# Development of an Online
# Climate and Fisheries Data Dashboard
## for Stakeholders in the Northeast Shelf Large Marine Ecosystem

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AMS 23rd Conference on Applied Climatology
Asheville, NC

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CLIMATE

# NOAA: In 2012, Waters Off Northeast U.S. Coast Were Warmest In 150 Years

BY JOE ROMM APR 28, 2013 12:24 PM

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A new "Ecosystem Advisory" from NOAA's Northea
Fisheries Science Center (NEFSC) reports, "Sea surf
temperatures in the Northeast Shelf Large Marine
during 2012 were the highest recorded in 150 year

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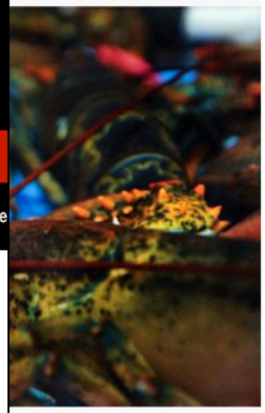
Business

## Lobster is now cheaper than cold cuts in some places. McLobster, anyone?

Lobster supply has outstripped demand, driving down prices so much that even McDonald's is offering it on its menus in Eastern Canada.



LAUTENS / TORONTO STAR FILE PHOTO
keye salmon and boneless grain-fed

2012

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REPORT

## Slow adaptation in the face of rapid warming leads to collapse of the Gulf of Maine cod fishery

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*Science* 29 Oct 2015:

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BASICS
Parrots Are a Lot More Than 'Pretty Bird'

SCIENCE

*Cod's Continuing Decli*

By ERICA GOODE OCT. 29, 2015

INTRODUCING

# Recommendations…

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At a 2013 NOAA-sponsored climate workshop in Providence, RI, participants identified:

***'need to track the pulse of ecosystem conditions via core observations of key indicators to track current changes and provide managers with early warnings of future changes'***

- https://joss.ucar.edu/meetings/understanding-climate-impacts-fish-stocks-northeast-shelf-large-marine-ecosystem-key

# Why do we need another tool?

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Volumes of data are already available through tools and services (and growing by the day)

- If you speak NetCDF, THREDDS, OPeNDAP

Data consumers - mixed capacity to access data

- Scientists
  - Fire up MATLAB, R, Python…
  - Grab A BUNCH of data (and coffee), filter what they want, chuck the rest…do science.
  - Science often = white paper, presentation, filed away
- Managers
  - Get data updates from science (meetings/static in time)
  - Want data quick and easy (e.g. download csv for area of focus)

# Build it right, make a plan

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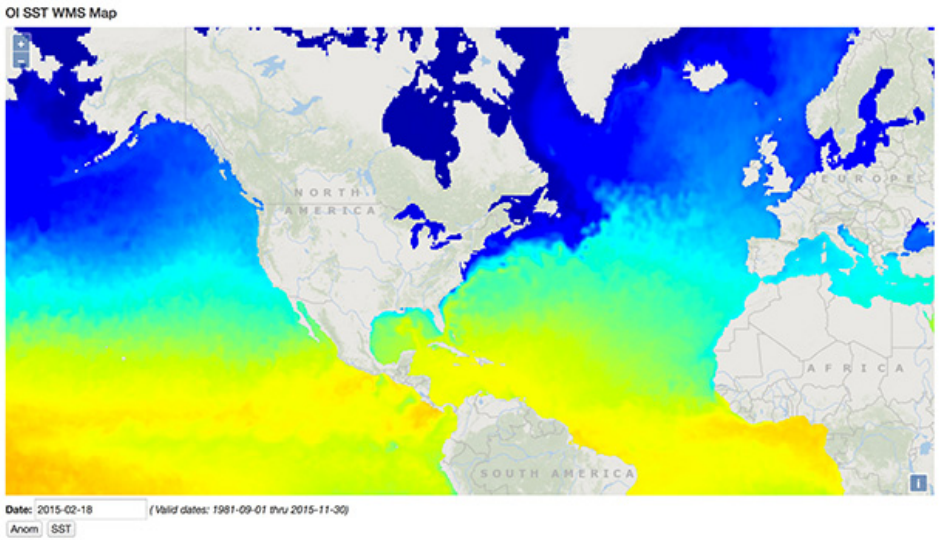
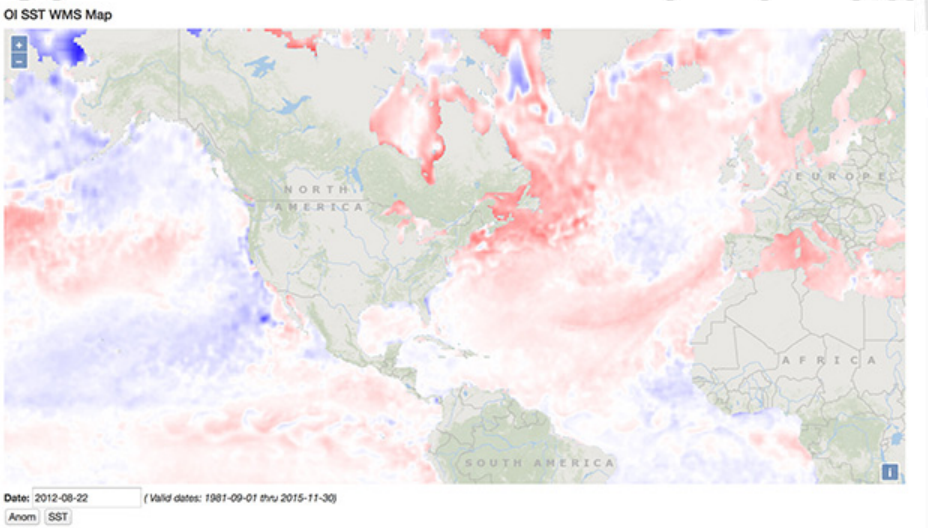
- **Define audience** and engage in process (e.g. fisheries managers, researchers, industry leaders, ENGOs)
- Make complex climate-relevant data **accessible and easy** to understand
- Develop **interactive visualizations** to quickly assess conditions in the ocean and evaluate them in the context of *past, present and projected* change
- Keep **data fresh** through automated daily updates

# The Data: Sea Surface Temperature

- NOAA NCEI daily Optimum Interpolation Sea Surface Temperature (OISST)
  - Sea Surface Temperature (daily OISST)
  - Anomalies (daily OISST minus 30-year climatology mean) to represent departures from normal or average conditions

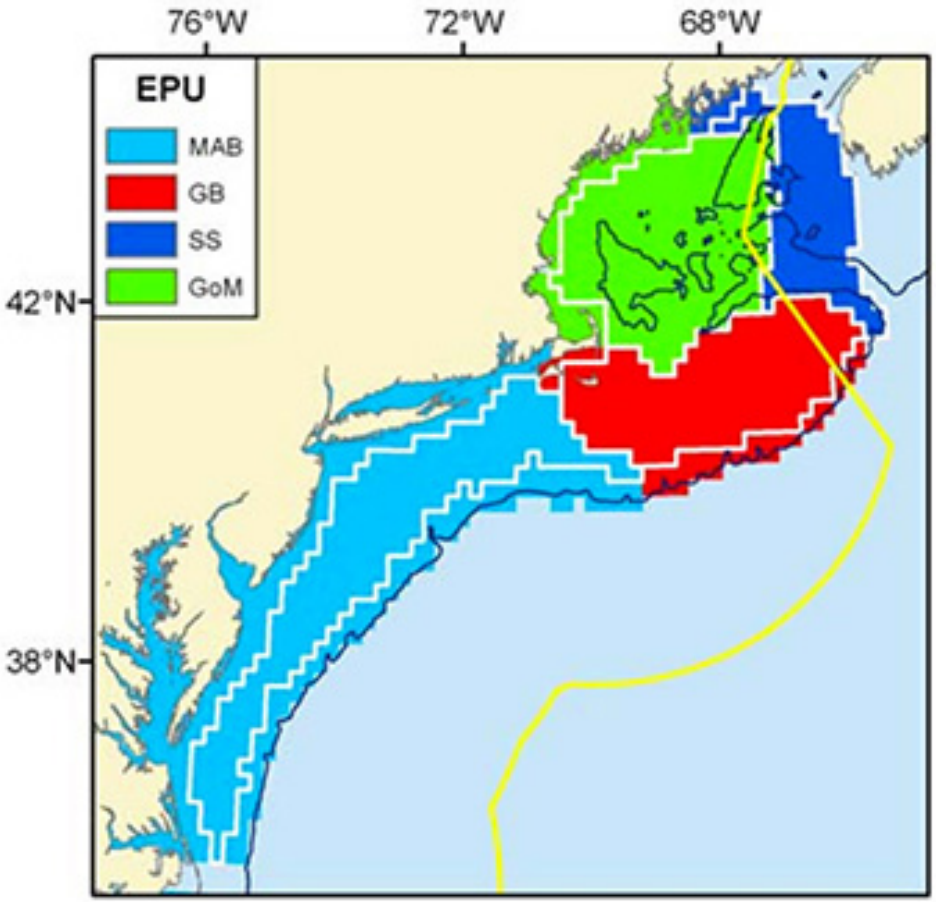



OISST - https://www.ncdc.noaa.gov/cdr/oceanic/sea-surface-temperature-optimum-interpolation

# Make it Relevant: Spatial Averaging

- Define sub-regions (Ecological Production Units – EPUs)
- Aggregate data from all grid points within sub-region (bounding box)
- Average time series for each grid point within the sub-region



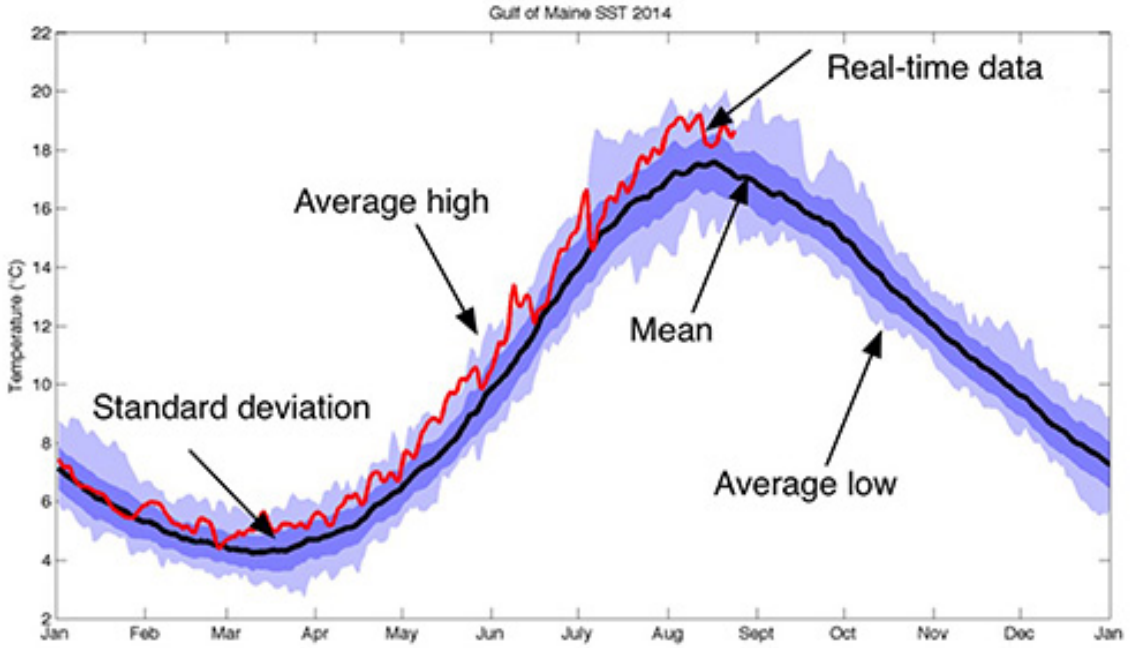

http://www.nefsc.noaa.gov/publications/crd/crd1207/

**Northeast Shelf EPUs: Gulf of Maine, Georges Bank, Scotian Shelf and Mid-Atlantic Bight**

# Make it Relevant: Climatologies

**To answer the simple question: 'are we hot or cold?'**

- Need reference level or climatology that defines what is normal
- 30 year period (1/1/1982-12/31/11) calculate high/low means, averages and standard deviations for each sub-region for each day of the year
- The values become background climatology that current conditions (monthly/daily) can be overlaid with current data dynamically updated on a daily basis



# Make it easy to use: The Interface

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**Marine Ecosystem Outlook Dashboard** Temperature Data Fisheries Data Outlooks and Advisories

## NOAA Fisheries Data Dashboard v0.2

**The Northeast Shelf Large Marine Ecosystem (NES LME) Dashboard** provides direct access to the latest and most relevant data on climate and ocean conditions for use in preparing for and responding to changes in the ecosystem. The preliminary dashboard focused on a deep dive into the NOAA OISST dataset for SST and anomaly. The footprint for the data is the full NES LME, with regions subset to match the Ecological Production Units of Gulf of Maine, Georges Bank, Scotian Shelf, and Mid-Atlantic Bight.

Click the **Temperature Data** tab to view the up-to-date data presented in the context of historical normals. The data are refreshed daily to provide a dynamic picture of the ecosystem. You can also quickly access other efforts in the region through the **Resources** tab.

We are working on additional data to include such as fisheries landings, other physical data (chlorophyll, salinity, precipitation). Please let us know what you think!

Send Feedback

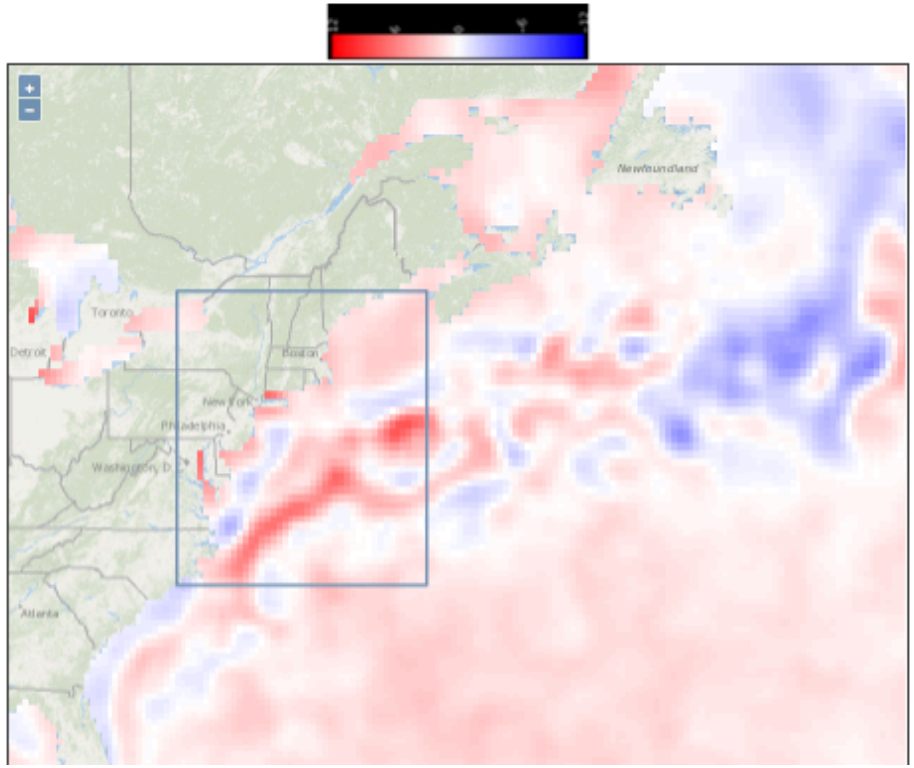
**Latest Regional Outlooks/Advisories**

- Spring 2016 NOAA Northeast Regional Climate Outlook
- 2016 GMRI Lobster Forecast
- NMFS Ecosystem Current Conditions Spring 2016

**Recently Updated Datasets**

- SST climatologies for sub-regions
- SST and anomaly maps
- OISST SST and anomaly time series for sub-regions

**Latest in the NES LME - May 13, 2016**




**Resources**

**Current Conditions of the Northeast Shelf Ecosystem**

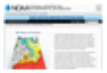
Summary of conditions for the Northeast Shelf Ecosystem. Produced in the spring and the fall, the Current Conditions of the Northeast Shelf Ecosystem provides information on sea surface temperature, phytoplankton and zooplankton blooms, chlorophyll distribution, species trends, long term projections and more.

**Gulf of Maine Region Climate Impacts and Outlook and Dashboard**

The quarterly Gulf of Maine Region Climate Impacts and Outlook offers a snapshot of recent weather events and anomalies; regional weather impacts on ecosystems and economic sectors; and a forecast for the coming three months.

**North American Multi-Model Ensemble**

The North American Multi-Model Ensemble (NMME) is a seasonal prediction system that combines forecasts from the leading North American climate models. It constitutes a multi-agency and multi-institutional research-to-operations (R2O) effort jointly led by the NOAA Climate Program Office (CPO) Modeling, Analysis, Predictions, and Projections (MAPP) program and the NOAA Climate Test Bed (CTB).



**Northwest Atlantic Regional Climatology**

NCEI Regional Climatology Team developed a new set of high-resolution quality-controlled long-term annual, seasonal and monthly mean temperature and salinity fields on different depth levels.

**OceanAdapt**

OceanAdapt is a collaboration between the Pinsky Lab of Rutgers University and the National Marine Fisheries Service (NMFS) to provide information about the impacts of changing climate and other factors on the distribution of marine life to the National Climate Assessment, fisheries communities, policymakers, and to others.

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**Marine Ecosystem Outlook Dashboard** Temperature Data Fisheries Data Outlooks and Advisories

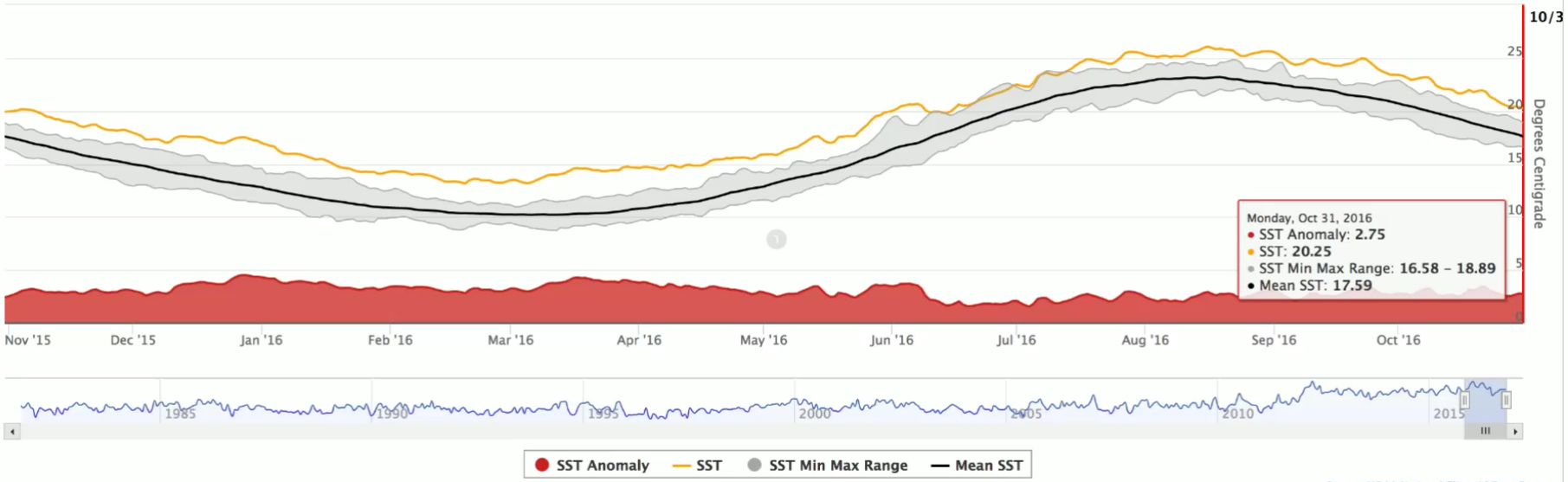
powered by Screencastify Lite

## OISST SST & Anomaly

**Northeast Shelf - Oct 30, 2016**

Zoom 1m 3m 6m YTD **1y** All

From Oct 31, 2015 To Oct 31, 2016




Source: NOAA National Climatid Data Center

### Selection Controls

Selected Region: Northeast Shelf

Select Map Layer: ANOM SST

# Still images in place of video

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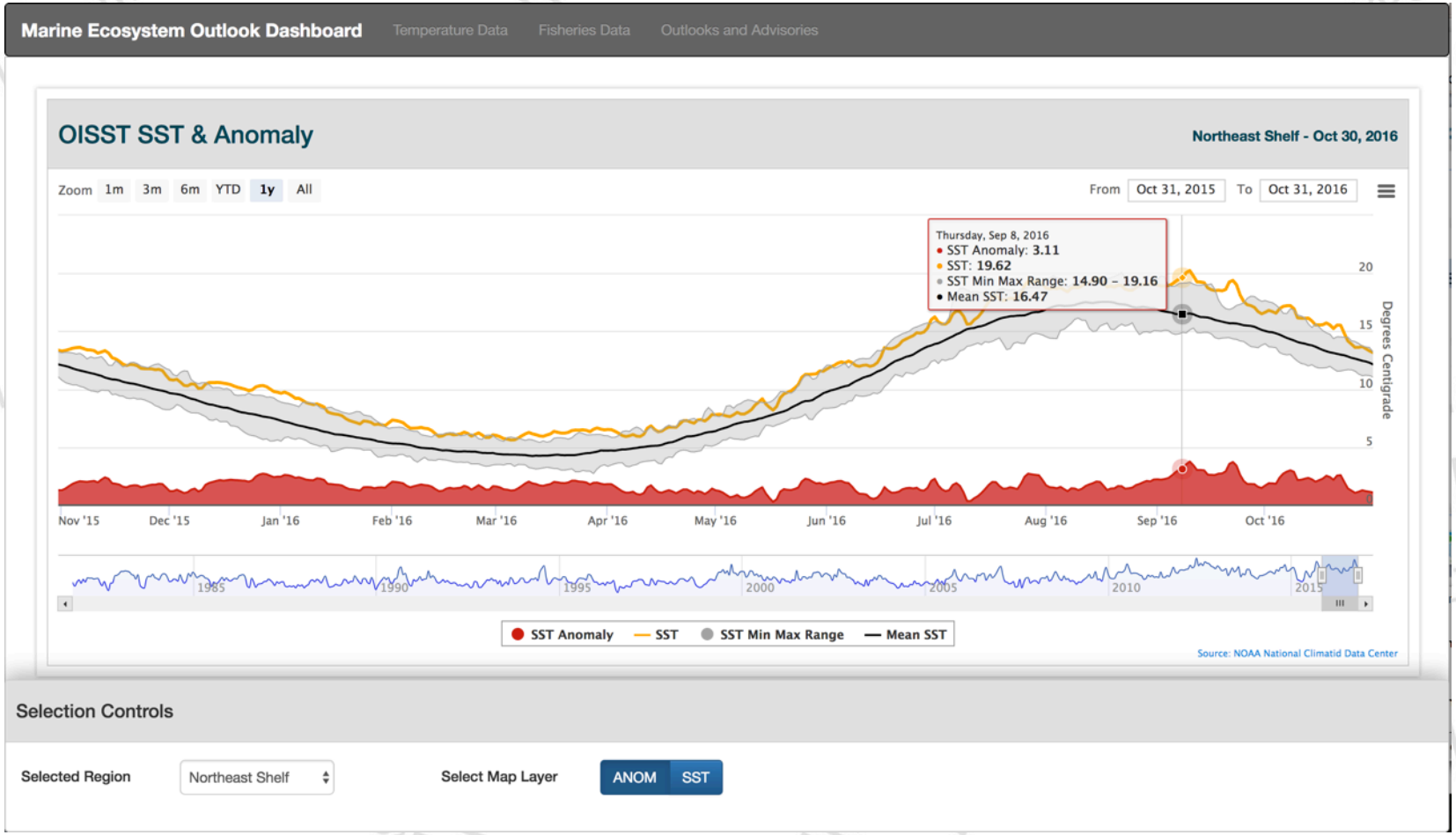

# Anomaly Trends

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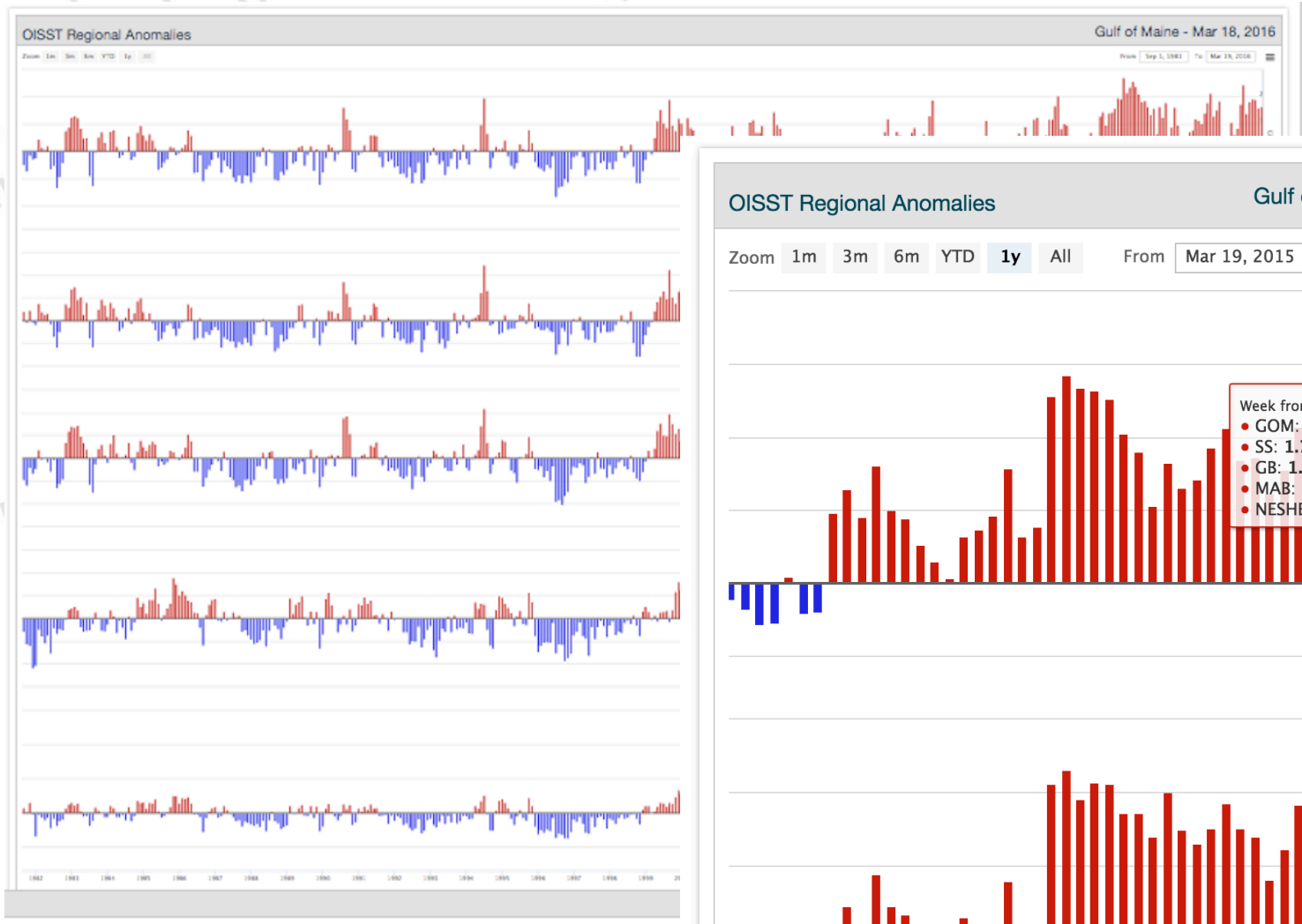


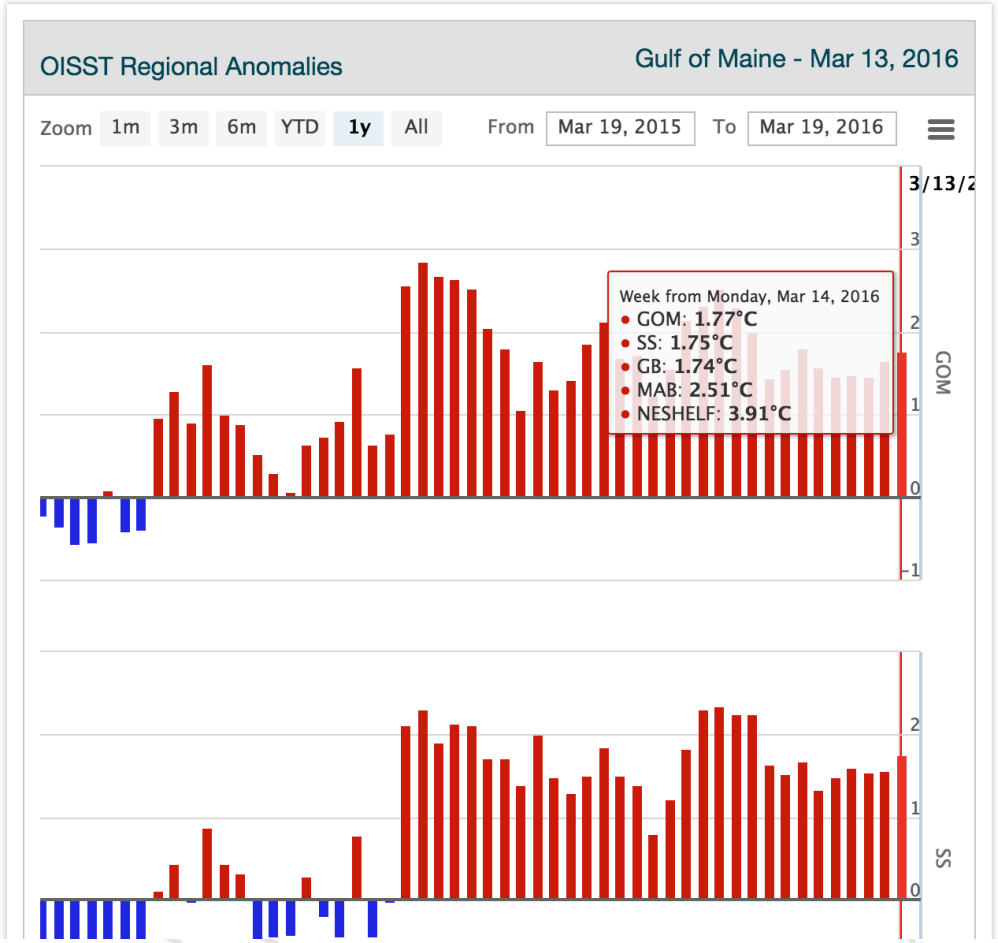

# Anomaly Map

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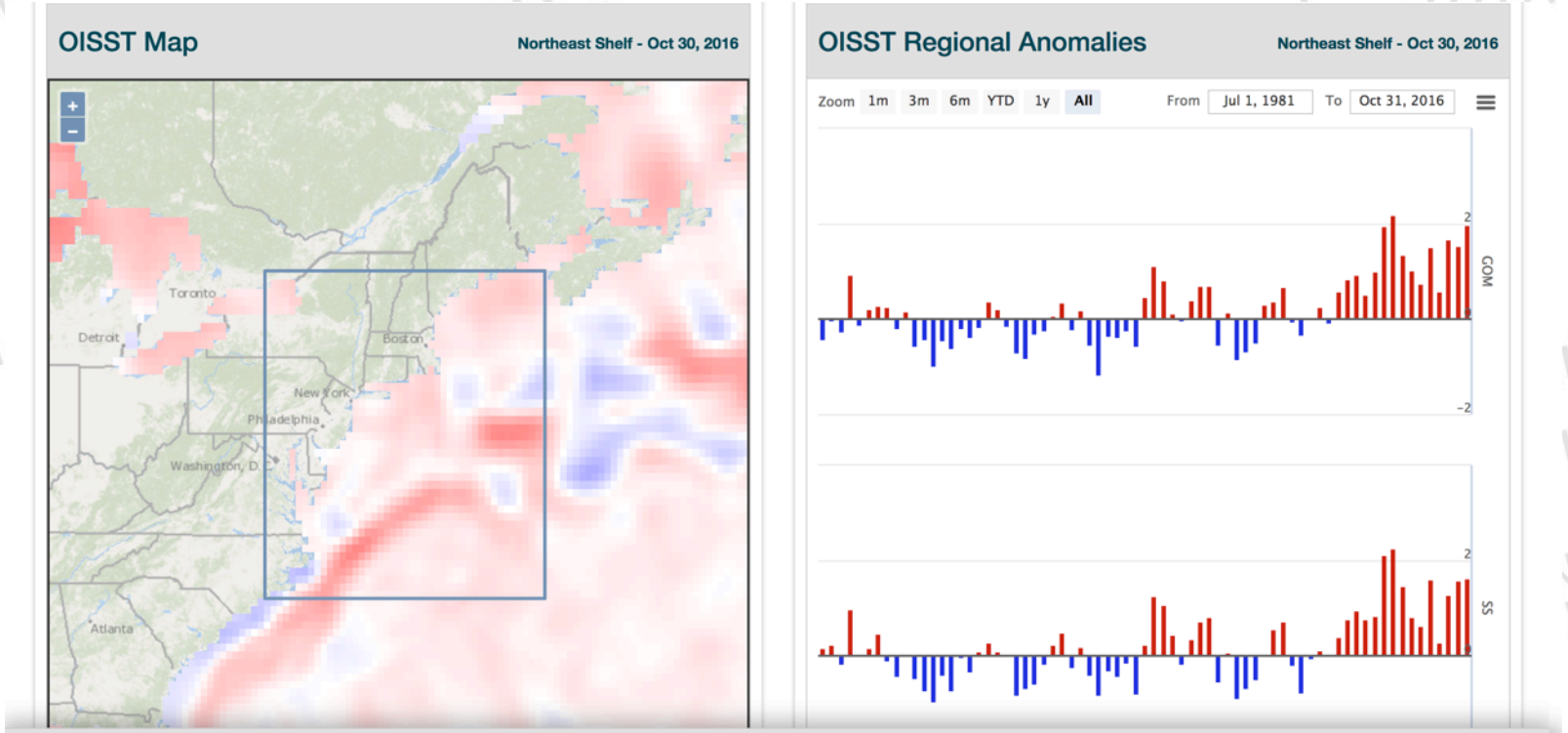

# Next steps: 2017-2018

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- Where we are:
  - Functioning beta version of dashboard with OISST temperature and anomaly data
  - Engaging ever growing group of stakeholders to define data needs and
- Where we are going:
  - Launch the dashboard in 2017!
  - Integrate new data sources (chlorophyll, precipitation, fish landings)
  - Add data access tools (download in csv)
- What is working
  - A use case, clearly defined and an engaged team to help maximize what we can do to reach the broadest audience
- Challenges
  - Needs often change depending on who is in the room
  - Building too specific of a use case, could become complicated to scale

# Thank You!

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- Questions/comments/tell me when it's live:
  - rmorse@gmri.org @rylekyot 
- Special thank you to our project partners/funders:
  - NOAA National Centers for Environmental Information
    - NOAA Regional Climate Services (Eastern Region)
  - NOAA Climate Program Office
  - NOAA National Marine Fisheries Service
    - Northeast Fisheries Science Center
    - Greater Atlantic Regional Fisheries Office (GARFO)
  - MARACOOS & NERACOOS (NOAA Integrated Ocean Observing System)
  - CINAR (Cooperative Institute for the North Atlantic Region)

...and growing

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