

Sea Level Rise May Pose Challenges For Some US Local Governments

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Sea level rise already affects some communities and in the long term may pressure some communities' operations, capital funding requirements, and indebtedness.

Sea level rise is a manifestation of global climate change that is already having noticeable effects on some communities situated along the U.S. coasts. Risks include heightened damage from episodic events such as hurricanes and storm surges (event risk) in addition to more chronic damage from pervasive flooding and permanent loss of land. These risks present a myriad of financial and logistical challenges to local governments.

To date, sea level rise has not played a material role in Fitch's assessment of the fundamental credit characteristics of any of its rated issuers. Fitch's special report, "[Event Risk and Overall Credit Resiliency](#)" provides more detail. However, there are real threats faced by governments in coastal areas. As the effects of sea level rise upon issuers' credit fundamentals become known and measurable, over time these considerations may take on greater importance as a credit factor in Fitch's rating decisions.

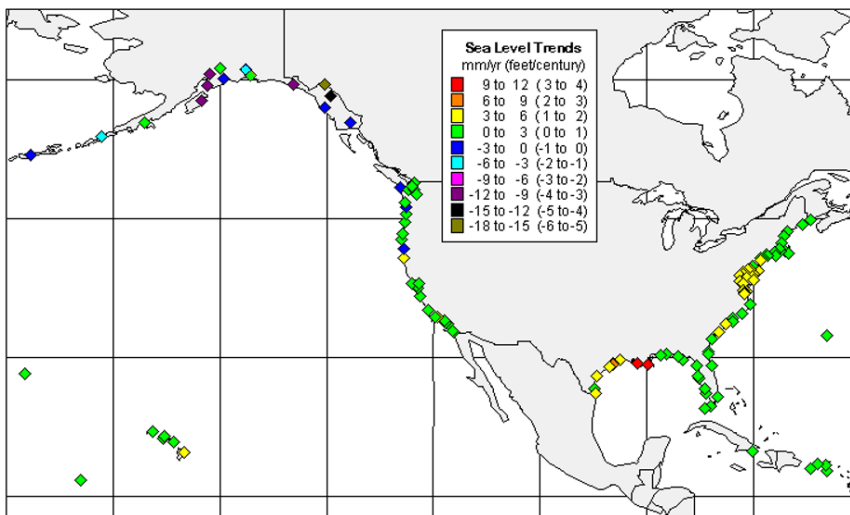
Sea Level Rise Increasingly Important in Government Planning

Municipal utility operations in coastal areas are susceptible to disruption from sea level rise as flooding and saltwater intrusion can affect water quality as well as the ability of utilities to treat sewerage, generate power, and dispose of solid waste. Long-term municipal planning efforts are becoming increasingly focused on protecting public facilities and private property near coastlines and in flood plains. Four counties in south Florida — one of the most vulnerable and highly populated regions in the U.S. facing imminent sea level rise — Miami-Dade, Broward, Palm Beach, and Monroe counties have joined together to form the Southeast Florida Regional Climate Change Compact Counties to create an action plan to address the effects of climate change. Sea level rise was one factor in Miami-Dade Water and Sewer Department's decision to spend an additional \$800 million to build a new wastewater treatment plant and expand an existing plant in order to minimize flows to treatment plants situated along the coast. The following map depicts relative sea level variations in the U.S. from 1854 to 2006.

Related Commentary

- [Event Risk and Overall Credit Resiliency \(December 2014\)](#)
- [Fitch: Sandy Won't Trigger Widespread Downgrades \(November 2012\)](#)

Relative Sea Level Variations



Source: Department of Commerce, NOAA, National Ocean Service, Center for Operational Oceanographic Products and Services.

Some local governments under immediate threat are already building infrastructure to relieve future flooding and storm surges. The City of Miami Beach, FL is in the process of a \$300 million upgrade of its stormwater system to reduce flooding. Norfolk, VA is spending significant sums to raise streets and upgrade its drainage systems. Last year, San Francisco, CA established guidelines by which sea level rise considerations are incorporated into all of the city's capital spending decisions.

Citizens living in flood plains are facing higher federal flood insurance rates. Revised zoning ordinances are evolving that may impose coastal or low lying development moratoriums or mandate modifications to existing housing to better withstand expected storm surges. Both of these developments could change the nature of shoreline development as home owner cost increases and restrictions on new development place limits upon taxable resource growth.

Fitch expects that government strategies to cope with sea level rise will vary widely given uncertainties as to timing and intensity. Aggressive measures such as the construction of seawalls, bulkheads, and drainage systems will involve considerable governmental outlays and most likely require regional coordination to be effective. These expenditures could serve to elevate participant debt levels and impose additional operating costs as these structures would require significant maintenance once they are completed. It is uncertain whether these investments will be appropriately sized for the actual threat, their structures effective in the long term, and if technological advances in the future could render these structures obsolete.

