

Monitoring and Managing Recreational Use in Backcountry Landscapes Using Computer-Based Simulation Modeling

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In the United States, legislation dictates that Wilderness Areas should be managed to, among other things, provide recreational visitors with opportunities for solitude. The growing popularity of outdoor recreation in backcountry settings presents managers with a unique set of challenges in their efforts to achieve this objective. These challenges are exacerbated in alpine landscapes, where the length of the recreational use season is limited by climate and geography, thus concentrating use during the summer months.

Indicator-based planning and management frameworks have been adopted to help address the challenges associated with managing visitor use in backcountry settings. This approach involves setting standards for selected variables that relate to the quality of visitors' experiences. For example, in backcountry settings, a standard may be set for the maximum number of contacts a group should have with other groups while hiking. However, on-the-ground monitoring of hiking encounters in dispersed, backcountry settings can be difficult, expensive, and unreliable. Recent research suggests that computer-based simulation techniques can be used to monitor hiking encounters and other visitor use-related indicators that are difficult to measure through on-the-ground observation. The challenge for the research community is to develop valid simulation models based on visitor monitoring data that can be used with confidence by managers.

This paper describes the development and application of a computer-based simulation model of recreational use in the John Muir/Ansel Adams Wilderness Areas in the Sierra Nevada Range, California, USA. The paper describes methods related to data collection, simulation model design, development and validation of outputs related to visitor use, and evaluation of alternative backcountry visitor use management practices. The results of the study provide managers with a tool for understanding existing visitor use patterns within the John Muir/Ansel Adams Wilderness Areas and estimating the effects of alternative management practices on the condition of crowding-related indicators of quality.