

**Regional heterogeneity in climate change impacts on the living marine resources of the Arctic.**

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A key finding of the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change impact review of the Polar Regions noted that the impacts of climate change in Arctic marine ecosystems will be heterogeneous. This paper examines the implications of climate change in six distinct shelf domains: the northern Bering Sea, the Chukchi Sea, the Beaufort Sea, the Canadian Archipelago and north Greenland Shelf, the Barents Sea and the Kara Sea. These domains include in-flow, outflow and interior shelf domains. We examine two hypotheses: 1. Domain/Temperature Matters: The rate of change in fish production in will be faster in in-flow systems (the northern Bering Sea, Chukchi Sea and Barents Sea) than in interior shelf of outflow systems due to advection of subarctic prey into the region; and 2. Latitude Matters: Differences in seasonal light cycles govern amount of annual primary production and will limit the carrying capacity fish and shellfish population in high latitude ecosystems despite reduced seasonal sea ice. Spring and summer ocean conditions in the present, near – future and longer-term future are derived from the CMIP5 earth system model of the Geophysical Fluid Dynamics Laboratory. Fish density is examined by latitudinal gradient using bottom trawl data collected in each region. The relative density of commercially important fish and shellfish (crab) species is examined to provide insight into when and where marine species may expand into high Arctic shelf ecosystems.

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