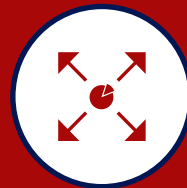
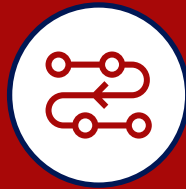


UNITED STATES CLIMATE ALLIANCE

GOVERNORS' CLIMATE RESILIENCE **PLAYBOOK** U.S. CLIMATE ALLIANCE **2021**



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EXECUTIVE SUMMARY

The 2021 Governors' Climate Resilience Playbook outlines 12 foundational steps to set and achieve an effective state-level climate resilience agenda. This Playbook updates the 2018 U.S. Climate Alliance (USCA) [New Governors' Climate Resilience Playbook](#) based on U.S. Climate Alliance member feedback and seeks to account for changing climate and political developments and conditions and capture some of the momentum around climate resilience action over the past few years. While the 2018 Playbook outlined what states should do to further the climate resilience agenda across states, the 2021 Playbook is focused on how to make it reality.

The importance of this work is underscored by the escalating destruction and costs states are grappling with from natural hazard events exacerbated by climate change. In 2020, 22 weather events across the U.S. – defined and tracked by the federal government as “billion dollar disasters” – caused [\\$95 billion in cumulative damages](#). These figures shattered the previous annual record of 16 billion dollar disasters in 2011 and 2017. With greenhouse gas emissions baked in for at least the next 30 years, placing an enormous burden on the next generation, choosing not to adapt in the face of such climate impacts is no longer an option. Cities and states must move swiftly to become more resilient and in doing so they can save billions of dollars and make America's communities more vibrant, healthy and prosperous.

While there is no single definition – or application – of climate resilience, there are five key themes that connect effective climate resilience strategies across geographies. These themes are woven through each of the 12 steps presented in this Playbook.

Climate Resilience Action:

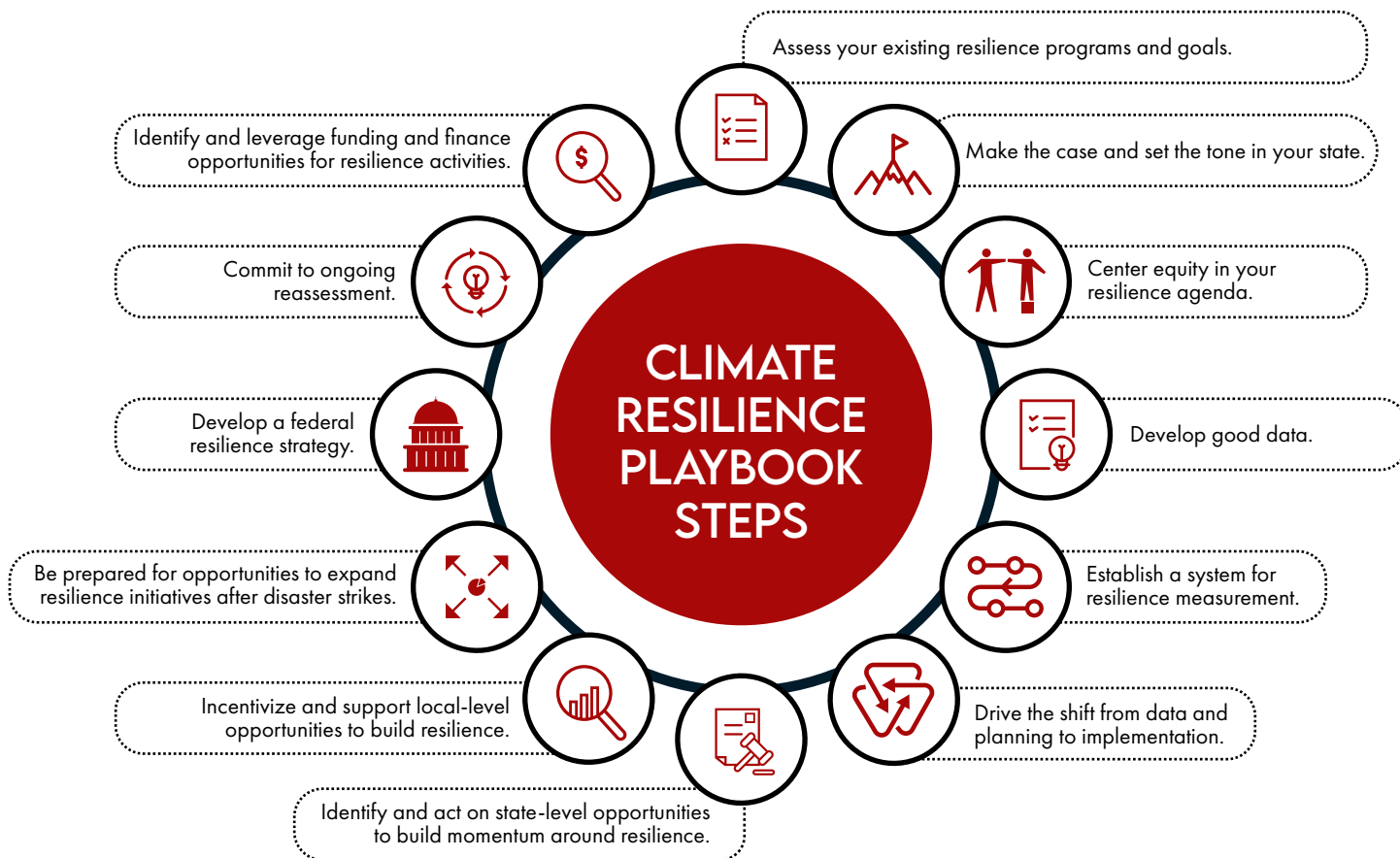
- ① **Grows slowly over time – occasionally accelerated by extreme events – and is an iterative process requiring commitment to metrics that track process, outputs, and community outcomes that support consistent reevaluation and realignment toward a guiding climate resilience vision.**
- ② **Centers equity in its leadership, processes, and investment strategies, signaling that distribution matters and that leaders, beyond creating resilient bridges and roads, are accountable to people, particularly those disproportionately at risk yet have the fewest resources to adapt.**
- ③ **Is embedded in strong partnerships and relationships between stakeholders at all scales of climate resilience governance.**
- ④ **Breaks down silos, bringing together leaders across sectors and departments and aligning them in the shared pursuit of both climate mitigation and adaptation goals simultaneously.**
- ⑤ **Is built through innovative funding and finance strategies, grounded in a business case that accounts for and values the diversity of community co-benefits associated with climate resilience progress.**

Underlying these themes is an opportunity for states to learn how their peers have approached complex climate resilience challenges and, in particular, what is working and what is not. To facilitate the exchange of “know how,” each step includes succinct case studies showcasing a notable state climate resilience strategy. Led by U.S. Climate Alliance member needs, the playbook also contains appendices that highlight in greater depth opportunities around climate resilience metrics, funding and finance, and navigating federal structures.

States are approaching climate resilience initiatives from various levels of preparedness and bandwidth. This Playbook offers opportunities to jump-start new state climate resilience agendas or elevate existing agendas further to better serve communities. For additional insight into how the multi-level steps in the Playbook can be approached from varying levels of capacity and ambition, see Appendix B.

Twelve Steps To Resilience

- ① Assess your existing resilience programs and goals. Take stock of existing resilience plans and progress and establish a center of gravity for the work.
- ② Make the case and set the tone in your state. Define a guiding resilience vision for the state to highlight its value proposition and to bring these efforts to the forefront of your priorities as a governor.
- ③ Center equity in your resilience agenda. Develop criteria for equitable, community co-owned climate resilience investments and create investment incentives for projects that prioritize lower-income and BIPOC communities at all scales.
- ④ Develop good data. Develop key partnerships and expand capacity to collect and host necessary data to support climate resilience initiatives.
- ⑤ Establish a system for resilience measurement. Develop diverse metrics for all components of the resilience building process and commit to long-term reassessment and realignment.
- ⑥ Drive the shift from data and planning to implementation. Foster cross-sector and interdepartmental coordination to identify top priorities and develop actionable next steps.
- ⑦ Identify and act on state-level opportunities to build momentum around resilience. Capitalize on the investments your state already is making to incentivize and enable climate resilience progress.
- ⑧ Incentivize and support local-level opportunities to build resilience. Support local scale climate resilience via guidance, funding, and technical support.
- ⑨ Be prepared for opportunities to expand resilience initiatives after disaster strikes. Use each crisis as an opportunity to assess vulnerabilities, underscore the importance of climate resilience work, and build back better.
- ⑩ Develop a federal resilience strategy. Become more strategic about how partnerships at the federal level are fostered and leveraged and how resources are pursued.
- ⑪ Identify and leverage funding and finance opportunities for resilience activities. Use strategic messaging to refine the business case for climate resilience and leverage innovative financing mechanisms.
- ⑫ Commit to ongoing reassessment. Engage in regular monitoring, revision and ongoing research to inform future decisions, policies, and investments.



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WHAT IS CLIMATE RESILIENCE?

The Intergovernmental Panel on Climate Change (IPCC) defined¹ adaptation and resilience as follows:

Climate Adaptation:

“The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.”

Climate Resilience:

“The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.”

Climate change risk comprises three elements²:

Climate change hazard: The specific climate-related events (shocks) or variations (stress) that have the potential to materially impact the asset, activity or system.

Climate change exposure: The degree to which the asset, activity or system is exposed to climate change hazards, based on its geographical and sectoral position.

Climate change vulnerability: The degree to which the asset, activity or system is sensitive to related losses from exposure to climate change hazards.

(1) Annex I: Glossary. International Panel on Climate Change. 2019

The specific climate-related events (shocks) or variations (stress) that have the potential to materially impact the asset, activity or system.

(2) Climate Bonds Initiative, *Climate Resilience Principles*, October 2018 [Accessed September 2021],

<https://www.climatebonds.net/climate-resilience-principles>

12 STEPS TO BUILD STATE RESILIENCE.

STEP 1



Assess Your Existing Resilience Programs and Goals.

Take stock of existing resilience plans and progress.

No state starts from zero when it comes to climate resilience, climate preparedness and critical infrastructure planning. Begin by assessing whether and to what extent your state has completed a climate resilience plan and/or a climate risk assessment that codifies guiding principles for the work. Also consider whether hazard mitigation efforts include climate resilience, based on existing or future risks. States may possess a combination of plans that should, but do not, incorporate climate risk and resilience and others that incorporate climate change but are overlooked. Often, states create resilience plans from their climate mitigation plans, and governors new to the climate resilience space often have existing structures that form the basis for resiliency. The agenda should focus on addressing gaps by elevating and adapting existing programs to focus and enhance climate resilience efforts.

States that have commenced climate resilience planning and execution should examine plans beyond their state, benchmark against other states and agencies and follow national, regional and local resilience trends.

Establish a center of gravity for this work.

Creating a resilient state is a massive undertaking that encompasses all of government, crossing all department and agency silos and decision-making bodies – including environmental and emergency services, economic development, natural resources, social equity, finance, and health, among others. Governors should move quickly to involve a dedicated group of experts or a central authority whose explicit responsibility is to move a climate resilience agenda forward. This arrangement could be created through legislation or executive action. Various options include creating a climate resilience cabinet, designating a lead agency, or appointing a chief resilience officer. To be clear, this does not need to be a new position, as an existing official can be given this responsibility. The key is having broad convening and review authority and a direct line of reporting to the Governor.

A central coordinator for state climate resilience telescopes a clear message that resilience is a state priority and is key to involving the agencies that impact resilience through their investments, programs and infrastructure projects. To succeed, this authority should possess the capacity to work with and influence state agencies, local governments, and other stakeholders; convene sub-state resilience leaders to improve coordination and policy implementation; capacity to coordinate and collaborate across departments and sectors; a clearly articulated mandate from the governor; and a strong leader who will make state climate resilience a top priority and responsibility³. Further, institutionalizing representation is key in this process. Black, Indigenous, and other people of color should not only be equitably represented within organizations but also justly compensated⁴.

(3) Smart Growth America, Governors' Institute, October 2015 [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

(4) Hughes, Sara, et al. Centering Racial Justice in Urban Flood Adaptation: Planning and Evaluation Tools for Great Lakes Cities. University of Michigan Graham Sustainability Institute. 2021. <http://graham.umich.edu/media/pubs/Catalyst-Report-Centering-Racial-Justice-in-Urban-Flood-Adaptation-48491.pdf>

Assess sub-state climate resilience plans to ensure alignment.

State-level climate resilience and hazard mitigation planning efforts only prove effective to the extent that they coordinate with and stimulate local-level action and risk mitigation. Accordingly, states should work with sub-state stakeholders to ensure alignment of regional and local climate resilience and hazard mitigation plans. This sub-state alignment is particularly important for ensuring that state climate resilience plans create social equity, in view of different government service histories and needs between urban and rural communities and socioeconomic groups.

CASE STUDY

Maine: In June 2019, Maine Governor Janet Mills signed bipartisan bill LD 1679 that created the Maine Climate Council. Comprising scientists, industry leaders, bipartisan local and state officials, and engaged citizens, the Council addresses the effects of climate change. The Council's Science and Technical Subcommittee collects climate data to inform the working groups as they develop strategies. In September 2019, the Council, six working groups, and a subcommittee — all together, over 200 members with diverse backgrounds and experiences — began work on a four-year Climate Action Plan. [Maine Won't Wait](#) is the consensus result of months of deliberations to determine how Maine must combat climate change. Upon completing the Plan, the Council quickly enacted a key recommendation to establish an Equity Subcommittee⁵. While the large number of participants in the Council's planning process presented modest logistical challenges, the payoff was a broad base of support for the Plan across sectors. This helped secure funding and policy changes that implement the plan. The Council and its subcommittees and working groups are monitoring implementation of the Plan and, in many cases, aligning the work of their organizations to support the Plan. The Council is tasked with revising the Plan every four years, with the next version due in 2024.

STEP 2



Make The Case and Set The Tone In Your State.

Whether your resilience program is robust or needs attention, bring these efforts to the forefront of your priorities as governor.

As the implementer for most federal resilience policy and the arbiters of local resilience momentum, states play a unique role in creating climate resilience in America's communities. States design, build and fund critical infrastructure; influence how and where development occurs; establish economic incentives and set standards; provide tools and expertise such as hazard mapping and long-term planning capacities to local governments; and disburse federal resources⁶. Climate risk and, thus, climate resilience are increasingly important for each of these roles. In fact, many states find that climate resilience more than climate mitigation is a theme for every state agency, not just those with infrastructure or building functions.

