

Preliminary insights into the spatiotemporal impacts of habitat change on two upper-trophic level estuarine predators

Conocimientos preliminares sobre los impactos espaciotemporales del cambio de hábitat en dos depredadores estuarinos de nivel trófico superior

A perçus préliminaires des impacts spatio-temporels du changement d'habitat sur deux prédateurs estuariens de niveau trophique supérieur

LINDSAY MULLINS^{A,B,*}, ERIC SPARKS^{A,C}, KRISTINE EVANS^D, JOHN CARTWRIGHT^B, JOHN MARESKA^E, AND MARCUS DRYMON^{A,C}

^aCoastal Research and Extension Center, Mississippi State University, Biloxi, Mississippi USA ^bNorthern Gulf Institute, Starkville, Mississippi, USA ^cMississippi-Alabama Sea Grant Consortium, Ocean Springs, Mississippi, USA ^dDepartment of Wildlife, Fisheries, and Aquaculture, Mississippi State University, Mississippi State, Mississippi, USA ^eAlabama Department of Conservation and Natural Resources, Dauphin Island, Alabama, USA, *le426@msstate.edu

EXTENDED ABSTRACT

Nearshore fisheries are highly vulnerable to the impacts of climate change and other stressors, such as conversion to urban land cover and overfishing, due to the direct pressure placed on coastal aquatic systems. Studies have demonstrated that coastal fish species distributions have altered in response to warming water temperatures associated with climate change, along with other traditional water quality parameters. Few studies, however, have evaluated these variables in conjunction with the impacts of additional forms of habitat change and degradation, such as conversion to urban land cover. A long-term gillnet survey has been conducted along the coastline of Alabama for 20 years, providing an opportunity for this kind of analysis on an appropriate timescale. Preliminary results indicate an increase in two upper-trophic level estuarine predators: juvenile bull sharks (*Carcharhinus leucas*) and gafftopsail catfish (*Bagre marinus*). Boosted regression trees were used to identify and quantify the impacts of water temperature, depth, salinity, dissolved oxygen, riverine discharge, Chl-a, and percent urban cover change on these changing abundances. Additional analyses will also assess changing trends in model variables over time and identify locations of significant relative abundance (i.e. hot spots) for the species along the coast. These results may demonstrate the impacts of changing environmental conditions on the abundance and distribution of two upper-level estuarine predators, providing insight into what may be early-stage indications of a coastal aquatic community response to climate change and habitat degradation.

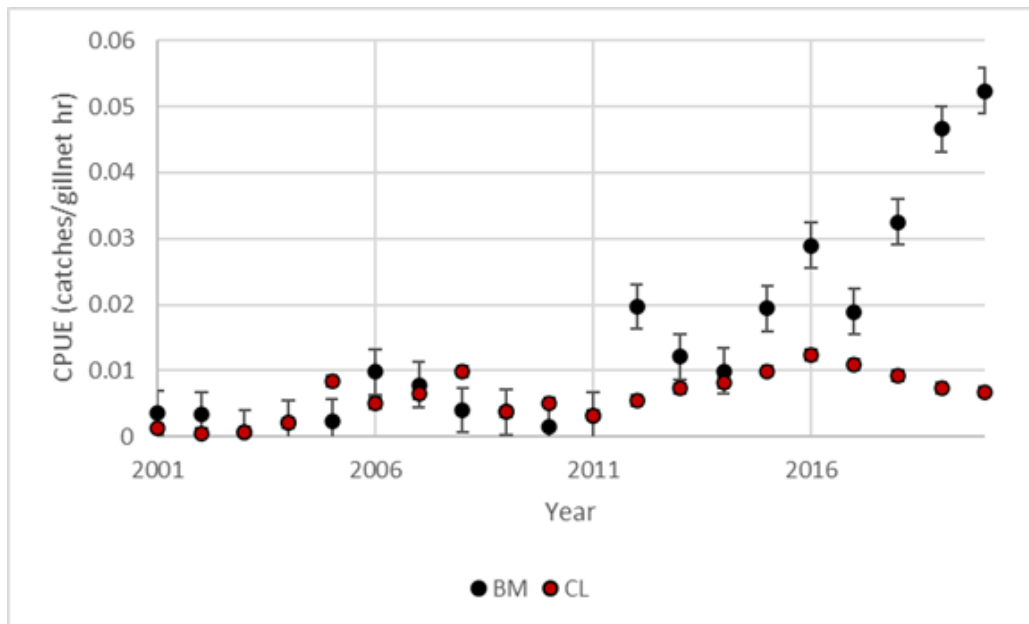


Figure 1. Annual CPUE and SE of gafftopsail catfish (BM) (n=1117) and bull sharks (CL) (n=428).

