

# **Climate Science and Fisheries Workshop**

**February 11, 2014  
Hilton Doubletree  
New Bern, NC**

## **Workshop Purpose**

Understanding climate change and the associated impacts on the ocean environment has emerged as one of the major challenges facing fishery science and management. The purposes of this workshop are 1) to inform the Mid-Atlantic Council about the state of climate science relative to prediction of climate change and 2) to describe the ecosystem impacts/changes which have already occurred and are likely to persist or intensify over the next two decades. The intent is to provide the Council with the current state of knowledge relative to climate change and the expected range of impacts on living marine resources. Workshop outcomes will help the Council in the development of an adaptive fishery management framework that can respond effectively to ecosystem responses related to climate change.

## **Program Outline**

**9:00 am – 10:00 am**

**State of Climate science and identification of range of responses of environment/fisheries/ecosystem to climate change over next 5-20 years**

Dr. Jonathan Hare, NMFS, Oceanography Branch, Narragansett Laboratory

- a. Describe current state of global climate models and resolution at regional ocean basin scale
- b. Describe current levels of scientific uncertainty associated with global and NW Atlantic regional climate models
- c. Discuss climate change projections for the next two decades for NE Shelf Ecosystems and the scientific uncertainty associated with those projections (5-20 years)
- d. Describe major oceanographic features of the NW Atlantic Ocean (with emphasis on NE shelf ecosystems and MAB in particular)
- e. Describe recent changes in the physical oceanography of NE Shelf Ecosystem and multi-decadal changes in atmospheric patterns and associated oceanographic features (NAO, AMO, etc)
- f. Discuss linkage between climate models, local oceanographic models and living marine resource models
- g. Describe observed and expected effects on species distributions, production, and assemblages within NE Shelf Ecosystems

**10:00 am – 10:45 am**

**Discuss framework for incorporation of climate science information into stock assessments**

Dr. Sarah Gaichas, Northeast Fisheries Science Center

Dr. Jason Link, NMFS, Senior Scientist for Ecosystems

- a. How can existing stock assessments be modified to incorporate climate change/environmental variability?
- b. Describe stock assessments to date that have incorporated climate information
- c. Describe environmental data necessary to account for a variable and changing climate and how the information can be incorporated into stock assessments
- d. Describe alternative stock assessment approaches that would account for variable and changing climate conditions which would continue to satisfy NS1 and NS2 requirements

**10:45 am – 11:15 am**

**Climate velocity concept and emerging analytical approaches to understanding climate effects on fisheries and identification of range of responses**

Dr. Malin Pinsky, Rutgers University

- a. Describe climate velocity concept
- b. How can climate velocity analyses be incorporated into current fishery assessment and management paradigm?
- c. Provide examples of climate velocity analyses conducted for MAMC managed species
- d. Is it possible to project these analyses in to the future?

**11:15 am – 12:00 pm**

**Fishing Fleet Dynamics**

Dr. Geret DePiper, NMFS, Northeast Fisheries Science Center

Dr. Douglas Lipton, NMFS, Senior Scientist for Economics

- a. Briefly describe current fleet operating in NE Shelf Ecosystem (e.g., permit distributions, vessel dependence on particular species, vessel mobility, etc.)
- b. What data and analyses are available to evaluate fleet dynamics and ability of current fisheries to adapt to systematic oceanographic change?
- c. What fishery management tools would best advantage current and future fleets to adapt to variable and changing climate conditions (e.g., catch shares, tradeable fishery rights, area based management, etc.)
- d. Identify and discuss current management tools which limit fleet adaptability

**Identification of potential best fishery management practices to allow Councils to react to climate related ecosystem changes**

**1:00 pm – 1:45 pm**

**Incorporation of climate information and uncertainty into stock assessments, biological reference points and ABC specifications**

Dr. Olaf Jensen, Rutgers University

- a. Describe how changing climatic/environmental conditions can be incorporated into stock assessment models; What specific TORs should stock assessments be given that relate to accounting for changing oceanographic conditions?
- b. What specific vital population parameters might change and how will these changes affect BRPs? Will BRPs auto-correct when environmental conditions change significantly? How will we detect such changes?
- c. Describe current MAFMC OFL/ABC control rules and risk policy; Where in the OFL/ABC/OY continuum is uncertainty about changing climate conditions accounted for? What assessment modelling approaches would already account for this source of uncertainty?
- d. Are current buffers between OFL/ABC adequate to account for climate changes? Are there any changes to the current risk policy that the Council should consider to account for climate change?

**1:45 pm – 2:30 pm**

**Incorporation of variable and changing climate and environmental conditions into essential fish habitat designations**

Terra Lederhouse, NMFS HQ, Habitat Protection Division

Dr. John Manderson, Behavioral Ecology Branch, Sandy Hook Laboratory

- a. Briefly describe the basis for current EFH designations for MAFMC managed species (i.e., two dimensional/area based)
- b. Given the potential for shifting thermal and oceanographic regimes due to changing climatic conditions over the next several decades, how will designation and management of EFH for managed species be affected?
- c. Briefly discuss alternative metrics to identify EFH using single species approach currently used (i.e., temperature, substrate, other physical characteristics of water mass, etc.)
- d. Should the Council consider a cross-FMP approach to EFH identification to potentially identify critical habitats within the ecosystem? If such an approach is warranted and feasible, could ecosystem based EFH designations satisfy existing Magnuson EFH requirements? Would an ecosystem based approach to EFH designation improve efficacy of habitat conservation and management (especially under expected climate change scenarios)?

**2:45 pm – 5:00 pm**

**Fisheries management in a changing climate –Synthesis, wrap-up and next steps**

Dr. John Boreman, NC State University

Katherine Latanich, Fisheries Forum, Duke University

Richard Seagraves, Mid-Atlantic Fishery Management Council