focus on the entire population or to design several specific campaigns. An undifferentiated strategy is best if the audience is homogeneous in the types of wildlife viewing experiences they prefer.

Phase 3. Define the target audience response to the campaign

Once the target audiences have been identified, desired responses to the information should be determined consistent with the objectives developed in phase 1. The desired responses to an information program can be described using the AIDA model (Fine 1991). This model addresses four levels of response to an information campaign: attention (including awareness and knowledge), interest, desire, and action. It is based on the idea that to influence behavior, recipients of information must first go through attention, interest, and desire phases. However, not all information campaigns have behavior change as their ultimate goal. Some campaigns may have, as a primary objective, increasing knowledge of the public for its own sake.

The first response level is *attention*. Attention focuses primarily on increasing the target audience's awareness and knowledge of the wildlife agency, issues related to wildlife management, and wildlife viewing opportunities. The second response level is *interest*. The target audience may be aware of wildlife viewing opportunities, however, they may not have seriously considered participating. This stage attempts to motivate the audience to learn more. This may be done by not only focusing on the experiences and resources that are available to a target audience but also on the benefits to the target audience in taking advantage of specific wildlife viewing opportunities. The final response level is *action*. At this stage, the audience is encouraged to take some action, including actually participating in wildlife viewing activities or less physical behavior, such as support for specific wildlife management

activities. Information should focus on the benefits of participation as well as the removal of perceived constraints to participation.

Phase 4. Develop the message

This phase addresses the question: *What kinds of information will you provide?* The extent to which a target audience receives, pays attention to, understands, remembers, and/or responds to an information and education campaign depends on the content and execution of the message. Characteristics of the target audience should be considered in encouraging effectiveness of the message. However, there are several key considerations for increasing the effectiveness of an information program.

The effectiveness of the information program. The most effective way to obtain the desired response from the target audience is to insure that they pay attention to and think about the message. Several factors influence whether an individual will elaborate on information provided in a message (Bright and Manfredo 1993).

- Make sure the language used in the message is consistent with the knowledge and education level of the audience. Technical jargon should be avoided unless it is an important part of the message and is adequately explained.

- Where possible, combine visual or audio (nonverbal) elements of an information campaign with the written or spoken word (verbal). This increases the ability of the target audience to comprehend and retain information.

- Repeating a message affects comprehension and persuasiveness. This is done by presenting the same message several times, repeating the message in different formats, or using several sources to present the message.

- It is important to make sure that the information provided is relevant to the experience the target audience desires.

- The message should be geared toward the knowledge and experience level of the audience for which it is intended.

- If the target audience perceives the agency has expertise or knowledge related to the issue and is also trustworthy in providing information, they are more likely to consider the information and accept it.

Phase 5. Select the media strategy and implement the campaign

This phase addresses the questions: *How and when will the information be provided?* Although we describe selection of the media strategy as a phase following development of the message, it is likely that these two phases will be addressed at the

same time. The media planner should also consider what media would be best to present those messages. Selection of the media involves determining the major media category, selecting the specific media vehicle, and deciding media timing.

Step 1. Determine the major media category. There are many categories of media for an information campaign, each with advantages and disadvantages based on cost and ability to reach the target audience. The main considerations in determining media type are (1) the media habits of the target audience, (2) the nature of the "product" and its suitability to the media type, (3) the timing and complexity of the message, and (4) the cost.

Step 2. Select the specific media vehicle. The next step to selecting the media strategy is to decide which specific vehicle should be used. Factors such as circulation data for specific media vehicles as well as cost data for different advertisement sizes, color options (if applicable), advertisement positions (e.g., within a newspaper or magazine), and quantities of insertions (e.g., for brochures) should be considered. In addition, qualitative characteristics like credibility, prestige, geographic editioning (different editions of the same magazine or newspaper), reproduction quality, and psychological impact are important.

Step 3. Decide media timing. The third step in selecting the media strategy is to decide the timing of the campaign. The first option is *seasonal timing*. Most wildlife-based recreation experiences, such as viewing migratory birds or hunting elk, take place during a particular time of year. Information campaigns about specific wildlife-related recreation experiences should coincide with these times to help target audiences plan for trips.

A second option is *short-run timing*, distributed during a short period. A *burst pattern* concentrates all exposures in a short space of time, such as one day. For example, information about elk viewing opportunities during the fall might be included as a supplement to the Sunday newspaper. This can create both attention and interest. A *continuous pattern distributes* information evenly throughout the period. An example is daily public service announcements, describing opportunities to view elk, aired on the radio throughout the week as well as on weekends. A third way is an *intermittent pattern*, where small bursts of information are provided in succession with none occurring between bursts.

Phase 6. Evaluate the information campaign

This phase addresses the question: *How will you measure achievement of your communication objectives?* Unfortunately, evaluation of the communication program or message delivery is typically overlooked. However, unless an evaluation is conducted, the organization will not be able to determine whether their efforts were successful, especially in terms of meeting objectives.

Summative or impact evaluation. The most common type of program evaluation is *summative or impact evaluation*. It is conducted once the media messages have been developed and the plan implemented. The purpose of this type of evaluation is to determine whether the information campaign was effective in achieving its goals and objectives. There are three reasons that summative evaluation of an information campaign is conducted. The first reason is *accountability*. For example, government organizations such as a wildlife management agency are naturally interested in justifying the public money spent on an information campaign by answering the question: "Did it work?" Second is *replication and generalizability*; that is, the extent to which the information campaign can be repeated or revised, and whether it can be used in other situations. Third is an *assessment of organization objectives*. Summative evaluation can determine whether the agency is meeting its overall goals and objectives and/or the need to establish new objectives.

Three evaluation models describe an impact evaluation. The *advertising approach* surveys a random sample of the target audience. The survey is designed to learn whether the target audience (a) recalls and recognizes the message, (b) likes the campaign materials, and (c) intends to act on their new knowledge and attitudes. The *impact-monitoring approach* tracks the impacts that occur as a result of the information campaign. This includes monitoring the number of requests for information about a particular wildlife viewing opportunity or actual visitation to the site at periodic intervals following the campaign. The *experimental approach* systematically compares groups exposed to the information campaign to those not exposed to the information. This approach helps identify whether exposure to the campaign is the cause of behavior.

Future research

Future research should focus primarily on the following areas:

- Identification of different segments of wildlife management stakeholders. Wildlife management is important to different segments for very different reasons. These differences will affect the types of information that these groups should receive as well as the media used to reach these groups.

- Determination of the types of messages that are most effective. Basic research in social psychology is going on to determine the types of messages that are most effective at educating the public as well as influencing public behavior. Researchers in the field of natural resource and wildlife management should contribute applied research to determine the most effective types of messages for their audiences.

- Underlying the above two research suggestions is the need for improved methods of evaluating information programs. The final step of developing a communication campaign, evaluation, is often done poorly if at all. However, evaluation is a key activity that insures that the goals and objectives of an information campaign are met and that future campaigns are done effectively.

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Estimating Visitor Use[10]

John B. Davis[11]

Background information

Need for this study

In *Fulfilling the Promise,* Recommendation P2 (Update the National Public Use Requirements), the U.S. Fish and Wildlife Service has promised to make public use reporting consistent and accurate (U.S. Fish and Wildlife Service 1999). Each year more people are visiting parks, natural areas, and outdoor recreation sites of all types, including National Wildlife Refuges. Public use figures collected between 1995 and 1999 by refuges and reported in the Refuge Management Information System (RMIS) database show an increase from 27.6 million to 31.4 million visitors.

However, the actual process by which data is collected is haphazard, with each refuge using its own methods with varying degrees of accuracy and reliability. Obstacles to improving public use estimation include a lack of information about how to measure the number of visitors using refuges and waterfowl production areas, budget and staff constraints, and the cumbersome process to receive public survey approval. Staff charged with reporting public use figures continue to experience frustration with the gap between the reports and the reality.

In *Fulfilling the Promise,* at least three specific needs are identified requiring accurate data about the number of visitors, namely, to

1. evaluate existing levels of service to the public,
2. document results of public use programs, and
3. demonstrate accomplishments to the Congress and the American people.

To meet these needs, the U.S. Fish and Wildlife Service has promised to develop a system-wide visitor counting handbook and train refuge staff to report visitor use accurately and consistently and evaluate the quality of visitor experience. This paper is essentially a summary of the first draft version of the handbook. The techniques are based on those developed in the 1970s by Mischon and Wyatt (1979) for the U.S. Army Corps of Engineers, with modifications appropriate to the conditions found in

[10]Davis, J. B. 2000. Estimating visitor use. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications,* eds. Fulton, D. C, K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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National Wildlife Refuges and Wetland Management Districts. A series of site-specific field tests of the sampling methods is currently being conducted in cooperation with the staff of nine refuges. From the results of the field tests, the applicability of the methods to the typical conditions within the Refuge System will be assessed, and a plan prepared for the application of the methods to all units within the system.

Important terminology

For the purposes of this paper and the subsequent handbook, four terms must be defined: visit, project, area, and site.

Visit. A visit is entry of one person into a public area to engage in one or more activities. This is a headcount only, and does not indicate the duration of the activity or the length of the stay. In many instances, the term *visit* and *visitor* are *not* synonymous. A single visitor may enter a public use area more than once in a single day, but many counting techniques are designed to record each visit.

Project, Area, and Site. Hierarchical terms—project, area, and site—that distinguish between different levels of physical layout or organization of a facility. A *project* is generally a single management entity, and is usually composed of several public-use *areas*, and each area may have one or more *sites*. As an example, a National Wildlife Refuge is a *project* within the meaning of this paper because it is a recognized management entity responsible for tracking and reporting public use. Within a particular refuge, one *area* may be designated for hunting of upland game birds during appropriate seasons. For access to the hunting area, refuge management may designate a parking lot, a *site*, where hunters obtain a self-registration permit before entering the area.

Resource settings

National Wildlife Refuges, perhaps more than any other outdoor recreation resource, are not uniform in their setting. The *setting* of a resource is determined by the level of managerial control over access to the resource and by the degree of dispersion of the recreation opportunities within the resource. Based on these variables, there are three important types of resource setting that include many National Wildlife Refuges.

Controlled access, primarily by vehicles through a gated or monitored entrance, to recreation opportunities concentrated along roadways. These are resource settings that are representative of many, but by no means a majority of refuges. Examples of this type would include refuges with entrance fee stations or those with a single primary entrance road. Even if access is not currently controlled, the fact that there is a single entrance makes it possible to count all visitors.

Multiple access through open or unregulated roads or trails to recreation opportunities concentrated along roadways or at developed sites. In many instances access will be by vehicle, possibly along state or county roads or through open refuge roads. However, for refuges in populated locations, access by foot or bicycle from adjacent property, especially over trails, may be important. Likewise, significant use may occur during the hours between the closing of refuge offices and the onset of darkness when most refuges are closed to public access.

Multiple access through open or unregulated roads, trails, or waterways to dispersed recreation opportunities that are not concentrated along roadways or are very numerous or widely separated. Examples of this setting include refuges where access is gained to rivers, lakes or impoundments within the refuge, either by land from refuge boat launches or from open waterways. Even in cases where the launch points are all controlled by the refuge, counting may be problematic if the launch areas are widely distributed or accessed from non-refuge roads. Wetland Management Districts also fit within this category because of the widely dispersed nature of the areas within the project.

This paper will focus on the first two resource settings, which are typical of a majority of National Wildlife Refuges. Future studies will examine methods for estimating visitor use in dispersed areas.

Simplified model of visitor estimation

For the manager of a refuge, the task of counting visitors can be viewed in relatively simple terms. Because of the requirements of the RMIS framework, the manager must report both the total number of visits annually to the project for all purposes, and the visits for specifically identified activities such as driving a wildlife auto-tour or freshwater fishing. In addition, a manager may wish information regarding the use in specific areas of the project, in order to develop or revise maintenance plans or staffing allocations. Figure 1 is a schematic representation of a project containing three public use areas. In principle, the total number of visits to the project can be expressed as a simple formula:

$$\text{Total Visits} = \text{Raw Count} \times \text{Weight} \qquad (1)$$

The manager's task is to obtain a raw count of some attribute directly related to the number of visits, as well as any proportional multipliers, or *weights* needed to convert the raw count to actual visits. For example, many refuges collect raw counts of the number of vehicles that enter the project, but to calculate the number of visits, the raw count must be multiplied by the number of persons per vehicle. The average number of persons per vehicle is a *weight*.

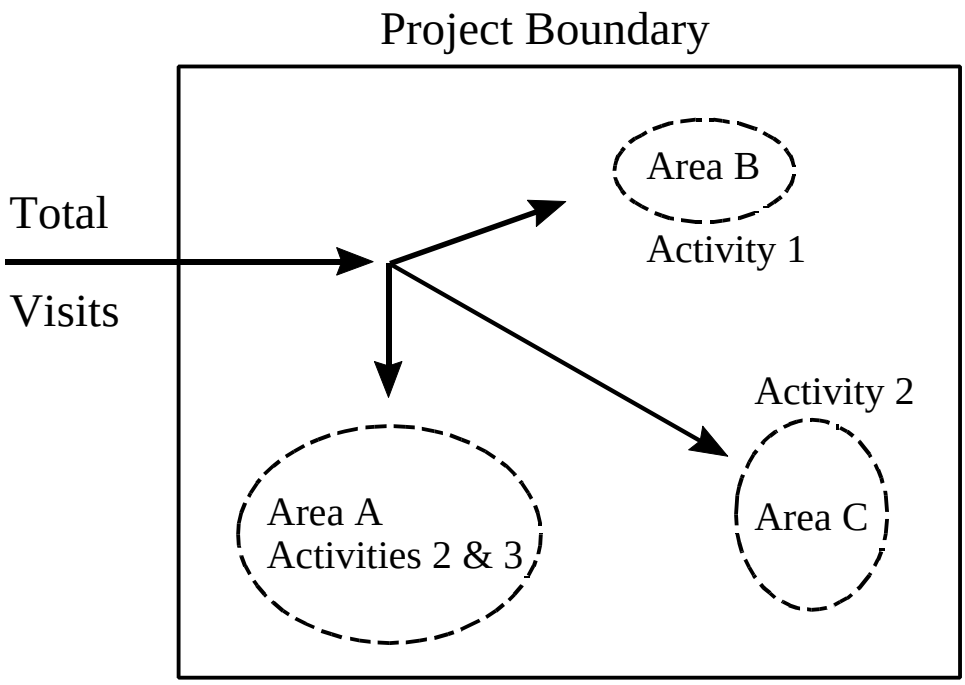

Figure 1. Simplified model of visitor use in an outdoor recreation resource. A single project, defined by managerial or administrative boundaries, may be composed of several recreation areas, each of which may provide sites for participation in specific recreation activities. Management is concerned with estimating the total number of visits as well as the number of activity days. The visitor may engage in one or more activities at different sites. Therefore, the number of activity days is generally greater than the total number of visits for the same period.

As shown schematically in Figure 1, once the visitors have entered the project boundary they may disperse to one or more wildlife-related activities. A basic principle of counting visitors is that the total number of visits does not equal the sum of all visitor activities, because a single visitor may engage in combinations of activities and because a single recreation area within the project may include more than one activity. The proportion of actual visits devoted to a particular activity is referred to as the *load* or *load factor* for that activity, and represented by the following equation:

$$\text{Activity Visit} = \text{Total Visits} \times \text{Activity Load Factor} \qquad (2)$$

The load factor is simply the percentage of total visits devoted to the activity. If all visitors engaged in every activity, then all load factors would be one (1.0). In practice, they are always less than one. In order to report activity visits, the manager must either have a reliable estimate of the total number of visits and the load factor for the activity, or directly determine the number of visitors who engage in the activity.

Techniques of visitor estimation

Both weights and load factors may be estimated using a variety of techniques. Regardless of the technique chosen, weights and load factors should be determined by a *reliable, planned, documented* methodology. Mischon and Wyatt (1979) identified five techniques of collecting data about the number of visitors: self-registration, entrance fees and use permits, direct observations, indirect estimation, and surveys. Each of these techniques is being used successfully today in the National Wildlife Refuges, although no single technique is appropriate to every situation.

Self-registration

This category includes guest books at Visitor Centers, trail registers, and non-quota hunter or angler permits. In many cases the respondent is asked to indicate the number of persons in the party, the types of activities engaged in, and the length of their stay. Information about the types of activities engaged in is particularly helpful because it can be used to estimate load factors. Although self-registration tools are inexpensive and may be the only feasible methods at remote trail-heads or parking areas, accuracy of the counts is always limited by uncertainty about the degree of compliance. Many visitors clearly do not bother registering. Repeat visitors are highly unlikely to register each time they visit.

Entrance fee stations and use permits

Entrance fees may be collected at a staffed entrance station, a self-pay station such as an "iron ranger," or at a visitor center. Examples of use permits, both with and without fees, include campground registration, day use permits for river access or quota permits for hunters and anglers. Although entrance fees are a valuable source of data regarding trends in the number of visitors, they do not provide complete information about the number of visitors unless there is a staffed fee booth where all visitors must stop before entering the refuge. For a refuge that requires a self-pay entrance fee but does not require holders of annual passes, Duck Stamps or Golden Eagle permits to register upon entering, the entrance fees will represent only a fraction of total visits. In contrast, use permits are much more accurate sources of information for particular activities, such as boating or quota hunts, especially if it is known that the refuge devotes significant time to permit checks and enforcement.

Direct observation

Direct observation includes any method where an individual visitor is monitored visually or by video camera. Obviously, direct observation can provide highly accurate counts, but is extremely time-intensive and capital-intensive. One very common method of direct observation is to have a receptionist, volunteer or staff member "click

in" each visitor who enters the visitor center or contact station, on a hand-held tally counter. Direct observation also includes situations where a volunteer or staff member conducts a tour, workshop or class for a group of visitors, and the number of participants is determined by direct count. Direct observation in the field is most valuable if it is incorporated as a periodic supplement to other counting methods to obtain estimates of weights or load factors, and if it can be conducted by volunteers, interns, or Y.C.C. workers under the supervision of a regular staff member.

Indirect estimation

Indirect estimation includes some of the most frequently used methods of estimating visitor use, such as traffic meters and door counters, the number of brochures dispensed at kiosks, or the number of automobiles parked at a particular area. All these are considered indirect because the visitors themselves are not observed. What is observed is some sign or evidence of their visit. For example, a traffic counter may record the number of vehicles passing a road, but it does not record the number of persons in the vehicle. In spite of this uncertainty, in many cases indirect estimation techniques represent the most cost-effective methods of acquiring large amounts of data without tying up staff hours.

Surveys

In the category of surveys are such tools as mail-back questionnaires placed on windshields, traffic-stop surveys conducted by volunteers, contractors or staff, contracted telephone or mail surveys, and hunter reports at check-in stations. If conducted properly, surveys are extremely accurate. They can provide a wealth of information about weights and load factors such as the number of persons per vehicle, the type of activity each party participates in, and even marketing information such as demographics and user preferences. However, surveys are expensive. One additional complication is that surveys used on federal lands must be approved through a formal Office of Management and Business (OMB) procedure requiring significant advance notice.

Case studies

As an illustration of the general concepts of estimating visitor use, and the application of some specific techniques, two case studies are presented that are typical of conditions in the National Wildlife Refuges. Although neither case study represents a specific refuge, all details are based on observation of actual techniques.

Case study 1: Example of estimating total visits to an area

This case study involves a single recreation area rather than an entire project. The focus of the area is a boat ramp giving access to a project lake where fishing is allowed. The area includes a parking lot, several picnic tables, an interpretive kiosk describing the lake and birds that may be observed in the vicinity, and a comfort station. The kiosk also dispenses Refuge brochures, including a bird list. There is only one road into the area. Hours are from daylight to dusk. Use is highly seasonal, with the majority of visitors using the area from mid-May to mid-September.

The goal in this case study is to determine the total number of visits to the area. Recall from the simplified model of estimating visitor use that the total number of visits to a project or a specific area is found from equation (1). In this example, a traffic counter is placed on the outbound lane of the entrance road to the area so the raw count is the number of vehicles leaving the area that cross the counter in a specified period. However, the traffic counter cannot distinguish between visitors and staff. The raw count will always be too large and must be adjusted by subtracting administrative use, as follows:

Net (Adjusted) Count = Gross (Raw) Count - Administrative Use (3)

Once the net count has been determined, it is multiplied by one or more weights to obtain the actual number of visits. Figure 2 shows the steps in the process of calculating the number of visits per month using a traffic counter.

