Mid-Atlantic Ocean Forum

Welcome! The Forum will begin momentarily.
While you wait, please let us know your favorite ocean movie title and your affiliation to the right.

You can also join the conversation on Twitter
#MidAForum @OurOceanMARCO

MARCO
Mid-Atlantic Regional Council on the Ocean

Mid-Atlantic Committee on the Ocean

Webinar Logistics & Overview

Tony MacDonald
Director, Monmouth University
Urban Coast Institute

- **Webinar Background Info link available (bottom left) for reference. General 'Chat' box to be monitored throughout for questions/issues.**
- **The Forum will be highly interactive, and its success depends on your participation**
- **Comments/questions will be captured**
- **Forum recording and summary will be shared along with presentations and background materials**

Agenda

10:00 a.m. **WELCOME**

- Overview and Logistics

10:15 a.m. **KEYNOTE REMARKS**

10:30 a.m. **POLICY, CLIMATE AND TECHNOLOGY PERSPECTIVES ON FUTURE OCEAN MANAGEMENT**

- White House Office of Science and Technology Policy Perspectives on Future Ocean Management
- Changing Climate, Changing Ocean
- The Future of Offshore Wind Energy Technology

11:00 a.m. **PARTICIPANT PERSPECTIVES, Q&A**

11:15 a.m. **STAKEHOLDER INPUT: FUTURE DIRECTIONS FOR MID-ATLANTIC OCEAN MANAGEMENT**

- Building on Current MACO and Work Group Efforts
- Brainstorming Other Collaboration Needs & Opportunities

12:15 p.m. **WRAP-UP AND NEXT STEPS**

MID-ATLANTIC OCEAN FORUM

WELCOME

Kisha Santiago-Martinez
New York State Deputy Secretary of State,
Chair, Mid-Atlantic Regional Council on the Ocean (MARCO) Management Board

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

MID-ATLANTIC OCEAN FORUM

WELCOME

Kevin Hassell
Environmental Specialist, New Jersey Department of Environmental Protection,
Chair, Mid-Atlantic Committee on the Ocean (MACO)

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

MID-ATLANTIC OCEAN FORUM

KEYNOTE REMARKS

Alicia Barton
President and CEO,
New York State Energy and Research Development Authority (NYSERDA)

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

MID-ATLANTIC OCEAN FORUM

POLICY, CLIMATE & TECHNOLOGY PERSPECTIVES ON FUTURE OCEAN MANAGEMENT

Darryl Francois
Chief of Engineering and Technical Review,
Bureau of Ocean Energy Management (BOEM)
Office of Renewable Energy Programs

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

Panelists

Deerin Babb-Brott
Principal Assistant Director for Oceans and Environment, White House Office of Science and Technology Policy

Charles Stock
Research Oceanographer, National Oceanic and Atmospheric Administration (NOAA) Geophysical Fluid Dynamics Laboratory

Walt Musial
Offshore Wind Lead,
National Renewable Energy Laboratory

Ocean Policy Committee Update
For the Mid-Atlantic Ocean Forum

Deerin Babb-Brott
Principal Assistant Director,
Oceans and Environment
Office of Science and Technology Policy

www.whitehouse.gov/ostp
www.ostp.gov
@WHOSTP

Summary (https://www.whitehouse.gov/ceq/initiatives/ocean-policy/)

- Policy actions to advance:
  - Mapping, exploring, and characterizing the U.S. EEZ and AK
  - Efficiency in authorizations for research, mapping, and exploration
  - Regional and national data and decision-making capacity
- Context
  - Executive Order 13840 "Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States" (2018)
  - Science and Technology for America's Oceans: A Decadal Vision (2018)
  - White House Summit on Partnerships for Ocean S&T (2019)
  - Presidential Memorandum on Ocean Mapping of the EEZ and Shoreline/Nearshore of Alaska (2019)
  - ORM data implementation plan

Background

- Executive Order 13840 "Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States" (2018)
  - Data, ROPs, engagement with ocean community, partnerships to advance ocean S&T
- Science and Technology for America's Oceans: A Decadal Vision (2018)
  - Five national goals; five "immediate opportunities," including:
    - Data integration on decision support tools
    - Ocean exploration and characterization
    - Research and technology partnerships

Summit on Partnerships/Ocean S&T

- Build and support partnerships across academia, private sector, philanthropy, and government
- Opener: Scripps, Walton Family Foundation, Fugro USA, OSTP, CEQ, NSF
- Sessions framed by priorities in the Ocean Decadal Vision
  - Exploring the Ocean (NOAA & University of New Hampshire)
  - Conserving Living Marine Resources (NOAA and TNC)
  - Protecting Coastal Health and Safety (NOAA and WHOI)
  - Sustaining Ocean Observations (ONR and Marine Technology Society)
  - Promoting Food Security (NOAA and University of South Florida)
  - Enabling Ocean Energy (DOE and Shell)
  - Characterizing Ocean Life (NASA and Rockefeller University)
  - Leveraging Big Data (NSF and MBARI)

Summit on Partnerships/Ocean S&T

- Takeaways:
  - The U.S. is poised to lead a second era of bold innovation in ocean S&T
  - Partnerships across academia, philanthropy, the private sector, and government are essential to advancing ocean S&T
  - A collaborative and dynamic strategy for partnerships in ocean S&T would coordinate, focus, and catalyze national effort
- Follow-up sessions held at academic and industry conferences/events; Federal Register request for public comment

PM on Ocean Mapping

- Map the U.S. Exclusive Economic Zone (EEZ)
- Explore and characterize priority areas of the EEZ (FR notice)
- Map Alaska nearshore and shoreline (FR notice)
- Increase permitting efficiency for exploration

National Strategy for Ocean Mapping, Exploration, and Characterization

- Map the U.S. Exclusive Economic Zone (EEZ)
- Explore and characterize priority areas
  - Identify priority areas
  - Partner with non-USG entities
  - Integrate new and emerging technologies
- Task Force draws from Congressionally-mandated SOST Interagency Working Group on Ocean and Coastal Mapping
- Co-Chaired by Dr. Alan Leonardi and RDML Shep Smith

Process for Mapping & OE Strategy

Ocean Policy Committee

Ocean Science & Technology Subcommittee	Ocean Resource Management Subcommittee	NOAA
Task Force drafts National Strategy for Mapping, Exploration, and Characterization	ORM drafts recommendations for efficient permitting of mapping, exploration, and characterization activities	NOAA drafts Strategy for Mapping the Arctic and Sub-Arctic Shoreline and Nearshore of Alaska

Timelines

- June 2020 Ocean Month
  - Presidential Proclamation
  - National mapping strategy (PMs2)
  - Alaska mapping strategy (PMs3)
  - Research permitting recommendations (PMs4)
  - Partnerships for ocean S&T report
- Summer
  - Begin implementation of s2, 3, and 4
  - Continue ORM data implementation
  - s4 recommendations can advance regional data, best practices, process interests