(5) Maine Climate Council, *Maine Won't Wait, A Four-Year Plan For Climate Action, December 2020* [Accessed September 2021]
<https://climatecouncil.maine.gov>

(6) Smart Growth America, *Governors' Institute, October 2015* [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

Define what resilience means in your state.

The first responsibility of the resilience office or sub-cabinet should be to define what climate resilience means to your state. Hazards and vulnerabilities, along with assets, vary, as do a state's primary challenges and goals. Developing a clear "story" and getting behind resilience in your state are key, not only to generate buy-in, but to align multidisciplinary departments and resources toward a common guiding vision that transcends "what we want to avoid" and, instead, illustrates what we want to become. Yet, when defining a state climate resilience vision, state leaders need to be cognizant that it truly reflects the state as a whole by cohesively integrating and highlighting what climate resilience means for communities.

Further, having a clear and motivating narrative of what climate resilience means to your state will help make your argument persuasive in a competitive funding environment. It should include how funding will be used and what expenditures will accomplish, such as reducing costs, increasing social equity, saving lives, avoiding connectivity disruptions, stabilizing economies, modernizing infrastructure, and other policy goals.

Refine the value proposition of climate resilience.

States have a distinct stake in disaster preparedness and recovery. Disasters increasingly cost billions of dollars in direct loss and economic disruption, and states are always critical players in post-disaster clean-up and recovery efforts. Essentially, states could save a lot of time, money, and lives by being better prepared for climate impacts. Having the ability to articulate these outcomes will enhance the understanding of climate resilience significantly across all stakeholder groups and constituencies.

To support climate resilience and illuminate the potential return on investment of proactive action, ask the business community or other key leaders to set the tone by preparing an economic study that frames the long-term scale of the problem. Such a report on making the business case for financing climate resilience is the Natural Hazard Mitigation Saves Report, updated in 2019, that indicates each dollar invested in mitigation saves between \$2 and \$13⁷.

Show the holistic value of climate resilience in your state.

The economic value of climate resilience action is clear, but it is not the complete story. The ROI of hazard mitigation efforts is far greater than avoided losses. The cost of inaction is very high, but climate resilience also can trigger better health outcomes, more jobs, and vibrant and equitable communities. Articulating the many benefits associated with resilience building can help grow support from constituencies and audiences. The opportunity involves framing climate resilience according to your vision and goal and articulating the value it can create. Such framing goes well beyond stating that no other choice exists.

CASE STUDY

Louisiana: Under Governor John Bel Edwards' direction, Louisiana's state government leaders convened in New Orleans for a two-day, Cabinet-level retreat focused on coastal resilience. During the conference, the leaders were asked to discuss the problem, their vision for Louisiana, and possible pathways to get there. The event greatly enhanced buy-in from state leaders across government and provided concrete steps for moving forward. The Center for Planning Excellence, a local non-profit, organized and conducted the retreat with financial support from local and national philanthropic partners as well as private sector supporters⁸.

(7) National Institute for Building Safety. Natural Hazard Mitigation Saves, December 1, 2019. [Accessed September 2021]
<https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report>

(8) Center for Planning Excellence. Resiliency: Tools and Resources. 2019. [Accessed September 2021]
<https://resiliency.lsu.edu/outside-resources-blog/2017/11/21/center-for-planning-excellence>

STEP 3



Center Equity In Your Resilience Agenda

Climate resilience projects' goals should go beyond just saving money. When savings are the only goal, states often protect high-value assets at the expense of the lower income, minority or otherwise disadvantaged communities. Climate resilience planning must consider safety, adaptive capacity, and impacts on the whole community, especially the traditionally overburdened populations. An adaptation strategy cannot succeed unless a commensurate set of activities and commitments to social equity exists that ensure disproportionately at-risk populations obtain the financial, technical, and institutional resources they require to adapt. When we attend to the needs of the marginalized, the resulting benefits are widely shared by the entire community.

USCA has [four principles](#) to which all member states commit, and one of which is “centering equity, environmental justice, and a just economic transition in their efforts to achieve their climate goals and create high-quality jobs.”

Identify data needs and conduct a climate risk or vulnerability assessment.

To facilitate this change, state leaders must conduct a climate risk and/or vulnerability assessment to study the distribution of climate impacts and determine any disproportionate harm across population segments — including the young who will bear the impact of climate risks their entire lives — and gauge the exposure of community assets. These efforts must be underscored by a bedrock of cultural values and community information that enable the success and actualization of equitable climate resilience planning.

Further, assessments must transcend the economic and infrastructural scope to include social and environmental capital. Consider incorporating resilience metrics that account for disparities in community adaptive capacity, health outcomes, social vulnerability, etc. In doing so, focus on determining the root causes of local disparities to better inform local policy decisions. For example, regarding flood mitigation, key adaptation strategies that address the root cause of disproportionate exposure include improving the equitable distribution of environmental amenities that reduce flood vulnerability. These include green infrastructure, strategies that improve housing quality and security and prevent displacement of low income and minority households, and adaptation programs and investments to create new jobs and business opportunities for marginalized groups⁹.

Avoid the checkbox culture.

Efforts to include equity in decision-making tend to be approached from a ‘one and done’ standpoint in which leaders think the hard work has been done after completing a diversity, equity, and inclusion training or conducting a vulnerability assessment. While institutions must guard against implicit and explicit biases that could get in the way of equitable policy-making, centering equity is an iterative process that involves long-term transformational change. Since inequity is systemic throughout government structures, equity must be embedded in any body of work across agency silos so leaders in every sector and level of government are grounded continually in equitable language and processes.

Avoiding the checkbox culture also means the flow of money and resources and relationship building cannot stop once a project is executed. Preventing the perpetuation of inequalities requires reevaluating projects to gauge and address inadequacies. Improving at this will require a follow-up and systems evaluation as well as greater connectivity, collaboration, and mutual support between communities and local decision makers. To do so, create participatory processes and institutional support for deep democracy by building coalitions of groups across community segments and sectoral lines with expertise at the community level and the availability to foster long-term relationships and build community trust.

(9) Hughes, Sara, et al. *Centering Racial Justice in Urban Flood Adaptation: Planning and Evaluation Tools for Great Lakes Cities*. University of Michigan Graham Sustainability Institute. 2021. <http://graham.umich.edu/media/pubs/Catalyst-Report-Centering-Racial-Justice-in-Urban-Flood-Adaptation-48491.pdf>

Include language that prioritizes community resilience and equity.

Language proves key in designing and amplifying social equity agendas. By defining community climate resilience and equity as fundamental to resilience, state governments send powerful signals to local governments and provide cover for leaders seeking to create change. As communities and local governments pilot strategies to center equity, state language expressing support for equity can remove or minimize obstacles that otherwise might hinder progress and disincentivize this important work for climate resilience.

Develop criteria for equitable resilience investments and create investment incentives for projects that prioritize lower-income and BIPOC communities at all scales.

Setting priorities is critical for when climate resilience resources and investments target overburdened communities since lower-income, underserved and Black, Indigenous and People of Color (BIPOC) communities are disproportionately at risk from climate hazards¹⁰ and other disruptors such as COVID-19¹¹. These priorities must be embedded as a key part of the climate resilience process. States that enable and support this targeting benefit local governments because top-down commitments from the state mobilize local policy and resources toward equitable climate resilience, which helps protect local leaders from potential backlash.

Improve capacity for proactive community relationship-building and participation in decision-making.

Frequently, hazard mitigation and other plans characterize communities as one body rather than distinct neighborhoods with unique assets, sources of risk and experiences. This furthers community distrust of top-down resilience action, and it fails to address underlying factors that contribute to disproportionate community vulnerability in the face of climate impacts. To avoid this, state leaders can provide resources and capacity to engage proactively with community members and build relationships that last beyond planning and project execution.

Throughout your climate resilience work and as you listen and learn from diverse voices and perspectives in this space, it helps to ask yourself, “Am I being the best ancestor that I can be?” When making resilience decisions and paving the way for multi-generational transformation, it is critical to co-design planning, policy, and program solutions alongside community members so they have ownership over the outcomes and also the process that gets them there. To do this, develop an equitable and participatory design process that bridges spaces between engineers, planners, government officials, and community members, and encourage other organizations and leaders to do the same. Further, planning agencies must recognize the historic and systemic dispossession of land from Indigenous communities that continues to shape BIPOC dispossession¹².

(10) US Environmental Protection Agency, *Climate Change Impacts and Risk Analysis*, 2021. [Accessed September 2021], <https://www.epa.gov/cira/social-vulnerability-report>

(11) Centers for Disease Control and Prevention, *Health Equity Considerations and Racial and Ethnic Minority Groups*, April, 2021. [Accessed September 2021] <https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html#fn3>

(12) Hughes, Sara, et al. *Centering Racial Justice in Urban Flood Adaptation: Planning and Evaluation Tools for Great Lakes Cities*. University of Michigan Graham Sustainability Institute. 2021. <http://graham.umich.edu/media/pubs/Catalyst-Report-Centering-Racial-Justice-in-Urban-Flood-Adaptation-48491.pdf>

CASE STUDIES

California: The California Health in All Policies Task Force (HiAP) has partnered with the Center for Social Inclusion and Race Forward to organize a Government Alliance on Race and Equity (GARE) training across 19 state-level departments and agencies, forming the Capitol Cohort. It is one of the first statewide efforts to address racial equity across agencies and engages several city and county jurisdictions in both Northern and Southern California. This provides a "foundation to support synergy and collaboration for racial equity work across California in a new way"¹³. The program began in 2016 as a series of local cohorts in the Bay Area and Southern California that expanded to the state level. The employees participating in the 50-hour curriculum have met three times since the Capital Cohort Pilot launched in January 2018. "In the first meeting, participants were introduced to core racial equity concepts such as race vs. ethnicity, structural and internalized racism, and white privilege. In the second, participants refined a racial equity statement for their department, and discussed steps to ensure the State of California inspires change by leading the way and taking meaningful action. The third meeting focused on results-based accountability, during which participants were encouraged to work as a team to analyze their organizations and break down issues to form manageable solutions"¹⁴.

North Carolina: "A North Carolina program offers zero percent interest loans for green projects and has developed a Wastewater Reserve component that sets aside a portion of the state's federal allocation for grants and low-interest loans to plan, design, and construct critical water infrastructure in economically disadvantaged communities. Eligible municipalities may receive up to \$3 million for three years of work and, presumably, covering a multi-year project, involving planning, design, and construction. The state also awards funds to study the potential benefits of merging existing local water infrastructure systems to be more efficient"¹⁵.

Massachusetts: The Massachusetts [Municipal Vulnerability Preparedness \(MVP\)](#) grant program has grown from a \$500k to \$21M program in under 5 years, and it is launching an MVP 2.0 process to develop new trainings and tools for municipalities on resilience planning, implementation, and centering environmental justice (EJ) and equity. Created in 2017 as part of Governor Baker's [Executive Order 569](#), the program provides support for cities and towns in Massachusetts to identify climate hazards, assess vulnerabilities, develop action plans to improve resilience to climate change, and apply those actions. To advance one of the key priority areas, the program offers educational [resources on the intersection of climate resiliency, environmental justice, and equity](#). This includes guidance for teaming with local partners and case studies of MVP projects focused on increasing equitable and resilient outcomes. In addition, the program's application evaluation criteria elevates projects located within EJ communities and that demonstrate positive impact to and support from the local community via compensated Community Liaisons on project teams and letters of support¹⁶.

Maryland: The Chesapeake Bay Executive Council, made up of Chesapeake Bay states and the District of Columbia, issued a statement in support of diversity in 2020. The [Statement in Support of Diversity, Equity, Inclusion and Justice](#) commits the Chesapeake Bay Program to strengthen and improve diversity, equity, inclusion and justice in all areas of the partnership, recruit and retain staff and volunteers that reflect the diversity of the Chesapeake Bay watershed, foster a culture of inclusion and respect across all partner organizations and ensure the benefits of their science, restoration and partnership programs are distributed equitably without disproportionate impacts on vulnerable populations.

(13) State of California: California Strategic Growth Council. SGC Joins Initiative to Take Racial Equity Training Statewide. May 2018. <https://sgc.ca.gov/news/2018/05-09.html>

(14) State of California: California Strategic Growth Council. SGC Joins Initiative to Take Racial Equity Training Statewide. May 2018. <https://sgc.ca.gov/news/2018/05-09.html>

(15) Center for Neighborhood Technology. Increasing Funding and Financing Options for Sustainable Stormwater Infrastructure. 2020. <https://www.cnt.org/sites/default/files/publications/Increasing%20Funding%20and%20Financing%20Options%20for%20Sustainable%20Stormwater%20Management.pdf>

(16) Municipal Vulnerability Preparedness. Environmental Justice & Equity. 2021. <https://resilientma.org/mvp/content.html?toolkit=justice>

STEP 4



Develop Good Data.

Building resilience in the face of climate change and related hazards depends on knowing those hazards, understanding the underlying (pre-existing) vulnerabilities, and tracking how well strategic interventions achieve desired results. That makes data on each of these components essential. States have two fundamental and complementary options: to look at (1) what and how well a state prepares and shores up its own activities and assets against growing climate risks; and (2) what and how well a state builds its resiliency. This includes activities under direct control of state actors as well as others at the local and regional levels and in the civic and private sectors working within state boundaries. This important choice affects what data to collect. Regardless of this choice, a number of guiding principles apply to the data collection effort.

Collect and host necessary data to support resilience initiatives.

Because climate hazards and impacts rarely affect a single community, states may need to support and facilitate climate resilience-building efforts that cross local government boundaries. States can support local government by collecting relevant data and interpreting federal data. In particular, states can:

- ✓ Collect and host data on state disasters, threats, hazards, asset exposure, human vulnerability, funding needs and sources, and avoided costs for being prepared. This information can include event and weather-related trends and costs over time, number of emergency event triggers, labor hours devoted to preparation, response, and recovery, among others.
- ✓ Partner with federal and regional institutions to build central data/information clearinghouses to reduce the need for data users to combine information from multiple sources. Also, invest in updating and maintaining databases regularly and, whenever possible, to partner with climate service providers in offering technical support so data and tools are readily accessible and appropriately used.
- ✓ Collect data on principal causes that contribute to climate vulnerability, such as the lack of social infrastructure, poverty, or systemic inequities.
- ✓ Develop scenarios for the possible climate out- and in-migrations that could impact communities because of repeated climate disasters or anticipated unlivable conditions from such climate hazards as rising seas, extreme heat and wildfires. They can identify factors that may increase the likelihood in certain communities to lose population, business, and infrastructure or, alternatively, to serve as “receiving” communities for displaced populations¹⁷.
- ✓ Provide and maintain climate science, data, and analytic tools critical for helping local governments understand their local physical, social, economic, and environmental risks due to climate change, and plan for climate resilience building.