Case study 2: Example of using load factors

The second case study deals with an entire project, a National Wildlife Refuge including a Visitor Center staffed 8:00 a.m. to 4:00 p.m., and a one-way auto tour with brochures dispensed at an interpretive kiosk. A county road passes through the refuge, and access to a refuge fishing area is obtained from the county road. The refuge is within 15 miles of a town of 5,000, and receives a significant amount of use by local citizens, particularly in the evening. The fishing area is especially popular with local youths, but appears to receive little use from other refuge visitors. There is an "electric eye" counter on the Visitor Center door, and a self-registration guest book with columns for the visitor to indicate which public uses they will be engaged in. There is one traffic counter available, which uses a buried, pressure-sensitive transducer. The counter's electronics can be set with a delay in order to count only one axle per vehicle.

In this case, there is no direct measure of the total number of visitors because of the multiple entries and through-roads. However, the total number of visitors is related to the three activities, symbolically represented by the load factors L_1 (visitor center), L_2

1. *Raw Count* = Traffic Meter Count for a one-month period.
   N_i = 4000 (counter reading on the last day of the current month)
   N_{i-1} = 2800 (counter reading on the last day of the previous month)

   Counts / Month = $N_i - N_{i-1}$
   = 1200

2. The meter counts once per axle. Because the primary focus of the area is the boat ramp, most vehicles will be drawing a trailer. Therefore the first weight, or multiplier W_1 is approximately 1/3 or 0.33. If many vehicles with only two axles use the road, the weight will have to be adjusted by periodic direct observation of a sample of all vehicles.
   Total Vehicles = (Counts / Month) × W_1
   = 400

3. Administrative uses account for an average of 10 trips per week, or 40 per month.
   Visitor Vehicles = Total Vehicles – Administrative Trips
   = 360

4. The second weight or multiplier, W_2 represents the average number of persons per vehicle. The value of W_2 must be determined by direct observation of a sample of visitor vehicles. In this example, W_2 is equal to 3.0
   Number of Visitors = Net Visitor Vehicles × W_2
   = 360 vehicles × 3.0 visitors/vehicle
   = 1080 visitors in this month

Figure 2. Example calculation of the number of visitors per month to the recreation area in Case Study 1. A traffic meter, which is classified as an indirect estimation tool, is the source of raw data for the estimation of visitor use. The road leading into the area is a dead-end at the boat ramp. The traffic meter is set up on the outbound lane of the area road, so it counts only vehicles leaving the area.

(wildlife loop) and L_3 (fishing pond). From the guest register in the Visitor Center, estimates can be obtained of the Load Factors. For example,

$$L_2 = (\text{Number of } \text{“✓”} \text{ in Auto Tour Column / Total Registered Visitors}) \quad (4)$$

For example, the visitor center register reveals that 60 percent of registered visitors indicate they intend to drive the auto tour, and 5 percent say they intend to stop at the fishing pond. Since all persons who registered stopped at the visitor center, the 60 percent who will drive the auto tour are all double-counts who will do *both* activities. From best-professional-judgement, it is also known that many people drive the auto tour after the visitor center is closed. Therefore, the wildlife loop visits account for the majority of the total visits, with the addition of a fraction of the visitor center visits and a fraction of the fishing visits. The number of visitors who drive the wildlife loop serves as a “base figure,” and the total estimated visitation can be found from that base figure. In Figure 3, this approach is used to develop a formula can that combines known numbers and estimated load factors:

1. The following weighted formulae are used to calculate actual counts from raw counts on the traffic meter “M” and the Visitor Center door counter:

Estimated Visitor Center Visits = Door Counts × W_1
Estimated Wildlife Loop Visits = Net Counts from “M” × W_2

with the following weights used:

W_1 = 0.5 visitors/count on door counter (each person counted going in and going out)
W_2 = 3.0 visitors/vehicle (from direct observation of a sample of visitor vehicles)

2. The number of persons who fish at the pond is determined by periodic sampling of the number of cars in the parking lot at the pond,

Estimated Fishing Visits = (Average vehicles/day) × (30 days/month) × W_2

3. In this example, suppose

Estimated Visitor Center Visits = 20,000
Estimated Wildlife Loop Visits = 60,000
Estimated Fishing Visits = 3,000

From the load factor for wildlife visits, 60% of visitor center visits are also wildlife visits, so a correction for double counts is applied:

Double Counts for Auto Tour = Estimated Visitor Center Counts x 0.60
= 12,000

The correction for the number of people who stop at the visitor center and also go fishing will be

Double Counts for Pond = Estimated Visitor Center Counts x 0.05
= 400

4. The total estimated visitation to this project is,

Total Estimated Visits = 60,000 + (20,000 - 12,000) + (3,000 - 400)
= 70,600

Figure 3. Example of the estimation of total visits and specific activity visits. The base figure for calculations is the number of persons who drive the wildlife auto tour, determined from a weighted count of the number of vehicles that activate a traffic counter.

Total Estimated Visitors = -Wildlife Loop Visits +
(Visitor Center Visits - Double Counts) +
(Fishing Visits - Double Counts)

However, because not all visitors will stop and sign the register, there is a possibility of sampling bias if a particular type of visitor, like a bird watcher, is more likely to sign in than a group of local youths who head straight for the fishing pond. As a check of the accuracy of the load factors, it is necessary to conduct periodic direct observation samples to evaluate the number of vehicles involved in each activity. At this station, the vehicle count is already conducted at the fishing pond. A sampling schedule could be designed to do the same thing periodically for the auto tour and the visitor center parking lot. This method will also establish how many vehicles are engaging in multiple activities.

Future directions for research and discussion

At present, the requirements of the RMIS reporting framework will continue to dictate what type of information about visitor use will be collected on National Wildlife Refuges. However, many refuge managers and outdoor recreation planners have raised important questions about the circumstances under which people are considered visitors to a refuge, and the relative importance of specific categories of visitors to the total annual count. The answers to some of these would require policy statements on a national level by the Refuge System and the Fish and Wildlife Service. The issues are listed here as a question for future discussion, "*Whom should we be using time, money and energy to count?"*

- Only those visitors engaged in the "big six" priority public uses: hunting, fishing, wildlife observation, photography, interpretation, and environmental education?
- Only those who actually know they are on a refuge?
- Persons who are driving through the refuge, especially if they are on a local, state or federal highway but do not actually stop at any refuge facilities?
- Persons who are hunting or fishing for subsistence but not recreation?
- Local visitors who use a refuge much like a convenient public park, especially after normal business hours, or visitors who come specifically to the refuge from a greater distance?
- Visitors engaged in recreational activities such as power-boating, swimming, snowmobiling or picnicking?

A related question is, *"Does it really matter how many people visit a refuge, or is it more important to know what impact they are having?"* The answer to this question is important for future decisions about the allocation of scarce management resources to visitor studies. If the answer is that impacts are more important, then the emphasis would shift away from simply estimating numbers to questions of visitor satisfaction, crowding, and social carrying capacity.

Regarding the future direction of research in the methods of estimating visitor use in the National Wildlife Refuge System, the development of a system-wide handbook is only the first step. Although the differences between refuge settings sometimes appear to outweigh their similarities, it would be helpful if the RMIS reporting framework included an electronic clearinghouse for the results of studies of visitor use. This would possibly reduce the amount of duplication of effort in estimating visitor use. One clear example is in the area of estimating the number of persons per vehicle. Many refuges use traffic counters to detect vehicles, but there is often a great mystery surrounding the multiplier for persons per vehicle. An electronic clearinghouse or bulletin board would be a place that refuges could post the results of studies they conducted about the number of persons per vehicle. It is unlikely that a national average value could be adopted, but managers would benefit by comparing their situations to those at other, similar stations.

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A Decision Process to Maintain the Quality of Recreation Resources and Visitor Experiences[12]

David W. Lime, Dorothy H. Anderson, and Theresa L. Wang[13]

A large Midwestern wildlife refuge managed by the U.S. Fish and Wildlife Service had witnessed rapidly-growing visitor use during the previous decade. The refuge was about 85 miles from a large metropolitan area that had experienced significant in-migration in recent years. The refuge also was 20 miles from a community of about 25,000 people where the population had remained relatively stable over the past three decades.

Much of the growth in visitation at the refuge, particularly on weekends, was attributed to an apparent surge in demand for camping in the refuge's three relatively small vehicle-access campgrounds. Each campground was adjacent to a water body (lake or stream), rustic in nature, contained about 25 sites well spaced from one another, provided well water for drinking and pit toilets, and was reached by at least 12 miles of gravel road from paved main highways.

A readily apparent impact of the increased demand for camping on the refuge was that designated sites in all three of the campgrounds were full by 5:00 p.m. on most Friday nights. By Saturday midmorning, overflow camping had spread to nondesignated locations both between existing sites and into numerous "open" and nonforested areas in and near the campground. At times the number of individual groups occupying a campground reached nearly 50—twice the number of designated sites!

Anecdotal data collected by managers suggested that much of the increased demand for camping was coming from the growing metropolitan area 85 miles away and that demand for camping

[12]Lime, D. W., D. H. Anderson, and T. L. Wang. 2000. A decision process to maintain the quality of recreation resources and visitor experiences. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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opportunities would continue. Discussions among affected staff sought to develop a plan to address the growing need for more camping spaces.

It was decided that the "simplest" solution to growing demand was to increase the size of all three existing campgrounds. Each campground was expanded to about 70 individual sites. The campground internal roads were altered and more sites were added. One new site was added between each original site. Because of the enlarged facility, a septic system was provided. Flush toilets and showers became a reality, and electricity was brought into the campground to accommodate an anticipated demand for growing electronic creature comforts. Access roads for two of the campgrounds remained gravel surfaces but were upgraded for increased traffic and higher speeds. The access road for the third campground was paved to accommodate anticipated traffic and easier access to a convenience store and a bait shop between the campground and the main trunk highway.

The campground "restoration" was completed during the off-season, and campers were exposed to the new facilities the following spring. The management employed at the three campgrounds had immediate and significant effects on the character of the areas and the kinds of camping and benefit opportunities provided. The drastic, as well as seemingly subtle changes in the design and types of facilities offered altered the character of the campgrounds to the point that they no longer appealed and were unsatisfactory to many previous visitors. A transition occurred in which the relatively small, informal campgrounds evolved into large, modern, intensively developed facilities. The resulting process of "creeping campground development" forced out those campers who sought solitude, a feeling of smallness, and more direct contact with nature.

In the above scenario, a management strategy was followed that resulted in perhaps more problems than it resolved. Campgrounds remained popular and were often filled to capacity or beyond on most summer weekends. Some overflow camping occurred, but not to the extent as before the restoration. A different clientele frequented the campgrounds, and new problems emerged including more littering, noise from dirt bikes, noise from loud radios played after dark, barking pets and pet droppings, and vandalism to restroom facilities.

Only one alternative (increasing the size of each campground) had been considered to address the growing demand for camping opportunities. This "off-the-shelf" solution

had been used in other refuges within the system, and conventional wisdom suggested "it worked." Campgrounds remained popular destinations and complaints were few.

Alternative management strategies probably should have been considered and their effects evaluated. In particular, the displacing of campers attracted to the original campgrounds should have been evaluated—especially because these campers primarily resided in the small community next to the refuge. Not only would these people have difficulty finding alternative camping opportunities to meet their desires and expectations, there is a good chance their support would wane for refuge programs in general at these and other areas.

A variety of management tactics and actions exist that could have been considered. The original small, informal campgrounds might have remained with aggressive surveillance and enforcement put in place to curtail overflow camping in nondesignated areas. Campers not accommodated would have to go elsewhere. Protecting the integrity of the original campground opportunities also could have been sustained by effectively informing interested visitors of other camping opportunities in the immediate area of the refuge—public as well as private. Furthermore, perhaps more attention should have been given to developing new campgrounds to cater to the expanding metropolitan campers increasingly seeking the refuge for outdoor recreation pursuits. Nearby private campgrounds also could be encouraged to help meet growing needs.

This hypothetical story is meant to illustrate how public resource managers can misdiagnose or underestimate problems and make decisions to resolve problems that can cause new and arguably greater biophysical and social impacts as measured by crowding, congestion, loss of visitor enjoyment, vegetation trampling, wildlife harassment, and related variables. Without thoughtful understanding of the nature and magnitude of recreation and visitor-caused problems, managers frequently employ strategies that are marginally successful or create as many problems as they solve. Such solutions are in search of a problem!

Introduction

Public land management professionals are increasingly challenged to meet a dual and seemingly conflicting mission—to protect and sustain natural and cultural resources for future generations as well as to provide high quality and enjoyable experiences for people. Many resource areas, both public and private, are threatened by many visitor-caused impacts. For some managers the situation is reaching crisis proportions. The biophysical environment is being damaged beyond acceptable limits and the people visiting these areas are no longer attaining the quality experiences and benefits they seek.

Managers, planners, and researchers have long wrestled with ways to address unacceptable visitor-caused resource impacts effectively, including crowding and congestion, visitor conflicts, trail and campsite deterioration, vegetation, wildlife, and water quality impacts, and noncompliant visitor behavior. Such impacts and dialogue

among resource professionals have led to a large body of information to support decisions to eliminate or reduce unacceptable visitor-caused resource impacts. Resource managers also possess a wealth of first-hand experience related to solving problems on the ground. But, the information is not always available. Managers do not always know what other managers have tried on the ground, and managers also do not always know how successful other managers have been in resolving visitor-caused resource impacts.

In the late 1990s, planners with the National Park Service's (NPS) Denver Service Center asked the authors to: (1) identify a decision process that managers could use to address unacceptable visitor-caused resource impacts, and (2) develop resources to support managers in that process. The process also should complement the NPS's efforts in implementing the Visitor Experience and Resource Protection (VERP) framework. VERP was developed to address issues of carrying capacity related to visitor-caused resource impacts and impacts to the quality of visitor experiences (Hof and Lime 1997; USDI, NPS 1997a, b). Although the handbook can be used by managers who have implemented VERP or other planning frameworks, such as Limits of Acceptable Change (LAC) and Visitor Impact Management (VIM), it also can be used by managers where such frameworks have not been applied or used to address visitor-caused problems.

The product of this cooperative venture with the Denver Service Center is a step-by-step, easy-to-use handbook for public land managers who have identified unacceptable impacts to resources and visitor experiences and want to act to eliminate them. Although the handbook was developed for use by NPS managers, it can be used effectively by any federal, state, county or local public land manager responsible for managing recreation use and resources.

The purpose of this article is twofold—to describe the decision process developed to address unacceptable visitor-caused resource impacts and to inform resource managers and planners of the availability of the handbook.

Understanding the decision process

The decision process for managing social and biophysical impacts of recreation use consists of five major stages: (1) problem awareness, (2) problem specification, (3) strategy and tactic selection, (4) plan implementation, and (5) monitoring (figure 1). Each stage is outlined briefly below.

Problem awareness

Problem awareness means managers recognize that a condition exists that has resulted in unacceptable impacts to the resource and/or visitor experience. It also means that managers realize these unacceptable impacts must be addressed. They may discover these impacts through their daily management routines, through interacting with the public, in

developing general or site management plans, or through ongoing efforts to monitor recreational use and use impacts.

Stage 1	*Problem awareness*	• Recognize that unacceptable impacts exist and must be addressed
Stage 2	*Problem specification*	• Identify impact(s) • Describe acceptable impact levels • Describe existing impact levels • Determine if existing impact is unacceptable • Identify root cause of impact
Stage 3	*Strategy and tactic selection*	• Select appropriate strategy • Identify potential tactics • Evaluate and select appropriate tactics
Stage 4	*Plan implementation*	• Develop implementation plan for selected management tactics • Identify specific management actions • Identify person(s) responsible for carrying out management actions • Implement actions
Stage 5	*Monitoring*	• Monitor effectiveness of actions • If problem arises, return to problem specification stage

Figure 1. Stages in the decision process for maintaining the quality of resources and visitor experiences.

Problem specification

The problem specification stage of the decision process consists of identifying specific resource and visitor experience impacts, describing acceptable levels for each impact, describing the existing level of impact, determining whether the existing impact is acceptable, unacceptable or approaching unacceptable levels, and describing the root cause of the impact. In the recent handbook by Anderson et al. (1998), a worksheet is used to document the problem, its impacts, whether the impacts are acceptable, and the cause of the impact.

The initial activity in the problem specification stage is to identify resource or visitor experience impacts. Identifying impacts can be done in a variety of ways. Managers can ask visitors through formal surveys or public meetings to identify impacts they see occurring. Or, if managers have established indicators and standards of quality for

resource and visitor experience impacts (e.g., using the VERP, LAC or some other framework), they can monitor standards over time to check the impact that visitor use has on the resource or the visitor experience.

Some more common impacts to the resource are trail deterioration, campsite deterioration, water pollution, wildlife and fishery impacts, and soil compaction (Table 1). Some more common visitor experience impacts are crowding, visitor conflicts, and noncompliant behavior.

Once impacts have been identified, the manager determines what an acceptable level is for each impact. If indicators and standards have been prescribed for an impact, then the acceptable level is the prescribed standard. If indicators and standards of quality do not exist, the manager needs to decide what is acceptable or how much impact can be tolerated before management intervention is required. These acceptable levels of impact can take the form of a "best educated guess." Managers may be helped in their decision process by involving visitors and other relevant stakeholders in discussions of acceptable levels of resource and visitor experience impacts. Past experience that managers may have had with a specific impact also may be useful in determining an acceptable level of impact.

After the acceptable level for an impact has been determined, the manager needs to describe the existing level of the impact. Where indicators and standards exist, the existing impact can be measured and recorded. Where they do not exist, the manager should describe in detail where and when the impact occurs, how much of it occurs, and who or what is impacted.

Determining whether an impact is acceptable or not can be done by monitoring standards, where standards have been implemented, and comparing values obtained through monitoring with previously established standards to determine if the existing level of impact is acceptable, unacceptable, or approaching unacceptable levels. Impacts outside established standards are unacceptable and should be addressed through appropriate management actions. Impacts that meet or are approaching the standard, although still acceptable, might signify deteriorating conditions. If so, managers should act accordingly to stop the deteriorating condition before it exceeds the standard. Impacts well within prescribed standards are acceptable and signify that no change in management is needed at this time.

When standards have not been established, determining what level of impact is acceptable is still possible. However, it can be a time-consuming and controversial task. Managers can ask visitors through formal surveys or public meetings if a specific impact is acceptable or not. Managers also can consult with resource experts to determine whether a particular impact is acceptable. For example, an expert panel of individuals could visit a site to offer their informed and collective ideas about a problem (Hof and Lime 1997). Such an interdisciplinary team could spend three to four days at a location exploring the site's purpose and significance, existing resources and existing conditions, and so forth. A

Table 1. Examples of resource and visitor experience impacts.

Resource Impacts

Trail deterioration, trail erosion, excessive trail muddiness, excessive trail width, excessive trail depth/development of tread ruts or grooves; development of social trails.

Campsite deterioration, excessive campsite size, loss of vegetation, erosion of campsite soils, proliferation of tent sites, depletion of dead and downed wood for campfires, proliferation of fire rings; proliferation of campsites.

Cultural resource deterioration, defacement of cultural resources, theft of cultural resources.

Improper disposal of *human body waste*, unacceptable amounts of human body waste at site.

Water pollution, contamination of water body with fecal material, soap residue, chemical substances, or food and animal remains.

Unacceptable levels or types of *litter*, improper disposal of garbage, unacceptable evidence of humans (e.g., trail markers, cairns).

Trampling of *vegetation*, loss of herbaceous vegetation or seedlings, change in species composition, introduction of exotic species, improper collection of specimens, deterioration of grazing areas, trampling of tree roots, nails in trees, peeling of bark, carving initials/words into bark, felling of live trees.

Soil compaction, erosion of organic litter and soil, excessive muddiness, disturbance of cryptobiotic crust.

Wildlife and fishery impacts, destruction or loss of habitat, change in species composition, introduction of exotic fauna, harassment or disturbance of wildlife, competition for food sources, attraction of wildlife, illegal hunting or fishing.

Visitor Experience Impacts

Unacceptable levels of *crowding* at attraction sites; unacceptable number of encounters at trailheads, in visitor centers, on trails, or at campsites; congestion, unacceptable traffic conditions on park roads, lack of available parking spaces.

Visitor conflicts due to incompatible uses, encounters with large groups or parties dissimilar to one=s own, rowdiness by itself or in combination with excessive consumption of alcohol, visitor displacement (spatial, temporal, or total).

Noncompliant behavior, vandalism, resource destructive behavior.

Inadequate or inappropriate levels of access to facilities, natural areas, or cultural resources; facility design that fails to accommodate the needs of the broadest possible spectrum of people, including persons with disabilities.

Threats to *visitor safety*, behavior that jeopardizes the safety of the individual or of other visitors, failure to maintain a safe environment through facility design, maintenance, or other means.

final interactive meeting with area staff could conclude with written recommendations concerning what might be appropriate indicators and standards for the site.

Once a resource or visitor experience impact has been identified as unacceptable, the next activity in the problem specification stage is to identify the cause of the unacceptable impact. After the cause is known, then appropriate strategies and tactics are selected to address the cause (i.e., stage three in figure 1).

