



NOAA
FISHERIES

Development of an Ecosystem Status Report (ESR) for the South Atlantic

POCs:

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Contributors:

NMFS/SEFSC

NOS/NCCOS

NCSU

Duke University

USGS

SCDNR/MARMAP

Many others

November 2018



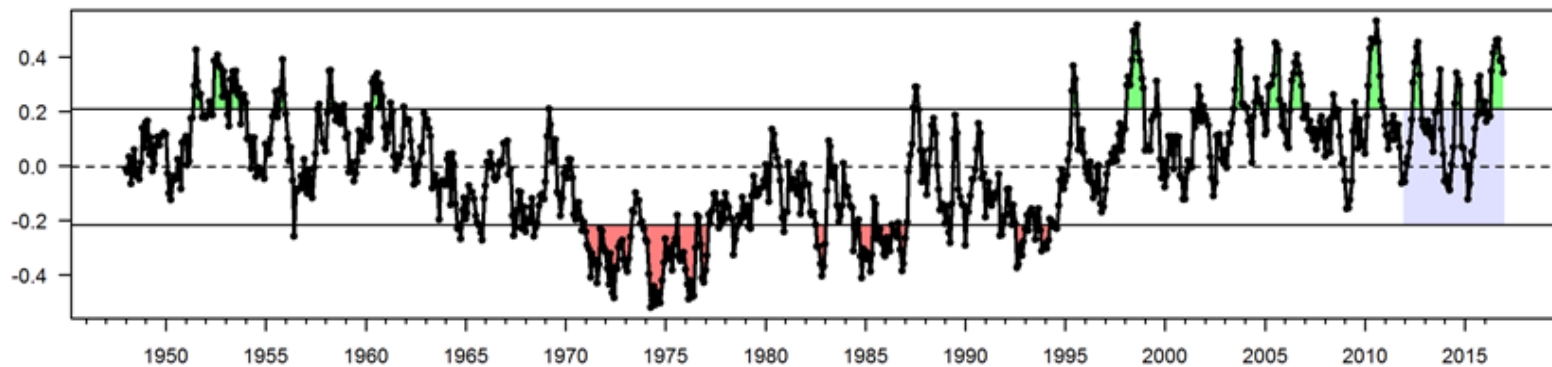
Outline

- Provide background on, and define, Ecosystem Status Report (ESR)
- Provide a status update for the South Atlantic ESR
- Identify ecosystem components that will be included
- Identify next steps
 - Draft ESR development and obtaining feedback

Ecosystem Status Reports

- Provide trends over time in multiple ecosystem components
 - How have components changed over time, and are they interrelated?

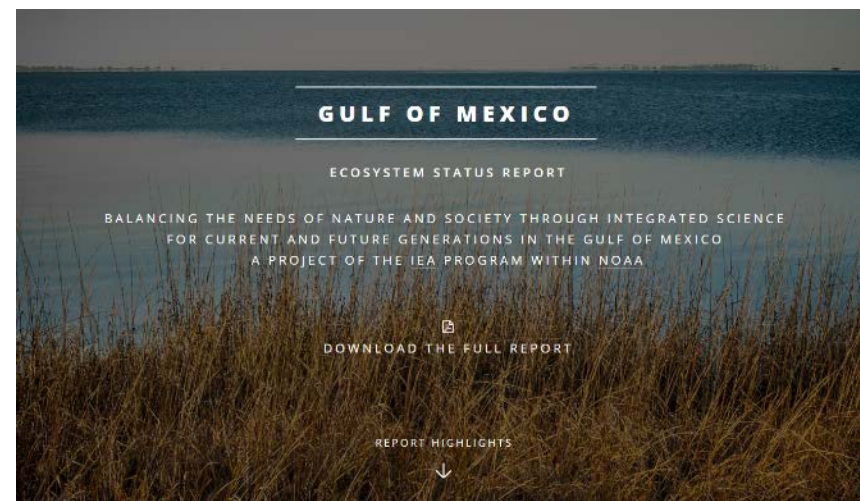
Atlantic Multidecadal Oscillation (AMO)



