

Effects of rebuilding cod size structure in a warmer Barents Sea

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The call for this theme session postulates that reduction of individual body size of marine organisms may result from warming temperatures and/or fishing. Northeast Arctic cod in the Barents Sea, currently the world's largest cod stock, does apparently provide a counter-example. A considerable increase has recently been observed both in total stock size, mean size of fish in the stock and the catch and spatial distribution, as well as in the temperature in the area (Kjesbu et al. 2014). This increase in stock size is due to both sound fisheries management and favorable climatic conditions.

The low harvest rates in recent years have, together with a couple of strong year classes (2004 and 2005) also led to a rebuilding of the cod age structure. Age 8 and older fish now make up more than 50% of the total biomass. In a couple of years the age/size structure will be similar to that seen in the late 1940s, following the low exploitation during WW II.

The mean age at first maturation of Northeast arctic cod decreased considerably from the 1940s to the 1990s (from about 9 to 6.5 years), and also the mean size at first maturation decreased while growth rates increased. It has been claimed that this is mainly due to evolutionary effects. So far, there has been little change in weight and maturity at age in stock during the recent period when exploitation rates have decreased and stock abundance has increased considerably. However, weight at age of older fish (age 7+) has decreased in the last couple of years. In future years, we will learn more about whether the changes in growth and maturation are reversible or not, and thus more knowledge about the importance of evolutionary effects can be gained.

Cod is the main piscivorous fish species in the area and also by far the most abundant large fish in the area. Thus the fish size spectrum in the area will be affected considerably, and predation on larger fish (medium-sized cod and haddock, long rough dab etc.) is likely to increase due to higher abundance of large cod.

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