Spatial Behavior, Marine Reserves, and the Northern California Red Sea Urchin Fishery

By

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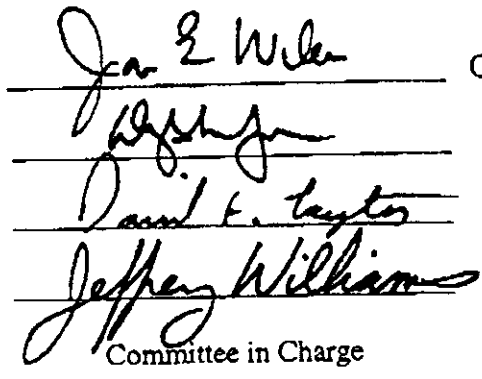

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ABSTRACT

Resource scientists have recently shown virtually unqualified support for managing fisheries with marine reserves, signifying a new resource management paradigm that recognizes the importance of spatial processes in both untouched and exploited systems. Biologists promoting reserves have based such support on simplifying assumptions about harvester behavior. This thesis shows that these naïve assumptions about the spatial distribution of fishing effort before and after reserve creation severely bias predicted outcomes, generally overstating the beneficial effects of reserves.

This thesis presents a fully integrated, spatial bioeconomic model of the northern California red sea urchin fishery. The model is the first attempt to marry a spatially explicit metapopulation model of a fishery with an empirical economic model of harvester behavior. The biological model is calibrated with parameters representing best available knowledge of natality, growth, mortality, and oceanographic dispersal mechanisms. The model of spatial behavior is estimated using a large panel data set of urchin harvester decisions, which are recorded in logbooks and on landings tickets.

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