Paul R. Armsworth, University of Tennessee, Knoxville, TN, USA
Barbara A. Block, Stanford University, Monterey, CA, USA
Joan E. Roughgarden, Stanford University, Palo Alto, CA, USA

Modeling a time-area closure as a tool for managing US tuna fisheries

We analyze a multispecies, multifishery bioeconomic model of US tuna fisheries. Specifically, we examine conditions for which implementing a time-area closure would increase the economic value of fisheries, focusing on a case study application in the Gulf of Mexico. Pelagic longline fishermen catch the highly valued Atlantic bluefin tuna (Thunnus thynnus, Scombridae) on their Gulf of Mexico spawning grounds while fishing for Atlantic yellowfin tuna (Thunnus albacares). We identify management strategies that would maximize the net present value of tuna fisheries, allowing for discounting of future benefits and costs relative to the present. If past fishing mortality rates continue in Atlantic bluefin tuna fisheries, implementing a time-area closure in the Gulf of Mexico incurs economic costs. However, the net present value of the fisheries is increased by implementing a time-area closure as part of a broader commitment to rebuild the heavily depleted bluefin population, provided the discount rate and the costs of such a closure in forgone fishing opportunities are not too large.