Strategy and tactic selection

The strategy and tactic selection stage consists of thinking in broad terms—thinking strategically—about how to address a problem, and then narrowing the thinking to select specific tactics to resolve unacceptable impacts caused by the problem. Management strategies are general ways in which managers address unacceptable impacts to resources and visitor experiences. Management tactics are the means by which a strategy is implemented. In the handbook by Anderson et al. (1998), a worksheet provides a space for managers to note the strategies and tactics they think might work. The worksheet should be used to help guide the discussion and keep track of specific comments group members have about specific tactics. The handbook also is meant to serve as a guide for final tactic selection.

Over the past 30 years, researchers have identified and analyzed many strategies for addressing unacceptable impacts to resources and visitor experiences. Five primary strategies have resulted:

1. Modify the character of visitor use by controlling where use occurs, when use occurs, what type of use occurs, and how visitors behave.

2. Modify the resource base by increasing resource durability or maintaining/ rehabilitating the resource.

3. Increase the supply of recreation opportunities.

4. Reduce use in the entire area, or in problem areas only.

5. Modify visitor attitudes and expectations.

These five strategies are appropriate for a variety of resource settings, including both frontcountry and backcountry conditions. Managers are encouraged to consider all of the strategies before selecting one or more to address specific unacceptable impacts. Using a combination of strategies to solve many unacceptable impacts to the resource and visitor experiences provides managers with flexibility to address the multiple dimensions and causes of unacceptable impacts.

Once a strategy or combination of strategies has been selected, potential tactics are selected that might be used to resolve an unacceptable impact (table 2). For ease of discussion, the 25 potential tactics are grouped into five broad categories: (1) site management, (2) rationing and allocation, (3) regulations, (4) deterrence and enforcement, and (5) visitor education. Each category represents a distinct approach to resolving unacceptable impacts to the resource and visitor experience.

Some categories are more appropriate for impacts related to the resource and others are more appropriate for impacts related to visitor experiences. For example, site management tactics are directly related to manipulating the biophysical resource in some way. Tactics outlined in the other categories are more related to management of the visitor or visitor behavior. Before choosing a tactic or set of tactics, the manager should review as many tactics as possible and note which one(s) might apply to resolving the problem.

The last step in the strategy and tactic selection stage is to evaluate and select tactics. The evaluation and selection of final tactics are probably best accomplished by managers and their staff through group discussion.

Plan implementation

The fourth stage in the decision process is plan implementation (figure 1). In the handbook by Anderson et al. (1998), a worksheet provides a suggested framework for the implementation plan. In this stage managers develop an implementation plan for the management tactics they selected in stage three of the process. Without a tactic implementation plan, unacceptable impacts likely will remain. Tactics by themselves are not management actions. They suggest a particular course of action but do not specify the actions managers must take to resolve unacceptable impacts. Each tactic selected in stage three of the process may have one or more specific management actions attached to it.

Monitoring

Management actions must often be viewed as experiments. The ability of managers to predict the consequences of actions is limited because there is much uncertainty about how people interact with natural and cultural resources. Monitoring is an ongoing, long-term undertaking, which, when properly conducted, improves manager awareness of resource and visitor experience impacts. Monitoring provides feedback to managers about the consequences of implementing specific management actions. This feedback may inform managers that their actions are successful at solving the problem and should be continued. On the other hand, monitoring data may tell managers that their actions are not correcting the problem or are causing new problems. In this case, the decision process for managing social and ecological impacts of recreation use should be revisited.

Table 2. Tactic categories and tactics associated with them.

Tactic Category	Tactics
Site Management	• provide facilities and structures • use vegetation • use physical barriers • increase (decrease), improve (not improve) or eliminate facilities • strengthen/harden sites • remove litter and other problems • close areas or facilities
Rationing and Allocation	• limit access using reservations • limit access using a first-come first-serve (queuing) system • limit access using lotteries • limit access using merit/eligibility system • charge fees
Regulations	• restrict access to specific locations (zoning) • restrict use/behavior at facilities • restrict/prohibit activities • restrict/prohibit equipment • restrict/prohibit modes of travel • limit length of stay • limit group size/stock/pets • restrict/prohibit use to protect environmental conditions
Deterrence and Enforcement	• provide signs • sanction visitors who engage in noncompliant behavior • provide personnel and law enforcement
Visitor Education	• educate visitors about appropriate behaviors • educate visitors to alter use patterns

Conclusion

The handbook developed from this project is available from the University of Minnesota, Cooperative Park Studies Program (115 Green Hall, 1530 Cleveland Avenue North, St. Paul, MN 55108).

The decision process and worksheets described in this article and the handbook can be used in a group setting in which many individuals brainstorm and discuss problems. Or, individuals can use the worksheets themselves to plan problem-solving activities. For example, several staff members with varying expertise would probably be appropriate to address apparent visitor conflicts and resource impacts on several trails throughout a large wildlife refuge. Possible solutions could vary spatially across the resource, and more than one functional area of responsibility could be involved. On the other hand, a group process may not be necessary for "simpler" problems, such as dealing with litter in vehicle-access campgrounds and day-use picnic areas or depletion of dead and downed wood for campfires. Here, an individual responsible for the management of the affected sites could use the handbook to select an appropriate strategy and tactic to resolve the problem.

This handbook builds on previous research and management experience during the past several decades to identify and describe alternative management techniques to address visitor-caused impacts. For example, our effort has built on the publications by Cole et al. (1987) and Cole (1989). While our work has expanded the management topic beyond wilderness to include all types of recreation settings and areas, we think our major contribution may be providing a simple to use process in which analysts use worksheets to specify their most critical problems and identify alternative management tactics to address the problems. The worksheets give users a visual process for evaluating and prioritizing among those tactics selected during dialogue. The worksheets also give managers a "paper trail" to refer to over time when questions arise about why a certain decision was made and the justification for the decision.

This handbook and associated literature concerning how to deal with visitor-caused impacts and conflicts is no panacea for resource managers. There is *no magic formula* for deciding an appropriate course of action. For some decisions there may be few alternatives. In other cases, information necessary to decide may be limited or conflicting. Political, administrative, legal, budgetary, and resource constraints also may influence what to do. Nevertheless, the handbook provides a compilation of the current thinking concerning how to address visitor-caused impacts, and it can help reduce the range of uncertainty associated with a particular decision. It does not eliminate the uncertainty! Ultimately, the manager is left with the responsibility to decide how much and what kinds of use are acceptable for a given area, and how and where such uses are to be managed and sustained.

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Applying Outcomes-based Management to Fish- and Wildlife-based Recreation[14]

David C. Fulton[15]

Introduction

The National Wildlife Refuge System provides important habitats for migratory birds as well as residential wildlife. In addition, refuges provide opportunities for outdoor recreation and environmental education. Planning and managing for these recreation and environmental education opportunities is essential to achieving the Refuge System's mission as well as maintaining public support for the Refuge System. Although the primary mission of our national refuges is the protection of wildlife and fisheries resources and their habitats, providing quality recreational experiences oriented toward wildlife is one of four goals within the National Wildlife Refuge System.

The general purpose of this paper is to describe an approach for planning wildlife-dependent recreation opportunities that are compatible with the habitat and wildlife protection goals of national wildlife refuges. This approach is outcomes-based management and focuses equally on protecting the resources of the refuge and providing service to the interested public.

The specific objectives of this paper are to:

1. Define Outcomes-based Management
2. Outline a planning process for implementing Outcomes-based Management for hunting, angling, and watchable wildlife programs
3. Identify and define the major elements of the planning process
4. Describe how elements of the planning process are implemented

Outcomes-based management

Outcomes, or benefits, based management of recreational and amenity resources focuses on producing psychological, social, economic and environmental benefits

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through satisfying recreational experiences (Driver and Bruns 1999). In this volume, Roggenbuck provides a review of both experience-outcome and benefits approaches to recreation. These approaches taken together provide the foundation for outcomes-based management of recreation. The key aspect of this approach is that recreation is more than activity, but rather an experience that provides satisfying psychological outcomes to those participating in the experience such as relief from mental and physical stress or feelings of achievement or solitude (see Driver et al. 1991 for a thorough list and discussion of psychological outcomes from recreation experiences). From the benefits perspective, such experiences not only produce direct psychological benefits for the individual who is engaging in recreation, but such experiences lead to secondary benefits for that individual and for the family, community, society, and environment in which that individual lives (Driver and Bruns 1999).

How do we manage for such benefits or outcomes? The key to doing so from the outcomes-based perspective is to focus on the opportunities that can be provided or produced through management of the specific activities and settings on which desired recreational experiences are dependent (Driver 1985; Driver et al. 1991). Defining and providing a specific recreational opportunity requires understanding what specific activities are desired and can be provided, what specific recreational settings for the activity are desired and exist, and what specific psychological experiences are desired and can be produced.

Understanding the nature of recreational settings is of principal importance to the process of outcomes-based management. Recreational settings vary along three dimensions that work together to provide the context for any recreational experiences. These setting dimensions include:

- *Resource or biophysical*. This setting includes the biophysical and environmental characteristics and conditions of a place and set a baseline for what types of activities or experiences are possible or appropriate. For example, fishing is not a possible activity without water and a fish resource. Likewise, hiking through nesting habitat of a rare bird species is an inappropriate springtime recreation activity if the goal is to sustain the resource.

- *Social*. This setting includes the range of social interactions and conditions that an individual or group is likely to experience in a particular area or location. The social setting may be influenced by such things as the types of visitors, their numbers and density, the proximity and behaviors of visitors, the types of equipment they bring along, the types of activities engaged in by visitors, and the degree to which visitors may conflict with one another concerning behavioral norms, values, and lifestyles.

- *Managerial*. The managerial setting is determined by the type of management actions taken in a location (e.g., trail development) and the rules and regulations (e.g., no overnight camping) enforced at a location.

Specific biophysical, social, and managerial settings facilitate the production of specific and diverse recreational opportunities that lead to different recreational experience-outcomes and benefits. These recreational opportunities can be grouped together based on their shared dependence on specific activities or settings and based on experiences desired from these opportunities. Such groupings form recreational opportunity classes that define sets of recreational opportunities that lead to similar outcomes and benefits. The theory and research necessary for developing such classes has been thoroughly discussed and reviewed elsewhere (Driver et al. 1991). The purpose of this paper is to outline a planning process for incorporating the ideas of experience-outcomes and benefits management decisions.

A planning framework for outcomes-based management

What is planning?

At its simplest, planning involves developing a scheme to achieve a particular objective (Loomis 1993). Crowe (1983:1) defined planning as "an integrated system of management that includes all activities leading to the development and implementation of goals, program objectives, operational strategies, and progress evaluation." Four basic questions must be addressed when making planning decisions concerning the recreational management of fisheries and wildlife resources (Crowe 1983). These questions include: What are the desired goals and objectives in managing the resource? Where are management programs in relationship to these goals and objectives? What actions need to be taken to achieve the goals and objectives? And, how do we know if and when we achieved the desired goals and objectives?

Ideally, objective, science-based information is used to address each of these questions in a continuous, cyclical process, and management actions that provide the greatest benefits with the least costs are implemented to achieve desired goals and objectives. Planning and problem-solving using such a rational process sounds pretty simple and straightforward. But, experienced fisheries and wildlife managers know that planning and management almost never goes so smoothly.

Planning and management is more complex and difficult for two primary reasons. First, planning occurs in the context of social and political conflict that makes the definition of specific management goals and objectives tenuous. Such conflict is unavoidable and is the context for much of social interaction. Our conflicts over desired goals and objectives for fisheries and wildlife resources, like any social conflict, are at best managed through a process of reasonable argument. Information used in this process may include appeals and statements of personal values as well as factual

information concerning the social and biophysical environment. Usually, the greater the degree of agreement concerning the factual information the easier conflicts are to resolve. A lack of objective information, however, is the second complexity of planning and management. Objective information is often scarce or there is little agreement concerning the facts. The process of science is a self-corrective one in which agreement may not be reached for years or decades and the facts are subject to change with new information. Furthermore, science-based information can be difficult, time-consuming and expensive to gather.

Because of the inherent conflict surrounding social decision-making about fisheries and wildlife resources and the challenge of gathering and utilizing science-based information, effective planning relies on both science-based research and analysis and collaboration among the many stakeholders with an interest in the resources. Planning involves information from three arenas. A "scientific" or fact-based arena, the arena of stakeholder who have a vested interest in the planning decision, and the public being served by the agency. The "scientific" arena focuses on science-based information from the biophysical and social sciences to provide explanatory and descriptive information concerning facts about the resource and resource users. Decisions concerning how these resources "should" be managed are also influenced by normative information involving vested stakeholders (agencies, sports and conservation groups, politicians) and the general public. Thus, fisheries and wildlife resource planning and management decisions represent an integration of both rational, science-based, "is" information and normative, "ought" information.

Frameworks for planning recreation management

Several planning frameworks have been developed for use in managing natural resource-based recreation (Driver et al.1987; Graefe et al. 1990; National Park Service 1997; Stankey et al. 1985; Shelby and Heberlein, 1986). While there are both important and subtle differences between the various frameworks developed by different researchers or different agencies, most of these frameworks favor: (1) collaborative processes that include substantial and meaningful involvement of stakeholders throughout the planning process; (2) approaches focused on defining clear outcomes for management via goals and objectives; (3) science-based approaches for collecting and analyzing information important to decision-making.

The planning framework presented in this paper, focuses on integrating and implementing the ideas of experience-based and benefits-based management (see Roggenbuck this volume; Fulton et al. 2000). Information from Fulton et al. (2000) is used extensively here to describe the planning framework. This planning approach attempts to integrate goal-directed, science-based planning with meaningful, collaborative involvement of stakeholders. It also views the production of recreation experiences, and subsequent benefits, as an interaction of inputs and outputs among

physical, social, and managerial systems and encourages a more holistic approach to wildlife recreation planning that considers and integrates social and biophysical parameters (Fulton et al. 2000).

Because it is focused on managing for the experiences of the visitor as well as the condition of biophysical resources, outcomes-based management emphasizes collaboration among management agencies, users and affected communities. This includes collaboration in developing the scientifically valid information necessary for assessing opportunity demand, resource capability and supply, and evaluating potential alternatives. Such collaboration requires face-to-face social dialogue with a range of interests from affected communities, but also includes community- and user-focused social science research directed at describing, in a reliable and valid fashion, the broader concerns and desires of the affected public. Collaboration ensures that a full range of diverse values and interests are represented when deciding what future conditions are desired and when deciding which means are preferred for obtaining these conditions. Collaboration may also include formal stakeholder decision processes in which representatives from the broad range of interests meet face-to-face to develop decisions that are acceptable to all.

Planning process for outcomes-based management

Outcomes-based planning follows a generic planning process which involves:

1. Visioning and Goal-setting
2. Defining Objectives
3. Developing, Assessing, and Selecting Action Alternatives
4. Implementing Planning Decisions
5. Monitoring and Evaluation (Potential revision of steps 1-4)

The stages or steps suggest that planning is a serial process (Figure 1). Planning, however, is typically an iterative process, and planners often have to revisit their goals and objectives as actions and alternatives are debated or new information is developed concerning the link between actions and indicator variables. Inclusion of monitoring and evaluation as a final step in the planning process highlights the fact that planning is a cyclical process.

Visioning and goal setting. The fundamental action in outcomes-based planning is identifying and developing a partnership among the stakeholders who have an interest in the resources that are the subject of the planning action. Stakeholders include, for example, the visitors to a refuge, representatives from local communities, and others who may be impacted by decision regarding management of the refuge, as well as the management agency responsible for the refuge (i.e., USFWS). A partnership among these entities is essential to developing a shared vision of recreation opportunities and resource conditions that are desirable for the future. Such a vision provides direction

Planning Stage	Planning Activities	Planning Product
Vision and Goal Setting	• Creation of Stakeholder Planning Committee representing agencies, local government, and varied local interests • Creation of a technical advisory committee to serve the needs of the stakeholder planning committee • Community Visioning Sessions with citizens • Public forums and dialogues focused on the planning issues • Community surveys	*Goals (Vision):* Long-range visioning with agencies and stakeholders affected or interested in the agency's future management direction. Open dialogue to reach a consensus vision for the future. Social science research would include developing wildlife viewing experience typology through focus groups and surveys of the users.
Defining Objectives	• Broad-based user surveys and focus groups • Stakeholder Planning Committee facilitated group sessions • Interactive public workshops	*Objectives, standards, and indicators:* Goals reviewed in conjunction with scientific and technical knowledge and described in a measurable way consistent with resources on the ground and demand for experiences. Scientific research integrated with consensus-seeking process. Research directed at understanding social and biophysical factors affecting production of experiences and demand for experiences.
Developing, Assessing, and Selecting Action Alternatives	• Stakeholder Planning Committee facilitated group sessions • Interactive public workshops	*Developing, assessing, and selecting alternatives*: Range of technically viable choices represent key preferences of stakeholders and reflect technical assessment of demand and supply of experiences and resources needed to produce experience opportunities. Scientific research integrated with consensus-seeking process to ensure adequate range of alternatives. Preferred alternative selected based on best available scientific and technical information and consideration of allocation preferences. Consensus on preferred choice instrumental to long-term political viability of plan. Social science research and stakeholder processes used to help determine social preferences.
Implementing Planning Decisions	• Management agency actions	*Implementing planning decisions:* Successful application of outcomes-based management depends on specific objectives and descriptions of recreation opportunity classes that are developed and agreed to by researchers and stakeholders.
Monitoring and Evaluation	• Creation of volunteer citizen monitoring groups • Community events focused on collecting monitoring information • Community surveys • Stakeholder Planning Committee facilitated group sessions • Interactive public workshops	*Monitoring and evaluation:* Long-term assessment of resource conditions and users experiences to determine if management actions achieve desired consequences. Monitoring framework is based on indicators and standards using science-based methods for implementation.

Figure 1. Stages in the planning process to develop products that produce results.

for defining a desirable range of goals representing the desired outcomes from recreation management. These goals are the restatement of societal, community and personal values that exist among the public being served by the management agencies and for whom the resource is being managed to produce benefits (Davidoff and Reiner 1962).

For this reason, meaningful goals cannot simply be developed by agency personnel and applied to management. Management goals must reflect the values of the public. To assure that they do the public needs to directly define these goals through face-to-face interaction with the agency and other stakeholders and through public surveys and other research techniques that can help determine the range and intensity of values (goals) among different segments of the public. Direct interaction of agency planners with local communities and other stakeholders not only engenders trust and a fair decision-process among stakeholders, but it also affords the opportunity for more in-depth, detailed discussion about stakeholder interests than can be obtained through methods such as mail surveys.

It is at this goal-setting stage that agencies should be initially considering what wildlife-related experiences and benefits will be produced (Driver 1985). Development of recreation opportunity classes related to wildlife and other resources on the land is essential to ensuring that experience-outcomes information is effectively incorporated into subsequent planning and management activities. Recreation opportunity classes represent a description of the specific experiences, settings, and activities people desire and provide a tool for specifying the types of wildlife-related experiences that are possible given the mix of biophysical, social, and managerial attributes in an area. It is at the goal-setting stage that the range of compatible and incompatible activities and experiences can be identified and defined within a recreation opportunity class.

Defining appropriate recreation opportunity classes involves collecting information from users via focus groups, surveys, and through other social science research methods. However, it also requires the validation of the defined opportunity classes with the stakeholders themselves. While these classes may be initially defined via statistical analysis of survey data, recreationists and other stakeholders must accept the definitions if the classes are going to be useful as a management tool. Opportunity classes that are accepted only by the researchers and managers who generated them will be of no value if the public does not accept them as meaningful classifications.

Defining objectives. Objectives are more concrete statements that specify the intentions of goals in clear terms. To assure clarity in providing future direction, objectives should be (Manning 1999; Schomaker 1984): (1) quantifiable in discrete terms (e.g., not simply more or less of this, but 25 percent more or 30 percent less), (2) bounded in space and time (i.e., should clearly specify when and where the quantifiable objective is to be reached), (3) realistic (i.e., objectives must be plausibly

attainable based on known information and technology, but they must also be somewhat challenging to obtain), and (4) outcome oriented (i.e., objectives should focus on what is being produced through management and not what resources are used in the management process).

Objectives serve two primary functions. First, they form the basis for a system of quantitative indicators and standards that define the desired conditions of the resources being managed and quality of the experiences being produced from these resources for specific recreation opportunities. Second, they provide guidance regarding the allocation of resources (usually geographically, but temporal, financial, or administrative allocations are also possible) among the different types of opportunities.

Specification of different recreation opportunity classes provides a basis for defining an array of objectives that are each compatible with and reflect the goals and mission of the agency or organization. Objectives should be defined with appropriate recreation opportunity classes in mind, and they must also be developed with the direct involvement of stakeholders. Objectives are not developed as simply guidelines for resource managers, rather they represent in concrete terms an agreement among stakeholders (including managers) about what social outcomes (experiences and benefits) are desirable.

As highlighted by Manning in this volume, to be meaningful, planning objectives must be communicated in terms that are readily observable or measurable. Doing so involves choosing measurable variables to define and give meaning to the objectives, and is at the center of every major recreation planning system in use today (Driver et al. 1987; Graefe et al. 1990; National Park Service 1997; Stankey et al. 1985; Shelby and Heberlein 1986). Briefly, indicators are measurable social or biophysical variables that are closely linked to a recreation opportunity. Standards on an indicator define a range of conditions under which a particular wildlife viewing opportunity is produced. (see Manning in this volume for additional information).

Developing, assessing, and selecting action alternatives. Potential management alternatives for recreational opportunities are developed using knowledge about desirable outcomes for recreation experiences and resource conditions. These alternatives are not pre-existing and must be created by the resource managers in collaboration with interested stakeholders. Such alternatives also represent decisions about how resources will be allocated for various uses. The basis of this kind of allocation decision, and one principal task of the planner, involves two key activities (1) assessing the demand for specific experience opportunities and the supply of resources and settings that produce such opportunities, and (2) comparing the level of demand and supply of such opportunities.

Because the allocation decision is all about how the decision will impact the various stakeholders, the public must be involved in defining different allocation alternatives

and in the process of assessing demand and supply of the resources. *How* that decision is made can be just as important as what the decision is in determining whether or not it will be viewed as a just, or fair, decision (Lind and Tyler 1988; Thibaut and Walker 1975; Tyler et al. 1997). Exclusion of interested and impacted stakeholders from the process will likely cause it to be seen as unfair and lead to lack of support for the allocation decision.

The potential impacts of each management alternative must be assessed, and finally, the planning process comes down to choosing among the alternatives (each with their associated objectives, indicators, and standards). To guide selection of an alternative, each is described according to the likely consequences it will produce. Final selection comes from several sources, but in keeping with the collaborative notion, the selection decision should arise from negotiated positions of stakeholders and information from users as well as legal mandates and scientific information. Collaborative involvement of stakeholders is important, because, although based on scientific information, the actual selection decision is intrinsically a political decision, or a decision about what is a just, or fair, allocation of resources as well as a cost-effective allocation.

Implementing planning decisions. Regardless of the specific allocation decision, the alternative selected must be a readable plan that provides a clear blueprint stating explicitly what experiences or benefits will be produced, where and when they will be produced, the quality and quantity that will be produced. This plan must also specify the means of production, or what actions will be specifically taken to achieve the objectives defined by the indicators and standards. Successful application of outcomes-based management depends on the degree to which plans adhere to and incorporate (1) the specific objectives and (2) the descriptions of recreation opportunity classes. The objectives and recreation opportunity classes developed by research and agreed to by the involved stakeholders are the key to assuring plans that achieve the desired outcomes of the public.

Monitoring and evaluation. In order to determine whether planning actions were successful, monitoring and evaluating consequences of the plan must follow implementation. Monitoring and evaluation are the key to identifying and correcting problems with management action and adapting decisions to what has actually occurred on the ground. Through monitoring and evaluation, planning actions become learning opportunities. Monitoring and evaluation is directed by the specifically defined management objectives that describe the specific quantitative outcomes desired through management and the specific actions that will be taken to achieve those outcomes. These desired outcomes are quantified through the use of indicators and standards, and it is these specific, quantitatively expressed standards that are used as the basis for monitoring and evaluation. At a minimum, evaluation should address the following questions:

To what extent were desired opportunities for recreation opportunities?
How did visitors evaluate the quality of these opportunities?
Did resource conditions stay within the bounds of standards that were established?

To answer these questions, an array of evaluative systems must be developed and implemented throughout a visitor use season. This might include actions such as visitor registration, observation of use or wildlife movements, regular inspection of site facilities, and post-visit evaluations of users. Stakeholders are also a central part of monitoring and evaluation efforts. Use of volunteers from stakeholder groups to help design and implement monitoring projects is an invaluable way to retain the interest and energy of the community of stakeholders. Evaluation of the plan also includes all parties who helped develop the plan and continue to have a stake in management and decision-making. Through such efforts, evaluation becomes the foundation for a recurring cycle of "fine-tuning" action plans and for periodic revision of allocation planning involving all stakeholders.

Summary

This manuscript provides a description of a framework for incorporating experience-outcome and benefits-based recreation information into planning decisions concerning recreational opportunities on refuges and other public lands. More information concerning these approaches can be found in the literature cited in this paper.

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Human Dimensions of Community Issues

Measuring the Social Dimensions of Managing Natural Resources[16]

Cornelia Butler Flora[17]

Two sister social sciences can aid in the establishment and management of wildlife refuges. One is sociology and the other is social psychology. Professionals in these disciplines are often scattered around the campus in professional schools, as well as in their home departments. Both psychology and sociology claim social psychology, whereas sociology is firmly rooted in departments of sociology and rural sociology.

Sociology focuses on communities and institutions such as bureaucracies and county commissions, while social psychology focuses on the individual. Sociology looks at the context at which managing the resource takes place. Social psychology looks at individual experience with a resource. Where sociology is interested in the outcomes of communities of interest and place, social psychology is interested in the outcomes of individual satisfaction and individual growth. Sociology is more likely to look at social movements and public policy, while social psychology is more apt to look at individual attitudes.

Sociology looks at three important pieces of refuge management in the larger context of natural resource management. The first is the *context*. What are the policies in which a wildlife refuge is embedded? What are the rules of each institution that is a partner in that management? Do those rules conflict or compliment each other? Are there barriers or facilitators in terms of public policy, affecting the behavior of managers and communities of interest and communities of place? Context includes the dominant religious groups and their beliefs, the dominant political groups and splinter parties, and the organized communities of interest such as the Audubon Society, the Sierra Club, Ducks Forever, and the Farm Bureau. This also includes the social characteristics of communities of place, such as the age, education, and occupational distribution of the population.

Sociology also looks at process. It is interested in the process creating a new refuge. What are the interactions among groups in the refuge and what is the interaction of management with groups? What are different ways that those processes work inside the refuge?

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Sociology sees that what happens on a refuge may be most impacted by people who care a great deal about the place but who never set a foot in the refuge. Sociology is very interested in the process that links various groups to such institutions as the Department of Natural Resources or the U.S. Department of Fish and Wildlife that are setting up refuges. Who are the major institutional actors? What are ways of interacting that generate conflict? What are ways of interacting that generate cooperation?

Finally, sociology looks at *impacts*. What are the impacts on various user groups? Sociologists are more interested in how *behavior* changes than in how attitudes change as a result of the use of a resource. Does activity in a reserve encourage an individual to write their Representative in support of the refuge program? Are user groups so outraged at what they see as the degradation of a resource that they write their Representative to demand that firmer and stricter rules be put into place? Do inner-city youth groups who participate in a wildlife refuge experience go back to their home neighborhood and start a butterfly garden? What are these changes that occur within user groups?

Sociology is also interested in the impacts on stakeholder groups. Stakeholder groups have different desires and outcomes so the refuge can make a difference. They also have fears about the kinds of things refuges can alter. Sociologists are less interested in those fears than in whether what goes on in the refuge contributes to the stated goals and purposes of various stakeholder groups.

Communities and resources

Sociologists always like to define their terms. My definition of a *community* comes from my interactions with biologists. I define it as "interactions among individuals and groups for mutual support." A number of other sociologists define community in this way. Thus, communities are not based on their particular functions or particular activities but on the fact that they are based on mutual support.

Where biological communities are based on interactions among organisms and groups of organisms, human communities are different in that humans have choice and are more mobile. To differing degrees we can decide with whom we will interact and when. Thus, human communities are particularly important in affecting changes both close to where they live and far away, either purposely or accidently.

Two kinds of communities make up these interactions of individuals for mutual support. One is the community of interest—the birders, the hunters, the fishers, and the photographers. They will often have their own journals, their own clubs, and their own newsletters. Then there are communities of place that revolve around the county or geographic area. It is important to note that within the communities of place there are often very different communities of interest and those are often linked to outside

communities of interest. Thus, sociologists talk about advocacy coalitions that are coalitions or partnerships among both communities of interest and communities of place to achieve mutually agreed-upon goals. Determining what these agreed-upon goals are can be critical for establishing and managing wildlife refuges in a way viewed as positive by both of these very important communities.

Communities of place and of interest have resources. I will deal particularly with the resources of the community of place, and more specifically with that of refuges. Resources can be consumed. That is to say, they can be used up and gone. When wetlands are drained and filled, there is immediate high fertility because of the high organic matter and nutrients in the soil. But when this is gone, the ability of the land to absorb water and to fill water is also gone and restoration is extremely difficult. Another example is when an important fishery is fished constantly all year around at the highest possible out-take rate. Soon all the fish are gone.

Resources can also be stored. They can be locked up with a wire put around them so no one is allowed to go in and nature will presumably take its course. I found this to be true to a greater or lesser degree in such areas as northern Missouri and in bioreserves around the globe.

Or, resources can be invested. We invest in resources when we rebuild wetlands, for example. Although remediation that has worked for hundreds of years is never as effective as the one taken out in a couple of days, it is still an important way of investing in resources. We are investing our resources when we make sure that grasses are available for nesting or when we help construct protected areas for fingerlings.

Capital: Human, social, natural, and financial

Resources invested to create new resources are called *capital*. We often think of capital only in terms of financial capital or money. Many sociologists and community developers have found it useful to think of other forms of capital: human capital, social capital, natural capital, and financial and built capital. These capitals come together to create healthy ecosystems, vital economies, or social equity. but priviledging one form of capital over the others can destroy the ecosystem, create a dependent, fragile economy, and increase social inequity.

Human capital

Human capital is fairly mobile. Each person carries it around with them. Wildlife refuges are both dependent on human capital and contribute to it. For example, environmental education is one of the activities mandated by Congress for wildlife refuges. Refuges help develop such skills as hunting, fishing, and photography.

Health is generated indirectly by refuges through the clean water and carbon sync refuges provide and also by providing places to walk, relax, and be free from stress.

Values are part of human capital. They help to create refuges and refuges help to reinforce those values that each individual has. Discussing values is sociologically acceptable. Everyone has values and values determine in a large way what we choose to do in our lives, our income, and with our time. Values influence whom we marry and how we raise our children. Values help us make choices. No research is value-free because values help establish the topic of research. However, values should not keep us from being objective. We need to look at the evidence carefully. No matter how much we want something to be related to something else, we must examine the evidence carefully and systematically to see the relationship among variables or to see how close or how far we are from our desired future states.

Finally, leadership is a part of human capital. Refuges can facilitate and foster leadership opportunities among individuals as groups form and learn through such activities as monitoring, education, and photography classes.

When we are monitoring the impact of refuges, we look at the increased use of knowledge, skills, and abilities of people in communities of interest and particularly in communities of place. Five outcomes were determined by research that the North Central Regional Center for Rural Development began with the USDA Forest Service. People in communities gave us the names of successful communities and places where they felt the USDA Forest Service made an important difference. When we asked them how they knew these communities were successful, five outcomes appeared again and again:

1. increased use of knowledge, skills, and abilities of local people;
2. increased networks and communication;
3. increased initiative, responsibility, and adaptability;
4. healthy ecosystems with multiple common benefits; and
5. vital economies.

Taking these outcomes, we then looked for ways to measure them. We found that increased use of the knowledge, skills, and abilities of people in communities include identifying capacities. Who has knowledge of nature, such as the local birds, wildlife, flora, the different uses of the different species, and the different patterns of life and death? Many people in the community know a great deal about this. As we identify those capacities, such as abilities to hunt, to fish, to take beautiful photographs, or to understand and interpret nature, we are building human capital.

Refuges also enhance the capacities of people in communities of interest and communities of place. But perhaps the most important way refuges can build human capital is through recombining these enhanced capacities by teaching the expert hunter

how an animal's life cycle depends on different aspects of the wetlands and border areas.

We see that human capital is also important for managers and staff at the refuge. The primary aim in first establishing refuges was to increase wildlife populations. Getting the animals into the refuge and counting them were critical skills for the wildlife refuge manager at that time. We gradually learned that habitat protection and habitat enhancement are necessary for increasing wildlife populations and that this skill is very important for the person involved in wildlife management. Then we moved to ecosystem management, understanding the interaction between wildlife and habitat and the important ecosystem functions performed by refuges. Finally, and more and more importantly, as we have moved into a policy context of evolution or decentralization and participation, relational skills are extremely critical to those involved in refuge establishment and management. If relational skills are missing, the output fails. Relational skills without the knowledge and skills to do ecosystem management does not get us very far either.

Social capital

Those relationship skills are an important piece of building the second kind of capital—social capital. Social capital involves mutual trust where people know they can count on someone, which brings in reciprocity. Mutual trust is established when different institutions and individuals can both give and receive. Thus, meetings are set up inviting people because we know enough about them to know which particular skills and points of view they can share.

Mutual trust and reciprocity tend to occur when people work together. In working together, we show the degree upon which we can be counted. One way of building trust is to start with small projects that have immediate visible results everyone can measure and contribute to. Groups are a very important part of social capital. These groups provide the context for working together to build reciprocity and trust.

When mutual trust, reciprocity, and working in groups occur, a collective identity can emerge and that collective identity can be embedded in a refuge as a symbol of who we are. We know this is important for communities of interest, such as the Audubon Society and Ducks Forever. It is also important for the people who live in the counties around the wildlife refuge. This collective identity, in turn, can lead to a sense of a shared future and the understanding that what happens to the resource and what happens to the people is highly interconnected and not a zero sum game.

We measure increased social capital that can result from a refuge by looking at strengthened relationships and communication. First, we look for increased interactions among unlikely groups within the community. A refuge can be a place where seminarians come together with bikers, both interested in a particular resource.

They can focus on points of agreement as they come together, often to contribute to the refuge through helping construct a wetland, planting riparian buffers, doing bird counts, and measuring water quality.

Secondly, we measure social capital by increased interactions among unlikely groups outside the community. These are those nested, advocacy coalitions. An example is when a west Texas rancher, who is part of the Texas Cattleman's Association, realizes that the birds that fly over the ranch are dependent upon the refuge in the Northern Great Plains and is concerned, like the Isaac Watson League, for the water fowl that migrate across both of their areas and are united through the refuge.

The third measure of strengthened relationships and communication is increased availability of information and knowledge. Increased availability of information and knowledge is seen in doing things such as putting the schedule of stocking streams up on the web. Another part of the availability of information is having people who have learned from the refuge take that knowledge into schools, civic organizations such as a Rotary Club, Sunday School classes, and even the local prisons. In turn, how those different groups view that knowledge and use it is an important input into the refuge.

A second area of sociological research, which we view as an outcome of and an input to the establishment and maintenance of wildlife refuges, is improved community initiative, responsibility, and adaptability. We see this in terms of the presence of a shared vision. Do communities of interest within a geographical area, as well as communities of place, agree on at least a piece of a desired future that they can work together for? Improved community initiative, responsibility, and adaptability also mean building first on internal resources. It is far too easy to say, "If only we had the money. If only someone would build us a road. If only someone would build a factory here. If only prices would go up." Rather, it means knowing what the local resources are and then figuring out new and better ways for using these resources more effectively to move toward that shared vision.

Third, it involves working for alternative ways to respond to constant change. The refuge is not a stagnant place, where we just somehow get the balance of nature right. Nature is a series of constant ebbs and flows. One year is wet; another is dry. One year the rain comes at a certain time of the year; another year it comes at a different time. A healthy ecosystem is constantly changing and constantly adapting.

The same is true for human communities. OPEC gets together and creates an artificial shortage of oil and then oil prices increase as a result. An increase in world wheat production decreases wheat prices. A labor shortage in an area increases the number of new migrants, often from different countries with different values about the environment and different languages for expressing their values. These are not deviations but realities. Communities that are responsible and adaptable are always looking for alternative ways to reach their goals, different ways of combining the

resources that are there. They look for ways of viewing new migrants as an asset to the community, not as a burden.

Natural capital

Natural capital is one of the major things that comes from the establishment and management of refuges. Air quality and the reduction of greenhouse gases are a critical part of the natural capital and carbon sync provided by refuges. Water quantity, in terms of reduced flooding, and water quality, in terms of water filtration, are critical provisions embedded in most of our refuges. Both holding soil and increasing the quality of soil through added organic matter are important ways in which refuges contribute to natural capital. Biodiversity, of course, is one of the major reasons for refuges in order to increase wildlife, not only the number of given species but also the number of different species. That biodiversity ranges from the micros in the soil to the birds of the air and the various flora and fauna on which both of those depend. Finally, it provides landscape. It provides an uncontrolled changing view that can provide inspiration and rest. While not everyone views a more natural landscape as superior to a nicely cultivated one, particularly one that has many row crops such as corn or soybeans, we are finding that landscape diversity becomes a critical piece of an assumed community of place, one that tends to attract residents who will in turn contribute to the social and financial capital of many rural communities.

We measure natural capital's impact on communities of interest and place through sustainable, healthy ecosystems with multiple community benefits. We have three areas that we measure for this outcome:

1. Human communities plan and act in concert with natural systems. Thus, local plans from various government entities and in various civic groups include a concern for and ways of interacting with natural systems.

2. Ecosystems are used for multiple community benefits. There is an understanding that what happens on one piece of land, public or private, highly impacts that which happens on other pieces of land and that both private and public lands together make ecosystems. Serving just one end in a community, even if that end is absolutely maximized, is less sustainable than providing multiple community benefits.

3. Those alternative uses of the ecosystem seek common ground. This becomes a major challenge for refuges, which is often an alternative use to the traditional management systems in place. It is very important to understand, particularly in the north-central region—the states from Minnesota, the Dakotas, Wisconsin, and Michigan through Nebraska, Kansas, Iowa, Illinois, Ohio, Missouri, and Indiana—that the current uses in terms of monoculture may be rapidly changing.

Providing alternatives that deal with multiple functions of the landscape can help rural people and rural communities at this critical moment of decision.

Financial capital

Another form of capital is financial capital. This includes debt capital, investment capital, tax revenue, savings, tax abatements, and grants. Refuges depend on these forms of capital. Often the investment capital comes from nongovernmental organizations (NGOs) such as land trusts, which will invest in land or use rights in order to provide buffers around refuges.

Financial capital is often viewed as a potential threat to a refuge, with the notion that tax revenue will decrease and investment capital will flow elsewhere. Research was needed to show under what circumstances tax revenue does decline and under what circumstances investment capital is attracted or attacked by refuges. Once we know these things, we can begin to act to try to make this less a threat. We find that financial capital is often the first argument used against refuges. Refuges cost money. People look at them as land out of production and as a public investment in land and management only.

Financial capital is important because it can be used to purchase built capital. In a refuge it means visitor centers, sewer systems, water systems, trucks, tools, computers, and roads. For those communities of place it means schools, new houses, broadband Internet access—key things that require money and contribute to the other capitals within a community.

We measure appropriately diverse and healthy economies by four different sets of indicators. One indicator relates to reduced poverty. How does a refuge reduce poverty? It provides a quality of access to an important resource so that, were it not public, it would be much more difficult for people who are financially disadvantaged to access. Second, a refuge can help create jobs with a variety of skill levels. It also provides training for those jobs that can help the working poor.

Increased business efficiency is another measure of appropriately diverse and healthy economies. In the case of refuges, this means that a variety of businesses may link together around a refuge so tourists will have many destinations from which to choose. This helps to focus advertising and also helps to multiply word-of-mouth advertising.

Another measured outcome is increased business diversity. Tourism is one of the fastest growing industries in this area. More varied businesses in tourism can lead to the fourth outcome which is increased community residence assets.

Since it is sometimes believed that refuges will increase poverty, decrease business efficiency, decrease business diversity, and decrease community resident assets, conducting research to monitor these impacts and outcomes is very important.

Indicators for accountability

One of the important pieces of applied sociological research is that it can be used to increase our accountability. We use it for planning. We use it for progress. We use it for performance results measurements, and we use it to reach our potential and for continuous improvement. Some people refer to these as the four "p"s of accountability.

Accountability includes baseline measures and performance results and goals. You need to know where it is you want to go and from where you started. Then you need to measure regularly how close you are to getting there. If you do not take all these things into account in your measurement, you are simply describing. You are not being accountable.

Descriptive work is important in understanding and defining the context. But, if you are going to show impact, you need to know what it is you want to have happen, what it is that you fear might happen, how to measure where you started, and how you are progressing to or from that goal.

Accountability facilitates continuous improvement. Constantly monitoring makes data far less threatening than one big evaluation and you can basically learn from mistakes. You can even take the holistic management approach that you will always be making mistakes, but you are constantly getting better and better.

