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# Perspectives on the integration of Wilderness research, education and management

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## **Perspectives on the integration of Wilderness research and education**

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## Abstract

Continued social and ecological research is vital to the sustainability of wilderness systems. Since land use is shifting from resource-based to recreational-based activities in many areas, recreational user education has become an increasing priority. This paper provides preliminary results from on-going wilderness research and examples of the use of this information for wilderness stewardship purposes. Direct integration of research into wilderness education programs such as Leave No Trace (LNT) can provide an essential mechanism for applying research findings at the user level. The LNT public-private national educational initiative establishes a framework to provide the user with the most complete minimum-impact skills and information. LNT also directly involves land management professionals as “master trainers” and thus provides an important feedback into identifying research priorities. We describe an approach that integrates current research into a user-based education program. An example of current research findings of vegetation impact is used to describe the use of scientific research to modify minimum-impact practices.

## Introduction

Assessment of recreational impacts in Wilderness has received considerable attention in recent years, with several excellent recent reviews (Kuss, et al 1990, Hammitt and Cole, 1987). As a consequence of increases in the popularity of outdoor recreation over the last 25 years, visitor impact has been identified as a significant component of degradation in many areas, particularly in relatively pristine regions (Hammitt and Cole, 1987). Significant impacts to soils and vegetation in many wildland ecosystems have been observed (Cole 1987a; Kuss et al., 1986). In addition, increased visitation has also led to decreased water quality in some areas (Hammitt and Cole, 1987) and negative effects on the wilderness experience of users (Kuss et al, 1990). This body of knowledge has helped us gain some insight into recreational effects, but many questions remain. In addition, many responses to impact are highly system-specific (Marrion, 1991).

Appropriate user education has been cited as a primary mechanism for mitigating user impacts ( McCool and Lucas, 1990). The majority of impact can be avoided through proper behavior (Cole, *et al.* 1987) and apparently, visitor behavior can be modified (Roggenbuck and Berrier, 1982). Wilderness users tend to be well educated (Roggenbuck and Lucas 1987) and it has been suggested that education leading to voluntary behavioral change is preferable to regulation and enforcement (Doucette and Cole, 1993).

It is unclear as to the early development of educational strategies to minimize user impacts. By the late 1960's agencies had adopted the “pack-it-in, pack-it-out” slogan (Doucette and Cole, 1993) and a formal educational program to promote minimum-impact use was initiated by the National Outdoor Leadership School (Petzoldt, 1974). These initiatives have evolved over time to reflect increased visitation and knowledge. Currently, information on appropriate minimum-impact techniques has been published (Cole 1989, Hampton and Cole, 1988) and

conceptual approaches to Wilderness education investigated (Roggenbuck and Manfredo, 1990). More recently, the *Leave No Trace* Program (LNT), a national public-private education program to promote minimum-impact recreation practices has been initiated. The U.S. Forest Service, National Park Service and Bureau of Land Management are the principal federal agency partners of this program.

In light of the current state-of-knowledge on recreational impacts, LNT seems particularly poised to be the primary vehicle to disseminate practical user information. As a consequence of this initiative, Wilderness user behavior could be influenced and the concomitant management requirements altered. In this paper we will examine the application of research results in LNT curriculum and discuss the potential feedbacks of the LNT program to research.

### Approach

The philosophy of the LNT program is not a dogmatic one, rather a conceptual framework of minimum-impact techniques that is suitable for broad application (Leemon *et al.*, 1992). The key to minimizing back-country related impacts is in the development of sound judgment and an experience base to allow for the most appropriate decisions for a given situation. Despite this lack of a "cookbook" approach, many specific questions must be researched in detail to increase the minimum-impact knowledge base and significant gaps in our knowledge remain (Cole 1987b). Consequently, continued LNT curriculum development can not only dispense current information, but also assist in continued identification of these "gaps".

An example of the need for scientific research and its ability to inform and modify techniques is found in an ongoing NOLS-USDA Forest Service research project. Previous backcountry minimum-impact teaching frequently recommended avoidance of alpine areas since these were "the most fragile of all" (Hampton and Cole, 1987) and generally directed users to forested areas for camping and travel. Recent results from applied trampling experiments (fig. 1) in the Wind River range (Monz *et al.*, 1994) indicate that the best practices could be contrary to this. The alpine areas examined in this study proved to be resistant to trampling, even at high rates, while forest understory plots were very susceptible to trampling. These areas are exemplified by the two sites shown (fig. 1). Although these results are preliminary and the resilience (grow-back) of these sites is still being investigated, these initial (2 yr) responses are dramatic. If these initial results remain consistent, they will be integrated into LNT curricula. Social impact concerns and management considerations will also play a role in the actual practices promoted.

Research findings such as these are vital to the continued improvement of LNT curricula and ultimately may prove significant at the user level. A conceptual model for how these results can be distributed to the user level is described (fig. 2). Research results are integrated into the LNT curricula through the close interaction of LNT staff and researchers. Results could initially be represented in scientific form, much as in fig. 1, and included in LNT training materials for LNT

masters, providing scientific “backup” for LNT practices. Information in this form is also helpful to agency management professionals.

“How to” information is the vital link in the LNT program. Here, the basic scientific results are distilled to the practical user information and practices that can be directly distributed to the user. The LNT program will also take advantage of industry and agency channels to further distribute this information. Hopefully, through education, user behavior can be influenced leading to a sustainable level of environmental quality. Monitoring user behavior can also lead to further modifications of the program, in order to increase efficacy.

