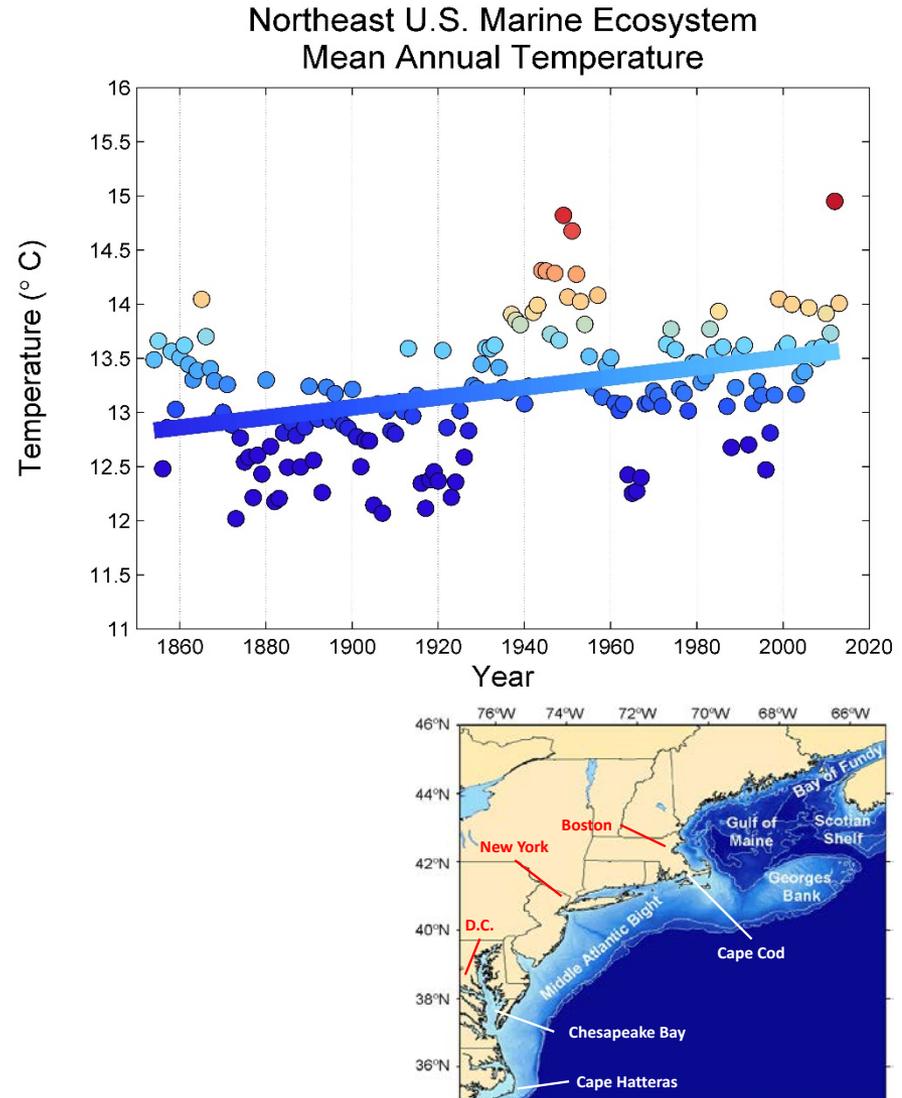


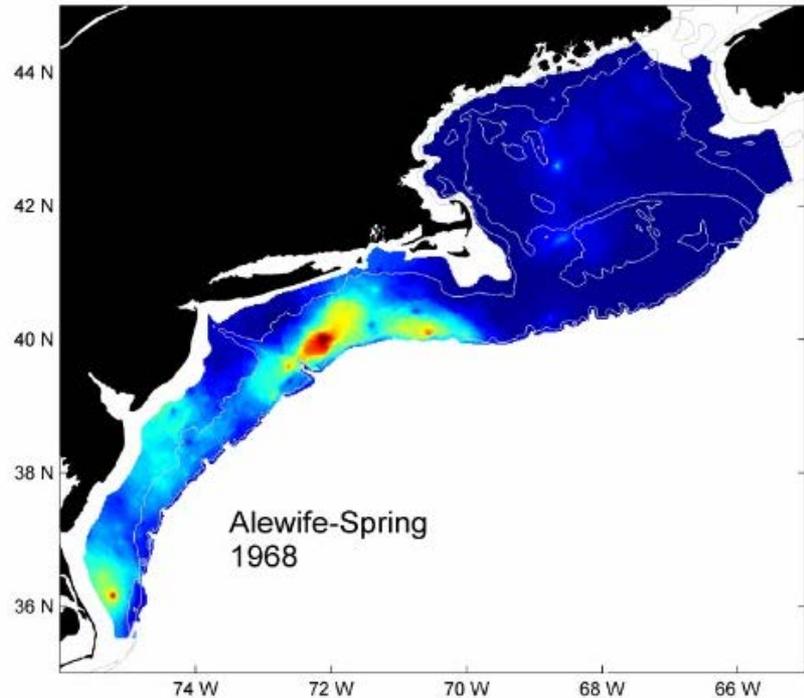
Northeast U.S. Shelf and Climate Change

- NEUS shelf is warming
- Climate change (long-term trend)
- Climate variability (cold-warm-cold-warm phases)



Northeast U.S. Shelf and Climate Change

- Historical changes in distribution
