Future Disaster Risks and Resilience Considerations
Worldwide Catastrophes

Loss events worldwide 1980 – 2013
Number of events

Source: Munich Re
U.S. Billion Dollar Disasters

Source: NOAA
Disaster Declarations

Growth in the number of declared disasters
1953-2013 YTD; trailing three year average

Source: FEMA
Disaster Expenditures

Source: Multiple
Open Disasters

Source: FEMA
TOTAL LOSSES FROM NATURAL HAZARDS BETWEEN 1960 AND 2011

Source: University of South Carolina
Hazards & Vulnerability Research Institute
1960 to 2011 Losses by Type

Source: University of South Carolina Hazards & Vulnerability Research Institute
There’s more to the disaster risk story
Urban and Coastal Population Growth

- Increased population and asset exposure in coastal and riverine areas
- Mitigating urban structures
- Logistics and vulnerable populations

Source: Census
Population in Poverty Increasing

Source: Census
Personal Savings Rate Decreasing

Source: Bureau of Economic Analysis
Deteriorating Infrastructure

- Average age of the 84,000 dams in the country is 52 years old.
- Number of high-hazard dams on the rise as many built to protect undeveloped agricultural land but now protect greater population and development.
- Estimated 100,000 miles of levees can be found in all 50 states and the District of Columbia.
- Many originally used to protect farmland, and now are increasingly protecting developed communities. The reliability of levees is unknown in many cases.

Source: ASCE 2013 Infrastructure Report Card
Now that we have today’s disaster context in perspective...
# Climate Change and Future Risks

<table>
<thead>
<tr>
<th>Event type</th>
<th>Trend Observed?</th>
<th>What’s expected in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme heat</td>
<td>Very likely</td>
<td>Increases virtually certain</td>
</tr>
<tr>
<td>Extreme precipitation</td>
<td>Likely</td>
<td>More in many areas, including some that will be drier overall</td>
</tr>
<tr>
<td>River flood</td>
<td>Regional trends of mixed sign</td>
<td>Tendency for increases in some regions</td>
</tr>
<tr>
<td>Coastal Flood</td>
<td>Likely</td>
<td>Very likely to increase</td>
</tr>
<tr>
<td>Drought</td>
<td>In some locations</td>
<td>Increased frequency/severity probable in many regions</td>
</tr>
<tr>
<td>Severe hurricanes</td>
<td>Virtually certain in N. Atlantic. Insufficient data elsewhere</td>
<td>Likely increase in # of severe storms and in max. wind speed and precip rates (in most basins)</td>
</tr>
<tr>
<td>Tornadoes</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Source: 2014 National Climate Assessment
Implications for Disaster Management

• Risk assessment and management
• Emergency operations and costs
• Assets and critical infrastructure
• Resilient recovery