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Multispecies perspective for small-scale fisheries management: A Trophic analysis of La Paz Bay in the Gulf of California, Mexico

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Given the complexity of small-scale fisheries and the difficulties for applying classical assessment methods, the status of these fisheries has been poorly documented. In this study, we used a trophic mass-balance model as an analytical alternative to evaluate the trophic impacts of small-scale fisheries as a whole on the marine ecosystem and their implications for ecosystem-based management, taking as a case study the La Paz bay and adjacent fishing grounds (BALAP) located in the Gulf of California, Mexico. Maturity indices, like ascendency and primary production to respiration ratio, indicate that the BALAP ecosystem is in a developing stage. This seems to be closely related to the reported two-season climatic regime that results in a nutrient supply characterized by an oscillating upwelling. The trophic model predicts a predominance of bottom-up control in the food web, which is congruent with the immaturity of the ecosystem. In this context, fisheries seem not to cause a significant impact to the ecosystem as a whole; however, target species show signals of being fully exploited by fisheries in the system. Red snapper and sharks showed the highest exploitation rates in the ecosystem. Based on these results, we discuss the current stock concept as a population-based management unit and the necessity for defining an ecosystem-based management unit.

Palabras clave: Mass-balance ecosystem analysis, Fisheries interactions, Small-scale fisheries management