Office of Science and Technology Policy

www.whitehouse.gov/ostp
www.ostp.gov
@WHOSTP

MID-ATLANTIC OCEAN FORUM

Charles Stock

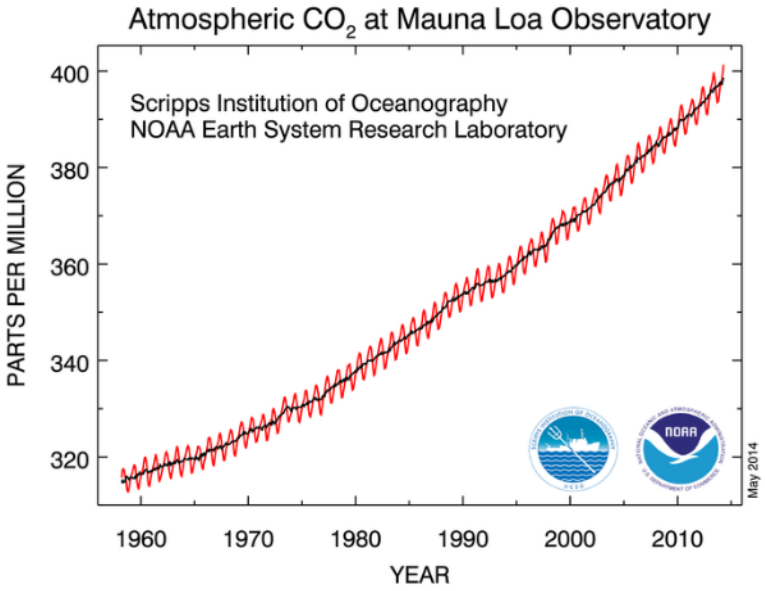
Changing Climate, Changing Ocean

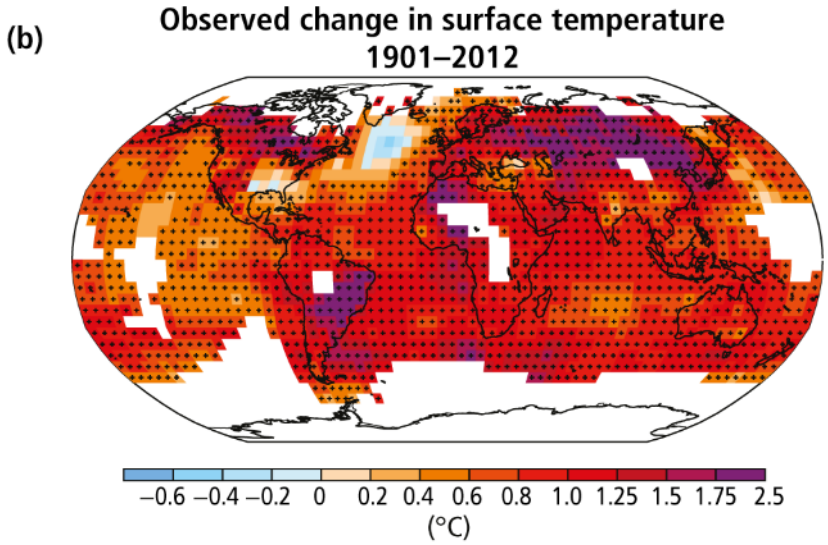
NOAA/Geophysical Fluid Dynamics Laboratory

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

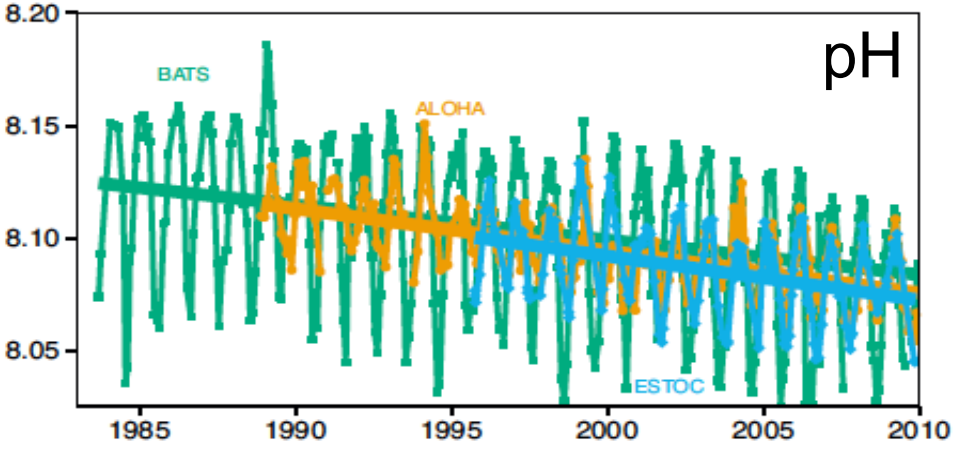
MID-ATLANTIC COMMITTEE ON THE OCEAN

Thank your local ocean



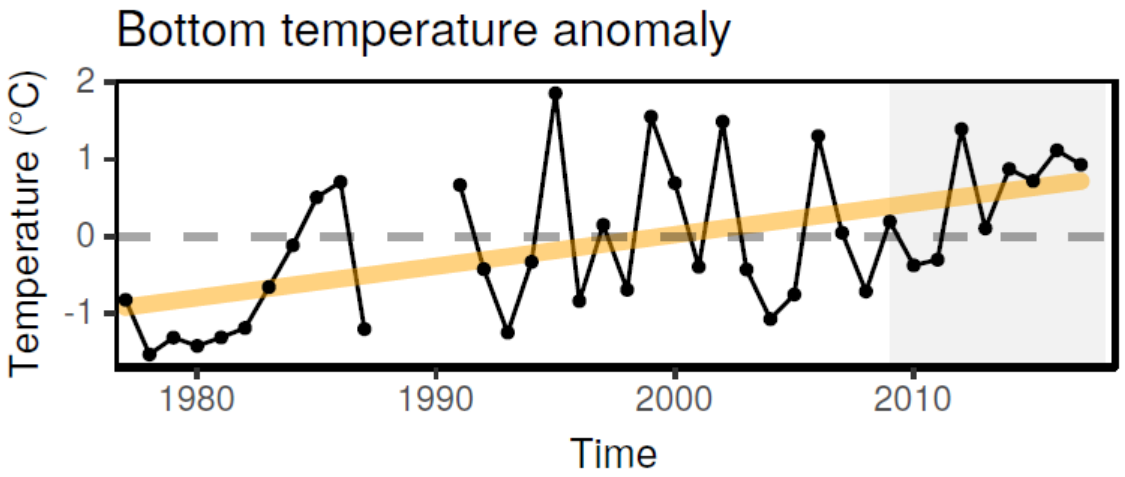


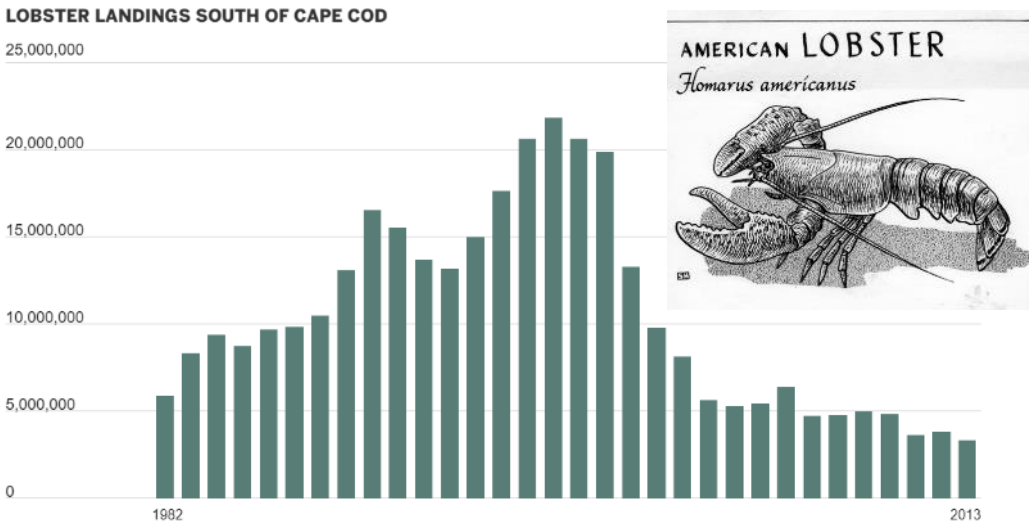
The ocean has absorbed 1/3 of emitted CO_2 and over 90% of the heat added by greenhouse gases. This service, however, has come with a price: warming, acidification, deoxygenation, stratification.

