

Adaptation/Resiliency Category Definitions

Cost of implementation

Low

- <\$25M total cost
- Most resources required for successful implementation are already on hand

Medium

- \$25M - \$100M total cost
- Requires some new resources for successful implementation

High

- >\$100M total cost
- Requires high degree of new resources or is a demonstration project
- Strategies with cost >\$250M should indicate the range of anticipated costs

Ease of implementation

Easy

- Strategy has been implemented many times and/or can build off an existing NYS program
- Proven and widely available technology
- Key stakeholders are strong supporters; no strong opponents

Medium

- Strategy is new to New York State but has been successfully implemented in other comparable states/countries
- Proven technology with known GHG impact, but still small-scale
- Key stakeholders are neutral, or balanced mix of supporters and opponents

Hard

- Strategy is unproven in comparable settings
- Early-stage technology (e.g., need for pilots to prove feasibility and significant capital to scale up)
- Key stakeholders oppose the strategy

Recommended Adaptation and Resilience Initiatives

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Adaptation and Resilience Strategy Summary (1 of 3)

Initiative #	Description	Action type	Climate risk addressed	Ease of implementation	Cost
AR1	Commit to comprehensive and equitable state climate change adaptation and resilience planning and implementation	Planning, funding	Multi-hazard	Easy	\$
AR2	Incorporate equitable adaptation and risk-reduction considerations into relevant state funding and regulatory programs, projects and policies	Regulation, policy, guidance	Multi-hazard	Medium	\$
AR3	Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects	Guidance, technical support, funding	Multi-hazard	Easy	\$\$
AR4	Evaluate opportunities to ensure equitable consideration of future climate conditions in land-use planning and environmental reviews.	Legislation, regulation, policy, information resources, guidance	Multi-hazard	Medium	\$

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Adaptation and Resilience Strategy Summary (2 of 3)

Initiative #	Description	Action type	Climate risk addressed	Ease of implementation	Cost
AR5	Develop policies and tools, and implement programs to reduce risks associated with coastal and inland flooding	Guidance, mapping, analysis, technical support, funding	Sea-level rise, coastal storms and erosion, fluvial and pluvial flooding, stream erosion	Medium	\$\$ + project costs \$\$\$
AR6	Develop policies and programs to reduce human risks associated with new patterns of thermal extremes	Guidance, technical support, funding	Extreme heat days, heat waves, extreme cold	Easy	\$
AR7	Develop policies and programs to reduce risks threatening ecosystems and biodiversity	Legislation, planning, acquisition	Follow-on effect of climate change	Medium	\$ + project costs \$\$\$
AR8	Strengthen meaningful community engagement and public education, and build adaptive capacity across all sectors	Program, funding	Multi-hazard	Easy	\$

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Adaptation and Resilience Strategy Summary (3 of 3)

Initiative #	Description	Action type	Climate risk addressed	Ease of implementation	Cost
AR9	Identify and evaluate options for supporting equitable adaptation and resilience practices and projects	Legislation, regulation, funding, revenue generation, analysis	Multi-hazard	Hard	\$\$\$
AR10	Enhance climate resilience and adaptive capacity of agricultural community, while preparing to take advantage of emerging opportunities	Funding, research	Multi-hazard	Medium	\$\$
AR11	Ensure the reliability, resilience and safety of a decarbonized energy system	Regulation, investment	Multi-hazard	Hard	\$\$\$

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Adaptation and Resilience Strategy – Initiative AR1: Overview

Description:	Commit to comprehensive and equitable state climate change adaptation and resilience planning and implementation.
Action type:	Plan
Risk addressed:	Numerous hazards present substantial risks to NYS built and natural systems, human health and economy.
Cost and funding considerations:	Low cost relative to risks and potential to mitigate risks through comprehensive adaptation and resilience planning, and potential to provide more effective and efficient programs. EPF funds available. If activity is linked to equity and preventing chronic disease through physical activity, age-friendly strategies, community wealth building, it can be linked to DOH contract and hospital benefits funds.
Ease of implementation:	Easy. Many states have state resilience officers and adaptation plans. Adaptation plan framework already developed. Vulnerability assessments and climate research underway.
Example case studies:	Safeguarding California Plan, Colorado Climate Plan 2018, Maryland sectoral strategies, Massachusetts Hazard Mitigation Plan, North Carolina 2020 Climate Risk Assessment and Resilience Plan, Resilient Rhody

Risks / Barriers to success	Possible mitigants
Requires staff to manage additional planning workload, including analysis, coaching stakeholders to evaluate intermediate outcomes and stakeholder engagement.	Building staff capacity. Assigning a cross-sectoral group such as adaptation and resilience sub-cabinet to facilitate coordination, dialogue and information exchange.

Adaptation and Resilience Strategy – Initiative AR1: Benefits and impacts

Commit to comprehensive and equitable state climate change adaptation and resilience planning and implementation

Benefits and Impacts	
Disadvantaged communities	Comprehensive planning provides greater opportunity for strategic development, implementation and evaluation of programs and projects intended to address vulnerabilities of disadvantaged communities while avoiding climate gentrification (displacement of low-income households).
Health and other co-benefits	Engage cross-sectoral local and state health representatives to integrate health considerations and other co-benefits within the plan.
Businesses and industries	Plan should include programs to improve resilience of businesses and other anchor institutions, particularly those critical to training and employment in disadvantaged communities.
Just transition: businesses and industries, workers	Engage anchor institutions, businesses, employee-owned businesses, industries and labor unions to integrate their perspectives into plan.
Other	Comprehensive planning would help avoid ad-hoc programming and cross-agency duplication of programs, and promote coordination across sectors, a long-term perspective and sustainability of initiatives.