Ecosystem Status Reports

- Prescribed under NMFS EBFM Policy and Road Map
- Have been developed by NMFS for West Hawaii, Bering Sea, Gulf of Alaska, Arctic (in progress), California Current, Gulf of Mexico and New England shelf
- Intended for use by Fishery Management Councils and other management bodies
- Can be used to complement individual stock assessments to guide management decisions
- Intended to be updated periodically

http://www.aoml.noaa.gov/oce/oceweb/ESR_GOMIEA/



South Atlantic Ecosystem Status Report

Small group-led:

NMFS: Kevin Craig, Todd Kellison, Kyle Shertzer, Nate Bacheler, Kate Siegfried, Mike Burton, Roldan Muñoz

NOS/NCCOS: Chris Taylor

University: Jeff Buckel (NCSU), Grant Murray (Duke)

17 Contributing Orgs / 33 people

- SEFSC (3 labs)
- NOS (2 labs)
- AOML
- NCAR
- USGS
- ACCSP
- FL-FWC, GA-DNR, SC-DNR
- Delaware, Duke, UNC, NCSU
- NC Wildlife Resources Commission



South Atlantic Ecosystem Status Report



- For majority of participants, ancillary to main job responsibilities
- First iteration: include most accessible data (e.g., readily available at regional scale)
- Current status:
 - Draft indicator list completed
 - Data acquisition and analysis
 - Completed for ~ 50% of indices
 - In progress for remaining indices
- Input welcome



Ecosystem Component Categories

- Climate forcing
- Physical pressures
- Benthic habitats
- Lower trophic levels
- Upper trophic levels
- Fishery indicators
- Human dimensions



South Atlantic Indicators (1 of 2)

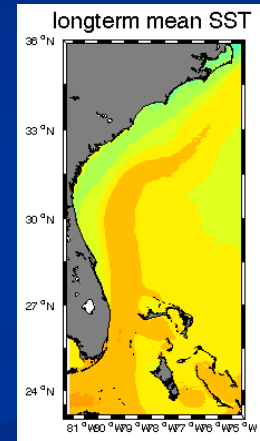
Climate

Atlantic Multidecadal Oscillation (done)
North Atlantic Oscillation (done)
North Atlantic Tripole Mode (IP)
Atlantic Warm Pool (IP)



Physical/Chemical

Water temperature (SST, bottom; done)
Gulf Stream (Strength, Positional variability; IP)
Upwelling index (IP)
Storm/hurricanes (ACE; IP)
Florida Current transport (done)
Sea level rise (IP)
Ocean acidity (done)
Coastal river flow (IP)
Nutrient loading (?)



Habitat

Wetland cover and urban land use (done)
Estuarine / coastal habitat coverages
 Submerged aquatic vegetation / seagrass (?)
 Oyster reef (?)
Coral and temperate reef coverage (IP)

Wetland habitat



Lower Trophic Levels

Primary Production (IP)
Zooplankton (?)
Ichthyoplankton (?)

Ecosystem Indicators (2 of 2)

Upper Trophic Levels

Abundance, species richness, diversity

- reef fish (SEFIS trap-video; done)
- apex predators (Longline; done)
- demersal forage fish (SEAMAP trawl; done)

Sea turtle nest counts (IP)

Marine mammals (?)

Coastal birds (done)

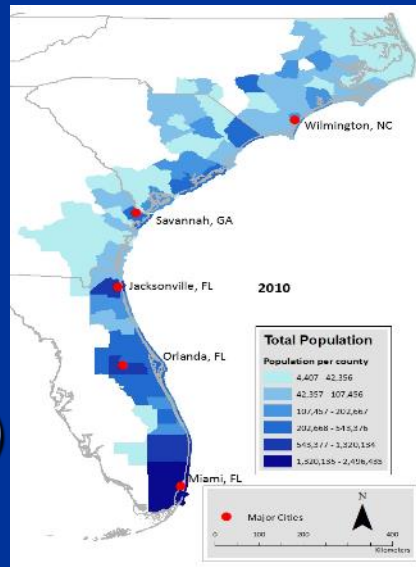
Human Dimensions

Population size and density (done)