- Life history / stock boundaries / catchability
- 24 of 36 fish stocks shifted poleward / deeper (Nye et al. 2009)

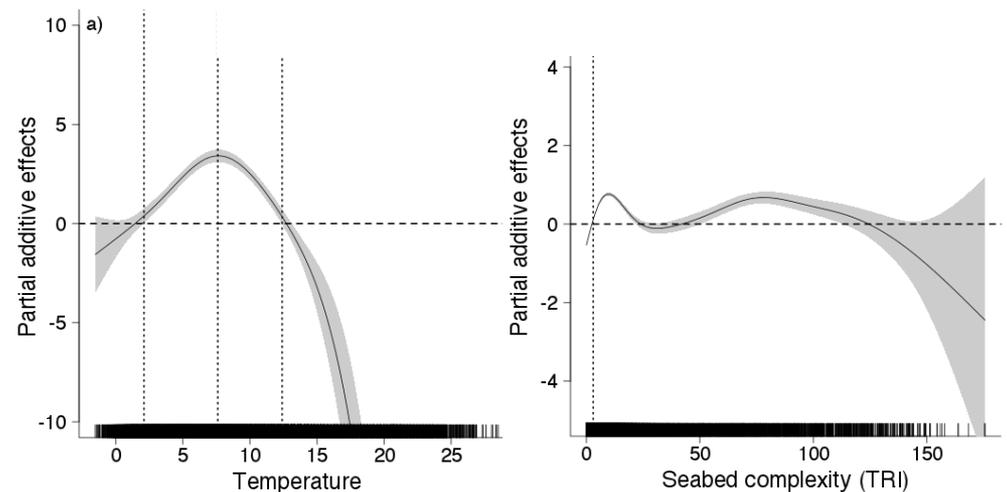
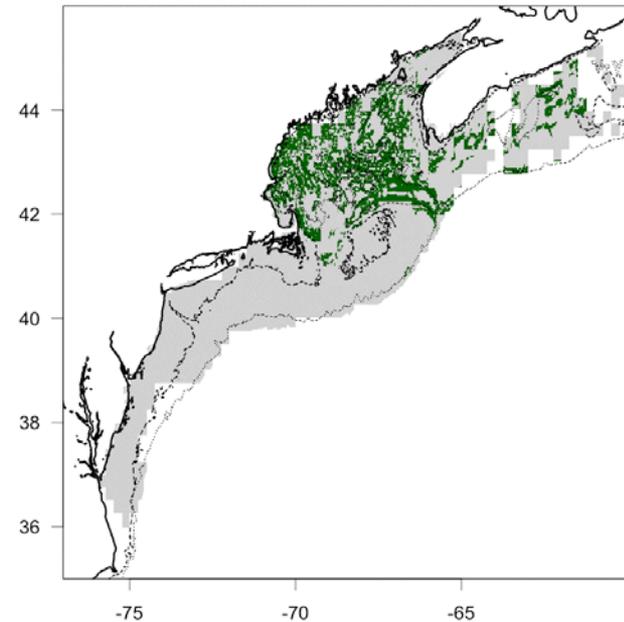


<http://www.int-res.com/abstracts/meps/v393/p111-129/>
<http://www.nefsc.noaa.gov/epd/ocean/MainPage/ioos.html>