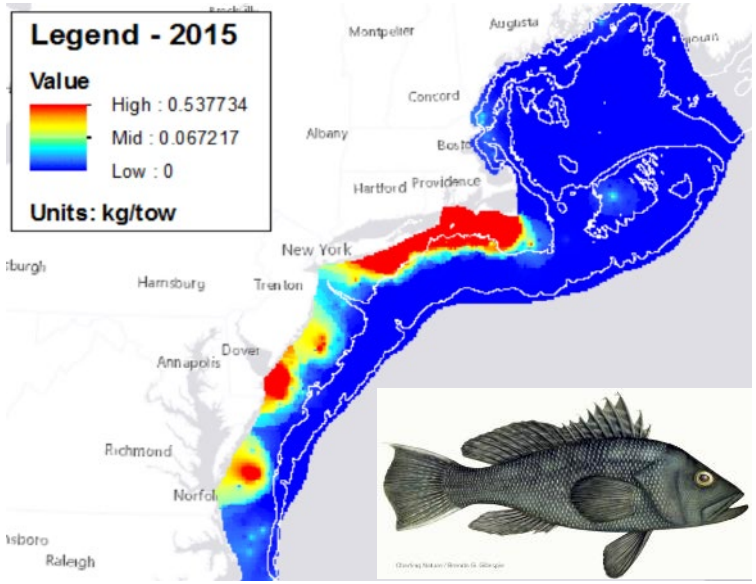


Source: IPCC's 5th assessment report

What about the Mid-Atlantic shelf?

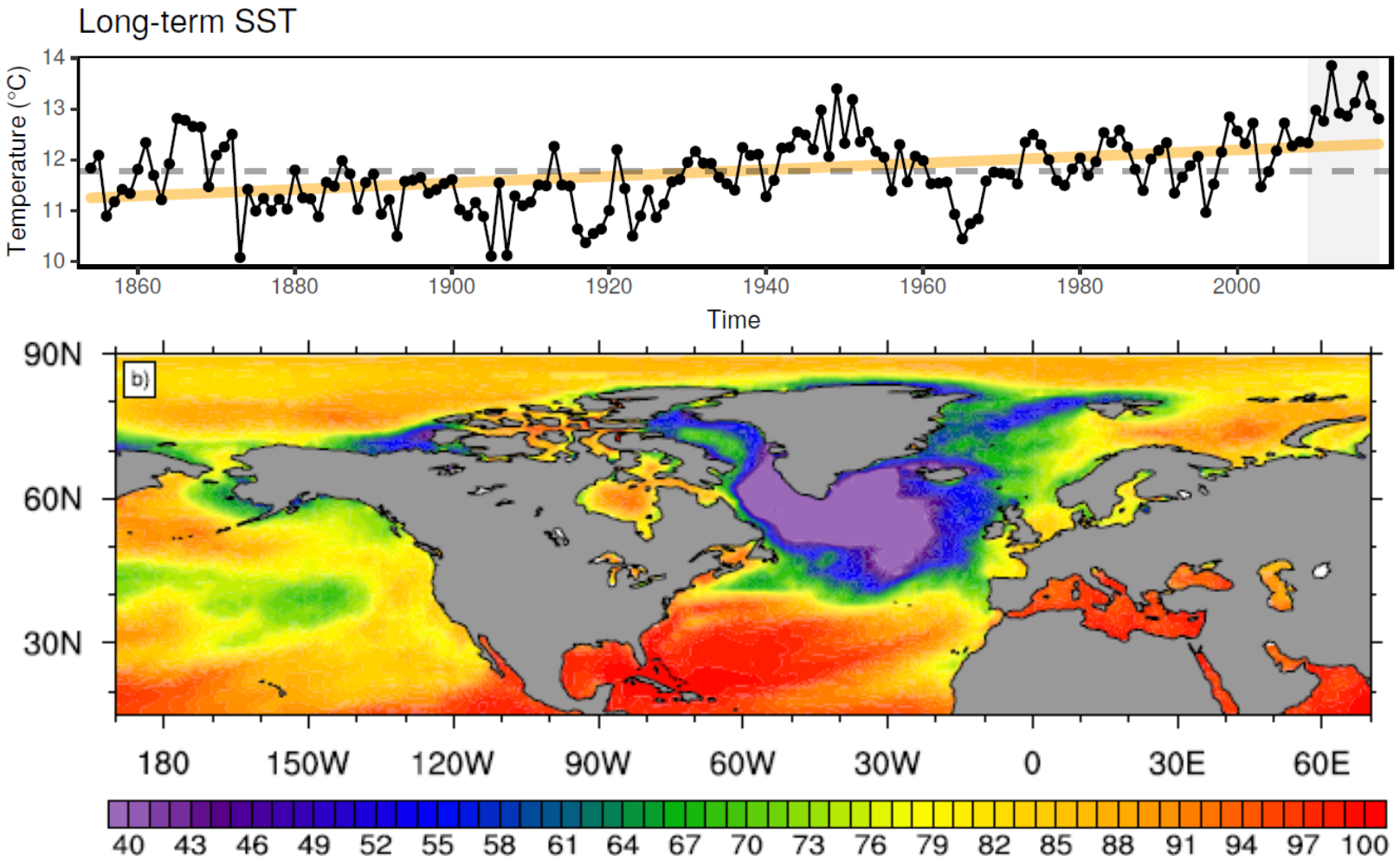






Sources: NOAA fisheries 2019 MAB SOE report; Boston Globe; Rutgers Ocean Adapt (Prof. Malin Pinsky)

Is this just a warm spell or is it here to stay?