Adaptation and Resilience Strategy – Initiative AR1: Components for delivery

Commit to comprehensive and equitable state climate change adaptation and resilience planning and implementation

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Appoint a state resilience officer within State Operations to coordinate and direct agency hazard mitigation, adaptation, response, resilience and recovery programs.	Director of State Operations	1 yr	DEC, DHSES and other relevant agencies
Convene an adaptation and resilience sub-cabinet to oversee development and implementation of a comprehensive state climate change adaptation and resilience plan.	Director of State Operations	3 yr	DEC, DHSES and other relevant agencies
Complete and implement state agency and authority vulnerability assessments, develop resilience and adaptation plans. Identify and prioritize state adaptation and resilience projects.	DEC	3 yr	All agencies and authorities
Allocate funding and staff resources for periodic, science-based integrated climate assessments and other research to support necessary regulatory and planning activities to reduce risk and promote resilience.	Legislature, NYSERDA	ongoing	DEC, communities

Adaptation and Resilience Strategy – Initiative AR2: Overview

Description:	Incorporate equitable adaptation and risk-reduction considerations into relevant state funding and regulatory programs, projects and policies.
Action type:	Legislation, regulation, policy
Risk addressed:	Multi-hazard
Cost and funding considerations:	Low costs to state, costs to comply TBD, but likely low relative to potential risks. More explicit design requirements would support applications for federal hazard mitigation and disaster recovery funding.
Ease of implementation:	Medium, some agency and other stakeholder resistance likely. Agency and stakeholder coordination necessary.
Example case studies:	NYC resilience guidelines, New Jersey S2670/A2785

Risks / Barriers to success	Possible mitigants
Substantial investment of staff time to develop and implement necessary guidance and policies. Training re: green infrastructure needed for regulators, design community. State agencies, utilities, generators may object to additional requirements.	Allocate funding and technical expertise for communities to comply with additional regulations. Provide incentives for property owners to build A/R into property management. Streamline permitting processes for projects that meet requirements.

Adaptation and Resilience Strategy – Initiative AR2: Benefits and impacts

Incorporate equitable adaptation and risk-reduction considerations into relevant state funding and regulatory programs, projects and policies

Anticipated Benefits and Impacts

Disadvantaged communities

Strategic and equitable development of green infrastructure could reduce flood risk, reduce energy costs, increase local engagement and empowerment, and increase training and employment opportunities in disadvantaged communities.

Health and co-benefits

Addressing climate-exacerbated impacts of insect-borne diseases with the spread of insects, contaminants in floodwaters, and heat-related health impacts would all reduce public health risks.

Just transition: businesses and industries, workers

Enhanced design guidelines would create demand for skilled design professionals and tradespeople. Expanded green infrastructure programs and other programs to encourage or require resilient construction would drive demand for skilled design professionals and tradespeople. Training programs to meet this demand could be targeted to industries and communities in transition, particularly disadvantaged communities. Entrepreneurship training and small business startup support would increase small business creation in climate adaptation and resilience products and services.

Other

Adaptation and Resilience Strategy – Initiative AR2: Components of the strategy 1 of 2

Incorporate equitable adaptation and risk-reduction considerations into relevant state funding and regulatory programs, projects and policies

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Adopt science-based projections of changes in climate parameters relevant to state decision making and standardize their use across all agencies and regulated entities.	DEC, NYSERDA	2 yr	Agencies, regulated entities
Promote integrated planning and develop criteria for integrated decision making for capital investments.	Director of State Operations	1 yr	Economic development and infrastructure agencies
Develop and adopt design guidelines for state-funded projects to ensure resilience to climate hazards, particularly sea-level rise, flooding and extreme heat.	OGS	2 yr	DOS, DOT, MTA, DASNY, ESD
Amend Smart Growth Public Infrastructure Policy Act and similar statutes to require consideration of relevant climate hazards, not only sea-level rise, storm surge and flooding, and issue implementation guidance.	Legislature, DOS, DEC	2 yr	Agencies

Adaptation and Resilience Strategy – Initiative AR2: Components of the strategy 2 of 2

Incorporate equitable adaptation and risk-reduction considerations into relevant state funding and regulatory programs, projects and policies

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Incentivize use of natural resources and nature-based features to mitigate climate hazards, where applicable, and monitor and evaluate benefits.	DEC	2 yr	DOS, OPRHP, funding agencies
Ensure, through state contract provisions, that design professionals and contractors are trained and qualified to incorporate nature-based solutions in infrastructure projects.	OGS	3 yr	DEC, DOS, infrastructure agencies, professional licensing bodies
Require all state-funded comprehensive land and water-use planning to assess climate-change vulnerabilities and strategies to promote resilience and reduce risk.	DEC, DOS	2 yr	Municipalities, regional planners, REDCs

Adaptation and Resilience Strategy – Initiative AR3: Overview

Description:	Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects.	
Action type:	Programmatic, funding	
Risk addressed:	Multi-hazard	
Cost and funding considerations:	Medium (can be completed incrementally)	
Ease of implementation:	Easy. Some state support programs for regional and local adaptation already in place. Additional tools and programs available to promote and support, or as models. High local demand for support.	
Example case studies:	NY Climate Science Clearinghouse Climate Smart Communities Portal, HREP’s Climate Resilience Partnership, PUSH Blue, Climate Safe Neighborhoods, Massachusetts Municipal Vulnerability	
Risks / Barriers to success	Possible mitigants	
Full implementation of this initiative involves use of web technologies that requires high-speed internet access and updated computers and software. Communities and other organizations have limited staff and other resources. Time pressures to implement strategies before the worst impacts of climate change unfold.	<p>Increasing access to broadband.</p> <p>Climate Leadership Coordinators (circuit riders) to supplement staff efforts.</p> <p>Citizen volunteer committees to supplement local government staff. Immediate and aggressive action to develop and implement these strategies and recruit adequate personnel will mitigate time pressures.</p> <p>Transient use of high-risk, open space areas (after buy-out) offers economic benefits to communities while reducing risks to property and infrastructure.</p>	