Develop partnerships with universities, nonprofits, and other networks.

State universities and other academic institutions offer a “brain trust” of experts to help identify and quantify risks. Gaining the advice and expertise of partners outside state agencies — from universities, nonprofits, business associations, regional institutions, and community groups — can deliver important resources and expertise to any state’s climate resilience work. For example, universities can contribute to data gathering and climate research; private businesses can provide insight into using climate resilience to leverage commerce and industry trends; and nonprofits and community groups can help reach out to vulnerable populations and undertake community-level projects. Engaging these stakeholders also builds deeper in-state organizational capacity and a growing community of practice around resilience that helps strengthen public support for both climate resilience and climate mitigation¹⁸.

(17) Platrik, Pete, Joyce Coffee. *How State Governments Can Help Communities Invest In Climate Resilience*, September 2020. [Accessed September 2021]
<https://static1.squarespace.com/static/5736713fb654f9749a4f13d8/t/60a41bca20a5810a36ff7977/1621367756587/Coffee+Platrik+State+Resilience+Framework+September-2020.pdf>

(18) Smart Growth America, *Governors’ Institute*, October 2015. [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

Commit funding for data collection, maintenance and administrative time.

Data collection proves critical, not only to determine what risk mitigation actions to take and in which areas but also to hold ourselves accountable to this work. Continued data collection can confirm that climate resilience projects meet the designed outcomes or, alternatively, they are not producing the intended, or have unintended, consequences. This accountability depends on capacity for long-term data collection, curation and maintenance.

Center equity in data collection and analysis.

Identifying frontline communities is a key prerequisite to an equitable resilience process. State leaders can identify communities through a spatial review of community assets and vulnerabilities, and conversations with community leaders and community-based organizations. The NAACP has identified several pre-existing vulnerabilities and assets relevant to adaptation and that help capture the potential for compounding and accumulating risks and exposures. These include air quality; homes within a 10-mile radius of a hazardous facility or toxic site (including brownfields); households with electricity shut-offs in the last 12 months; and households with water shut-offs in the last 12 months. Sometimes the most valuable data to inform climate resilience decision-making are numerical/quantifiable. But, to more effectively engage community members in designing and collecting data, qualitative data from surveys and community interviews can prove to be extremely valuable¹⁹. Ideally, quantitative and qualitative data combine to form a more complete and accurate story.

CASE STUDY

Massachusetts: In 2018, the Massachusetts Executive Office of Energy and Environmental Affairs and MA Emergency Management Agency worked in close partnership to release the first-in-the-nation integrated [State Hazard Mitigation & Climate Action Plan \(SHMCAP\)](#). The rigorous statewide climate vulnerability assessment leveraged robust data on 14 natural hazards that could affect the Commonwealth of Massachusetts because of changes in precipitation, sea level rise, increasing temperatures, and extreme weather. The assessment was conducted through extensive agency and stakeholder engagement to define longer-term state mitigation and adaptation goals and to identify actions at the local, regional, and state level to reduce state hazard risks and build climate resilience. After the plan's release, Governor Baker launched the [Resilient MA Action Team \(RMAT\)](#), the interagency taskforce responsible for plan maintenance and implementation that provides regular progress updates at the online [SHMCAP Action Tracker](#)²⁰. Massachusetts recently launched a statewide climate impact assessment that uses updated climate change projections to identify the Commonwealth's most urgent climate impacts across regions and sectors. These findings will inform directly the first five-year update of the SHMCAP released in 2023.

(19) Hughes, Sara, et al. Centering Racial Justice in Urban Flood Adaptation: Planning and Evaluation Tools for Great Lakes Cities. University of Michigan Graham Sustainability Institute. 2021.

<http://graham.umich.edu/media/pubs/Catalyst-Report-Centering-Racial-Justice-in-Urban-Flood-Adaptation-48491.pdf>

(20) State of Massachusetts: Department of Environmental Protection. Natural Hazards, Climate Change & DCR: DCR's 2018 vulnerability assessment survey for the State Hazard Mitigation & Climate Adaptation Plan. 2018.

<https://www.mass.gov/doc/dcr-vulnerability-assessment-2018/download>

STEP 5



Establish A System For Resilience Measurement

Get the right people in the room.

An undervalued aspect of creating an effective resilience measurement system is to convene all the right people together to engage, build a shared vision of the future, tie funding sources together, deduce co-benefits, overcome silos, solve problems and create a collective sense of efficacy and achievement. This group also should connect with and elevate the voices of people from underserved communities and others so they contribute to defining research needs and determining highest priorities.

Visualize where you want to go.

Develop a clear pragmatic vision that aligns with your state's priorities. Developing a common vision not only builds political will and engages the public, it also provides a motivational focal point for orienting your metrics strategy. This vision must reflect stakeholders' concerns, needs, and insights into what is most useful and desirable to them. The concept involves drawing a line between a current problem and where your state wants to be in the future and setting metrics that orient strategies that hold up against such stressors as COVID-19 or climate impacts. Resilience metrics should serve as guide rails, informing decision-makers of the direction to head to realize their resilience vision, reflecting progress being made, and helping to point to course corrections if and when needed.

Develop diverse metrics for all components of the resilience building process.

Resilience metrics serve a variety of purposes for state resilience leaders. In the past, some states have focused mainly on climate indicators to track changes in climate conditions, or on vulnerability indices to understand conditions on the ground. More recently, focus has shifted to actually tracking adaptation measures. These metrics can help prioritize investments in line with the greatest risks, monitor resilience progress and evaluate effectiveness of investments or programs, among others. Often decision-makers focus on just one category—examining only indicators of climate hazard vulnerability or long-term project outcomes, for example. This approach misses many opportunities to gauge and improve the approach of all aspects of the resilience building process. This is why it is important to assess a diversity of metrics addressing aspects of the implementation process, efforts to build adaptive capacity, the resilience actions themselves, as well as the many outcomes for state agencies and communities. In doing so, we hold ourselves accountable to holistic resilience building, not just a small sliver of the story. The following includes one way to approach the metric identification process as well as some illustrative metric examples.

If following this approach, keep in mind it will be evolving over time as the field advances:

- ✓ **Input (Resilience planning and implementation process):** Resilience framework implementation process, low-barrier job opportunities, equity, diversity, and inclusion training of resilience leadership.
- ✓ **Output (Direct project impacts):** Energy savings, additional community green space, avoided disruption costs, and stormwater management.
- ✓ **Outcomes (Community multi-benefits):** Unemployment rate, less flooding, fewer heat or air quality related hospitalizations, reduced income inequality, and community adaptive capacity.

Begin, analyze and refine.

Ultimately, establishing an effective system of resilience measurement is an ongoing process and not an end in itself. No matter what stage you approach this from, don't let the perfect be the enemy of the good. No right way exists to approach resilience metrics and, no matter what, continuous monitoring, evaluation, and recalibration must occur. The opportunity is to start somewhere and communicate with others what you are doing, what you want to do moving forward, and why you are doing it. This helps establish a norm, scale these efforts, and learn from one another along the way. It also creates transparency and trust and strengthens your governance capabilities.

CASE STUDY

Colorado: In July 2021, the [Colorado Resiliency Office](#) – which was established in 2013 in response to a flood disaster and has grown into a multi-hazard resilience coordination hub – completed an update of its online Colorado Resiliency Resource Center. The site includes case studies, a resiliency dashboard and a toolkit of resources for resilience as well as pre-and post-disaster recovery. The site also offers resilience-building events and a peer exchange platform to facilitate the exchange among local governments of ideas and lessons learned²¹.

STEP 6



Drive The Shift From Data and Planning To Implementation.

Identify top priorities and develop actionable next steps.

A key part of climate resilience is understanding the climate and other hazards that pose the greatest threat to your state, and who is most vulnerable to those hazards. Driven by data and serving as a key state planning tool, a state hazard mitigation plan— required by the Federal Emergency Management Agency (FEMA) for much of its non-emergency grant programs (and certain aspects of disaster recovery assistance)²²—can help considerably to accurately assess current and future risk, build in-state climate resilience capacity, and best position your state to compete for available funding to finance implementation. The resilience office or sub-cabinet should work closely with the state emergency management agency to develop a plan that maximizes potential benefits with clearly defined priorities, objectives, and specific tasks and actions to take. They should include those related to mitigating risk for underserved communities. To be effective, hazard mitigation plans should be adopted by the highest elected official or designee in the state²³.

Once a plan is developed, it is important to provide all relevant agencies the resources necessary to execute it. This is not possible, however, without buy-in and the provision of feedback across departments and scales.

(21) State of Colorado: Colorado Resiliency Office. A Resilient Colorado. September 2021. [Accessed September 2021]
<https://mailchi.mp/3a331036c0ab/template-one-7911232?e=08f496ef4c>

(22) US Department of Homeland Security FEMA, Mitigation Planning and Grants. [Accessed September 2021]
<https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/requirements>

(23) Smart Growth America, Governors' Institute, October 2015 [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

Foster coordination across departments.

Identify common causes or multiple benefits that can generate support from champions across departments, agencies, businesses, nonprofits, and others so resources can be pooled and responsibilities shared.

Include stakeholders to generate data, ideas, and build broad buy-in for policies.

Consider convening on-the-ground staff, local government leaders, and other department stakeholders to discuss vulnerability and to inform investment decisions and further integration of climate resilience priorities across departments based on past performance.

Position yourself for funding opportunities.

Develop a ready-to-go pipeline of projects to help position communities to exploit funding and financing opportunities that may arise, such as federal economic-stimulus or recovery funds. If a project already has some funding, it can be difficult to then generate federal support. Likewise, support often is only available to projects with a completed design. Thus, it is important to find the special window between projects “ready for funding” and “shovel-ready design.” However, for projects to be resilient, they should be designed based on the best available data on future risk. Some projects that have been in the pipeline for years may be based on out of date risk profiles or not even take climate change into account.

To facilitate the design of shovel-ready projects, state governments can provide funding and expertise that enable local governments, private sector developers, community organizations, and nonprofit organizations to design numerous climate resilience projects and prepare them for funding. These pipelines may represent myriad projects: new storm-water parks and sea barriers or the retrofitting of a water treatment facility, a bridge or roadway elevation, or dam modernization.

The following will prove valuable:

- ✓ Inventory “must do” climate resilience projects of state departments and local governments.
- ✓ Partner with nonprofit conservation and environmental organizations to strengthen local climate resilience, especially for rural communities.
- ✓ Support regional climate resilience design competitions.

Commit to a de-siloed approach to climate resilience and mitigation.

Discarding the assumption that climate resilience and mitigation are competing, isolated investment agendas is critical. Creating space to explore integrating these two sectors and elevating mitigation and adaptation agendas simultaneously will be increasingly valuable in the future. For example, investing in natural or green infrastructure can further greenhouse gas mitigation goals as well as advance climate resilience agendas with benefits that complement hard or gray infrastructure systems, such as water and food security, public health and safety, and wildlife habitat. In addition, weaving carbon emission goals into resilience plans can further support these two agendas working together.

CASE STUDY

New Mexico: In January 2019, New Mexico Governor Michelle Lujan Grisham issued Executive Order 2019-003 on Climate Change and Waste Prevention. It created the state [Interagency Climate Change Task Force](#) (the Task Force) and included directives for agencies to incorporate climate mitigation and adaptation practices into their policies and operations. The task force comprises 9 interagency Climate Action Teams responsible for proposing, planning, and executing strategies to reduce greenhouse gas emissions and enhance New Mexico’s ability to adapt to climate change²⁴. It meets quarterly with a focus on interagency collaboration and interim updates. With the support from the U.S. Climate Alliance, the Task Force conducted the first-ever climate change resilience gap assessment using an adaptation of the National Governors Association [State Resilience Assessment Planning tool](#). The assessment helped staff assess the level of state resilience, identify gaps, and incorporate findings to improve resilience in Climate Action Team Action plans and the development of a Climate Adaptation and Resilience plan as an annex of the state hazard mitigation plan.

(24) State of New Mexico: Interagency Climate Change Task Force, Date [Accessed September 2021] <https://www.climateaction.state.nm.us/task-force.html>

STEP 7



Identify And Act On State-level Opportunities To Build Momentum Around Resilience.

Capitalize on the investments your state already is making.

Whether it involves local assistance dollars, direct infrastructure expenditures, tax incentives, or permitting, every decision can support your state's climate resilience goals. The need will exist to invest strategically in specific, potentially large-scale adaptation and climate resilience projects, but don't miss the opportunity to incentivize climate resilience through day-to-day investments, incentives, and policies since a secondary benefit exists here. State funding can offer incentives for contractors and service providers to develop skills and expertise around resiliency, and this has spillover effects. It makes it easier and more cost-effective for other actors – local governments or private companies – to demand similar standards. In particular, states can set climate resilience standards and codes, manage risk, create clear cost-benefit analysis, and incentivize and reward climate resilience.

Set resilience standards and codes.

Standards and codes are critical for state infrastructure, buildings, and utilities as well as for regulatory mechanisms to build climate resilience on private property. Establishing standards also will enhance eligibility for federal funding. For instance, FEMA's Building Resilient Infrastructure for Communities grant program awards significant points for states with such things as a state building code in place. In addition, states should employ design standards and best practices for materials procurement and use, asset management, construction, bridge management systems, safety, etc. One of the primary recommendations of the report by the White House Hurricane Sandy Rebuilding Task Force was that adopting and enforcing current model building codes was one of the most effective things states could do to drive climate resilience²⁵.

Manage risk.

Unlike flood insurance policies set at the national level, states regulate property insurance and, thus, play a key role in risk mitigation. State insurance commissioners can create climate risk policies for the insurance sector. These efforts can benefit from integrating climate resilience measures into program spending criteria and establishing mandatory risk assessments. In addition, states should establish funding and the political capital to develop a buyout program and statewide strategies to address assets already in high-risk areas²⁶.

Clarify cost-benefit analysis requirements for proposed resilience-building activities.

Cost-benefit analysis requirements should include full lifecycle accounting, anticipation of climate risks in discounting investment, inclusion of the value of ecosystem services, quantification of the public health and other benefits, and description of the cost of inaction, especially for rural and marginalized populations. For instance, a green infrastructure project might improve air quality, which improves public health; lessen basement flooding, which improves property values and can save owners and renters money; increase tourism, which attracts business and produces tax revenue; and reduces stormwater to treat that reduces costs for public utilities²⁷.

