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Perspective

Real-world progress in overcoming the challenges of adaptive spatial planning in marine protected areas

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ABSTRACT

Guidelines for spatial planning, including those from integrated coastal management, systematic conservation planning, and marine spatial planning, have conceived planning processes as iterative and adaptive. Adaptive spatial planning is advocated because it allows decisions to be improved with new data, as knowledge accumulates on management within particular contexts, and to fine-tune spatial management arrangements to fit constantly changing social-ecological systems. Yet, to date there have been very few reviews of the process and practice of adaptive spatial planning in real-world contexts. Here we review the theoretical challenges presented in the literature on adaptive spatial planning against 5 case studies of adaptive planning in the marine realm: Kubulau District, Fiji; Southeast Cebu, Philippines; the Great Barrier Reef, Australia; central California, USA; and KwaZulu-Natal, South Africa. Our aim is to assess the extent to which the theoretical challenges have been addressed in practice. We find that none of the case studies analyzed effectively addressed all the challenges of adaptive spatial planning. Differences in legislation, resources, and capacity to undertake adaptive spatial planning mean that each planning process is operated differently in each case study. For example, adaptive spatial planning can occur through a structured and institutionalized approach when resources and government support are available, but it can also operate in a relatively more opportunistic and flexible way if governments are weaker but civil society has strong champions. Although the case studies addressed aspects of adaptive planning, some persistent challenges remain, including scientific gaps regarding triggers for adaptation and unsympathetic institutional and policy contexts and planning cultures. These challenges must be addressed before all the benefits of adaptive spatial planning can be realized.

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1. Introduction

Spatial planning for natural-resource management, which allocates resource use and management to specific areas to achieve ecological, economic, and social objectives (Ehler and Douvere, 2007), is expanding worldwide and has become institutionalized within individual countries. Guidelines for spatial planning, including those from integrated coastal management (White et al., 2005), systematic conservation planning (Groves, 2003; Knight et al., 2006a; Margules and Pressey, 2000; Pressey and Bottrill, 2009), and marine spatial planning (Collie et al., 2012; Ehler and Douvere, 2009), conceive planning processes as iterative and adaptive. The adaptive nature of planning is particularly important in the transition from spatial design – the allocation of notional conservation actions or human uses to specific areas – to application – the implementation of actions on the ground or in the water. Plans benefit from being adaptive for several reasons, including (Pressey et al., 2013): (1) the opportunity to fine-tune the plan so the intended actions better fit the context, feasibility, and management limitations of a region; (2) to correct for mistakes in data, or change the plan based on surprises not foreseeable in the planning process; (3) to improve decisions, based on accumulated new data; and (4) to incorporate learning about the social-ecological systems in which the plan is being implemented. However, despite the many potential benefits of adaptive planning, spatial plans for natural resource management have been largely static. This is often because there is a lack of commitment to and capacity for an ongoing adaptive process, with potentially high political and economic costs. Instead, multiple institutions commit to planning for a short period, often too short for effective implementation, and sometimes not learning from the processes previously undertaken by others (Holness and Biggs, 2011).

Spatial planning is frequently undertaken as a one-off project, resulting in plans that quickly become outdated and fail to be implemented or to fully achieve their objectives. Yet, to capitalize on the substantial investment in spatial planning around the world, plans must be seen, not as static products, but as starting points for ongoing adaptation and refinement (Pressey et al., 2013), even if adaptation involves additional costs. Adaptive planning is necessary to ensure that spatial plans remain relevant, living documents, continually adjusted in response to improved understanding of opportunities for implementation, new data, revised objectives, and feedback on the effectiveness of implemented management actions (Grantham et al., 2009; Pressey et al., 2013). Examples of ways in which spatial planning can be adaptive include updating plans in response to additional data from consultation processes (EKZNW, 2012; Lewis et al., 2003), reviewing and revising plans post-implementation (Henson et al., 2009; Weeks and Jupiter, 2013), and iteratively modifying plans to better address local or regional objectives (Harris et al., 2011; Mills et al., 2010). Adaptive spatial planning can occur either where plans are purposely conceived as experiments (c.f. 'active' adaptive management; McCarthy and Possingham, 2007) or where plans are progressively updated in response to new information through a "learning by doing" approach (Walters and Hilborn, 1978).

Salafsky et al. (2002) identified three levels at which natural resource management can be adaptive: the project, the portfolio, and the discipline. Project-level adaptive management involves a cycle of planning, implementation, monitoring, and evaluation (Plummer, 2009) implemented within a single location (analogous to "Conservation Action Planning" undertaken by The Nature Conservancy; Dudley et al., 2007). For example, the level of surveillance of a marine no-take zone might change in response to increasing numbers of poachers. Portfolio-level adaptive management involves a similar cycle undertaken across a network or portfolio of sites (e.g. management implemented across several locations which, in the case of a network, would be complementary). We conceive the spatial component of this portfolio-level planning and adaptation cycle as 'adaptive spatial planning'. Discipline-level adaptive management is described as the result of knowledge accumulation by scientists and stakeholders around the world creating a body of knowledge and fostering improved decision-making. Discipline-level adaptive management, as described by Salafsky et al. (2002), is much broader than the scale at which conservation planning or marine spatial planning are undertaken (Salafsky et al., 2002), and might progressively refine the perception of best-practice in spatial planning.

While much has been written about adaptive management at the project scale (e.g. Lee, 1999; McLain and Lee, 1996; Walters, 1997), less attention has been given to understanding adaptive spatial planning (i.e. adaptive management at the portfolio scale). A substantial technical literature on evaluation and adaptation at policy and program levels emerged in the late 1980s out of the urban planning domain, but with no explicit spatial dimension (e.g. Patton, 1997; Talen, 1996). Incorporating the spatial component, Kato and Ahern (2008) explored the potential of an adaptive approach to landscape planning for water resource management and, in the process, identified key concepts and principles for adaptation to address uncertainty. Grantham et al. (2009) discussed the importance of incorporating explicit learning processes into conservation planning frameworks, highlighting the critical need for embracing adaptation in planning. Pressey et al. (2013) reviewed the reasons why plans should be adaptive, and the conceptual, operational, institutional, and policy implications of plans being, or needing to be, dynamic. Yet, we are aware of only one study focused on describing on-ground challenges and solutions to adaptive conservation planning: the one describing the South African National Parks experience (Holness and Biggs, 2011). Here we add to this literature by synthesizing the challenges encountered in undertaking adaptive spatial planning in five marine regions. In addition to expanding the set of practical examples, we use our case studies, in combination with previous literature on conservation planning and more broadly, to identify the broad set of key challenges applicable to adaptive planning in general.

We assess the reality of adaptive spatial planning for marine resource management through five case studies (Table 1): Kubulau District, Fiji; Southeast Cebu, Philippines; the Great Barrier Reef, Australia; central California, USA; and KwaZulu-Natal, South Africa. The foundation for this paper comprises discussions at two meetings on adaptive spatial planning for marine conservation: the first, a workshop at the offices of WWF-US in 2010; and the second, a symposium at the International Marine Conservation Congress in Victoria, Canada, in May 2011. These discussions led us to interrogate each case study against the general model for adaptive planning found in the literature. Our aim is to provide guidance for others to refine and adapt these examples for their own situations.