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Locking in loss: Baselines of decline in Australian biodiversity offset policies

Martine Maron [a,*], Joseph W. Bull [b], Megan C. Evans [c], Ascelin Gordon [d]

[a] The University of Queensland, Landscape Ecology & Conservation Group and School of Geography, Planning and Environmental Management, Brisbane, Queensland 4072, Australia
[b] Department of Life Sciences, Imperial College London, Silwood Park campus, Buckhurst Rd, Ascot SL5 7PY, UK
[c] Fenner School of Environment & Society, The Australian National University, Canberra, Australian Capital Territory 0200, Australia
[d] School of Global, Urban and Social Studies, RMIT University, GPO Box 2476, Melbourne, Victoria 3001, Australia

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ABSTRACT

Biodiversity offset trades usually aim to achieve 'no net loss' of biodiversity. But the question remains: no net loss *compared to what?* Determining whether an offset can compensate for a given impact requires assumptions about the counterfactual scenario—that which would have happened without the offset—against which the gain at an offset site can be estimated. Where this counterfactual scenario, or 'crediting baseline', assumes a future trajectory of biodiversity decline, the intended net outcome of the offset trade is maintenance of that declining trajectory. If the rate of decline of the crediting baseline is implausibly steep, biodiversity offset trades can exacerbate biodiversity decline. We examined crediting baselines used in offset policies across Australia, and compared them with recent estimates of decline in woody vegetation extent. All jurisdictions permitted offset credit generated using averted loss—implying an assumption of background decline—but few were explicit about their crediting baseline. The credit calculation approaches implied assumed crediting baselines of up to 4.2% loss (of vegetation extent and/or condition) per annum; on average, the crediting baselines were >5 times steeper than recent rates of vegetation loss. For these crediting baselines to be plausible, declines in vegetation condition must be rapid, but this was not reflected in the approaches for which assumptions about decline in extent and condition could be separated. We conclude that crediting baselines in Australian offset schemes risk exacerbating biodiversity loss. The near-ubiquitous use of declining crediting baselines risks 'locking in' biodiversity decline across impact and offset sites, with implications for biodiversity conservation more broadly.

1. Introduction

Conservation decisions all involve assumptions about what would happen in absence of a particular intervention. Judging the benefit of a given conservation intervention relies equally on envisaging the future in which the intervention occurs, and the future in which it does not—that is, the counterfactual scenario (Box 1; Ferraro and Pattanayak, 2006; Maron et al., 2013). For example, the expected benefit from gazetting a new protected area implicitly assumes some probability that biodiversity in that location would ultimately be lost in absence of protection (Wilson et al., 2005).

Specifying the counterfactual scenario is critical, as without it, the extent to which outcomes are attributable to the conservation intervention cannot be known (Ferraro, 2009). The assumed counterfactual scenario or baseline (Box 1; Angelsen, 2008; Ferraro, 2009) can be extremely influential in calculation of the benefit of a conservation intervention as it determines the reference against which gains are measured (Bull et al., 2014a; Ferraro and Pattanayak, 2006; Maron et al., 2013). Yet counterfactual scenarios are often ignored in calculating conservation benefits, and when they are used, they are rarely explicitly described or justified in terms of their plausibility, were the intervention not to occur (Ferraro, 2009; Miteva et al., 2012).

This issue has started to receive more attention, with discussion in the literature around appropriate counterfactuals for evaluating the outcomes of conservation interventions increasing in recent years (Bull et al., 2014a; Ferraro and Pattanayak, 2006; Maron et al., 2013). A particular focus has been on biodiversity offsetting, which is emerging as one of the most rapidly-growing and controversial conservation approaches—and one in which baseline assumptions play a central role (Bayon and Jenkins, 2010; Whiteman et al., 2010). The core principle behind biodiversity offsetting is that of 'no net loss', whereby conservation benefits generated at a site must compensate fully for any impacts on biodiversity at another site. The question remains, however: no net loss *compared to what* (Salzman and Ruhl, 2010; Virah-Sawmy et al., 2014)? In order to identify whether gains at an offset site are indeed equivalent to a given loss, plausible counterfactual scenarios must be developed against which both the expected gains at the offset site and the losses at the impact site can be estimated. The

* Corresponding author. Tel.: +61 7 3365 3836, mobile: +61 417 110 537.
E-mail addresses: m.maron@uq.edu.au (M. Maron), j.bull10@imperial.ac.uk (J.W. Bull), megan.evans@anu.edu.au (M.C. Evans), ascelin.gordon@rmit.edu.au (A. Gordon).

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counterfactual scenario against which offset gains are measured is the 'crediting baseline' (*sensu* Angelsen, 2008; Box 1; Fig. 1).

Gordon et al. (2011) and Bull et al. (2014a) have demonstrated that the choice of crediting baseline is a fundamental determinant of whether a biodiversity offset policy delivers its intended biodiversity outcomes. They show how different but plausible baselines could lead to either a net loss or a net gain, relative to 'business as usual'. Specification of crediting baselines is therefore a particularly high-stakes exercise for biodiversity offsetting, because the estimated gains from an offset determine the amount of losses that can occur elsewhere (Gordon et al., 2015). Thus, ensuring baselines are appropriate is arguably more critical in offset exchanges than for other types of conservation decisions (such as prioritising properties for land stewardship payments), where overestimation of benefits is not linked to equivalent losses (Fig. 1; Gordon et al., 2015).