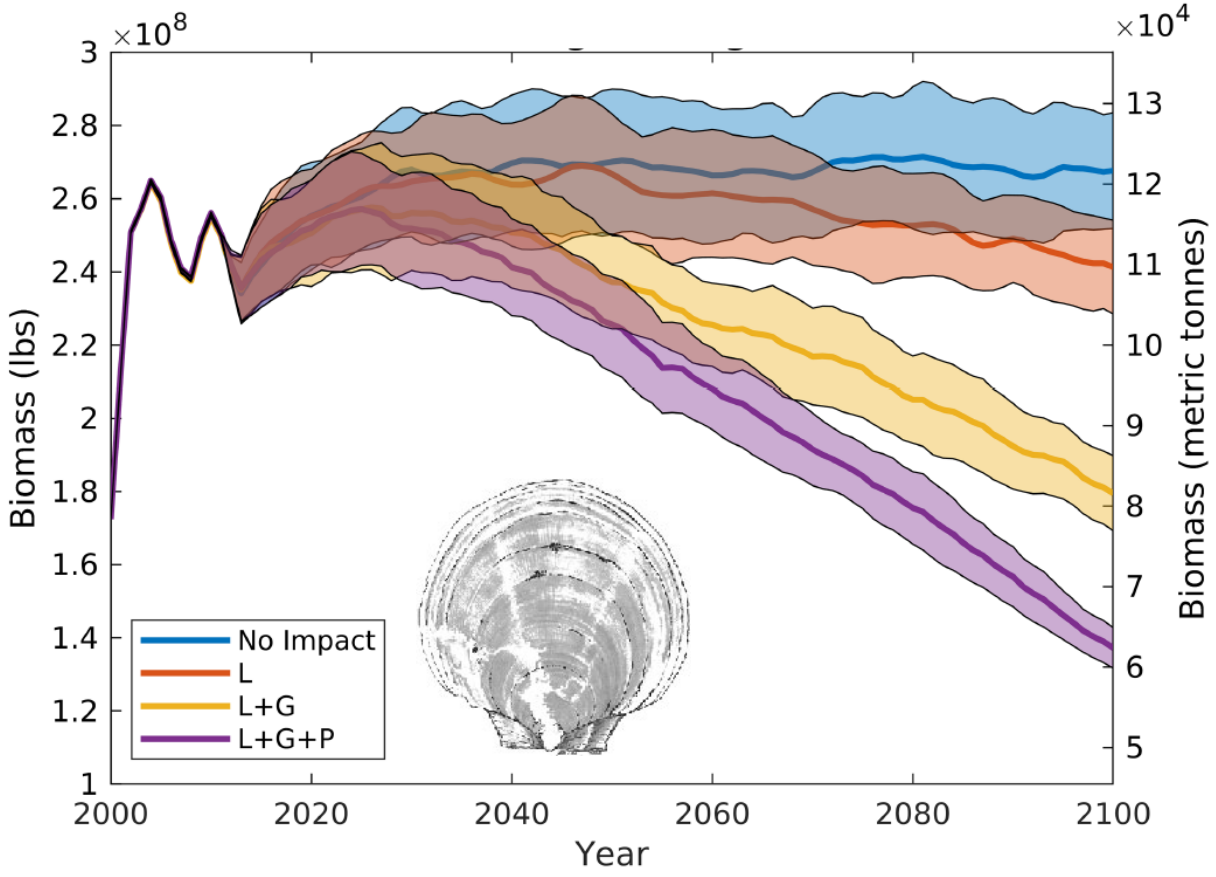


Most years will be warmer than the warmest year observed between 1976-2005 by the middle of this century

Sources: NOAA Fisheries, 2018 MAB SOE report; Alexander et al. (2018) *Elem. Sci. Anth.*

Ocean Acidification

Scallop biomass with high greenhouse gas emissions and adaptive management

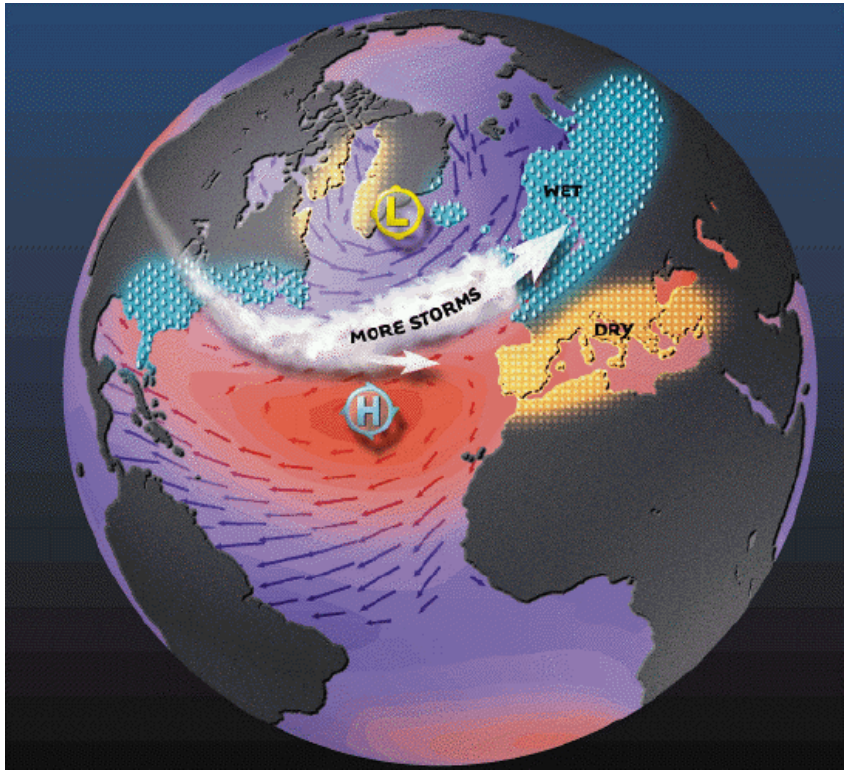


- Different colors correspond to range of acidification impacts on scallops ecology and life cycles
- Resilient over the next 20 years, but sharp declines possible afterward
- Numerous ongoing efforts by NOAA fisheries and partners to determine which colored curve is most likely (NEFSC; Shannon Meseck; Dvora Hart)