On the other hand, local governments that respond hesitantly to climate change may face higher mitigation costs and potentially much higher disaster recovery costs in the future, particularly should federal support mechanisms decrease over time. Historically, the burden on governments following natural disasters has been eased through the Federal Emergency Management Agency's (FEMA) grants used to reimburse local governments for costs incurred for debris removal and repair and restoration work in declared federal disaster areas. Reimbursements can compensate for at least 75% of the eligible costs of clean-up and other damage mitigation, providing a financial lifeline to localities already reeling from an extreme event.

FEMA's Pivotal Role

FEMA also provides preventative grant funding through its hazard mitigation assistance program. These grants to municipalities, which in fiscal 2013 totaled over \$700 million, support long-term measures to reduce the impact of future disasters. However, they are only disbursed after a community has experienced a major disaster and has thus demonstrated a true need for assistance. Furthermore, hazard mitigation grant applicants may only propose projects that are determined to be cost-effective as demonstrated by a positive cost benefit ratio. In 2011, FEMA permitted potential sea level rise to be factored into the cost-benefit analyses of grant applicants (also only after an event has occurred) for grant funding for coastal areas, which has resulted in increased funding for flood and storm surge mitigation in vulnerable areas. FEMA also maintains grant programs for pre-disaster and flood mitigation assistance with somewhat more limited funding.

Federal spending across all agencies on disaster relief including FEMA has been growing as the U.S. experiences more frequent disasters. The Center for American Progress estimates that the federal government spent \$136 billion on disaster relief from fiscal years 2011 through 2013 (slightly under half of that total was for Superstorm Sandy relief). If climate change, including sea level rise, continues to raise the number of disasters and associated costs, then federal budgetary pressures could lead to some curtailment or strict rationing of this aid in the future.

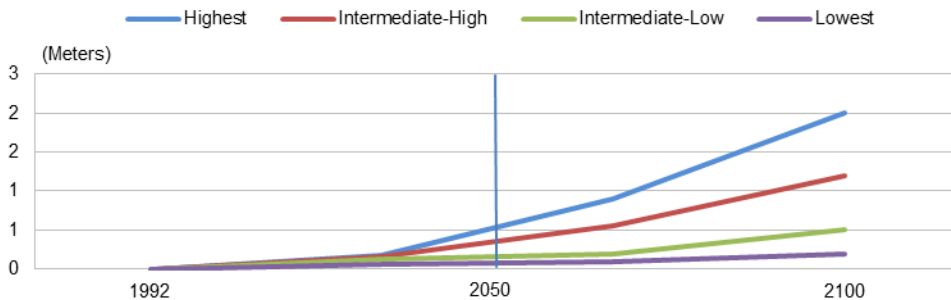
Sea Level Rise Forecast to Accelerate

Many highly populated areas continue to experience sea level rise at rates higher than the global averages, causing storm events to become increasingly more costly. It is projected to accelerate as oceans continue to warm, expanding in volume and steadily melting the Arctic and Antarctic ice sheets. The National Oceanic and Atmospheric Administration (NOAA)

estimates that by 2050, sea levels may rise by 0.5 feet on the low end and by up to 2.0 feet in a worst-case scenario. By 2100, the low end of NOAA's projections show closer a rise of about 0.7 feet and a worst-case scenario of upwards of 6.6 feet (see chart, Global Sea Level Rise Scenarios below) of rise. Rising seas are already evident across the country; sea level rise along the Gulf of Mexico is proceeding at one of the highest rates globally, including in Louisiana, where the U.S. Geological Survey estimates that 25% of the state's coastal wetlands were lost between 1932 and 2010. This chart shows NOAA's estimated sea level rise projections from low to high by the year 2100. Fitch added the vertical line from the year 2050 to demonstrate nearer term sea level rise projections. Based on the intersections with the lowest and highest trajectories, Fitch estimates for 2050 a low end SLR of 0.5 feet rise and a higher end rise of 2.0 feet.

Global Sea Level Rise Scenarios

(Meters Above 1992 Levels)



Source: National Tidal Datum Epoch (NTDE) by NOAA.

In some areas along the East and Gulf Coasts, sea level rise is further exacerbated by land subsidence. At the Norfolk Naval Station in the Hampton Roads area of Virginia, sea levels have jumped 14.5 inches since 1930 due to a combination of rising seas and land subsidence. In the Miami area, flooding has become more frequent with saltwater from the ocean seeping into the porous limestone aquifer, threatening freshwater supplies, and compromising infrastructure. These combined hazards have prompted the U.S. Army Corps of Engineers to now require that every Corps project consider future elevation of relative sea level. A three-foot rise would affect most of the nation's coastal areas, which includes a substantial portion of the U.S. population and wealth.

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