Important aspects of this model are the feedbacks into research. LNT is constantly identifying practical information gaps in minimum-impact knowledge, many of which cannot be answered by simple literature review. Field observations also lead to further hypotheses and new research.

### Conclusions

The LNT program can be utilized as an important mechanism for distributing current research findings applicable to the continued improvement of minimum-impact backcountry techniques. By utilizing research, LNT can develop appropriate training materials for managers and “how to” publications for Wilderness users. Of equal importance, is the continued feedback of LNT to researchers to assist in the development of research projects with immediate user application. Ultimately, these efforts can further the goal of integrating responsible recreational use and Wilderness preservation.

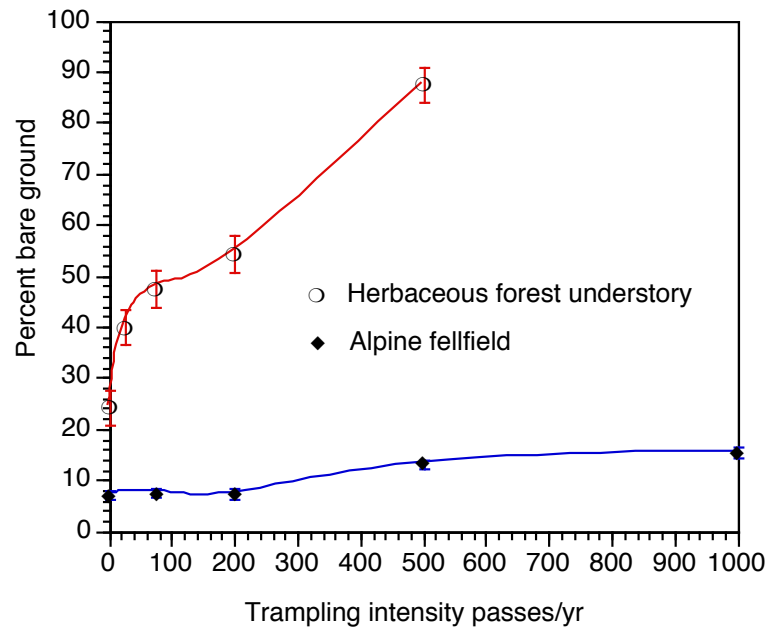


Fig. 1 Response of an alpine fellfield and a forest understory site to two years of trampling. Values are means  $\pm$  pooled SE. Adapted from Monz, *et al.* (1994)

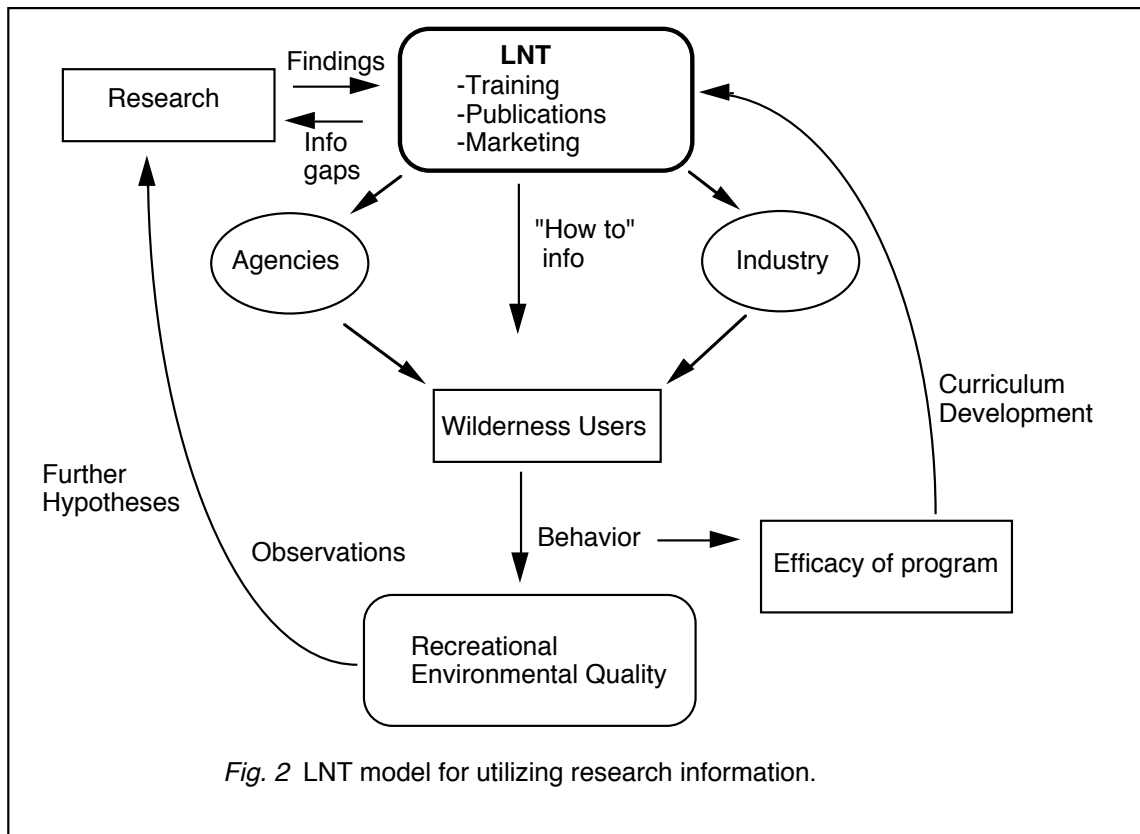


Fig. 2 LNT model for utilizing research information.

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