Northeast U.S. Shelf and Climate Change

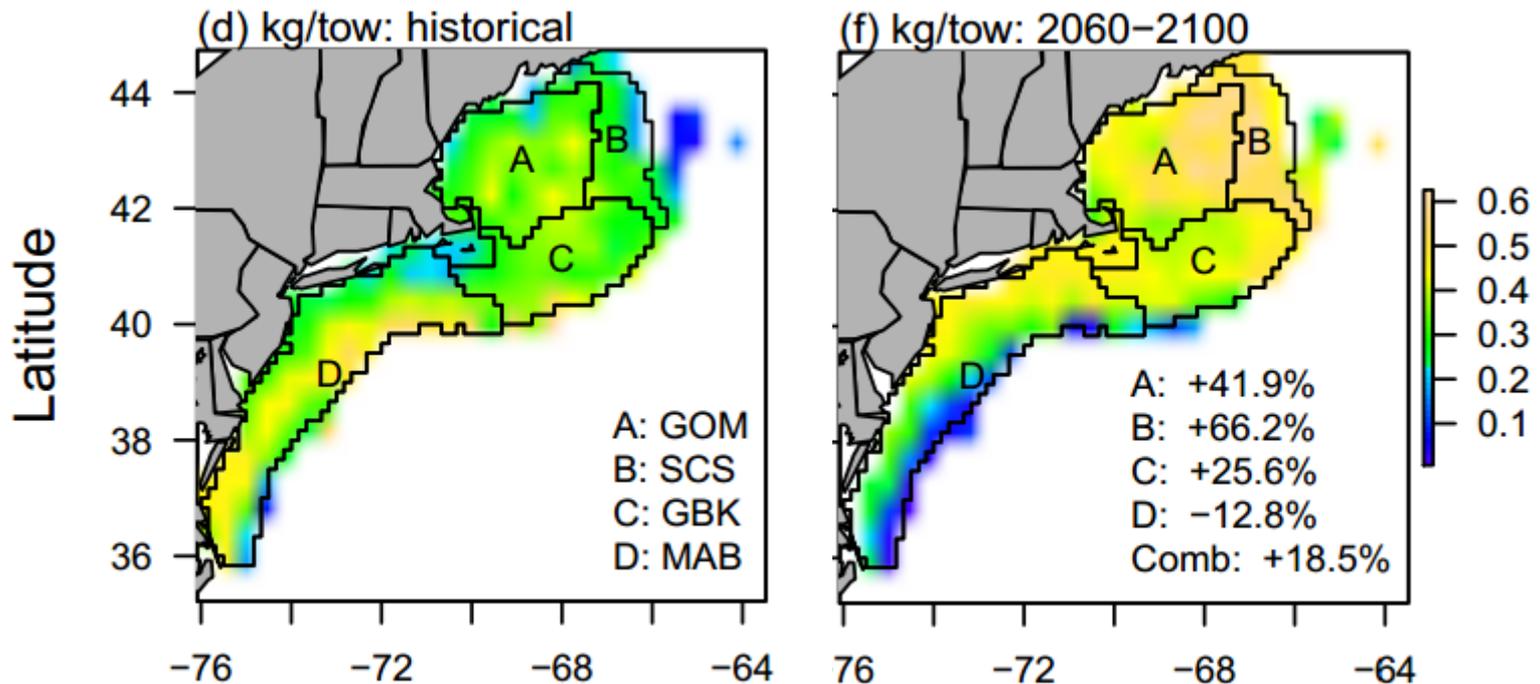
- Niche model projected using climate forecasts
- Cusk (Hare et al. 2012)
- Habitat projected to decrease in future

Potential habitat NovDec



Northeast U.S. Shelf and Climate Change

- Future changes projected through coupled biological-climate models
- Northeastward movement will continue



Northeast U.S. Shelf and Climate Change

Quantitative Approach

- Atlantic cod 1-2 years per species
- Atlantic croaker 50+ fishery species
- Cusk 20+ protected species
- Atlantic salmon 100's of trophic interactions
- River herring



70-140 years before we have an understanding of the direct effect of climate on resource species

Northeast U.S. Shelf and Climate Change

Steps forward:

