

# BIOECONOMIC MODEL OF EASTERN BALTIC COD UNDER THE INFLUENCE OF NUTRIENT ENRICHMENT<sup>1</sup>

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## Abstract

The objective of this paper is to study the economic management of Eastern Baltic cod (*Gadus morhua*) under the influence of nutrient enrichment. Average nitrogen concentration in the spawning areas during the spawning season of cod stock is chosen to be an indicator of nutrient enrichment. The optimal cod stock is defined using a dynamic bio-economic model for the cod fisheries. The results show that the current stock level is about half of the estimated optimal stock level and that the current total allowable catch (TAC) is about one-fourth of the optimal equilibrium yield. The results also indicate that the benefit from a reduction in nitrogen very much depends on the harvest policies. If the TAC is set equal to the optimal equilibrium yield, the benefit of a nitrogen reduction from the 2009 level to the optimal nitrogen level would be about 604 million DKK over a 10-year time horizon, given a discount rate of 4% per year. However, if a recovery management plan is chosen, the benefit would only be about 49 million DKK over a 10-year time horizon.

**Key Words:** Bio-economic model, Eastern Baltic cod, eutrophication.

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