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**Can U.S. Gulf of Mexico Pelagic Longline Spatial Closures Meet Management Objectives? A Policy Exploration Using an Atlanits Ecosystem Model**

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**Abstract**

The U.S. Gulf of Mexico has two pelagic longline spatial closures where some highly migratory predators aggregate for spawning and/or foraging: one permanent (DeSoto Canyon), and one seasonal (Spring Closure). Management objectives of these closures include reducing catch and rebuilding biomass of bycatch groups (i.e., Atlantic billfish, bigeye tuna, some pelagic sharks, prohibited sharks, and sea turtles) and incidental species (i.e., bluefin tuna) while maintaining catch of target groups (i.e., swordfish, yellowfin tuna, bigeye tuna, skipjack tuna, albacore, dolphin fish, wahoo, and some sharks). A policy exploration was conducted using the Gulf of Mexico Atlantis ecosystem model to investigate if the closures could achieve management objectives, and to evaluate potential ecosystem impacts. Performance measures corresponding to management objectives and some ecosystem aspects (i.e., average individual weight, proportion mature, pelagic:demersal ratio, and ecosystem biodiversity) were monitored. The model estimated that DeSoto Canyon was more successful at achieving management objectives than Spring Closure. Both closures reduced Gulf-wide catches of some bycatch and incidental groups (especially green turtles and miscellaneous tunas) with little reduction to total catch of target groups. Catch of targeted yellowfin tuna increased with the closures. Neither closure caused meaningful increases in biomass of bycatch or incidental groups, but there were increases in biomass of some targeted groups (especially yellowfin tuna). DeSoto Canyon influenced ecosystem performance metrics while Spring Closure did not. This study demonstrates the utility of an existing ecosystem model for rapid appraisal of the potential impacts of spatial closures.

**Keywords:** Gulf of Mexico, spatial management, highly migratory species, ecosystem modelling

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