Ocean warming expands habitat of a rich natural resource and benefits a national economy

Geographic redistribution of living natural resources changes access and thereby harvesting opportunities between countries. Internationally shared fish resources can be sensitive to shifts in the marine environment and this may have great impact on the economies of countries and regions that rely most heavily on fisheries to provide employment and food supply. Here we present a climate change-related biotic expansion of a rich natural resource with substantial economic consequences, namely the appearance of northeast Atlantic mackerel (Scomber scombrus) in Greenlandic waters. In recent years, the summer temperature has reached record highs in the Irminger Current, and this development has expanded the available and realized mackerel habitat in time and space. Observations in the Irminger Current in east Greenland in 2011 of this temperature-sensitive epipelagic fish were the first records so far northwest in the Atlantic. This change in migration pattern was followed by a rapid development of a large-scale fishery of substantial importance for the national economy of Greenland (23% of Greenland's export value of all goods in 2014). A pelagic trawl survey was conducted in mid-summer 2014 and the results showed that the bulk of similar to 1 million Mg (=t) of mackerel in the Irminger Current in southeast Greenland were located in the relatively warm (>8.5 degrees C) surface layer. Mackerel was also observed in southwest Greenland. Finally, 15 CMIP5 Earth System Model projections of future marine climate were used to evaluate the epipelagic environment in Greenland. These projections for moderate and high CO2 emission scenarios (representative concentration pathways [RCP] 4.5 and 8.5) suggest how the available mackerel habitat may expand further in space and time. Overall, our results indicate that, if the stock remains large, productive, and continues its current migration pattern, then climate change has provided Greenland with a new unique opportunity for commercial exploitation. However, positive cases like this should not be cherry-picked and misused as arguments against timely and effective mitigation of climate change.

General information
Publication status: Published
Organisations: Section for Marine Living Resources, National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Greenland Institute of Natural Resources, Institute of Marine Research, Marine Research Institute Reykjavik
Contributors: Jansen, T., Post, S. L., Kristiansen, T., Oskarsson, G. J., Boje, J., MacKenzie, B. R., Broberg, M., Siegstad, H.
Pages: 2021-2032
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Ecological Applications
Volume: 26
Issue number: 7
ISSN (Print): 1051-0761
Ratings:
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.4 SJR 2.376 SNIP 1.483
Web of Science (2016): Impact factor 4.314
Web of Science (2016): Indexed yes
Original language: English
Keywords: ECOLOGY, ENVIRONMENTAL, MACKEREL SCOMBER-SCOMBRUS, ATLANTIC MACKEREL, CLIMATE-CHANGE, PELAGIC FISH, CONTINENTAL-SHELF, IMPACTS, FISHERIES, WARS, climate change, CMIP 5, Greenland, mackerel (Scomber scombrus), Northeast Atlantic, projection, Ecology, Climate change, Mackerel (Scomber scombrus), Projection
Electronic versions:
Publishers version
DOIs:
10.1002/eap.1384
Source: FindIt
Source-ID: 2305613389
Research output: Contribution to journal › Journal article – Annual report year: 2016 › Research › peer-review