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“Cod in a Changing Climate”

The Role of Cod in the Ecosystem

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To help us explore the role of cod in the ecosystem, we reviewed biological interactions between cod and its prey, predators and competitors within six ecosystems. These six examples are from a broad geographic range: three are cod-capelin (*Mallotus villosus*) systems toward cod's northern limit across the top of the Atlantic (Barents Sea, Iceland, and Newfoundland-Labrador), two are more diverse systems toward the southern end of the species' range on either side of the Atlantic (North Sea and Georges Bank-Gulf of Maine), and one is a species-poor system with an unusual physical and biotic environment (Baltic Sea). We then attempted a synthesis of the role of cod in these and other ecosystems and speculate on how the role of cod might change in response to a variety of influences, particularly climate change. Our review indicates similarities in feeding across the ecosystems, with cod prey, predators and competitors functionally similar in all six ecosystems. Conversely, our review indicates different magnitudes of the role of cod in an ecosystem, with subsequently different effects of this role on cod populations, on cod prey populations, and on cod predator populations. Due to the direct effects of fishing on cod, it also appears that the ecological role of cod is diminished relative to historical roles in many cod ecosystems. What remains unclear is how additional climate variability will alter cod stocks, and thus the role of cod in the ecosystem.

Keywords: predator, prey, competitor, *Gadus morhua*, ecological function, North Atlantic

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