Adaptation and Resilience Strategy – Initiative AR3: Benefits and impacts

Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects

Benefits and Impacts	
Disadvantaged communities	Directly engages organizations, businesses, schools and neighborhood groups in disadvantaged communities and provides them tools and resources, creates jobs and provides training for youth from disadvantaged communities. Potential negative impact of green gentrification.
Health and other co-benefits	Increases health of ecosystems including water resources, increases public engagement, provides employment, and strengthens capacity of local governments.
Businesses and industries	Increases economic resilience, develops business continuity strategies, fosters resilient economic development and fosters climate adaptation-related business opportunities.
Just transition: businesses and industries, workers	Provides new local business opportunities and job training in nature-based solutions for adaptation and resilience, ecosystem-based adaptation and related support services. Helps receiving communities prepare for climate migration and the assimilation of large numbers of people relocating to new climate-resilient communities.
Other	Retreat could have effects on residents that remain, community cohesion, tax base, etc.

Adaptation and Resilience strategy – Initiative

AR3: Components for delivery 1 of 3

Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Support development of local government resilience, continuity and adaptive capacity. Consider expanding role of local or regional advisory bodies to include climate change adaptation and resilience planning and implementation.	DEC	1.5 yr	Local governments, CACs, EMBs, NYSACC, Legislature
Assist local governments to adopt and integrate climate change considerations into local regulatory programs and land use plans, including hazard mitigation, local waterfront revitalization and comprehensive land-use plans.	DEC, DOS, DHSES	2 yr	All state agencies, local governments
Develop local economic resilience strategies and provide support to local governments and businesses with climate-adapted economic development, business continuity planning, and local government climate financing and budgeting.	TBD	2 yr	DOS, DEC, local governments, Legislature

Adaptation and Resilience strategy – Initiative AR3: Components for delivery 2 of 3

Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects

Components required for delivery <i>(Brief description of action required)</i>	Implement ation lead	Time to implement	Other key stakeholders
Provide support to local communities for planning and implementing ecosystem-based adaptation projects that help ecosystems and wildlife adapt to climate change, maintain critical ecosystem services, such as protecting water resources and wetlands, providing natural flood control, improving carbon sequestration, and providing nature-based resilience.	DEC	1 yr	DOS, nonprofit agencies, local governments, Legislature
Provide annual funding for Climate Leadership Coordinators to provide training, technical support and county and regional capacity building to assist local governments to assess climate vulnerabilities, and to develop and implement adaptation plans.	DEC	1 yr	Local governments, contractors, Legislature
Support deployment of online tools to facilitate local and regional vulnerability assessments, adaptation planning and implementation with metrics, project management, progress monitoring dashboard, peer collaboration network, and financing resources.	DEC	1 yr	OITS, consultant/contractor, local governments

Adaptation and Resilience strategy – Initiative AR3: Components for delivery 3 of 3

Provide state agency planning and technical support for equitable regional and local adaptation and resilience plans and projects

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Develop policies and guidance and provide funding for community environmental and economic resilience through managed retreat with strategic property buy-outs, strategic reuse of industrialized waterfronts, and economic repurposing of buy-out properties and stranded coastal assets.	DOS	3 yr	ESD, DEC, DHSES, HCR, GOSR, FEMA, local governments, Legislature
Establish strike teams to equitably assist municipalities with resilient post-disaster recovery.	TBD	2 yr	DHSES, DOS, DEC, GOSR, municipalities
Develop policies and guidance and provide funding and support to receiving communities to prepare them for addressing climate migration out of climate-impacted areas and assist with resettlement housing, jobs, schools, infrastructure and services.	TBD	3 yr	DOS, HCR, DHSES, DEC, GOSR, local governments, schools, Legislature
Create Watershed Protection Improvement Districts under NY Town Law Article 12 Sec 190 to assess local climate change impact fees, run payments-for-ecosystem services initiatives (PES) and oversee participation in voluntary carbon markets.	DOS	1 yr	DEC, towns

Adaptation and Resilience Strategy – Initiative AR4: Overview

Description:	Evaluate opportunities to ensure equitable consideration of future climate conditions in land-use planning and environmental reviews.
Action type:	Legislation, policy, guidance
Risk addressed:	Multi-hazard
Cost and funding considerations:	Medium cost to evaluate opportunities and implement necessary regulatory and policy changes. Staff or consultants needed to develop information sources, e.g., maps, and guidance.
Ease of implementation:	Medium. Challenges include staff availability; stakeholder resistance, particularly development community; complexities of assessing cumulative impacts; resistance to regional planning
Example case studies:	California EQA Guidelines, Washington State Environmental Policy Act, Council on Environmental Quality guidance,

Risks / Barriers to success	Possible mitigants
<p>Municipalities, developers and other businesses may object to additional review requirements.</p> <p>Limited capacity of local review boards.</p> <p>Lack of maps and other information sources necessary to support assessment of future conditions.</p>	<p>Ensure rigorous stakeholder involvement during development of new requirements.</p> <p>Provide clear guidance for review and readily available information sources.</p>

Adaptation and Resilience Strategy– Initiative AR4: Benefits and impacts

Evaluate opportunities to ensure equitable consideration of future climate conditions in land-use planning and environmental reviews.

Benefits and Impacts	
Disadvantaged communities	Consideration of future conditions during project review provides opportunity to evaluate effects on disadvantaged communities and develop alternatives.
Health and other co-benefits	Consideration of future conditions during project review provides opportunity to evaluate effects on public health.
Businesses and industries	Some businesses and industries may object to incorporation of climate change considerations into project reviews.
Just transition: businesses and industries, workers	Could create new jobs around the additional regulations (QA officers, additional code officers).
Other	

Adaptation and Resilience Strategy – Initiative AR4: Components for delivery

Evaluate opportunities to ensure equitable consideration of future climate conditions in land-use planning and environmental reviews.

