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A multispecies biomass dynamics model for investigating predator-prey interactions in the Bering Sea groundfish community

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Abstract

Concerns over long-term cumulative impacts of fishing on marine ecosystems and the status of many marine species have led to calls for ecosystem-based approaches to fishery management. Single-species population dynamics models traditionally used in fisheries stock assessments lack separate accounting of predation mortality and often underestimate natural mortality. Age-structured models used for stock assessments in the Alaska region are biologically realistic, but their applicability is limited to a relatively small number of commercially exploited species because they require accurate survey and fishery age composition data. The objective of this study was to develop relatively simple age-aggregated multispecies models that describe biomass dynamics of some commercially and ecologically important groundfish species in the eastern Bering Sea by accounting for their trophic interactions. We developed and contrasted two alternative model formulations: a multispecies biomass dynamics (MBD) model and a multispecies delay difference (MDD) model. Both MBD and MDD models were able to capture observed trends in survey

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