KEYWORDS: habitat change, coastal fisheries, elasmobranchs, predators, spatial ecology

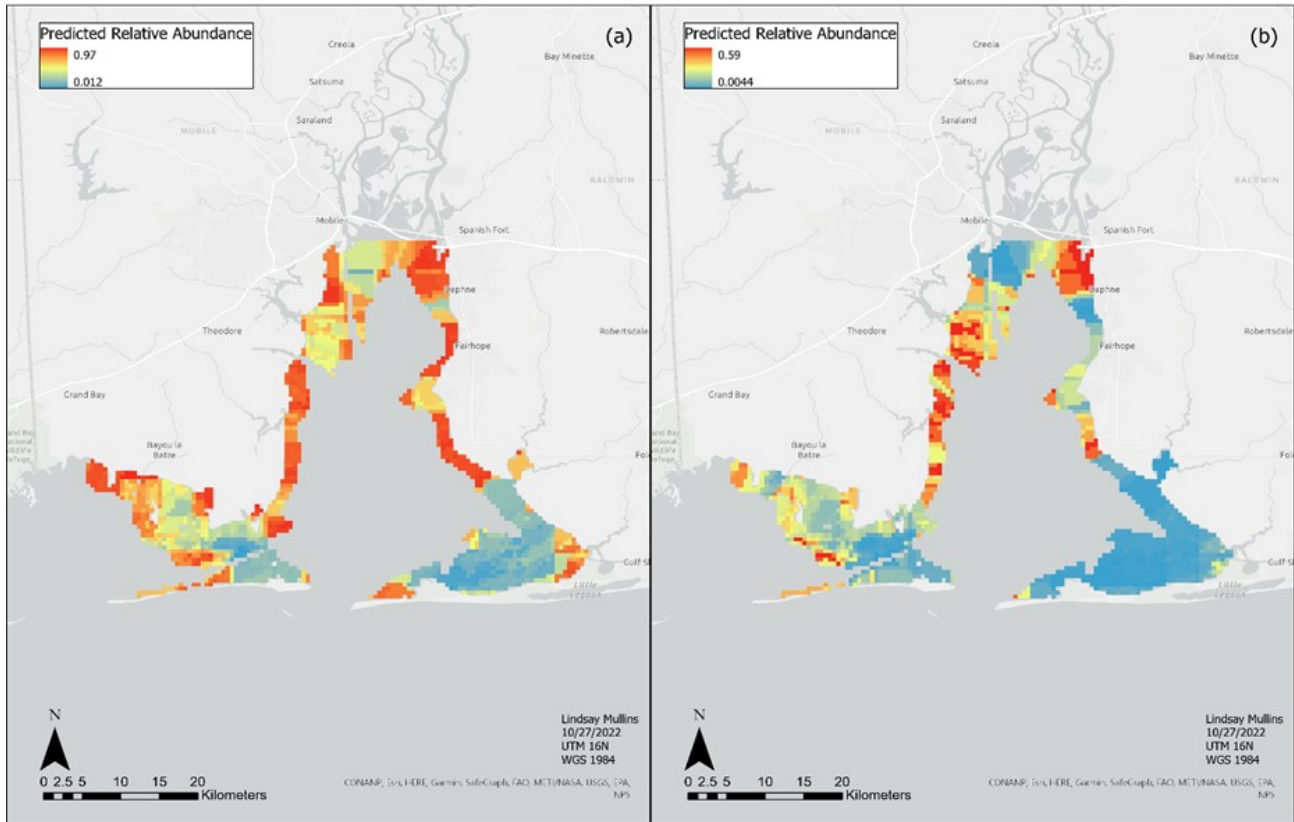


Figure 2. Species distribution model displaying suitable habitat for (a) gafftopsail catfish and (b) bull sharks according to BRT results.