

Ecosystem-Based Adaptation Sectors

Coastal Ecosystems

SECC Fall Planning Meeting

16 November 2009

Gainesville, FL

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New Focus for SECC

Vulnerability of Coastal Areas



- 1,500+ miles of general coastline
- 15,000+ miles of tidal coastline
- Low coastal elevation above sea level
- 20 million residents within 60 miles of Atlantic or Gulf
- \$30+ billion in ocean economy
- 25% of USA coastal seasonal homes in FL

New Target Audiences



- State and local governmental officials
- Coastal planners and managers
- Coastal property owners
- Coastal industry and businesses
- Academic and agency scientists and managers

New or Renewed Partners



- Sea Grant and Land Grant Extension Programs
- State, County and City Planning Associations
- Gulf of Mexico Alliance
- Gulf of Mexico Ocean Observing System
- Southeast Atlantic Ocean Observing System
- GOM and SE Atlantic Sea Grant Researchers
- National Sea Grant Climate Change Network

EFFECTS OF CLIMATE CHANGE ON FLORIDA'S OCEAN AND COASTAL RESOURCES

FLORIDA OCEANS AND COASTAL
COUNCIL



Infrastructure Impacts



- Water, power, telecommunications, transportation, buildings were constructed to last at least 75 years.
- Infrastructure longevity was based on past environmental design criteria and specifications.
- Many of these may have been exceeded already by aspects of climate change.

Human Health Impacts



- Changes in climate - negative effects on human health.
 - Injury or death due to severe heat waves, hurricanes, & floods
- Stormwater discharges - carry nutrients, toxins, and fecal contaminants from land into coastal waterways.
 - Closure of beaches and shellfish beds
- Loss of marine organisms - some of which are sources of chemicals with disease-fighting properties

Economic Impacts



- Impacts will be unevenly distributed across regions and society.
- Negative impacts will outweigh benefits for most sectors that provide goods and services.
- Immense strains will occur on public sector budgets.
- Secondary impacts can include higher prices, reduced incomes, and job losses.

Florida's Economic Impacts Study



In a Florida study:

- Cost of inaction to address climate change issues ranged from \$27 billion by 2025 to \$354 billion in 2100
- Included economic activity in tourism, hurricanes, electric power, and real estate.
- Not considered were agriculture, fisheries, insurance, transportation, water systems, and ecosystem damages.

SECC Coastal Stakeholders

Address and Adapt to What?

“Drivers” of Climate Change

- **Increased greenhouse gases**
- **Increased air temperature and water vapor**
- **Increased water temperature**
- **Increased sea level**

17 Categories of Florida Effects

- **Ocean acidification**
- **Altered rainfall/runoff**
- **Tropical storms and hurricanes**
- **Coral bleaching**
- **Coral and fish diseases**
- **Loss of sessile marine life**
- **Decreases in biodiversity**

- **Range changes**
- **Exotic/nuisance species**
- **Altered rates of nutrient cycling**
- **HABs, hypoxia, and human diseases**
- **Tidal wetland losses**
- **Coastal geomorphology changes**
- **Beach loss**

The FOC Report Approach

What is currently known = effect has been observed

What is probable = an effect is highly likely to occur in the future

What is possible = it may occur, but predicted impacts must be carefully qualified with certainty

Driver Example: Sea Level Rise

WHAT WE KNOW

Around Florida, relative sea level has been rising at a relatively slow but constant rate, generally less than an inch per decade.

WHAT IS PROBABLE

In time, the rate of absolute sea level rise will accelerate because of ocean warming and contributions from land-based ice melt from areas such as Greenland and Antarctica.

WHAT IS POSSIBLE

Major inputs of water from high latitude and high altitude ice reservoirs could cause catastrophic rises in sea level.

Effects Examples: Sea Level Rise

WHAT WE KNOW

**Many tidal wetlands are keeping pace with sea level changes.
Some are accreting vertically, migrating up-slope, or both.**

**Wetlands elsewhere are perishing as estuarine and coastal forests
and swamps are retreating, replaced by marsh vegetation.**

**Even at constant rates of sea level rise, some tidal wetlands will
eventually “pinch out” at upland defenses such as seawalls.**

Effects Example: Sea Level Rise

WHAT IS PROBABLE

More lowland coastal forests will be lost during the next one to three centuries as tidal wetlands expand across low-lying coastal areas.

Plant communities along tidal rivers and estuarine shores will be lost, increasing sedimentation to local waters.

Most tidal wetlands in areas with low freshwater and sediment supplies will “drown” if sea level rise outpaces their ability to accrete vertically.

Effects Example: Sea Level Rise

WHAT IS POSSIBLE

More than half of the saltmarsh, shoals, and mudflats critical to birds and fishes in Florida estuaries, could be lost during the 21st century.

The loss of tidal wetlands will result in dangerous losses of the coastal systems that buffer storm impacts.

Major redistributions of sediment may have *compensatory or larger benefits* to natural systems, but these processes cannot be forecast with existing models.

Interpreting Climate Reports

	EMPIRICAL DATA? (Past & Present)	MODELED OUTPUTS? (Present & Future)
GLOBAL?		
CONTINENTAL OR NATIONAL?		
STATE OR LOCAL?		

Response to Climate Change

Tolerant and Accept

No reasonable options to avoid having to accept an undesirable and detrimental effect. (e.g. Accept the loss of coral reefs?)

Mitigate

Use in-kind strategies and actions to compensate for some or all of an adverse effect. (e.g. set aside low uplands so tidal wetlands can migrate as sea level rises).

Adapt

Modify our ways of life, behavior, infrastructure, or economy to accommodate changing conditions (e.g. Change land use laws for future coastal development; build major new infrastructures that take into account rising sea levels over next 30-50 years)

SECC Research Questions

Coastal Areas

- How are coastal county governments considering climate change and SLR in their policies, what information are they using, and what do they need for effective policies?
- To what extent are coastal property owners aware of potential threats of SLR, increased storm surge and how are they responding to this information?

SECC Research Questions

Coastal Areas

- To what extent does existing coastal erosion legislation address stakeholder needs regarding SLR and are these policies used by developers and other stakeholders?
- What information is needed by coastal stakeholders for information on climate variability, climate forecasts, and climate change, would they make use of an information/decision support system, and what tools are needed?

SECC Research Questions

Coastal Areas

First Steps

Stakeholder engagement

Inventory of existing activities

Needs assessment

“Climate change is real. It is here, and it is happening now, in our backyards and around the globe.”

“NOAA is committed to helping governments, businesses, and communities manage climate risks, adapt to changing conditions, and reduce the threat of climate change.”

Dr. Jane Lubchenco

**Under Secretary of Commerce for Oceans
Administrator, NOAA**