(25) Hurricane Sandy Rebuilding Task Force. Hurricane Sandy Rebuilding Strategy: Stronger Communities, A Resilient Region. August 2013.
<https://www.hud.gov/sites/documents/HSREBUILDINGSTRATEGY.PDF>

(26) Smart Growth America, Governors' Institute, October 2015 [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

(27) Plastrik, Pete, Joyce Coffee. How State Governments Can Help Communities Invest In Climate Resilience, September 2020. [Accessed September 2021]
<https://static1.squarespace.com/static/5736713fb654f9749a4f13d8/t/60a41bca20a5810a36ff7977/1621367756587/Coffee+Plastrik+State+Resilience+Framework+September-2020.pdf/>

Incentivize and reward climate resilience.

Many climate resilience projects deal with capacity building rather than ‘ribbon cutting’ enhancements. Celebrate these less ‘visible’ achievements. The ability to articulate project outcomes in quantifiable terms can prove useful in retaining momentum and interest around less ‘visible’ climate resilience projects. Further, “resilience cutting” ceremonies for resilience initiatives can generate support and emphasize their importance.

CASE STUDIES

Minnesota: *Minnesota GreenStep Cities is a voluntary challenge, assistance and recognition program that helps cities achieve their sustainability and quality-of-life goals. This free continuous-improvement program, managed by a public-private partnership, is based upon 29 optional best practices. Each can be applied after clearance from city elected officials, staff and community members by completing one or more actions at a 1, 2 or 3-star level from a list of four-to-eight actions. These voluntary initiatives are tailored to all Minnesota cities and focus on cost savings and energy use reduction and encouraging civic innovation.*

Connecticut: *The Connecticut Act Concerning Climate Change Adaptation, [PA 21-155](#), signed into law July of 2021 enacts multiple recommendations of Governor Lamont’s [Governor’s Council on Climate Change \(GC3\)](#) by increasing local resilience planning options, legal authorities, and financing for adaptation and resilience projects. The law allows municipalities to implement fees to cover the costs of addressing flooding and pollution from stormwater via stormwater authorities. These stormwater authorities provide municipalities with an affordable way to invest in watershed-wide pollution and flood abatement and can benefit environmental justice communities that are disproportionately burdened by these impacts. The law also expands the purview of municipal flood and erosion control boards to include flood prevention and climate resilience responsibilities, enabling them to construct and maintain climate resilience systems, including both grey and nature-based climate solutions as potential flood prevention measures. The boards can cover these costs through a number of measures, including a special assessment on lands and buildings benefiting from the climate resilience projects. Further, this law expands the scope of the Connecticut Green Bank, a nationally-recognized leader in financing clean energy, by creating an Environmental Infrastructure Fund to invest in climate adaptation and resilience projects in addition to water, waste and recycling, agriculture, land conservation, parks and recreation, and environmental markets.*

STEP 8



Incentivize And Support Local-level Opportunities To Build Resilience.

Recognize your state’s role in bottom-up climate resilience momentum.

As extreme weather events and climate hazards become more present in our daily lives, climate resilience efforts must be mobilized on all fronts, from neighborhood-level and community-based to international. Local governments play an essential role in building climate resilience. They control land use planning, local roads, enforce building codes, zoning, parks, local government facilities, and building permits. They are the on-the-ground implementers of change. Still, this bottom-up action depends in many ways on state leadership because local governments often must patrol and oversee state requirements, regulations, and investments. Local capacities often are supplemented by state and federal funding programs and enabling policy.

Further, if local governments’ climate resilience needs are not fulfilled, the state will incur massive disaster costs. This financial exposure gives states and local governments great incentive to jumpstart local climate resilience agendas from an economic perspective as well.

State governments possess the power to make or break local climate resilience needs as administrators of resource allocation; managers of natural areas; organizers of emergency capacities and responders to natural disasters; regulators of energy, buildings, insurance, and other essential and vulnerable sectors, and as public opinion shapers.

Support local scale climate resilience via guidance, funding, technical support.

Myriad opportunities exist for states to advance and support local climate resilience agendas. As intermediaries between local and federal resilience structures, states bolster local capacity by helping local players reach the right funding sources and by providing cover to local governments and acting as sounding boards for their needs to protect them from continual federal requests that encroach on local bandwidth to effect change.

In particular, states can²⁸:

- ✓ **Offer technical assistance and climate risk data:** The resilience office or sub-cabinet should work with state agencies to enable and empower communities by providing technical assistance and training to local government staff; ongoing, direct assistance to local officials; and climate data and risk analysis and communication assets for climate resilience.
- ✓ **Offer communication resources to build public support for resilience initiatives:** States can communicate about state funds, programs, and regulations that support local climate resilience-building activities.
- ✓ **Implement incentive programs:** For example, communities that complete a certain number of state-offered and climate resilience-related technical assistance workshops could earn points on related grant applications or unlock eligibility for direct assistance from the state fund. Similar benefits could be awarded to communities that successfully establish local climate resilience funds or voluntarily apply higher resilience standards than legally required, such as freeboard elevation or the FEMA Community Rating System program for flood-prone areas.
- ✓ **Offer credit rating support for local borrowing from the municipal bond market:** This can de-risk local and private sector investment into projects and may not even incur costs in the long run.
- ✓ **Condition local government access to state funding on the use of specific climate-risk scenarios to assess local needs:** The goal is to drive consistency in model assumptions. For instance, states can require the use of scenarios that assume stable or increasing greenhouse gas emissions rather than scenarios that project decreasing greenhouse gas emissions and, thus, relatively fewer significant climate impacts over time.
- ✓ **Develop guides and tools to help local governments address barriers to resilience action:** This is helpful at a state level because the national guides are written more generically to address all states and differences in state laws and programs require specific approaches.
- ✓ **Establish sources of resilience funding:** States possess several options for creating funds for climate resilience. They can maximize the use of federal grant and revolving loan programs, increase local authority to raise revenue, raise resilience funds by bonding against future tax revenue, tap money generated by carbon-pricing markets, and include surcharges on property insurance. For more information, consider Step #11.
- ✓ **Provide access to best practice resources, model ordinances, and resilience and recovery checklists for communities to emulate and apply:** The [EPA's Flood Resilience Checklist](#), which helps communities prepare for floods, exemplifies the types of tools that could be provided. The state should develop a centralized system online to provide easy access to this information, a resource that could be especially useful to small urban or rural communities that lack internal planning staff and adequate connections to external expertise.

(28) Plastrik Pete, and Joyce Coffee. **How State Governments Can Help Communities Invest In Climate Resilience, September 2020 [Accessed September 2021]**

<https://static1.squarespace.com/static/5736713fb654f9749a4f13d8/t/60a41bca20a5810a36ff7977/1621367756587/Coffee+Plastrik+State+Resilience+Framework+September-2020.pdf>

Technical assistance could support determining:

- How to protect a particular roadbed from flooding or how much green infrastructure is needed to retain a certain amount of water after a rainfall.
- Which local codes, ordinances, and permitting processes should contain new climate-adaptation standards for buildings, or how to ensure that city prohibitions against development in certain high-risk areas could survive legal challenges.
- How to integrate resilience-building policies into the array of hazard mitigation, emergency response and other local plans that typically exist. These include comprehensive plans, watershed management plans, tree and shade plans, capital improvement plans, and the like.

Facilitate local knowledge transfer.

States can hold their programs accountable to local outcomes by facilitating the exchange of local 'know-how' and lessons learned. Since local action occurs daily, states can incentivize action and also help connect communities with developed resilience plans to others to facilitate the exchange of lessons learned, ideas, and best practice. These lessons from municipalities can then be used to frame the state plan, serving as a key venue to incorporate feedback from local governments and other relevant stakeholders²⁹.

CASE STUDY

Georgia: In 2019, The Georgia Climate Conference gathered more than 430 leaders and experts to collaborate, raise awareness of climate work across the state, highlight progress, and identify opportunities to do more. Hosted by the Georgia Climate Project and funded by the Ray C. Anderson Foundation, the event fostered constructive, nonpartisan discussion about how climate change affects Georgia and what needs to be done, brought together experts working to understand and act on climate change, and, ultimately, identified practical steps to respond to climate change impacts³⁰.

Florida: In April of 2021, Florida Governor Ron DeSantis announced that \$148 million-plus had been awarded to communities through the Florida Department of Economic Opportunity's Rebuild Florida Mitigation General Infrastructure Program. The program, administered by DEO, enables local governments to develop large-scale infrastructure projects to make communities more resilient to future disasters. The funds are allocated to the state through the U.S. Department of Housing and Urban Development's (HUD) Community Development Block Grant – Mitigation (CDBG-MIT) program formed in response to 2016-2017 presidentially declared disasters. This funding leverages public-private partnerships, which allows local projects to access millions in mitigation and adaptation funds. This enables more wide-ranging resilience projects over those that rely solely on government funding³¹. Further, to foster coordination across the program, the Florida Coastline Resilience Program hosts a quarterly webinar where attendees from all over the state hear what their counterparts are working on. Participants provide project updates, introduce new resources and, most importantly, engage in asking for advice and recommendations. Audience members include consultants as well as staff from city, county, state and federal government entities, universities and nongovernmental organizations³².

New York: New York State announced its multi-agency Climate Smart Communities program in 2009 to provide guidance and technical support to local governments interested in taking local climate action. The Climate Smart Communities program is supported by seven state agencies and authorities. It provides direct technical assistance from regional coordinators funded by the Department of Environmental Conservation (NYSDEC) and the Energy Research and Development Authority (NYSERDA). In 2014, the agencies released a certification program to recognize leading communities and to provide a framework to assist communities in developing their local climate action plans. In 2016, as part of an expansion of the New York State Environmental Protection Fund, the state legislature created the Climate Smart Community grants program, administered by NYSDEC. Since 2016, NYSDEC has awarded roughly \$50 million to municipalities to support a variety of climate projects. They include vulnerability assessments, adaptation planning, and flood-risk reduction projects. At least 346 municipalities representing 49% of the state's population participate in the program; 80 of these communities, representing 27% of the state's population, have achieved certified status³³.

(29) Resilient Nation Partnership Network, US Department Of Homeland Security FEMA, and National Oceanic and Atmospheric Administration NOAA, Building Alliances For Equitable Resilience, April 2021 [Accessed September 2021]
https://www.fema.gov/sites/default/files/documents/fema_rnpn_building-alliances-for-equitable-resilience.pdf

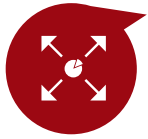
(30) State of Georgia: Georgia Climate Project. 2019 Georgia Climate Conference: Minimizing Georgia's Risk. Maximizing Georgia's Future. [Accessed September 2021]
<https://conference.georgiaclimateproject.org>

(31) State of Florida: Florida Governor Ron DeSantis. Governor Ron DeSantis Announces Nearly \$150 Million in Awards to Florida Communities for More Resilient Infrastructure. April 2021. [Accessed September 2021]
<https://www.flgov.com/2021/04/16/governor-ron-desantis-announces-nearly-150-million-in-awards-to-florida-communities-for-more-resilient-infrastructure/>

(32) State of Florida: Florida Department of Environmental Protection. Quarterly Coastal Resilience Forum. August 2021. [Accessed September 2021]
<https://floridadep.gov/rcp/florida-resilient-coastlines-program/content/quarterly-coastal-resilience-forum>

(33) State of New York: Climate Smart Communities. State Support for Local Climate Action. [Accessed September 2021]
<https://climatesmart.ny.gov/>

STEP 9



Be Prepared For Opportunities To Expand Resilience Initiatives After Disaster Strikes.

Use each crisis as an opportunity to assess vulnerabilities and underscore the importance of resilience work.

Proactive climate resilience action and disaster preparedness are critical. Yet, climate impacts are arriving faster than adaptation efforts can keep up. When a climate resilience crisis or natural disaster occurs, be prepared to respond and build state climate resilience for the next disaster with an action plan at the ready. Initially, leverage attention on the disruption to expand communication campaigns and educational opportunities relating to hazard events such as drought, heat, or flooding, and emphasize the importance of climate resilience concerning them.

Further, emphasize planning ahead and adopting policies that direct smart recovery and rebuilding before a crisis. For instance:

- ✓ Review state insurance and reinsurance practices and expedited permitting to support rapid rebuilding efforts after resilience shocks, and align private financial incentives to state resilience objectives.
- ✓ Plan ahead to apply reforms that address development in high-hazard areas and promote new resilient microgrids.
- ✓ Maintain a project pipeline to be funded by FEMA, HUD, SBA or other sources while also seeking pre-event funds for these priority projects.
- ✓ Keep in mind areas that, due to repetitive loss and predicted future impacts, should not be rebuilt after extreme events and, conversely, communities that are appropriate receiving communities.
- ✓ Provide guidance, and technical and financial support for pre-event, long-term recovery planning in particularly vulnerable communities.

Plan ahead for shifting resources.

Federal dollars and political and public support will likely shift in the wake of a disaster, providing opportunities for progress. Post-disaster recovery periods often are accompanied by a large and relatively rapid dispersal of local, state, and federal funds, with COVID-19 serving as a key example. Further, many funding opportunities go into effect when the president declares a major disaster under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. This represents a unique opportunity to invest heavily in resilience measures and ensure that future disasters have less of an impact³⁴.

Foster a “build back better” environment.

Commit to comprehensive solutions – measures that increase climate resilience and adaptive capacity long term – rather than short-term, temporary fixes. When natural disasters damage property and infrastructure, the state should ensure that rebuilding efforts produce more resilient, economically viable, equitable, and environmentally responsible structures. The pressure to rebuild quickly is always high following major disasters, but it is critical that the state prevent recovery funds from being used to rebuild to the same pre-disaster standards if they do not recognize the future risks. Essentially, this replicates the risk that existed before. The state should not authorize any rebuilding project under its control until measures to mitigate future damage have been analyzed and implemented into the project’s scope³⁵.

(34) Smart Growth America, Governors’ Institute, October 2015 [Accessed September 2021] <https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

(35) Smart Growth America, Governors’ Institute, October 2015 [Accessed September 2021] <https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

CASE STUDY

California: After the worst fire season in California history and as drought conditions signaled increased wildfire risk, Governor Gavin Newsom in collaboration with the California Forest Management Task Force developed the [State Wildfire and Forest Resilience Action Plan](#). Over the past two years, the Task Force — that grew out of the state’s Tree Mortality Task Force established when a recent drought killed a massive number of trees — has convened over two dozen interagency and stakeholder-led work groups to develop the recommendations presented in this Action Plan. It also will serve as a roadmap for implementing the Agreement for Shared Stewardship of California’s Forest and Rangelands with the U.S. Forest Service under the U.S. Department of Agriculture, and for aligning the state’s efforts with other federal, local, tribal, regional and private organizations³⁶.

