**ICES CM 2017/F:271**

**Effects of underwater habitat quality on the top predator Baltic cod and its food web interactions**

**Authors:** Barbara Bauer, Valerio Bartolino, Michele Casini, Ayoe Hoff, H. E. Markus Meier, Piotr Margoński, Bärbel Müller-Karulis, Alessandro Orio, Mika Rahikainen, Sofia Saraiva, Jan Warzocha, Janina Kownacka, Jeroen Steenbeek and Maciej T. Tomczak

**Abstract**

Coastal states around the Baltic Sea engage in continued management efforts with the aim to restore underwater habitats and ecosystem health. In this study, we investigated potential effects of nutrient management efforts on the key predator cod (*Gadus morhua*). We use a spatial ecosystem model (Ecospace), forced by a coupled physical-biogeochemical model (RCO-SCOBI), to explore the potential future developments of the fish community under three different nutrient load scenarios: increased (BAU), current (REF) and decreased (BSAP). The distribution range and the center of gravity of cod distribution were similar in the BAU and REF scenarios. However, the model predicted an increased distribution range, as well as a northward shift of the center of gravity, of both adult and juvenile cod, within 20 years from present under BSAP. This suggests an increased spatial overlap between cod and its main fish prey groups, sprat (*Sprattus sprattus*) and herring (*Clupea harengus*), implying potential for stronger top-down control*.*

Our study provides evidence that nutrient load and eutrophication reductions may be effective in decreasing the current predator-prey spatial mismatch and thereby contribute to restoring ecosystem functioning in the Baltic Sea.

**Keywords:** Ecospace, fisheries, eutrophication, simulation model, spatial management

**Contact author:** Barbara Bauer, Stockholm University, Baltic Sea Centre,

Svante Arrhenius väg 20 F. SE-106 91 Stockholm, Sweden.

barbara.bauer@su.se