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Assessing collaborative, privately managed biodiversity conservation derived from an offsets program: Lessons from the Southern Mallee of New South Wales, Australia

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ABSTRACT

Conservation effort needs to be integrated across whole regions, to include all landuses and tenures; and engage owners, managers and other interest groups. Where conditions are conducive, multi-stakeholder collaboration offers the advantages of averting conflict. It also offers a platform for the development of a shared vision for a region, and a common space for generating synergistic, place-specific innovations to achieve that vision. Spatial modelling assists in the process, evaluating and visualizing cumulative impacts arising from sets of landuse and management changes across a region.

The Southern Mallee Guidelines was an offset scheme in the Southern Mallee region of NSW, Australia, developed to address jointly the agricultural development and biodiversity conservation concerns in the region. The scheme provided a timely example of place-specific response to tackling the complexity of land clearing in Australia, as policy makers were searching for alternatives to top-down regulation.

At the close of the scheme, we applied a scenario-based, regional biodiversity evaluation tool known as Conservation Options in Regional Environments (CORE). It was developed to evaluate the cumulative impacts of development and conservation measures arising from the scheme. CORE is also useful as a learning and engagement tool. CORE combined a vegetation community-based evaluation, and a fauna species and functional fauna group evaluation based on metapopulation dynamics theory. Using this tool, we found that with some qualifications, the scheme broadly maintained overall biodiversity persistence in the region.

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1. Introduction

1.1. Collaborative, whole-of-landscape planning for biodiversity

Reliance solely on publicly owned reservation severely limits the potential of attaining biodiversity conservation goals (Bengtsson et al., 2003; Scott et al., 2001). Whole of landscape conservation is needed to maximize the retention of biological features and to connect large conservation reserves (Noss, 1983). This need is likely to become more acute with the advent of climate change, as established public reserves become less able to protect the features for which they were originally created (Araújo et al., 2004; Dunlop et al., 2012). Any opportunities to increase the contribution of privately owned or managed land to the overall nature conservation effort deserves urgent attention (Alpert, 1996).

Incorporating privately managed land offers more than extra hectares for the conservation cause. It also provides rich and diverse conservation opportunities by bringing into play, and building upon, the social capital of a region i.e. the knowledge, passions and the capacities for innovation of a diverse set of players (Curtis and Lockwood, 2000; Frame, 2008; Love et al., 2010). This can happen only through the voluntary involvement of landholders

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and the broader community (Kamal and Grodzinska-Jurczak, 2014; Wyborn, 2013).

The key to successful private land conservation relies largely on collaboration between the sometimes divergent interests of conservation and production, with the intention of achieving mutually acceptable, or even synergistic, management (Selin and Chavez, 1995; Wondolleck and Yaffee, 2000). In comparison to acquiring and managing reserves (which can be a *complicated* task), private land conservation leads to *complexity*. This complexity arises from the sheer number and diversity of potential players and management regimes, thus putting private land conservation into the realm of wicked problems (Rittel and Webber, 1973). Such problems cannot be solved solely through technical means. Players can include government, funders, landholders, industry groups, and conservationists, and each carries their own set of interests, understandings, aspirations, practices, and capacities which deserve attention (Adler et al., 2000; Ozawa, 2006; Roux et al., 2006).

Spatial modelling and geographical information systems (GIS) are powerful tools for collaboratively structuring, processing and articulating information and knowledge in planning processes (Balram et al., 2009). They provide a platform to 'describe' the information and knowledge of landscape processes within a system. When configured into regional-scale scenario planning, spatial modelling can transcend narrowly focused evaluation of individual impacts, allowing sets of potential landuse and associated environmental changes and their interactions to be evaluated collectively. Changes arising from seemingly contrary individual actions across a region (for example, clearing of native vegetation in one location and conservation actions elsewhere) can be integrated into a single evaluation. It is possible for broadly acceptable, synergistic sets of actions to emerge at a regional scale, despite individual gains and losses across a range of values, distributed unevenly across space.

