Sea Grant South Atlantic Research Priorities Needs Assessment
Draft 6/04/07

DRIVERS

• Human population growth
  o Coastal development
  o Seasonal/vacation use

• Watershed activities
  o Urbanization and other land use changes
  o Operation of dams
  o Emissions from industry, waste from power plants
  o Effluent from sewage treatment plants, septic tanks

• Direct alteration of coastal habitat:
  o Construction of docks and marinas
  o Dredging (dredge and fill)
  o Trawling
  o Building seawalls, jetties, etc.
  o Impoundments

• Marine activities
  o Ecotourism
  o Swimming
  o Boating
  o Fishing, shellfishing
  o Aquaculture
  o Shipping activity (operation of ports, ballast water management)
  o Military operations
  o Offshore oil and gas development, extraction

• Climate
  o Precipitation
  o Temperature
  o Storm events
  o Sea level
  o Wind stress
  o Decadal indices and other long-term forcing

• Physical Setting
  o Bathymetry
  o Wave environment

produce PRESSURES on the environment

• Point source pollution
• Non-point source pollution, including atmospheric deposition
• Changes in freshwater inflow
• Habitat loss, fragmentation
• Changes in hydrography, bathymetry
• Introduction of invasive species
• Acoustic effects
• Overfishing, bycatch
• Climate effects
  o Increased frequency of hurricanes and other storms
  o Sea level rise
  o Drought, flooding

which affect the STATUS of the environment
• Physical characteristics
  o water circulation patterns
  o residence time
  o sediment transport, rate of erosion
  o extent and location of habitat (wetlands, coral reefs, hard bottoms, salinity zones, etc.)
• Water, sediment quality
  o salinity
  o suspended sediment
  o dissolved oxygen (hypoxia)
  o nutrient concentrations
  o contaminant concentrations (metals, toxins, pharmaceuticals, plastics)
  o coliforms, pathogens
  o pH
  o radioactivity
  o marine debris
• Biological components
  o amount and distribution of primary producers
  o amount and distribution of secondary producers
  o food web interactions
  o species diversity
  o presence of invasive species
  o contaminant concentrations in organisms

which IMPACT human health and ecosystem services
• Habitat loss and degradation
  o wetland loss
  o coral bleaching
  o seagrass dieoff
  o marsh dieback
  o alteration of physical setting (e.g. interruption of sand budget)
• Eutrophication symptoms
  o decrease in submerged aquatic vegetation
  o increase in harmful algal blooms
  o high chlorophyll concentrations
  o fish kills
• Effects on fisheries
  o Decreased fish catch
- Increased disease of fish, aquaculture species
- Disruption of food web due to invasive species

- Effects on human health and quality of life
  - Contaminated fish and shellfish
  - Beach closures

- Effects on Valued Species
  - Endangered, Threatened and Species of Concern (i.e. sea turtles, right whales)
  - Culturally or commercially valued species (i.e. crabs, shrimp, shellfish, seagrass, coral, finfish)

Catalyzing human RESPONSES for change

- Point source pollution control: NPDES permits, secondary wastewater treatment
- Stormwater management strategies
  - Buffers
  - Impoundments
  - Retention ponds
  - Constructed wetlands
- Habitat mitigation and restoration
  - Beach renourishment
  - Wetland mitigation and restoration
- Fisheries management
  - Fisheries regulations
  - Marine Protected Areas
  - Ecosystem-based management
- Eutrophication mitigation
  - Targets to decrease nutrient loads
  - Best management practices in watershed

Other Tools:

- Development of predictive models
  - Circulation
  - Global climate change
  - Runoff
- Monitoring for preventative and responsive measures
- Enforcement
  - Improved inspection of shellfish and fish
- Changes in legislation
- Education