STEP 10



Develop A Federal Resilience Strategy

As laboratories for federal policy, states possess influence and can impact the design and application of federal climate resilience resources. Governors play a key role in holding the federal government accountable to do climate resilience and can apply significant leverage to take full advantage of this ability. Yet, navigating federal structures can prove confusing and convoluted. If the climate mitigation platform is a guide, it helps to make the climate resilience navigation clearer if greater momentum around it exists at the federal level. Accordingly, two priorities apply for state governments to push the federal climate resilience agenda: 1) Provide feedback to the federal government about how it can better fill state needs for climate adaptation and climate resilience and, 2) become more strategic about how partnerships at the federal level are fostered and leveraged and how resources are pursued. USCA places a high priority on federal/state interaction

Map federal opportunities back to your state.

States should map which federal agencies have authorities related to disasters/extreme climate events in your state and determine who in your state cabinet interacts with the primary federal departments working on climate resilience (DHS, FEMA, HUD, EPA, NOAA, Army Corps, etc.). In New Jersey, for example, FEMA deals with the state police, and the DOT works through NJ Transit and the Port Authority of New York and New Jersey. In some cases, such as when Congress provides emergency funding through a supplemental appropriation, large tranches of federal funding can come through HUD and other non-disaster agencies. As part of this mapping, states should clarify which agencies lead various federal programs and implant them, and identify other partners who may help facilitate this action. Then, states should align state resources according to existing federal channels by using the unique partnerships between state agencies and federal departments as a leverage point and basis for communication. This will help organize funding opportunities at a program level, not a project level, better coordinate matching opportunities and keep accountability to the greater state climate resilience goals.

(36) Forest Management Task Force, *California’s Wildfire And Forest Resilience Action Plan*, January 2021, [Accessed September 2021]
<https://www.fire.ca.gov/media/ps4p2vck/californiawildfireandforestresilienceactionplan.pdf>

Develop an agenda to leverage and inform federal programs.

To influence and guide the federal climate resilience agenda and take advantage of federal opportunities, relationships and feedback are vital. Provide ongoing information and input to the administration through semi-regular one-pagers, whether a formal request has been issued or not. Engage with practitioners and subject-matter experts. Given the Office of Intergovernmental Affairs' knowledge of federal programs, build relationships and work through the IGA as well as with budget examiners in the Office of Management and Budget (OMB). Other White House components may also have dedicated staff for climate resilience efforts.

States should bolster federal climate resilience momentum in Congress as well. Governors possess significant political leverage in Congress to support resilience language in appropriations bills. This ensures that resilience becomes an administration priority and obligation. To do so, build relationships with committee staff members and work with your congressional delegation on appropriations and transportation and infrastructure. To better hold Congress accountable for designing programs that deliver and perform, provide consistent feedback as you build these connections. Communicate the state experience in navigating federal programs, procedures and processes. As Congress looks to improve climate resilience programs, it is important that their adjustments are informed by the state experience.

Build a coalition of governors to pursue common goals.

Coalitions of states have even more power with both branches of federal government, and climate resilience efforts are an area where nearly all states are aligned. There is undervalued power in gathering cases and presenting a coalition of voices on a particular request. This fosters the exchange of climate resilience strategies – what worked and what didn't. And a multi-state emphasis will have greater impact in the federal arena. Further, possessing disparate case studies bolsters the case for climate resilience.

As members of a coalition, states can do the following:

- ✓ Encourage the federal government to bring on a chief resilience officer.
- ✓ Take a cohesive approach to enhancing state-level policy agendas.
- ✓ Indicate that adaptation and climate resilience are as important for states as mitigation.
- ✓ Press the federal government—legislative and executive branches, including federal departments and agencies—to increase more rapidly the funding available for climate resilience building.
- ✓ Advocate for the federal government to improve crucial data resources, and offer tools for more effective planning and project implementation.
- ✓ Identify and support crucial security and safety-related public infrastructure needs that could be impacted or enhanced by adaptation strategies.

Together, governors can bring about greater federal support for climate resilience more effectively than any state acting in isolation.

CASE STUDY

United States Climate Alliance: *The United States Climate Alliance (USCA) has a multi-pronged strategy to help inform, shape and support federal resilience action and policy, which includes: advocating for and facilitating strategic dialogue between governors and their staff and key federal government and Congressional leaders; supporting targeted state engagement that informs federal policies and programs; providing states with the tools to align or harmonize policies with the federal government and other actors; supporting legislative engagement; and building support for federal climate leadership through creative and impactful communications strategies, campaigns, and partnerships.*

STEP 11



Identify And Leverage Funding And Finance Opportunities For Resilience Activities.

It is in a state government's interest to address climate resilience proactively and tackle the question of financing head-on. Resilience building can prevent substantial future costs in infrastructure repair and disaster-emergency relief and loss of state and local tax revenues (property, income, sales, and business taxes/fees) from chronic and acute climate hazards. Climate resilience investments can generate an average of \$6 in cost savings for every \$1 invested, according to an analysis of risk-mitigation funding by federal agencies.

We identify a variety of mechanisms states can use to finance proactive climate resilience in Appendix F. However, effective climate resilience funding and finance also require intentionality in making the fiscal case, managing risk, and stacking funding sources.

Use strategic messaging when making the case for climate resilience investment.

Funding applications and proposals are stronger when they include effective economic arguments targeting the potential funder. When pitching to federal partners, such targeted messaging around quantifiable costs and benefits, reliable data, program and policy objectives, and logistical procedures make a difference. It can increase the safety of people and infrastructure and avoid damages and expenses, among other things. To support this message, you can present letters of support that demonstrate community buy-in; a comparison of costs and benefits of different actions to achieve a specific goal; and an estimate of positive impacts on amenities that people value, such as health and clean air.

In contrast, when working with foundations, philanthropists, or impact investors, the more impactful value proposition often revolves around climate change impacts on people and the environment, obligations to future generations, equitable outcomes, and environmental stewardship. In these contexts, it proves invaluable to communicate how a project will benefit underserved communities; who will bear the cost and who will receive the benefits; and who will organize site visits and present community input and levels of buy-in³⁷.

Incorporate climate risk into investment decision-making.

States annually fund housing, roads, water systems, and other important infrastructure. Unfortunately, these investments sometimes are made in locations at high risk from natural hazards, or they encourage growth in high-risk areas. Consequently, they increase a state's vulnerability to natural hazards and drastically reduce the return on state investments³⁸. Building statewide climate resilience requires integrating the changing climate into land use planning and other decision making and taking into account climate impacts which present grave impacts to communities, particularly lower income and BIPOC communities who have been historically marginalized by land use decisions³⁹. For infrastructure, this means incorporating climate risk considerations across the entire asset lifecycle— from planning, procurement and contracting to development and service delivery.

Decisions that incorporate climate resilience are, by nature, forward-thinking and seek to improve the long-term performance and well-being of your communities. To be accountable to this goal, consider extending the lifecycle of an asset and increasing the timeframe over which projects are tracked. It proves important to ensure that short-term problems don't take precedence over longer-term goal-oriented actions.

(37) Headwaters Economics, *Building funding strategies for flood mitigation projects*, September 2020 [Accessed September 2021]
<https://headwaterseconomics.org/natural-hazards/funding-strategies-flood-mitigation/#how>

(38) Smart Growth America, *Governors' Institute*, October 2015 [Accessed September 2021]
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

(39) Burgess, Katherine. *Smart Growth Means Tackling Climate Head-on*. Smart Growth America. September 21, 2021.
<https://smartgrowthamerica.org/wp-content/uploads/2016/10/building-resilient-states.pdf>

Organize funding on a program level to better stack funding.

To better manage funding and pool resources, consider organizing funding on a program rather than a project level. Reflecting the holistic nature of climate resilience projects, project leaders likely will need to leverage multiple funding sources – including grants in addition to innovative financing mechanisms – to cover costs associated with project design, application, and ongoing maintenance and monitoring. Therefore, to most effectively stack a diversity of funding sources, aggregating small-scale projects with the same goal – say, stormwater management or urban heat island mitigation – can help project leads meet grant-matching requirements; increase eligibility for and interest from funding sources that favor systems-scale work; and better align disparate sources. The principal objective of an adaptation and climate resilience strategy is to ensure that governmental departments and public agencies adopt and mainstream the strategy in all decisions, and not to implement stand-alone projects. Another key objective involves governments continuously monitoring and evaluating the impact of their decisions and actions to address any challenges and adjust their actions accordingly⁴⁰. This is far more easily done at a program level.

Leverage financing mechanisms.

Besides pursuing federal, state, private, and utility grants from departments such as FEMA and HUD or state revolving loan funds, state governments can employ various ways of raising revenue for climate resilience building tailored to their political situations, fiscal conditions, and legal barriers. These include caps on tax increases that may constrain the use of taxes or fees. Some states raise climate resilience funds by bonding against future tax revenue through long-term borrowing of private capital and/or by tapping money generated by carbon-pricing markets. Other revenue-raising methods under consideration in states include surcharges on property insurance⁴¹. For additional insight into potential finance mechanisms to leverage, consider Appendix F.

The bottom line: Be creative. Take advantage of innovative funding mechanisms and use multiple strategies to acquire the funds you need.

(40) The World Bank, *The Adaptation Principles: 6 Ways to Build Resilience to Climate Change*, November 2020. [Accessed September 2021]
<https://www.worldbank.org/en/news/feature/2020/11/17/the-adaptation-principles-6-ways-to-build-resilience-to-climate-change>

(41) Plastrik, Pete and Joyce Coffee. *How State Governments Can Help Communities Invest In Climate Resilience*, September 2020. [Accessed September 2021]
<https://static1.squarespace.com/static/5736713fb654f9749a4f13d8/t/60a41bca20a5810a36ff7977/1621367756587/Coffee+Plastrik+State+Resilience+Framework+September-2020.pdf>

CASE STUDIES

Rhode Island: Infrastructure Bank is a quasi-public entity that serves as the state's central hub for financing infrastructure improvements for municipalities, businesses, and homeowners. Established by the Rhode Island General Assembly in 1989 as the Clean Water Finance Agency, the bank's mandate expanded significantly in 2015 to include energy and brownfield remediation initiatives. To better reflect its restructured charter and service capabilities, the Clean Water Finance Agency rebranded as the Rhode Island Infrastructure Bank. It has a broad directive to pursue local investments in domestic low-carbon technologies, climate resilient infrastructure, and other green segments such as water management systems. The bank manages revolving loan funds capitalized via federal grants, state contributions, and other funds. It maximizes its lending capacity by leveraging its limited program equity in the capital markets to unlock larger pools of private capital. This capitalized pool financing model enables the bank to create economies of scale and invest in more near-term infrastructure projects with a limited amount of program equity. Its Clean Water State Revolving Loan Fund successfully leverages over four dollars of private capital for every federally funded dollar for investments in sewer pipes, wastewater treatment plants, rain gardens, and septic systems⁴².

The New York: The State Smart Growth Public Infrastructure Policy Act⁴³ requires any agency or authority to demonstrate consideration of 11 specified smart growth criteria when it supports, undertakes, funds, or approves a public infrastructure project. Mitigation of future physical risk due to sea-level rise, storm surge and flooding is included in the criteria that must be considered.

Massachusetts: In April 2021, Massachusetts launched the beta [Climate Resilience Design Standards Tool](#) to help integrate up-to-date statewide climate projections and climate resilience design standards into state and local projects. The tool provides users a preliminary climate change exposure and risk rating as well as recommendations to increase the resiliency of project design. It also provides guidelines and forms to help agencies and municipalities integrate site suitability, regional coordination, and flexible adaptation considerations into building, infrastructure, and natural resource projects with physical assets. State leaders are piloting and using the tool to enhance resilience evaluation within infrastructure grant programs and project review processes. The resilience design standards tool is a project of the Resilient MA Action Team (RMAT), an inter-agency team working to apply the State Hazard Mitigation and Climate Adaptation Plan and improve resilience to climate change across the state. The RMAT is led by the Executive Office of Energy and Environmental Affairs and the Massachusetts Emergency Management Agency, and is staffed by designated Climate Change Coordinators from each Executive Office.

(42) State of Rhode Island: Green Bank Network. Rhode Island Infrastructure Bank. June, 2021. [Accessed September 2021]

<https://greenbanknetwork.org/rhode-island-infrastructure-bank/>

Rhode Island Infrastructure Bank. How we work. 2020. [Accessed September 2021]

<https://www.riib.org/how-we-work>

(43) State of New York. Environmental Conservation Law, Article 6 [Accessed September 2021]

<https://www.efc.ny.gov/smartgrowth#:~:text=The%20State%20Smart%20Growth%20Public,degradation%2C%20disinvestment%20in%20urban%20and>

STEP 12



Commit To Ongoing Reassessment.

Engage in regular monitoring, revision and ongoing research to inform future decisions, policies, and investments, ensuring transparency along the way.

Since our future climate is replete with many unknowns, implementation of any climate resilience strategy must be viewed as a first step in a constantly evolving process. The climate resilience field is growing at an exponential rate. Each year, we collectively learn more about best practices, innovative mechanisms and, ultimately, what works and what doesn't. Climate resilience cannot be built overnight. It also does not have a clear arrival point. Rather, climate resilience comes from holding ourselves accountable to the outcomes we want to create by reassessing continuously where we stand, what progress has been made, where we want to be in five, 10, or even 50 years from now and determining how to mobilize the best resources to get there. It helps to keep in mind the burden climate risk places on young generations who will grapple with climate impacts their entire lives. Key strategies include committing to update climate resilience plans every two-to-three years, conducting regular meetings with a coalition of peer resilience leaders to encourage momentum, and leveraging partnerships to exchange lessons learned and best practices continuously.