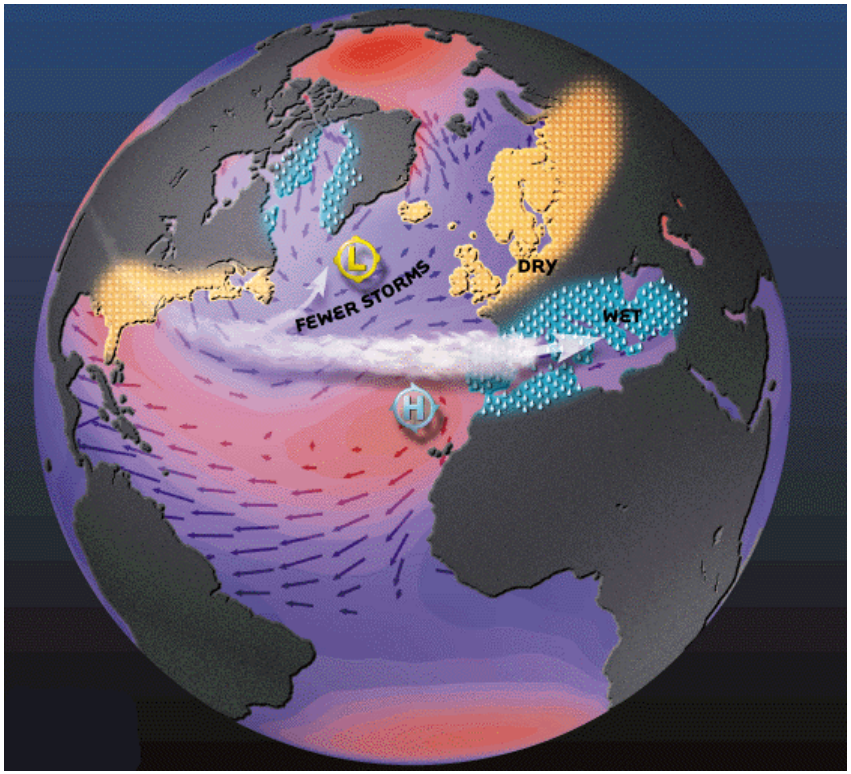
Source: Rheuban et al., 2018; PLoS ONE

Climate and shifting winds

An Example: The North Atlantic Oscillation



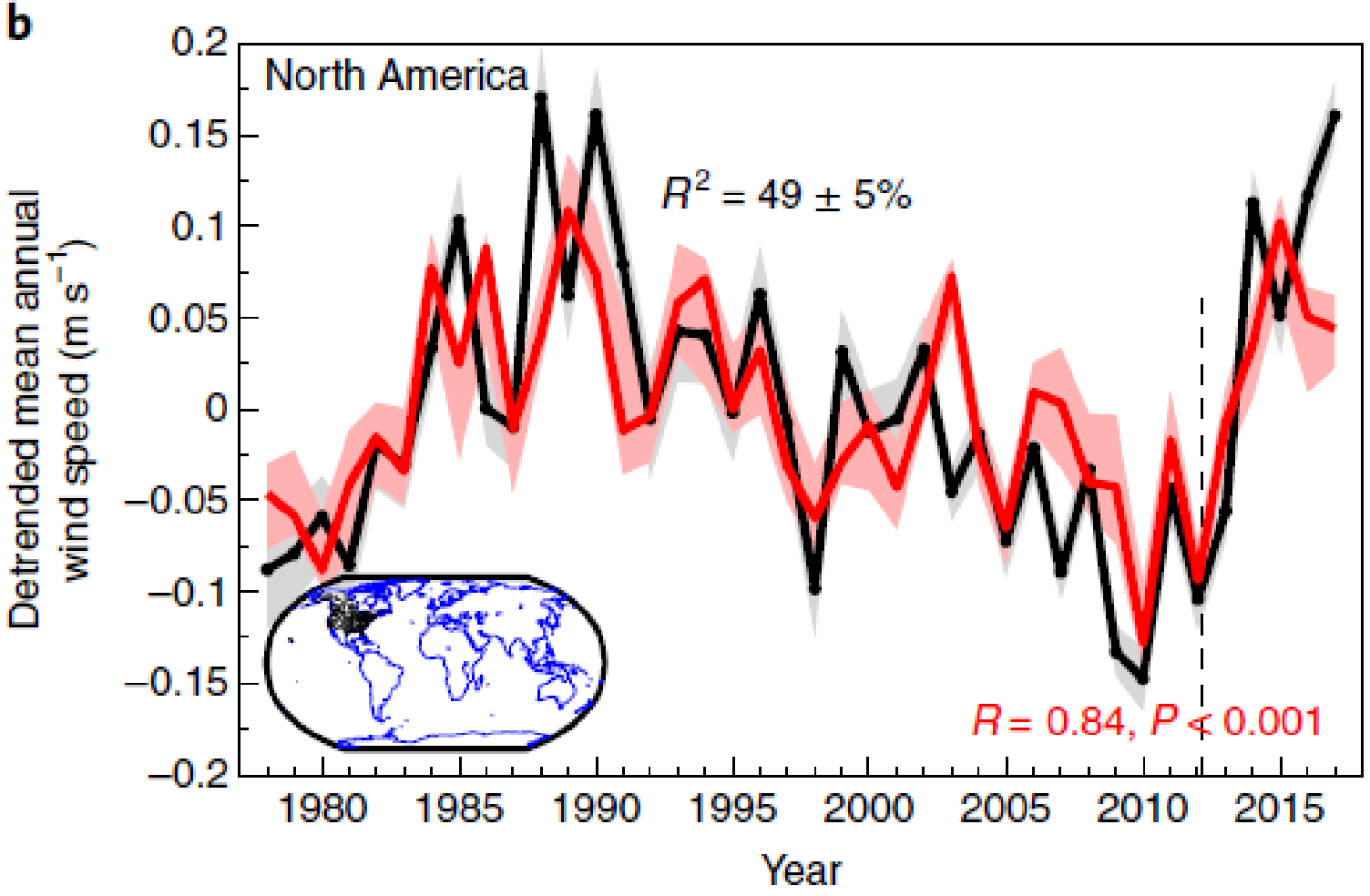
Positive NAO



Negative NAO

Climate and shifting winds

Observed North American wind speed anomalies (black line) versus that explained by climate variability (red line)



Source: Zeng et al., Nature Climate Change, 2019

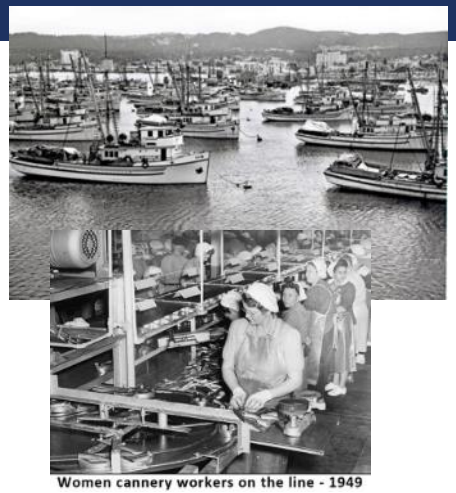
Other climate topics for discussion

- Rising sea levels
- Potential increased hurricane risks
- Potential increased river flow extremes
- Altered seasonality and amount of ocean productivity
- Changes in ocean salinity

- Advances in ocean predictions and projections
- Opportunities to Mitigate the risks of climate variability and change on coastal communities and coastal ecosystems

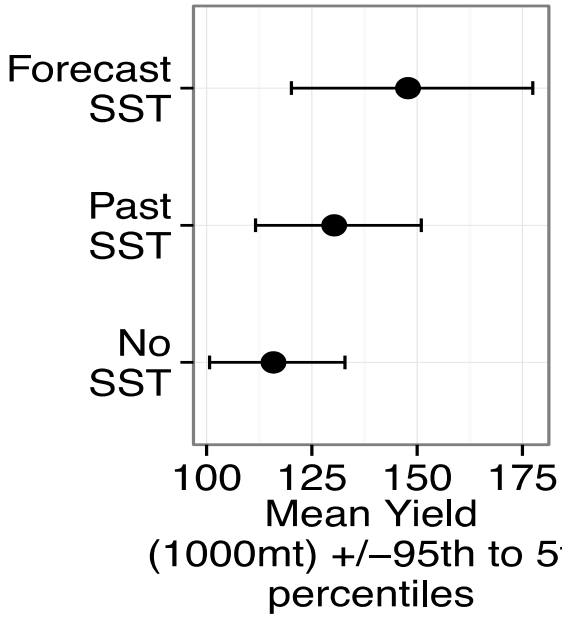
Mitigating climate variability and change impacts