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Develop or update guidance on consideration and mitigation of climate change risks in permit and SEQRA reviews, and amend SEQR Handbook and workbooks.	DEC	3 yr	Municipalities
Enact legislative amendments to enhance the ability of county and regional planning boards to encourage comprehensive planning beyond municipal boundaries.	Legislature	2 yr	DEC, DOS, local governments, regional planning boards
Amend the project review process to facilitate approval of adaptive projects, including a review incentive program for carbon-neutral or resilient development.	DEC	3 yr	Municipalities, EJ advocates
Provide guidance on assessment of effects of agency actions and public investments on regional and local economies and adaptive capacity.	DEC	3 yr	Municipalities, EJ advocates

Adaptation and Resilience Strategy – Initiative AR5: Overview

Description:	Develop policies, programs, and decision support tools to reduce risks associated with coastal and inland flooding.
Action type:	Guidance, mapping, analysis, technical support, funding
Risk addressed:	Sea-level rise, coastal storms and erosion, fluvial and pluvial flooding, stream erosion
Cost and funding considerations:	Low cost for development of policies and programs. Medium costs for floodplain assessment, mapping and other information resource development. Potentially high costs for buy-outs and land acquisition.
Ease of implementation:	Medium. Challenges include staff availability; stakeholder resistance, particularly development community
Example case studies:	Lake Ontario REDI, Resilient NY studies, Hudson River Flooding Decision Support System mapping tool, Climate-adaptive Design program, Flood Resilience Network, North Carolina Action Plan for Nature-Based Stormwater Strategies, Massachusetts Flood Risk Protection Program

Risks / Barriers to success	Possible mitigants
<p>Updates to flood maps are not routinely done and do not reflect risks associated with climate change (increases to annual chance flood). Community buy-in of decision support tools is needed.</p> <p>Buy-outs and other risk-mitigation measures could promote green gentrification.</p>	<p>Develop more user-friendly tools. Calibrate models with observed events to show how they effectively predict impacts. Improve forecasting and prediction science.</p> <p>Incorporate strategies to avoid green gentrification.</p>

Adaptation and Resilience Strategy – Initiative AR5: Benefits and impacts

Develop policies and programs to reduce risks associated with coastal and inland flooding

Benefits and Impacts	
Disadvantaged communities	Prioritize allocation of flood hazard mitigation funds to disadvantaged communities and low-income households. More user-friendly tools would help these communities better understand risks. Assess potential negative impact of green gentrification.
Health and other co-benefits	Additional tools and planning would reduce stress and improve preparedness. Health benefits of flood hazard mitigation – reduced exposure to toxic mold, respiratory disease, and other adverse health impacts; avoided losses to lives, livelihoods, and property.
Businesses and industries	Decision support tools could be used to improve property management and reduce risks to continuing operations.
Just transition: businesses and industries, workers	Federal, state and community investments to build more resilient infrastructure could create additional jobs.
Other	

Adaptation and Resilience Strategy – Initiative AR5: Components for delivery (1 of 2)

Develop policies and programs to reduce risks associated with coastal and inland flooding

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Maintain funding for watershed assessments to identify flood hazards.	DEC	1 yr	Municipalities, DOT
Provide support to municipalities for right-sizing culverts and bridges to reduce flood risk and improve aquatic habitat quality.	DEC	1 yr	DOT, DOS
Provide support and incentives for municipal participation in FEMA's Community Rating System.	DEC	1 yr	DHSES, DOS
Provide support for incorporation of CRRRA guidelines into local floodplain regulations.	DEC	1 yr	DOS
Amend state building code to account for sea-level rise and enhanced riverine flooding.	DOS	2 yr	DEC
Develop a statewide flood-risk mapping strategy to include an assessment of changes in riverine flood risk, flood map inventory, and a floodplain designation scalability assessment.	DEC	2 yr	DOS, DOT

Adaptation and Resilience Strategy – Initiative AR5: Components for delivery (2 of 2)

Develop policies and programs to reduce risks associated with coastal and inland flooding

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Explore use of multi-hazard, climate-informed datasets on flood hazard to account for pluvial flood risk and other climate impacts.	DEC	2 yr	DOT
Support restoration of buy-out areas to maximize flood protection, carbon sequestration and other ecosystem benefits.	DEC	2 yr	HCR, DHSES, DOS, GOSR, OPRHP, NGOs, municipalities

Adaptation and Resilience Strategy – Initiative AR6: Overview

Description:	Develop policies and programs to reduce human health risks associated with new patterns of thermal extremes.	
Action type:	Guidance, technical support, funding	
Risk addressed:	extreme heat days, heat waves, extreme cold	
Cost and funding considerations:	\$	
Ease of implementation:	Easy	
Example case studies:		
Risks / Barriers to success	Possible mitigants	
Providing air conditioning to vulnerable populations contributes to GHG emissions (albeit a relatively small proportion of the overall).	Use of low-GHG HVAC equipment and heat pumps. Central and accessible cooling centers rather than individual units	
Evolving understanding of the health impacts associated with weatherization.	Evaluation of health impacts associated with weatherization.	
Staff time and resources.		

Adaptation and Resilience Strategy – Initiative AR6: Benefits and Impacts

Develop policies and programs to reduce human health risks associated with new patterns of thermal extremes

Benefits and Impacts

Disadvantaged communities

Many of the components proposed under this strategy have a focus on vulnerable populations and disadvantaged communities.

Health and other co-benefits

Reduced heat related illnesses (both direct and indirect)

Businesses and industries

Potential benefits to businesses that follow thermal-protection design guidelines

Just transition: businesses and industries, workers

Opportunity to provide training to workers from disadvantaged communities on certain technologies to mitigate impacts of extreme heat and then hire them for subsequent work.

