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Research Note

A methodology for prioritising management tasks for an extensive recreational walking track system

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ABSTRACT

Land management requires the setting of priorities so that limited resources can be allocated to maximum effect. Priorities inevitably have a subjective component, which can be minimised by using systematic and transparent methodologies to derive them. A method for priority setting introduces several potential advantages to a management process, in particular a sound basis for justifying priorities to managers and stakeholders alike. This paper describes a methodology that was developed for prioritising management tasks across a 1700 km recreational walking track system in Tasmania, Australia. Priorities were calculated numerically within a framework of seven components, based on assessments of factors such as environmental impacts, visitor safety and conformity to Limits of Acceptable Change (LAC) standards. The methodology yielded logical results, was easy to use and was readily accepted by management staff. With suitable modifications it could be adapted for use in other land management applications and in other regions and environments.

1. Introduction

1.1. The role of prioritisation in environmental management

Effective environmental management generally requires the setting of priorities so that limited resources can be allocated to maximum effect (Ayres, Anderson, & Hanrahan, 1998; Sánchez-Triana, Ahmed, & Awe, 2007). For example, spatial conservation prioritisation is widely used to identify priority locations for conservation investment (Wilson, Cabeza, & Klein, 2009). In the absence of rigorous analytical systems, priorities may be determined semi-quantitatively using simple methodologies or ranking systems. For example, the Department of Conservation and Land Management of Western Australia (1994) assigned protection priorities to threatened plant and animal taxa using a scoring sheet based on considerations such as whether taxa are geographically restricted and whether they face a single over-riding threat that could lead to their early extinction. The World Wildlife Fund's Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) methodology assigns scores to factors such as the extent and likely permanence of environmental threats, as a basis for prioritising management responses for protected areas (Ervin, 2003; Leverington, Hockings, Pavese, Costa, & Courrau, 2008).

A Limits of Acceptable Change (LAC) approach has been adopted by many land managers as a system for defining management objectives in terms of specific and often quantified limits (Cole & Stankey, 1998; McCool & Cole, 1998). The LAC approach prioritises issues in the sense that it distinguishes between acceptable and unacceptable conditions, of which only the latter require a management response. However it does not provide guidelines for prioritising responses to multiple 'unacceptable' issues. To date there have been no published accounts of attempts to embed LAC systems in methodologies for generating priorities for management.

1.2. Prioritising the management of walking tracks and associated trampling impacts

The past 50 years have seen a huge growth in the popularity of recreational trail[2] use, particularly in natural areas in the economically developed world (Pigram & Jenkins, 2006). Many of these areas contain extensive trail networks, which require both trail maintenance and management of their associated impacts (Pigram & Jenkins, 2006). For example, the federal portion of the United States National Trails System extends over 64,000 km (Prescott, 2003). Trail management can require environmental monitoring, the regulation of trail usage and the education of trail users, as

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[2] The word 'trail' is used in this paper to denote a path or track that may be used by walkers, horse riders or cyclists. The word 'track' is used as shorthand for 'walking track'.

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well as physical works for the survey, construction, maintenance, repair and realignment of trails (Parks & Wildlife Service, 1994).

The management of walking tracks and associated trampling impacts generally involves addressing a range of issues that may include track widening and erosion, campsite impacts, the adequacy of infrastructure, unplanned track development, and behavioural issues such as violations of 'no campfire' regulations (Leung & Marion, 2000). The management responses to these issues generally need to be prioritised.

Tasmania's priorities for management actions of walking tracks are based on a hierarchy of five strategic sub-priorities, namely walker safety, the protection of natural and cultural values, cost, use levels and user enjoyment (Wellington Park Management Trust, 2003).

The Tasmanian Parks and Wildlife Service (PWS) assigned management priorities to tracks in the 1.4 million hectare Tasmanian Wilderness World Heritage Area, based partly on a track classification system that specifies acceptable limits of parameters such as track width for each class of track (PWS 1994, 2013). The classification scheme has since been incorporated into a more rigorous LAC system, which was used in the current study (see Section 2.4).

