

National and International Perspectives on Adaptation

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IPCC 6th Assessment Report: Adaptation as an urgent need

- Climate change adaptation ... requires **immediate and long-term action** by governments, business, civil society and individuals at a scale and speed significantly faster than that represented by current trends.
- **Adaptation gaps** exist between current levels of adaptation and levels needed to respond to impacts and reduce climate risks. Most observed adaptation is fragmented, small in scale, incremental, sector-specific, designed to respond to current impacts or near-term risks, and focused more on planning rather than implementation.
- Some adaptation is incremental, which only modifies existing systems. Other actions are **transformational**, leading to changes in the fundamental characteristics of a system. Even with low concentration pathways, some transformational adaptation will be necessary to limit intolerable risks.



IPCC AR6:

Figure SPM.4 | Climate responses and adaptation options

System transitions	Representative key risks	Climate responses ¹ and adaptation options	Potential feasibility ¹
Land and ocean ecosystems	Coastal socio-ecological systems	Coastal defence and hardening	●
		Integrated coastal zone management	●
	Terrestrial and ocean ecosystem services	Forest-based adaptation ²	●●
		Sustainable aquaculture and fisheries	●
		Agroforestry	●
	Water security	Water use efficiency and water resource management	Biodiversity management and ecosystem connectivity
			●
Food security		Improved cropland management	●
		Efficient livestock systems	●
Urban and infrastructure systems	Critical infrastructure, networks and services	Green infrastructure and ecosystem services	●
		Sustainable land use and urban planning	●
		Sustainable urban water management	●
Energy systems	Water security	Improve water use efficiency	●
		Critical infrastructure, networks and services	Resilient power systems
	Energy reliability		●●
Cross-sectoral	Human health	Health and health systems adaptation	●
	Living standards and equity	Livelihood diversification	●



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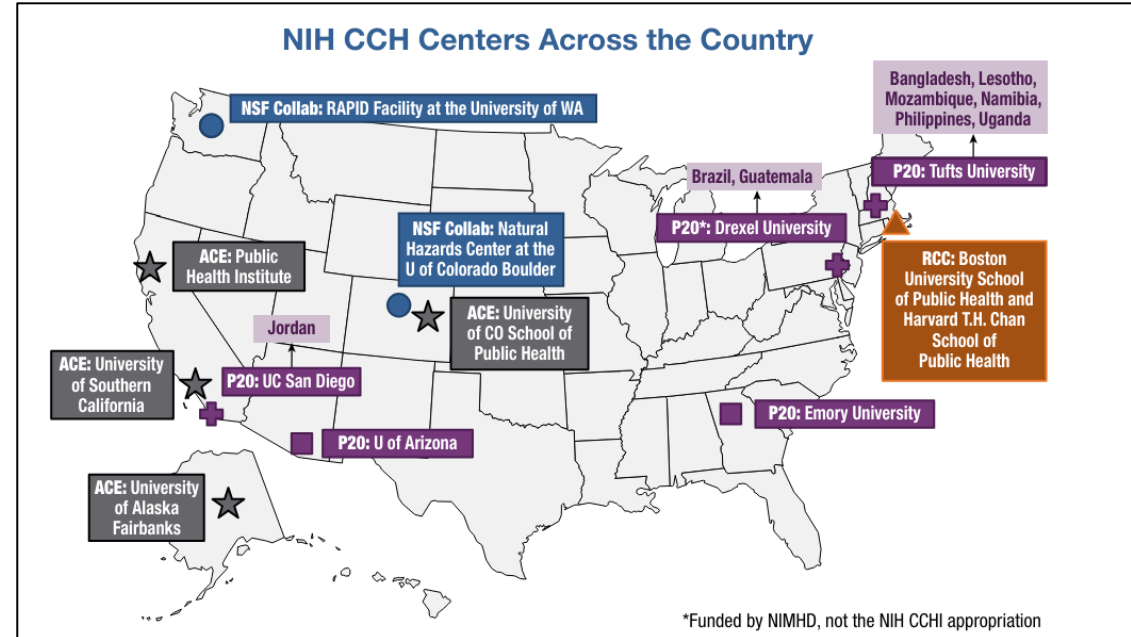
Infrastructure Investment and Jobs Act

