



DRAFT

Catalog of State Sectoral Adaptation Actions

A catalog of state-level, vulnerability-reducing adaptation actions and policy options.

Key to Future Rankings of Options in the Tables that Follow:

Potential Adaptive Capacity Increase ^{1/}	Potential Cost or Cost Savings ^{1/}
High (H): Able to reduce significantly climate risks associated with the highest impact magnitudes	High (H): Cost-benefit ratio in excess of 1.5
Medium (M): Able to significantly reduce climate risks associated with the medium impact magnitudes	Medium (M): Cost-benefit ratio between 1.0 and 1.5
Low (L): Able to significantly reduce climate risks associated with the lowest impact magnitudes	Low (L): Cost-benefit ratio less than 1.0
Uncertain (U): Not able to estimate at this time	Uncertain (U): Not able to estimate at this time
^{1/} Several measures may overlap in terms of vulnerability reduction and/or cost impacts. Estimates assume measures would be implemented independently from other measures.	

Definition of “Priorities for Analysis”:

- **High:** High priority options will be analyzed first.
- **Medium:** Medium priority options will be analyzed next, time and resources permitting.
- **Low:** Low priority options will be analyzed last, time and resources permitting.

Notation of Options:

- **Options marked in bold an asterisk (*)** indicate some of the related state actions that are approved or underway, as described further in the companion options description document. TWG members are encouraged to provide information on other relevant actions.

Existing Built Environment & Infrastructure Adaptation Options

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
1	(Managed) Retreat					
1.1	Limit infrastructure investments in hazard-affected coastal areas					
2	Protect					
2.1	Update floodplain mapping (some of this is taking place)					
2.2	Strengthen building codes and increase building inspection frequency					
2.3	Change disclosure requirements for coastal hazards					
2.4	Provide assistance or incentives for improving hazard preparedness of homes					
2.5	Consider any possible legal issues associated with sand for beach nourishment					
2.6	Conduct a vulnerability assessment for cultural resources such as museums (assuming the habitat and socioeconomic issues have been addressed to some degree this might be new)					
2.7	Increase construction standards for piers and wharves for wave strength					
2.8	Increase erosion and hazard planning focused on sheltered coastlines					
3	Accommodate					
3.1	Hazard insurance for home owners and businesses					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
3.2	Evaluate and improve capacity of storm water infrastructure for high intensity rainfall events					
3.3	Increase infrastructure design standards to address lower probability events (e.g. some cities are protecting to the 500 year event rather than the 100 year event because of the increased vulnerability)					
3.4	Community education on hazards that addresses the relationship between climate variability and climate change					
3.5	Landuse planning to allow species and habitat migration					

Future Built Environment & Infrastructure Adaptation Options

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
1	(Managed) Retreat (understood as taking out what is currently in place)					
1.1	Site industrial systems away from areas vulnerable to changes in sea level rise and associated hazards					
1.2	New building codes, design standards including setback zones and phased-out or no development in areas exposed to sea level rise and associated hazards					
1.3	Relocation of threatened structures					Possible policy mechanisms: Develop rolling easement program; Develop rolling buffer program; Creating upland buffers
1.4	Develop and use insurance policies to drive and support retreat activities					
1.5	Guide future development out of areas vulnerable to sea level rise and associated hazards					
1.6	End permitting of new homes in areas vulnerable to sea level rise and associated hazards					
1.7	Develop a strategy for managing the retreat of (Small and large) ports and associated infrastructure, such as rail and roads					
1.8	Develop a strategy to assure long-term public access to water					
1.9	Buy out unused properties in areas vulnerable to sea level rise and associated hazards					
1.10	Develop retreat strategies for the management of existing structures or conditions that may become submerged hazards to navigation or public health (e.g. effluent outfalls, water intakes, septic fields, rockwalls,					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
	docks, and piers)					
1.11	Develop strategies to address situations of changing ingress/egress to structures as support for access roads in areas vulnerable to sea level rise and associated hazards is withdrawn					
2	Avoid (placing people and property at risk)					
2.1	Minimization of paved surfaces and use of trees to reduce flooding					
2.2	Require that counties act on comprehensive planning requirements					
2.3	Integrate critical area planning requirements with comprehensive planning laws, including emergency planning and infrastructure planning requirements					
2.4	Strengthen existing critical area planning and implement requirements to address SLR and associated coastal hazards					
2.5	Develop a strategy to regularly update floodplain maps					
2.6	Application of hard structural options (such as dikes, levees, floodwalls, and saltwater intrusion barriers) and soft structural options such as dune restoration and creation Wetland restoration, creation, periodic beach nourishment, temporary barriers and other options					
3	Accommodate					Consider resilience and redundancy in policy
3.1	Storm-surge early warning system and adequate response, evacuation plan					
3.2	Hazard insurance					* Cross cutting issue
3.3	Modification of land use, agricultural , and landscape practices including aquaculture, saline-resistant crops, depending on location and purpose					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
3.4	Strict regulation of hazard zones					
3.5	Raise shoreline structures					
3.6	Create standards for floating piers					
3.7	Establish a mechanism to evaluate and recommend new design standards for structures (and placement of mechanical and electrical equipment) that may be vulnerable to SLR and associated hazards					
3.8	Design industrial systems to reduce vulnerability to future sea level rise and associated hazards					
3.9	Institute new hazard-resistant building codes and design standards to reduce vulnerability of structures to future sea level rise and associated hazards					
3.10	Establish a coordinating mechanism to assure that local governments act in concert with the state to reduce future impacts from SLR and associated hazards					
3.11	Synchronize future design with emergency planning infrastructure requirements					
4	Research and Data needs					
4.1	Investigate opportunities and innovations with potential to benefit the economy, public services, and business sectors					
4.2	Create inventory of infrastructure vulnerable to future SLR and associated hazards					
4.3	Create on-line mapping capability for multiple audiences including local governments					Process already well along
4.4	Create visualization tool for SLR and associated hazards					Google Earth?
4.5	Surveillance and monitoring of sea-level rise					
4.6	Investigate potential and limitations of					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
	eminent domain, vesting, grandfathering, and amortizing strategies to support retreat activities					
4.7	Assess financial impact of property value changes					
4.8	Investigate consequences of application of hard structural options (such as dikes, levees, floodwalls, and saltwater intrusion barriers) and soft structural options such as dune restoration and creation Wetland restoration, creation, periodic beach nourishment, temporary barriers and other options					
	Evaluate the potential risks and opportunities to a ferry system (incl. public transportation and emergency planning)					
5	Capacity Building and Training					

