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## **Special Session 4. *Recreational Impacts on Wildlife in Wildlands***

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### **Wildlife Preservation and Recreational Use: Conflicting Goals of Wildland Management**

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#### Introduction

**Large tracts of wildland in North America have been set aside as wilderness areas and national parks. More than 200 million acres (88 million ha) of such lands have been formally designated in Canada and the United States (Eidsvik 1989). The primary goal of these designations is the preservation of undisturbed natural conditions and processes.**

**Although preservation is the foremost goal of these wildlands, recreational use is usually allowed and often encouraged. Recreation use data are scant, often of poor quality and subject to misinterpretation due to changes in measurement units and number of areas reporting; however, the trend is clear. Recreational use of wilderness and national parks has increased greatly over the past half-century. Recreational use of National Forest wilderness in the United States has probably increased at least tenfold since the late 1940s, to current annual use levels of more than 12 million recreation visitor days (Lucas and Stankey 1988). In addition, the popularity of wilderness recreation in relation to other types of forest recreation has steadily increased. Wilderness use grew from 1 percent of total forest recreation use in 1946 to 6 percent in 1986. In 1946, only 5 percent of forest camping occurred in wilderness:**

in 1986, 35 percent of forest camping took place in wilderness (Lucas 1989). Similar trends took place in national parks in the United States and comparable lands in Canada.

The twin goals of nature preservation and provision of recreational opportunities inevitably conflict. Recreation causes impacts to the land and the wildlife that inhabit the land. Management actions taken to mitigate these impacts frequently restrict access and recreational activities. The responsibility of the wildland manager is to determine the optimal mix of preservation and use, and to implement strategies to achieve this mix. To help the manager in this task, research on interactions between recreationists and the environment is needed.

### Recreational Impact Research

The earliest study of recreational impact on natural environments, that we are aware of, examined tourist impacts on tree roots in the California redwood state parks (Meinecke 1928). By the late 1950s, a few other recreation impact studies had been conducted, including studies of the response of animals to human presence (e.g., Altmann 1958). It was in the 1960s and 1970s, however, that an increased awareness of recreational impact problems spurred a great increase in the number of studies. Worldwide, there have been about 150 published papers on recreational impact on vegetation and soils that contain original data (Cole 1987); the number of papers with original data on recreational impacts on wildlife is somewhat higher--there were 166 papers as of 1983 (Boyle and Samson 1985).

Despite all these studies, our understanding of recreational impacts is still rudimentary. Goldsmith (1974) has commented that most recreational impact studies merely "record observations of a rather superficial nature and only a few describe specially designed experiments with detailed analysis of the resultant data." Seventeen years later, this analysis of the situation still applies. Most research continues to merely document the obvious; time frames from studies are short; theory is lacking; few studies utilize experimental designs; and few studies produce results that lead to broader generalizations.

### Need for Wildlife Impact Research

There are a number of reasons for thinking that recreational impacts on wildlife may be significantly compromising wildland preservation goals. The first reason, as stated earlier, is that recreational use of these lands has increased dramatically in recent decades. Second, in contrast to impacts on vegetation and soil, which are highly localized, impacts on wildlife are likely to be more widespread. Since animals are mobile, it is possible for entire populations or entire habitats to be disrupted by recreational use.

A third reason for concern is the tendency for management to promote more even distribution of recreational use, both in space and time. In most places, recreational use is extremely unevenly distributed (Roggenbuck and Lucas 1987). Use is often confined to trail corridors, with a few select trails accounting for a majority of use. Similarly, use is often confined to seasons when weather is mild, and to weekends and holidays when most people are away from work. Managers have frequently

considered this concentration of use to be undesirable because it can result in high levels of crowding and resource impacts at popular times and in popular places (Hendee et al. 1990). The common response has been to attempt to disperse use more widely. Visitors are told about alternatives to the popular places or asked to avoid crowded trails and places. The attractions of off-season travel are advertised as a contrast to the crowded conditions of the high-use season and people are advised to visit on weekdays rather than on weekends.

Recreational use is still unevenly distributed, but there is evidence that use distributions have shifted. Winter season visitation in national parks has increased greatly, as have cross-country skiing and off-trail travel in backcountry. For example, total visitation to Yellowstone National Park changed little between 1965 and 1980; however, winter visitation increased tenfold (Aune 1981). Reductions in use at popular times and in popular places have seldom been dramatic. It is the increases in use of remote places and during the off-season that have been pronounced. The proportion of an area that is never visited and the proportion of the year that visitation is negligible have shrunk greatly over the last few decades--as much in response to changes in use distribution as to increases in use. The effect on wildlife is that refuge from disturbance has decreased dramatically--if low levels of recreational use have a significant impact.

The interface between humans and wildlife, particularly in regard to nonconsumptive uses of wildlife, has recently become a topic of considerable interest. Social scientists, in particular, have been organizing meetings and writing papers on the human dimensions of wildlife (Manfredo 1989). Another topic that obviously lies at the juncture of social science and wildlife management is the impact of recreationists on wildlife. The intent of this paper and of this session is to suggest that this area deserves more attention.

### Information Needs

In order to more effectively minimize conflict between recreation use and wildlife preservation goals, we need to: (1) understand the responses of wildlife to recreational activities; (2) understand the factors that influence the nature and magnitude of impacts; (3) improve research methods; and (4) develop and implement new management strategies. This session is organized around these topics.