Ocean & coastal economy (done)

Recreational fishing effort (IP)

Commercial fishing revenue IP)

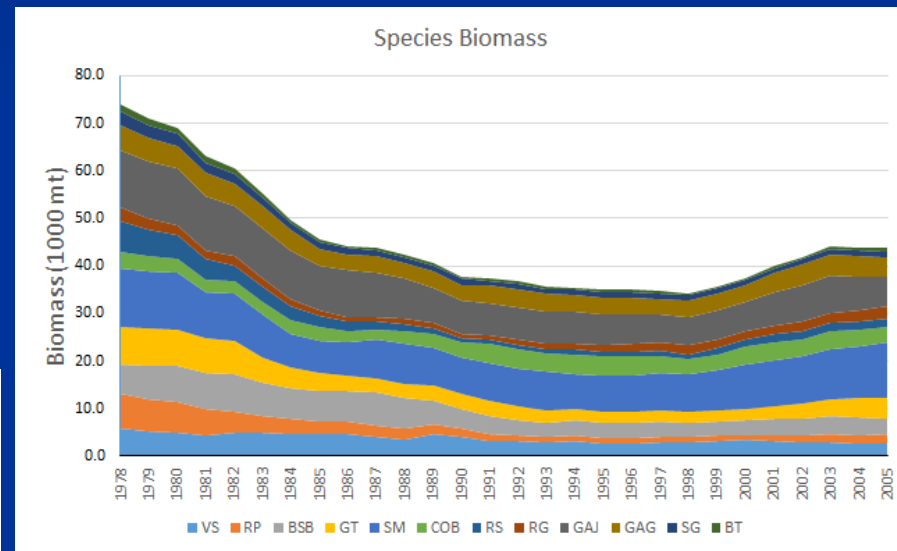


Fishery Indicators

Status federally managed species (done)

Biomass, recruitment, surplus production (done)

Landings (commercial and recreational; IP)



End of 2017:

29% overfishing

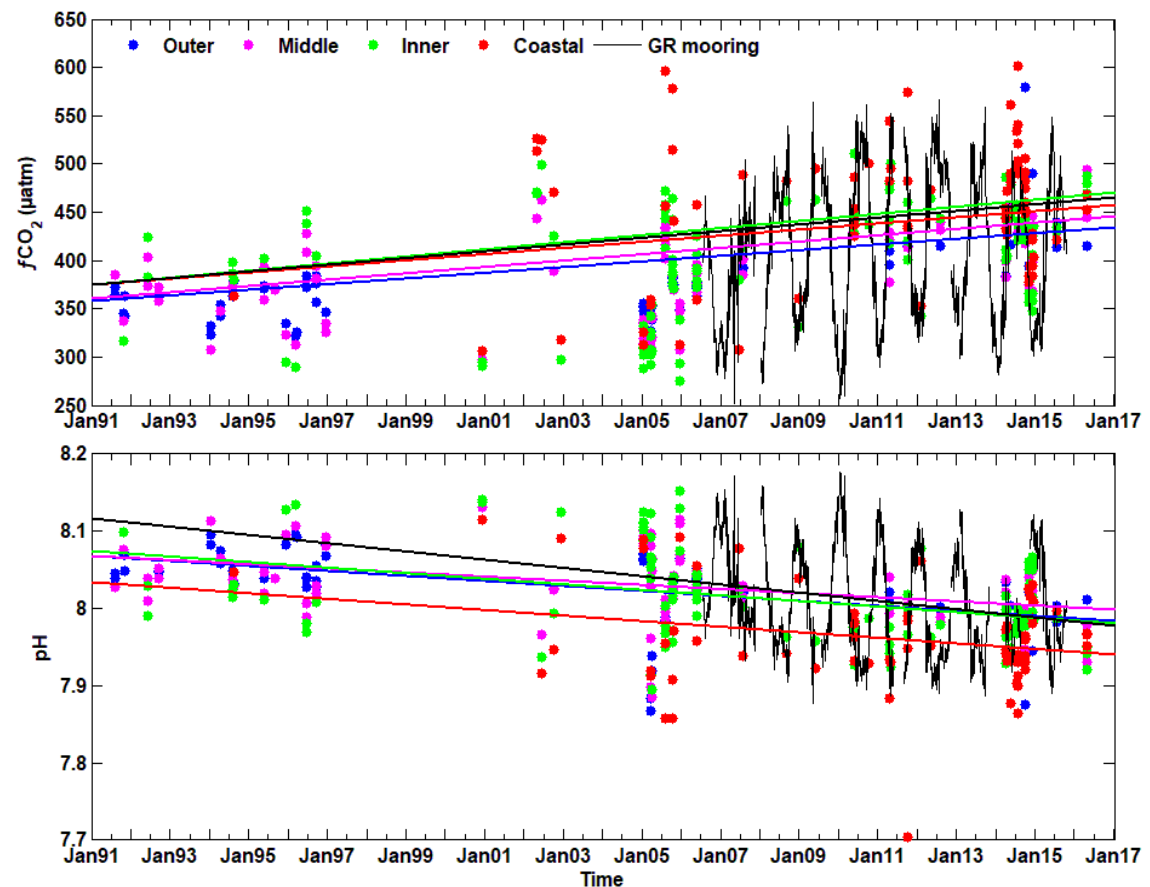
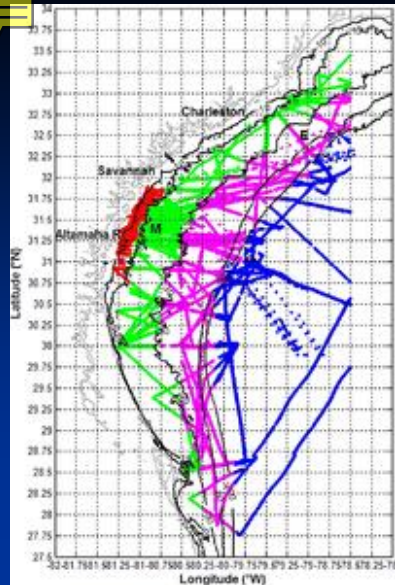
21% overfished

Example: Ocean Acidification

Multidecadal $f\text{CO}_2$ Increase Along the United States Southeast Coastal Margin

Janet J. Reimer¹, Hongjie Wang² , Rodrigo Vargas³ , and Wei-Jun Cai¹ 

¹School of Marine Science and Policy, University of Delaware, Newark, DE, USA, ²Department of Physical and Environmental Sciences, Texas A&M, Corpus Christi, TX, USA, ³Department of Plant and Soil Sciences, University of Delaware, Newark, DE, USA



Reimers and Cai
(University of Delaware)

