

## **Appreciating the value of age: An evaluation of efficiency gains from controlling gear selectivity under various scenarios**

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### **Abstract**

The central objective of fishery management is to ensure the sustainability and profitability of the resource base. The importance of the fish stock's age-structure is increasingly recognized in economics and ecology. Still, current policies predominately rely on the aggregate biomass. We carefully calibrate a detailed model on the North-East Arctic cod fishery to estimate the efficiency gains from controlling gear selectivity. Moreover, we explore the sensitivity of optimal harvesting policies with respect to different assumptions on the biological model, in particular different recruitment functions and density-dependent growth. Age-selective harvesting is central to increasing profits in all scenarios. However, the maximum achievable Net-Present-Value differs strongly for the different biological assumptions, which -- by and large -- all are equally defensible. This points to the need to more routinely assess the structural uncertainty surrounding bio-economic simulations. Our study provides an increased understanding of the determinants of age-structured harvesting, emphasizing that it is high time to move beyond traditional reference points and consider age-differentiated management tools.