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Consistency and use of information about threats in the participatory process for identification of priority conservation areas in the Brazilian Amazon

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ABSTRACT

Despite the increasing number of scientific papers on the subject, conservation planning has failed to actively prioritise the creation of new protected areas. Strategies proposed to increase the creation of new protected areas based on conservation plans include broad stakeholder participation in decision-making processes in order to include their concerns and facilitate social acceptance of proposed actions. However, there are controversial views about the effectiveness of stakeholder participation. The quality of the decision depends both on the information used by stakeholders and on how it is used, so it is necessary to evaluate both these aspects of a decision-making process. Threats are intrinsically related to conservation decisions because they are more easily understood by people than biodiversity values, and they can affect both decisions and outcomes of conservation actions. This article analyses how information about threats was used in the decision-making process conducted by the Brazilian Government in 2006 to indicate priority areas for the conservation of the Amazon biome. We first verified the consistency of the information on threats attributed by stakeholders to these new priority areas, and then assessed whether the existence, levels and types of threats influenced the choice of areas for conservation. The results showed that there were some successes in recognising threats, but also many inconsistencies, especially in assigning levels of intensity for some types of threats such as fishing. The decision-making process also did not fully use available information to indicate areas for conservation. The lack of understanding on the motivation behind these inconsistencies could suggest the presence of political opportunism. A more quantitative approach to assigning priorities is needed: one that is less dependent on the individual input of stakeholders and more accurately reflects the actual emergency status of proposed areas. This indicates that greater effort should be allocated to combining a participatory approach with a robust decision support system.

1. Introduction

The establishment of protected areas of high biotic value is a consolidated practise. Initially, such areas were created mainly to protect scenic and recreational value, without concern for the preservation of regional biota (Pressey, 1994). However, new requirements for species and habitat protection have resulted in the development of new methodologies with the main objective of increasing biodiversity representativeness, including ecosystems, communities, populations or species (Margules and Pressey, 2000).

Including knowledge on threats is essential for planning conservation measures, and consideration of the various types of threats and their levels may be an important tool for the production of effective and feasible plans (Scholz, Steinback, Kruse, Mertens, & Silverman, 2010). As a result, defining the elements of biodiversity and the processes that threaten its existence became the basic elements of the methodology known as systematic conservation planning (Margules and Pressey, 2000).

A lot of time, money and effort have been allocated to conservation planning (Margules and Pressey, 2000). However, despite the increasing number of scientific papers on the subject, in many cases, the knowledge arising from such papers has not been converted into actions. About two-thirds of scientific production in this field correspond to plans not implemented, revealing a problem with the adoption of conservation science in the real world (Knight and Cowling, 2007). One of the strategies proposed to increase the

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effectiveness of conservation planning is to incorporate socioeconomic information and aspirations in order to ensure public support and, thereby, maximise benefit, i.e. conserve areas known as "hotspots" with large numbers of species under a high level of threat (Polasky, 2008).

Consolidated data on ecology, costs, human population density and human expectations facilitate feasibility assessments for the implementation of systematic plans (Game et al., 2011; Knight, Cowling, Difford, & Campbell, 2009). Moreover, the consideration of social values also contributes to the development of strategies aimed at reducing uncertainty in the performance of actions, which can be decisively influential in the creation and management of protected areas (Brandon, 1998). However, the coincidence of areas of high conservation value and with strong social support is not always realistic, usually revealing more obstacles to the creation of new protected areas (Bryan, Raymund, & Crossman, 2010).

The involvement of stakeholders from the early planning stages is one of the main suggestions to increase the chances of successful implementation of conservation plans (Ban, Picard, & Vicent, 2009; Walmsley and White, 2003). Misinformation used by local and regional actors regarding biodiversity value hinders the realisation of actions. So, in theory, the definition of conservation actions in line with social needs combined with the compilation and analyses of data on conservation values and threats in a process of spatial prioritisation could increase the effectiveness of plans. This process, which could use several variables in the search for viable conservation actions, is known as opportunism, and favours complementarity in evaluating conservation value with data on costs and human and social capital (Knight and Cowling, 2008).

Some authors argue that different types of opportunism may influence the process of identifying areas for conservation (e.g. Pressey and Bottrill, 2008). One is 'informed opportunism', which reflects a balance between priorities based on representation and persistence of biodiversity and real world constraints. It recognises that the exclusion of threats is a key element to the success of conservation plans and that the needs and aspirations of people must be satisfied (Pressey and Bottrill, 2008). Another is 'political opportunism' or 'uninformed opportunism', which refers to the creation of reserves in areas that do not significantly contribute to the conservation of biodiversity, and ultimately give rise to missed opportunities for the conservation of the areas most in need of protection. In this type of opportunism, actor goals exert a strong influence on decisions. As a result, the decision can reflect a compromise between competing interests rather than a collective search for optimal solutions (Newig & Fritsch, 2009). The persistence of political opportunism in the creation of conservation areas has negatively affected the maintenance of biodiversity, resulting in a misleading impression of progress in conservation (Pressey and Bottrill, 2008).

The participatory approach is usually also a way of incorporating both traditional and scientific knowledge in the decision-making for generating biodiversity conservation plans, and can result in good outcomes when applied to these processes (Knight et al., 2009). Some steps have been proposed for the efficient incorporation of knowledge from different sources in decision-making processes. The first is to recognise the existence of different types of knowledge associated with the different stakeholders. Then, it is recommended to validate both traditional information and scientific knowledge, and combine the information from these different sources in a transparent manner to support the shared decision-making process (Fazey, Fazey, Salisbury, Lindenmayer, & Dovers, 2006; Sutherland, Gardner, Haider, & Dicks, 2013). The conservation of the Brazilian Amazon has, for many years, been a concern of environmentalists because this biome comprises the largest expanse of remaining neotropical rainforest (Martino, 2007). Unlike other Brazilian biomes, most of the Amazon is still relatively pristine, offering a great opportunity for the creation of reserves that effectively contribute to the conservation of their species and environments. The Amazon forest provides important ecosystem services both locally and globally, which include biodiversity conservation, carbon storage, and regulation of the regional water cycle (Houghton et al., 2000). Its vast area and wide variety of ecosystems harbour the greatest biotic diversity in the world (Martino, 2007; Mittermeier, Werner, Ayres, & Fonseca, 1992), but the complexity of its environments and a lack of scientific knowledge make it difficult to reliably estimate its biodiversity (Peres, 2005).

There is strong national and international political pressure driving the implementation of a network of protected areas to conserve the biodiversity and environmental services of the Amazon's forests. In comparison with other biomes, the story of Amazonian conservation is unique, since a large proportion of its existing reserves were created according to some planning. While there have been some international initiatives, most reserves arose from Brazilian government plans that indicated the areas to be conserved (Schulman et al., 2007). The latest initiative to indicate priority areas for conservation in the Brazilian Amazon was conducted by the Brazilian Ministry of Environment (MMA) in 2006. The process included a compilation of spatial data transferred by various agencies and the participation of various stakeholders (government officials, academics, environmental organisations, social movements, traditional communities and private sector representatives), which enabled negotiations incorporating several points of view (MMA, 2007). This process was conducted in two stages. The first consisted of technical meetings that aimed to establish the features and targets to be protected, divided into three broad categories: biodiversity (endemic species, endangered species, watersheds, etc.); sustainable use (species of economic and/or medicinal importance, or of traditional/cultural importance, etc.); and, processes (environmental services, climate maintenance, biogeochemical cycles, etc.). The methodology of systematic planning was applied to these targets to generate a "biological importance map", which did not include any form of threat assessment (MMA, 2007). Priority areas for conservation were defined in a second phase of "regional seminars", which used the map from the first phase as guidance. Differently from the first phase, where most participants were experts from different backgrounds (social, biology, earth sciences), in the second phase, the meetings included people representative of many different groups of interest, including social organisations, indigenous, agribusiness and industry. A complete list of participants can be found at MMA (2007). At these seminars, participants were grouped by geographic region of interest. Other local data (such as the location of cities, deforestation, and maps with demands from different communitarian associations, etc.), were combined with the biological importance map to establish the final contours for the priority areas. After completing this process, each area was characterised in terms of threats, urgency, opportunity and degree of conservation importance (from amongst High, Very High or Extremely High) (MMA, 2007).

The result of this process was the assignment of 824 priority areas (Fig. 1), which comprised 80% of the Amazon (MMA, 2007). Amongst these, 490 were already protected, but needed to be included on the map according to government guidance. A required action was assigned to each of the 334 new areas (i.e. not yet protected), such as the creation of protected areas of strict preservation, sustainable use or of undefined category, or even the demarcation of Indigenous Lands and Quilombola Territories (land assigned to slave descendants), amongst other actions.

This identification of priority areas for conservation of the Amazon represented one of the broadest consultation and participatory decision processes in conservation planning, involving more than 300 people and, therefore, represents a unique opportunity to