Previous research has documented numerous cases where wildlife have responded negatively to recreational use; however, it is seldom possible to determine how significant these impacts are. An ungulate may run from an approaching skier, but does that reduce the fitness of that individual or significantly affect a population--either in the short or long term? We need more research that documents the various effects of different recreational activities on wildlife: and more attention needs to be paid to impacts other than short-term behavioral changes in individuals. Are there long-term impacts? How are behavioral responses by individuals manifested at the population or community levels? This type of research is challenging because it is difficult to distinguish between natural variability in populations and variability that results from recreational use (Boyle and Samson 1985), particularly where the effect of recreation is indirect and the response occurs far from the point of disturbance or after a time lag (Goldsmith 1974).

Managers need to understand why some types of disturbance cause pronounced impacts while others have little effect. They also must understand why the same recreational activity causes serious problems in some situations and has no effect in others. Such characteristics of the disturbance as activity type, frequency and timing can influence the severity of the response. Characteristics, of the animals being disturbed can also influence responses. There is a particular need to better understand learned behavior, such as the ability of animals to habituate to human disturbance. An understanding of the factors that influence the nature and magnitude of impacts will enable managers to develop more effective strategies for minimizing impact.

To obtain an improved understanding of recreational impacts on wildlife, new and improved research designs and methods are needed. As stated before, impacts are complex and it is often difficult to uncover cause and effect relationships. More experimentation is clearly needed, but confounding variables are usually difficult to control. Short-term, readily observable behavioral responses are easy to study, but longer-term investigations are needed to answer questions of significance.

The ultimate goal of this research is to see that management optimizes the twin goals of wildlife preservation and recreational opportunity. Beyond simply closing areas to all recreational use, impacts might be kept to acceptable levels through such strategies as spatial and temporal restrictions or even subtle alterations in human behavior. Besides managing disturbance agents, managers may also be able to reduce impact by managing the animal populations and the context in which disturbance occurs. Hopefully, there will also be opportunities to evaluate the success of management programs that are established.

## Conclusion

It is our hope that this session will accomplish a number of goals. First, we hope that it will increase awareness of the need to improve our understanding of recreational impacts on wildlife. Wildlands are important to our society and undisturbed wildlife populations are a critical indicator of the quality of wildlands. Managers can only be as effective as the knowledge and information they bring to bear on problems. The current, poor level of understanding of this topic is clearly an impediment to effective management.

Second, we hope that the substance of the technical articles will be useful to scholars interested in working in the field and managers already grappling with impact problems. Papers that review the literature, describe available research methodologies and discuss available management options should help in this regard.

Third, we hope that through the opportunity to present these papers and the discussion that ensues, we will all learn from each other. New ideas will surface and new contacts will be developed. Substantial improvements in knowledge will only come if more researchers work in the field; more of these researchers commit more of their time and energy to the subject; and new ideas and methodologies are brought to bear. Will you--the wildlife conservation community--accept this challenge?

## References

- Altmann, M. 1958. The flight distance of free-ranging big game. *J. Wildl. Manage.* 22:207-209.  
Auen, K. E. 1981. Impacts of winter recreationists on wildlife in a portion of Yellowstone National

- Park, Wyoming. M.S. thesis, Dept. of Fish and Wildlife Management, Montana State University, Bozeman. 111pp.  
Boyle, S.A. and F.B. Samson. 1985. Effects of nonconsumptive recreation on wildlife. *A review Wildl. Soc. Bull.* 13:110-116.  
Cole, D.N. 1987. Research on soil and vegetation in wilderness: A state-of-knowledge review. Pages 135-177 in R.C. Lucas, comp. *Proceedings-national wilderness research conference Issues, state-of knowledge, future directions.* Gen. Tech. Rep. INT-220. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, Utah. 369pp.  
Eidsvik, H.K. 1989. The status of wilderness: An international overview. *Nat. Resources J.* 29:57-82.  
Goldsmith, F. B. 1974. Ecological effects of visitors in the countryside. Pages 217-231 in A. Warren and F.B. Goldsmith, eds., *Conservation in practice.* John Wiley & Sons. London. U.K.  
Hendee, J.C., G.H. Stankey, and R.C. Lucas. 1990. *Wilderness management.* 2nd ed. North American Press, Golden, Colorado. 546pp  
Lucas, R. C. 1989. a look at wilderness use and users in transition. *Nat. Resources J.* 29:41-56.  
Lucas, R. C. and G.H. Stankey, 1988. Shifting trends in wilderness recreational use. Pages 357-367 in A.H. Watson, comp. *Outdoor recreation benchmark 1988.* Gen. Tech. Rep. SE-52 U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station, Asheville, North Carolina. 498pp.  
Manfredo, M.J. 1989. Human dimensions of wildlife management. *Wildl. Soc. Bull.* 17:447-449  
Meinecke, E. P. 1928. The effect of excessive tourist travel on the California redwood parks. California Department of Natural Resources, Division of Parks, Sacramento. 20pp  
Roggenbuck, J.W. and R.C. Lucas. 1987. Wilderness use and user characteristics: A state-of-knowledge review. Pages 204-245 in R. C. Lucas, comp *Proceedings-national wilderness research conference: Issues, state-of-knowledge, future directions.* Gen. Tech. Rep. INT- 220 U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, Utah 369pp.