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Are offsets effective? An evaluation of recent environmental offsets in Western Australia

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ABSTRACT

The use of environmental offsets has increased in many parts of the world over the last decade, but assessments of their effectiveness have been rare. We provide the first quantification of the effectiveness of offsets in an Australian State (Western Australia) with an offsets register and history of offset implementation. We determined what outcomes were achieved and the environmental effectiveness of 208 past and current offsets applied as part of environmental approvals between 2004 and 2015 under State jurisdiction legislation. Of the past offsets, we conclude that at most 39% of the offsets studied delivered an outcome and can be considered effective, with land acquisition comparing favourably to other offset types. The outcomes of many offsets were unknown due to reporting too soon after implementation (14%) and inadequate reporting (18%). Thirty percent of past offsets during this time period were found be ineffective through non- or inadequate implementation. We observed significant improvements in the clarity of offset approval conditions over the time period of our study, nonetheless, we suggest that these results provide evidence of the need for better implementation of on-ground management and research into the nature of offsets. We make four suggestions for improvement: 1) timely reporting and compliance with environmental conditions; 2) ensuring approval conditions measure ecological outcomes; 3) improving project planning for offsets; and 4) including contingency and longer term planning in offset design. Conclusions from examining implementation of offsets in Western Australia are likely to be applicable wherever offsets policies are in place or being developed.

1. Introduction

Environmental offsets ("offsets") are an increasingly used but controversial policy tool (Maron et al., 2015) to compensate for unavoidable development impacts on biodiversity (Business and Biodiversity Offsets Programme, 2009; Bull et al., 2013; Goncalves et al., 2015) or to provide net positive impact (Aiama et al., 2015). While much has been written on the advantages and potential pitfalls of the use of offsets in conservation policy (Maron et al., 2016), this has mostly been done in the absence of reliable information on how offset policies are working in practice. In this paper we provide one of the first evaluations of the effectiveness of a large number of offsets, in an area of great biodiversity value that faces rapid and ongoing resource and urban development.

The policy for modern offsets has developed in response to conservation concerns for biodiversity loss due to human development (Gordon et al., 2015; Fallding, 2014; Madsen et al., 2010). Originally used in the 1970s as a form of biodiversity trading and banking for wetland and threatened species mitigation (Burgin, 2008; McKenny and Kiesecker, 2010), offsets are now frequently employed by many nations as part of environmental impact assessments (EIA; ten Kate et al., 2004). There are 51 offset schemes currently in use around the world (Ives and Bekessy, 2015). Principles and standard on offset implementation and verification have been developed by many jurisdictions, with commonly employed examples including: no net loss (or net gain/benefit), like for like or better, in perpetuity, averted loss and additionality (ten Kate et al., 2004; Business and Biodiversity Offsets Programme, 2012; McKenny and Kiesecker, 2010).

Offsets are an appealing policy tool for mitigating environmental impacts because they may be used to provide compensation for impacts on biodiversity values, ecosystem function, ecosystem services, or all three (Bull et al., 2013). Despite the rapid expansion in the use of offsets, and the increasing interest from government, scientific, legal and community sectors (McKenny and Kiesecker, 2010; Environment and Communications References Committee, 2014), there is considerable uncertainty about the outcomes of offset policies (Gordon et al., 2011; Gibbons and Lindenmayer, 2007). Use of offsets presents conceptual and practical challenges (Goncalves et al., 2015) and significant contested issues (Maron et al., 2016), but chief among these is understanding how (and if) offsets deliver on anticipated outcomes.

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Relatively few examinations of effectiveness of offsets are available. Quétier and Lavorel (2011) outlined requirements for assessment of offset effectiveness, and other studies have recommended various approaches: for instance, modelling outcomes under different scenarios (Gordon et al., 2011) or comparison against a series of principles (McKenny and Kiesecker, 2010). Existing evaluations of offsets mostly relate to ecological function of wetland mitigation projects in North America (e.g. Brown and Veneman, 2001; Sudol and Ambrose, 2002; Matthews and Endress, 2008; Moreno-Mateos et al., 2012) and regulatory compliance in New Zealand (Brown et al., 2013). The design and/or implementation of offset policies have been criticised for not producing the anticipated biodiversity conservation outcomes (e.g. Brown and Veneman, 2001; Quigley and Harper, 2006; Gibbons and Lindenmayer, 2007; Matthews and Endress, 2008; Teal, 2011; Maron et al., 2012) and for infrequent successful examples (e.g. Pickett et al., 2013). Maron et al. (2016) highlighted the lack of empirical evaluations of offset schemes and identified the lack of available information about implementation and effectiveness as a key gap in offsets policy.

