

Development of habitat suitability index models of demersal fishes off the eastern coast of Japan

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An accurate estimation of a potential habitat of fish species enables us not only to understand the response of species to environmental changes but also to utilize it for an efficient use of fish resources. Habitat suitability index (HSI) model is widely used as tool in ecological impact assessments, ecological restoration studies, and practical exploration of potential fishing zone. It describes the relationships between fish abundance and ocean environmental variables and then estimates the level of habitat suitability as an HSI score representing “poor” to “good” habitat qualities. In this study, we developed the HSI models for several species of demersal fishes off the eastern coast of Japan by applying several machine learning algorithm to Japanese commercial fishery dataset compiled by Tohoku National Fisheries Research Institute, Japan Fisheries Research and Education Agency, that includes trawling catch data of more than 30 species of demersal fishes. In addition, we used an ocean reanalysis dataset FORA (4-dimensional variational Ocean Re-Analysis)-WNP30 produced by JAMSTEC/CEIST and MRI-JMA. The horizontal resolution is 0.1*0.1 degree of latitude and longitude with 54 vertical levels, which can provide realistic fields of 3-dimensional ocean circulation and environmental structures including ocean bottom layers up to 1500m depth. We investigated the HSI response of several species to ocean environmental changes occurring off the eastern coast of Japan. The results indicated that the habitat distributions of *Pseudopleuronectes yokohamae* and *Mlicrostomus achne* could be influenced by the Oyashio intrusion occurred in 2012 winter.

Keywords: habitat suitability index model, demersal fish, FORA