

Evaluating conflict potential in the marine and coastal areas of the Kimberley region of northern Australia through public participation GIS

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Marine spatial planning (MSP) has been emerging as an approach to plan and maintain a balance between different human uses and conservation goals. Large, remote areas present a number of challenges for conservation managers. The Kimberley region in northern Western Australia extends ten degrees of longitude, eight degrees of latitude, and in our study spanned over 13,300 km of complex coastline. The region is remote, with a low population, and a history of economic development including agriculture, mining, fishing, and more recently oil and gas exploration. It is also renowned for its rich Aboriginal culture and heritage, biodiversity and wilderness (Wilson, 2014; Wilson, 2013). Most conservation planning, including MSP, suffers from the lack of social data (St Martin and Hall-Arber, 2014), hence the aim of this study was to evaluate, through the well established method of public participation GIS (e.g. Brown and Pullar, 2012), areas of conflict potential using human values associated with the marine and coastal region of Kimberley.

Methods

The first step of the investigation was field based; where a range of stakeholders were interviewed to elucidate values they held for the area. Participants marked locations (polygons) on hard copy maps and through the interview process, associated one or more values they held with each place. The second step in our analysis was to generate areas of higher than average intensity of each particular value (heat maps). The third step was to develop conflict matrices, with values categorized as consumptive and non-consumptive, and the degree of conflict potential based on the extent of social norm violation and goal interference, as determined by the researchers. Fourthly, cross tabulation of the values and plotting using a grid-based net across the study region was used to generate conflict potential maps. Lastly, the boundaries of current and proposed marine protected areas were superimposed across the conflict potential maps.

Results and Discussion

Seventeen held values were elucidated from the 167 interviews with stakeholders who either visited or lived in the Kimberley region. Most valued were biodiversity, the physical landscape and Aboriginal culture. This set of 17 human values included

consumptive, non-consumptive, direct and indirect uses (MEA 2005). Our results show that firstly, the entire space within the study area was valued for one or more values. Secondly, at least a third of existing marine protected areas were mapped as experiencing medium to high conflict potential (Fig 1.). These were all near-shore, with large, remote offshore marine protected areas showing very little evidence of conflict potential. As Aboriginal culture, biodiversity and physical landscape values were most marked by the respondents, careful consideration of the social impacts of future developments associated with access is essential. Our findings also highlight that there is an important base for societal support for marine protected areas in the region.

Thirdly, participatory mapping based on interviews provides social data for the 'missing layer' in MSP (St Martin and Arbor-Hall, 2008). Such data are needed if the social concerns of stakeholders are to be recognized and included in spatial planning. The other methodology contribution of our approach is a means for making visually explicit where conflict is most likely.

Conclusions

Participatory mapping complemented by extensive field interviews is a powerful method of evaluating existing human values over large marine spaces and provides quantitative inputs into modeling of conflict potential in marine spatial planning.

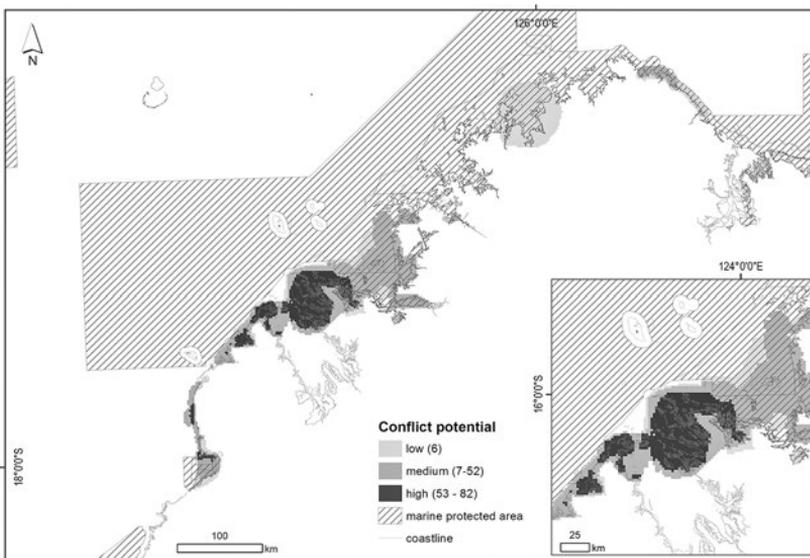


Figure 1. Illustration of conflict potential based on direct use consumptive values and all other values in the context of existing marine protected areas along the Kimberley coast.



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