Human Health and Public Safety Adaptation Options

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
1	Disease Prevention: Vector-borne diseases, Water-borne diseases					
1.1	Augment vector surveillance and control programs for vectorborne diseases that are likely to become more common or widespread with climate change					
1.2	Vaccination campaigns					
1.3	Stricter agricultural run-off control policies					
1.4	Strengthen and enforce watershed contamination protection laws					
1.5	prevention programs targeting most at-risk, vulnerable populations					
1.6	Safeguard freshwater supply					
1.7	improve sewage and solid-waste management infrastructure to reduce vulnerabilities to climate change (i.e. storm surge, flooding, inundation)					
1.8	Implement educational programs for schools and the public on to help control vector breeding sites					
1.9	Design programs to monitor for the appearance of vector- and waterborne diseases following floods and storms					
1.10	Develop syndromic surveillance program to identify outbreaks of waterborne diseases					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
2	Acclimatization, resilience to thermal extremes					
2.1	Require consideration of climate change projections in building guidelines and urban planning					
2.2	Increase urban vegetation-plant trees, roof gardens, planned growth, etc.,					increase the resilience of communities to heat waves while reducing energy requirements.
3	Mitigate mortality and morbidity from extreme weather events					
3.1	Planning laws that prevent new-construction in vulnerable zones					
3.2	Building guidelines					
3.3	Forced, subsidized migration					
3.4	Economic incentives for building in non-risk zones					
3.5	Establish communication mechanism to coordinate efforts between disaster relief and public health agencies.					
3.6	Early warning systems for extreme weather coupled with adequate response plan					
3.7	Implement educational programs on appropriate behavior and following extreme events					
3.8	work with insurance industry in design of enhanced programs					

Resources and Resource-Based Industry Adaptation Options

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
1	Agricultural industries					
1.1	Ensure farmers, especially in remote, rural locations have access to most up-to-date weather forecasts					
1.2	early warning systems for extreme events					
1.3	Conduct research to develop new crop varieties					
1.4	Change farming practices to conserve soil moisture and nutrients, reduce runoff and control soil erosion					
2	Terrestrial resources					
2.1	Subdivide large fields, improve runoff channels in large fields					
2.2	Increase flood protection, e.g., levees, reservoirs					
2.3	Wetland protection and restoration					
2.4	Improve flood warning and dissemination					
2.5	Curb floodplain development					
2.6	Change land topography to reduce runoff, improve water uptake and reduce wind erosion					
3	Water resources					
3.1	Increase reservoir capacity					
3.2	Increase water use efficiency and water recycling in industrial and power station cooling					
3.3	Improve management of underground water resources as population and demand grows					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
3.4	Safeguard drinking water supplies against saltwater intrusion					
3.5	Better design for septic systems					
3.6	Increase standards to enhance resilience of natural water systems					
3.7	Monitor groundwater salinity increase					
3.8	Enhance treatment works					
3.9	Reuse and reclamation					
3.10	Reduce volume of effluent to treat					
3.11	Promote alternatives to chemical use					
4	Marine ecosystems					
4.1	Research and integrated management of fisheries within coastal and open marine ecosystems					
4.2	Integrated monitoring systems in productive areas, aimed at obtaining systematic information on hydrophysical, hydrochemical, and hydrobiological processes					
4.3	Integrated ecological monitoring to identify anthropogenic changes, including climate change, and predict fish productivity					
4.4	Modification and improvement of the technology of the fishing industry and management of the fish trade					
4.5	Organization of marine biosphere reserves and protected areas for the habitat of marine mammals					

Option No.	Adaptation Policy Option	Flexibility	Capital intensity	Adaptive capacity	Level of consensus	Notes
4.6	Use of emerging predictive information related to natural climate variability (e.g., ENSO) to support fishery management and planning.					