THE ROLE OF HUMAN DIMENSIONS IN WILDLIFE RESOURCE RESEARCH IN WILDLIFE MANAGEMENT

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Abstract: The human dimension in wildlife resource (HDWR) management is increasingly recognized by wildlife managers as an important component to understand and to integrate into daily decision-making. The nature of human dimensions and HDWR research has changed from a traditional emphasis on hunters and big game species to economic issues. To aid bear (Ursidae) managers, I outline the types of questions which can be answered, integrate examples of research with large predators from around the world, and discuss public involvement in wildlife management. As human dimensions research remains a relatively unknown approach in wildlife management, wildlife managers can benefit from an overview of the field. Especially for managers of large predators such as bears, which often elicit strong public emotions, management becomes as much a sociopolitical issue as a biological one.

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Aldo Leopold remarked in the early 1940s that the problem of game management is not how we should handle the deer but how we should handle the people (Flader 1974). Since then wildlife managers have struggled with how to involve the public in implementing policy and programs. It is useful for managers to understand public opinion before, during, and after implementing wildlife management decisions. Such information can help identify public concerns early in the planning process and how those concerns change over time. Monitoring public concerns and addressing them promptly can help managers better handle the people component of the wildlife management equation.

While traditional wildlife management was basically applied wildlife biology, the field now includes studies of animals, studies of habitats, and finally studies of people, the latter being known as the human dimension of wildlife management. It is important for wildlife managers to have information on each of these components and the interaction between humans, wildlife populations, and habitat.

Wildlife management decision-making has become as much a sociopolitical issue as a biological one. Various publics have become more concerned and vocal about wildlife issues, often demanding a role in the decision-making process. In response, public involvement has been mandated by many agencies in charge of managing wildlife populations. While there are many levels of public involvement (Praxis 1988), traditional approaches of public meetings and open houses have been primarily used in wildlife management. Such meetings are useful in identifying the vocal, usually opposing, viewpoints and in defining the extremes (Johnson et al. 1993) of interest groups that usually participate in such activities. While these interest groups are part of the public, they do not represent the entire wildlife constituency. Accessing and involving a more general public requires different approaches.

The question agencies face, therefore, is how to involve the public without compromising the biological basis for implementing certain policies. The public should not dictate wildlife policy, and wildlife management should not be a popularity contest. The extent of public concern should be identified by the public involvement process in a way that allows managers to address these concerns appropriately. In some cases this may involve intensive educational programs; increasing public knowledge about wildlife species has been shown to be effective in generating more positive attitudes toward that species (Kellert 1985; Bath 1989, 1991). Having positive attitudes and better knowledge of the species may result in appropriate behavior toward the species (e.g., decreasing illegal kills of animals, supporting a specific wildlife referendum). Human dimensions in wildlife resource research can address these complex issues faced by wildlife managers and decision-makers.

This paper provides: (1) an understanding of the nature of HDWR research, (2) the types of issues that such research can address, and (3) various examples on how human dimensions research has been applied and integrated into wildlife management decision-making such as wolf (*Canis lupus*) reintroduction in Yellowstone National Park, importance of wildlife to Canadians, polar bear (*Ursus maritimus*) management in Manitoba, and brown bears (*Ursus arctos*) and poaching in Russia. Upon illustrating the application of human dimensions survey research with specific examples involving large predators, this paper will examine human dimensions research within the context of public involvement.

HUMAN DIMENSIONS AND HDWR RESEARCH

Each resource management issue, including wildlife resource management, has 2 broad components: a human component and a biophysical component. Within the human component there are dimensions that can be examined including economic, legal, institutional, political, and social dimensions. Mitchell (1989) integrates these perspectives into a framework labeled the dimensions of resource management (Fig. 1). Human dimensions research can examine these perspectives over temporal and spatial scales.

While HDWR research remains relatively new to many wildlife resource agencies, there has been research in this area for >20 years (Hendee and Potter 1971, Hendee and Schoenfeld 1973). An overview of HD research was included in a standard text on wildlife management in 1980 (Filion 1980); however, its use still remains limited within wildlife management agencies, and HD personnel are rarely on staff. But with the public participating or wanting to participate in more natural resource decision-making, it has become increasingly important for management agencies to understand the values, needs, perceptions, and actions of their constituency (Filion 1980).