Example: Fishery Ecosystem Components

NMFS Longline Survey



Apex Predators

SEFIS Trap-Video Survey



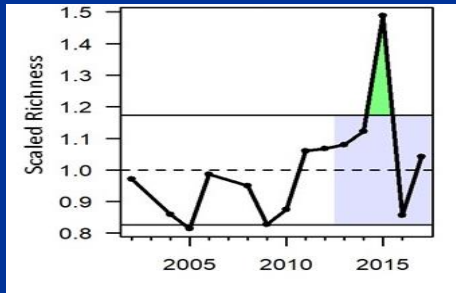
Reef fishes

SEAMAP Trawl Survey

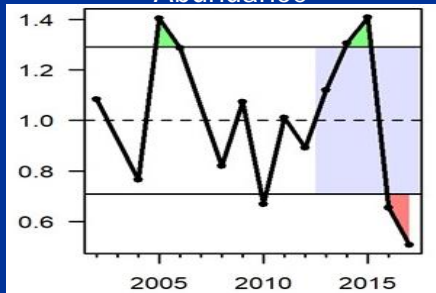


Juveniles & demersal forage fish

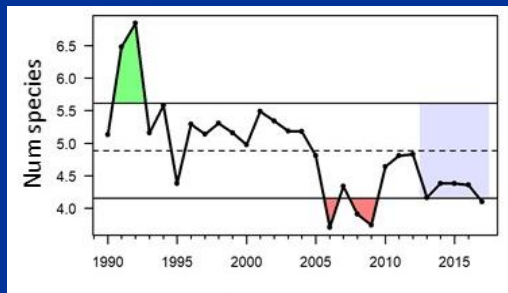
Richness



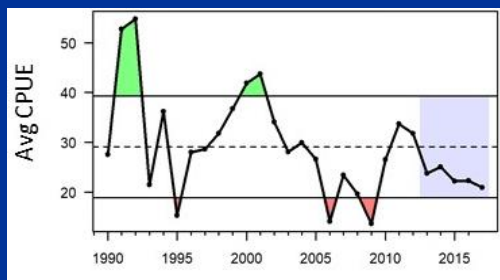
Abundance



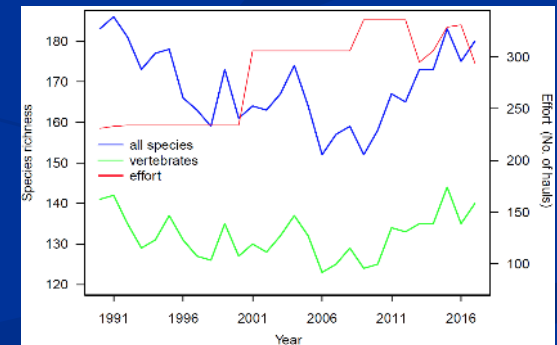
Richness



Abundance

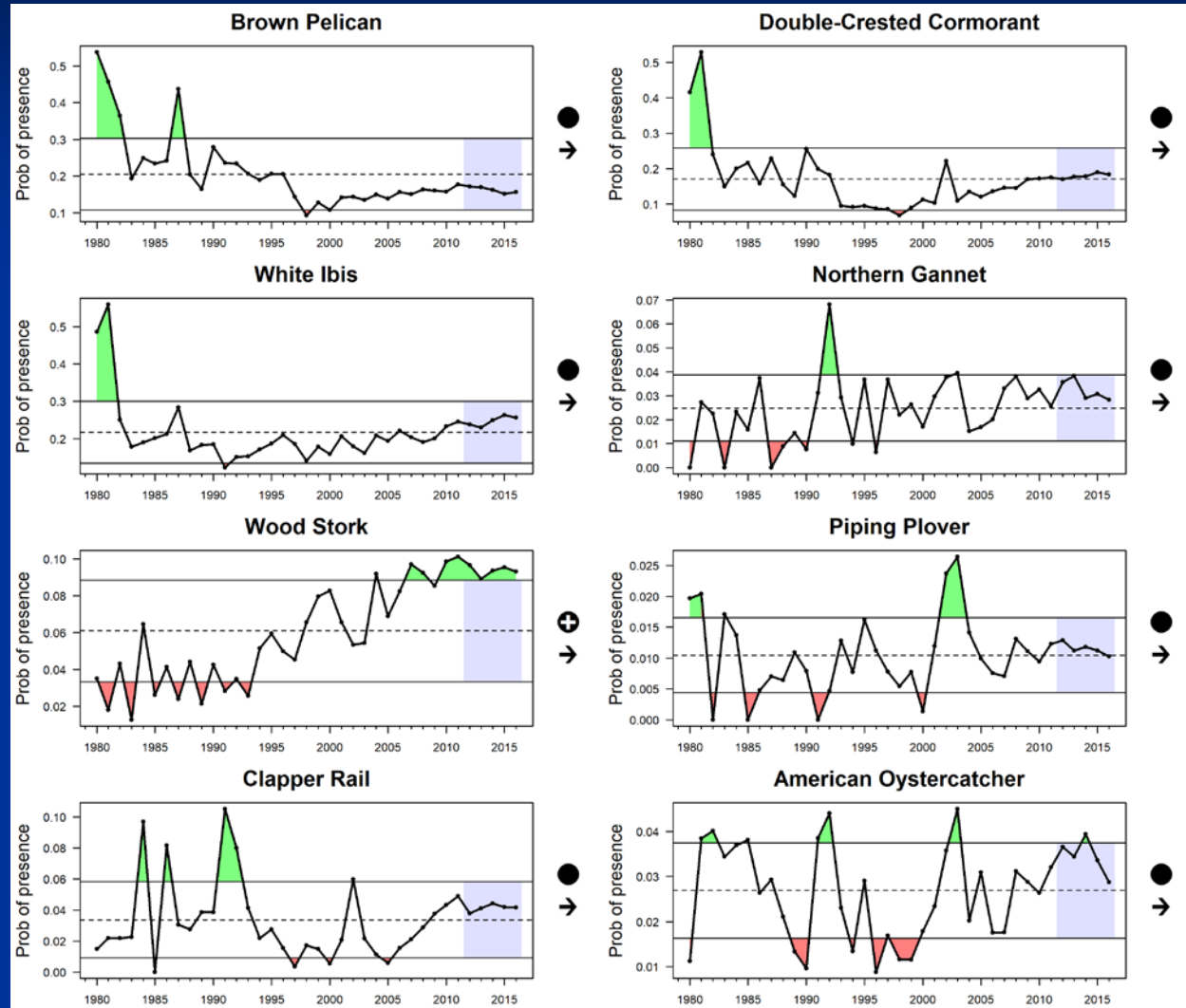


Richness



