

Estimating season-, size-, and sex-specific spatial distribution of American lobster (*Homarus americanus*) using key habitat variables

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ABSTRACT

Spatial distributions of American lobster, *Homarus americanus*, are influenced by many factors. However, quantification of impacts of these factors on spatial dynamics of lobster is often difficult. We developed a modeling approach for quantifying the season-, size-, and sex-specific lobster spatial distribution with respect to environmental and spatial variables in the Gulf of Maine (GOM). Eight environmental and spatial variables including bottom temperature, bottom salinity, latitude, longitude, depth, distance offshore, and two sediment-related variables were considered in the model. Temperature and depth were found the most important in regulating lobster spatial distribution. Considerable seasonal differences in lobster distributions by sex were found in this study. In the offshore waters, significant sexual segregations were found in the fall, during which females were dominant at higher latitude and males were dominant at lower latitude. This segregation was not apparent in the spring although females were still dominant in the offshore waters in the higher latitude. Juveniles and adults were also distributed differently; juveniles were more abundant in the inshore waters in the lower latitude while adults were more widespread along the entire coast. The predictive results are in line with ecology of American lobster. This study provides a tool to evaluate possible changes in lobster spatial distribution with respect to changes in key habitat and other environmental variables, and consequently could be of value in the management of American lobster.