Effectiveness has been considered in various contexts, including EIA (Pope et al., 2013), offsets policy (Gordon et al., 2011; Gordon et al., 2015; Moreno-Mateos et al., 2015), restoration offsets (Maron et al., 2012) and natural resource management programs (Pannell and Roberts, 2010); however there is no generally agreed definition for measuring effectiveness of offsets as they range across so many different types of projects. We propose that the effectiveness of offsets can be distilled to include three key concepts:

1. "Successful in producing a desired or intended results" (Oxford Dictionary of English, 2010);
2. The offset brought measurable, successful, long-term benefits; and
3. The benefit of the offset counterbalanced significant residual impacts or risk of a project (Government of Western Australia, 2014).

We examine these three concepts to determine if offsets imposed under Western Australian state jurisdiction have been effective. This approach constrains our examination of effectiveness to the technical and governance challenges described by Maron et al. (2016).

Where they are used around the world, offsets are generally imposed and administered under a regulatory framework. In Australia, similar to the USA and Canada, environmental regulation occurs in both State and Federal jurisdictions and includes impact assessment and mitigation measures. A wide variety of actions can be included as offsets in environmental approvals, such as environmental management, reservation of land (managed by public agencies or private organisations), restoration of ecosystems, research, or contribution to funds to achieve these.

Western Australia (WA) provides a unique opportunity for insight into offset effectiveness. Renowned for its floristic diversity and endemism, Southwestern Australia is a biodiversity hotspot, with <30% original habitat remaining following extensive historic habitat loss associated with agricultural and contemporary ongoing urban development (Myers et al., 2000). Offsets for impacts on biodiversity have been in use in WA since the introduction of regulations on clearing of native vegetation in 2004 and release of Environmental Protection Authority position statements or guidance from 2006 onwards (Environmental Protection Authority, 2006; Environmental Protection Authority, 2008). The WA State Government has released a whole-of-government policy (Government of Western Australia, 2011) and comprehensive guidelines (Government of Western Australia, 2014; "Guidelines"). Here, as elsewhere, offsets form part of a hierarchy and are nominally resorted to once efforts to avoid and mitigate damage have been made. A focus on transparency and accountability regarding offset requirements in WA led to the development of a publicly accessible offsets register in 2013 ("the Offsets Register"; www.offsetsregister.wa.gov.au) to record the rationale, offset actions and spatial location of offsets (Government of Western Australia, 2014). The use of offsets in impact assessment and approvals, legislative frameworks and accessibility of data mean that WA provides an ideal location for study of offset effectiveness.

2. Methods

2.1. Offsets included in the study

All offsets included in this study were approved in WA during the period 2004 to February 2015 under the State *Environmental Protection Act 1986* (EP Act). A total of 287 offsets were included in this study, and the effectiveness of a subset of 208 past and current offsets is reported. Most of these offsets were approved after July 2011 (consistent with data included in the Offsets Register). In Australia, there is overlap between threatened species and ecological community listings under Commonwealth and State legislation; however the offset requirements for each jurisdiction differ. Offsets are also applied for approvals under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*, including examples where the same offset has been used to satisfy State and Commonwealth legislation. However, to avoid issues of duplication and complications of evaluating effectiveness according to two approvals, we chose to include WA State EP Act approvals only.

We included the following offsets in our study:

a) All offsets listed on the Offsets Register as at February 2015, except ten clearing permits administered by the Department of Mines and Petroleum (for which detailed reporting information was not available at the time of analysis);
b) All other known offsets approved under EP Act Part IV; and
c) An additional16 offsets approved under EP Act Part V (which were included in a departmental internal review) prior to the establishment of the Offsets Register.

The methodology we used was as comprehensive as possible but did not attempt to include all offsets in WA as the terminology used within approvals documentation was inconsistent over time, particularly prior to 2011. We categorised the offsets according to offset types, design, implementation, evaluation and effectiveness.

Our study focused on the implementation and outcomes reported by approval-holders or compiled by regulators. We did not examine the validity of any assessment process or offset and did not conduct field verification. This obviously limits our examination of effectiveness, but provides the most complete analysis possible using publicly available information.

2.2. Offset types

We used the three offset types defined in the Guidelines, and refined them further:

1. Land acquisition – change of tenure for conservation purpose, including reservation and similar, funds for land purchase and conservation covenant. "Reservation and similar" was used when a land parcel was identified for purchase or swap in the approval documentation or subsequently. This was distinguished from "funds for land purchase" which required monetary contributions to a fund, to be used for land purchase; while the environmental values of the offset were specified at the time of assessment, the land parcel was not identified.
2. On-ground management - management actions that addressed threats, including rehabilitation/restoration (we have amalgamated these for ease of analysis), threat management (such as weed or fire management) and planting for fauna habitat.
3. Research – no subtypes, research included taxonomic or ecological studies and science associated with management of impacts or recovery planning (where this is included as a research offset by the regulator).

We found two additional offset types in existing approvals - *Strategic funds* (monetary contributions for strategic conservation outcomes; not