NOAH
North Sea Observation and Assessment of Habitats

Sensitivity Index for Demersal Fish 2009

GENERAL OVERVIEW

Dataset name:
Cumulative Sensitivity Index for demersal fish in 2009

Project:
North Sea – Observation and Assessment of Habitats (NOAH)

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DATASET SPECIFICATIONS

Dataset Parameter(s) and supplied Unit(s): extend if necessary
Sensitivity Index SI (unitless)

Date(s) available:
2009

Validated:	**Version Date:**
Yes	*14.03.2014*

Current State:
final

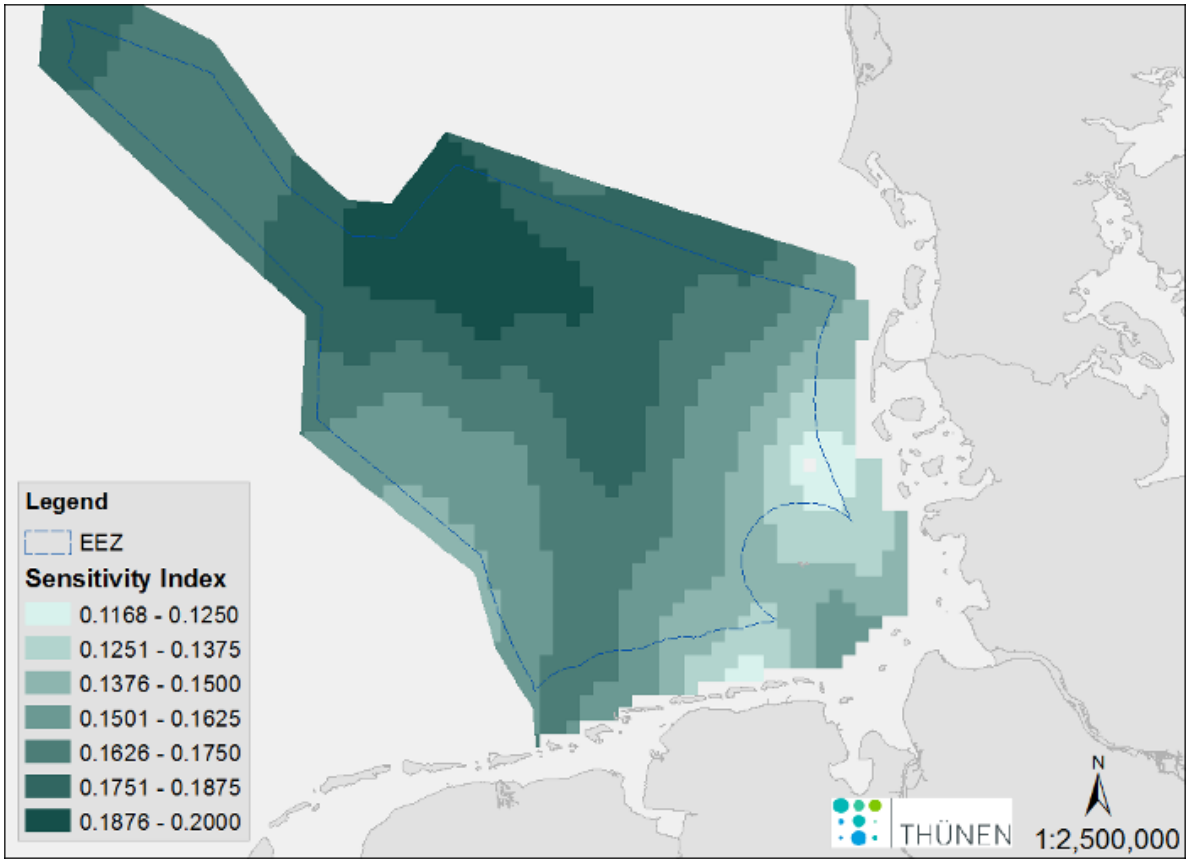
Format:
ESRI shape- /layer file

Citation:
Rambo H, Stelzenmüller V, Greenstreet SPR, Möllmann C. (2017). Mapping fish community biodiversity for European marine policy requirements. ICES Journal of Marine Science 74: 2223–2238. https://doi.org/10.1093/icesjms/fsx060

Greenstreet, SPR, Rossberg AG, Fox CJ, Le Quesne WJF, Blasdale T, Boulcott P, Mitchell I, Millar C, Moffat CF (2012). Demersal fish biodiversity: species-level indicators and trends-based targets for the Marine Strategy Framework Directive. ICES Journal of Marine Science 69: 1789-1801.

DATASET DETAILS

Abstract
In the German EEZ of the North Sea, we investigated the demersal fish fauna sampled with a small beam trawl in autumn 2009. On each station a cumulative sensitivity index was determined, based on the life history traits of each fish species and ranging from 0 (least sensitive) to 1 (most sensitive). The spatial distribution of the resulting SIs was mapped with the help of a geostatistical kriging approach. Overall, SIs and thus the sensitivity to trawling was relatively low ranging from 0.117 to 0.198. This corresponds to species being resilient to intermediately sensitive (resilient< 0.165, intermediate 0.165-0.31, sensitive > 0.31 based on the classification following Greenstreet et al. 2012). Highest SIs were found in the north-west of the German EEZ and in the Elbe Urstromtal, lowest SIs in near-coastal areas.



Acquisition and Processing Description:

The SI shown here is based on fish data from a beam trawl survey in November/December 2009 covering the German EEZ of the North Sea. Altogether 75 stations were sampled and a SI was calculated for each identified species. The SI is based on species life history traits that provide a good indication about the sensitivity of a species to human activities. Here we used the approach described by Greenstreet et al. (2012), compiling information on the two von Bertalanffy growth equation parameters, ultimate body length, the growth parameter K, and length- and age-at-first-maturity for each fish species. Each of these variables were standardized, and the overall sensitivity index of a species is the arithmetic mean of the four standardized values. The individual SIs range from 0 (least sensitive) to 1 (most sensitive). To spatially visualize the sensitivity of fish communities in the EEZ, individual SIs were weighted with the relative abundance of the species and summed up for each station. The spatial map was created using simple kriging in R 3.0.3 with the geoR package.

Notes and Limitations:

The SI is a theoretical approach to quantify the sensitivity of species based on life history traits. The range of SIs is based on 119 North Sea fish species identified in the International Bottom Trawl Survey in Q1, and is not standardized to the species found in the German EEZ.