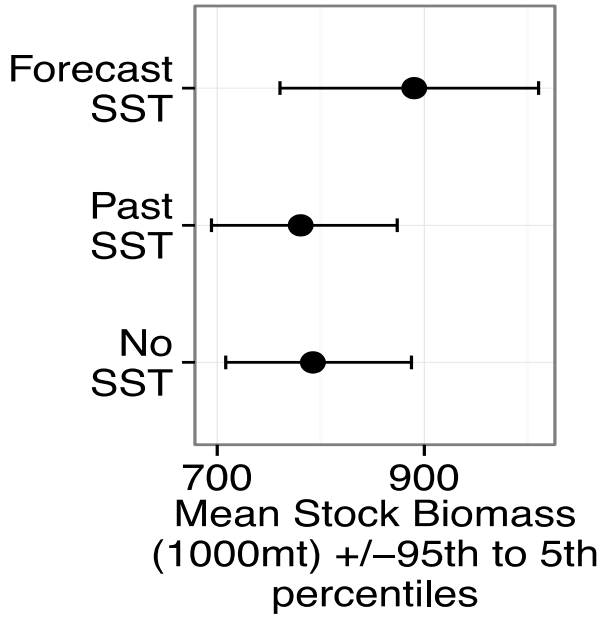

Unloading sardines - 1920s


Women cannery workers on the line - 1949


End of an Era - Cannery Row.1950

Environmental Considerations





Sources: City of Monterey; Tommasi et al., 2017; Ecological Applications

MID-ATLANTIC OCEAN FORUM

The Future of Offshore Wind Energy Technology

Walt Musial
Offshore Wind Lead
National Renewable Energy Laboratory
Golden, Colorado

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

Why Offshore Wind Energy?

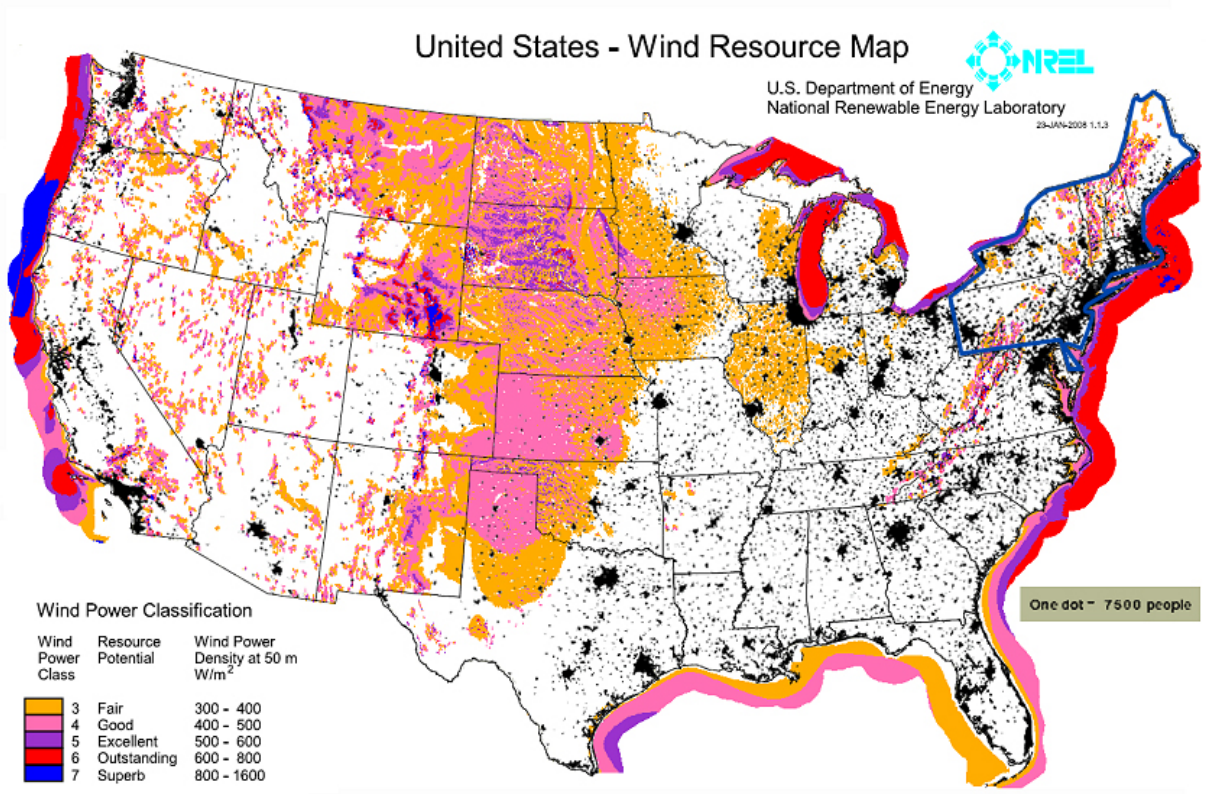


Figure credit: NREL

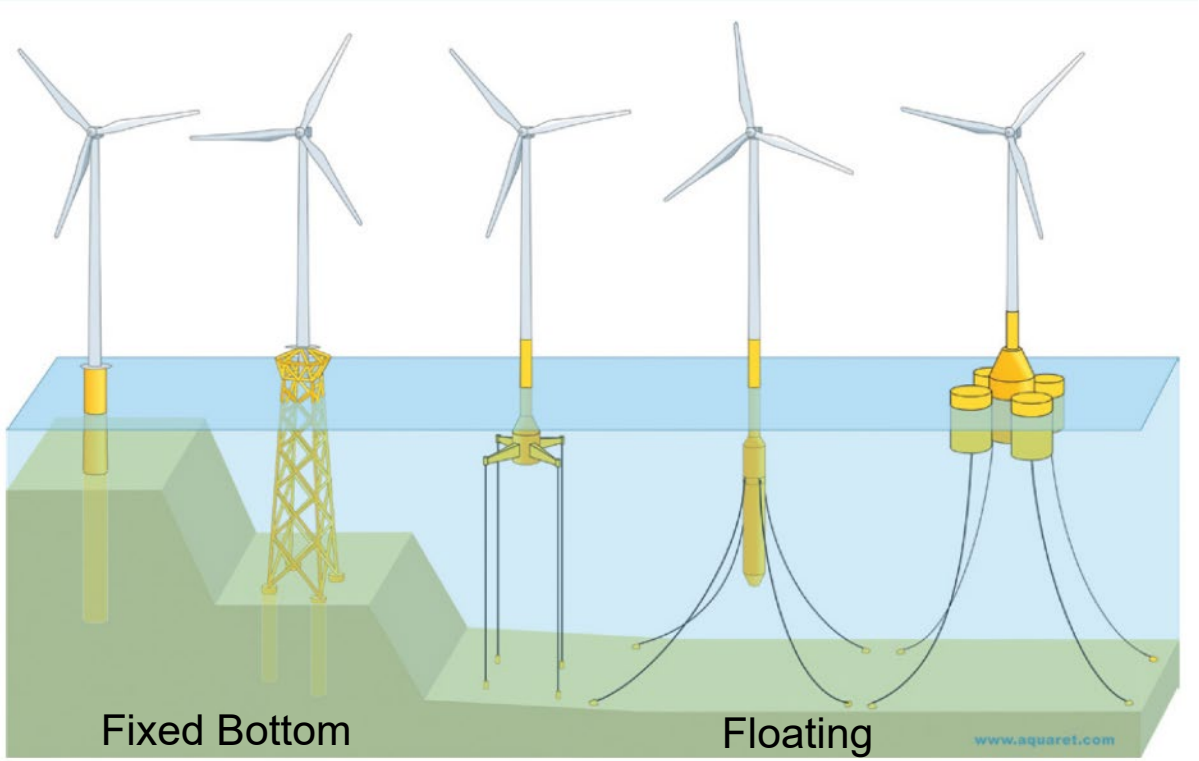
Offshore resource shown out to 50 nm from the coast. US waters extend to 200 nm from coast

