SHIFTING SPECIES DISTRIBUTION WITH CLIMATE CHANGE

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SUBTHEME: Incorporating ecological, environmental, and climate variability in stock assessment and ecosystem based fishery management

BIO

Dr. Jonathan Hare is the director of the NOAA Narragansett Laboratory and oversees the operational oceanography programs for the Northeast Fisheries Science Center. He is also involved in regional and international ocean observing activities and climate change studies. Jon received a BA in Biology from Wesleyan University. He earned a PhD in Oceanography from SUNY Stony Brook and his degree work was funded by New York Sea Grant. He received a National Research Council Research Associate in 1994 to work at the NOAA Beaufort Laboratory and was hired by NOAA in 1997. Jon moved to the NOAA Narragansett Laboratory in 2005. His research has focused on fisheries oceanography: understanding the interactions between the ocean environment and fisheries populations with an aim of contributing to assessments and management. Jon also examines the effect of climate change on fish population dynamics. This work involves coupling the output of IPCC-class climate models with fish population models to simulate the effects of climate change on population dynamics. He also works to move the new scientific information into the fishery assessment and management process.

ABSTRACT

Fishery species have been shifting distributions for decades and these changes have rarely been incorporated explicitly in stock assessments and management. Numerous studies have now documented changes in species distributions related to climate change. In general, species are moving poleward and into deeper waters. However, it is important to recognize that this is a general pattern and that there are a substantial number of exceptions. The global evidence of shifting distributions will be reviewed and the causes of shifting distributions will be identified (primarily climate change and fishing). Factors that contribute to the general northward / deeper pattern will be discussed as will factors that are responsible for exceptions. The relevance of shifting distributions to fisheries assessment and management then will be addressed: availability, stock structure, spatial allocations, and closed areas to provide a partial list. Finally, tools that are developing to project / predict distributions in the future will be summarized and areas where more work is needed to improve these tools will be identified.