Accountability helps create learning communities. A very important piece of accountability and getting that data is in getting together and reflecting on it. That means that in research each piece of data should be reflected upon and considered in terms of what it tells you about where you are going and how you are getting there. If you are too busy to reflect on the data, you are certainly too busy to change your data gathering methods.

Further, accountability builds strong partnerships. Refuges cannot be established and maintained without partnerships. Partnerships require transparency and transparency requires accountability. Good measurement based on sound research principles is critical in this aspect of partnerships.

From research to outcomes

What are some uses of indicators? The purpose of indicators is to show progress toward achieving identifiable goals. This is where we want to go. This is an indicator that we are getting there. This is a measurement of that indicator to see how we have changed over time. Thus, many indicators are less to compare one area with another than to compare a single piece over time. You are looking for your personal best.

Indicators enable key participants to improve the system from their own level. Therefore, different people need different data because that data should change what they do. Each time you decide to gather data, particularly when you decide to gather it over time, you must ask yourself, "What will I do differently if I know a particular fact? What will this piece of evidence tell me regarding what we should do next as a manager, as a citizen, or as a biologist?"

Indicators support communication of effectiveness and performance. When we tell people they are doing a good job, we can also show them the changes in the indicators. We tend naturally to measure what we do, so we want to select good indicators. This way we will spend our time doing things we personally think are important and things that those who make decisions that impact us will think important. This continuous learning—reflection, action, reflection, action—is critical.

Reflection requires measurement and research. What if there is no action as a result of the research? From the point of view of building community and contributing to the sustainability of a watershed, the research is useless. It may serve to support other functions, such as helping a student in getting a Master's degree or helping a professor in getting an article published. Those are certainly legitimate functions, but in terms of research supported by your entity, there has to be that tradeoff. I stress participatory research a great deal in the work that I do, both in the sustainable agriculture and natural resource management collaborative research program and in the research and action carried out by the North Central Regional Center for Rural Development.

We do not do research unless it informs action and we do not support action unless enough data is gathered so it can be reflected upon and therefore shared. This too should be part of an ongoing social dimensions research agenda. It should show the change in action that we and others should take in order to move toward our goals.

Indicators should be meaningful and appropriate contexts. That means you may have one set of measures for management, another set of measures to work with your partners, and another set of measurements for congress. This does not mean a whole raft of indicators. It means having indicators that mean something to where you are and to the people there. No indicator is meaningful by itself. It is only meaningful to the different groups that reflect upon it.

Indicators should be specific. It should be very clear what you are measuring. Indicators should be reliable. The same person measures the same object at the same time or different people measure the same object at the same time and get the same result. Reliability is very important. Indicators are very objective. For sociologists, that means we tend to rely more on behavior than we do on attitudes. We may look more at what people write or put together collectively than at a particular attitude survey at one point in time.

Indicators should be efficient in terms of the cost in gathering them and they should be real time, so they can have immediate use. The problem, of course, with census data is they do not come out until they are about two to three years old and by that time they are actually ten years old. Thus, they tell us a lot about the past but not very much about the present and precious little about the future.

There are some common pitfalls in selecting indicators. One pitfall is an unclear relationship between outcomes and process activities. Can we draw a logical relationship between what we do and those outcomes that we seek? This unclear relationship often comes because we default to readily available information, such as the census data or the count of cars over the road. Because it exits, that is what we use rather than figuring out what it is we really want to measure and what the best approximations are for what we want to measure. An exact measure of something that is meaningless is much worse than an inexact measure of something that really matters. So inexact indicators that can still be fairly specific and are logically defensive and hopefully empirically proven to be associated with that larger outcome in other situations is what you need to go for.

Selecting unmeasurables as indicators is another pitfall. An example is having a goal so wonderful that we are simply unable to measure it. Indicators need to be relatively concrete. The concept can be very abstract but the indicator must be concrete.

Another pitfall is that the indicator is irrelevant to the goals or activities. We often measure activities as if they were goals without seeing that activities should lead to something and that something should then lead to something else. What we should be looking for are steps toward an outcome, not something to measure just to be measuring it.

Demanding that an indicator be comprehensive and able to measure the whole, rather than a piece of the whole, is another pitfall in indicator selection. Indicators do exactly that—they indicate something. They are *not* the same as the outcome you are working toward. They are a little piece of reality that shows you are moving in a direction.

When you are looking at the intersection of context, process, and outcomes, you have a conundrum of causality. Prime order asks, “Does activity precede the outcome?” Covariation asks, “Does a change in the activity then result in a change in the

outcome?" And then there is the elimination of rival causal factors. Of course, we can never eliminate rival causal factors. That is why in our statistics classes we always had to prove the null-hypothesis, that there was no relation because you can never prove a relationship.

One way that we can put measurement into practice is by mapping outcomes. In order to do this we must ask the following questions:

- What outcomes are to be achieved?
- Who are the partners interested in reaching those outcomes?
- What are the shared goals and outcomes?
- What are the inputs of each partner? Not just how many dollars will each bring to the table but what expertise, what amount of time, what kind of space can each offer? Can someone lend machinery? Can someone give secretarial support? Can someone set up a list serve? All these may be critical inputs to the activities involved in moving toward the specific output that will eventually lead to the outcomes that will be measured.

One of the principles used when we think about partnerships is the efficiency ratio. What are the proportions of the sources we leverage in achieving our outcomes? That means we do not have to be "Lone Rangers." No entity these days has enough money to accomplish much by themselves anyway. We are more efficient if we bring more folks with a variety of resources to the table. This also means that we value resources other money.

In measuring our outcomes we have to agree on what is the unit of analysis. What do we mean by the community? What are the communities of place and what are the communities of interest? What is the level of aggregation? Are we talking about individuals? Are we talking about classes? What are we talking about? What is the evidence that we will use? I like to think of this in terms of evidence, rather than data, because when we are talking about making decisions that change the way we behave or how we allocate resources, we are, like juries, weighing evidence. What is the most useful kind of evidence that we can gather and how do we gather that evidence?

Our criteria for measure should include:

- Something is likely to change because of what we do.
- It is responsive to what we do, even with those random changes that are always occurring. In other words, having a wet year or having a dry year will not make too much difference in the outcome.

- Measuring it at different points in time is easy.

If we have a great measure that is very expensive, we may only do it once. That kind of expense with a measure is worth it in our analysis of context but it is problematic if we are doing the type of continual monitoring that builds social capital and helps us work toward our goals.

The outcome is a larger goal, what we expect to happen as a result of our activity. Again, we cannot totally control it due to those random changes that are always occurring. The output is the immediate product of our activities and those of our partners. It is something we can control and therefore claim. However, sometimes we focus more on things we can control rather than on things that are important.

Activities include meetings, putting in signage, education programs, wetland remediation, breeding fish, stocking streams, and reducing parking lot sides. These are activities that can take place related to a refuge and can contribute to the output that in turn contributes to the outcome. Only then can we look at the inputs.

Inputs help determine what activities can be done and a variety of activities should be listed. Inputs are also a way to bring in partners, not because they have this input resource but because they share the outcome. Inputs include dollars, people, time, and particularly knowledge. It involves space, technology, and machinery. All these are critical inputs that often come from a variety of sources in terms of the communities of interest and communities of place, which share the multiple outcomes provided by the refuge. Remember the five activities: hunting, fishing, nature observation, environmental education, and photography. It is important that all those activities take place, but it is even more important that those activities contribute to the variety of outcomes, not only for refuge users but for the whole variety of stakeholders for whom the other outcomes matter greatly.

A map is drawn by separating the outcomes, seeing what you start with, seeing what outputs lead to those outcomes, listing the alternative activities, and then seeing the inputs needed to carry out those activities. If you do not have all the input you need for a particular activity, then you should look for a different activity that contributes toward the outputs. You also look for activities that can contribute to multiple outcomes. For example, if you are interested in an output for repairing buffers in a refuge, you could simply accomplish this by telling someone to come in and do it quickly. That would be one output of riparian buffers. It would also increase the financial income of one member of the community, perhaps, but that would be about it. In this scenario, we could say there are two outcomes, one related to ecosystem health and another related to the economic vitality of the community.

If you take that same amount of money, or perhaps just part of it, to have a series of field days for training and educating a variety of people in how to and why to do

riparian buffers, you would also be contributing to human capital and social capital. There would also be a wider disbursement of financial capital when you paid food providers and transporters for their services. In this case, the output would be the same, but the outcomes would be very different.

In order to carry out the last scenario where a variety of groups are involved, you need partners. What are the advantages of working with other groups? You can optimize your outcomes and contribute to more than one at a time. Second, you can cut duplication. By cutting duplication you can also show the unique role of what you do on the refuge, as well as the importance of each partner. Working with other groups allows you collectively to bring diverse resources to address a specific issue. People want to collaborate more on specifics that lead toward an agreed-upon outcome. This can be done in a very general way by saying, "What can we do if we pool our money?" And finally, it helps to address a variety of issues better in a systematic way. Working with other groups increases buy-in in communities of interest and place and increases political clout. People who participate are more willing to support a program long term.

There are some disadvantages to working with groups, as well. There can be high transaction costs involved. Determining who the partners are, negotiating the terms of the contract with each partner and with all of the partners together, and simply keeping information flowing so that everyone is involved takes a lot of time and requires transaction costs. Nothing makes a person angrier in a partnership than if they feel their name is being used in vain. That means you must constantly check back with the partners, which requires a lot of time on the telephone, a lot of time of e-mail, and probably a lot of time chatting. It is important to keep people tied together, but it can also become an end in itself, rather than a means toward an end. We can be so busy keeping a group together that we forget why we are a partnership in the first place.

The outcomes in refuge management are not just to help the ecosystem and to focus on fauna biodiversity. They also include a vital economy and social equity. Refuge management can increase human capital, social capital, natural capital, and financial and built capital. Only by increasing all these capitals can the refuge become stronger and more dynamic. This then yields some potential research questions. What do different communities want from the refuge? What are the desired future states of different communities of place and of interest? What are the different communities of interest within communities of place? How do different communities know what they want and how far they are from getting what they want? What are their evidence or indicators? How do different communities think they will get to where they want to go? These are the mental causal models of what leads to what. For example, people may agree on a desired future state but have some wildly different views about how to get there. One may think that severe government regulation is needed while others may think that more local participation is needed. Looking into effecting these mental

causal models allows us to communicate better with people, especially with people whose mental causal models differ from our own.

Another critical research question is in what context do which processes work to achieve which outcomes? We know some general principles of participation in buy-in, for example, but it can vary a lot. What you do in southern Alabama will be very different from what you do in suburban areas of Minnesota. Understanding that context and systematically linking context to process to outcomes is a very important piece of social research that can help in refuge establishment, management, as well as in building healthy communities of place.

Appropriate methodologies include content analysis of group and institutional publications. In fact, we recommend doing this first. Before starting any kind of intrusive data gathering, we recommend you work through written records, newspapers, and key informants first to determine who are the critical institutional actors in an area. These should relate to the issue of land management, environmental quality, and other aspects of the outcomes you believe your refuge contributes to or will contribute to. Documents should be analyzed in terms of the desired future states and can include community plans, newsletters, and, again, newspapers. Newspapers should be read carefully, looking at the phrases used and the words used. Do they appear to use words the same way you do? If a sociologist does this research for you, you will then need to spend time discussing the findings.

Focus groups can be a next phase after document analysis. A good focus group strategy in this case is to bring together representatives of institutions, formal and informal. You could include someone from the coffee shop on the corner, as well as representatives from the county level Farm Bureau or the Farmers' Union. These focus groups should include those who agree in their written statements about their desired future state. Conveners of the focus group can point out that there is evidence based on the written statements that everyone agrees on a certain issue or issues and then can raise broad questions concerning how to get there.

You can also use data collected for other administrative purposes. Data collection guidelines can be found in the interactive workbook, *Measuring Community Success and Sustainability*, which is available on the web page of the North Central Regional Center for Rural Development (http://www.ncrcrd.iastate.edu) or for sale in hard copy. This Center web page also contains an annotated bibliography of social indicators that could be of use to researchers.

We have a method of measurement once we have determined the meaningful outcomes. We generally work with the five outcomes because, in the case of refuges, it is very arguable that the refuge contributes to all four forms of capital and the five outcomes that communities feel are important. For each outcome we will ask the group that is going to do the measurement the following questions: What is the most

important indicator of this outcome? What is our measure related to this indicator? What is the baseline measure we will use? What is our unit of measure? Will we look at the community? Will we look at the county? Will we look at the township? Will we look at the membership of an organization? What exactly will be our unit of measure? Where will we get the information that we need? If it was already collected, where is it located? For example, one of the ways we looked at reduced poverty related to natural resource management was to study the number of unpaid utility bills. We found that better woodland management led to a number of craft activities that provided income for the lowest skilled members of the community, and the community's own indicator of reduced poverty was being able to pay their utility bills on time. Utility companies who had that data over time and by zip code could provide it to the community regularly.

Where we will get the information needed is often a matter of relationships and convincing people of the meaningfulness of an indicator. How will we get the information that we need? In this case, a relative of one of the people on the measurement committee was an employee of the utility company. This committee member was assigned to get that data by contacting the relative and then meeting with the relative's boss as a representative of this community.

Who will collect the information we need? In this case again, the individual whose relative worked for the utility company was drafted to be on the committee. Will we need to pay someone for information? If so, how much per hour or per task? How many hours will it take? We will need to know these details in order to determine how much it will cost. It is okay to pay people for monitoring. When we do not pay people for monitoring, this work counts as in-kind contributions and should be included in the reports.

When will the information be collected? Basically, it is really good to set a date every year to make sure this is a regular—annual, semiannual, or biannual—activity. How will we measure progress from the baseline? Will it be in terms of percentage? Will it be in terms of absolute change? Will it be in terms of rates? How will we look at this—per person? And how else can we use this information to achieve our other outcomes?

Each piece of data costs time, money, and effort to gather. The more uses to which we can put this data in forming our action related to other outcomes, the more efficient and effective we will be and the bigger difference we can make.

A sample indicator and measure in the human capital outcome is increased use of the people's knowledge, skills, and ability. An indicator of that is the participation of local people in conducting educational activities of the refuge. The activities would include identifying local people with knowledge and providing courses so they can share their

knowledge and learn more about the resource. The measure would be the number of local people acting as docents in the refuge.

Some sociological research, particularly in applied sociological research, addresses the context, the process, and the outcome. How do we measure it and how do we effect it? All research takes time and money. We need to be judicious in our choices of what we measure based on knowing how we are going to use it. Too often we measure things simply because we have always measured them. With each piece of data gathered, with each measure of community success, with each measure of outcome that you will monitor over a period, you need to ask yourself, "What will I do differently if I know this fact?" If it is not clear to you, talk it over with a sociologist. The North Central Regional Center for Rural Development, which serves this region, will be happy to put you in contact with a social scientist in your region or state or in other states if it seems more appropriate.

We are convinced that social research has an important role to play in making your job easier and making what you do even better. Combined with research on the human dimensions, a social/psychological research, we can know more, act more wisely, and serve more people as we share our knowledge. One of the saddest things about the social aspects of refuge management is that by not recognizing it to be a research topic, we do not create opportunities to compare and examine our experiences systematically. The importance of comparative case studies is critical in this work. Each resource and each refuge can participate in this in a variety of ways.

Research on Minorities, Social Justice, and Natural Resource Management: An Agenda and Three Examples[18]

Patrick C. West[19]

In this paper three areas of research on minorities and natural resource management are explored based on my research in these areas. Other issues related to minorities could be addressed, but due to space limitations I will confine my discussion to these three issues. The first two issues relate to fisheries resources and the third relates to recreational use of public lands including federal wildlife refuges. The specific topics considered here are:

1. Toxic fish and environmental justice
2. Indian fishing rights conflicts, and
3. African American minorities and the recreational use of public lands

Toxic fish and environmental justice

Point source discharge in public waters is usually considered the jurisdiction of the states and the US Environmental Protection Agency (USEPA). However, as these issues affect the viability of fisheries resources, the US Fish and Wildlife Service (USFWS) should also be playing a role in research and policy making. Because low income minorities are the highest consumers of fish in many regions, this should encourage the USFWS to engage in research on environmental justice. Environmental justice has usually been conceived as the differential impact of toxic pollutants on minority populations. Most attention has been paid to the differential siting of hazardous waste facilities near low income minority neighborhoods. But the very high consumption of toxic fish by low income minorities is also receiving increasing attention. In our studies in Michigan (West et al. 1995), low income minorities are consuming fish well above the average sport angler. For many years, it was assumed that the average consumption for all anglers was 6.5 grams/person/day (GPD). This was then factored into a complex formula involving many variables in setting point discharge regulations for specific toxic chemicals. The formula is complex but the relevant understanding here is that, other factors being equal, the greater the assumed fish consumption rate, the more restricted is the permitted discharge of toxic chemicals.

[18]West, P. C. 2000. Research on minorities, social justice, and natural resource management: An agenda and three examples. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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Recently the USEPA, drawing on a variety of research studies, established and mandated that the average fish consumption assumption in point discharge standards in the Great Lakes states should be 15 GPD, or a little more than twice the existing standard. Our research in Michigan (West et al. 1995), indicates that low income (less than $25,000) minorities (primarily African American and Native American) consume fish at a rate of 43.1 GPD, while other subgroups consume fish at closer to the 15 GPD mean (11 GPD to 18 GPD). Note that this is a statistical interaction effect between race and class (statistical interaction—$F = 21.65$, $p < .001$). Most studies on fish consumption have not tested for this interaction effect. (For other comparisons of our methodology with the methodologies of other fish consumption studies see USEPA 1997.) The high 43.1 GPD for low income minorities is troubling but is also in need of further replication research before these data can be effectively used in reformulating point discharge policy nationwide.

Because the USFWS is the primary fishery agency of the federal government, it is recommended that the USFWS and the USEPA collaborate to conduct replication studies. If replication studies continue to find such high rates of consumption for low income minorities, the implications for federal point source standard setting are clear. Relying on "fish consumption advisories" to lower consumption by this group of anglers would fail to understand the important protein subsistence role that lies behind this high rate of consumption.

Indian fishing rights conflicts

This highly charged policy and management issue is relevant to USFWS research and policy agendas in two important ways. First, as in the case of toxic fish, the USFWS is the sole federal agency concerned primarily with fisheries policy. Second, because Indian fishing rights claims stem directly from federal treaties, the federal government, and not the states, has a sole responsibility in relating to tribes and tribal rights based on federal treaties. Both law and precedent established in litigation clearly supports this role for federalism.

There are many areas of social science research that would be relevant avenues for research. For instance, my early research focused on the political sociology of power relations among the contending parties and the coalition power between state DNR's, white anglers, and tourism stakeholders (West 1986). However, more recently I have begun to view these power struggles as they are nested in law and questions related to the sociology of law.

There are two lines of research that come together to form one meaningful and pragmatic line of research. The first aspect of this research is the sociology of legal institutions themselves, especially matters of Native American law that have developed based on treaty law and court precedents. The second line of research is public reaction to the

special "substantive" rights granted to Native American tribes by law. Are these reactions racist, or are they based on different perceptions of "justice" in American culture?

The legal history of Native American law clearly establishes "special legal rights" especially where these claimed rights are based on treaties with the federal government. Treaties that are still in existence in modern legal institutions of the federal courts translate traditional law of the past into a continuity of legal rights now encased in "rational legal law" of our modern legal system. They have the force of legitimate law. While the Congress has the right to abrogate treaty rights, they have been reluctant to do so in the modern period, and the federal courts have been respectful in translating treaty rights into rational legal "substantive justice rights," i.e., special rights for particular groups of people whose claim of special rights is granted legal sanction and legitimacy by specific rules of law. Indian fishing rights ensured by treaties is one such "substantive justice" right.

Two other closely related principles of Indian rights law reinforce these substantive justice rights. The first of these we might call the "emic interpretation of treaty law." The concept of "emic" in anthropology means the interpretation of reality as native peoples perceive it to be (not, for instance, as a social scientist might interpret things). In relation to Indian fishing rights, this principle of Indian law ensures that treaties be interpreted in the way(s) that the native peoples understood them to be at the time of their agreement to treaty creation. Thus, for instance, the right to fish at "accustomed places" might have a broader territorial meaning according to the emic interpretation of fishing rights. The second principle is the doctrine of "reserved rights." In the signing of original treaties native fishing rights were not granted by white society, but rather were reserved rights that native people retained in giving up land rights. This principle adds legal legitimacy to the substantive justice of special Indian fishing right claims. Legal research on these and other principles of treaty law can help in the formulation of rational legal agency policy. It can also be used to conduct research on white society's reactions to substantive rights. Many white fishers will frame their arguments against special Indian fishing rights according to another major principle of justice in American culture—the doctrine of "equality before the law." According to this principle of justice a white fisher might say, "I have nothing against Indians, but they should have to follow the same fishing rules and regulations that I do." Thus, white objection to Indians' special rights under federal law protecting Native American fishing rights may not always be based in racism but rather on two conflicting principles of "social justice" within American culture and legal institutions. To the extent that racism is not present, these conflicting principles of legitimate principles of justice (substantive justice vs. equality before the law) research aimed at conflict management may have a different approach than the assumption of racism. To the extent that independent racism may be present, research may establish that these conflicting principles of American justice may pour more oil on the fire of overt racism. Distinguishing the grey areas between these two extremes would be a theoretical and methodological challenge for any such research in this arena, but the conceptual distinction between these two polar extremes would be essential in any research on the public's reactions to seemingly conflicting legal claims. In fact, however, is it not true that the principle of different

income levels paying different taxes is both a matter of substantive justice and equality before the law? Is this not true in the case of special substantive rights for Native American fishing rights?