- ✓Electric generation close to population (80% of U.S. lives near the coast)
- ✓Stronger, more consistent winds
- ✓Larger scale projects possible
- ✓ Creates jobs
- ✓ Revitalizes ports and domestic manufacturing

Most Offshore Wind Deployment Has Been on Fixed-bottom Support Structures

Leading Offshore Wind Countries
(Installed Capacity)

United Kingdom	8508 MW
Germany	7441 MW
China	6007 MW
Denmark	1925 MW
Belgium	1556 MW
Netherlands	1136 MW
Sweden	196 MW



27,208 MW Installed | 82 MW Installed

The future Floating Wind Energy market may be bigger than the fixed-bottom market

Floating Offshore Wind is Being Considered Where Waters Are Too Deep for Current Fixed-Bottom Technology

- 80% of offshore wind resources are in waters greater than 60 meters
- Floating wind enables sites farther from shore, out of sight, with better winds!
- Floating wind technology is expected to be at deployed at utility scale by 2024.

Some Areas of the World Being Considered for Floating Wind

Portions of this slide were adapted courtesy of Aker Solutions

Sources: EIC Global Offshore Wind report 2019; Norwep, Equinor, internal analysis

Where in the U.S. is Floating Offshore Wind Being Considered?

58% of the U.S. offshore wind resource is in water depths greater than 60m depth, which will require floating foundations

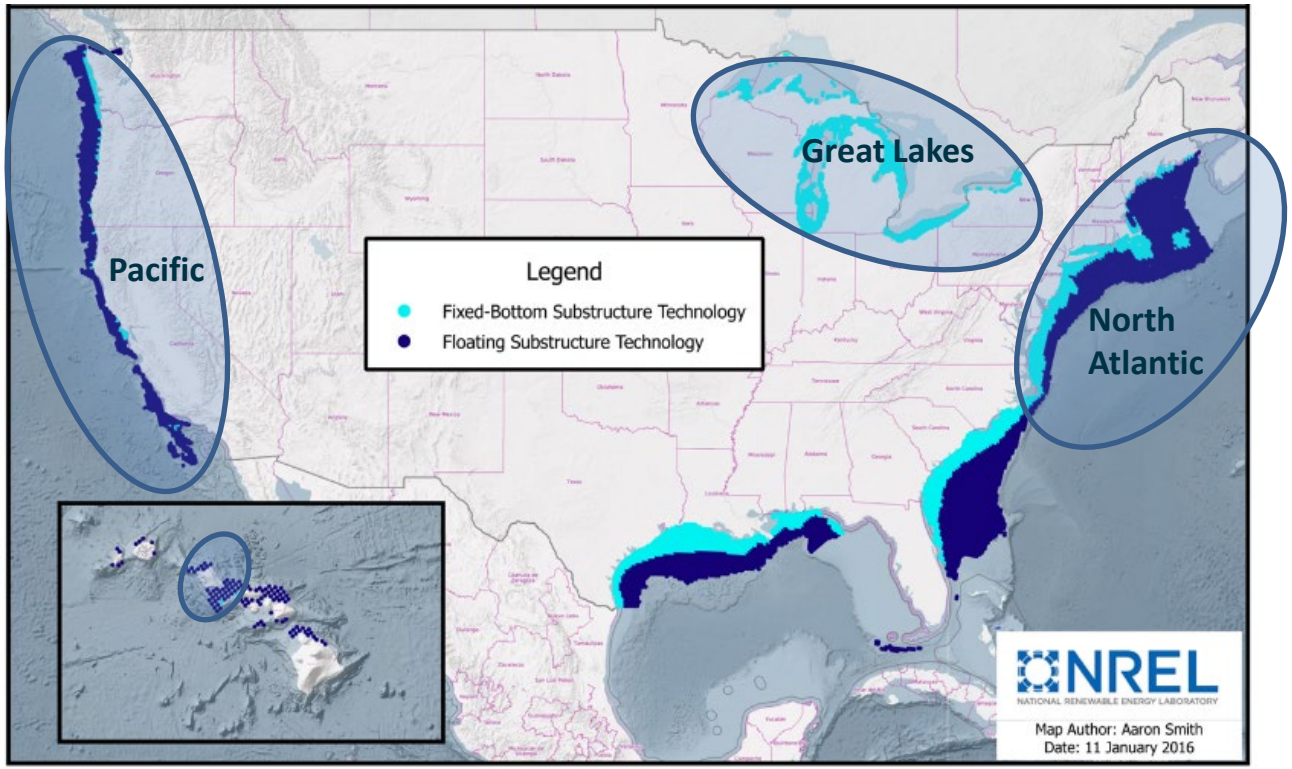


Figure credit: NREL

- **Pacific Region** – High water depths require floating technology
- **North Atlantic** – high demand, scarcity of shallow sites
- **Great Lakes** – visual impacts may require farther distances

Oil and Gas Experience Helped Accelerate First Generation of Floating Wind Turbine Prototypes

Basic types of floating wind substructures were derived from oil and gas

Oil and gas criteria alone may result in safe, but bulky and expensive designs

Next phase: Optimized engineering approach will yield commercial mass-produced utility-scale floating wind systems

Knowledge Transfer

Job Transfer

Photo credit: PPI

Photo credit: https://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/10978898/Life-on-an-oil-rig-in-pictures.html?frame=2980750

