

ALWRI PROGRAM OF WORK: RECREATION

Problem Selection and Justification: (extracted from the Leopold Institute's Program Charter)

Problem 1. Inadequate understanding of recreation experiences and the impacts of recreation hamper efforts to preserve and protect wilderness resources and experiences.

Management of recreation has historically been the foremost focus of wilderness stewardship. Collectively, wilderness managers probably spend more time on recreation issues than on any other. They are confronted with the challenge of defining an appropriate balance between (1) providing access by visitors for the unique recreation opportunities that wilderness provides and (2) protecting biophysical, experiential and other values of wilderness and then implementing management programs to maintain this balance. Wilderness recreation use is increasing in many places, forcing managers to choose between restricting access, changing behaviors, increasing regulation, or accepting increased degradation of biophysical and/or experiential conditions. Each of these courses of action has different implications for wilderness resources and visitor experiences. The challenge of this assignment is elevated by recognition that recreation management objectives and strategies vary greatly across the National Wilderness Preservation System, with environmental, access, and use characteristics. Managers must decide on recreation management strategies based on these characteristics. Some wilderness areas, however, remain extremely lightly used, though managers have little knowledge about the primary influences on recreation experiences there or how management should be implemented to protect those experiences. Intergenerational differences in knowledge of impacts, preferences or expectations for conditions encountered, and reaction to management strategies are relatively unexplored but of increasing importance.

Wilderness managers are encouraged to develop wilderness plans that clarify decisions about an appropriate balance between access, regulation and wilderness conditions. They are encouraged to develop specific management objectives (even indicators and standards), to monitor more systematically, and to develop comprehensive management programs that include education as well as regulation. Over the past few decades, wilderness recreation research has contributed substantially to the knowledge foundation for the development of recreation management objectives, monitoring programs, and effective management strategies. In particular, a substantial body of descriptive information about wilderness visitors and the biophysical and experiential impacts of visitors have been developed. But further work is needed. Basic, descriptive work must continue, as must research into relationships (e.g. between use levels, user behaviors, experiential and environmental variables and between experiential and resource impacts). Further research of an applied nature is also needed. We believe that we can make the most profound contribution by focusing our efforts on the following four topics.

Element 1a. Inadequate understanding of the basic dimensions of human experience in wilderness makes it difficult to establish appropriate management objectives and programs.

Wilderness managers are charged with the responsibility of managing wilderness such that opportunities for appropriate human experiences are protected. To effectively do this, we need to understand how wilderness management decisions (action and inaction) affect the nature of the human experience in wilderness. We need a better understanding of the basic dimensions of wilderness experiences, including opportunities for solitude, exhibition or development of primitive skills, unconfined travel and living, enjoyment of natural conditions, inspiration, challenge and reflection. The majority of past experiential research in wilderness has focused on crowding issues. We need to understand a broader array of human experiences in wilderness (particularly those that are relatively unique in wilderness) and the array of physical and social influences on these experiences. There has been a heavy reliance in the past on mail back surveys of wilderness visitors. This approach needs to be supplemented with other methods, both quantitative and qualitative, that provide greater insights into the nature of on-site wilderness experiences. Conflict between visitors with differing orientations detracts from the quality of experiences. To minimize this, we need a better understanding of conflict and ways it can be minimized. Wilderness planners and managers also need to consider the long-term and large-scale implications of their decisions. To do so, they need more information on displacement and substitutability. Displacement is the process whereby visitors change the location of their recreation in response to perceived adverse changes in condition or access. Substitutability refers to the ability to obtain similar benefits by recreating in different places.

These topics are important because wilderness planners have difficulty specifying objectives for human experiences in wilderness due to inadequate understanding of these experiences. In addition, wilderness managers find it difficult to develop management strategies related to visitor experiences because there is little agreement on the range of experiences to be provided in wilderness or which experiences should be given highest priority. Wilderness planners and managers will benefit from this research through an improved ability to specify desired experiences and to implement management programs that are effective in providing opportunities for desired experiences. This research should also contribute conceptually to the advancement of the leisure sciences, by expanding our vocabulary for describing human experience and by increasing our insight into influences on experiences.

We propose to:

- Describe what visitors are experiencing in wilderness and how their experience varies (1) during the wilderness visit and over multiple visits, (2) between different types of visitors, (3) with visit characteristics (such as the experiences they are seeking on any particular trip), and (4) with setting attributes, such as use density, environmental characteristics, and management regime. This research will be conducted in wildernesses that vary in both user characteristics and ecoregion. Outcome: help managers specify objectives for experiences and devise management actions that promote opportunities for those experiences.
- Better understand conflict between recreation visitors and how conflicting values among visitors impact the realization of desired experiences. Outcome: development

of approaches for managing conflict.

- Describe how visitor's use and experience of wilderness changes over their lifetime and in response to management actions by studying how recreationists use a system of wilderness and related lands to realize certain benefits. These use patterns should provide insight into the phenomena of displacement and substitutability, as well as understanding of how generational differences affect response to wilderness conditions. Outcome: improve perspectives on the large-scale (spatial and temporal) implications of wilderness recreation management decisions.

Element 1b. Inadequate understanding of recreational impacts makes it difficult to protect wilderness resources.

Wilderness recreation inevitably impacts biophysical resources. Site impacts are locally severe in most wildernesses and in many are increasing, both in extent and severity. There is general agreement that wilderness managers should not attempt to avoid recreation impact entirely, because the benefits would not exceed the costs of minimal access for recreation. Rather, managers must decide how much impact is acceptable. They should monitor impacts and develop strategies for keeping impacts to acceptable levels. The science of recreation disturbance ecology has been developing over the past few decades to assist wilderness managers in confronting this challenge. Substantial progress has been made in understanding the impacts of recreation on vegetation and certain attributes of soils, at the site level, as well as the short-term impacts of recreation on wildlife. However, we need a better understanding of below ground impacts of recreation, impacts on water, longer-term impacts on wildlife, and recreation impacts at larger spatial scales. We need to complement extensive research in mountains with more research in other ecoregions, such as aridlands. The impacts of pack stock grazing on meadows are also poorly understood, given the prevalence of this use.