- Coupled fisheries dynamic – climate models
- Coupled distribution – climate models
- Vulnerability assessment
- Outreach

Quantitative

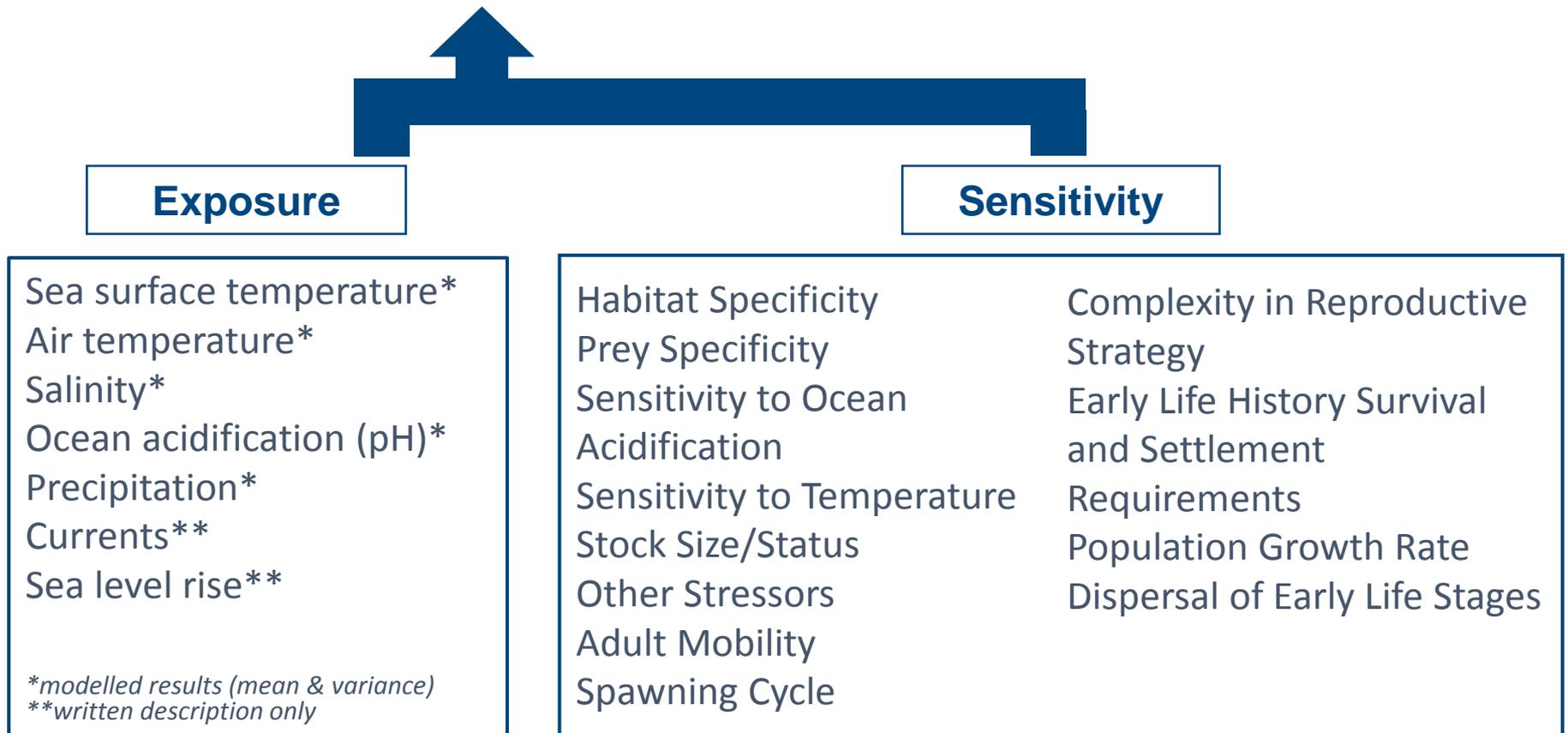
- Atlantic cod
- Atlantic croaker
- River herring
- Cusk
- Others

Qualitative

e.g., this talk

Northeast U.S. Shelf and Climate Change

Northeast Fisheries Climate Vulnerability Assessment (79 species)



Northeast U.S. Shelf and Climate Change

Northeast Fisheries Climate

Vulnerability Assessment (79 species)