1.3. Advantages of using systematic methodologies to determine priorities

All priorities have a subjective component as they are ultimately based on value judgments. However, the subjective component can be minimised and made explicit if priorities are derived using systematic, transparent and preferably quantitative methodologies. The use of such methodologies can be seen as an example of systematic conservation planning, which is concerned with the application of spatially explicit conservation management actions through a transparent process of setting objectives and priorities (Watson, Grantham, Wilson, & Possingham, 2011).

The advantages of using such methodologies include:

(i) The resulting priorities will be easier to justify to managers, funding bodies and stakeholders (Trombulak, 2010). This is particularly advantageous if proposed management actions and/or priorities are controversial.
(ii) When differences of opinion arise over priorities, the causes of these differences can be narrowed down to specific components of the priority-calculation process which can then be justified or modified as appropriate.
(iii) Systematic methodologies occasionally yield unexpected results owing to factors that might be overlooked or incorrectly assessed when priorities are assigned qualitatively.

The following advantages are also likely to apply if the methodology can be automated:

(iv) Once data have been entered priorities can be calculated rapidly – a major advantage if large numbers of issues require prioritisation.
(v) If required, priorities can easily be recalculated using modified parameters.

1.4. Context in which the current methodology was developed

In 2010 the PWS managed national parks and other reserves totalling 2.5 million hectares – approximately 37% of the land area of Tasmania (the area of reserved land has since increased further). The reserves encompassed over 1700 km of walking tracks as well as hundreds of kilometres of trackless routes. Although management plans, which included prescriptions for walking tracks, already existed for much of the reserve system, these were geographically fragmented and in many cases out of date.

The PWS commissioned the authors in 2010 to prepare a strategy for managing walking tracks and impacts related to recreational walking across the reserve system (Parks & Wildlife Service, 2011). The preparation of the strategy required compiling data on current conditions and likely rates of change, and developing a prioritised programme of management responses.

2. Methods

2.1. Data sources and data storage

The authors had first-hand and reasonably current knowledge of a large proportion (over 1000 km) of the track system, having undertaken extensive fieldwork for track monitoring and other purposes during the years preceding the study. Approximately 30 person-days of fieldwork covering 200 km of track was undertaken during the early part of 2010 in areas for which little recent information was available, and where track deterioration and similar issues were suspected to be occurring. Information for other tracks and areas was obtained from PWS field staff.

Data were compiled in a Microsoft Access database henceforth referred to as the Track Strategy Database. For each identified management issue, data were compiled for more than 60 variables relating to environmental conditions, safety issues, visitor experience and other factors. The variables most relevant to the calculation of management priorities are described in Section 2.4.

2.2. Defining management issues and assets

Management issues were defined as situations associated with the track network and recreational walking that required or might require a management response. Examples include environmental damage such as track erosion, safety issues such as the risk of falling, informal track development, and deterioration of track infrastructure.

Issues were associated with assets, which were defined as discrete and mutually exclusive components of the track and route network. Most assets were either 'local' items of track infrastructure such as bridges, campsites and viewing platforms, or sections of track or route with fairly homogeneous conditions and surfacing. For example, a 1278 m long section of track might comprise the assets '450 m of boardwalk', '820 m of unimproved track' and '8 m treated pine bridge'.

When an issue was judged to require two or more responses with different priorities, it was redefined as separate issues. For example, if a section of track required hardening as a high priority to arrest active widening, and edge rehabilitation as a medium priority to address the problem of excessive width, the active widening was recorded as one issue and the excessive width as another.

The methodology was not designed to identify the appropriate management responses to particular issues, or to trade off the costs and benefits of alternative response options.

2.3. Components that determined priority

The methodology defined priority as a function of the following primary components:

1. The nature, extent, severity and likely duration of environmental impacts;
2. visitor safety;