

Coastal and Ocean Climate Applications (COCA) Program: Understanding Climate Impacts on Fish Stocks and Fisheries to Inform Sustainable Management

Healthy and productive fisheries are an essential component of the U.S. economy and society. In 2011, U.S. commercial and recreational fishing supported 1.7 million jobs in fishing, generated \$199 billion in sales, and contributed \$88 billion to the U.S. Gross Domestic Product.¹ Sustainable fisheries create and sustain jobs, stabilize economies in coastal areas, support working waterfronts, provide opportunities for commerce, and help to meet the growing demand for seafood across the U.S. and the world.

There is increasing concern about the impacts of climate variability and change on fish stocks, fisheries, and marine ecosystems in the Northeast and other U.S. regions. Climate-related parameters (e.g. extreme events, winds, ocean temperatures, stratification, currents, coastal precipitation, runoff, inundation etc.) can directly and indirectly affect marine ecosystem conditions, which in turn impact the abundance, distribution, and productivity of fish or other species that support economically important fisheries (i.e., fish stocks).^{2,3} Sustainable fisheries management in a changing climate requires an increased understanding of how climate, fishing, and other stressors interact to affect fish stocks, their habitats and prey.

The NESLME encompasses an area of approximately 260,000 km² from Cape Hatteras in the south to the Gulf of Maine and western Scotian Shelf in the north.³ The NESLME has been experiencing climate-related impacts and is projected to be significantly impacted by changing climate conditions in the future. To improve the resilience and adaptation of fisheries in the NESLME in a changing climate, in FY14, COCA, in partnership with NMFS, is soliciting proposals to address relevant research priorities under the following two options:

Option 1 – Three-year research projects that advance the understanding and projection of the impacts of climate variability and change on fish or other species that support economically important fisheries in the NESLME. Each project can request up to \$600,000 a year for three years for a total of \$1.8 million over three years, and includes both direct and indirect costs.

Option 2 – Two-year research projects that improve our understanding of the socioeconomic impacts of climate variability and change on fisheries and fishery dependent communities in the NESLME and/or enhance the use and application of climate-related data and information in fisheries stock assessments and management decisions. Each project team can request up to \$150,000 a year for two years for a total of \$300,000 over two years, and includes both direct and indirect costs.

Option 3

In FY14, COCA, in partnership with NMFS, is also soliciting proposals for one year and up to \$50,000 to develop a workshop focused on bringing together scientists from various disciplines (e.g. physical, ecological, social, economic) to promote interdisciplinary partnerships and discuss and prioritize future research needs to advance understanding of the impacts of climate variability and change on fish stocks and fisheries in the U.S. marine ecosystems. Please note this option is open to all U.S. regions.

¹National Marine Fisheries Service. 2012. Fisheries Economics of the United States, 2011. U.S. Department of Commerce, NOAA Technical Memorandum. NOAA Fisheries-F/SPO-128, 175p. <https://www.st.nmfs.noaa.gov/st5/publication/index.html>

² http://www.nefsc.noaa.gov/press_release/2013/SciSpot/SS1304/

³ http://www.nefsc.noaa.gov/press_release/2013/SciSpot/SS1307/

³ For more information on the NESLME see <http://www.nefsc.noaa.gov/ecosys/ecology/index.html>

Option 1 and 2 proposals must address one or more of the following priority areas of research:

- Research to improve understanding of the direct (e.g. recruitment, growth, physiology, behavior) and indirect (e.g. trophic interactions, habitats,) impacts of climate variability and change on fish stocks.
- Research to improve understanding of how climate variability and climate change, fishing pressure, and other stressors interact to affect fish stocks and ecosystem state.
- Development and application of high-resolution, coupled, regional climate-ocean-ecosystem models to provide past and future projections for improving our understanding of climate impacts on fish stocks.
- Improved acquisition, integration, synthesis, analysis, delivery and application of existing (historical and current) climate and marine ecosystem observations and monitoring information.
- Social and economic research to understand past and possible future impacts of climate variability and change on fisheries and fisheries-dependent communities to advance the identification of adaptation options.
- Development and implementation of communication efforts based on user-friendly, science-based information resources (e.g. tools, trainings, guidebooks, websites, communities of practice) to enhance communication, awareness and/or visualization of climate impacts on fish stocks and fisheries.
- Integration of climate-related information into fisheries stock assessments, habitat assessments, ecosystem assessments, management plans, and practices.

All Option 1 and 2 projects should:

1. Advance the application and integration of climate-related information into NOAA's fisheries stewardship responsibilities. Investigators should identify and leverage NOAA initiatives, funding opportunities, activities, and programs that are relevant to the proposed project.
2. Collaborate with relevant NOAA Laboratories, Fisheries Science Centers, and Cooperative Institutes to the extent this collaboration enhances the effectiveness of the research and its outcomes.
3. Collaborate with and/or leverage relevant research and decision-making institutions - e.g. non-governmental organizations; academic institutions; state, tribal, and local governments; private sector organizations; and other federal agencies (e.g. Department of the Interior, National Aeronautics and Space Administration) - to the extent this collaboration enhances the effectiveness of the research and its outcomes.
4. Include interdisciplinary collaborations (e.g. between physical, ecological, social, economic scientists and managers/decision makers), and, if applicable, promote communication and partnerships between the scientific and marine resource management communities for continued use and understanding of climate-related information.

While the intent is to fund all options, the number and type of projects funded and funding amount of all projects are subject to the availability of funding.

References:

Websites:

- Coastal and Ocean Climate Applications Program - <http://cpo.noaa.gov/ClimatePrograms/ClimateandSocietalInteractions/COCAProgram.aspx>
- National Marine Fisheries Service - <http://www.nmfs.noaa.gov/>
- National Marine Fisheries Service - Climate, Fisheries and Protected Species http://www.nmfs.noaa.gov/stories/2014/03/climate_portal.html
- NOAA Next Generation Strategic Plan - <http://www.ppi.noaa.gov/ngsp/>
- Understanding Climate Impacts on Fish Stocks of the Northeast Shelf Large Marine Ecosystem: Key Research Needs and Future Directions Workshop - <http://www.joss.ucar.edu/meetings/understanding-climate-impacts-fish-stocks-northeast-shelf-large-marine-ecosystem-key>

Reports and Papers:

- Griffis, R and Howard, J (eds.) 2013. Oceans and Marine Resources in a Changing Climate: A Technical Input To The 2013 National Climate Assessment. Island Press.
- Kappel, E.S and Cullen, V (eds.) 2013. Oceanography: Special Issue on GLOBEC, Understanding Climate Impacts on Ocean Ecosystems. Oceanography. Vol. 26, No. 4.

Please refer to federal funding opportunity - NOAA-OAR-CPO-2014-2004106 - in grants.gov for full application details and requirements.