CASE STUDY

Nevada: *In the fall of 2020, as part of the Nevada Climate Initiative, state officials hosted virtual listening sessions to gather input from Nevadans on an array of climate change topics. They included renewable energy deployment, land use and land change, transportation, air quality, economic recovery, and climate justice. In gauging public interest in and support for various adaptation and mitigation strategies, as well as capturing feedback on how the state can better serve its communities, these robust sessions help tailor new climate strategy to Nevada's needs via the input from the general public, business and industry partners, conservation organizations, and others with an interest in climate change⁴⁴.*

(44) State of Nevada: Climate Initiative. Listening Sessions. 2021. [Accessed September 2021]
<https://climateaction.nv.gov/our-strategy/listening-sessions/>

APPENDIX

APPENDIX A: Resilience Metrics

There are five primary reasons⁴⁵ why resilience practitioners are interested in using metrics:

- 1 Communication:** People become more easily engaged and brought on board to action when tangible change is presented in the form of a metric that is a hopeful and mobilizing alternative to ‘doom and gloom’ messaging. Accordingly, metrics can help build political will, strengthen accountability and support powerful stories of progress and success.
- 2 Planning:** By enabling internal consistency across government silos, resilience metrics can align various players and ensure everyone works toward the same goals. Metrics of progress and success can also help ensure alignment across sectors.
- 3 Fundraising:** Metrics enable climate resilience project leads to show the value and myriad benefits from resilience projects that foster greater interest and buy-in from potential funders.
- 4 Accountability:** Metrics are key to good governance and due diligence; they show how outcomes relate to the original project intent.
- 5 Learning:** Metrics provide a prime opportunity for learning, both from successes as well as failures.

State leadership in resilience metrics.

- ✓ Colorado:** Under Governor Jared Polis, the Colorado Department of Local Affairs’ Colorado Resilience Office (CRO) developed the [Colorado Resiliency Framework](#), a state resiliency plan with six priority areas. The Framework presents the State’s resiliency vision and goals and explores risks and vulnerabilities across four themes: adapting to our changing climate, understanding risks from natural and other hazards, addressing social inequities and unique community needs, and pursuing economic diversity and vibrancy. This vision has guided the design of community-level indicators and state-level indicators that are shared in [dashboards](#) and data visualization of these resilience metrics. A collaboration of organizations and the state also has developed the [Future Avoided Cost Explorer](#), an interactive explorer serving as a statewide study and new planning resource to guide local resilience planning and execution.
- ✓ New York:** It has enacted the [Climate Leadership and Community Protection Act](#) and the [Community Risk and Resiliency Act](#) to advance the state’s climate change strategies. In alignment with Article 7 of the UNFCCC Paris Agreement on Resilience Monitoring and Evaluation, New York is developing community-based climate resilience indicators and metrics as part of its [NYS Climate Leadership Coordinators](#) initiative. Sponsored by seven cross-sector state agencies and authorities, the New York [Climate Smart Communities](#) program provides Climate Leadership Coordinators to assist local governments in adopting appropriate resilience indicators and metrics as part of their vulnerability assessments and climate change adaptation and resilience plans. The New York team has identified 172 potential indicators and metrics. These measures can be used by local communities in visualization tools and incorporated into an online progress dashboard. Environmental justice communities and equity issues are given a special focus in the state’s work.

(45) Moser, Susanne. Resilience Metrics. [Accessed September 2021]

<https://resiliencemetrics.org> – A toolkit that offers approaches, tip sheets, resources and examples of how to develop targeted resilience metrics.

UNITED STATES CLIMATE ALLIANCE

- ✓ **Minnesota:** The state's Resilience & Adaptation Action Team (R&AT) was created under [EO 19-37](#), which established the Climate Change Subcabinet and the Governor's Advisory Council to promote coordinated climate change mitigation and resilience strategies in the state. Fifteen state agencies serve on the Subcabinet under which five action teams, including R&AT, identify climate strategies, policies and actions which will inform the state's overall strategy moving forward. R&AT has also established a resilience metrics working group with state agencies and the University of Minnesota that will be an important part of the implementation of resiliency strategies. Climate equity will also be an essential component of the Minnesota's mitigation and resiliency climate actions. The state's new website, [Our Minnesota Climate](#), provides updates on the work of the Climate Subcabinet and the Action Teams, and includes a preview summary of the state's efforts in building a meaningful platform for climate action in the document [Conversations and Ideas Lead to Bold Action](#). Minnesota is looking to make use of its highly successful [GreenStep Cities & Tribes Program](#) as a resource to connect communities to the strategies and actions that will be identified by the state. GreenStep Cities and Tribes is a voluntary challenge, assistance, and recognition program that helps local governments achieve their sustainability, mitigation, resilience and quality-of-life goals. The Minnesota Pollution Control Agency co-leads this program that was developed by cities, non-profit organizations, the University of Minnesota, businesses, and state government agencies in 2010. Steps 4 and 5 of the program include tracking basic resilience metrics in the categories of buildings and lighting, transportation, land use, environmental management, economy and community development.
- ✓ **California:** The California Governor's Office of Planning and Research oversees the [Integrated Climate Adaptation and Resiliency Program \(ICARP\)](#) which provides a cohesive and coordinated response to climate change impacts across the state. Through the enabling legislation, [SB 246](#), ICARP focuses on efforts that advance climate equity and support integrated climate strategies as well as strategies that benefit both greenhouse gas reductions and adaptation. Senate Bill 246 also established two driving components of ICARP: development of an [Adaptation Clearinghouse](#) and formation of a [Technical Advisory Council](#), or TAC. The Climate Resilience Metrics Workgroup is housed under the TAC and is working to develop a suite of climate resilience metrics that demonstrate the State's progress towards reducing risk and increasing climate resilience across California's interconnected natural, social-human and built systems.
- ✓ **Maine:** Led by the Maine Climate Council, an assembly of scientists, industry leaders, bipartisan local and state officials, and engaged citizens, the four-year-old state plan for climate action, '[Maine Won't Wait](#)', has eight broad strategy areas that focus on mitigation and adaptation. The state is developing resilience metrics, focusing initially on process metrics that are a smaller lift than outcome metrics. The plan outlines 11 key metric areas to evaluate progress toward climate adaptation and mitigation goals to inform policymakers at the local level and in the state legislature. It also centers equity in this approach since the Maine Climate Council Equity Subcommittee will recommend targeted goals and program metrics for key populations and groups, provide additional key equity outcome indicators, and program suggestions for Council consideration."

APPENDIX B:

Wayfinding the resilience playbook for varying levels of ambition & capacity.

Reflecting that states approach climate resilience from varying levels of capacity and ambition, this table presents multi-level opportunities for each playbook step that fall into three categories:

Level 1: Low-hanging fruit for states new to climate resilience.

Level 2: Mid-level opportunities for states that have begun their climate resilience journey but that may lack capacity.

Level 3: More advanced components for states with more mature resilience standing.

Resources for accomplishing opportunities have not been evaluated yet. Therefore, the resources for accomplishing a specific opportunity do not necessarily correspond to their level. For example, a Level 1 opportunity may require more resources than a Level 2 or Level 3 opportunity and vice versa. Also, states may be at a Level 3 for certain steps and a Level 1 for others. Additionally, states should formulate their responses to suit the different economies, populations, and livelihoods of their communities, in addition to aligning, for example, with their respective regulatory and organizational frameworks.

USCA Governors Climate Resilience Playbook Table

01. Assess your existing resilience programs and goals.

Level 1	<ul style="list-style-type: none"> ✓ Assess whether and to what extent your state has completed a climate resilience plan and/or a climate risk assessment that codifies guiding principles for the work. ✓ Consider whether hazard mitigation efforts include resilience, based on existing or future risks. ✓ Focus on addressing gaps by elevating and adapting existing programs to focus and enhance resilience efforts. ✓ Establish a center of gravity for this work: a dedicated group of experts or a central authority whose explicit responsibility is to move a resilience agenda forward. Various options include creating a resilience cabinet, designating a lead agency, or appointing a chief resilience officer.
Level 2	<ul style="list-style-type: none"> ✓ Ensure the resilience authority can work with and influence state agencies, local governments, and other stakeholders; possesses the capacity to coordinate and collaborate across departments and sectors; and possesses a clearly articulated mandate from the governor and strong leadership that makes state resilience a top priority and responsibility. ✓ Institutionalize representation to ensure that Black, Indigenous, and other people of color are equitably represented within organizations and justly compensated. ✓ Work with sub-state stakeholders to ensure alignment of regional and local resilience and hazard mitigation plans.
Level 3	<ul style="list-style-type: none"> ✓ Examine plans beyond their state, benchmark against other states and agencies and follow national, regional, and local resilience trends.

02. Make the case and set the tone in your state.

Level 1	<ul style="list-style-type: none"> ✓ Define a guiding vision for what resilience means in your state. Include how funding will be used and what expenditures will accomplish, such as reducing costs, saving lives, avoiding connectivity disruptions, stabilizing economies, modernizing infrastructure, and others that affect policy goals.
Level 2	<ul style="list-style-type: none"> ✓ Refine the value proposition of climate resilience and show the holistic value of resilience in your state. Articulate the amount of time, money, and lives that could be saved as well as the improved health outcomes, greater number of jobs, and improved overall well-being by being better prepared for climate impacts.
Level 3	<ul style="list-style-type: none"> ✓ Illuminate the potential return on investment of proactive action and ask the business community or other key leaders to set the tone by preparing an economic study that frames the long-term scale of the problem.

USCA Governors Climate Resilience Playbook Table

03. Center equity in your resilience agenda.

- | | |
|----------------|---|
| Level 1 | <ul style="list-style-type: none"> ✓ Conduct a climate risk and/or vulnerability assessment to study the distribution of climate impacts and determine any disproportionate harm across population segments and to gauge the exposure of community assets. Consider incorporating resilience metrics that account for disparities in community adaptive capacity, health outcomes, social vulnerability, etc. ✓ Issue statements of support or institutional initiatives in support of diversity, equity and inclusion, as well as environmental justice initiatives. ✓ Ensure state department leaders have diversity, equity, and inclusion trainings underway. ✓ Introduce state language that prioritizes community resilience and equity. |
| Level 2 | <ul style="list-style-type: none"> ✓ Set priorities for equitable treatment of resilience investment and embed these priorities as a key part of the resilience process. ✓ Enhance vulnerability assessments by focusing on determining the root causes of local disparities to better inform local policy decisions. ✓ Co-design planning, policy, and program solutions alongside community members so they own the outcomes and the process that gets them there. To do so, develop an equitable and participatory design process that bridges the spaces between engineers, planners, government officials, and community members, and encourage other organizations and leaders to do the same. ✓ Ensure planning agencies recognize the historic and systemic dispossession of land from Indigenous communities that continues to shape dispossession of Black, Indigenous, and Communities of Color. |
| Level 3 | <ul style="list-style-type: none"> ✓ Avoid the checkbox culture. Embed equity in any body of work across agency silos so leaders in every sector and level of government are grounded continually in equitable language and processes. Implement a follow-up and systems evaluation as well as greater connectivity, collaboration, and mutual support between communities and local decision makers. |

04. Develop good data.

- | | |
|----------------|--|
| Level 1 | <ul style="list-style-type: none"> ✓ Commit funding for data collection and administrative time. ✓ Collect and host necessary data to support resilience initiatives. |
| Level 2 | <ul style="list-style-type: none"> ✓ Develop partnerships with universities, nonprofits, and other networks to form a “brain trust” of climate experts to help identify and quantify risks. |
| Level 3 | <ul style="list-style-type: none"> ✓ Center equity in data collection and analysis by identifying frontline communities and valuing qualitative data informed by community input. |

USCA Governors Climate Resilience Playbook Table

05. Establish a System for Resilience Measurement.

- | | |
|----------------|--|
| Level 1 | <ul style="list-style-type: none"> ✓ Start somewhere and communicate what you are doing with others. ✓ Develop a clear, pragmatic vision for climate resilience that aligns with your state's priorities. Ensure that this vision reflects stakeholders' concerns, needs, and insights into what is most useful to them. |
| Level 2 | <ul style="list-style-type: none"> ✓ Convene the right people to engage, tie funding sources together, deduce co-benefits, reduce silos, solve problems, and create a collective sense of efficacy and achievement. ✓ Develop diverse metrics for all components of the resilience-building process. |
| Level 3 | <ul style="list-style-type: none"> ✓ Reevaluate progress of resilience metrics and realign strategy toward your state's resilience vision. |

06. Drive the shift from data and planning to implementation.

- | | |
|----------------|---|
| Level 1 | <ul style="list-style-type: none"> ✓ Identify common causes or multiple benefits that can generate support from champions across departments, agencies, businesses, nonprofits, and other groups so resources can be pooled and responsibilities shared. ✓ Work closely with the state emergency management agency to develop a hazard mitigation plan that maximizes potential benefits with clearly defined priorities, objectives, and specific tasks and actions to take. ✓ Weave carbon emission goals into resilience plans and resilience goals into mitigation plans. |
| Level 2 | <ul style="list-style-type: none"> ✓ Identify common causes or multiple benefits that can generate support from champions across departments, agencies, businesses, nonprofits, insurance agencies and other groups so resources can be pooled and responsibilities shared. ✓ Work closely with the state emergency management agency to develop a hazard mitigation plan that maximizes potential benefits with clearly defined priorities, objectives, and specific tasks and actions to take. ✓ Weave carbon emission goals into resilience plans and resilience goals into mitigation plans. |
| Level 3 | <ul style="list-style-type: none"> ✓ Consider convening on-the-ground staff, local government leaders, and other department stakeholders to discuss vulnerability and to inform investment decisions and further integration of resilience priorities across departments based on past performance. ✓ Create space to explore integrating and elevating mitigation and adaptation agendas simultaneously. For example, investing in natural or green infrastructure can further greenhouse gas mitigation goals as well as advance climate resilience agendas with benefits that complement hard or gray infrastructure systems, such as water and food security, public health and safety, and wildlife habitat. |

USCA Governors Climate Resilience Playbook Table

07. Identify and act on state-level opportunities to build momentum around resilience.

Level 1	<ul style="list-style-type: none"> ✓ Celebrate less 'visible' resilience achievements that deal with capacity building rather than 'ribbon cutting' enhancements.
Level 2	<ul style="list-style-type: none"> ✓ Set resilience standards and codes. ✓ Employ design standards and best practices for materials procurement and use, asset management, construction, bridge management systems, safety, etc. ✓ Establish insurance commissioners to create climate risk policies for the insurance sector.
Level 3	<ul style="list-style-type: none"> ✓ Clarify cost-benefit analysis requirements for proposed resilience-building activities to include full lifecycle accounting, anticipation of climate risks in discounting investment, inclusion of the value of ecosystem services, quantification of the public health and other benefits, and description of the cost of inaction, especially for rural and marginalized populations.

