



Food for Thought

Linking MPA effectiveness to the future of local rural fishing societies

Xavier Basurto*

Duke Marine Laboratory, Nicholas School of the Environment, Duke University, Beaufort, NC 28516, USA

*Corresponding author. tel: +252 504 7540; fax: +252 504 7648; e-mail: xavier.basurto@duke.edu.

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In the context of the debates about the effectiveness of marine protected areas (MPAs) it is usual to ask how humans affect MPA effectiveness. Here I flip the question: How MPAs can affect the future of local rural societies? Without a supportive society the likelihood of MPAs' long-term effectiveness would be compromised. Our approach links theories of human prosociality and antisociality to MPA effectiveness and mixes descriptive qualitative and quantitative field experimental techniques.

We studied coastal MPAs aimed at protecting biodiversity and characterized for having buffer and a core no-take fishing areas. MPAs constitute land/sea use policies because their establishment changes the site's rules and fishing practices reshuffling stakeholders' balance of winners and losers. For instance, fishers might lose while ecotourism operators might gain access and economic benefits. It is possible too that MPA's process of formation and implementation results in an increase of prosociality like cooperation between stakeholders, facilitating them to agree on regulations benefitting them economically and enabling the emergence of traditions of environmental stewardship and MPA effectiveness. The reverse is possible: the MPA could promote incentives for antisocial behaviour like overt conflict leading to the loss of local stakeholders' capacity to engage on mutual cooperation on issues of strategic importance to the effectiveness of the MPA, like monitoring and enforcement. In extreme cases, the loss of capacity for mutual cooperation could "spill-out" into other key areas of civic life, affecting local inhabitants' capacity to develop agreements about the provision of a range of environmental goods and services like clean water for household consumption, threatening the overall viability of the local civic

society in question, and thus, the long-term effectiveness of the MPA (Figure 1).

No human is entirely prosocial or antisocial. These behaviours cannot be easily untangled from each other in daily interactions. This artificial separation is useful only for analytical purposes. Take for instance the concept of "*friendly rivalry*" we have coined in our work to describe the seemingly contradictory behaviour among fishers to be a friend with other fishers when at sea, particularly when it comes to conviviality and safety issues, but at the same time enjoy to be competitive with one another about finding the best fishing sites and amount of catch landed at the end of a fishing journey. In the words of one of our interviewees: "I always want to be a friend to everyone, and I always want to beat everyone to land the most catch". Prosocial and antisocial behaviours such as *friendly rivalry* are part of daily life in rural fishing communities. Taking *friendly rivalry* as the norm behaviour in fishing communities, our experimental work found that at MPA sites in Baja California Mexico fishers and non-fishers from the same community were statistically significantly more prosocial *and* more antisocial with each other than fishers and nonfishers from communities outside of the influence of MPAs. After controlling for a number of different factors we attributed the effects of increased prosociality *and* antisociality among fishers *and* non-fishers alike to the presence of the MPA. At first glance finding that MPAs heighten prosociality and antisociality might seem like a contradiction, but one needs to remember the concept of *friendly rivalry* to realize it is not. What our findings suggest is that MPAs turned *friendly rivalry* behaviour into a heightened state. We refer to individuals within MPAs as *hyper competitive*

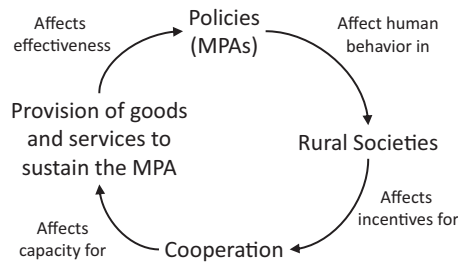


Figure 1. Illustration of how MPAs affect human behavior and how in turn human behavior affects MPA effectiveness.

cooperators, to highlight that their behaviour is no longer typical of *friendly rivalry*. Most importantly, the heightened competition we observed does not seem to preclude members of the fishing community's willingness to cooperate with one another, and thus does not seem to have negative effects for MPAs effectiveness, or at least not yet.

Our experiments constituted controlled interactions among individuals based on game theoretic predictions and standard procedures from the field of behavioural economics. Please refer to Basurto *et al.* (2016) for definitions and details about our methodological procedure.

What are the implications of our findings for MPA effectiveness? Even though we studied all MPAs in Baja California necessarily our sample size is limited and our findings bounded to this region. We attribute prosocial behaviour to two mechanisms: Repeated 'trust-building' exercises conducted over more than 15 years in the local population about the importance of "working together" for the common good; and to the mandate that all fishing within the MPA be organized within fishing cooperatives,

a kinship form of organization that facilitates prosociality. At the same time, we attributed antisocial behaviour (through interviews, surveys, and field experiments) to individuals' desire to get ahead of others, either by making more money or otherwise. It was not attributed to sentiments of vengeance, conflict, etc. The explanation for our finding of simultaneous prosociality and antisociality among members of the fishing community is more tentative. One possibility is that we are tapping into human behaviours that emerge when a local community starts to economically diversify, such as when a MPA is established. It is likely easier to maintain *friendly rivalry* when there is little economic diversification, everyone in the community depends on fishing, and everyone experiences the good and bad fishing seasons together. When new sources of income become available, some fishers might now be part-time tourism operators and do not experience the same economic constraints during the low fishing season. These differences might heighten sentiments of envy and jealousy eventually leading to antisocial sentiments of hypercompetition. In our particular setting, the presence of hypercompetition did not eclipse cooperation and community members were still able to work together on issues beneficial to overall MPA effectiveness. Yet, there are plenty of cases of MPAs in the literature where antisociality have eclipsed incentives for prosociality, endangering the long-term sustainability and effectiveness of the MPA. Our study provides a novel angle to look at MPA effectiveness by informing conservation planners' need to take issues like social and economic inequality more seriously when considering siting and engagement processes with local fishers.

References

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