We describe and assess the biodiversity outcomes of the Southern Mallee Guidelines for the Development of Land use Agreements scheme (Southern Mallee Regional Planning Committee, 2000) (hereafter referred to as 'the scheme'). The scheme set conditions by which clearing of certain areas of native vegetation on privately managed leases were to be strategically offset by the establishment of private reserves. We describe Conservation Options in Regional Environments (CORE), a multi-faceted spatial assessment tool developed for the region, which was used to evaluate whether the scheme achieved the maintain-or-improve criteria for biodiversity for the region (Ardill, 2004; New South Wales National Parks and Wildlife Service, 2002). The assessment essentially compared a pre-scheme scenario (Pre-SM) with a post-scheme scenario (Post-SM) in relation to a pre-European (or pre-Industrial) benchmark (Pre-1750). CORE's ability to elucidate the combined impacts of the scheme suggests the approach could be useful in similar land use planning settings.

2. Methods

2.1. The Southern Mallee guidelines

The Southern Mallee Guidelines scheme was a place-specific approach to a complex, multi-stakeholder land use allocation problem. The scheme was underpinned by the best available science at the time of its inception, and by a broad set of stakeholders working to reach an agreed way forward. This collaborative example was of interest due the controversial proposition that the establishment of private reserves could effectively offset losses to biodiversity which resulted from broadscale clearing of native vegetation for agriculture.

The scheme was developed in the Southern Mallee region of the Lower Murray Darling catchment in far-west NSW (Allaway and Cover, 1996; Deans and Holmes, 2002). The scheme, led by the NSW Department of Land and Water Conservation, was collaboratively governed by a multi-sectorial agency committee made up of indigenous elders, landholders, conservationists (World Wildlife Fund), local government, NSW natural resource management agencies and the Murray-Darling Basin Commission (LMD CMA, 2006). After its formation in 2004, the Lower Murray Darling Catchment Management Authority (the CMA) took responsibility for the winding up of the scheme.

The major stated objectives of the scheme (Southern Mallee Regional Planning Committee, 2000) were to:

1. Prevent further land degradation
2. Ensure that natural resources were used within their capability
3. Minimize adverse impacts arising from the use of natural resources
4. Ensure that the habitat of native flora and fauna was maintained and improved
5. Promote appropriate property planning and management practices and
6. Preserve items and places of cultural heritage value.

Land tenure in the region is primarily Crown Land leased for grazing in perpetuity. The scheme constituted a voluntary offset agreement where, through a process of negotiated land use agreements, landholders received approval to extend dryland (not irrigated) cultivation through selective clearing of native vegetation from their largely uncleared grazing leases. Clearing was regulated by a system of limits and criteria (Freudenberger et al., 1997; Southern Mallee Regional Planning Committee, 2000). Offset design stipulated that offset areas should contain vegetation communities (from the same property) similar to those being cleared. New private reserves, created under the scheme were perpetual on the Western Land Lease Title and contributed to Australia's National Reserve System, in accordance with the intent of IUCN category IV, Habitat Species Management Area.[1]

The offset design employed in this scheme was developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Freudenberger et al., 1997). It was based on maintaining the aerial representation of vegetation classes, and on a number of design principles. The newly reserved areas were required to be historically uncleared, and able to respond well to passive restoration and pest control. Habitat conditions were expected to gradually improve over time, facilitated by the closure of artificial watering points and the reduction of grazing pressure from domestic stock (Deans and Holmes, 2002). Thus, clearing offsets were to be achieved by improving habitat condition and removing threats within the newly established private reserves, rather than by revegetating cleared areas.

Between 1998 and 2005, the scheme led to significant land use change in the region (see Table 1). Under the Scheme 40,458 ha of native vegetation (mostly Belah-Rosewood, Mallee, Cypress Woodland, Chenopod Shrubland, and Grassland communities) was cleared. To offset this loss, 107,992 ha of corresponding native vegetation was added to the private reserves system which represented a 45% increase in the area of land dedicated to conservation in the region (see Table 1 and Fig. 1).

The scheme was popular with farmers in the region as it provided flexibility to further their enterprises. However, the scheme was eventually in contravention of new native vegetation clear-

[1] These reserves are not exempt from development. A sand mine was approved for one.

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