Other

Adaptation and Resilience Strategy – Initiative AR6: Components for delivery 1 of 2

Develop policies and programs to reduce human health risks associated with new patterns of thermal extremes

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Provide guidance and funding for development of regional and local heat emergency plans that demonstrate a prioritization toward the health and stability of disadvantaged communities.	TBD	TBD	DHSES and other state agencies, local emergency management and other agencies
Promote and facilitate access to programs that provide cooling to vulnerable populations, with focus on providing high-efficiency units, and addressing energy costs/insecurity and additional barriers to use.	TBD	TBD	Local social service, public health, DPS, utilities, OTDA, DOH, NYSERDA
Promote and fund development and implementation of cooling centers, including assessments to increase accessibility via public transportation. <i>(*placeholder for discussion of warming centers)</i>	DEC	1 yr	DHSES, DOH, DOT, NYSERDA, transportation providers, local emergency management, and other agencies

Adaptation and Resilience Strategy – Initiative AR6: Components for delivery 2 of 2

Develop policies and programs to reduce human health risks associated with new patterns of thermal extremes

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Promote and incentivize use of natural resources, nature-based features, shade structures, cool roofs and cool pavements to reduce individual risks and mitigate neighborhood climate impacts associated with extreme heat, with focus on disadvantaged communities.	DEC	1 yr	DOS, NYSERDA, DOH, OPRHP, DOT, municipalities
Develop and maintain heat warning systems to communicate to the public, workers and other stakeholders.	DOH	1 yr	State and local agencies
Develop and update educational materials and messaging relating to the risks of exposure to extreme heat/cold for vulnerable populations, workers and other key stakeholders.	DOH	1 yr	State and local agencies
Amend state building code and provide incentives toward more effective weatherization from thermal extremes.	DOS	TBD	DOH, NYSERDA, DEC, OGS, municipalities
Develop and provide training, assistance, and/or guidance to local public health and other partners.	DOH	1 yr	DEC, municipalities

Adaptation and Resilience Strategy – Initiative AR7: Overview

Description:	Develop policies and programs to reduce risks threatening ecosystems and biodiversity.
Action type:	Legislation, planning, municipal grants, acquisition
Risk addressed:	Loss of biodiversity, loss of critical habitats and threatened and endangered species, and other ecosystem services
Cost and funding considerations:	Low cost to develop plans, develop spatial inventories of natural resources, and provide municipal grants. Medium to high costs for land acquisition.
Ease of implementation:	Medium. Challenges include need for legislation, local or developer opposition and federal involvement.
Example case studies:	Aquatic organism passage projects through the State WQIP Municipal Grant Program

Risks / Barriers to success	Possible mitigants
<ol style="list-style-type: none"> 1. Political opposition to increased regulatory authority. 2. Municipal resistance to state acquisition of lands. 3. Potential effects of climate adaptation and resiliency solutions (e.g., protecting shoreline, raising transportation corridors). 4. Adequate funding and staffing. 	<ol style="list-style-type: none"> 1. Targeted public education and outreach. 2. Partnerships with NGOs (e.g., TNC, OSI, Scenic Hudson) 3. Interagency communication and coordination to minimize natural resource impacts of projects. 4. Pass and implement the Restore Mother Nature Bond Act.

Adaptation and Resilience Strategy – Initiative AR7: Components for delivery 1 of 5

Develop policies and programs to reduce risks threatening ecosystems and biodiversity

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Adopt the goals of the New England Governors and Eastern Canadian Premiers Resolution 40-3, Resolution on Ecological Connectivity, Adaptation to Climate Change, and Biodiversity Conservation.	DEC	1 yr	DOS, OPRHP, DOT
Develop statewide conservation framework that incorporates current, accurate spatial data on critical ecosystems (terrestrial and aquatic), including priority ecosystem complexes and habitat connectivity, and provides basis for prioritizing state funding, tax relief, land acquisition, including acquisition of state and national forest inholdings, and technical assistance programs to conserve natural areas.	DEC	5 yr	DOS, OPRHP, NGOs
Establish conservation corridors to implement an integrated, watershed approach to improve critical terrestrial and aquatic habitats that fosters connectivity, supports fish and wildlife, and provides community resilience to drought and flooding.	DEC	10 yr	DOS, OPRHP, land trusts
Prioritize protection of large private forest parcels and biodiversity through conservation easements or fee acquisition.	DEC	10 yr	DOS, OPRHP, land trusts

Adaptation and Resilience Strategy – Initiative AR7: Components for delivery 2 of 5

Develop policies and programs to reduce risks threatening ecosystems and biodiversity

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Enhance funding for Land Trust Alliance-administered forest easement program to allow land trusts to protect smaller forest parcels in targeted priority areas.	Legislature	1 yr	DEC, NGOs
Continue the development of conservation easement and incentive programs (e.g., Source Water Buffer Program) to include areas of the farm set aside for conservation of wetlands, stream corridors, riparian buffers, or wildlife corridors.	AGM, SWCC	2 yr	SWCD, farmers
Fund local governments to develop natural resource inventories, land use plans and regulations that protect forest blocks, wetlands, Important Bird Areas, wildlife corridors, floodplains, stream corridors, and other important habitats. Identify these protections as essential elements of comprehensive plans in state planning enabling legislation and make eligibility for certain state programs contingent on biodiversity protection and contributions to other climate action priorities.	Legislature	2 yr	DEC, OPRHP, DOS, NGOs, local governments
Restore regulatory oversight for wetlands and waterbodies that were removed from federal protection under the 2020 promulgated “Navigable Waters Protection Rule.”	Legislature, DEC	3 - 5 yr	DOS, ORES, DPS

Adaptation and Resilience Strategy – Initiative AR7: Components for delivery 3 of 5

