



THE JAMES A. BAKER III INSTITUTE FOR PUBLIC POLICY  
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## CONSIDERING SEA LEVEL RISE

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## Considering Sea Level Rise

Over the past year, the issue of climate change and greenhouse gas emissions policy has correctly climbed to the top of the agenda in political and media circles in the United States. Broad debate and education programs have focused on strategic climate mitigation — and rightly so. But academic specialists, business leaders and policymakers alike have yet to come to grips with the substantial strategic thinking that is needed to address the specific challenges that can come from sea level rise. A recent Council on Foreign Relations study should be praised for calling attention to the need for risk reduction through investment in coastal and vital infrastructure defenses, emergency response plans and enhanced vulnerability assessments, but we need to see many more specific, detailed studies being completed by regional experts.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that the global mean sea level has risen at an average rate of 1 millimeter (mm) to 2 mm per year during the 20th century through thermal expansion of seawater and widespread loss of land ice. Moreover, satellite observations in the last decade show that the rates have increased since 1993 to  $3.3 \pm 0.4$  mm/yr. Global mean sea level is projected by IPCC to rise between another 100 mm to 220 mm (3.9 inches to 8.6 inches) by 2050. Dynamical instabilities in response to climate warming may cause faster ice-mass loss. Recent scientific publications (2007) show that sea level observations are tracking at the high end of the IPCC estimates and conclude that 80 centimeters (cm) (32 inches), and perhaps greater than 1 meter (m) (more than 40 inches), is the most likely global rise by the year 2100, raising the risks to life and property of those living in coastal areas.

Sea level rise will present a daunting challenge to coastal areas and infrastructure. Nearly two-thirds of humanity lives within approximately 90 miles of coastal waters. One-tenth of the global population and 13 percent of the world's urban population live in coastal areas that lie within just 10 m above sea level. In the United States, more than 50 percent of Americans live in 772 coastal counties. By 2025, nearly 75 percent of Americans are projected to be living near a coast, with population density doubling in some areas such as Florida and California.

An increase in extreme weather events is likely to exacerbate existing water management and control problems in low-lying, coastal areas such as the U.S. Gulf Coast where coastal

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agriculture, petrochemical plants, oil refineries and potable water systems could be threatened in the future.

The challenge of sea level rise is particularly pertinent to the U.S. energy sector. The hurricanes of 2005 affected both U.S. Gulf Coast refineries and deliverability of fuel. Shortages and gasoline lines were reported in parts of South Carolina, Florida, South and North Dakota, Massachusetts, New York, New Jersey, Georgia, Arkansas, Texas, Louisiana and Kentucky. The area stretching from Corpus Christi, Texas, to Lake Charles, La., is home to 21 refineries, comprising 27 percent of U.S. refining capacity. The Houston/Beaumont/Port Arthur area represents 20 percent of U.S. refining capacity. These facilities are a vital part of the U.S. fuel distribution system but are as vulnerable to eroding coastline as are homes and coastal communities.

The Houston-Galveston Area Council has created a Climate Impact Task Force. This is a great first step. Its aim is to develop recommendations on how local governments can best adapt to potential changes in the future climate of the Houston-Galveston region. Because of uncertainties in the projections, several scenarios of potential climate change will be considered and potential impacts assessed on such sectors as flooding and storm surge, ecosystems and water quality, public infrastructure, energy, public safety and the regional economy. Recommendations of best practices for local governments will be developed and reported. Rice University is playing a key role with new work on severe storms, flooding and evacuation route issues. The safety of our citizens, wildlife and infrastructure are at stake. While the threat of sea level rise may seem distant, the investments and preparations needed are monumental and will take time to establish and finance. It is imperative to get started now.