- Department of Transportation:
 - Promoting Resilient Operations for Transformative, Eff't, and Cost-saving Transportation
 - \$8.7B to states for vulnerability assessments and protective measures for transportation assets against “current and future weather events and natural disasters”
 - Healthy Streets Program
 - \$500M grant program for cool pavements and porous pavements and to expand tree cover.
 - Port Infrastructure Development Program
 - \$2.25B in grants for projects that improve the resiliency of ports to address sea-level rise, flooding, extreme weather events, earthquakes, and tsunami inundation, and reduce or eliminate port-related criteria pollutant or greenhouse gas emissions.
- Department of Energy: \$1B for the DOE’s new program, Electric Grid Reliability and Resilience Research, Development, and Demonstration, to enhance regional grid resilience
- FEMA: \$1.8B for Building Resilient Infrastructure and Communities Program (BRIC) for building pre-disaster community resilience.
- Executive Order 14052: “building infrastructure that is resilient and that helps combat the crisis of climate change”



Climate-driven Health Risks: NIH and National Academies Research

- NIH established the Climate Change and Health Initiative: “an urgent, cross-cutting NIH effort to reduce health threats from climate change across the lifespan and build health resilience in individuals, communities, and nations around the world, especially among those at highest risk.”



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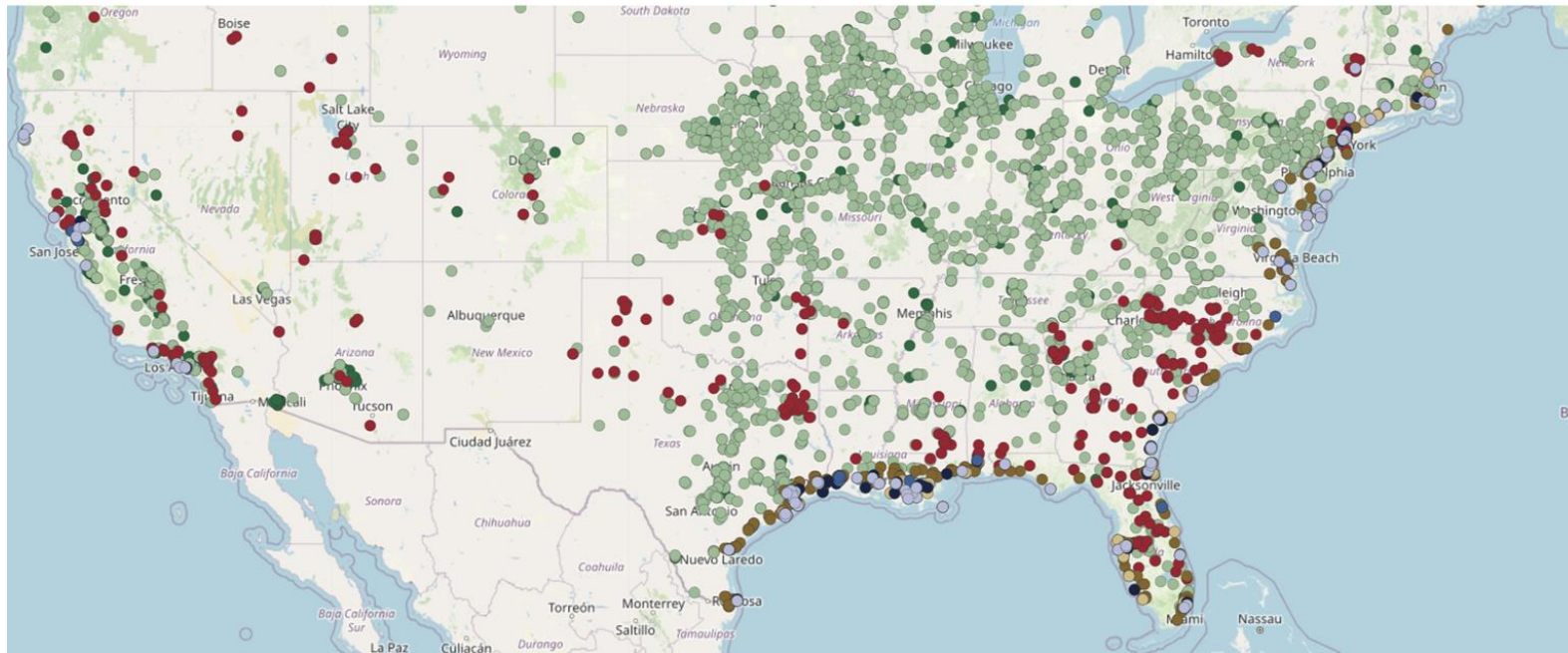
National Academies: Climate Crossroads

Climate Crossroads harnesses the breadth of the National Academies' expertise, resources, and advice to catalyze actions to meet the climate crisis.