Develop policies and programs to reduce risks threatening ecosystems and biodiversity

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Map and inventory all wetlands (regulated and unregulated, tidal and non-tidal), shallow water habitats, Significant Coastal Habitats, priority forests, and critical fish and wildlife resource connections. Ensure all maps and inventories are accurate and publicly available.	DEC, DOS	5 – 10 yr	ACOE, municipalities, NGOs, ORES
Improve and expand DEC’s ability to regulate all wetlands and adjacent areas that meet regulatory criteria through internal and external guidance, and changes in law and regulation.	Legislature, DEC	5 yr	DOS
Expand the Aquatic Connectivity Restoration category of the State WQIP Municipal Grant Program. Incorporate climate risks to aquatic ecosystems in project selection and prioritize prevention of culvert/road crossing failures. Align construction standards to future climate scenarios.	DEC	1 yr	DOT, local governments, NGOs
Develop regional permits with ACOE to incentivize use of natural and nature-based features to enhance resilience and ecosystem benefits.	DEC	Unknown	DOS, ACOE

Adaptation and Resilience Strategy – Initiative AR7: Components for delivery 4 of 5

Develop policies and programs to reduce risks threatening ecosystems and biodiversity

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Avoid siting of major energy infrastructure within identified cores and corridors for wildlife. Leverage mitigation funding for renewable energy projects permitted through the Office of Renewable Energy Siting to mitigate effects that cannot be avoided.	DEC	1-30 yr	ORES, DPS, NYSERDA
Incorporate best management practices (e.g., construction windows) from threatened and endangered species management plans into state and federal funded or regulated projects in and near critical habitats (e.g., tidal wetlands) to reduce and mitigate ecosystem impacts.	DEC, DOS	5 yr	ACOE, USFWS, OPRHP, DOT, OGS, HCR, DHSES, DPS, ORES, NMFS, BOEM
Amend Real Property Tax Law to incentivize private forest stewardship for a broader range of goals, including biodiversity, wildlife habitat protection, water resource protection, outdoor recreation and carbon sequestration.	Legislature	3 yr	NYFOA, ESFPA, SAF, NGO's, Landowners, NYS Tax and Finance, Local municipalities, SUNY ESF

Adaptation and Resilience Strategy – Initiative AR7: Components for delivery 5 of 5

Develop policies and programs to reduce risks threatening ecosystems and biodiversity

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Provide technical assistance and incentives to promote use of natural climate solutions and best management practices by landowners, land managers, and agricultural producers.	DEC	2 yr	AGM, SCWD
Expand implementation of relevant parts of the NYS Invasive Species Comprehensive Management Plan, including two key ISCMP Priorities: 5) Prevention and Early Detection 6) Improve Response to Invasive Species; advance biocontrol of forest pests.	DEC	2 yr	AGM, Cornell University, SUNY ESF, Forest Ecosystem Monitoring Cooperative

Adaptation and Resilience strategy– Initiative AR7: Benefits and impacts

Benefits and Impacts	
Disadvantaged communities	Improving wetland function in urban watersheds provides natural areas for enjoyment, recreation, and education. Expanding waterfront public lands to allow for tidal wetland migration provides EJ communities with open space.
Health and other co-benefits	Healthy ecosystems provide services that benefit people: flood mitigation, recreation (e.g., hiking, camping, fishing, hunting, wildlife viewing), carbon sequestration, clean water and air, renewable natural resources (e.g., hunting, fishing, lumber).
Businesses and industries	Benefits include flood mitigation, resilient transportation infrastructure. Impacts: regulatory restrictions in wetlands and adjacent areas.
Just transition: businesses and industries, workers	Replacing undersized and failing road/stream crossings provides construction jobs and resources to municipalities. Reducing flooding reduces flood damage to businesses, industries, and workers' private residences.
Other	Healthy, resilient fish and wildlife resources; open space for all New Yorkers; increased recreational opportunities in urban areas.

Adaptation and Resilience Strategy – Initiative AR8: Overview

Description:	Strengthen meaningful community engagement and public education, and build adaptive capacity across all sectors.
Action type:	Program, funding
Risk addressed:	Multi-hazard
Cost and funding considerations:	Low cost to develop and implement education programs, higher costs to subsidize building improvements
Ease of implementation:	Easy, existing home audit and training programs as models
Example case studies:	

Risks / Barriers to success	Possible mitigants
Engaging the public in educational programming.	Connect with existing community-based groups and organizations. Improve messaging to connect with existing norms, values, attitudes, and beliefs.

Adaptation and Resilience Strategy– Initiative AR8: Benefits and impacts

Strengthen meaningful community engagement and public education, and build adaptive capacity across all sectors

Benefits and Impacts	
Disadvantaged communities	Workforce training could be targeted to areas of low employment, including unemployed youth.
Health and other co-benefits	Civic engagement and improved community relations
Businesses and industries	Outreach can include business and industry assistance for climate change adaptation, identification of new markets, skilled labor and professional placement.
Just transition: businesses and industries, workers	Training and placement could be targeted toward communities and industries in transition.
Other	

Adaptation and Resilience Strategy – Initiative AR8: Components for delivery

Strengthen meaningful community engagement and public education, and build adaptive capacity across all sectors

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Amend the Property Condition Disclosure Act to remove seller's option to pay a credit, rather than providing a disclosure statement.	Legislature	2 yr	Real estate industry
Establish campaign to build student and public awareness of climate change effects and solutions, including co-benefits of actions to mitigate and adapt to climate change	DEC	3 yr	NYSERDA, SED
Establish program to enhance building resilience by training operations staff in disaster preparedness and response	NYSERDA	2 yr	DEC, DOL, DOS, DHSES, municipalities, building owners, MTA
Establish program to provide home and small business resilience audits and resilience refinancing.	NYSERDA, DEC, DHSES	2 yr	Contractors, homeowners
Establish or expand climate action corps that employ and train disadvantaged youth and provide a source of skilled labor for climate-related ecosystem restoration and green infrastructure projects that increase nature-based resilience and natural carbon sequestration.	DEC, OPRHP	6 mo	Youth, local governments and nonprofit organizations
Establish Climate Smart Community Student Corps to train students to engage with community groups to facilitate development and implementation of local climate adaptation plans.	DEC	1 yr	CSC supporting agencies, universities, municipalities