Recreational use of wildlife refuges by minorities

The issue of underrepresented recreational use of public lands by minorities is a challenge for many federal, state, regional, and local public land management agencies including the USFWS. Research by the USFWS on this issue and the barriers to increasing minority participation has lagged behind the research by other agencies, especially the research carried out by the USDA Forest Service (e.g., Ewert et al. 1993).

However, the issues and challenges are much the same. Prior research on this topic has focused primarily on two theoretical explanations for minority underrepresentation in the recreational use of public lands; the "marginality" and "cultural" hypotheses (see especially Washburne (1978), whose research set the tone for the emphasis on these two hypotheses). The marginality hypothesis states that there is lower participation because, on average, minorities do not have the economic means available to white families. The cultural hypothesis postulates that minority culture does not place a positive value on such participation. While there is evidence for both hypotheses, a third hypothesis has received less attention—the role of discrimination, or fear of discrimination, that tends to keep minority groups away. In our research in the Detroit metropolitan area, the use of "depth probe" measures was able to detect interracial relations factors better than structured questionnaire measurements. Indicators fell into three categories: racial/antiblack, race problem, and unwelcome/uneasy. Using these indicators our research found that 37 percent of black respondents (compared to 16.7 percent of white respondents) experienced interracial relations factors with respect to types of negative reactions they had experienced from others in regional pubic parks (West 1989). Further qualitative evidence suggests that traveling to distant recreation areas is perceived as hostile terrain in addition to experiences in public lands themselves (West 1993). Thus, future research on barriers to minority participation on public lands in general and federal wildlife refuges in particular that may be sponsored by the USFWS should investigate interracial relations in addition to marginality and cultural explanations.

While the recreational use of public lands, including federal wildlife refuges, may seem to be less important than other civil rights issues, we might recall that the act of Rosa Parks sitting in the front of a bus on that historical day, had very little to do with mass transportation, and very much to do with human dignity. While the issues raised here may seem more controversial than those raised in other papers in this volume, I would urge the USFWS to consider these and other research agendas involving minority social justice issues. These are neither liberal nor conservative issues—they are human issues, issues of our common humanity. There is a marvelous book called by some "the good book," that says somewhere "love thy neighbor as thy self." I do not believe there was a footnote, or

intention to read between the lines, any qualifier that says “unless thy neighbor is not white.”

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Applied Demography and Natural Resource Management: A Perspective on Social Change along the Upper Mississippi Flyway[20]

Donald R. Field, Roger Hammer, Tracy Kuczenski, Paul Voss, and Alice Hagen[21]

Maps discussed in paper available at: http://www.ssc.wisc.edu/poplab/mississippi

Introduction

The demographic study of human population and natural resource management at a landscape scale is perhaps new to refuge managers. On the one hand, most social science research on people and social behavior applied to refuges has been derived from social surveys of recreation users on site or state, regional, and national surveys of public attitudes toward wildlife. Such work has provided perspective on the characteristics of refuge users (who are the recreation users), frequency of use (how often do people visit refuges), nature of the use (hunting fishing or wildlife viewing), and the changing values various segments of the population have toward fisheries and wildlife in American society. This work, however, has not addressed refuge concerns about land use patterns adjacent to refuges, habitat fragmentation, soil erosion on these lands and the implications for water quality, species reproduction, distribution, and composition on refuges as well as the ecological integrity of the refuges themselves. The demographic study of people and land use, on the other hand, while well developed elsewhere has been largely absent as an information tool for refuge managers.

The purpose of this paper is to introduce refuge managers to applied demography and its use in refuge management. We proceed in the following fashion. First, we describe applied demography and the demographic study of people and the environment. Second, we draw a parallel between demographic analysis and landscape ecology. Third, we introduce three demographic variables, housing, income, and traditional extractive occupations, that provide perspective on social change along the Upper

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Mississippi Flyway. And finally, we pose several questions for future demographic research in support of wildlife refuges.

What is applied demography?

It has been almost forty years since demographers Philip Hauser and Otis Dudley Duncan established what quickly became the definitive statement regarding the focus and scope of the field of demography. In their original formulation, demography is defined as:

> "The study of the size, territorial distribution and composition of a population, changes therein, and the components of such changes, which may be identified as natality (birth), mortality, territorial movement (migration) and social mobility (change in status)" Hauser and Duncan 1959:2.

Since their original definition of demography, the scope of demographic inquiry has expanded to include subfields of population studies, social demography, and applied demography. Formed by demographers working in staff and research positions in land grant universities, state government, natural resource agencies, private practice, and corporate business enterprises, applied demography has assumed a strong geographic dimension and policy orientation. Rives and Serow define this subfield in the following way:

> "In our view, applied demography is that branch of the discipline that is directed toward the production, dissemination and analysis of demographic and closely related socioeconomic information for specific purposes of planning and reporting. While many lines of demographic inquiry involve the analysis of statistical information pertaining to individuals, families and households, applied demography almost always deals with information on population size, growth and composition for specific *geographic areas*. Thus there is an identifiable difference in the unit of analysis. Applied demographers tend to focus on the *geographic units* and their population characteristics while others are concerned with individuals and demographic behavior" (Rives and Serow 1984:9-10; emphasis added).

Nowhere is this applied scholarship more self-evident than in the studies of rural communities and population change associated with natural resource systems. Spatial scale and geographic unit are central criteria to understanding human populations, land use, and natural resource management.

Demographic analysis and natural resource management

In her presidential address to the American Population Association, Anne R. Pebley (1998) outlined the progression of demographic studies associated with the environment. Pebley draws heavily upon Vernon Ruttan (1993), who outlined three waves of social concern regarding the environment. Initially Ruttan suggests demographic attention to the environment focused upon whether natural resources such as land, water, and energy supplies could sustain economic growth in association with population growth (Ruttan 1993). This emphasis prevailed in the 1940s and 1950s. The next wave expanded upon the base of natural resources and examined the byproducts of technological development, i.e., the ability of the environment to absorb air and water pollution, asbestos, pesticide, radioactive waste, and household waste. Such emphasis emerged in the 1960s and 1970s. According to Ruttan (1993), the third wave, 1980 through the 1990s, added acid rain, global warming, and ozone depletion to the population natural resource equation. Pebley follows with the emergence of an additional focus in the third wave of demographic research on the relationship of population growth and land use upon loss of wilderness and the extinction of plant and animal species. She notes, however, that in most cases the emphasis is on the consequences of environmental change on human welfare.

With the emerging emphasis on ecosystem management, we would add a fourth wave in demographic research, namely the application of demographic analysis (applied demography) to resource management on public lands. There is a problem-solving and policy element to this analysis. There is, likewise, an added focus on integrating demographic measures with specific characteristics of the biophysical environment in a common theoretical and methodological paradigm. Recent trends in research and practice in natural resource management place human behavior and social systems as important dimensions of ecosystem management in parks, forests, and refuges. In other words, people and communities are a natural component of ecosystems along with plants, animals, minerals and chemicals, air, and soils and must be examined together. This, likewise, expands demographic analysis from its traditional partnership with other social sciences such as sociology, geography, anthropology, and economics to the fields of forestry, wildlife and plant ecology, soil science, and agronomy. We suggest landscape ecology affords one opportunity to link applied demographic analysis with its emphasis on geographic units to biophysical characteristics of the environment.

Applied demography and landscape ecology

Landscape ecology is an emerging but rapidly burgeoning field of study that involves a scale-conscious investigation of the patterns and ecological processes of landscapes. Risser noted that:

> "As a field of scientific inquiry, it considers the development and maintenance of spatial heterogeneity, interactions and exchanges across heterogeneous landscapes, the influence of heterogeneity on biotic and abiotic processes, and the management of that heterogeneity . . . Landscape ecology considers managed, as well as natural, ecosystems, and many fundamental questions in ecology and resource management require understanding the ecology of a landscape" (Risser 1987).

It integrates scientific rigor and theory into case studies designed to understand ecological relationships and seeks to resolve conflicts between human activities and ecological systems. The rapid growth of the discipline can be attributed to a number of trends, including the ready availability of powerful imaging, remote sensing, and data storage tools. The ongoing debate over land use and resource allocation and preservation, made more salient by growing human populations; broad-scale environmental questions, and land management problems require the accumulation of empirical evidence about a wide range of ecological systems consistent with landscape analysis. Further, the focus on landscapes and regions is evident in the ready adoption of concepts applied in landscape ecology borrowed from such applied fields as landscape architecture, urban and regional planning, conservation biology, and geography.

As Risser (1987:3) notes, landscape ecology is "the synthetic intersection of many related disciplines that focus on the spatial and temporal patterns of the landscape." Applied demography is a parallel discipline and a similar synthesis. Applied demography operates at both scale and geographic unit compatible with landscape ecology while the demographic variables employed match landscape ecological measures in kind. We note here that the field of landscape ecology accommodates the discussion of human landscapes and, more importantly, the organization of human society within natural and human constructed landscapes. Significantly, landscape ecology as a field of study considers humans as actors in and therefore as part of the landscape (see Risser 1984:7; Naveh and Lieberman 1984:9). Landscapes can be characterized by three fundamental concepts: structure, function, and change (Risser 1987:5).

For the applied demographer at a landscape level population size, composition, concentration, and distribution provide structure to a social system. Social system functions consist of relationships and interactions between and among population members and institutions. The interactions between social structure and function and the structural and functional attributes of the biophysical landscape foster distinctive social-cultural systems and shape the manner in which environmental dimensions are incorporated into these systems. All systems undergo changes in their structure and function. Such changes invariably affect the relationship of a social system with the

biophysical environment. For our purposes here, we focus on social system structure and the change therein to illustrate the application of applied demography to resource management.

The Upper Mississippi region

This paper focuses on a 31-county region along the Mississippi River in Minnesota and Wisconsin. The region includes 16 counties in Minnesota and 15 in Wisconsin beginning with Pool 8 of the Mississippi in the south at Vernon County, Wisconsin, and Houston County, Minnesota, and stretching north along the Mississippi to Hennepin and Ramsey counties in the Minneapolis-St. Paul metropolitan area. The region also extends north along the St. Croix River, encompassing Chisago and Washington counties in Minnesota and Polk and St. Croix counties in Wisconsin. The region includes both counties on the Mississippi River and their immediate neighbors. Along with Minneapolis-St. Paul, the region encompasses the Eau Claire and La Crosse, Wisconsin, and Rochester, Minnesota, metropolitan areas and the smaller cities of Menomonee, Maiden Rock, Pepin, Alma, Fountain City, Arcadia, and Trempealeau, Wisconsin, and Red Wing, Lake City, Wabasha, and Winona, Minnesota.

Housing density 1940 to 1990

Population density and housing density are two different but related measures of population structure and social organization of communities and the countryside. People are counted by the census at their primary residence. Thus, population density is a reflection of the permanent population residing in a given geographical area. Seasonal residents, in other words, are not reflected in population counts for areas subject to both growth of permanent residents and temporary residents. Housing density may be more useful for assessing changes in land use along the Mississippi riverway because of relative permanency of housing stock whether owned by permanent or temporary residents. Elsewhere we have outlined the benefits of examining housing density associated with forest cover and change in natural regions where seasonal housing is flourishing (Radeloff et al. 2000). While the Mississippi River corridor is not experiencing the rapid growth in seasonal land ownership as the northwoods of Minnesota and Wisconsin, it is nevertheless an opportunity in one measure to capture both types of residential ownership. In 1940, the region was overwhelmingly very low density with fewer than five housing units per square mile. Moreover, nearly all the cities and villages were compact, high-density areas (with 40 or more housing units per square mile) and only a few of them were surrounded by medium density peripheries of between five and 20 housing units per square mile. Even the Minneapolis-St. Paul area was nearly confined to Hennepin and Ramsey counties. The riparian corridor of the Mississippi displayed a markedly higher population density than the surrounding areas. During the next three decades, up to

1970, this compact development pattern slowly yielded to a more dispersed, medium-density pattern. During the 1970s this change accelerated with noticeable differences between 1970 and 1980. In particular, the large area with very low housing density in St. Croix County, Wisconsin, virtually disappeared. Along the Mississippi, higher housing density areas expanded, consolidated, and merged. Although residential development patterns continued to grow more disperse during the 1980s, it was not at the pace of the earlier decade. Overall the structure of human settlement changed significantly during the 50-year period with population density increasing along the river and dispersing over a larger portion of the region.

Projected housing density 2000 and 2010

We projected the number and density of housing units for the year 2000 and 2010 using two different methods. In the first set of projections we used the average housing growth rate from the preceding five decades from 1940 to 1990, calling it the "Historical Trends" and in the second we used only the high growth rate from the 1970, calling it the "Rural Renaissance." In the historical trends projection, by 2010, the only substantial areas with fewer than five housing units per square mile remaining in the region will be in Buffalo and Jackson counties in Wisconsin, and Dodge, Fillmore, Houston, and Wabasha counties in Minnesota. The only one of these remaining low-density areas along the Mississippi will be near Wabasha, Minnesota. In the rural renaissance projection, the portion of this very low-density area near the Mississippi disappears with only a fragment remaining in central Buffalo County, Wisconsin. A major portion of the very low-density area in Dodge County, Minnesota, also yields to housing development in the rural renaissance projection.

Seasonal housing

Within the region, the Mississippi River itself does not appear to be a magnet for seasonal housing except along Lake Pepin, Pool 5, and Pool 4, near Pepin and Alma, Wisconsin, and Lake City and Wabasha, Minnesota. Although these Mississippi River areas have high proportions of seasonal housing, they are embedded within counties with relatively low housing densities. The major centers of seasonal housing in the region lie in the lake area of Polk County, Wisconsin, and near the Wisconsin River in Juneau County, Wisconsin. The sizeable pocket of seasonal housing in south central Jackson County, Wisconsin, lies along the Black River south of the Black River Falls State Forest. The other concentration of seasonal housing in northeastern Jackson County may be more oriented toward hunting given its proximity to state wildlife areas.

Household income

The geographic pattern of household income in the region reflects the general differences in income patterns among urban, suburban, and rural areas. The broad band of Minneapolis-St. Paul suburbs have the highest income levels as do Rochester, Minnesota, and La Crosse, Wisconsin. The central city areas of Minneapolis and St. Paul, along with the most rural areas in the region, have the lowest median household incomes at less than $25,000 per year. The low median income in the lake area in northeastern Polk County is somewhat surprising and may indicate income differences among year-long residents and the high proportion of seasonal residents who report their income at their primary residences. In terms of income, the Mississippi River communities are not noticeably differentiated from surrounding areas, except as a function of their place in the urban hierarchy.

Farming, forestry, and fishing occupations

The percent of employed persons in farming, forestry, and fishing occupations provides some indication of the traditional nature of some local economies. If we examine the history of settlement along the river, towns grew on the back of these extractive activities including river commerce. Overtime this dependence on extractive employment declined. Communities who were able to diversify their occupational structure experienced growth while those communities who did not declined or disappeared altogether. Today, counties with high percentages of employment in these extractive occupations do not tend to be immediately near the Mississippi River. River towns in counties bordering the river have diversified their occupational structure adding more service sector, manufacturing, and information age technology jobs than counties once removed from the river.

Recommendations for demographic research in support of wildlife refuges

Demography is historically linked to human ecology. Demographic attributes often comprise human ecological analysis. Our recommendations will span the two fields of social inquiry in no particular manner. Here we have introduced only a few of the demographic dimensions of social change along the Mississippi corridor. The next step is to integrate the social structure with land use change along the corridor. The forest/vegetation descriptions along the river on both the Minnesota and Wisconsin side are available to do so. We will be able to examine forest cover change in association with settlement and development patterns. Pebley (1998), in her presidential address, has suggested land use and deforestation is a fundamental concern for demographers in their future inquiry of population structure and the environment. For example, the attraction of the river to new immigrants has resulted in the loss of farmland and forests along the borders of the river. This uneven

dispersed development is accelerating the fragmentation of forests, perhaps limiting the remaining areas of minimum habitat requirements for certain species of animal populations. At the same time certain preferred locations (growth hot spots) along the river for new development may not be near wildlife refuges and thus are not a problem for refuge management.

Working with the Upper Mississippi Research Center (USGS Biological Resources Division), river, fisheries, and wildlife characteristics can also be integrated into a data base allowing assessment of changes in aquatic characteristics, species reproduction, composition, and distribution associated with human expansion along the riverway. Further water quality assessments at hot spots where development on bluffs and shorelines are expanding contributing to agricultural runoff, pesticide contamination, and soil erosion can be documented.

Refuges are also attractions to river users. As income rises and residents along the river reflect the new economy, recreation use can be expected to increase. River recreation by and large attracts boaters and anglers from the immediate region. Increased population inhabitation, at human development hot spots (growth communities) along the corridor can contribute to increased recreation boating and hunting given the information on household recreation patterns. Projections can be made on future recreation use of the river and in areas around refuges.

Demographic information spatial displayed can provide refuge managers with a useful tool to participate in the policy process associated with gateway communities and protected area landscape scale management. Ecosystem management applied to refuges can likewise now include the human species and their institutional structure as part of these models and in the various planning process looking into the future state of refuges.

Conclusion

In this article we have briefly outlined the field of applied demography as it is being employed in the study of natural resource management and drew a parallel with landscape ecology. This new integrated database will allow managers to assess human population change with a variety of environmental factors on the river and along its course. Future issues facing refuge managers will mostly like emerge from human development outside the refuges on the Mississippi and along the shorelines and corridor bluffs. Our goal is to provide a profile of population growth projections allowing managers to anticipate rather than react to human pressures on these protected lands.

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Community Relations, Conflict Management, and Collaborative Partnerships[22]

Kristen C. Nelson and Barry W. Stieglitz[23]

Introduction

Collaboration, co-management, community outreach, or conflict management, what will it be? Increasingly US Fish and Wildlife Service (FWS) managers are finding they must understand and work with multiple stakeholders in the contested terrain of natural resource management.

Refuge planners and managers may feel conflict most keenly when they establish a new refuge but conflict and disputes can be a part of any FWS initiative at the local, state, or national level. We can benefit from a substantial amount of literature and experience dealing with natural resource mediations, negotiations, and policy dialogues in many contexts. Some federal agencies are more involved in institutionalizing conflict management but all agency managers can benefit from understanding the concepts behind conflict management, collaborative partnerships and the possibilities for their use in achieving the FWS mission.

Collaborative partnerships are the contemporary version of multiple stakeholders working together to achieve common interests. To date, there is tremendous variation in the types of partnerships that exist, the issues covered, and the processes that work best. But what is the state of the art today? For example, FWS biologists have often been part of watershed partnerships and increasingly, will be asked to join with other jurisdictions and stakeholders to manage ecosystems.

This paper highlights topics in conflict management, collaborative partnerships, and community outreach that are germane to FWS managers. As a case study, Barry Stieglitz presents how he has used human dimensions research to support his staff's work in the Florida Keys. Finally, we summarize the relevant research issues identified by participants in the Human Dimensions of Natural Resource Management Workshop (Feb. 2000).

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History of human dimensions research by the FWS

Interest in human dimensions research has ebbed and flowed within the FWS since the 1950s hunting and fishing surveys. With the emergence of the environmental movement, the passage of the Endangered Species Act and the National Environmental Policy Act (NEPA), the FWS Division of Program Plans within the Office of Planning and Budget established a core staff of social scientists. But in the mid-1980s, the human dimensions staff vanished as the agency reorganized by line management. Interest in human dimensions has only gradually reemerged in the 1990s (Lwellynn et al. 1998).

Llewellyn et al. (1998) point to only two studies that had any lasting influence over the FWS. First was Kellert's 1977 study of American Attitudes, Knowledge, and Behavior Toward Wildlife and Natural Habitats. Kellert conducted 3,100 in-depth interviews over three years. The study was funded by each FWS program with a proportional cost over the three-year study period (Kellert 1979). This study influenced an agency shift from game species to inclusion of nongame species. It highlighted an FWS constituency shift from wildlife users to the public. And it recommended a "sophistication of people management" by the agency. As a result of this study there was some impact on animal damage control. In 1981, 14 social scientists from FWS and other agencies got together at the Minnesota Valley National Wildlife Refuge to form the Human Dimensions Wildlife Study Group.