- Accelerating Decarbonization
 - Thriving Ecosystems
 - Community Resilient Communities
 - Climate, Health, and Equity
-
- Climate Conversations
 - Climate Crossroads Summit, July 16 & 17, at the National Academies, DC

New Rules for 1990 Amendments to the Clean Air Act: RMP facilities

reas with each hazard. The colors correspond to the specific natural hazards.



Natural Hazards That May Impact Chemical Facilities

Wildfire ⓘ

- High Wildfire Risk Potential

Storm surge:

- Storm Surge from a Minimum Intensity (Category 1) Hurricane
- Storm Surge from a Maximum Intensity (Category 4 or 5) Hurricane

Flooding ⓘ

- Highest Flood Hazard
- Moderate or Other Flood Hazards

Sea level rise ⓘ

- Flooding at High Tide with no Additional Sea Level Rise
- Flooding with 1 ft. of Sea Level Rise
- Flooding with 3 ft. of Sea Level Rise



RMP facilities at risk of climate-related natech events in Puerto Rico.

Chemical Accident Prevention: EPA Should Ensure Regulated Facilities Consider Risks from Climate Change GAO-22-104494



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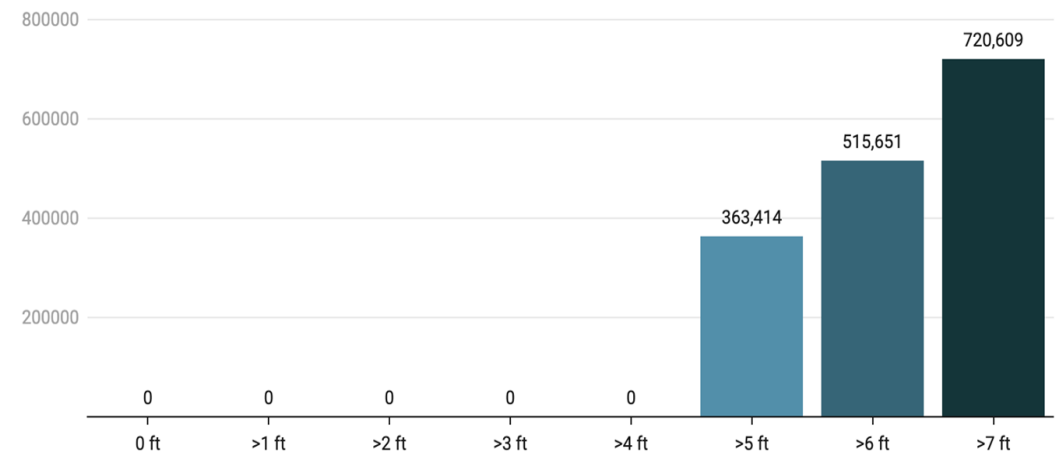
E.P.A. Sets New Rules to Limit Damage From Disasters at Chemical Facilities

The rules require facilities to explicitly address threats such as wildfires or flooding, including those linked to climate change.

- **Natural hazards and power loss:** (1) Adding amplifying regulatory text to emphasize that natural hazards (including those that result from climate change) must be addressed in process hazard analyses.
- **Facility siting:** (1) Emphasizing that facility siting must be addressed in hazard reviews
- **Safer technologies and alternatives analysis:** Requiring ((2) A Practicability assessment of inherently safer technologies and designs (3) Implementation of at least one passive measure at the facility, or combination of active and procedural measures equivalent to or greater than the risk reduction of a passive measure
- **Root cause analysis:** Requiring a formal root cause analysis incident investigation when facilities have had an RMP-reportable accident.

Tons of Hazardous Waste Potentially Impacted by a 0-7ft Rise

Heights at which managed waste could potentially be impacted by sea level rise (in tons)



Source: NOAA, RCRAInfo • [Download image](#) • Created with [Datawrapper](#)

At the local level... (place-based resilience)

- Local Climate action plans

- City of Tempe AZ (extreme heat)
 - Green infrastructure standards, adopting the International Green Construction Code, urban forestry master plan
 - Business case for investments in urban cooling and green infrastructure to the private investment community
 - Working with Arizona State university researchers for down-scaled projections to feed into city decision-making
- New York City
 - April 29th : release of NPCC4, the NYC Panel on Climate Change's (NPCC) 4th full climate assessment report for NYC. An independent advisory body assesses the current and future impacts of climate change on NYC
 - Coastal flood protection (structural, nature-based, and non-structural)
 - Climate Displacement and Socio-Vulnerability (CDSV) measure to identify areas most vulnerable to climate hazards, socio-economic disparities, and displacement. Calculated at the neighborhood level to highlight the vulnerabilities of certain populations with intersecting climate risks.
 - Local knowledge; lived experience

