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Climate and ecosystem influences on fish body size and growth

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Growth and body size have important implications for marine and diadromous fish populations, as they affect survival, reproductive potential, and other biological processes. Ecosystem conditions such as ocean temperature and prey quality have been linked to declining population productivity of certain species and stocks, such as Atlantic salmon and Gulf of Maine cod. Further, substantial declines in fish body size have been reported for several Northwest Atlantic marine ecosystems during the late 1980s and early 1990s, a period coincident with major fishery, climate, and ecological changes. This presentation provides a synthesis of changes in fish body size in the Gulf of Maine-Georges Bank region and identifies relationships to ecological and fishery factors. Growth patterns provide finer-scale insight into how ultimate body size is attained. We investigate changes in growth patterns for Atlantic salmon from the Penobscot River, Maine, and Gulf of Maine Atlantic cod, and identify growth increments as an indicator of short-term environmental influences on fish biological processes. Finally, we demonstrate how growth and size serve as mechanisms linking ecosystem conditions to population-level outcomes.

Keywords: climate impacts, ecosystem conditions, growth, body size

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