The second research program recognized by Llewellyn et al. (1998) is the National Survey of Fishing, Hunting, and Wildlife-associated Recreation. It evaluates demand and need for recreation in these areas. In 1980 the findings from this study supported passage of the federal Non-game Bill. It has also resulted in funding options for nonconsumptive use and many economic assessments.

In the 1990s, human dimensions research has slowly reemerged as a critical element in FWS work establishing new refuges and evaluating user experiences.

Guidance from the FWS Mission Statement

In public meetings and agency documents, the FWS leadership increasingly emphasizes the importance of social science research and working with local communities as a means to achieving the agency mission. This spring, in Missoula, Montana, Jaime Rappaport Clark called for human dimensions research as an integral part of problem solving by the FWS. She challenged the participants at the Society for Conservation Biology meeting to evaluate how successful they have been in incorporating a sound understanding of human systems along with their work on natural systems.

For those that wonder if human dimensions research is really appropriate for an agency dedicated to protecting fish and wildlife, they need only to look at the FWS Mission Statement for guidance.

> "The System's foundation rests on . . . an ecosystem approach to land management and to the stewardship of its fish, wildlife, and plants. In simple terms, this philosophy looks at the health and biological integrity of the land (ecology), takes a view beyond boundaries (landscapes), works shoulder-to-shoulder with the brothers and sisters of the entire Service family (cross-program), **views people and society as part of the landscape and resources by working with and through others (partnerships)**" (Clark 1999) (emphasis added).

Fulfilling the Promise (U.S. Fish and Wildlife Service 1999) goes even further to make recommendations for how to go about working with people, communities, and other government agencies. For example:

> "***Recommendation P7***: Forge new and non-traditional alliances to broaden support for the System by establishing citizen and community partnerships on all staffed refuges.
>
> ***Recommendation P8***: Strengthen partnerships with states, Tribes, nonprofit organizations, and academia. Develop new policies and authorities for establishing formal relationships with the business community."

In all these cases, social science research and applied problem solving can help agency personnel successfully implement recommendations and meet their objectives. It can assist agency staff in building strong community relations, understanding the dynamics of emerging conflicts, and maintaining successful partnerships.

Community relations: A Florida Keys case study

(from Barry Stieglitz)

There are four National Wildlife Refuges in the Florida Keys: two created as bird reserves, which now include designated wilderness, and two created solely for the recovery of endangered species: the Key deer and American crocodile. In 1957, when the National Key Deer Refuge was established through the collaborative efforts of the Boone and Crockett Club and the Wilderness Club of Philadelphia, there were approximately 100 people and 26 Key deer living on 6,000-acre Big Pine Key, the heart of the Key deer range. In the early 1970s, the human population had risen to nearly 1,000, while the Key deer herd, through very intensive and aggressive protection efforts, rose to nearly 400 animals. Then came air-conditioning and mosquito control, and a surge of human

development and population growth. The experience in the Florida Keys as a public land manager is all-too-common: endangered species/human conflicts, the throes of a typical gateway community, and user conflicts. This combination of typical conflicts made for one big atypical mess.

The Keys are like much of the rest of south Florida, with a tourism-based economy which depends largely upon the quality of the environment for its appeal and continuation. The Keys are a "gateway community," a term which describes towns bordering public lands, known for their scenic vistas and high quality of life. It is a place at odds with itself, where a demand for economic growth vies with quality of life and community character issues and the sustainability of its environment. Much of the economic growth degrades or destroys that which made the Keys the Keys—"gin-clear" waters, pristine coral reefs, isolated mangrove islands overflowing with bird colonies, remarkable sunsets, and a combination of North American fauna and Caribbean flora found no where else in the world. First marketed as paradise, the tourism tax dollars generated from its millions of annual visitors were reinvested in marketing, until a huge incestuous and cannibalistic gyre fed upon itself and grew at its own expense.

The waters which were once compared to the clarity of gin resemble split pea soup in places. Beaches are closed due to high fecal coliform bacteria counts created by inadequate and insufficient sewage treatment methodology and facilities. The once-thriving coral reefs have become but a shadow of themselves, algae-encrusted and dying, the causes myriad and in dispute. The buzz of personal watercraft flushes birds from their nests, allowing the unshielded nestlings to roast in the hot south Florida sun. And what of the unique blend of flora and fauna? More than 120 listed as endangered, threatened or otherwise imperiled by the federal, state, and county governments. Only the sunsets remain untainted. If the Keys are not yet Paradise Lost, they are certainly Paradise Dying.

In 1990 a meager staff of eight, which did not include any communication professionals, tried to manage the four Florida Keys National Wildlife Refuges. The tourism marketing boom was on the rise, and the Keys became not only a desirable retirement community, but a huge destination for vacationers. The demand for recreation opportunities, especially "thrill" recreational experiences such as parasailing and personal watercraft operation, grew as more and more vacationers came to the Keys. User conflicts became increasingly common. The resident community became extremely polarized, creating high tensions, fistfights at public meetings, spawning antigovernment newspapers, and headlines which pitted endangered species against residents and the needs of children.

In the early 1980s, there was a single large catamaran offering tours of the refuges' backcountry waters. Only ten years later nearly two dozen boats were offering tours of the same areas. Some illegally accessed refuge islands, placing up to 50 people simultaneously on a designated wilderness beach only 10 feet wide and approximately 900 feet long. Personal watercraft rentals, parasailing, and "party" boat tours became commonplace in and around the wilderness islands.

So, what was done to reduce these conflicts?

First, the refuge staff became alarmed at what they saw happening in the backcountry. They worked with the state of Florida to obtain management authority over those state emergent, tidal, and submerged lands in the backcountry. They proposed a range of alternatives, including modest wildlife management zones to exclude inappropriate and disruptive public use from critical wildlife areas either year-round or seasonally. Some members of the community wanted to go further. They lobbied for and achieved the most restrictive alternative, which included not only 19 wildlife management zones, but a complete prohibition on amphibious aircraft landings, hovercraft, water-skiing, airboats, and the much-detested personal watercraft (PWC). An important note is that the strongest support for the bans came not only from the environmental community, but from other backcountry users, especially fishing guides, whose businesses suffered as a result of irresponsible PWC use. Sometimes you can get help from unexpected quarters, but you will not know unless you look. This support was due in part to extensive outreach at nearly 20 public meetings on the state management agreement.

When I arrived at this duty station in 1995, I became the single point of contact for all media inquiries. This was not a control issue, it was to ensure quality and consistency in all of our public communications. This paid big dividends later. It turned "the government" into a single face and name. A person who could develop personal relationships and trust with media representatives.

I talked with any group who would have me: Chamber of Commerce, Rotary Club, live local access television, radio call-in shows, Big Pine Key Civic Association, and the Key Deer Protection Alliance. These speaking engagements helped greatly, because people had access to something they always felt deprived of before: information. Some people think information only has value if it is withheld: I say it only has value if everyone has it.

I also listened. Communication is, by definition, two-way. The speaking schedule opened doors to communication and collaboration that had never been opened before. We built a trail to a fallen local environmentalist with the Key Deer Protection Alliance, we worked with the Chamber of Commerce on extremely contentious road improvement issues, and we started a Key deer Habitat Conservation Plan with the county and Florida Department of Transportation to address long-term divisive development and traffic conflicts.

We also developed better communication skills among the staff. I spent my first week in my new job at a course entitled "Building Community Support." Other staff training included simple writing and grammar, interpersonal skills, conflict resolution, and facilitation. I saw some gradual improvement over time in the staff's abilities and, perhaps most importantly, confidence in communicating with the public and media.

We formed a refuge support group in the local community, to increase grassroots support and develop community members as ambassadors for the FWS.

We joined the Chamber of Commerce, which provided access to some of our most staunch detractors. It also helped to put a face on "the government." Thereafter, if someone had a gripe, they could not say the government is doing this, they said "Barry" is doing this, and they would call me about it.

In 1997, I received a boon. Someone from our Washington office called and said they wanted to help, and offered $15,000 and a consultant to complete a community relations study, if I wanted it. I did not bother to say "yes," I just asked the consultant to get on the plane!

It worked like this. I provided the consultant with everything I could, including my assessment of the situation, newspaper clippings, names of contacts (both supporters and detractors), and a copy of an older report containing recommendations to improve community relations. The consultant then interviewed staff and the contacts, and came to some fairly concise conclusions which had national application for the FWS (recommendations in italics, Gilliam 1997).

National Implications from Keys Community Relations Study

1. *Resource and habitat protection through government regulations are an essential ingredient in protecting wildlife habitat, but will never in and of themselves be sufficient to achieve the mission of the agency Public understanding and support that lead to community-based partnerships are ultimately the means by which the work of the Fish and Wildlife Service to conserve, enhance and protect fish, wildlife and habitats will be achieved.*

I can add nothing to this statement: we all learned in school that the most difficult portion of wildlife management is the human element. Holistic approaches often work best.

2. *Science needs to be sound, current, accessible, understandable and most of all, communicated to the public. The translation of scientific research to public understanding and the communication to the public is as important as the scientific study itself.*

3. *The best scientist is not necessarily the best communicator. Make sure that we have people who can effectively explain our message to the public assigned to that task. Be willing to hire professional communicators when it is clearly indicated.*

Regarding these two points, communication with the public and outreach, are <u>everyone's job</u>! I made the mistake of allowing people to say—I am not trained in that, or I do not feel comfortable doing that. It is the contact by the maintenance man at the hardware store, or the biologist doing a turtle survey, that can often be the most successful communication with the public. Never miss an opportunity. Give your people the training, and most importantly, the support to try, and fail if necessary, to talk to the

public. You cannot collaborate with folks with whom you do not communicate. That said, I also recognize that while everyone wears the hat of "outreach," there is also nothing to substitute for the full time focus of a trained, professional communicator. While everyone should conduct outreach, it should also be a professional someone's full-time job. And in case there is any question in your mind, a trained environmental educator is not necessarily a trained communication professional. The skills and abilities, while they overlap to some degree, are generally not interchangeable.

4. *The image of the Fish and Wildlife Service is formed by individuals. An image that is appropriate for law enforcement may be counterproductive in proving that the Fish and Wildlife Service wants to be a good community partner. Traditional rules—such as when uniforms are necessary—may need to be reinterpreted.*

This is true. For instance, in the Keys we heard that many members of the public resented our "military-looking" uniforms and law enforcement officers wearing firearms in public. So I switched the entire, nonlaw enforcement staff to the kinder, gentler knit polo-style uniform shirts, and received positive feedback about it. This may not work everywhere, or be appropriate, but might help our agency image, and certainly demonstrated our responsiveness to community concerns.

5. *Cultivating public support is a full-time, long-term undertaking. A plan for achieving the goal of public support should be passed from one project leader to another to maintain continuity. It should not be personality-dependent, any more than achieving any other management goal for a field station is left to managerial discretion.*

We now have Comprehensive Conservation Plans, Fire Management Plans, and Law Enforcement Plans. Why not some long-term vision and direction for community relations? I am not suggesting a formal, written process with public input, but certainly a sharing of vision between generations of managers and their primary communications staff. The turnover of managers in the Keys was a concern not only for the staff but the community. The lack of management direction and consistency between managers was a common complaint.

6. *All staff should be trained to work with the public, assigned to appropriate public contact responsibilities, and rewarded for achievements in this area.*

Again, outreach is everyone's job: this is often a hard sell to biologists, especially when they see it as counterproductive to protection efforts.

As a side note, become familiar with the Bleiker concept of "informed consent." From a practical standpoint, this is what we should strive for. Focus your most intensive outreach efforts not on those who already agree with your direction, program, or project, nor on those who will never agree, but those in the middle. And your goal for these folks is not to get them to say "yes," but rather to make sure they will not say "no." Think about it.

In 1999, I presented a paper on outreach at the International Wildlife Management Congress in Hungary, and was amazed to hear the common element in almost every presentation of the human dimension aspect of their work. We are talking questionnaires, studies, and focus groups, and other social sciences incorporated right into research from the start. For instance, there is a large carnivore restoration project in Europe. And this is not some US-style project where we send out questionnaires through the mail to hunters with prepaid return envelopes. We are talking about biological researchers walking up into the mountains in the middle of nowhere to ask shepherds what they think about wolves in their hills. We, too, need to make social research and communications a part of everything we do, until it becomes second nature, to reduce conflict which is derived from information gaps or miscommunication.

Successful communication can lead to collaboration which can eliminate or reduce conflict. And that is why I stress the importance of communications: I see it as a way to avoid significantly these problems which so effectively consume our time and prevent us from doing other resource work. Talk with your publics, and, as importantly, listen to them. Be consistent and frequent with your messages. Find support where you expected none. Do not preach to the choir, find the people outside the church and get them inside. Always remember that outreach is everyone's job, and make them accountable for doing it every day, but provide training and recognition when they succeed and support when they fail (and they will fail sometime). Invest in communications professionals. Last, do not be afraid to take risks. Folks will respond positively to your attempt to reach out to them.

I know someone will ask the question, so I will answer it in advance. The answer is you must recognize the importance of effective, consistent communication and prioritize it appropriately. The question, of course, is how do I fund a professional communicator and communication training for my staff?

Continuum of conflict management options

Despite the best community relations efforts FWS managers will be confronted with conflict. The conflict may be policy based as in a disagreement between stakeholders about delisting an endangered species. It may be site specific such as the deer management plan in the Minnesota Valley Refuge. Certainly most conflicts include a difference in value orientation among the various stakeholders. Some constituents value the economic contribution of fisheries, while others value the ecological contribution of aquatic biodiversity. FWS managers need to know what these values are in order to address them in a conflict management situation. Finally, many environmental conflicts revolve around resource distribution. Who has what right to a given resource be it water, a wildlife population, or a landscape level vista?

In many of these environmental conflicts there is often no "right" answer. Even the FWS staff may disagree about the right way to manage a wetlands system depending on whether they are managing for an endangered species, for a harvestable species, or at the

ecosystem level. With this level of disagreement within the FWS, one can only begin to imagine the issues local community stakeholders would be concerned about when developing the "best management plan."

Another factor that often emerges in environmental conflicts is the public's lack of trust in resource and environmental institutions. Stakeholders in a variety of organizations come to a conflict with a history of interaction. They often believe the government agency responsible for managing a particular resource has not dealt with them fairly in the past and they have very little trust in a productive relationship for the future. In some cases, groups will believe all government agencies are alike, transferring their frustration and distrust from one agency to the next agency they encounter in a dispute. Agency personnel also come with a history of conflicts with stakeholders that will influence their participation in any attempt to manage a conflict. People come to conflicts over FWS policy and management with a personal, group, and societal experience of conflict that must be understood to negotiate a possible solution successfully.

In the dispute resolution process of conflict management there is a continuum of options available to the stakeholders and FWS managers. Briefly they range from consensual to adjudicative processes that incorporate informal to formal procedures. *Negotiation* is the most flexible process involving all the stakeholders working together without a facilitator to find common ground. Most successful negotiations feed their agreements back into the traditional decision-making process as recommendations. *Facilitation* is equally flexible in the process but is often used by stakeholders when the service of a third party would help guide the parties to find a common agreement. These settlements are often presented as advice within the traditional decision making process. *Mediation* is a more formal process often designed by a third party for stakeholders in an escalated conflict. Some agencies have an institutionalized mediation process but in many cases mediations are situation specific. Whether the mediation process is institutionalized or not will influence how any settlements feed into the traditional decision making process.

Arbitration and the courts are the adjudicative dispute resolution processes with active third party involvement, rigorous procedures, and often mandatory participation. Similar to labor arbitration, environmental conflicts under arbitration require stakeholders to present evidence to a neutral third party. In many states this third party has the ability to hold the parties to a decision. Finally, many conflicts will end up in the court system with the traditional system of litigation and decision making by the judicial system. Some stakeholders prefer this well tested means for "settling" conflicts for a variety of reasons related to the balance of power, organizational resources, and existing laws. The FWS certainly expends a tremendous amount of its budget in this final dispute resolution technique. Some folks are interested in using negotiation and mediation to reduce costs, reach "better decisions," and build a social context for future partnerships.

Despite twenty years of environmental conflict management literature there is still a great deal of work to be done, especially in relation to FWS. For example, community relations

studies done by FWS managers or consultants would certainly help improve communication and reduce the number of future conflicts. An understanding of the sociopolitical context, stakeholders, and resource issues would help managers participate in productive conflict management. Or it would be beneficial to understand how FWS managers can facilitate constructive exchange and learning even during the most heated conflicts. If you are interested in the abundant literature on negotiation and mediation, you can start with Susskind et al. 1999, 2000; Backburn and Bruce 1995; Goldberg et al. 1995; Crowfoot and Wondolleck 1990; and Carpenter and Kennedy 1988.

Collaborative partnerships

In the 1990s, collaboration became the buzzword of regional environmental management. Citizen groups and government agencies were frustrated with the stalemate caused by the raging environmental conflicts of the 1980s. Agency budgets had been cut to the point that they could no longer "go it alone," they needed to combine resources with other stakeholders. And new thinking about landscape ecology, watershed management, and ecosystem management meant that citizen groups, businesses, and multiple government entities had to work together to achieve shared management goals.

Collaborations and collaborative partnerships come in all shapes and sizes: from the Upper Mississippi River and Great Lakes Region Joint Venture for the North American Waterfowl Management Plan to local watershed councils. Certainly the western United States has the greatest number of attempted collaborations with watershed councils, Bureau of Land Management (BLM) Resource Recovery Councils, Habitat Conservation Planning Processes (HCPs), and various forestry roundtables. The USDA Forest Service, EPA and BLM have taken the initiative across the nation in the attempt to institutionalize collaborative processes.

Supporters of the collaborative processes note many of the benefits found during conflict management negotiations. They find that collaboration is necessary for complex problem solving, successful implementation, and trust building, among other benefits. Critics find collaborative processes tend to co-opt local community interests, ignore important conflicting values, and result in "watered down" agreements, among other problems.

Much of the current research on collaboration and collaborative partnerships is based on single case studies or findings summarized from a few case studies. There is a real need for more comparative work across different collaborations, evaluation of the institutional impacts of collaboration, investigation into "burnout" in partnership participants, and an analysis of how collaborations evolve overtime. (For emerging literature on these issues refer to Wondolleck and Yaffee 2000; Frentz et al. 1999; Williams and Ellefson 1997; and McCloskey 1996.)

Identified research needs in this area

In the full group session of the Human Dimensions Workshop, all the participants identified many researchable issues related to community relations, conflict management, and collaboration. When asked, "What problems could be helped by knowing more about visitors?", a dominant theme was *conflict between use groups*. Everyone thought more research needed to been done to reduce conflict between user groups but they also wanted some investigation into the disjunction between the visitors' perceptions of appropriate use and the manager's desires for resource management.

The second question, "What information do we need to enhance FWS work with communities?" is directly applicable. There were many suggestions but a few included: learning more about communities around FWS lands, identifying opinion leaders, understanding community goals/values/attitudes/behaviors, identifying shared community/FWS goals, measuring trends in demographics, etc., measuring social capital benefits/costs of FWS lands, and training in collaborative processes. Certainly the demand for informative social science research to address FWS work with communities will continue. The tough change will be to move from our intellectual understanding that work with communities is the only way to fulfill the FWS mission to each of us providing practical support for human dimensions research and programs in our planning and budgetary decisions.

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Environmental Values Related to Fish and Wildlife Lands[24]

David N. Bengston[25]

Introduction

Rapid change in the social, political, economic, and scientific environments in which public land management takes place has characterized recent decades. Managing public lands in ways that are responsive to the changing social environment is one of the biggest challenges facing public land managers today. One of the most significant changes in the social environment in which natural resource managers operate is the evolving values of the public and other stakeholders. Social scientists who study values have found a slow but steady reorientation of environmental values in the U.S. in recent decades (e.g., Bengston et al. 1999; Deason 1996-97; Hays 1987; Kempton et al. 1995; Ladd and Bowman 1995; Manning et al. 1999; Xu and Bengston 1997). Wildlands are increasingly valued as amenities to enhance quality of life besides being valued as a source for material commodities. Increasing tension between traditional (economic and commodity-related values) and emerging (recreational, aesthetic, moral/spiritual, and ecological values) values is apparent, and points to the need for planning and decision making processes that are better able to negotiate and incorporate diverse values. Public land managers need to understand the nature of environmental values better if they are to work collaboratively with diverse stakeholder groups.

The purpose of this paper is to provide an overview of key concepts related to environmental values and their importance for public land managers. The following section defines environmental values and discusses their relationship to environmental attitudes and beliefs. This is followed by presentation of a broad system for classifying environmental values and understanding the distinct ways in which people value nature. A final section discusses some recommendations for future research related to environmental values.