One way to gain this understanding is to collect quantitative and representative data on the desired population through a survey. This is the essence of HDWR research. HDWR is defined as that research which "focuses on the public's knowledge levels, expectations, attitudes and activities concerning fish and wildlife resources and associated habitats. There is a close tie between human dimensions and conservation education research" (Adams 1988:3). Research on human dimensions in wildlife has taken several directions, each addressing various aspects of the definition above. Early research focused upon public relations and wildlife issues (Cain 1960, Calkins 1960, Monk 1963, Kline 1965, Gilbert 1966). During the 1970s, a proliferation of articles dealt mostly with the characteristics of hunters and fishermen (Peterle 1961, 1967; Greene 1970, Moeller and Engelken 1972, Applegate 1973, Eisele 1973, Klein 1973, Klessig and Hunt 1973, More 1973, Kennedy 1974, Kitts and Low 1974, Linder et al. 1974, Shaw and Gilbert 1974). While later in the 1970s there were more articles concerning hunting and fishing, there were also broader articles dealing with wildlife-related recreation and urban wildlife. Several articles dealing with nonconsumptive wildlife uses were published during the late 1970s (Lime 1976, Fazio and Belli 1977, Wilkes 1977, Langenau 1979) along with others comparing consumptive and nonconsumptive users (Witter and Shaw 1979). In the 1980s, while there were still many articles published about deer hunters, broader studies emerged including work on American attitudes toward wildlife (Kellert 1980). During the 1980s and still prevalent is research on the economic values of wildlife (Brown 1978, Charbonneau and Hay 1978, O'Leary and Weeks 1979, Shaw and Zube 1980, Walsh et al. 1984, Berryman 1987, Decker and Goff 1987). HDWR research in the 1990s has focused on funding nongame programs (Heberlein 1991, Harris et al. 1992) and future directions for the HDWR field (Giglotti and Decker 1992).

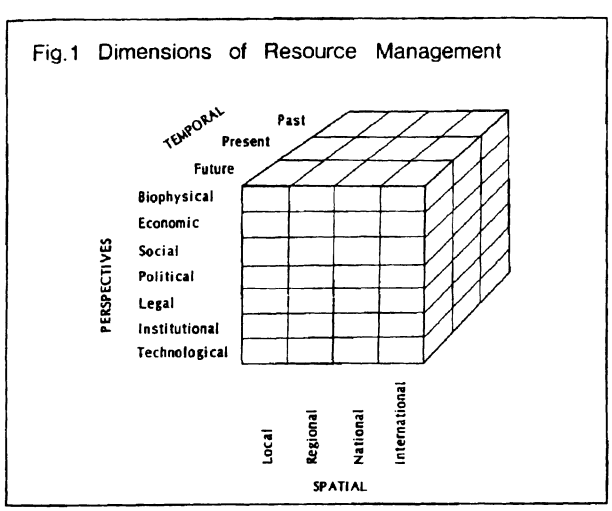

Fig. 1. Dimensions of resource management (Mitchell 1989).

While most HDWR research has focused on characteristics of deer hunters, fishermen, or birders, there has been some research on large predators from a human dimensions perspective. Most of this research has focused on attitudes toward grizzly bears (*Ursus arctos horribilis*) and confrontations between humans and bears (Marsh 1970, Bryan and Jansson 1973, Cole 1974, Mihalic 1974, Stuart 1978, Jope and Shelby 1984, Braithwaite and McCool 1989, Bath 1994*a*) and attitudes toward wolves and wolf restoration (Buys 1975, Arthur et al. 1977, Llewellyn 1978, Hook and Robinson 1982, Kellert 1985, Bath 1989, Bath and Buchanan 1989, Tucker and Pletscher 1989, Bath 1991).

RESEARCH QUESTIONS AND HDWR EXAMPLES

Adam's (1988) definition of HDWR research highlights clearly the connection between conservation education and HDWR research. This research can play an integral role in designing and delivering educational programs and

persuasive messages which can affect attitudes and behavior (Bright et al. 1993, Bright and Manfredo 1996). HDWR research can address the question: What are public attitudes, beliefs, and knowledge toward an issue or wildlife species? Upon identifying weaknesses in knowledge, relationships between certain beliefs and attitudes can be examined. Agencies can target education to those specific weaknesses in knowledge that are most directly linked to attitude, thus maximizing the effectiveness of educational programs.

When addressing this question of public attitudes, beliefs, and knowledge of a species or issue, the entire resource constituency should be involved. By identifying, documenting, and analyzing attitudes of interest groups expressing opposite viewpoints, vocal lobby groups as well as the general public, the entire spectrum of attitudes can be examined. While each group must be dealt with separately, this approach allows wildlife managers to assess how far apart the extremes are and where the general public lies in comparison. Part of the general public can be considered the silent majority, a group which does not attend public meetings or join lobby groups but who may have views on wildlife issues. Obtaining information from these individuals involves more active public involvement, one that can be acquired through HDWR research. Having scientific data on the various publics helps managers better balance those views of vocal lobby groups and make decisions based on knowledge of the entire resource constituency.

