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Overexploitation of fish stocks in the Mediterranean and Black Seas

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The number of overexploited or collapsed fish stocks in the Mediterranean Sea has been increasing at a rate of approximately 38 every 10 years between 1970 and 2010, a new study has shown. In the Black Sea, the equivalent figure is 13 stocks per decade, the researchers found. The study's authors augmented traditional methods of stock assessments with a variety of other data sources on multiple fish species to give a more accurate overview of these marine ecosystems. These results should be used to improve conservation and management, they recommend.

Worldwide global fishing fleets are two to three times larger than the oceans can sustainably support. To help tackle the problem of overexploitation of fish stocks — fished populations of particular species — the EU has developed and implemented a variety of fisheries legislation. Developing effective, sustainable management practices requires reliable information on the levels of fish stocks.

In the Mediterranean and Black Seas, several fish stocks have been reported as overexploited based on traditional assessment methods, such as data recorded by national authorities, regular stock assessments or scientific surveys. However, traditional methods of stock assessment were designed to measure single species fisheries, whereas the marine ecosystems in these areas are comprised of a mix of different species. This means current surveys could be missing up to 80% of landed fish from the Mediterranean, according to some estimates.

This research aimed to address this problem by using a more comprehensive set of data to measure all stocks for which there is landing data, and to assess the degree of exploitation of fish stocks in the different subdivisions of the Mediterranean and Black seas — western, central and eastern Mediterranean subareas and the Black Sea — between 1970 and 2010.

To do this, the researchers used a number of different indicators of fish stock exploitation not commonly used in traditional assessment methods. These included the variability of total landings over time, the number of recorded stocks, the 'trophic level' of the catch (how far up the food chain the mix of species in the catch lies, on average), the 'fishing-in-balance index' — a way of describing how productive a fishery is over time — and a catch-based method of fish stock classification, which uses the relationship between the catch of a given year and the historical maximum catch to classify the exploitation status of a stock.

By applying these indicators to the separate subdivisions of the Mediterranean and Black seas the researchers also included areas where traditional stock assessment and scientific surveys are currently lacking.

The researchers conclude that fish populations in the Mediterranean and Black Sea are at risk from overexploitation. The results show that overexploited and collapsed stocks were increasing at a rate of 44, 33, and 38 stocks per decade for the western, central, and eastern Mediterranean, respectively, and 13 stocks per decade for the Black Sea, between 1970 and 2010.

The pattern of exploitation and the state of different fish stocks varied among the different subdivisions, with the eastern Mediterranean and Black Sea notably worse than the western and central Mediterranean, where the total percentage of overexploited and collapsed stocks exceeded 50% and growing populations were less than 10%.

These results confirm the need for more detailed and extensive stock assessments across fisheries made up of a mix of species. Such data should be used to inform and improve marine management and policy, the authors say.

Source: Tsikliras, A. C., Dinouli, A., Tsiros, V.-Z., & Tsalkou, E. (2015). The Mediterranean and Black Sea Fisheries at Risk from Overexploitation. *PloS One*, 10, e0121188. DOI:10.1371/journal.pone.0121188. This study is freely available at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0121188.

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