

Indicator development for Yu Shan National Park in Taiwan: an adaptive process

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The Visitor Experience and Resource Protection (VERP) framework was developed by the U.S. National Park Service in the early 1990's to tackle one of the most challenging park management issues facing America's national parks – managing visitor capacities (NPS 1997). Building on an adaptive management model, the VERP framework aims to maintain the quality of visitor experience while protecting the integrity of natural resources by defining zone-specific management objectives and by establishing indicators and standards based on public involvement and empirical research (NPS 1997, Manning 2007).

Most studies that have examined or helped implement the VERP or similar frameworks (like Limits of Acceptable Change-LAC) took place in North America. In recent years there have been growing international interests in the utility and applicability of indicator-based frameworks for park systems outside North America (Brown et al. 2006, Tonge et al. 2006). In East Asia, Yu Shan National Park has become the first major protected area to apply and adapt the VERP framework since 2007. As the team who provide research support to this effort, we recognised early on that substantial adjustments were necessary in order to effectively integrate the indicator-based framework with the current management practice in Taiwan's parks. This paper illustrates one major step in the VERP application in Yu Shan – the development of indicators and its adaptive process.

Due in part to mudflows and landslides that occurred in and around Yu Shan in August 2009, and in part to social considerations and agency culture, we deviated from the 9-step process as specified in the VERP Handbook (NPS 1997) and adopted a more 'streamlined' approach. Rather than involving all stakeholders in indicator identification which seemed to be infeasible, we adopted three alternative steps to achieve the same goal of indicator identification. First, we conducted a workshop for Yu San National Park staff to discuss management zoning procedures and potential indicators. Second, 31 senior park volunteers and professional mountain climbers were selected for in-depth interviews. Third, 500 mountain hikers were surveyed with an intercept questionnaire. This three-step design was intended to evaluate the merits of potential indicators from both managerial and visitor perspectives.

Our results show that some common indicators emerged across different management zones. These indicators include vandalism, feeding wildlife, landscape quality and environmental sanitation. More specifically, natural resource indicators such as the quantity and type of wildlife, water quality of river and stream, vegetative condition, soil erosion on hiking trails, air quality, and quantity and type of exotic species were identified by both park staff and mountain hikers. Visitor experience indicators, such as crowding, vandalism, human noise, trash, trail maintenance, human waste, interpretation signs, and carrying capacity of specific facilities, were also significant for both parties. However, there were also important differences between these two parties. For example, park staff focused more on resource-oriented indicators such as trail conditions, species diversity and exotic species, and several experiential and managerial indicators, such as different levels of crowding perception (minimum, ideal, or maximum), emergency evacuation system, visitor's recognition of Yu San National Park, and research funding. On the other hand, visitors paid far less attention on natural resource conditions. Instead, they were more interested in experiential

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indicators, such as crowding with other groups, carrying pets into mountain area, and perception of environmental impacts due to research activities. The next steps in this ongoing project are to develop a prioritised list of indicators and identify monitoring options for those listed in the high priority category.

Our experiences in Yu San National park offer some valuable insights to park agencies and researchers about the ways and challenges of implementing the VERP or similar frameworks in a different park system. For example, instead of holding a series of public hearings, the intention and importance of this project was conveyed to the public by communicating with park volunteers and professional climbers. Most of the park volunteers in this case came from the local region and they are respected leaders in their communities. Furthermore, we found that park staff were more eager to provide feedback than visitors. We will discuss the major lessons learned from this project which may inform future applications in Taiwan or other non-U.S. park systems.

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