This type of HDWR study investigated public attitudes toward wolf reintroduction in Yellowstone National Park (Bath and Buchanan 1989, Bath 1991). It surveyed members of the Wyoming Stock Growers, Defenders of Wildlife, Wyoming Wildlife Federation (hunters), a general public sample from each state bordering the park (Montana, Idaho, and Wyoming), and a countywide general public sample (residents living in counties bordering the park) to identify the attitudinal spectrum and to help wildlife managers and politicians understand their constituencies. Resource management has both a scientific and political decision-making process, and involving the constituency at the same level as the decision-making may be most appropriate. For example, Congressmen and Senators at the state level made decisions about wolf restoration in Yellowstone National Park; assessing the attitudes of a representative sample of residents across each state (Bath 1991), rather than just local attitudes, gave decision-makers information on their entire constituency. Vocal groups such as the Wyoming Stock Growers had negative attitudes toward wolf restoration, but after considering the views of all residents, politicians supported wolf restoration in accordance with the majority of residents in each state (Bath 1991).

In examining simply current attitudes, beliefs, and knowledge, wildlife managers obtain a static assessment of the human component. These 1-shot studies are often crisis-driven and have limited use in long-term wildlife management decision-making. Experimental designs, including multiple group designs, can be effective in building on baseline data; such designs offer managers the potential to address many questions. (For a more detailed examination of alternative research designs and their applicability to human dimensions research, see Bath [1996]).

HD research can also address whether attitudes, beliefs, and knowledge are changing. Just as the wildlife biologist assesses whether a wildlife population is increasing, decreasing, or remaining the same through a longitudinal study, HDWR research can identify, document and analyze attitudes and beliefs. As wildlife populations increase or decrease, attitudes may change. For example, bear populations are increasing in Norway; bear–livestock depredations are also on the rise (Swenson et al. 1995). Public support and attitudes toward bear recovery in Norway may change as bear populations grow. Similarly, a perception that a large predator is declining or endangered may nurture positive attitudes. Decker and Purdy (1988) explored public responses to changing black bear populations and suggested that it is possible to identify a wildlife acceptance capacity. The willingness to accept more bears depended on perceptions of populations and changed as perceptions of populations changed. In another example of attitude monitoring, Applegate (1977, 1982) examined changes in hunter participation rates over time. As wildlife managers alter policies and implement new management plans, regular assessment of public attitudes, beliefs, knowledge, issues, and concerns may help managers gauge the effect of their actions. Such longitudinal HDWR research then becomes an integral part of the wildlife managers daily decision-making.

While attitude changes can be evaluated through longitudinal research design, addressing the more difficult questions about the effects of certain actions and why are things changing requires more complex research designs. Such designs involve control groups and multiple groups being assessed over time (Campbell and Stanley 1963, Spector 1981, Bath 1996). For example, to assess the effects of persuasive messages and educational programs, a pre- and post-test design with control groups is needed. A study of this nature was undertaken by Bright et al. (1993) concerning attitudes toward fires in Yellowstone Na-

tional Park. An application of such research to large predators is needed.

Do attitudes, beliefs, and knowledge vary spatially? Bath and Buchanan (1989) found that strength of attitudes toward wolves and wolf restoration in Yellowstone National Park decayed with distance from the park. As one moved further from the park, attitudes were more positive; this result may be influenced by a rural to urban phenomenon, but it still indicates that public attitudes, like large carnivore habitat, are not uniform across areas. By understanding the extent of support or opposition by the public on a regional basis, wildlife managers may be able to include such information with habitat data as an additional criteria in selecting areas most suitable for large carnivore recovery. For example, if the best bear habitat contains residents with negative attitudes, while an area that may not be the best from a habitat viewpoint but contains residents with more positive attitudes, this latter area may be more suitable overall for bear recovery based upon the understanding of the human and biological components of the wildlife management equation. Where large carnivores are allowed to recover in administrative zones, it may be useful again to understand the human component across these zones. Such information could be used for targeting awareness programs to specific areas.