Example: Coastal Birds

Cornell Lab of Ornithology
Citizen Science



Next steps



- Goal: draft report completed in 2019
- Reviews and feedback
 - Southeast Fisheries Science Center (SEFSC)
 - South Atlantic Fishery Management Council (SAFMC) and Science and Statistics Committee (SSC)
 - NMFS National ESR working group
 - Other partners (SECART, SECOORA, state agencies)
- Finalization of report
- Coordination with SAFMC and SSC

Thanks!

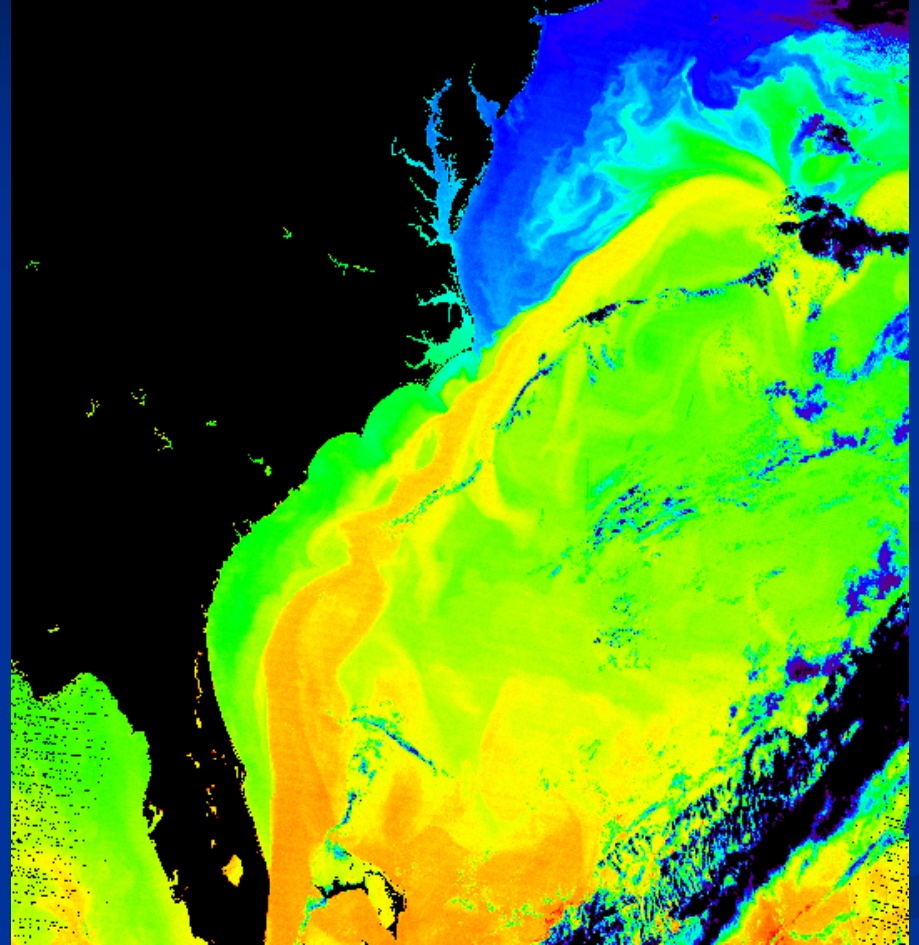
Questions?



