

Assessing aquatic community composition, habitat, and environmental conditions in the northern Gulf of Mexico over a three decadal period: 1986-2015.

Martin O'Connell
University of New Orleans
22 August 2017

While the northern Gulf of Mexico has many productive estuarine-based fisheries, over the past two decades it has experienced large-scale natural and anthropogenic disasters. To assess its aquatic organisms and habitats we analyzed fishery-independent data over three decades (1986-2016) during spring (April-June) and fall (September-November) from southeastern Louisiana, Mississippi Sound, and coastal Alabama. Multivariate community analyses revealed significant differences in species composition among the three states in trawl collections for both spring (ANOSIM, $R = 0.543$, $p < 0.001$) and fall (ANOSIM, $R = 0.722$, $p < 0.001$) while beach seine collections were not significantly different across the states for either the spring (ANOSIM, $R < -0.06$, $p = 0.61$) or fall (ANOSIM, $R < 0.167$, $p = 0.14$). The greatest habitat factor contributing to these differences was the presence of more shell substrate at Louisiana sites (LINKTREE analysis, $B\% = 68$, $p < 0.05$). Using data on individual species, we tested for changes in abundance over time. While 31 species exhibited significant (INDVAL, $p < 0.05$) declines in at least one state-season-gear scenario, Blue Crabs experienced the most declines overall with decreases in five trawl scenarios. Three species of flatfishes (Bay Whiff, Fringed Flounder, and Blackcheek Tonguefish) also experienced multiple declines. Louisiana trawl sites became significantly more saline in both spring (ANOVA, $p = 0.31$) and fall (ANOVA, $p = 0.02$) while Mississippi spring trawl sites (ANOVA, $p = 0.02$) and Alabama trawl sites for both spring (ANOVA, $p < 0.01$) and fall (ANOVA, $p < 0.01$) became significantly warmer.