HDWR research can also gather information on human behavior toward the resource. For example, to identify the extent of brown bear poaching and hunting success in the Kamchatka region of Russia, Cheskin and Bath (unpubl. data) surveyed local residents about their behavior and the behavior of others in the area. Attitude and belief information was also gathered to correlate with the behavior to better understand the issue and to increase reliability and validity of the data. Documenting the extent of illegal harvest will provide wildlife managers with better data on population numbers and a better understanding of this aspect of the human component.

Another aspect of behavior which has received increasing attention in HDWR research is public expenditures and willingness to pay for large carnivore conservation. Wildlife managers have to be able to market their decisions, management, and research programs based on economics. Wildlife-related recreation generates billions of dollars a year in several countries. While large predators are not specifically identified in the survey on the importance of wildlife to Canadians (Filion et al. 1994), millions of dollars are spent within each province in Canada participating in wildlife-related recreation. Interest in seeing large predators and willingness to spend money for the chance of viewing large predators does exist. Every year millions of people visit Yellowstone National Park in hopes of seeing a bear (Bath 1994*b*). Users of McNeil River, Alaska, have been documented as willing to pay up to US $277 (1993) per person to enjoy the bear viewing experience there (Clayton and Mendelsohn 1993). The trail of thousands of cars for wolf howls in Algonquin Provincial Park, Canada, is another example of public interest and expenditures to view large carnivores (Strickland 1983). Churchill, Manitoba, receives thousands of visitors per year who hope to see polar bears (*Ursus maritimus*). While local resident attitudes toward the polar bear are not as positive as those of visitors, both groups realize the economic importance of protecting the bear and its environment (Bath 1994*a*). By examining economic issues as well as attitudes and beliefs, HDWR research can help wildlife managers better understand the entire human component.

PUBLIC INVOLVEMENT AND WILDLIFE MANAGEMENT

Aldo Leopold realized the importance of managing people in the 1940s. Wildlife management definitions clearly emphasize the importance of the human component (Anderson et al. 1987), and human dimensions research is on the increase. However, how does the wildlife manager involve the public in a meaningful way that does not compromise the biological basis for certain policies? How does the public get involved in decision-making without dictating wildlife policy and turning wildlife management into a popularity contest? HDWR research can help considerably in providing a structure and a guide for public involvement and in addressing various questions. HDWR research, however, is only 1 mechanism which can be used to involve the public.

Public involvement can take many forms and is really about redistributing power from managers to the public. It can involve the entire spectrum of power sharing, from nonparticipation (e.g., rubberstamp committees), degrees of tokenism (e.g., hearing residents but not acting upon their ideas), to real citizen power (e.g., complete control and responsibility). Few wildlife management agencies have been prepared to turn over their wildlife management programs to the public, but this has happened. The Yukon Department of Renewable Resources allowed a citizen team to reach a consensus on wolf management; the team produced a lasting agreement (Todd 1995). In contrast, British Columbia and Alaska saw their wolf management plans publicly attacked and were unable to develop lasting agreements (Todd 1995). Wildlife managers must enter into public involvement negotiations willing to listen and act upon what they hear. Managers

must decide where along the continuum of public involvement they are comfortable. If informed public consent is desired, the agency must be prepared to develop a communication plan clearly outlining target audiences, messages, mechanisms, evaluation criteria, priorities, and time frames.

Perhaps one of the most difficult decisions for the wildlife manager is when and how public involvement should occur. "Public involvement must be conceived as an integral part of the project...from its conception to its implementation" (Praxis 1988:3). Much of the conflict in resource management occurs when the pubic is brought into the process near the end after important decisions have already been made. The public should be involved at the normative stage of the planning process (what ought to be done), strategic stage (what could be done), and the operational stage (what will be done). When the public is consulted later in the planning process without earlier involvement, they are not free to challenge the fundamental questions at the normative stage. Consider the hypothetical example where managers have decided wolf control will occur in one of several areas (operational stage) and the public is asked for their opinions on which area such control should occur. Much of the public may wish to visit the initial stage of the planning process and question whether wolf control is needed (normative stage) or express views about other solutions (what could be done at the strategic stage). As these decisions have already been made prior to involving the public, conflict occurs.

Public involvement and the use of HDWR research in understanding the human component and providing a mechanism of public involvement should not be seen as an unfortunate stumbling block an agency must plod through to implement a program. If wildlife resource managers are to manage public resources truly for the benefit of the entire public, we must learn more about the public. For successful wildlife management, HDWR research and public involvement programs should be proactive (not crisis-driven), longitudinal in design (rather than one-shot studies), representative of the entire constituency (not just the vocal lobby groups), and truly integrated into the daily decisions of wildlife managers.

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