

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

**A Special Report to the
Florida Energy & Climate Commission
and the People of Florida**

January 26, 2009

**FLORIDA OCEANS AND COASTAL
COUNCIL**

The logo for the Florida Oceans and Coastal Council is a blue rectangular box with a white wavy line at the bottom. The text "FLORIDA OCEANS AND COASTAL COUNCIL" is written in white, bold, uppercase letters within the box.

Florida Oceans and Coastal Council

- **Created by the Legislature in 2005**
- **Oceans and Coastal Resources Act**
- **15 Appointed Members**
 - **State and federal agencies & programs**
 - **Public and private academic institutions**
 - **NGO research and advocacy groups**
 - **Florida business and corporate sectors**

Ex-Officio Members

- **Department of Environmental Protection**
- ***Co-chair: Mike Sole, Secretary***
- ***Designee: Bob Ballard, Deputy Secretary, Land and Recreation***

Administration: Lee Edmiston, Director, FDEP Office of Coastal and Aquatic Managed Areas

Council Staff: Becky Prado, CAMA Program Administrator

- **Fish and Wildlife Conservation Commission**
- ***Co-chair:* Ken Haddad, Executive Director**
- ***Designee:* Gil McRae, Director, Fish and Wildlife Research Institute**

- **Department of Agriculture and Consumer Services**
- ***Co-chair:* Charles Bronson, Commissioner**
- ***Designee:* Sherman Wilhelm, Director, Division of Aquaculture**

FOCC Progress to Date

- **Create an annual science plan to guide state research priorities**
- **Building a web-based resource assessment tool for citizens, research institutions and agencies**
- **Enhanced state's ocean observing capabilities**
- **Determined the value of state's ocean economy**

Florida's Ocean and Coastal Economy 2008

**Based on two studies conducted by the
National Ocean Economics Program**

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Florida's Ocean Economy

- **\$25 billion in GSP**
- **\$13.5 billion in wages**
- **511,000 jobs**

**Florida's ocean economy ranks
2nd in the nation to California**

Florida's Coastal Economy

- **\$562 billion in GSP**
- **\$226 billion in wages**
- **5.8 million jobs**

Florida's coastal counties contribute about 79% of the state's economic productivity

Seeking to Understand

- **12 American reports on climate change in the past 13 months**
- **Including 5 Florida reports on climate, energy, effects, and resources in the past 8 months**
plus summits, conferences, workshops

Florida Climate Action Team Adaptation Report 2008

- **ADP-3: Protection of Ecosystems and Biodiversity**

“Florida’s ecosystems should be managed for resiliency by enhancing their ability to naturally adapt to *the stresses of climate change...*”

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“Adapt to what?”

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Approach

**“This report carefully identifies what is known--
and with what level of certainty --about each of
the aspects driving climate change and
describes its effects on Florida’s ocean and
coastal resources in terms of
what is currently known,
what is probable,
and what is possible.”**

4 Drivers of Climate Change

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

17 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**

Driver: 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 in Estuaries, Tidal Wetlands and Rivers

WHAT WE KNOW

Many tidal wetlands are keeping pace with sea level changes. Wetlands elsewhere are perishing as estuarine and coastal forests and swamps are retreating.

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

Effects in Estuaries, Tidal Wetlands and Rivers

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.

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

Effects in Estuaries, Tidal Wetlands and Rivers

WHAT IS POSSIBLE

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

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

Interpreting Climate Reports

	EMPIRICAL DATA? (Past & Present)	MODELED OUTPUTS? (Present & Future)
GLOBAL?		
NATIONAL?		
FLORIDA?		

IPCC (2007)

“Accelerated sea level rise caused by rapid... response of the ice sheets to climate change is very unlikely during the 21st century...

Owing to limited understanding of the relevant... processes, there is presently no consensus on the long-term future of the ice sheet or its contribution to sea level rise.”

Abrupt Climate Change **(USGS 2008)**

“Inclusion of [nonlinear responses of ice-shelf melting] in models will likely lead to sea-level projections for the end of the 21st century that *substantially exceed* the projections presented in the IPCC... report (0.28 ± 0.10 m to 0.42 ± 0.16 m rise).”

What the Ocean Council's Report Does and Offers

- Extends the Action Team's findings to ocean and coastal resources**
- Speaks directly to Florida stressors and effects**
- Introduces scales of certainty, and potential for benefits, in state climate discussions**
- Provides a template for ocean updates, and a model for other Florida assessments**

What the Ocean Council's Report Does and Offers

-- Contributing to efforts by others

Adaptation Working Group

Florida Sea Grant strategic planning

Gulf of Mexico Alliance priority issue (new)

**-- Identifies climate research gaps and priorities
for FOCC action**

-- Affirms state energy and climate priorities

THE LONG-TERM SOLUTION

“The long-term extent and severity of oceanic or coastal effects caused by climate change ultimately depend on how rapidly humanity can eliminate human sources of carbon dioxide and other greenhouse gases entering the atmosphere at harmful levels, now and in the future.”

<http://www.floridaoceanscouncil.org>



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