- Exposure to climate change in NEUS is high to very high
- Sensitivity higher for diadromous and shellfish; lower for groundfish and pelagics

Vulnerability

		Vulnerability			
		Low	Medium	High	Very High
Sensitivity	Very High			2 Shellfish	1 Shellfish 1 Diadromous
	High			5 Shellfish 5 Groundfish 4 Elasmobranchs	8 Shellfish 7 Diadromous 2 Coastal 1 Groundfish
	Medium			5 Groundfish 3 Elasmobranchs 2 Shellfish 1 Pelagic	2 Diadromous 3 Coastal
	Low			8 Groundfish 5 Elasmobranchs 5 Pelagics 1 Shellfish	8 Coastal
		Low	Medium	High	Very High

Exposure

Northeast U.S. Shelf and Climate Change

Regional specific RFP from Climate Program Office

DEPARTMENT OF COMMERCE NOAA WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

 **CLIMATE PROGRAM OFFICE**
Advancing scientific understanding of climate, improving society's ability to plan and respond

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2014 Understanding Climate Impacts on Fish Stocks and Fisheries to Inform Sustainable Management Federal Funding Opportunity

Funding Opportunity Title: NOAA Climate Program Office FY 2014 – Understanding Climate Impacts on Fish Stocks and Fisheries to Inform Sustainable Management
Announcement Type: Initial
Funding Opportunity Number: NOAA-OAR-CPO-2014-2004106
Catalog of Federal Domestic Assistance (CFDA) Number: 11.431, Climate and Atmospheric Research

NOAA is accepting individual applications for a competition held through the Coastal and Ocean Climate Applications (COCA) program focused on understanding impacts of climate variability and change on fish stocks and fisheries to inform sustainable management.

Letters of intent are due by 5 p.m. Eastern Time, July 14th, 2014 and the deadline for final applications is 5:00 p.m. Eastern Time, September 12th, 2014.

The Climate Program Office was established in October 2005 to oversee the agency's climate portfolio and to manage the competitive research program that funds high-priority science to advance the understanding and prediction of the Earth system and associated climate processes. CPO also supports multi-disciplinary research and assessments designed to foster the effective use of climate information for informed decision-making.

 [Download information sheet](#)  [Read the full FFO](#) [Grants.Gov listing/application](#)

Questions/Who to Contact:

General Questions
Diane Brown, CPO Grants Manager
Diane.Brown@noaa.gov

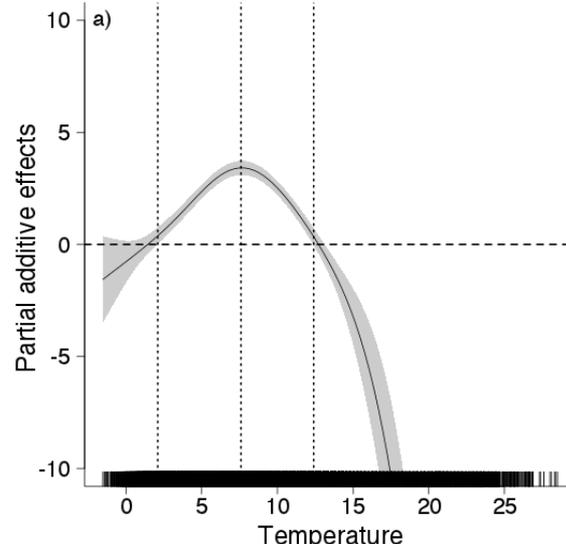
Specific questions about Climate Observations and Monitoring (COM)
Competition 1 - Data Sets and Indicators
Competition 2 - Paleoclimate Proxy/Multi-proxy Reconstructions and Analyse
Bill Murray (william.l.murray@noaa.gov)

Specific questions about Earth System Science (ESS)
Competition 3 - Climate Variability and Predictability (CVP): Improved Understanding of Tropical Pacific Processes, Biases, and Climatology
Sandy Lucas (sandy.lucas@noaa.gov)

Competition 4 - Atmospheric Chemistry, Carbon Cycle, and Climate (AC4): Observational Constraints on Sources and Sinks of Aerosols and Greenhouse Gases
Monika Kopacz (monika.kopacz@noaa.gov)

Specific questions about Modeling, Analysis, Predictions, and Projections (MAPP)

River Herring Bycatch



Potential habitat NovDec

