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Optimal management scenarios for the artisanal fisheries in the ecosystem of La Paz Bay, Baja California Sur, Mexico

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In La Paz Bay, two artisanal fisheries operate, one based on hook-and-line, targeting snappers and groupers, and the other mainly based on gillnets, targeting species such as tilefish and haemulids. A shrimp fishery, which is not permitted to expand, also operates. We analyzed various harvesting strategies with the Ecopath with Ecosim modelling software, using catch-and-effort data for target species to fit simulated biomasses. Optimal harvesting strategies for artisanal fisheries were explored using social, economic and ecological criteria. Several harvesting strategies were simulated: continuation of the current state of the fisheries, optimizing economic and social (employment) criteria, using maximum sustainable yield (MSY) as a goal of management, and optimization of an ecological criterion when necessary. Optimization of current fisheries and economic and social criteria, and the MSY resulted in depletion of some stocks and in no-realistic increases in fishing effort. Combinations of economic-ecological, social-ecological and economic-social-ecological criteria did not result in stock depletion. However, some of these scenarios resulted in unrealistic choices, especially large increases in gillnet fishing effort. Among the reasonable choices, a strategy of increasing the hook-and-line fishery effort by a factor of 1.5 and the gillnet effort by a factor of 2.8, appeared to be potentially applicable, to increase efficiency of the artisanal fisheries.

Palabras clave: Tendencias espaciales, La Paz Bay, Ecopath with Ecosim, Optimization, Harvesting, Artisanal fisheries