

Bias in evaluating the effects of marine protected areas: the importance of baseline data for the Galapagos Marine Reserve

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Abstract

Analysis of ecological baseline data collected for key resource species within the Galapagos Marine Reserve indicates that variation in animal density associated with the location of fully protected zones can be comparable to protected area effects. Even with a high level of interspersed conservation, tourism and fishing management zones, major differences in densities of economically important species were evident between zone types prior to enforcement of fishing restrictions. Densities of the most valuable fishery resource, sea cucumbers, were three times higher in zones that remained open to fishing compared to 'no-take' conservation zones, and densities of sharks were five times higher in tourism zones than fishing or conservation zones. These results highlight bias in the socio-political processes that can accompany selection of marine protected areas, where fishers attempt to minimize perceived impacts on their livelihood by locating large protected zones in resource-poor areas, and tourism operators and sport divers argue for protection of areas containing atypically-interesting features. Bias in the location of fully protected zones can seriously confound 'control-impact' field investigations when data prior to prohibitions on fishing are lacking, including meta-analyses, which are dominated by such potentially systematically biased studies.