Extras

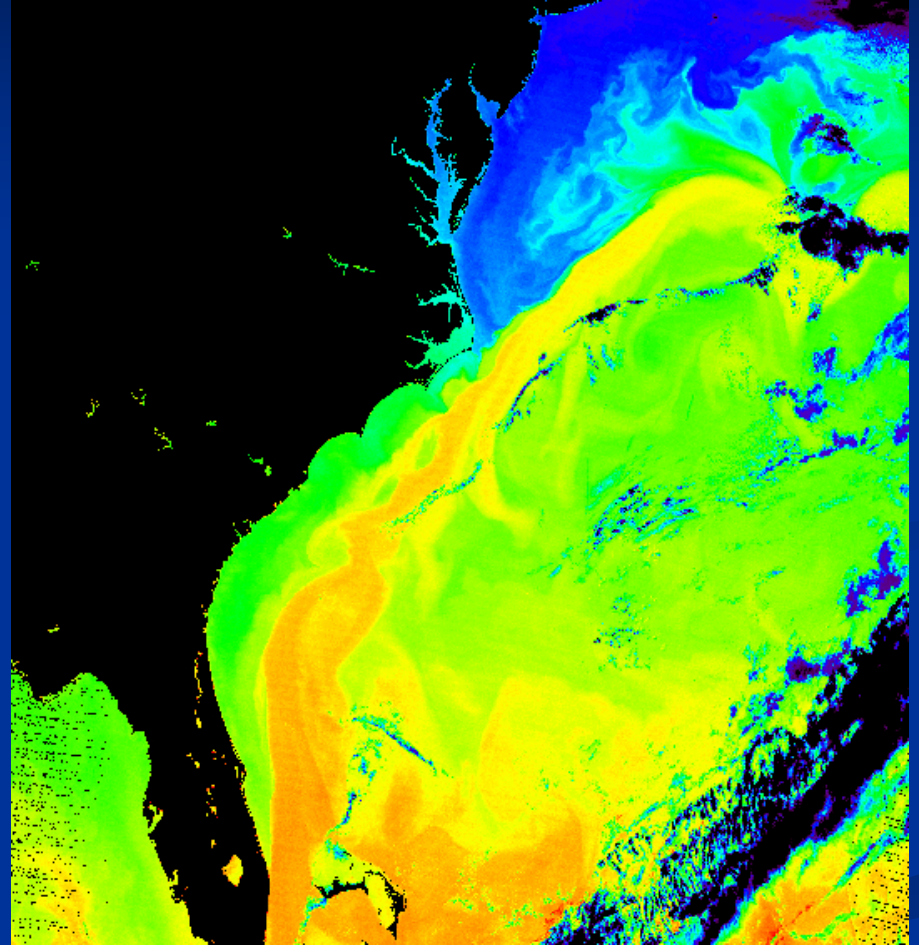
Physical Indicators

- Water temperature (NCSU)
 - Sea Surface Temperature (SST)
 - Bottom water temperature
- Gulf Stream (NCSU)
 - Strength
 - Positional variability
- Upwelling (NCSU)
- Storm and wind indices (NCSU)



