Understanding Recreation Flow to Protect Wilderness Resources at Joshua Tree National Park, California

Erik Murdock

University of Arizona, USA
e-mail: emurdock@ag.arizona.edu

Understanding the relationships between resource impacts, visitor experience and visitor flow is a fundamental issue addressed by Joshua Tree National Park (JTNP) wilderness managers. Over one million people visit JTNP each year due to its proximity to three major metropolitan areas and international acclaim. JTNP has the highest concentration of rock climbing routes in the world and an estimated 250,000 people visit JTNP each year to rock climb. Nearly 80% of JTNP is designated as wilderness and is thereby managed according to the Wilderness Act of 1964. The Wilderness Act states that wilderness should afford "solitude" and "untrammeled" landscapes. Although less than 5% of the rock climbers visit the wilderness, a steady increase in the number of climbers has focused attention on managing wilderness climbing resources to retain environmental integrity and wilderness character. The main controversy centers on rock climber's placing fixed anchors, or bolts, while establishing new climbing routes. Fixed anchors are defined as any piece of climbing protection that is left in place to facilitate a safe ascent or rappel. The 1998 JTNP Wilderness Management Plan deems rock climbing an appropriate wilderness activity. However, park staff believes that continued unregulated placement of bolts in JTNP's wilderness leads to greater impacts and is unsustainable. Therefore JTNP must determine a management action that allows for wilderness rock climbing, including new climbing route development, and protects the finite wilderness resource.

This paper describes a method for understanding the temporospatial relationship between wilderness visitor flow and sensitive resources at JTNP in order to develop fair and effective wilderness recreation policy. It is rooted in the concept that visitor flow models based on a comprehensive understanding of resources, visitor behavior, and flow patterns influence the creation of streamlined plans that are site-specific and efficient instead of over-regulatory and cumbersome. Static GIS cartographic models of wilderness character (solitude, impacts and resources) and dynamic recreation simulation models of visitor flow examine the transactions between wilderness visitors and complex landscapes. Recreation simulation also allows JTNP managers to explore the consequences of proposed management plans, such as permitting processes or closures, prior to field implementation. Models are based on two years of data that include a comprehensive climbing resource inventory, wilderness visitor flow data (collected using a variety of monitoring equipment), and psychological testing. The robust data set allows the models to consider wilderness resource attributes such as travel networks, climbing route difficulty and quality, sensitive biological and cultural resources, and proximity to facilities, as well as individual visitor attributes such as time of visit, preferred activities, preferred activity settings, and tolerance for crowds. In this way, JTNP can identify specific areas of the wilderness that are in need of regulation, and design an appropriate management plan to retain wilderness character.