



Principles for integrated environmental management of military training areas



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ABSTRACT

Military Training Areas (MTAs) cover an estimated 200–250 million hectares globally, occur in all major ecosystems, and are potentially significant conservation assets. In some jurisdictions, MTAs may be the largest terrestrial land use category that is owned and operated by a sovereign government. Despite this, MTAs are not recognised as either a conservation or environment protection resource. Further, no MTAs are managed for their environmental values, defined as aspects of the environment that are valued by society, nor is there any specific MTA management guidance that details how both the military training and environmental values of a MTA can be maintained.

We conducted a desktop review of Australian and German MTA management documentation to determine whether they contained management principles that recognised both military training and environmental values. Management documentation from these two countries was chosen as they are considered to be among countries at the forefront of MTA management globally. Our review determined that both the Australian and German management regimes do not have specific management principles for these values. This is likely to be the case for the majority of MTAs globally.

For the first time, we develop MTA management principles that integrate the management of both military training objectives and environmental values. Key to achieving this integration is an understanding of the intersection of the impacts of military training on the environment, and the known, or potential, environmental values of a particular training area.

To assist with the implementation of the management principles, we developed a new conceptual framework for the management of MTAs. The framework contains two adaptive management loops. The first focuses on the management of environmental values of MTAs, the second targets the military training values of MTAs. These two management loops facilitate for the development of management practices that optimise MTA management for both military training and biodiversity conservation.

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1. Introduction

Globally, the size of the MTA estate is at least 50 million hectares, although the actual figure may be closer to 200–250 million hectares (Zentelis and Lindenmayer, 2014). Zentelis and Lindenmayer (2014) suggested that MTAs are likely to occur in

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all major global ecosystems and, if appropriately managed, have the potential to contribute significantly to biodiversity conservation. Environmental values of MTAs, defined as those aspects of the environment that are valued by society, occur on nearly all MTAs globally. Some important environmental values found at MTAs are due to military training disturbance creating new habitats (e.g. Jentsch et al., 2009; Cizek et al., 2013). In addition, many MTAs contain either remnant vegetation and/or disturbance-dependent communities no longer found in the surrounding environment (e.g. Gazenbeek, 2005). For example, the intensification of agricultural practices in Europe has resulted in the loss of many heathlands that are now found only in MTAs due to military training-related disturbance (Natura, 2000; Gazenbeek, 2005). The remnant coastal

heathland found at the Shoalwater Bay MTA in Australia is the largest remaining area of coastal heathland on the Australian east coast is a direct result of the area being used solely for military training (Keith et al., 2014).

No MTAs are explicitly managed for their environmental values: they are managed to ensure military training is not compromised by environmental issues (Havlick, 2011; Fiott, 2014; Zentelis and Lindenmayer, 2014). In a time when the environment is under unprecedented levels of threat (Driscoll et al., 2012; Cardinale et al., 2012; Steffen et al., 2015), MTAs could play a critical role in reducing the rate of biodiversity loss by providing environmental refuges for species and ecosystems (Aycrigg et al., 2015).

MTAs are unique with no other land management uses having similar management challenges. Outside of war itself, MTAs are the only place where military vehicles and equipment, including munitions are used. Unlike war, this use occurs repeatedly in the same locations and can result in cumulative contamination and land degradation (Doxford and Judd, 2002). The nature of military training, including the use of modern day weaponry such as long range artillery and missiles, high-calibre automatic weapons, high explosives, and specialist military vehicles precludes most traditional approaches to environmental management such as those employed in forestry and national park management (Doxford and Judd, 2002). The management risks during, and after, training activities are significant (Doxford and Judd, 2002). Conventional land management such as wildlife monitoring, prescribed burning and land remediation/rehabilitation cannot occur when military training is occurring due to the risk of death or injury. When military training is not occurring, risks associated with the remnants of past training activities, such as unexploded ordnance or contamination, significantly limit management options. For example, traditional environmental survey techniques cannot be implemented in areas contaminated with unexploded ordnance. These management challenges are unique to all MTAs (Havlick 2011, 2014; Doxford and Judd, 2002). MTAs are likely to be among the largest land use category owned and operated by sovereign governments globally. Unlike other large-scale land management units that have specific management guidance, for example, the IUCN's guidance for global protected areas (IUCN, 2013), no specific MTA management guidance exists that integrates military and environmental considerations, despite catering for other mixed land uses.

The successful management of MTAs requires consideration of both military training and environmental values (Fiott, 2014; Lawrence et al., 2015). One way of achieving this is through the development of management principles that provide a framework for how management objectives can be achieved. For example, a management principle may require all habitat types within an area of land be adequately protected. Successful management principles need to recognise management objectives and provide overarching guidance as to how these objectives may be met (United Kingdom Cabinet Office, 2004).

We assessed management documentation for Australian and German MTAs to determine whether they contained management principles that provided guidance on how both military training and environmental values of MTAs can be managed and maintained. German and Australian documentation was selected as both countries are considered to be at the forefront of MTA management globally. Our findings led to the development of a set of MTA-specific management principles that address the unique management challenges presented by MTAs. We integrated these management principles in a new conceptual model that is based on two adaptive management loops, one for military training and a second for environmental protection. Our management principles seek to provide strategic guidance on MTA management, closing fundamental knowledge gaps, while understanding the impacts of

military training on the environment and biodiversity, and managing disturbance associated with military training.

2. Methods

Key Australian and German MTA management documentation was identified in discussions with environmental managers and policy officers from the Australian Department of Defence and the German Bundeswehr (Table 1, Appendix A in Supplementary material).

Australian and German MTA management documentation was assessed to determine whether they contained management principles that address both military training and environmental considerations. Importantly, management principles had to have a focus on management of **both** military training and environmental values. Each management document was read thoroughly and reviewed to assess whether management principles focused on both. Documents were considered to meet these requirements if they:

1. Explicitly recognised military training and environmental management considerations.
2. Provided on-ground management options for the use of a MTA that traded-off military training and environmental considerations.
3. Contain measurable management actions that may be undertaken. For example, requiring the protection of water bodies from training activities or pollution.

Management documentation that contained these elements were scored a one. Documents that did not were scored a zero.

3. Results

Both the Australian and German MTA management regimes utilise a command and control approach to management, focussing on military training requirements and the safety of the soldiers undertaking the training. The Australian management regime comprises of a series of environmental management guidelines and plans that are given effect through Range Standing Orders. The German management regime is detailed in *Concept for the Utilization of the Training Areas and the Air-to-Ground Firing Range in Germany* (Bundeswehr, 2014) which describes the management regime to be employed at each major training area. This document also incorporates the German Military's obligations under both German and European Union environmental law.

Our review of the management documentation found that both Australian and German management documentation **1.** Did not contain management principles that explicitly recognised military training and environmental protection objectives, **2.** Did not identify, or provide suggestions for, possible military training/environmental trade-offs that could be implemented in MTA management, and **3.** Failed to have clear, measurable management objectives that integrated military training and environmental considerations (Table 2). Australian management documentation did not contain guidance for the protection of biodiversity on MTAs. Both the Australian and German management regimes recognised there are environmental considerations for MTAs that require management. However, management focus was on minimising the impact of these considerations on military training. Documentation in neither jurisdiction focussed on managing environmental values, for example, by increasing the area of a habitat type or maintaining habitat connectivity through an MTA. Overall, the management documentation we reviewed failed to integrate environmental considerations into the management of an MTA, thereby failing to

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