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Catalog of State Adaptation Actions

Resources and Resource-Based Industries

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 <u>1/</u>	Potential Cost or Cost Savings <u>1/</u>
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
<u>1/</u> 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.

Resources and Resource-Based Industries Adaptation Options

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
1	Develop and utilize a new integrative vision for Maryland regarding the interplay of development and resources in the face of climate change.					Include insurance, public works/infrastructure, business, homeowners, public interest, etc. Force the debate about how to integrate such issues as “hard” and “soft” protection, replacement, infrastructure development, etc. Revisit and revise periodically.
2	Conduct comprehensive critical areas mapping and assessment to determine where there may be a chance to defend/protect developed areas (and if so, to determine how) versus where we shouldn't.					
3	Identify staged geographical and chronological priorities, e.g., (1) the Bay itself; (2) the 100' buffer area; (3) the 1000' buffer area; etc.					Use as an important organizing principle.
4	Enact legislation requiring local governments to consider sea-level rise when amending their plans for coastal land use, open space wetland protection and other relevant policies.					Might be better for the Infrastructure development TWGs.
5	Develop improved criteria for identifying ecologically critical lands, in particular considering how sea-level-rise and other climate changes will hurt habitats and seek opportunities to acquire or better manage these lands.					
6	Ensure that the Federal Farm Bill conservation programs preserve existing commitments and encourage new enrollments. This may involve adjusting the rates paid to land owners or finding efficient ways to restore relatively small parcels, such as buffers along streams.					<ul style="list-style-type: none"> • Related efforts are underway. • Should be a high priority. • Need the Federal government involved to support this program. • Focus on critical regions.

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
7	Maryland (through its Green Fund) should increase support of non-structured approaches to stormwater management (i.e., preventive measures incorporated in land-use and development planning rather than technological fixes of point-source pollution) and require consideration of greater extremes in precipitation events due to global warming.					<ul style="list-style-type: none"> • MD just passed in March an overhaul of stormwater management along these lines. • The Green Fund could help with additional funding. • Are other TWGs are working on this?
8	Develop and distribute stormwater runoff guides for local communities and municipalities					Encourage, for example, "Rain Gardens"
9	Consider stricter stormwater permits to steer development away from coastal and stream buffer areas, wetlands and other sensitive lands.					
10	The Maryland fisheries service and the Chesapeake Bay Program should move toward an ecosystem approach for managing fisheries in the Bay. State and regional fisheries management plans should consider how climate change will affect fisheries.					Jen to get additional input from collaborator on status of ecosystem-based planning.
11	Adjust fishing regulations to account for shifting pollutions that may result from global warming.					
12	Adjust waterfowl hunting regulations to account for shifting populations that may result form global warming.					Should link to Federal legislation on wildlife adaptation.
13	There should be an effort made to identify high risk areas and encourage the planting of salt-tolerant species (Loblolly Pine) wherever possible. The State also needs to inaugurate a program to search for other salt-tolerant tree species (e.g. Live Oak) which may be suitable for forestry on the lower Eastern Shore.)					

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
14	Promote privately-owned forest retention, health and conservation through adoption of Forest Stewardship Plans					<ul style="list-style-type: none"> • Effort is already underway, but probably needs modifications to account for Sea Level Rise. • Perhaps should target particularly vulnerable areas.
15	Retain and expand forests, agriculture, and conservation in order to protect water quality; mitigate shoreline erosion in the Bay watershed; minimize future takings issues, avoid stranded infrastructure, and help sequester carbon.					
16	Use the best available tools, such as the Resource Lands Assessment, to identify areas of greatest opportunity and benefit.					
17	Adopt a “no net loss of forest canopy” requirement					
18	Enhance state monitoring of disease, pests, dieback, etc.					
19	Use the Extension Service to develop materials and conduct outreach to resource-based industries regarding climate science training, impacts awareness, and best management practices (BMPs) (e.g., freshwater savings opportunities, water table management, water recapture and reuse (cisterns), etc.)					
20	Promote best management practices through a mix of regulatory policies, financial incentives, and education and outreach.					
21	Develop and distribute guidance for local communities and municipalities to become sustainable in the face of climate change					Possible wise use of the Coastal Communities funding mechanism
22	Encourage forest riparian buffer retention through financial incentives.					

