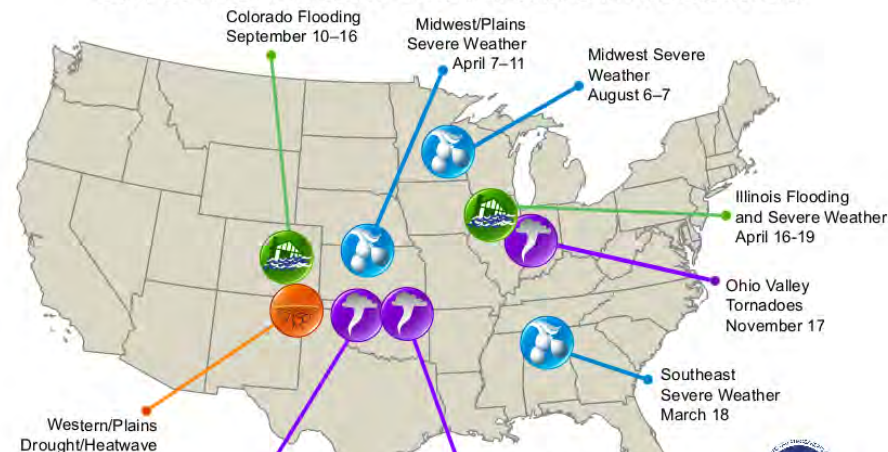


EXTREME EVENTS

Super Storm Sandy, Drought, Wildfires, Floods and more...



U.S. 2013 Billion-dollar Weather and Climate Disasters



9 > \$1B DISASTERS in 2013

This map denoted the approximate location for each of the nine billion-dollar weather and climate disasters that impacted the United States during 2013.

Coastal Vulnerability Around the World



Earth at Night
More information available at:
<http://antwrp.gsfc.nasa.gov/apod/ap001127.html>

Astronomy Picture of the Day
2000 November 27
<http://antwrp.gsfc.nasa.gov/apod/astropix.html>

Coastal lifelines, such as water supply and energy infrastructure and evacuation routes, are increasingly vulnerable to higher sea levels and storm surges, inland flooding, drought, erosion, and other climate-related changes.



Economic Benefits of Coastal Ecosystem Protection Services

Analysis of 34 hurricanes → loss of 1 hectare of wetland in the model corresponded with increased average storm damages of \$33,000 per storm (Constanza et al. 2008)



U.S. coastal wetlands provide \$23.2 billion storm protection benefits annually (Constanza et al. 2008)



Coastal Protection

Rebuild By Design Competition



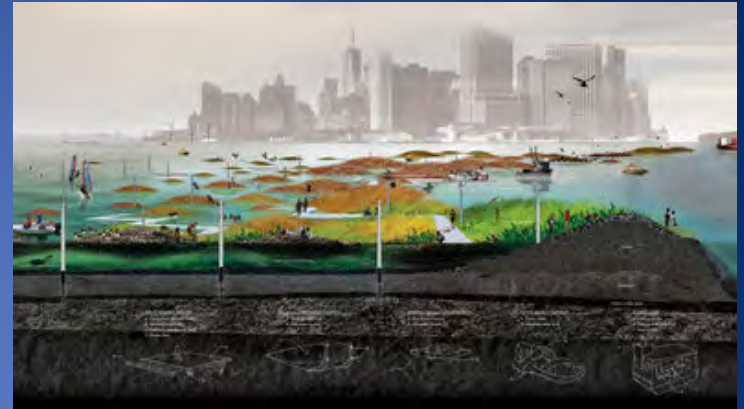
MIT et al. 2014



Interest in “green infrastructure” and “living shorelines” for storm protection

✧ “Protecting the city, before next time” New York Times, Nov. 3, 2012

✧ These areas also provide blue carbon habitats, i.e., carbon sinks, as well as other ecosystem services





Additional Coastal Ecosystem Services

Beyond storm surge protection, coastal ecosystems provide a suite of valuable benefits (ecosystem services) on which humans depend for food, economic activities, inspiration, and enjoyment.