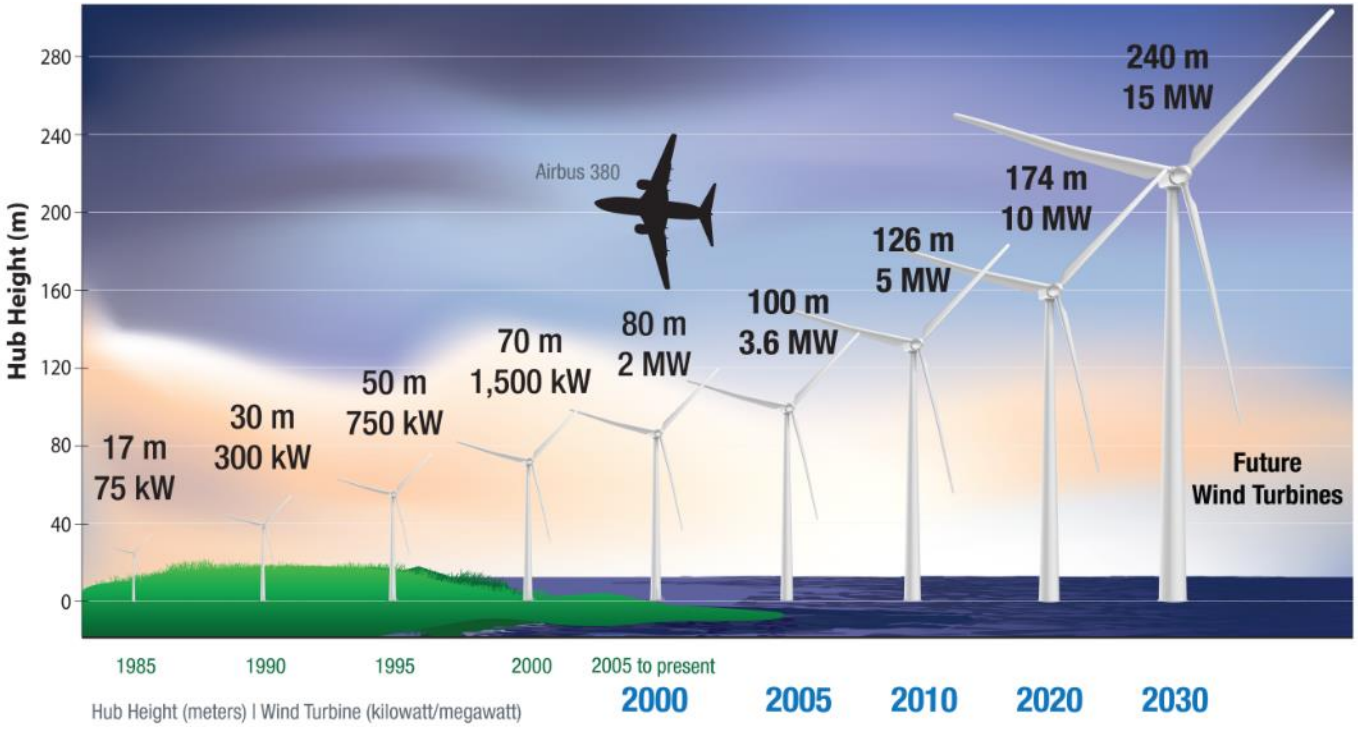
Floating Wind's Next Generation Platforms

- Lighter and more stable platforms
- Full-system designs that facilitate low turbine motion, port assembly, commissioning, and stable tow-out
- 14 Pilot-scale projects are being built to demonstrate next generation technology

Examples of Hybrid Systems

Figure credits: Stiesdal Offshore Wind and SBM

Larger Turbines Present New Challenges



Expected Turbine Growth – 15 MW by 2030

Offshore turbines are twice as big as land-based

Larger turbines lower project costs

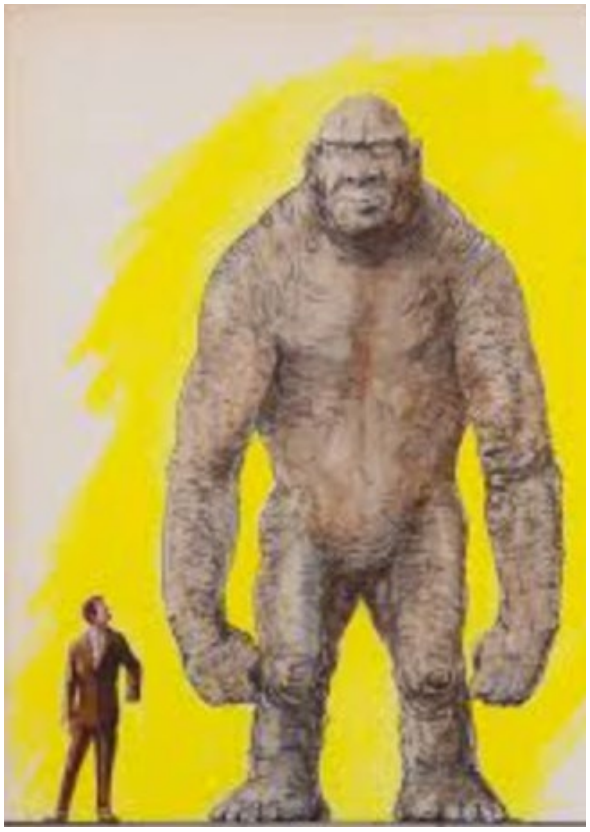
Floating and fixed-bottom offshore turbines use same turbines….so far…..

Larger turbines:

- Exceed FAA height limits
- Are more visible from shore
- Will require infrastructure upgrades or alternative installation methods

Technical Innovations Enable Continued Turbine Upscaling

- Advanced light-weight materials
- Advanced controls to limit loads and protect vital systems
- High-fidelity design and analysis tools
- Material and manufacturing innovations
- Automated service and logistics
- Remote diagnostics and robotic repairs
- Industrialization of the supply chain



The primary innovation of larger turbines are the dozens of smaller innovations that enable the larger turbine to exist

Technical Innovations Enable Larger Turbines

Photos Courtesy of GE

GE 12-MW Wind Turbine Nacelle

107-meter Blade for GE 12-MW Wind Turbine

- The GE-12MW Haliade-X wind turbine will be commercially available in 2022
- Other wind turbine manufacturers are developing larger machines in the same time frame

One 12 MW Haliade-X could supply the equivalent energy for 4,000 – 4,500 average U.S. homes

Thank you for your attention!

Walt Musial
Offshore Wind Research Platform Lead
National Renewable Energy Laboratory
walter.musial@nrel.gov

Photo Credit : Dennis Schroeder-NREL

MID-ATLANTIC OCEAN FORUM

QUESTIONS FOR PANELISTS?

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

MID-ATLANTIC OCEAN FORUM

STAKEHOLDER INPUT ON FUTURE DIRECTIONS FOR MID-ATLANTIC OCEAN MANAGEMENT

11:15 a.m. **Building on Current MACO and Work Group Efforts**

11:45 a.m. **Brainstorming Other Collaboration Needs and Opportunities**

Work Group Leads

Offshore Renewable Energy

Michael Snyder
Ocean and Great Lakes Program
Manager, New York Department of State

Maritime Commerce and Navigation Safety

Jerry Barnes
Marine Planner, Aids to Navigation Program
Manager, U.S. Coast Guard Fifth District

Ocean Acidification

Mary Ford
Director of Engagement and External Relations,
Mid-Atlantic Regional Association Coastal
Ocean Observing System (MARACOOS)

Work Group Leads

Non-Consumptive Recreation

Kevin Hassell
Environmental Specialist, New Jersey
Department of Environmental Protection

Marine Debris

Laura McKay
Program Manager,
Virginia Coastal Zone Management Program

MID-ATLANTIC OCEAN FORUM

WRAP-UP & NEXT STEPS

MARCO
MID-ATLANTIC REGIONAL COUNCIL ON THE OCEAN

MID-ATLANTIC COMMITTEE ON THE OCEAN

Upcoming Webinars & Events

- **May 28, 11 a.m. ~ MACAN Webinar: *NOAA National and Mid-Atlantic Ocean Acidification Research Plan***
- **June 9, 1 p.m. ~ MACO Webinar: *Mid-Atlantic Fish Habitat is Changing***
- **June 16, 2 p.m. ~ MARCO Portal 'How Tuesday' webinar on U.S. Coast Guard New Jersey Seacoast/ Delaware Bay Port Access Route Study (PARS) and Proposed Cape Fear River Approach Anchorage Area**

Visit midatlanticocean.org for more details

Contact: info@midatlanticocean.org