Adaptation and Resilience Strategy – Initiative AR9: Overview

Description:	Identify and evaluate options for supporting equitable adaptation and resilience practices and projects.
Action type:	Legislation, regulation, program, finance
Risk addressed:	Multi-hazard, climate gentrification
Cost and funding considerations:	\$\$\$ for creation of infrastructure fund, \$ for policy development
Ease of implementation:	Hard. Financing and risk-transfer models not well known. Political resistance from developers likely.
Example case studies:	Environmental and Energy Study Institute: https://www.eesi.org/briefings/view/050719nfp , NYS Healthy Homes Value-Based Payment Pilot Residential Service Providers

Risks / Barriers to success	Possible mitigants
<p>Low-cost insurance incentivizes risky behaviors.</p> <p>Political pressure may inhibit adequate pricing of risk through premiums.</p> <p>Catastrophic risks difficult to insure, and difficulties exacerbated by climate change and numerous market failures.</p> <p>Slowly appearing risks difficult to insure.</p> <p>Migration from high-risk areas due to insurance increases affects tax base.</p>	<p>Communication that risk-based premiums will reduce perverse incentives and overall costs to taxpayers.</p> <p>Rigorous analysis of potential risks and benefits associated with risk-transfer programs.</p> <p>Communication regarding municipal and societal costs associated with high-risk development.</p>

Adaptation and Resilience Strategy– Initiative AR9: Benefits and impacts

Identify and evaluate options for supporting equitable adaptation and resilience practices and projects

Benefits and Impacts	
Disadvantaged communities	Adverse events have more severe consequences on disadvantaged communities.
Health and other co-benefits	
Businesses and industries	Some components of this initiative would affect insurance and financial industry.
Just transition: businesses and industries, workers	
Other	

Adaptation and Resilience Strategy – Initiative AR9: Components for delivery 1 of 2

Identify and evaluate options for supporting equitable adaptation and resilience practices and projects

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Create a resilient infrastructure fund through bonding.	Legislature	1 yr	Taxpayers
Impose a surcharge on insurance premiums for select lines of insurance, affected by climate hazards, to generate revenue to support risk-reduction and adaptation projects.	Legislature	2 yr	Municipalities, insurers, policyholders
Report on options to create tax exemptions for risk-reduction measures and establish a revolving fund to support regional and local risk-reduction and adaptation projects, including provisions to allow borrowing from the fund to meet local cost shares of risk-reduction projects and to provide capital to private entities.	Legislature	2 yr	DTF

Adaptation and Resilience Strategy – Initiative AR9: Components for delivery 2 of 2

Identify and evaluate options for supporting equitable adaptation and resilience practices and projects

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Report on options to enhance hazard mitigation funding and pre-fund disaster recovery, and to transfer catastrophic risk to the insurance and capital markets.	DOB	1 yr	Legislature, DEC, DHSES
Address persistent underinsurance by surveying the amount and types of coverage purchased by homeowners and developing strategies for increasing take-up rates of flood insurance and other coverage.	DEC	2 yr	Homeowners
Provide recommendations on the continued use of anti-concurrent causation clauses.	DFS	3 yr	Insurers, policyholders

Adaptation and Resilience Strategy – Initiative AR10 Overview

Description:	Enhance climate resilience and adaptive capacity of agricultural community, while preparing to take advantage of emerging opportunities
Action type:	Research, funding, outreach
Risk addressed:	Multi-hazard, particularly flooding, thermal extremes, drought, seasonal shifts
Cost and funding considerations:	\$\$, funding from EPF through Climate Resilient Farming (CRF), AEM Base Program, AgNPS Program (water quality), and other state and federal programs, seek new and enhanced funding sources.
Ease of implementation:	Easy - program infrastructure exists for many projects/items; Medium for more advanced and novel approaches
Example case studies:	Agricultural Community Recovery Fund (ACRF) Assessments, Climate Resilient Farming (CRF) Program

Risks / Barriers to success	Possible mitigants
<p>Increased potential for drought</p> <p>Increased potential for flooding</p> <p>Increased severity of flood damage</p> <p>Pest, weed, and disease pressure</p> <p>Soil degradation including erosion, compaction, and net loss of organic material</p> <p>Insufficient technical and financial resources</p> <p>Climate variability, extremity, and pace of future change</p>	<p>Greater implementation of conservation practices provides tangible benefits. Technical assistance and protective measures taken at the farm scale will provide planning and physical infrastructure needed to be resilient in face of regional or localized events.</p> <p>Many conservation practices that protect topsoil and attenuate flooding can also be used to store water during times of drought, doubling their value by addressing two major impacts with one practice. Additionally, many of these same practices protect and provide many important co</p>

Adaptation and Resilience Strategy – Initiative AR10

Benefits and impacts

Enhance climate resilience and adaptive capacity of agricultural community, while preparing to take advantage of emerging opportunities