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What are environmental values? How do values relate to attitudes and beliefs?

Values have been defined in many ways by social scientists in different disciplines, including economics, political science, anthropology, psychology, and sociology. Each of these disciplines—and others as well—approach the topic from a somewhat different perspective and each perspective sheds some light on the nature of human values (Bengston 1994). From a practical standpoint, values can be defined simply as relatively enduring concepts of what is good or desirable. Value in this sense is sometimes referred to as an ideal or held value. Environmental values are enduring concepts of what is good or desirable about the environment and natural resources. Individual values refer to values held by an individual, and social values are shared by groups of people.

Values are a key part of a system of attitudes, beliefs, and values through which people view and interpret the world around them. Figure 1 illustrates the relationship between attitudes, beliefs, and values for the case of wolves. An *attitude* is a learned predisposition toward some object as either favorable or unfavorable (Fishbein and Ajzen 1975). For example, a person might have a favorable attitude toward wolves. *Beliefs* reflect what people think is true about an object, and they are one reason for having a particular attitude toward the object. For example, someone with a favorable attitude toward wolves may hold many supportive beliefs, such as the belief that wolves have a right to exist without interference from people, or wolves are a symbol of our natural heritage (Fig. 1). Both attitudes and beliefs are subject to change based on new information, persuasion, life experiences, and other learning processes. Values are the most deep-rooted and central elements in a person's system of attitudes and beliefs (or a group's shared system of attitudes and beliefs). Like attitudes and beliefs, individual and social values change over time, but they tend to be more stable and resistant to change. As shown in Figure 1, someone with a favorable attitude toward wolves may hold a variety of values that help explain why wolves are good or desirable.

Attitudes	Favorable attitude toward wolves: "I love wolves"				
Beliefs	Wolves play an important role in ecosystems	Wolves have a right to exist	Wolves symbolize our dwindling natural heritage	Wolves are beautiful creatures	Wolves are important for tourism & ecotourism
Values	Ecological	Moral/spiritual		Aesthetic	Economic

Figure 1. A simple system of attitudes, beliefs and values about wolves.

Systems of environmental attitudes, beliefs, and values (such as the simplified one illustrated in figure 1) tend to be robust structures that are resistant to change. New beliefs that are added—through formal or informal education, life experiences, etc.—will generally be consistent with the overall system. For example, a person holding the views showed in Figure 1 would be highly unlikely to adopt the belief that wolves are vicious, evil creatures. These systems are also resistant to change because when an existing belief is discarded, the overall system will likely still stand. For example, if a person with a favorable attitude toward wolves holds the belief that wolves never attack people and that belief is shown to be inaccurate and is therefore modified or abandoned, the person's overall attitude toward wolves and their underlying environmental values related to wolves are unlikely to change.

The robustness of systems of environmental attitudes, beliefs, and values is important because it helps show why merely "educating the public" about wildlife management is unlikely to produce the desired results. Changing people's beliefs about a particular management practice (e.g., trapping or hunting wildlife to achieve a management objective) does not deal with their overall attitude toward the management practice or wildlife in general, sets of other beliefs they may hold, and deeply held environmental values. Rather than educating the public, listening to the public and other stakeholder groups and working collaboratively with them is much more likely to be effective.

A system for classifying environmental values

Figure 2 presents a broad framework for understanding the ways in which people value the environment, including the values they hold for public lands. Two fundamentally different types of environmental values are distinguished in Figure 2: instrumental and non-instrumental. When we value the environment instrumentally, we are concerned about its usefulness as a means to some desirable human end. The instrumental values of nature arise from the fact that "… nature benefits us. Nature is useful: it serves a purpose, satisfies a preference, or meets a need" (Sagoff 1991:32). In contrast, when we value the environment non-instrumentally, we care about it as an end in itself, rather than a means to an end. Most people value public lands both instrumentally for the benefits they receive from these lands and non-instrumentally, in ways that go beyond their contribution to self-interested goals.

There are two broad categories of instrumental value related to the environment (Figure 2). Like instrumental value in general, the economic (or more broadly, utilitarian) value of the environment stems from its utility for achieving human ends, where the ultimate end or goal is maximizing the satisfaction of individual preferences. The economic conception of the value of nature focuses on the usefulness of the environment as expressed in individual preferences or an aggregation of individual preferences.

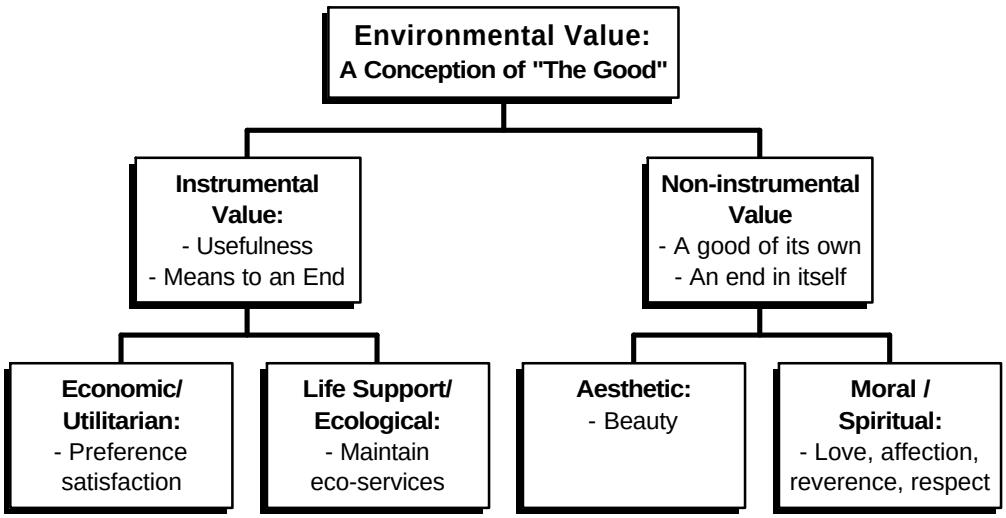

Figure 2. A classification system for environmental values.

Life support value is another broad concept of what is instrumentally good about the environment. For people who hold this value, life-supporting environmental functions and services are good because human well being depends on them. Unlike economic value, life support value is not adequately measured by adding up people's preferences or willingness to pay for environmental functions and services. Many people are unaware of the life-supporting benefits that ecosystems provide, so aggregating preferences or willingness to pay for life-supporting environmental services does not produce a meaningful measure of their importance. The benefits exist whether or not people are aware of them.

Figure 2 also shows two broad types of non-instrumental value. Aesthetic value is a type of non-instrumental value in which beauty is the concept of what is good. Sagoff (1991) notes that nature may be valued as an object of knowledge and perception, his definition of aesthetic value. Aesthetic value has historically had and continues to have profound impacts on public land policy and management: "One of the main reasons that we have set aside certain natural areas as national, state, and county parks is because they are considered beautiful" (Callicott 1992:12).

Finally, moral/spiritual value is also a type of non-instrumental value. People value an object morally when they regard it with love, affection, reverence, and respect (Sagoff 1991). This is what Aldo Leopold (1966:261) had in mind when he wrote: "It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value." Spiritual value is a type of moral value, as is attachment orientation to nature, sense of place, and heritage value (Xu and Bengston 1997).

Each of these four broad types of environmental value represents a distinct concept of what is good about the environment or motivation for caring about nature. It is important to keep in mind, however, that public lands are always valued in multiple ways simultaneously: A national forest may be valued economically for timber harvested and morally for sacred Native American sites it contains; a wildlife preserve may be valued aesthetically for its natural beauty and for the environmental services provided by its wetlands.

The simple classification of environmental values shown in Figure 2 could be expanded to include much more detail and specific types of value that fall under the four main categories. But the important point for natural resource managers is that most people value the environment and public lands both instrumentally and non-instrumentally. In the past, resource managers have sometimes emphasized the instrumental values—especially economic/utilitarian values—to the neglect of non-instrumental values. But the deeper, non-instrumental values help explain why many people care so passionately about environmental issues and therefore why the intensity of conflict over resource management is often high. People are much more passionate about places of the heart than places valued only for instrumental reasons.

Future research recommendations

This final section discusses some recommendations for future research related to environmental values relevant to public land managers. First is the need for research that is place-specific. Much of the research on environmental values is general and not focused on a particular area. This can help natural resource managers understand the broad social context in which management takes place. But people's environmental values and concerns often vary from location to location. Specific information about the values people hold for particular public lands would be most useful to managers. Research is needed to shed light on the values held by communities of place and communities of interest for particular public lands. Creative and cost-effective ways to gather this information are needed.

Another need for future research is on differences in environmental values, preferences for recreation activities, acceptability of management actions, etc. among different ethnic and minority communities. The communities served by public natural resource management agencies are becoming more racially and ethnically diverse. A number of studies have shown that members of racial and ethnic groups may hold environmental attitudes and values, have greater concern for certain environmental problems, and have participation rates in wildland recreation and environmental activism that differ in various ways from those of European-Americans (see Bengston 2000 and studies cited therein). Responding to an increasingly diverse society in ways that ensure the views of all citizens are included in resource management and policy is an important challenge for natural resource management agencies.

Third, many communities near public lands have experienced an influx of urban migrants in recent decades, including seasonal homeowners, retirees, tele-commuters, and others. This trend is likely to continue in the coming decades. Urban migrants typically have different value priorities and different orientations toward nature than long-time rural residents (Shannon 1988). The urban migrants often have less direct contact with nature than long-time residents, and they are often eager to be involved in planning and decision-making on public lands. Research is needed to understand better the value differences between long-time residents and new residents—especially in communities that have experienced significant change in this respect—in order to minimize conflict, facilitate communication between these groups, and build bridges of understanding.

Finally, research on collaborative planning and decision-making processes is needed. Collaborative approaches to planning and management are a key to getting diverse values on the table and working them out. It is through discourse and deliberation that people discover and express social values, which can then be incorporated into management. It is important to create collaborative processes that encourage people to express freely the deeper, non-instrumental values and strike a balance between scientific information and these values. "Science is, of course, a very important and necessary part of resource management. But when we emphasize a scientific and objective attitude to the exclusion of all else, we create an environment in which it is difficult for people to speak about intuitive and emotional experiences, and in which it is difficult for us to hear or understand them when they do" (Schroeder 1996:16-17).

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Social Impact Assessment: How We Assess the Effects of Our Actions on Visitors, Neighbors, and Other Stakeholders[26]

Stewart D. Allen[27]

Introduction

Across the country, the Fish and Wildlife Service is writing or revising comprehensive conservation plans that guide management of the National Wildlife Refuges. Typically, these plans are presented to the public as environmental impact statements—most of which pay short shrift to the human environment and how people, their values, and their institutions will be affected by the new refuge plans. Yet many yardsticks are available to measure the effects of our actions on the human dimensions of ecosystems. The yardsticks we choose or choose to ignore convey to society our understanding of human systems and our values associated with them.

This paper focuses on social impact assessment. There is a wealth of literature on the topic (for example, Finsterbusch et al. 1983; Freudenberg 1986), and a wealth of models—both good and bad—that demonstrate the range of possible approaches. This paper reviews some key guidelines and principles emerging from the social impact assessment literature, including what types of effects to consider measuring, what populations merit special attention, how to apply information on visitor attitudes and experiences (and other available data) to the impact assessment, techniques for incorporating expert opinions, panels, or roundtables into the assessment, and how to address issues such as environmental justice.

Definitions of social impact assessment

It is important to begin with a review of the diverse ways practitioners have defined social impact assessment. Perhaps the most relevant conclusion is that social impact assessment is an ongoing, iterative process—not just a chapter in a document. Another key point is that we must be prepared not just to quantify changes that may occur, but to discuss the meaning of those changes to people, communities, and

[26]Allen, S. D. 2000. Social impact assessment: How we assess the effects of our actions on visitors, neighbors, and other stakeholders. In *Human Dimensions of Natural Resource Management: Emerging Issues and Practical Applications*, eds. Fulton, D. C., K. C. Nelson, D. H. Anderson, and D. W. Lime. St. Paul, MN: Cooperative Park Studies Program, University of Minnesota, Department of Forest Resources.

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institutions, and how change may be interpreted differently based on people's values and orientations.

- Social impact assessments estimate how proposed actions and their alternatives will affect the quality of people's lives (Bryan and Hendee n.d.).

- The main purpose of . . . social analysis in resource management is to answer the question "Who is affected by an agency action, and how are they affected?" (Richardson 1993).

- Efforts to assess or estimate, in advance, the social consequences that are likely to follow from specific policy actions . . . and specific government actions . . . particularly in the context of the National Environmental Policy Act . . . By social impacts we mean the consequences to human populations . . . that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society (Interorganizational Committee on Guidelines and Principles 1993).

- SIA is a systematic effort to identify, analyze and evaluate social impacts of a proposed project or policy change on the individuals and social groups within a community or on an entire community in advance of the decision making process in order that the information derived from the SIA can actually influence decisions (Burdge and Robertson 1990).

- Social impact management is a people-centered, ongoing decision-making process designed to identify, evaluate, respond to, and monitor the public issues arising from industry and government activities (Preister and Kent 1981).

- An impact that disrupts or interferes with the usual patterns of interactions and meanings attributed to individual and group activity (Impact Assessment, Inc. 1990).

Principles of social impact assessment

When assessing the effects of management actions on human components of the ecosystem, it is wise to keep several key principles in mind (Interorganizational Committee on Guidelines and Principles 1993). Following these principles leads to scientific, defensible, reasonable estimates of the social consequences of our public land management actions.

Involve the diverse public

People's perceptions of impacts can be easily incorporated into impact assessments. Some projects have used special panels to help gauge effects (Burchfield et al. 1997), while others have simply relied on the public involvement process as a source of information. An even better approach is to involve affected publics in the impact assessment process (Burdge 1995).

Analyze impact equity

Nearly any project or plan will produce winners and losers because people and stakeholder groups are affected differentially. Identify how different groups will be affected, and how they likely will cope with the changes. Environmental justice should be addressed: "Each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations . . . " (Executive Order 12898;1994, amended 1995).

Focus the assessment

Identify the most significant social effects and focus on those. Just as biologists use indicators to assess and measure change, so can social scientists.

Identify methods and assumptions and define significance in advance

Methods can range from analysis of similar projects to expert opinion to collection of primary data regarding the effects. Often, assumptions will need to be coordinated with analyses on effects on other resource areas. For example, we need biologists' estimates of impacts to wildlife populations before we can assess effects on humans' use of those animals (Allen 1985a).

Provide feedback on social impacts to planners

This allows mitigation to be incorporated into management alternatives, or allows the alternatives to be modified in response to anticipated social effects.

Use SIA practitioners

If you do not hire one, your appellants will! This may seem obvious, but how many refuges or regional offices have a social scientist with extensive experience in social impact assessment available? At least have the preliminary assessment peer-reviewed.

Establish monitoring and mitigation programs

Impact assessments, after all, are only our best guesses about future events; we are often incorrect, especially when people are involved. People can adapt, resist, deny, and deal with change through a variety of social and psychological mechanisms.

Identify data sources

Again, this may seem obvious, but nonsocial scientists may not know where to begin. Published literature, secondary sources (such as that available from the census, state, county, or community), and primary data (such as survey research, interviews, or focus groups) should all be considered.

Plan for gaps in data

We seldom have the luxury of collecting primary data on social conditions and likely effects on those conditions. It is okay to say desirable data are not available. In such cases, we must often make assumptions. That is fine, but they should be reasonable and explicit. If an effect cannot be quantified, it is still worth discussing in the best terms you can use.

Dependent variables in social impact assessment

Who and what will be affected by our actions, and how? Another way to think of this: what are the key dependent variables in a social impact assessment? We need to know the range of possibilities before selecting the appropriate variables for each analysis.

Following are a number of lists of variables that social impact assessment practitioners have included in their analyses. They are provided to cue readers into the diverse range of types of social effects measured. Not all will apply to every project; one must pick and choose among them (and others) based on the type of plan or project and the nature of the effects. Be aware that community (i.e., town or village) has become a key unit of analysis for many impact assessments (Pivo 1992).

Variables derived from a review of the literature (Interorganizational Committee 1993):

- Population characteristics
- Community and institutional structures
- Political and social resources
- Individual and family changes
- Community resources

Variables used to explore the socioeconomic effects of implementing ecosystem management on national forest lands (Jakes and Harms 1995):

- Impacts on the economy
- Impacts on recreation and aesthetics
- Social and cultural impacts
- Impacts on forest product outputs
- Impacts on management

Variables communities can use to assess change (Burdge 1995):

- Population impacts
- Community and institutional arrangements
- Conflicts between local residents and newcomers
- Individual and family level impacts
- Community infrastructure needs

Variables used to identify economic, social, and psychological impacts associated with the Exxon Valdez oil spill (Impact Assessment, Inc. 1990):

- Fundamental disruptions of usual ways of living, including the experience of personal health and well being
- Experience of the loss of personal and community control
- Displacement of usual and expected actions, plans, and resources for responding to the demands of the "proposed action"

  (Each of the above was discussed at the community, interpersonal, and individual scales)

Variables used to identify broad-scale changes associated with adoption of an ecosystem approach to managing public lands in the Interior Columbia River basin (Burchfield et al. 1997):

- Effects on predictability
- Effects on access to decision making

- Effects on private lands
- Effects on communities and quality of life
- Effects on American Indian tribes

Techniques for measuring the effects of our actions on the chosen dependent variables

Many methods have been used to measure the magnitude and significance of social impacts. Typically, this will depend on the information available on the human components of the ecosystem, and how those data were collected.

Measuring the amount of change is not the same as measuring the social impact; we must also consider the meaning of that type and degree of change to different affected populations. For example, we may start an analysis of effects on recreational use by using a recreation opportunity spectrum framework to measure the types of opportunities present currently and the types that would be available under various planning alternatives (Allen 1981). The outcome of this analysis may suggest that one alternative would increase the amount of land available for primitive opportunities and decrease the amount available for roaded natural opportunities is certainly useful; that is a quantifiable environmental impact. We could continue by projecting the visitor days expected.

The true social scientist (and decision maker), however, is interested in knowing the meaning of that change. Is it significant? To answer this, we can draw on regional analyses of available opportunities, regional analyses of projected demand for various opportunities, statements made by individuals and organizations affected by the change; analyses of effects from past plans, and surveys of recreational visitors that asked how people feel about the affected area and others in the region. These types of analyses give meaning to the change. An important related consideration is how will people and institutions respond to the change? Recognize that these responses may well have impacts of their own!

It should be clear that we need information not just on project setting and how it will change, but on the social context and definition of that setting. For instance, if we are proposing to prohibit certain types of recreational activities, the social impact assessment needs to consider other opportunities in the project area or region where those activities and experiences are available, and the extent to which those settings and the experiences they provide are substitutable (Allen 1982). Without this social context, interpreting the significance of the impact is difficult. For instance, people can become very attached to places; their reactions to change likely will differ from people only casually familiar with the same place, because there are no substitutes for that emotional attachment and sense of place.

Another technique for measuring effects is to use panels of experts who are presented with information about the project and the alternatives, and are asked to estimate the type and direction of effects on various affected populations and entities. They may be asked to develop the list of types of impacts and affected populations, or may be presented with them; their charge can be narrow or broad. This can be useful, as long as the experts are the right ones (consider including people possessing local knowledge on the panel), the analysis is at the appropriate scale, and the results will be understandable. The technique can be useful when other resource areas also are using panels to help with the impact assessment.

Another strategy to consider is estimating the losses in economic value of nonmarket resources that would be affected, such as recreation settings, instream flows, or wildlands (Allen 1998, Allen 1985b). Although controversial, well-established procedures exist for developing such estimates (Brown et al. 1994). Even if the precise numbers developed are questionable, they can anchor the magnitude of an effect using a unit of measure we all understand—the dollar.

Conclusion

Ultimately, the level and type of effort we expend on social impact assessment depends on many factors, including:

- the standard (institutional norm) regarding social impact assessment for this type of project or plan;
- the scope of the proposed action and the degree of change that would result;
- the level and type of effort planned for the impact assessment as a whole;
- the public and decision maker interest in social effects compared to other effects and what type of effects are most controversial or important to measure;
- the willingness of decision maker to incorporate social mitigation measures into the final plan;
- the internal and external market demand for science-based impact assessment;
- available information on the social affected environment;
- the funding and time available for primary and secondary research; and
- the availability of qualified social scientists to conduct the assessment.

Yet, even if the answer to these questions points in the direction of a minimum effort at social impact assessment, a credible job can be done by adhering to the basic principles, following established procedures, and making the social portion an integral component of the overall assessment effort. Today's publics are sophisticated reviewers of plans (or can hire consultants who are); we should expect increasingly intensive review of our social impact assessments, and do the best we can with the resources available. The result will be better plans, better management, and greater public understanding of how what we do affects people, communities, and society.

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