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Manuel Hidalgo, Vesselina Mihneva, Marcelo Vasconcellos and Miguel Bernal, 2018. [Chapter 7: Climate change impacts, vulnerabilities and adaptations: Mediterranean Sea and the Black Sea marine fisheries.](#)

In "Barange, M., Bahri, T., Beveridge, M.C.M., Cochrane, K.L., Funge-Smith, S. and Poulain, F., eds. 2018. Impacts of climate change on fisheries and aquaculture: synthesis of current knowledge, adaptation and mitigation options. FAO Fisheries and Aquaculture Technical Paper No. 627. Rome, FAO".

Abstract: • Fisheries in the Mediterranean and Black Sea are multi-specific and multi-fleet, with small pelagic species the most important in terms of landings and small-scale fisheries (SSF) the dominant fleet. Current high rates of overfishing will affect their capacity to cope with climate change impacts. • Surface warming, increasing heatwaves and a decrease in precipitation are very likely over the Mediterranean, with changes in circulation, sea level rise and winter weather regionally likely. In the Black Sea, surface warming, changes in thermohaline structure, sea level rise and extreme weather events are likely. • Meridionalization (occurrence of warm water species in northern regions) and tropicalization (expansion of non-native tropical species) in the Mediterranean, and Mediterraneanization (spreading of Mediterranean species) in the Black Sea, are strengthened by warming and will have positive and negative impacts on fisheries. • Longitudinal gradients in the rate of warming and changes in primary production are likely and result in an expected increase in fish diversity in the eastern Mediterranean and decrease in the western Mediterranean. In the Black Sea, projections show an increase in primary production in the north and a decrease in the south. • Changes in primary production and runoff will likely have a negative impact on the optimum habitats for small pelagic fish in the Mediterranean. In the Black Sea, changes in anchovy migration, overwintering and schooling behaviour as a result of warming will negatively affect fisheries in several countries. • Demersal species will suffer regional impacts associated to the expected changes in primary production, thermohaline circulation, and the strength of winter weather. Warming and the expected increase of Atlantic water entering into the Mediterranean will likely affect migrations and spawning behaviour of large pelagic fish. • Fisheries vulnerability to climate change is likely to be higher in south and southeast developing countries given the higher exposure to warming and arrival of non-indigenous species, and their overall lower adaptive capacity. Lower vulnerability is expected for the Black Sea, given a lower dependency on fisheries. • New opportunities will emerge in the SSF and the related communities, where new potentially commercial species could increase yields and economic profitability. The arrival of non-indigenous species will also

trigger problems in fisheries based on native species. • Numerous regional initiatives are aimed at embracing short-term measures to reverse the current fisheries and ecosystem challenges with medium- and long-term actions to adapt to climate change impacts. Transboundary research and management strategies are paramount, particularly for developing countries. • National adaptation plans (NAPs) and nationally determined contributions (NDCs) show, in general, limited references to adaptation measures (AMs) on fisheries. Few countries envisioned AMs on: monitoring, commercialization and fish consumption, research on ecological mechanisms and socio-economic impacts, education, and technical actions on species and habitats.

Keywords: