



**NOAA**  
**FISHERIES**

# Seasonal forecasting and ecosystem-based fishery management

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April 7, 2016

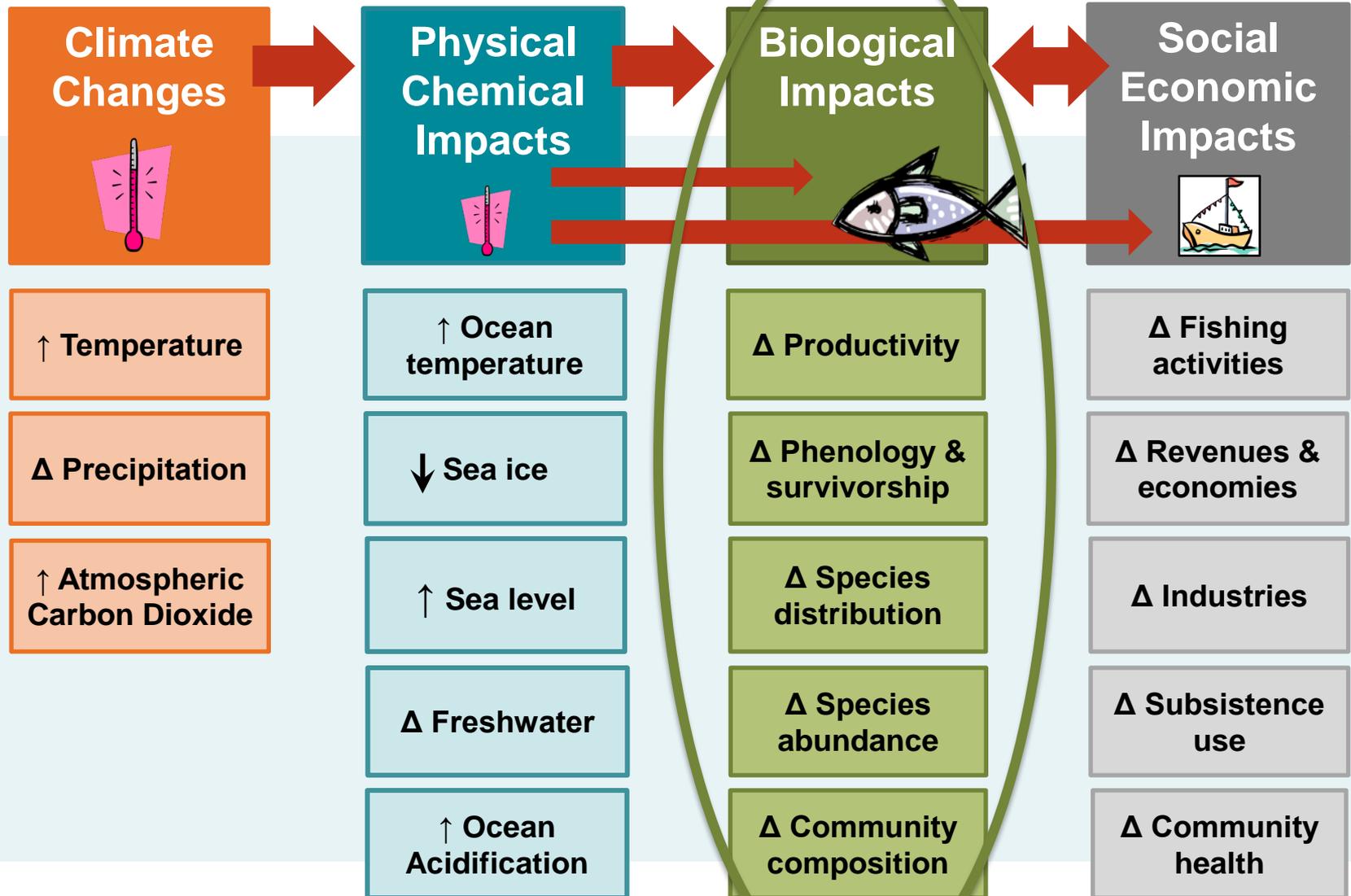
# Fisheries are diverse

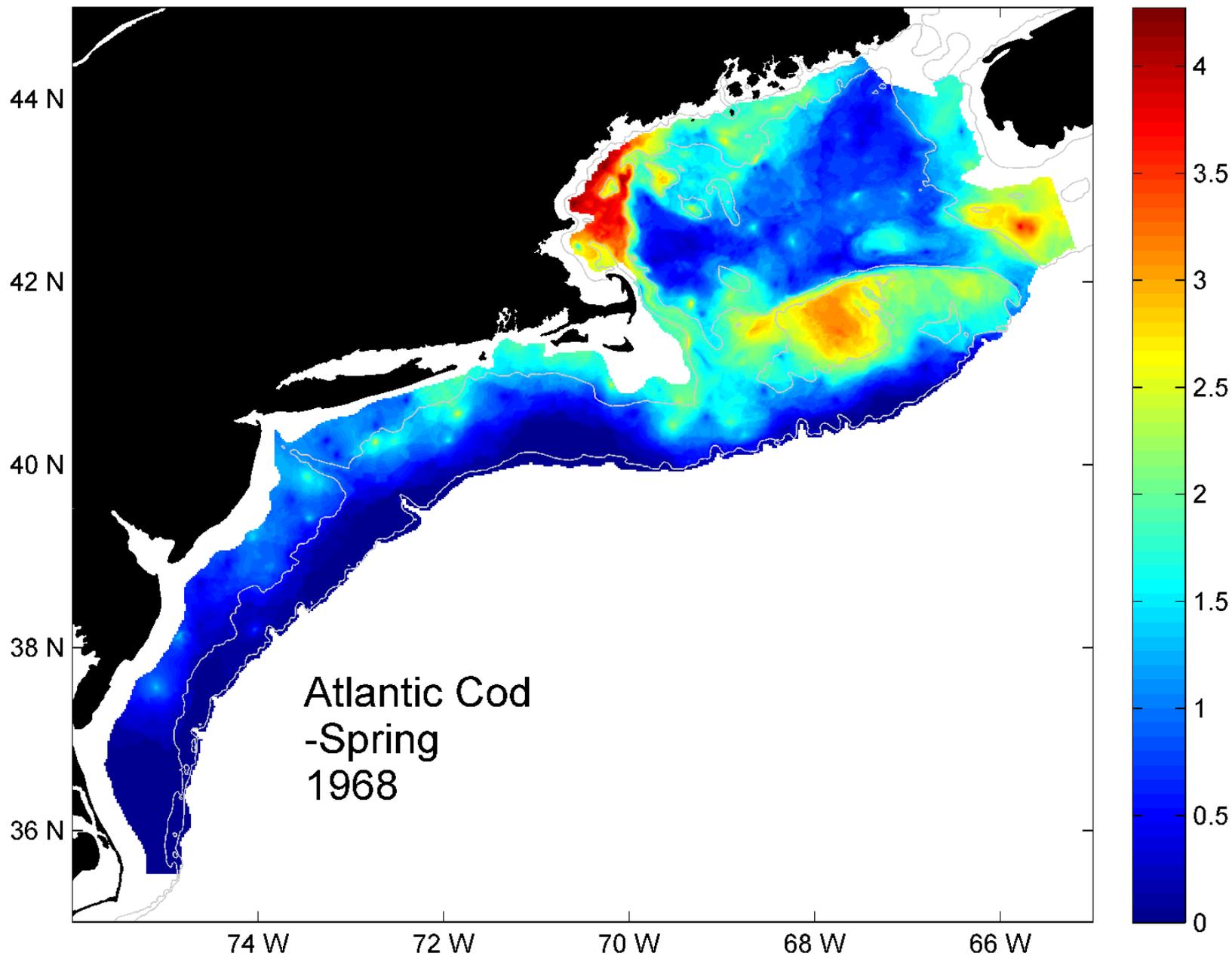


The chartered fishing vessel *Vesteraalen*. (Photo by Jay Orr)



# Changing weather patterns affect fisheries





<http://www.nefsc.noaa.gov/ecosys/>

How can seasonal forecasts help  
with decisions about fishing?

Industry, Management, Science

# Where should I fish today?

## EXPERIMENTAL PRODUCT

avoid fishing between solid black 63.5°F and 65.5°F lines  
to reduce turtle interactions

Sea Surface Temperature: 19Feb2011-21Feb2011

Ocean Currents: 10Feb2011-16Feb2011

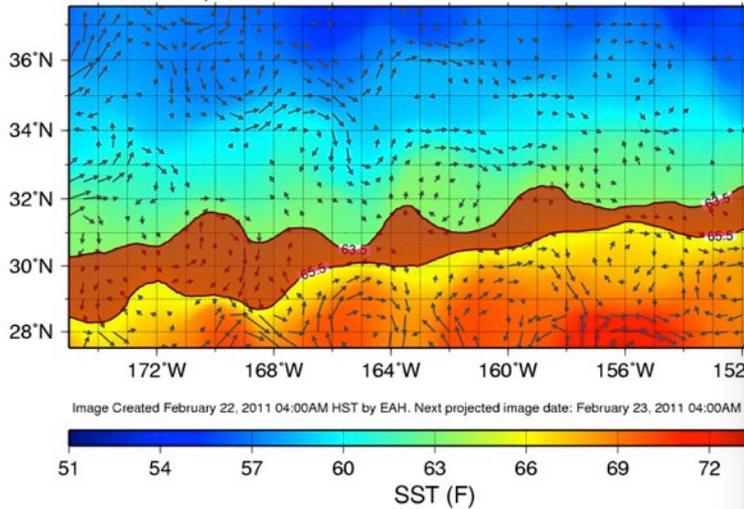


Image Created February 22, 2011 04:00AM HST by EAH. Next projected image date: February 23, 2011 04:00AM HST



PACIFIC ISLANDS FISHERIES SCIENCE CENTER  
ECOSYSTEMS AND OCEANOGRAPHY DIVISION  
2570 Dole Street, Honolulu, HI 96822  
<http://www.pifsc.noaa.gov/eod/turtlewatch.php>  
contact: [Evan.Howell@noaa.gov](mailto:Evan.Howell@noaa.gov)

Data provided by Central Pacific CoastWatch node

TURT



## EXPERIMENTAL PRODUCT

avoid fishing between solid black 63.5°F and 65.5°F lines  
to help reduce loggerhead sea turtle interactions

Sea Surface Temperature: 07Sep2015-09Sep2015

Ocean Currents: 03Sep2015-09Sep2015

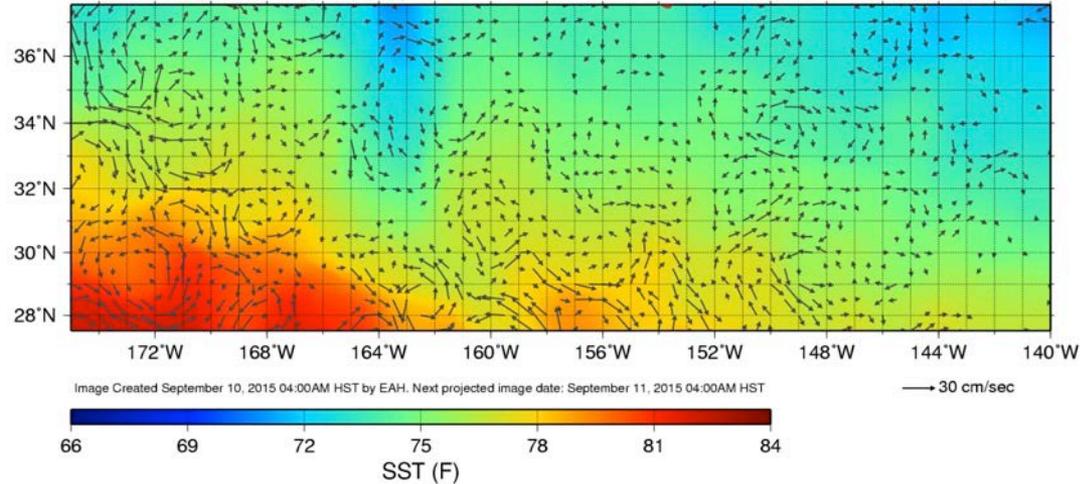


Image Created September 10, 2015 04:00AM HST by EAH. Next projected image date: September 11, 2015 04:00AM HST



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TURTLEWATCH



<http://www.pifsc.noaa.gov/qrb/2011>

# When should we be ready for fish?

BANGOR DAILY NEWS

BANGOR DAILY NEWS

Lobster price

Gulf of Maine ocean temperatures above normal



Robert F. Bukaty | BDN

A young lobster fisherman scrub

Joe Cormier of Westbrook, Maine, paddles out to surf, Thursday, March 29, 2012, at Higgins Beach in Scarborough, Maine, where the ocean temperature was in the 40s. The winter's warm air temperatures are resulting in water temperatures in the Gulf of Maine that are rising well above average, according to scientists.

# When should we be ready for fish?



The screenshot shows the website for the Gulf of Maine Research Institute. The header includes the logo, a search bar, and navigation links: 'Our Focus', 'Our Work', 'Events', 'Resources', 'News', and 'About Us'. The breadcrumb trail reads: 'Home » Our Work » Research » Project Database » Gulf of Maine Lobster Forecasting'. The main heading is 'Gulf of Maine Lobster Forecasting'. To the right is a green 'Project Overview' box containing the following information:

- GMRI Scientists:**
  - Andrew Pershing
  - Kathy Mills
  - Christina Hernandez
- Research Theme:** Climate Adaptation
- Project Status:** Ongoing

Below the overview box is a 'Related' section. The main content area features a photograph of a person in a blue jacket holding a lobster over a green mesh trap. The text on the left side of the page reads:

We are developing a forecast of when the Maine lobster fishery will shift into its high-landings mode in an effort to ensure a successful lobster season this summer. In 2012, unusually warm waters in the Gulf of Maine caused lobsters to migrate inshore and molt earlier than usual, which created a glut of lobsters on the market and deflation of prices (because distributors and processors were not prepared for so much product). Our goal is to enable the industry to be more prepared for the coming lobster season with advance notice of its

<http://www.gmri.org/our-work/research/projects/gulf-maine-lobster-forecasting>

# Cooperative data collection

**eMOLT home**



Overview  
What's new  
Results >>  
Data Access  
Updates/Reports  
Main  
Oceanography  
Page



## Environmental Monitors on Lobster Traps (eMOLT)



<http://www.nefsc.noaa.gov/epd/ocean/MainPage/emolt.html>

# How many fish will there be next year? (and for the next two?)



Species	Year	Commercial Quota (millions of pounds)	Commercial Minimum Fish Size (TL)	Commercial Mesh Size	Recreational Harvest Limit (millions of pounds)
Summer Flounder	2015	11.07	14"	5.5"	7.38
	2016	8.12	14"	5.5"	5.42
	2017	7.91	14"	5.5"	5.28
	2018	7.89	14"	5.5"	5.26
Scup	2015	21.23	9"	5"	6.80
	2016	20.47	9"	5"	6.09
	2017	18.38	9"	5"	5.50
	2018	17.34	9"	5"	5.21
Black Sea Bass	2015	2.24	11"	4.5"	2.33
	2016	2.24	11"	4.5"	2.33
	2017	2.24	11"	4.5"	2.33

<http://www.mafmc.org/newsfeed/2015-08-17/demersal-specifications>

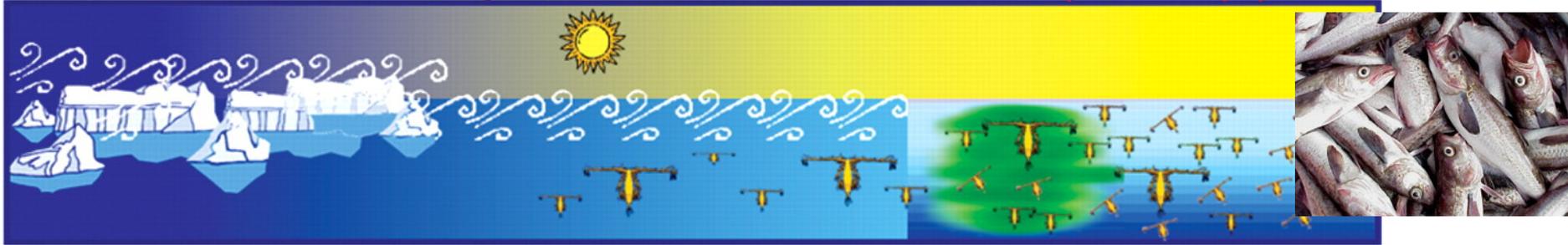
# Could we improve 1-2 year fish forecasts?

b

Early Ice Retreat



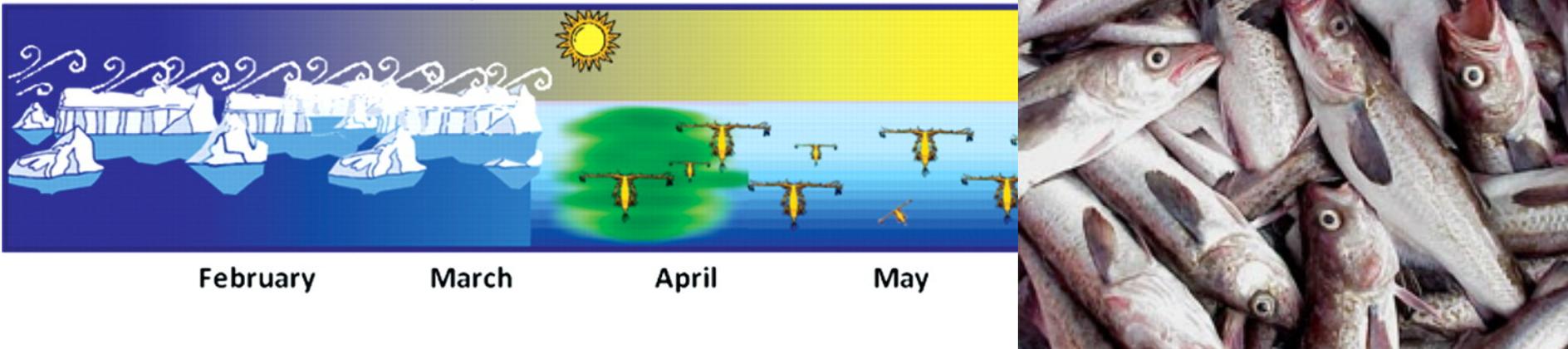
Late Bloom, Warm Water - Mostly small copepods



Late Ice Retreat



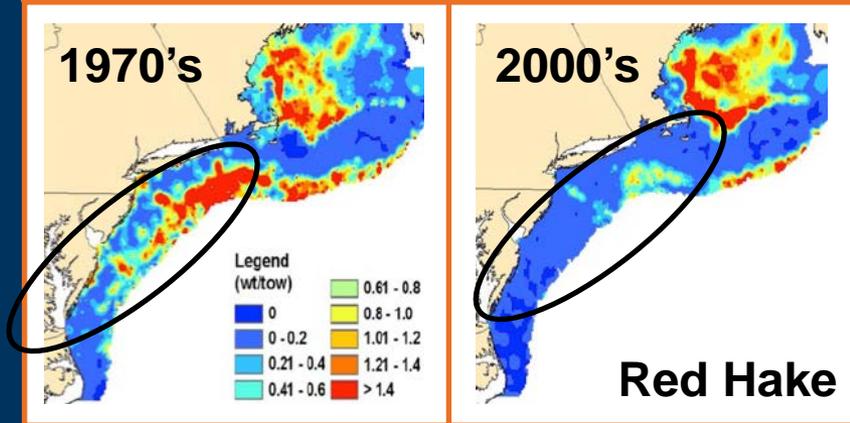
Early Bloom, Cold Water - Large



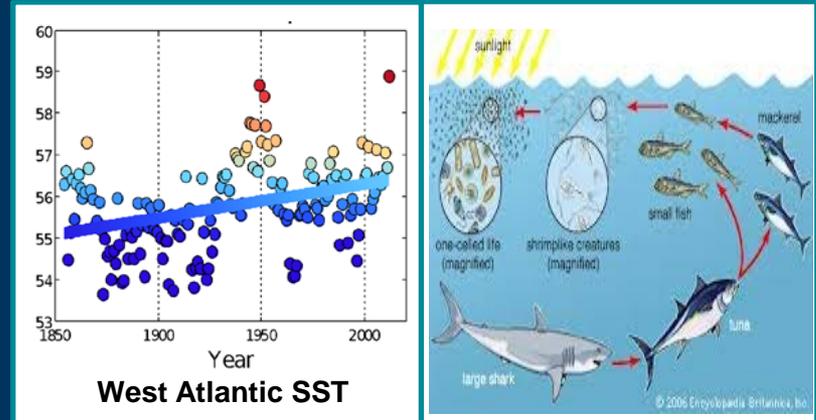
George L. Hunt, Jr et al. ICES J. Mar. Sci. 2011;68:1230-1243

# Key Information Requirements

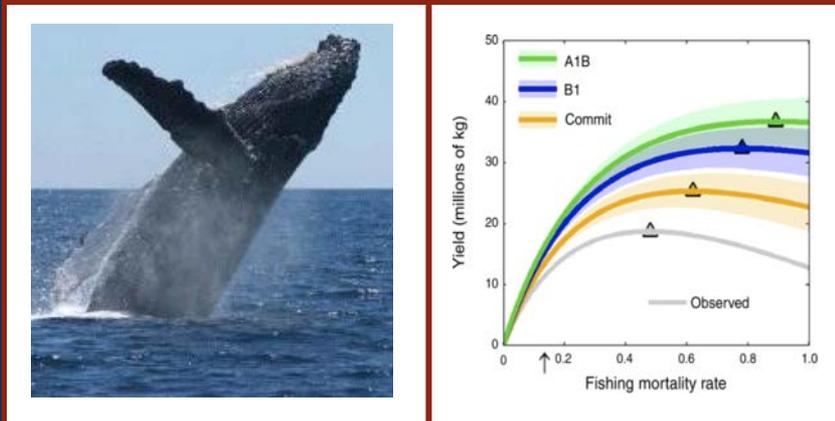
## WHAT IS CHANGING?



## WHY IS IT CHANGING?



## HOW WILL IT CHANGE?



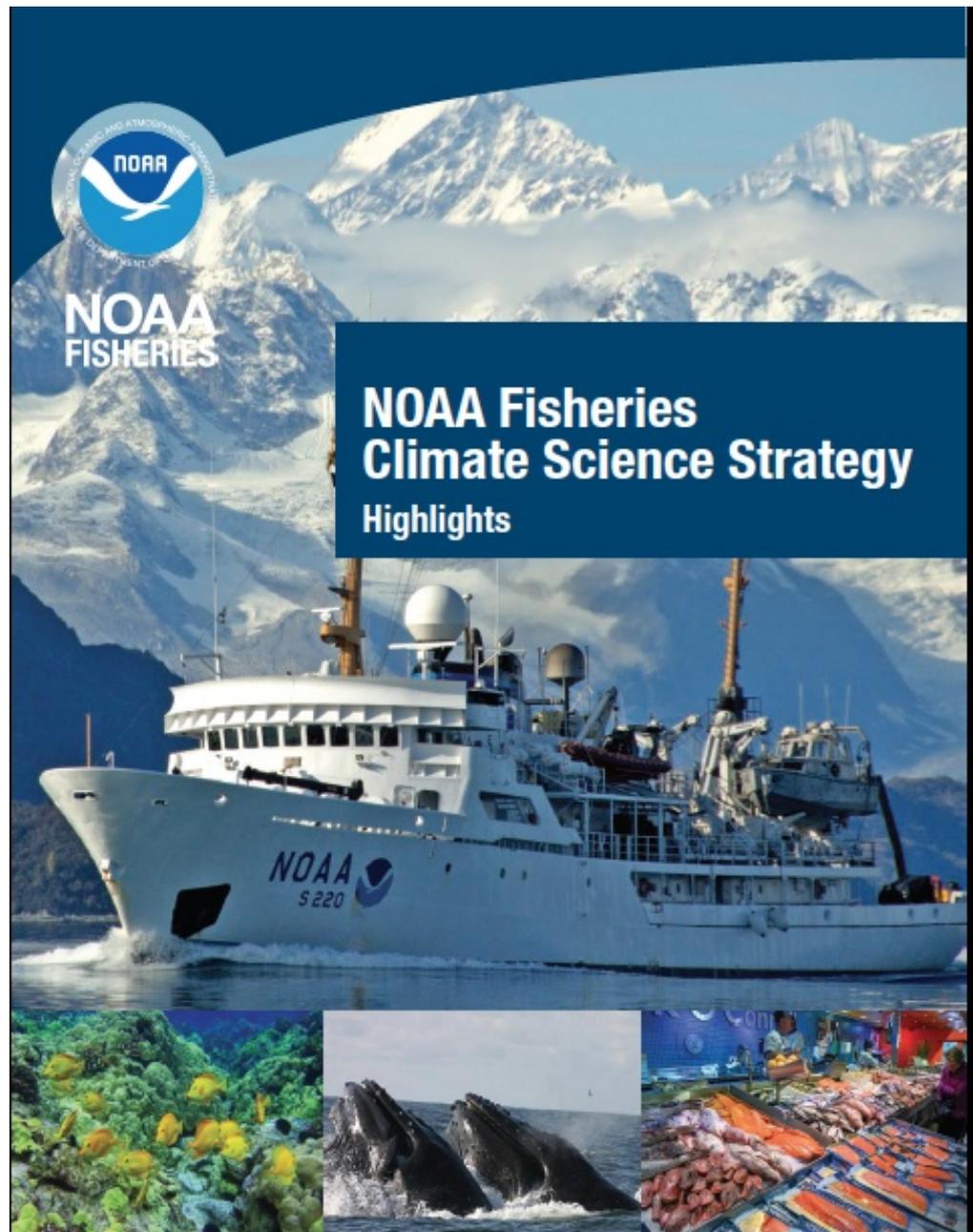
## HOW TO RESPOND?



We are moving beyond  
previously observed ranges

NEED seasonal to two year forecasts  
to model system responses and  
adjust management for the unknown

# Our plans...



<http://www.st.nmfs.noaa.gov/ecosystems/climate/national-climate-strategy>

# Thank you

<http://www.nefsc.noaa.gov/ecosys/>

<http://www.nefsc.noaa.gov/ecosys/current-conditions/forecast.html>

<http://www.nefsc.noaa.gov/ecosys/climate-change/projected.html>