We need to increase our understanding of factors that influence the severity, extent and spatial pattern of impacts (primarily the amount, type, timing and location of use). We also need to translate this information into the curriculum presented in low-impact educational programs such as Leave-No-Trace. The primary beneficiaries of this research will be wilderness managers developing management programs to minimize recreation impacts or restore sites that have been damaged by recreation use. This research should also contribute conceptually to the advancement of the larger field of recreation ecology and its applications to recreation and tourism management outside wilderness. Given highly limited resources available for this work, our proposed program of work can only tackle a small portion of this research need.

We propose to:

- Further build fundamental ecological knowledge about the nature of recreation impacts, relationships between use and environmental attributes, and the severity, extent and spatial pattern of impact. Use this knowledge to develop potential management strategies and to predict the likely consequences of alternative strategies. Conduct this research in wildernesses that vary in both user characteristics and

ecoregion. If possible, complement research on impacts to soil and vegetation with research on impacts to wildlife and water. Outcome: improved strategies for managing recreation use and resultant impacts.

- Identify trends in recreation impact by repeating surveys conducted in the past. Trends in places with substantially different environments, use patterns and management programs will be compared. Outcome: improved understanding of trends in wilderness conditions, as well as strategies for managing recreation use and resultant impacts.
- Close knowledge gaps related to low-impact practices, such as (1) the relative durability of different environments subjected to recreation use, (2) how to minimize harassment and disturbance of animals, (3) how to limit the adverse impacts of pack stock confinement and grazing, and (4) the nature and severity of recreation-related water pollution and how behaviors can reduce impacts. Outcome: development of practical techniques for reducing recreation impacts through behavioral change

Element 1c. Site restoration programs in wilderness are often ineffective, due to inadequate information.

Recreation has caused locally severe site impacts in most wildernesses. In many places, severely impacted sites have been closed to further use, either because the location or the severity of impact is considered inappropriate. Often, sites are simply closed and allowed to recover naturally. However, many of the damaged sites are in environments in which natural recovery rates are constrained by factors such as short growing seasons (e.g. alpine environments) or unpredictable or inadequate soil moisture (e.g. arid environments). In such places, unassisted recovery is likely to require centuries, if it occurs at all. Increasingly, wilderness managers are expending substantial time and effort in attempts to accelerate natural recovery rates using assisted restoration techniques. Many of these restoration attempts have been unsuccessful and, in some cases, have exacerbated problems. Reasons for lack of success are poorly understood. Part of the problem is inadequate understanding of recreation impacts on belowground processes and on interactions between soil and plants (as discussed under element 1b). We lack a foundation of experimental work on alternative restoration techniques. Finally, we have no means of capturing the substantial experiential knowledge that exists among field practitioners. We need a better understanding of how impacts constrain recovery processes, as well as more assessments of the effectiveness of alternative restoration techniques. The primary beneficiaries of this research will be wilderness managers developing programs to restore sites that have been damaged by recreation use. This research should also contribute conceptually to the advancement of the larger field of restoration ecology and to applications outside wilderness.

We propose to:

- Identify the factors that limit natural recovery processes on damaged sites. Particular attention will be given to belowground conditions and processes and linkages

between soil and vegetation. We will develop knowledge about the population biology, demography, and reproductive ecology of plant species used in restoration efforts. Outcome: suggest interventions that should increase the effectiveness of restorations.

- Evaluate the effectiveness of existing restoration techniques and adapt existing techniques to wilderness restoration. Existing restoration programs will be evaluated and experiments will be designed to isolate factors that influence success. These studies will be conducted in a variety of habitats. Outcome: our knowledge foundation about effective restoration techniques will be increased and made more accessible to practitioners.

Element 1d. Recreation planning and management is hampered by the lack of tools for assessing visitor distribution and flow in wilderness landscapes.

Understanding the spatio-temporal distribution of use is of fundamental importance to those who plan for and manage wilderness recreation use. The kind and amount of visitor use has profound effects on the quality of natural resources and visitor experiences in wilderness. Therefore, it is important to be able to monitor the flow of visitation, in space and over time, and predict how distributions are likely to change in response to both management actions and factors that are not subject to managerial control. Travel simulation models are useful tools for facilitating the planning and management of visitor use distribution in situations where monitoring and prediction of visitor flow is difficult. Simulation makes it possible to use easily collected measures (e.g., the number of people entering at particular trailheads) to monitor hard-to-measure indicators (e.g., number of encounters between groups on particular trails). Simulation modeling can help fine-tune existing management programs by allowing managers to experiment with different management actions (e.g. different entrance or trailhead quota schemes to identify a program of quotas that optimizes the tradeoff between amount of use and congestion). Work on wilderness travel simulation was conducted in the 1970s but, due to technical challenges, languished until recently. In the past few years, this work has been revived and now holds renewed potential. These efforts need to be coordinated and focused so that they bring maximum utility to the wilderness recreation manager. Development of travel simulation models, to the point where they are readily available tools, should benefit wilderness planners and managers. They should also be useful in the broader context of park and transportation planning.

We propose to:

- Work collaboratively with developers of travel simulation models to maximize their utility to wilderness recreation managers. Outcome: a state-of-knowledge report that describes the current status of travel simulation modeling, illustrates varied applications of this tool, and facilitates the improvement and availability of this tool.