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
23	Expand Maryland’s urban canopy tree program and link forests with stormwater management.					
24	Create and finance a Forest Health Contingency Fund to protect forests against insects and disease.					Initial focus should be on coastal forest areas to help against sea level rise.
25	Require 3rd party certification on the management of forest lands owned by State and local governments.					Needs clarification as to benefits with respect to climate change and sea level rise.
26	Survey local governments throughout the state about what they’re doing in response to sea level rise impacts, what they perceive as barriers, and how best to share results (e.g., through outreach, establishing a network, etc.) on an ongoing basis.					
27	Encourage local governments to address erosion control measures, wetland retreat, resource conservation and the linkage of these items to community realignment plans and working and conservation lands designations (see below for more details on these plans).					<ul style="list-style-type: none"> Probably needs to be initiated by state, with local (and perhaps Federal) cost –sharing. Need to identify existing incentives and what new ones may be needed. Could start by highlighting demonstration projects. Probably requires an educational component, too.
28	Encourage local governments to develop community realignment plans specifying how phased transitions will occur in coastal hazards areas, including up- and down-scaling of density and public investment in infrastructure.					Probably needs to be initiated by state, with local (and perhaps Federal) cost –sharing.
29	Encourage local governments to develop working and conservation lands designations to address long term goals for habitat management and optimal use as sea level rises and storm surge events increase.					<ul style="list-style-type: none"> Probably needs to be initiated by state, with local (and perhaps Federal) cost –sharing. Include migratory corridors.

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
30	Implement Purchase of Development Rights (PDRs) and Donation of Development Rights (DDRs) mechanisms to address shoreline erosion control, to prevent future hazardous or undesired development patterns, and to encourage "soft" erosion control approaches and wetland migration.					Use Program Open Space (POS) funding to purchase shoreland development rights, secure migratory bird flyway areas, and secure other easements and climate protections.
31	Revise regulations enabling private land owners to put sediment on their tidal marshes, and continue to rebuild declining marshes on public lands using dredged materials from Army Corps projects.					<ul style="list-style-type: none"> • May need to be part of a broader regional plan. • May also want to consider dredgewater on-site.
32	Encourage the use of living shorelines when private homeowners defend their coastlines against sea level rise so that vulnerable species which need the bay interface ecosystem to survive (e.g. Maryland Terrapins, Tiger Beetles, etc.) will not be lost.					<ul style="list-style-type: none"> • There is already a program and expertise in Maryland, but it needs more funding to encourage property owners to use softer techniques. • Funds could be generating from a state carbon surcharge (increased gasoline tax, a per kilowatt hour supplement on electric bills. etc.).
33	Change the Tidal Wetlands Act to alter riparian protection rights of landowners.					
34	The Dept of Natural Resources in conjunction with the Department of the Environment should develop state tidal wetlands conservation and restoration plans that promote designation of wetland migration corridors and remove and discourage use of hard shoreline erosions structures in coastal marsh environments.					May fit into the Integrated Shoreline Management Plan?
35	Establish policies such as rolling easements or mandatory setbacks to discourage new development in vulnerable coastal areas.					

Option No.	Adaptation Policy Option	Flexibility	Capital Intensity	Adaptive Capacity	Level of Consensus	Notes
36	Encourage carbon sequestration using wetland creation and reforestation approaches.					
37	Develop a wildlife adaptation strategy that identifies fish, wildlife and habitats threatened by climate change and outlines actions to protect them.					
38	Ensure that conservation agencies receive adequate, dedicated funding each year to meet existing conservation goals and to address the new challenges of global warming.					The Legislature should also reduce reliance on the annual appropriations process and provide more long-term budget certainty.
39	In order to promote groundwater recharge and, as a co-benefit, reduce harmful impacts of stormwater runoff, identify additional test jurisdictions for bio-infiltration projects in new and reconstructed highways similar to Montgomery County, Maryland "road code" adopted in July 2007.					