

Is it too hot for Summer? Identifying the impact of spatial oceanographic anomalies (sea surface temperature) on the Summer flounder (*Paralichthys dentatus*) in the U.S. Mid-Atlantic Bight

Samar Deen, Patrick Sullivan

This study examines the spatial densities of the summer flounder (*Paralichthys dentatus*) relative to sea surface temperature (SST) for the years 1985-2015. The objective of this study is to look for a significant poleward shift in the distribution of the Mid-Atlantic summer flounder fishery in response to warming ocean temperature. In order to look for trends in the redistribution of the summer flounder we explore the conditional autoregressive and the simultaneous autoregressive models to examine whether spatial correlation has an effect on the estimates of abundance. The abundance data is based on the National Marine Fisheries Service, National Oceanic and Atmospheric Administration spring and fall trawl surveys. The SST data is derived from the Advanced Very High Resolution Radiometer Pathfinder SST time series (1985-2009) Version 5.0, monthly products on a 4km global grid and the Aqua MODIS 11 μ nighttime SST time series (2010-2015), monthly 4km products, provided by NOAA's National Environmental Satellite, Data, and Information Service. Previous studies that have examined the trawl data up until 2008 have indicated that the summer flounder has exhibited a significant northward trend in (at least one season) in fall and not in spring. We test the hypothesis that a northern shift in the distribution of the summer flounder stock is correlated with a regional-climate-driven increase in ocean temperature and that there is a change in spatial patterns of abundance. A preliminary analysis of the spring 2005-2015 data suggests that the effect of temperature on abundance is significant after 2010 even after accounting for spatial correlation, suggesting that there might be a shift in distribution.

Keywords

summer flounder, ocean warming

Contact author

Samar Deen, Cornell University, sa462@cornell.edu