A crediting baseline that assumes no change in biodiversity over time in the absence of the offset action allows credit to be generated only by 'restoration gain' resulting in improvement in habitat values at a site over time (Maron et al., 2012). However, most baselines used for generating offset credit assume (often implicitly) that there will be a decline in biodiversity over time in the absence of the offset action (Pawliczek and Sullivan, 2011; Salzman and Ruhl, 2010). Where such declining baseline scenarios are used, it is possible to generate offset credit via 'averted loss' (Maron et al., 2013), whereby the conservation benefit of an offset is derived from a reduction in the loss of biodiversity, relative to what would have been likely to occur in absence of the offset.

Despite their importance for determining whether biodiversity benefits gained through offset exchanges are commensurate with the losses associated with a development impact, crediting baselines are rarely explicitly stated. However, offset policies often permit the generation of at least some offset credit through protecting biodiversity that already exists without making any other improvements (Brown et al., 2014; U.S. Fish and Wildlife Service, 2003; Wilcove and Lee, 2004). In these cases, it can be inferred that a declining crediting baseline is assumed, either implicitly or explicitly, to allow the generation of the averted loss credit.

The use of a declining crediting baseline in offsetting involves some risks (Angelsen, 2008; Gordon et al., 2015). Critically, the consequence of specifying a crediting baseline in 'no net loss' biodiversity offsetting is the maintenance of that baseline. This is because maintenance of the baseline trajectory becomes the target net outcome from offset trades. Thus, a baseline of decline effectively locks in that decline as the net effect of impact-offset exchanges (assuming the debiting baseline [Box 1] is similar) (Gordon et al., 2015).

Nevertheless, there are circumstances in which an assumption of background decline of biodiversity is realistic (Kormos et al., 2014), and in these situations averted loss offsets could potentially result in better outcomes from offsets than restoration offsets only, which often have a high risk of failure (Maron et al., 2012). For example, if a species' decline is due to an introduced predator, that decline would therefore be expected to continue even in the absence of any development impact. However, the use of an implausibly steep baseline of decline results in exacerbating biodiversity loss, as the net outcome from impact-offset trade is to maintain this overly steep baseline of decline (Gordon et al., 2015). Whilst concerns about poorly-constructed crediting baselines have been raised elsewhere, the extent to which steep declining baselines are embedded in currently active offset policies, and the discrepancies between such baselines and more plausible counterfactuals, have not yet been explored.

In this paper, we examine the often-implicit assumptions about crediting baselines in a range of offset policies, in order to reveal the designed-in consequences of offset trades for biodiversity. We explore this issue for a country considered well-advanced in offset policy implementation: Australia, which has biodiversity offset policies in operation (or in development) nationally, in each of its six States and two Territories, and in some Local Council regions (McKenney and Kiesecker, 2010). Specifically, we (1) explore the extent to which a baseline from which to measure offset gains is clearly articulated for nine offset policies in eight Australian jurisdictions; (2) for cases where a baseline is not explicitly stated, we explore whether a declining baseline is implied based on the rules specified for calculating offset credit under that policy and/or actual offset trades that have occurred, and if so, estimate the implied rate of decline; and (3) compare the baseline rates of decline to recent rates of vegetation loss for each of the jurisdictions to identify the degree to which the decline assumptions inherent in the policy correspond to available evidence of vegetation loss.

2. Material and methods

2.1. Review of baseline assumptions

Most Australian states and territories have one or more biodiversity offsets policies or sets of guidelines, and there is also a national policy (Fig. 2). The documentation describing required or recommended credit calculation approaches was examined for each policy and guideline to identify whether it contained sufficient information to determine the crediting baseline used in offset credit calculations. For one jurisdiction where this information was not available, a publicly-available offset register was searched for information about offset trades from which some elements of credit calculation could be inferred. We were able to obtain sufficient information to extract the baseline assumptions for nine policies across Australia: seven state and territory policies, the national policy, and a set of guidelines applying to Council regions in Tasmania (Fig. 2). The credit calculation and accounting approaches used for each policy vary from simple area-based multipliers to complex calculators of gain (e.g., Department of Environment and Primary Industries,

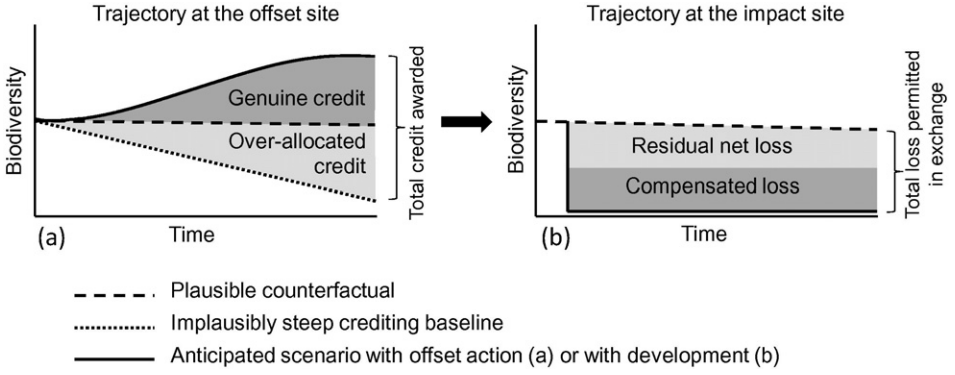

Fig. 1. Example of an offset trade in which the use of an implausibly steep crediting baseline (fine dotted line) results in inflation of offset credit (a) which is then exchanged for an equivalent loss (b). The total credit allocated in (a) comprises both the genuine gain compared to the plausible counterfactual (dark grey) and the overallocated credit (light grey), resulting in a residual net loss equivalent to the amount of credit that was overallocated (light grey shading in (b)).