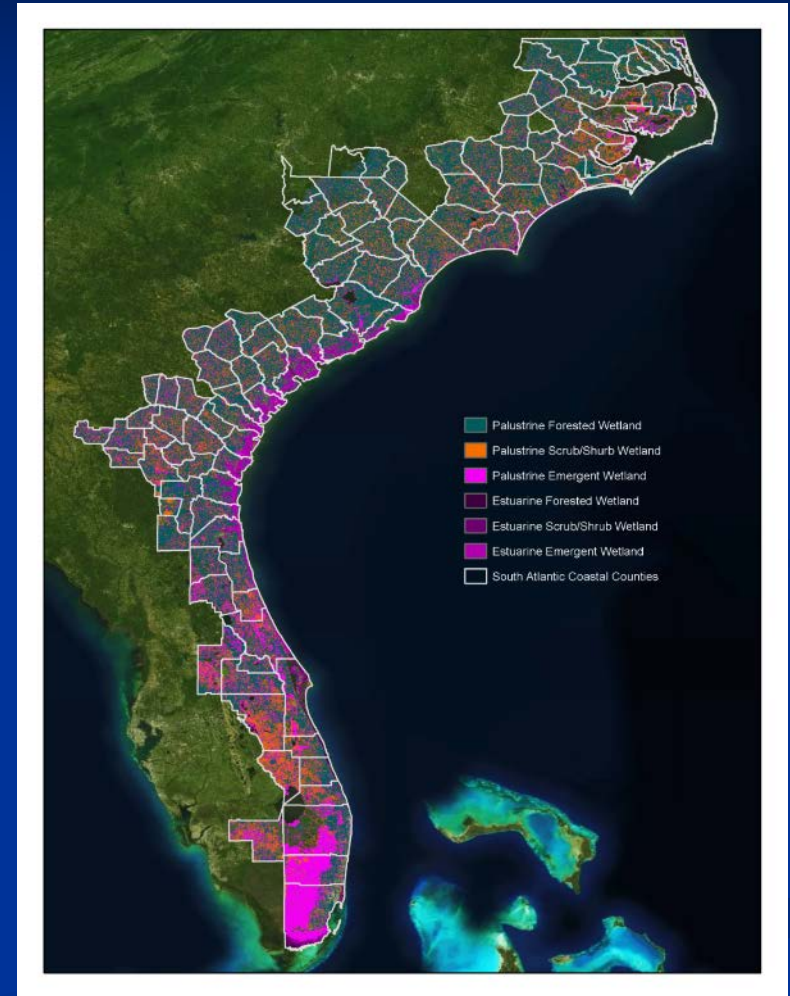
Physical Indicators

- Sea level rise (NOAA)
- Atlantic warm pool (AOML)
- Ocean acidity (UGA and GRNMS)
- River flow (USGS)
- Nutrient loading (USGS)
- Contaminants (?)



Benthic Habitats and Land Use

- Wetland cover and urban land use (NOAA/NOS)
- Estuarine / coastal habitat coverages (?)
 - Salt marsh
 - Submerged aquatic vegetation / seagrass
 - Oyster reef
- Coral and temperate reefs



Lower Trophic Levels

- Primary Production (NMFS/NEFSC)



- Zooplankton (?)
- Ichthyoplankton (?)
- Invertebrate abundance (e.g., shrimp and blue crab) (?)

Upper Trophic Levels

- Fish
 - Abundance
 - Species richness
 - Life-history traits
- Fish functional groups
 - Nearshore
 - Continental shelf / shelf-break
 - Reef fish
 - Sharks
- Sea turtles
- Marine mammals
- Birds



Fishery Indicators

- Landings and effort
 - Commercial
 - Recreational
- Status of federally managed species
 - Overfished / overfishing



- For example:
 - 63 federally managed species in 6 FMPs in the South Atlantic region
 - 2017:
 - 29% overfishing
 - 21% overfished
 - 37.5% overfishing or overfished





Human Dimensions Indicators

- Demography (population)
- Economy
- Employment
- Tourism and recreation
- Recreational fishing effort
- Fishing revenue
 - Commercial
 - Recreational