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Ecosystem model predictions of fishery and conservation trade-offs resulting from marine protected areas in the East China Sea

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The East China Sea (ECS) supports a highly productive fishery and is rich in biodiversity, but economic development in China and peripheral countries has led to intensifying anthropogenic impacts in the ECS. In response to this the Chinese government has introduced a range of marine spatial management measures. A spatial ecosystem model (Ecospace) of the ECS was developed to examine (1) the likely nature of trade-offs between fishery and conservation goals resulting from the marine protected areas (MPAs) and (2) possible trade-offs within the fishery sector resulting from the MPAs. The results suggest that overall the fishery has benefited from all of the simulated MPAs, whereas, although they defy categorical interpretation, effects of the MPAs on biodiversity and ecosystem structure are variable. Simultaneous application of several metrics of ecosystem status indicates that the perceived effect of an MPA on ecosystem status can depend on which metrics for ecosystem status are used, and how these metrics are interpreted. The simulations indicate that a fisheries and conservation outcome beneficial to all is possible, but not guaranteed, with the creation of an MPA. Total landings and profitability are predicted to have increased as a result of each of the MPAs, albeit at the cost of reduced landings and profits to some sectors of the fishery. This study demonstrates the benefits of the additional information relating to biodiversity, ecosystem structure and within fishery dynamics available from spatial ecosystem models compared to the single species models typically used to examine MPA effects. However, the use of a more complex ecosystem model introduces additional uncertainty in model interpretation

Palabras clave: East China Sea, Ecospace, fishery, marine protected areas, trade-offs

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