Anticipated Benefits and Impacts

Disadvantaged communities	Municipalities and communities, particularly disadvantaged communities, will benefit by increasing job opportunities in soil and water conservation, internships for academic credit as a workforce is assembled that is adequate to meet the scale of local impacts. Benefits of flood attenuation on vulnerable farms come in the form of fewer and less intense impacts/destruction to public, commercial private property and adding to the resilience and ability of farms to survive and build back to be more resilient to climate change.
Health and co-benefits	Farm and watershed scale flood and drought attenuation benefits all New Yorkers by helping maintain a safe food supply by protecting farms, farmland and the necessary public infrastructure. Implementation of conservation practices off the farm at a watershed scale, protects the local farming community along with public infrastructure and the private communities located in that watershed. Protections extend to public and private investments made over time in local economies, infrastructure, natural resource protection. Will reduce cost of future flood recovery efforts. Provide needed stability to hydrologic systems such that natural processes begin to compliment programmatic goals. Ecological co-benefits to many flood and drought attenuation best management practices include improvements to carbon sequestration, water quality, biodiversity and habitat. Investments in farm level adaptation and resiliency measures helps to ensure a stable secure and local food system.
Just transition: businesses and industries, workers	Large scale, locally led, publicly/private funded conservation efforts will provide training, internship and long-term employment for many people in conservation from across the state. This capacity building and the conservation workload generated will also be supportive of other entities and agencies: farming community, local construction companies, engineers, municipalities, academic institutions.
Other	

Adaptation and Resilience Strategy – Initiative AR10

Components for delivery

Enhance climate resilience and adaptive capacity of agricultural community, while preparing to take advantage of emerging opportunities

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Expand support for Climate Resilient Farming and Agricultural Environmental Management programs, including efforts to increase adoption of climate-resilient practices.	AGM, SWCC, SWCDs	6-12 months	Farmers, DEC, universities, NGOs,
Develop and support a water and energy efficiency realization program to meet needs related to climate change, including decision-support tools, power upgrades and strategies to reduce equipment costs.	AGM, SWCC, CCE, SWCDs	6-12 months	Farmers, DEC, universities, NGOs, NYSERDA
Expand support for research and outreach on climate-resilient crop varieties, technology to provide freeze and frost protection, and increased use of perennial crops for food and feed.	AGM, SWCC, Cornell, CCE	Continuous	Farmers, NGOs, SWCDs, NYSERDA, universities
Assess, develop and promote agricultural and watershed based best management practices for flood attenuation and drought mitigation	AGM, SWCC, SWCDs	Continuous	Farmers, DEC, NGOs, universities, CCE, DOT

Adaptation and Resilience Strategy – Initiative AR11

Overview:

Description:	Ensure the reliability, resilience and safety of a decarbonized energy system.
Action type:	Regulation, policy, funding, analysis, mapping, technical support
Risk addressed:	Multi-hazard, especially sea-level rise, flooding, drought, thermal extremes, extreme storms, wildfire. Non-climate hazards: electromagnetic pulse and geomagnetic disturbance
Cost and funding considerations:	\$\$\$; substantial investment required to ensure resilience; costs reduced if incorporated into initial siting and design on new infrastructure
Ease of implementation:	Hard. Uncertain whether investments in resilience can be claimed in rate recovery. Need to consider company and geographic diversity in risk assessment.
Example case studies:	

Risks / Barriers to success	Possible mitigants
<ol style="list-style-type: none"> 1. Generation and T&D infrastructure vulnerable to climate hazards that are increasingly severe. 2. Electrified buildings more vulnerable to grid failure. 3. High costs to enhance infrastructure resilience. 4. Resistance to continued use of gas infrastructure. 	<ol style="list-style-type: none"> 1. Continued research on climate projections, and siting and design standards that incorporate future conditions. 2. Energy efficiency upgrades, capital improvements and codes to enhance resilience to grid failures. 3. Analysis to understand risk and resilience costs; financial mechanisms to offset costs and shift risks, technology R&D, education; incorporation of future conditions into initial siting and design.

Adaptation and Resilience Strategy – Initiative AR11: Benefits and impacts

Ensure the reliability, resilience and safety of a decarbonized energy system

Anticipated Benefits and Impacts

Disadvantaged communities

Transition costs will affect everyone, but disadvantaged communities will bear a disproportionately larger share and be among the last to benefit.

Health and co-benefits

Decarbonization will eliminate major sources of air pollution. Significant health and safety risks associated with long-term outages.

Just transition: businesses and industries, workers

New jobs will be created in the emerging clean-energy economy, but wages could be lower, especially for blue-collar workers. New qualifications and skillsets needed for new technology deployment, maintenance and recovery.

Other

Electrification has many benefits, but vulnerability to grid failure will increase. Near total replacement of generation and construction of T&D infrastructure provides opportunity to achieve resilience through planning, siting, codes and standards.

Adaptation and Resilience Strategy – Initiative AR11: Components of the strategy

Ensure the reliability, resilience and safety of a decarbonized energy system

Components required for delivery <i>(Brief description of action required)</i>	Implementation lead	Time to implement	Other key stakeholders
Require public and investor-owned utilities and generators to assess vulnerabilities to climate hazards and prepare resiliency promotion and risk-reduction plans.	PSC	3 yr	DPS, utilities, generators
Prioritize investments that modernize the energy system to ensure reliability and resilience.	PSC	3 yr	NYSERDA, DPS, utilities, generators
Develop strategies to ensure availability of fuel and power for emergency vehicular fleet operations and essential public transportation during power grid outages.	TBD	2 yr	DPS, DHSES, DOT, other agencies, local governments
Promote energy efficiency upgrades and capital improvements to buildings to endure grid failures (high-performance walls, roofs and windows; batteries; solar PV).	DOS	3 yr	NYSERDA, PSC, DPS, utilities, municipalities
Develop a comprehensive strategy to support development of islandable microgrids and district systems to provide locally generated power, especially to critical facilities during grid emergencies.	NYSERDA	2 yr	Local governments, utilities
Develop a comprehensive strategy for transition of existing natural gas infrastructure to RNG or hydrogen to ensure reliability and resilience during power sector decarbonization.	NYSERDA	3 yr	PSC, DPS, utilities