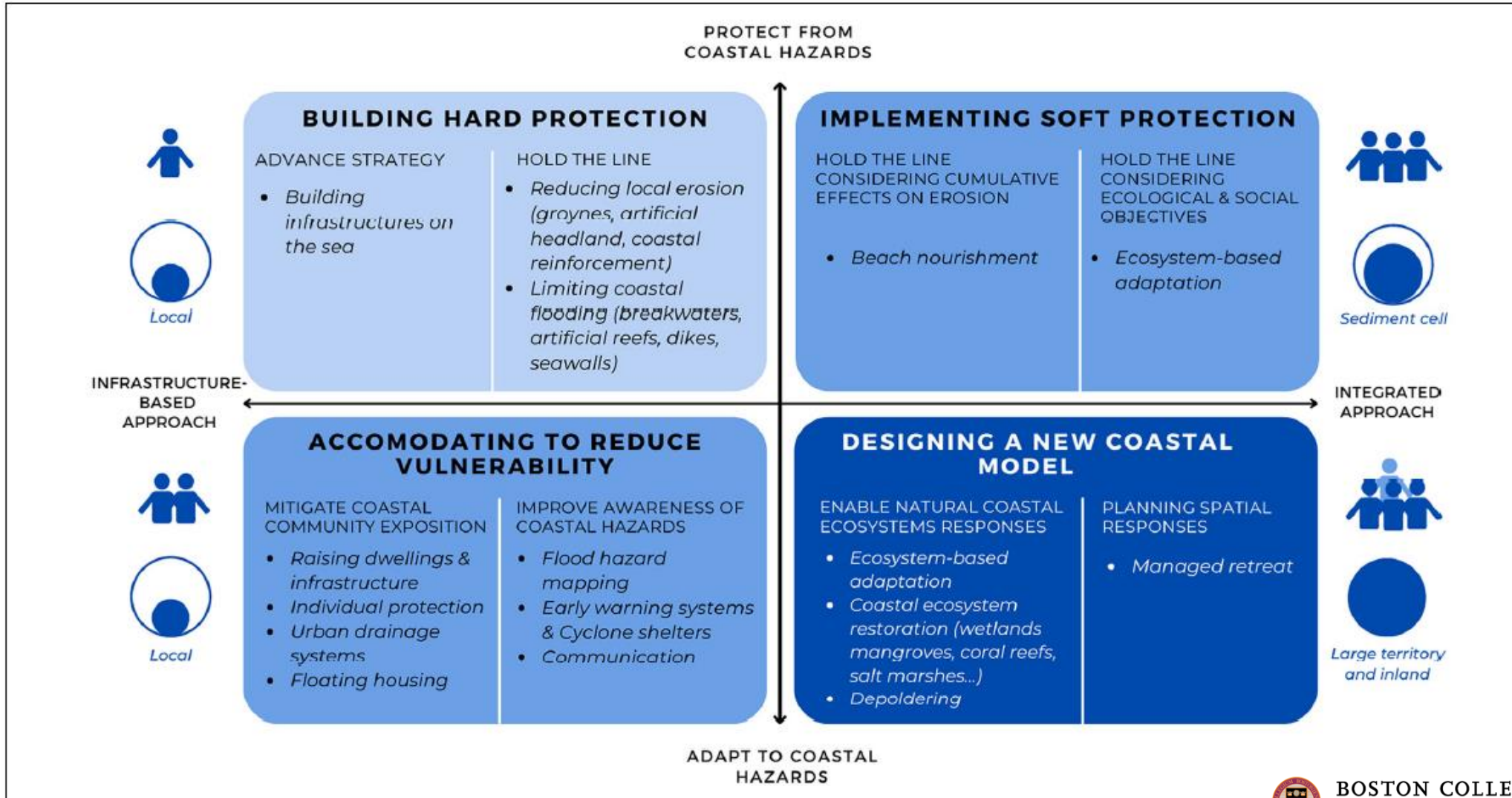


Help with creating Local Climate Action Plans

- 100 Resilient Cities – Rockefeller Foundation – 2013-2019
 - Chief Resilience Officer to transform city government planning and operations to build a greater capacity for resilience
 - Resilience strategies, then implementation in Phase 3
 - Now: Resilient Cities Network
- C40 Mayors
- Georgetown Climate Center and Adaptation Clearinghouse



Moving beyond Protection to Transformative Adaptation: Sea Level Rise



Final thoughts

Themes

- A growing adaptation gap
- Need for transformational adaptation
- Action needed at all levels; much is currently happening at the local level across the world