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How do we know if managed realignment for coastal habitat compensation is successful? Insights from the implementation of the EU Birds and Habitats Directive in England.

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ABSTRACT

In England saltmarshes account for less than 0.5% of the land area; however they have a very high biodiversity value and provide significant economic and social services. Climate change, continuous coastal urbanisation and port development are serious concerns for coastal protection planners, city councils and state government agencies interested in balancing the social, economic and environmental needs of these dynamic areas to ensure sustainable development. Providing habitat 'compensation', creating new intertidal habitats to replace those lost to developments and coastal protection schemes via Managed Realignment (MR), has been identified in the UK as the principal way to manage the loss of habitat and prevent biodiversity loss. However, the few existing studies that do evaluate the effectiveness of managed realignment projects in England indicate that they are not compensating fully for the original loss of habitat. Through an analysis of scientific and grey literature, conservation legislation, and purposive semi-structured interviews, we sought to ascertain what motivates the continued use of MR for habitat compensation in England, as well as in what ways success is defined by practitioners at various scales. We find that ambiguities in the conservation legislation, inconsistencies regarding definitions and evaluative metrics across scales, and a lack of transparency and reporting in past projects has led to confusion regarding what specifically should be recreated in MR projects for habitat compensation, and how best to instigate it. From this, we argue that to be able to evaluate whether current MR practices in England will actually preserve biodiversity, or contribute to its loss, and thus to ensure consistent and effective monitoring, evaluation and implementation of scientific best practices 1) habitat compensation needs to be rigorously defined; 2) consistent, cross-scalar success criteria and targets for MR projects need to be clearly established; and 3) transparent reporting and evaluation of MR projects by independent agencies should be promoted.

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1. Introduction

The current rate of global biodiversity loss greatly exceeds precedent natural rates, jeopardising the ecological functions that support all life on earth, the most predominant cause being changes in land use due to human activities (Steffen et al., 2015). Coastal wetlands in particular are threatened by land reclamation and development, and globally between a quarter and a half of saltmarsh area has already been lost (UNEP, 2005). In addition to biodiversity concerns, the loss of coastal habitat will likely lead to increased vulnerability of people and property as the climate changes and sea levels continue to rise (Arkema et al., 2013). In

England saltmarshes account for less than 0.5% of the land area, however they have a very high ecological biodiversity value and provide significant economic and social worth (UK National Ecosystem Assessment, 2011). Many of these areas are internationally important for biodiversity conservation and provide vital habitats for important migratory bird species (Atkinson, 2003) and so are designated conservation areas. Despite these factors, saltmarsh loss is still occurring at an alarming rate on the English coast as a consequence of port developments or flood and erosion protection schemes.

Providing habitat 'compensation', creating new habitats to replace those lost to developments, has been identified as one way of managing the loss of saltmarsh habitat and its associated protected flora and fauna. In Europe, compensation is incorporated into the EU Birds and Habitats Directives (Nature Directives), which

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are transnational legislation explicitly established to facilitate nature conservation in the EU (European Commission, 2014). However, the validity of the compensation concept as a viable approach to biodiversity conservation has been called into question through a double argument: 1) that the results of compensation are often ecologically inadequate while 2) compensation carries troubling political implications and unduly legitimizes habitat destruction (Hobbs et al., 2011). Even the European Commission (EC), for example, concedes that “according to current knowledge, it is highly unlikely that the ecological structure and function as well as the related habitats and species populations can be reinstated up to the status they had before the damage by a plan or project” (European Commission, 2007, p. 17).

In England, strategies for compensation and re-creation of saltmarshes have often taken the form of Managed Realignment (MR) (Defra, 2005). However, the available science indicates that MR projects in the country are in fact not compensating adequately for the loss of habitat (Elliott et al., 2007; Mazik et al., 2010; Mossman et al., 2012; Morris, 2013). Given that the EC recommends that compensation strategies follow scientific best practice (European Commission, 2007), this raises the question of why (with what motivations) England continues to pursue the potentially problematic method as a coastal biodiversity conservation strategy. This brings into focus issues of how “habitat compensation” is defined and what actually constitutes “success” in a MR project. The nested nature of the EU Nature Directives, which involves coordinated regulations and monitoring between EU, national, and municipal actors, means that the definitions and evaluative criteria employed for assessing MR projects should be consistent across scales in order to ensure consistent and effective monitoring, (re) evaluation and implementation of scientific best practices. Whether such consistency is indeed the case has not been sufficiently established and thus remains ambiguous. This is the major motivation for this research.

