

WILDLIFE RESPONSES TO RECREATION AND ASSOCIATED VISITOR PERCEPTIONS

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Abstract. Outdoor recreation has the potential to disturb wildlife, resulting in energetic costs, impacts to animals' behavior and fitness, and avoidance of otherwise suitable habitat. Mountain biking is emerging as a popular form of outdoor recreation, yet virtually nothing is known about whether wildlife responds differently to mountain biking vs. more traditional forms of recreation, such as hiking. In addition, there is a lack of information on the "area of influence" (within which wildlife may be displaced from otherwise suitable habitat due to human activities) of different forms of recreation. We examined the responses of bison (*Bison bison*), mule deer (*Odocoileus hemionus*), and pronghorn antelope (*Antilocapra americana*) to hikers and mountain bikers at Antelope Island State Park, Utah, by comparing alert distance, flight distance, and distance moved. Within a species, wildlife did not respond differently to mountain biking vs. hiking, but there was a negative relationship between wildlife body size and response. We determined the area of influence along trails and off-trail transects by examining each species' probability of flushing as perpendicular distance away from a trail increased. All three species exhibited a 70% probability of flushing from on-trail recreationists within 100 m from trails. Mule deer showed a 96% probability of flushing within 100 m of recreationists located off trails; their probability of flushing did not drop to 70% until perpendicular distance reached 390 m. We calculated the area around existing trails on Antelope Island that may be impacted by recreationists on those trails. Based on a 200-m "area of influence," 8.0 km (7%) of the island was potentially unsuitable for wildlife due to disturbance from recreation.

Few studies have examined how recreationists perceive their effects on wildlife, although this has implications for their behavior on public lands. We surveyed 640 backcountry trail users on Antelope Island to investigate their perceptions of the effects of recreation on wildlife. Approximately 50% of recreationists felt that recreation was not having a negative effect on wildlife. In general, survey respondents perceived that it was acceptable to approach wildlife more closely than our empirical data indicated wildlife would allow. Recreationists also tended to blame other user groups for stress to wildlife rather than holding themselves responsible.

The results of both the biological and human-dimensions aspects of our research have implications for the management of public lands where the continued coexistence of wildlife and recreation is a primary goal. Understanding wildlife responses to recreation and the "area of influence" of human activities may help managers judge whether wildlife populations are experiencing stress due to interactions with humans, and may aid in tailoring recreation plans to minimize long-term effects to wildlife from disturbance. Knowledge of recreationists' perceptions and beliefs regarding their effects on wildlife may also assist public lands managers in encouraging positive visitor behaviors around wildlife.

Key words: American bison; disturbance; flight distance; flush response; hiking; mountain biking; mule deer; outdoor recreation; pronghorn antelope; visitor perceptions.

INTRODUCTION

Millions of visitors annually are attracted to public lands to engage in recreational activities. Because outdoor recreation is the second leading cause for the de-

cline of federally threatened and endangered species on public lands (Losos et al. 1995), and the fourth leading cause on all lands (Czech et al. 2000), natural resource managers are becoming increasingly concerned about impacts of recreation on wildlife (Knight and Gutzwiller 1995). Recent assessments have suggested that recreation may have pronounced effects on wildlife individuals, populations, and communities by affecting behavior and fitness and by altering interspecific interactions (e.g., Boyle and Samson 1985, Knight and Cole 1995a). To manage for coexistence between wildlife and recreationists, managers should be aware of the potential consequences of recreation for wildlife.

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