Below, we review the existing literature on MR for habitat compensation as it relates to the EU Nature Directives in England in order to try to identify the criteria used to judge the success or failure of MR as a biodiversity conservation approach at the national scale. In addition, we identify some of the motivations behind the continued use of the method for biodiversity offsetting in England. Complementary to this literature review, we evaluate existing legislation to better understand the decision making structures implicated in the monitoring and evaluation of MR projects. We subsidize these insights with a series of interviews with experts and practitioners in England which aim to highlight some of the additional considerations and challenges for assessing whether MR projects are successfully facilitating habitat conservation or contributing to biodiversity loss in practice. Building on the apparent disconnects and inconsistencies within and between scales of administration regarding definitions, targets, and evaluative processes and criteria, our analysis suggests that in order to evaluate whether current MR practices can actually preserve biodiversity, or are contributing to its loss, habitat compensation needs to be rigorously defined and measured against a standard set of evaluative criteria across scales. Transparent reporting of project impacts and independent reviews are also crucial for effective project evaluation. Taking steps to address these disconnects and ambiguities would likely contribute to increased efficacy of future conservation efforts in England and Europe more broadly.

2. Theoretical framework

2.1. Off-setting, habitat compensation and managed realignment

Habitat compensation has received increasing attention in the

last several decades as biodiversity conservation has climbed higher on the social and political agenda. The basic premise behind habitat compensation is that habitat lost due to the adverse effects of development activities can be off-set by establishing comparable habitat in another location, thus theoretically providing for a “no net loss” or even “net gain” in biodiversity (McKenney and Kiesecker, 2010). Habitat compensation is one of a wide variety of available approaches to “off-setting”, a term given to a family of related policies such as compensatory habitat creation, mitigation banks, conservation banking, habitat credit trading, complementary remediation, and more (Bull et al., 2013, p. 370). Habitat compensation can be required for a wide variety of activities depending on the context, though in general the development of infrastructure in response to human population and economic growth has been identified as a major driver of habitat loss and thus the need for compensation around the globe (Quintero and Mathur, 2011). In the European Union, habitat compensation is explicitly incorporated into the Nature Directives via Article 6(4) which identifies compensatory measures as “intended to offset the negative effects of the plan or project so that the overall ecological coherence of the Natura 2000 Network¹ is maintained”, which includes compensation in terms of both ecological structure and function (European Commission, 2007, p. 10). Approaches taken to achieve habitat compensation depend heavily on the habitat under question, for example, whether it's compensation of tropical forest habitat or compensation of coastal wetland habitat (McKenney and Kiesecker, 2010).

Regardless of geographical location, habitat type, or the specific strategy employed, balancing conservation and development is the generic goal of all habitat compensation policies. Within the context of coastal management in England, one approach to habitat compensation that is gaining prominence is the facilitation of managed realignment (Atkinson et al., 2004). Managed realignment has been increasingly considered as a “soft”, and more economically sound, alternative to the construction of new or maintenance of existing hard coastal defence infrastructure such as seawalls, jetties, and groins (Turner et al., 2007). By removing obstructions to shoreline realignment, this technique intends to mimic what would normally happen under conditions of rising sea levels. As French (2006, p. 409) explains:

The underlying rationale of the technique in the estuarine context is simple, i.e. to return land to the sea, so as to allow salt marsh and intertidal mudflats to develop landward of those already in existence. The perceived benefits of this include increased wave attenuation, a naturalised estuarine shape (a return, often partial, from the artificial, land claim induced shapes of many contemporary estuaries), and a localised reduction in the impacts of sea level rise due to the increased tidal volume. While the short term effectiveness of managed realignment is thought to be related to local geophysical and historical land use characteristics, the longer term effectiveness of the technique is much more ambiguous.

2.2. Discontents

While the concept of environmental offsetting has become more prominent in the past several decades, it has not been without its critics (Walker et al., 2009). Habitat compensation in particular has been heavily criticized for a variety of reasons, including the

¹ Natura 2000 is a network important sites for rare and threatened species and habitat types. It consists of Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

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