08. Incentivize and support local-level opportunities to build resilience.

Level 1	<ul style="list-style-type: none"> ✓ Recognize your state's role in bottom-up resilience momentum. ✓ Communicate the costs to states of local level inaction. In particular, if local governments' resilience needs are not fulfilled, the state will incur massive disaster costs. This financial exposure gives states and local governments great incentive to jump start local resilience agendas from an economic perspective as well. ✓ Establish sources of resilience funding. ✓ Offer technical assistance and climate risk data. ✓ Facilitate local knowledge transfer.
Level 2	<ul style="list-style-type: none"> ✓ Offer communication resources to build public support for resilience initiatives. ✓ Implement incentive programs. ✓ Condition local government access to state funding on the use of specific climate-risk scenarios to assess local needs. ✓ Provide access to best practice resources, model ordinances, and resilience and recovery checklists for communities to emulate and apply.
Level 3	<ul style="list-style-type: none"> ✓ Offer credit rating support for local borrowing from the municipal bond market. ✓ Develop guides and tools to help local governments address barriers to resilience action.

USCA Governors Climate Resilience Playbook Table

09. Be prepared for opportunities to expand resilience initiatives after disaster strikes.

Level 1	<p>✔ Leverage attention on the disruption of communications and educational opportunities that would affect focused events such as drought, heat, or flooding, and emphasize the importance of climate resilience concerning them.</p> <p>Plan ahead for shifting resources. Federal dollars and political and public support likely will shift in the wake of a disaster, providing opportunities for progress. This represents a unique opportunity to invest heavily in resilience measures and ensure that future disasters have less of an impact.</p>
Level 2	<p>✔ Emphasize planning ahead and adopting policies that direct smart recovery and rebuilding before a crisis:</p> <ul style="list-style-type: none">• Review state insurance and reinsurance practices and expedited permitting to support rapid rebuilding efforts after resilience shocks and align private financial incentives to state resilience objectives.• Plan ahead to apply reforms that address development in high-hazard areas and promote new resilient microgrids.• Maintain a project pipeline to be funded by FEMA, HUD, SBA or other sources while also seeking pre-event funds for these priority projects.• Keep in mind areas that, due to repetitive loss and predicted future impacts, should not be rebuilt after extreme events and, conversely, communities that are appropriate receiving communities.• Provide guidance and technical and financial support for pre-event, long-term recovery planning in particularly vulnerable communities.
Level 3	<p>✔ Commit to comprehensive solutions – measures that increase resilience and adaptive capacity long term – rather than short-term, temporary fixes. When natural disasters damage property and infrastructure, ensure that rebuilding efforts produce more resilient, economically viable, and environmentally responsible structures.</p>

10. Develop a federal resilience strategy.

Level 1

- ✓ Map which federal agencies have authority related to disasters/extreme climate events in your state and determine who in the state cabinet interacts with the primary federal departments working on resilience (DHS, FEMA, HUD, EPA, NOAA, Army Corps, etc.).
- ✓ Clarify which agencies lead various federal programs and implant them, and identify other partners that may help facilitate this action.
- ✓ Align state resources according to existing federal channels by using the unique partnerships between state agencies and federal departments as a leverage point and basis for communication.

Level 2

- ✓ **Join a coalition of governors to pursue common goals. As members of a coalition, consider this:**
 - Encourage the federal government to bring on a chief resilience officer.
 - Take a cohesive approach to enhancing state-level policy agendas.
 - Indicate that adaptation and resilience are as important for states as mitigation.
 - Press the federal government—legislative and executive branches, including federal departments and agencies—to increase more rapidly the funding available for resilience building.
 - Advocate for the federal government to improve crucial data resources and offer tools for more effective planning and project execution.

Level 3

- ✓ Provide ongoing information and input to the administration through semi-regular one-pagers, whether a formal request has been issued or not.
Engage with practitioners and subject-matter experts.
- ✓ Reflecting the Office of Intergovernmental Affairs' knowledge of federal programs, build relationships and work through the IGA as well as with budget examiners in the Office of Management and Budget (OMB).
- ✓ Hold Congress accountable for designing programs that deliver and perform, provide consistent feedback as you build these connections, and communicate the state experience in navigating federal programs, procedures, and processes.

APPENDIX C:

Organizations working with states to increase resilience.

United States Climate Alliance: The author of the US Climate Alliance Governors' Climate Resilience Playbook, this bipartisan coalition of governors is committed to achieving the goals of the Paris Agreement. Collectively, its member states represent 61% of the U.S. economy, 57% of the U.S. population, and 43% of U.S. emissions. Its members are committed to accelerating new and existing policies to reduce greenhouse gas emissions, building resilience to the impacts of climate change, and promoting clean energy deployment at the state and federal level, while centering equity, environmental justice, and a just economic transition in their efforts to achieve their climate goals and create high-quality jobs.

Several networks support state government resilience efforts.

These are institutions with whom USCA and its members collaborate:

- ♦ **American Flood Coalition:** This nonpartisan group of political, military, business, and local leaders drive adaptation to reflect the reality of higher seas, stronger storms, and more frequent flooding. The coalition seeks to advance national solutions that support flood-affected communities and protect our nation's residents, economy, and military installations.
- ♦ **Environmental Defense Fund (EDF):** With its mandate to "take on climate change and other grave threats by identifying what's most urgent and where we can make the most difference," EDF leverages science, economics, partnerships and advocacy to create change in the areas of climate, energy, ecosystems, oceans, and health. In particular, EDF works with global communities to "prepare them for the climate change impacts we can't avoid, while addressing the ones we can."
- ♦ **Georgetown Climate Center (GCC):** As part of the Georgetown University Law Center, the GCC seeks to "advance effective climate and energy policies in the United States and serves as a resource to state and local communities that are working to cut carbon pollution and prepare for climate change." The Adaptation Program at the GCC ranks among the nation's leading sources of practical strategies for preparing and responding to climate change impacts. The team "helps states and communities by providing legal and policy support to inform the development of adaptation strategies, while also sharing resources, lessons, and best practices widely to inform the broader field of adaptation planning and practice."
- ♦ **The Pew Charitable Trust:** This global nongovernmental organization strives to improve public policy, inform the public, and invigorate civic life. With a focus in five sector areas – communities, conservation, finance & economy, governing and health – it commits to generating research, providing technical assistance, and building relationships to advance powerful, positive change.
- ♦ **National Governors Association (NGA):** The NGA is the voice of the leaders of 55 states, territories, and commonwealths. Its teams work side by side with state leaders to identify challenges, help governors stay ahead of the curve and offer solutions before challenges become problems.
- ♦ **The Nature Conservancy (TNC):** This global environmental nonprofit works to create a world where people and nature can thrive. TNC tackles climate change through nature-based solutions, promoting smart clean energy policies, building resilience, and inspiring productive conversations.

APPENDIX D: Experts/Advisors

Throughout 2021, USCA's Climate Resilience Working Group contributed significant time and expertise to the Resilience Playbook and its framing. In July through September 2021, the USCA and their contractor met bilaterally and in focus groups with a dozen experts to inform the 2021 Resilience Playbook. We were particularly seeking insights related to resilience action and the federal/status nexus; social equity; metrics; and the efforts of other state member groups.

- ◆ **Kristin Baja**
Resilience Officer at the Urban Sustainability Directors Network
- ◆ **Ryan Colker**
Vice President of Innovation at the International Code Council and Executive Director at the Alliance for National and Community Resilience
- ◆ **Running-Grass**
Faculty member in the Urban Environmental Education Graduate Program at Antioch University, Seattle, Executive Director at Three Circles Center, and former Environmental Justice Program Manager at the Environmental Protection Agency
- ◆ **Stéphane Hallegatte**
Lead Economist of the Climate Change Group at the World Bank
- ◆ **Patty Hernandez**
Executive Director at Headwater Economics
- ◆ **Daniel Lauf**
Energy Program Director at the National Governors Association
- ◆ **Robert Lempert**
Director of the RAND Pardee Center for the Longer-Range Future
- ◆ **Laura Lightbody**
Flood Preparedness Project Director at the Pew Charitable Trusts
- ◆ **Samantha Medlock**
Senior Counsel at the House Select Committee on the Climate Crisis
- ◆ **Susanne Moser**
Director of Susanne Moser Research & Consulting and Affiliate Faculty of the University of Massachusetts-Amherst, Antioch University New England
- ◆ **Brian Para**
State Program Director of the American Flood Coalition
- ◆ **Mark Rupp**
Director of State-Federal Policy & Affairs, Ecosystems at the Environmental Defense Fund
- ◆ **Josh Sawislak**
Distinguished Senior Fellow at the Global Resilience Institute, and Senior Advisor at the American Flood Coalition
- ◆ **Laurie Schoeman**
National Director of Resilience and Disaster Recovery at Enterprise Community Partners & Co-Creator, Resilience 21 Coalition
- ◆ **Katie Spidalieri**
Senior Associate at the Georgetown Climate Center

APPENDIX E: Federal Resources

The federal government plays many key roles in the growth of climate resilience, including the provision of laws and executive orders, and technical assistance on climate science projections; providing grants to assess the vulnerability of infrastructure, such as highways and public transportation systems; responsibility for the resilience of federal assets etc. Federal grants, loans, loan guarantees, and other federally backed resources such as mortgage insurance and flood insurance help finance and protect critical investments. Federal regulations and guidance set minimum requirements and provide information to guide government decision-making and use of federal dollars. And federally generated data inform project planning and execution. The intent of this Appendix is to provide state leaders with an overview of federal programs and positions so that states may more effectively navigate and leverage Federal opportunities to build climate resilience.

Presidential Executive Orders

The Biden Administration's '[30 by 30' U.S. lands and oceans climate goal](#) may offer opportunities to fund state resilience efforts. As part of the goal, The Administration would work with "state, local, tribal, and territorial governments, agricultural and forest landowners, fishermen, and other key stakeholders" to protect 30 % of U.S. lands and ocean territories by 2030.

The Biden Administration's January 2021 EO on [Tackling the Climate Crisis at Home and Abroad](#) establishes a whole-of-government approach to addressing the climate crises. While mitigation-focused, the EO also has a commitment to delivering environmental justice in communities all across America and emphasizes assessment, disclosure and mitigation of climate-related risks in every sector of the economy. The EO also creates an environmental justice council and orders directed federal departments and agencies to look for ways to address social equity.

The Biden Administration also has a focus on distributing federal resources for social equity benefits in the **EO Advancing Racial Equity and Support for Underserved Communities**, which prioritizes a "comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality" in federal government programs, delivering 40 percent of climate investment benefits to disadvantaged communities, referred to as [Justice40](#). As this text was going to press, the Biden Administration released the [climate adaptation and resilience plans](#) for more than 20 federal agencies as well as a commitment to [improving the accessibility of climate information and decision tools](#) to individuals and communities facing intensifying climate impacts.

International Agreements

The US has rejoined the Paris Agreement, reinstating America as a leader [in domestic and international climate action](#) by committing to both decrease global greenhouse gas emissions and boost climate resilience in our communities.

Federal Financial Disclosure Requirements

Several federal agencies are increasing requirements for climate risk disclosure, including Treasury⁴⁶, the Federal Reserve⁴⁷, the Federal Housing Finance Agency, the Securities and Exchange Commission and the Commodity Future Trading Commission, which has a [Climate Risk Unit](#) and a related [report](#), Managing Climate Risk in the U.S. Financial System.

Federal Data & Tools

Data.gov, Climate [Accessed September 2021]
<https://www.data.gov/climate/>

U.S. Climate Resilience Toolkit, Meet the Challenges of a Changing Climate [Accessed September 2021]
<https://toolkit.climate.gov>

National Climate Assessment, Climate Change Impacts in United States [Accessed September 2021]
<https://nca2014.globalchange.gov>

U.S Department of Homeland Security FEMA, Flood MAPs [Accessed September 2021]
<https://www.fema.gov/flood-ma>

Climate Program Office, Regional Integrated Sciences and Assessments Program [Accessed September 2021]
<https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA/About-RISA>

House Select Committee on Climate Crisis, Solving the Climate Crisis [Accessed September 2021]
<https://climatecrisis.house.gov/tracker>

(46) U.S. Department of the Treasury, Treasury Launches New Effort on Climate-Related Financial Risks in the Insurance Sector August 31, 2021. [Accessed September 2021]
<https://home.treasury.gov/news/press-releases/jy0337>

(47) Board of Governors of the Federal Reserve System, Climate Change and Financial Stability, March 2021. [Accessed September 2021]
<https://www.federalreserve.gov/econres/notes/feds-notes/climate-change-and-financial-stability-20210319.htm>

Federal Funding

EU-USCA CLIMATE RISK AND RESILIENCE COOPERATION/ CLIMATE FINANCE ADVISORS, BENEFIT LLC

(Database continually updated)

As climate resilience becomes increasingly critical for states to invest in, the number of funds that provide monetary and technical assistance is growing rapidly. Climate Finance Advisors, BLLC (CFA) tracks federal funds that are useful for actors at various jurisdictional levels (states, local governments, tribes, etc.) on an ongoing basis. Below is a snapshot as of September 29, 2021, which draws upon work conducted and prepared under the [EU-USCA Climate Risk and Resilience Cooperation](#) supported by the European Union and the U.S. Climate Alliance. It also draws from the [Connecticut Financing and Funding Adaptation and Resilience Working Group](#) report appendix of federal funding resources. Below is a snapshot as of September 29, 2021.

Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Building Resilient Infrastructure and Communities (BRIC)	<p>Building Resilient Infrastructure and Communities (BRIC) supports states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards.</p> <p>The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.</p>	FEMA	<p>Up to 6% annual set aside from post disaster grant funding. State, territory and tribal set-asides and national competition for balance, large and small grants. \$919M expected in FY21, up from \$500M in round 1 (FY20). Up to \$1M award per applicant for capability and capacity-building efforts and \$500k for mitigation-related activities.</p> <p>https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities/before-apply</p>	10% to 25%	https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities
Flood Mitigation Assistance (FMA)	The Flood Mitigation Assistance Program is a competitive grant program that provides funding to states, local communities, federally recognized tribes and territories. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program	FEMA	<p>\$160 million total in FY21, \$4 million for Project Scoping or \$600,000 for Sub-applicant for Community scale projects and relocations \$70 million for Community Flood Mitigation Projects (\$30 million per project cap) \$86 million for Technical Assistance, Flood Hazard Mitigation Planning and Individual Flood Mitigation Projects. Up to \$1M per applicant.</p> <p>https://www.fema.gov/fact-sheet/notice-funding-opportunity-fiscal-year-2021-building-resilient-infrastructure-and</p>	0%-Severe Repetitive Loss 10%-Repetitive Loss 25%-Hazard Mitigation Assistance	https://www.fema.gov/grants/mitigation/floods

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Hazard Mitigation Grant Program (HMGP) - Section 404	FEMA's Hazard Mitigation Grant Program provides funding to state, local, tribal and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.	FEMA	Allocated using a "sliding scale" formula based on the percentage of funds spent on FEMA Public Assistance and Individual Assistance for each Presidentially declared disaster. The formula provides up to 15% of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10% for amounts between \$2 billion and \$10 billion, and 7.5% for amounts between \$10 billion and \$35.333 billion. In FY21 \$3.46 billion is available through HMGP.	25%	https://www.fema.gov/grants/mitigation/hazard-mitigation
Community Development Block Grant (CDBG) Disaster Recovery	The Emergency Coastal Resilience Fund was established to increase the resilience of coastal communities located within federally declared disaster areas impacted by hurricanes Florence and Michael, Typhoon Yutu and wildfires in 2018. The fund supports conservation projects that strengthen natural systems at a scale that will protect coastal communities from the future impacts of storms, floods and other natural hazards.	HUD	\$4.0B appropriated in two separate congressional acts in FY2019. No appropriation yet for FY2020 or 2021. Loans \$2-4M. Administered at the state level. https://www.dca.ga.gov/sites/default/files/cdbd-dr_multifamily_final_0.pdf Grants for Community Resilience Plans and Mitigation. https://files.hudexchange.info/resources/documents/CDBG-Disaster-Recovery-Overview.pdf	N/A	https://www.hudexchange.info/programs/cdbg-dr/
High Hazard Potential Dams Grant	FEMA's Rehabilitation of High Hazard Potential Dams (HHPD) grant program provides technical, planning, design, and construction assistance for eligible rehabilitation activities that reduce dam risk and increase community preparedness.	FEMA	\$12 million total appropriated in FY21.	35% (may be in-kind)	https://www.fema.gov/emergency-managers/risk-management/dam-safety/grants/resources
Clean Water State Revolving Fund (CWSRF)	The Clean Water State Revolving Fund (CWSRF) program is a federal-state partnership that provides communities low-cost financing for a wide range of water quality infrastructure projects.	U.S. EPA	Small to large loans, \$158 million was largest loan in 2019. Average loan agreement is about \$3M - https://upload.wikimedia.org/wikipedia/commons/e/e9/Clean_Water_SRF-poster_EPA-2020.png	Repayment starts 12 months after construction, can match with FEMA and USDA	https://www.epa.gov/cwsrf

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Emergency Coastal Resilience Fund	FEMA's Hazard Mitigation Grant Program provides funding to state, local, tribal and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster.	NOAA, NFWF	\$31 million FY20. No maximum, but \$2 million restoration average cap. Grant amt calculated based on past averages https://www.nfwf.org/sites/default/files/2020-11/ecrf-program-fact-sheet.pdf	A 1:1 non-federal match in cash and/or in-kind services is strongly encouraged, and projects providing match will be more competitive	https://www.nfwf.org/programs/emergency-coastal-resilience-fund
The Environmental Justice Collaborative Problem-Solving (CPS) Cooperative Agreement Program	EPA's EJ Collaborative Problem-Solving Cooperative Agreement Program provides funding for eligible applicants for projects that address local environmental and public health issues within an affected community. The CPS Program assists recipients in building collaborative partnerships to help them understand and address environmental and public health concerns in their communities.	U.S. EPA	FY21 RFP for \$9.2 million total pool (\$3.2 million + \$6 million), \$200,000 each for 46 projects.	N/A	https://www.epa.gov/environmental-justice/environmental-justice-collaborative-problem-solving-cooperative-agreement-0
Environmental Justice Small Grants Program	EPA's EJ Small Grants Program supports and empowers communities working on solutions to local environmental and public health issues. The program is designed to help communities understand and address exposure to multiple environmental harms and risks.	U.S. EPA	\$7.3 million total for FY21 RFP, up to \$75,000 for each project (total projects expected to be 100).	Not Mentioned	https://www.epa.gov/environmental-justice/environmental-justice-small-grants-program
The State Environmental Justice Cooperative Agreement Program (SEJCA)	EPA's State Environmental Justice Cooperative Agreement Program provides funding to eligible applicants to support and/or create model state activities that lead to measurable environmental or public health results in communities disproportionately burdened by environmental harms and risks. These models should leverage or utilize existing resources or assets of state agencies to develop key tools and processes that integrate environmental justice considerations into state governments and government programs.	U.S. EPA	\$200,000 grants, 5 in number.	No	https://www.epa.gov/environmental-justice/state-environmental-justice-cooperative-agreement-program

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Regional Resiliency Assessment Program (RRAP)	The Regional Resiliency Assessment Program (RRAP) is a voluntary, cooperative assessment of specific critical infrastructure that identifies a range of security and resilience issues that could have regionally or nationally significant consequences. The goal of the RRAP is to generate greater understanding and action among public and private sector partners to improve the resilience of a region's critical infrastructure.	DHS	N/A	Not Mentioned	https://www.cisa.gov/regional-resiliency-assessment-program
Water Infrastructure Finance Act (WIFIA)	A federal credit program administered by EPA for eligible water and wastewater infrastructure projects.	U.S. EPA	\$20 million limit for large communities, \$5 million limit for small communities.	WIFIA can fund a maximum of 49% of the project costs, max of 80% can come from federal sources.	https://www.epa.gov/wifia
Land and Water Conservation Fund (LWCF)	LWCF was created to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities to all Americans. The LWCF program can be divided into the "State Side" which provides grants to State and local governments, and the "Federal Side" which is used to acquire lands, waters, and interests therein necessary to achieve the natural, cultural, wildlife, and recreation management objectives of federal land management agencies.	National Park Service	The Great American Outdoors Act, signed into law in September 2020, established permanent funding of \$900M/year for LWCF. https://www.nps.gov/subjects/legal/great-american-outdoors-act.htm	N/A	https://www.nps.gov/subjects/lwcf/index.htm
Water Resources Development Act	WRDA 2020 includes key provisions to invest in ports, harbors and inland waterways; build more resilient communities; and ensure that the U.S. Army Corps of Engineers carries out projects in an economically and environmentally responsible manner.	USACE	When merged with prior enacted language from the CARES Act, WRDA 2020 will provide for increasing annual expenditures – up to over \$3 billion – for port & harbor maintenance. Separate (unspecified) funding is available for inland waterways. Tribal Partnership Program per project limit is \$18.5 million.	N/A	https://transportation.house.gov/committee-activity/issue/water-resources-development-act-of-2020

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Community Development Block Grant Mitigation (CDBG-MIT)	The Community Development Block Grant Mitigation (CDBG-MIT) Program is a unique and significant opportunity for eligible grantees to use this assistance in areas impacted by recent disasters to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses.	HUD	\$16 billion total worth of funds allocated in last appropriation in FY18. \$8.29B was allocated to Puerto Rico in a special appropriation in January 2020.	Not Mentioned	https://www.hudexchange.info/programs/cdbg-mit/
Weatherization Assistance Program (WAP)	The U.S. Department of Energy (DOE) Weatherization Assistance Program reduces energy costs for low-income households by increasing the energy efficiency of their homes, while ensuring their health and safety. The program supports 8,500 jobs and provides weatherization services to approximately 35,000 homes every year using DOE funds.	DOE	FY2021 appropriations for WAP are \$310 million, plus \$5 million for training and technical assistance. Administered at the state level. The FY2021 Consolidated Appropriations Act (P.L 116-260) also included legislative language reauthorizing WAP through FY2025. Grantees may use up to 15% of their grant to undertake leveraging activities which may provide additional funding or other resources to supplement Weatherization or be used to run a parallel Program. Link to application instructions: https://www.energy.gov/sites/default/files/2021/02/f82/2021-application-instructions_v2.pdf	N/A	https://www.energy.gov/eere/wap/weatherization-assistance-program
RAISE Discretionary Grants	RAISE provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve national objectives. The Department will prioritize projects that can demonstrate improvements to racial equity, reduce impacts of climate change and create good-paying jobs.	Department of Transportation	Total pool of \$1 billion. For this round of RAISE grants, the maximum grant award is \$25 million, and no more than \$100 million can be awarded to a single State, as specified in the appropriations act. Up to \$30 million will be awarded to planning grants, including at least \$10 million to Areas of Persistent Poverty.	Not Mentioned	https://www.transportation.gov/RAISEgrants
Hazard Mitigation Grant Program Post Fire	FEMA's Hazard Mitigation Grant Program (HMGP) has Post Fire assistance available to help communities implement hazard mitigation measures after wildfire disasters.	FEMA	Calculated on a case-by-case basis.	25%	https://www.fema.gov/assistance/public/fire-management-assistance

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Climate Program Office	CPO supports competitive research through four major program areas: Earth System Science and Modeling (ESSM); Climate and Societal Interactions (CSI); Communication, Education and Engagement (CEE); and the National Integrated Drought Information System (NIDIS).	NOAA	Approximately \$15 million total. Most awards will be at a funding level between \$50,000 and \$300,000 per year.	Not Mentioned	https://cpo.noaa.gov/Funding-Opportunities/2022-Notice-of-Funding-Opportunity
Public Assistance Program - Section 406	The mission of the Public Assistance (PA) Program is to provide assistance to State, local, Territorial, or Tribal, and local (SLTT) governments, and certain types of private nonprofit (PNP) organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. Through the PA Program, FEMA provides supplemental Federal grant assistance for debris removal, emergency protective measures, and the restoration of disaster-damaged, publicly owned facilities and specific facilities of certain PNP organizations.	FEMA	For large permanent work projects using Section 428 PA Alternative Procedures, funding is made on the basis of a fixed-cost estimate agreed upon by the applicant, recipient and FEMA. For small projects, the minimum amount is \$3,300, with a cap of \$131,000.	Up to 25%, reduced to 10% in some instances	https://www.fema.gov/sites/default/files/documents/fema_pap-pg-v4-updated-links_policy_6-1-2020.pdf
Coastal Resilience Grants	The NOAA Coastal Resilience Grants program, jointly administered by NOAA's National Ocean Service and NOAA Fisheries, implements projects that build resilient U.S. coastal communities and ecosystems. This program is intended to build resilience through projects that conserve and restore sustainable ecosystem processes and functions and reduce the vulnerability of coastal communities and infrastructure from the impacts of extreme weather events, climate hazards, and changing ocean conditions.	NOAA	No explicit cap, but judging by past projects, most range in size from \$190k to \$1.6M. \$9M grant pool in FY2018. https://www.fisheries.noaa.gov/national/habitat-conservation/current-and-past-resilience-projects	50% (2:1 federal: local match)	https://www.fisheries.noaa.gov/grant/noaa-coastal-resilience-grants

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Coastal and Marine Habitat Restoration Grants	NOAA's Restoration Center recognizes that habitat protection and restoration are essential elements of a strategy for sustainable commercial and recreational fisheries. Investing in habitat restoration projects leads to real, lasting differences for communities, businesses, and the environment. The Community-based Restoration Program supports restoration projects that use a habitat-based approach to rebuild productive and sustainable fisheries, contribute to the recovery and conservation of protected resources, promote healthy ecosystems, and yield community and economic benefits.	NOAA	Award amount \$75k to \$3M for 1-3 years https://www.fisheries.noaa.gov/grant/coastal-and-marine-habitat-restoration-grants	Not required, but 50% match recommended	https://www.fisheries.noaa.gov/grant/coastal-and-marine-habitat-restoration-grants
Section 103 Hurricane and Storm Damage Reduction	The Continuing Authorities Program (CAP) authorizes USACE to plan, design and construct small scale projects under existing program authority from Congress. Local governments and agencies seeking assistance may request USACE to investigate potential water resource issues that may fit a particular authority. A CAP project is conducted in two phases: a feasibility phase and a design and implementation phase. Both phases of a CAP project are cost-shared between the federal government and the non-federal sponsor.	USACE	Maximum Federal Cost for planning, design and construction of any single project is \$10 million. Feasibility study is 100% funded up to \$100k. Costs over \$100k are 50/50.	0% (Feasibility Study - fully funded), 65% (Final Design and Construction)	https://www.saj.usace.army.mil/Sect103HurricaneandStormDamageReduction/
Section 204 Ecosystem Restoration in Connection with Dredging	Section 204 of the Water Resources Development Act of 1992 provides authority for the Corps of Engineers to plan, design and build projects to protect, restore and create aquatic and ecologically related habitats in connection with dredging of authorized Federal navigation projects.	USACE	\$10 million maximum per project.	0% (Feasibility Study - fully funded), 65% (Final Design and Construction)	https://www.nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program/Section-204/

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Funding Mechanism or Program Name	Brief Description	Administering Body	Funding Range	Required Match % (0-100)	Link to Overview
Section 205 Flood Damage Reduction	Section 205 of the 1948 Flood Control Act authorizes the Corps of Engineers to plan, design, and construct structural and non-structural flood control projects in partnership with non-Federal government agencies, such as cities, counties, special authorities, or units of state government. Projects are planned and designed under this authority to provide the same complete flood risk management project that would be provided under specific congressional authorizations.	USACE	Maximum Federal Cost for planning, design and construction of any single project is \$10 million. Feasibility study is 100% funded up to \$100k. Costs over \$100k are 50/50.	0% (Feasibility Study - fully funded), 65% (Final Design and Construction)	https://www.sas.usace.army.mil/Missions/CAP/Section-205-Flood-Damage-Reduction/
Safeguarding Tomorrow through Ongoing Risk Mitigation (STORM) Act	The STORM act will provide capitalization grants to states to establish revolving loan funds for projects designed to reduce risks from disaster, natural hazards and other related environmental harm.	FEMA	Upto \$5 million per project.	Repayment terms up to 20 years after project completion, or up to 30 years for projects benefiting low-income geographies.	https://www.congress.gov/bill/116th-congress/senate-bill/3418/all-info

(46) U.S. Department of the Treasury, Treasury Launches New Effort on Climate-Related Financial Risks in the Insurance Sector August 31, 2021. [Accessed September 2021] <https://home.treasury.gov/news/press-releases/jy0337>

(47) Board of Governors of the Federal Reserve System, Climate Change and Financial Stability, March 2021. [Accessed September 2021] <https://www.federalreserve.gov/econres/notes/feds-notes/climate-change-and-financial-stability-20210319.htm>

APPENDIX F: Funding Mechanisms

State governments have access to many funding mechanisms⁴⁸ to further resilience progress. To supplement federal, state, philanthropic and institutional grants, these are several mechanisms available to leverage debt, seek innovative sources of revenue, engage the private sector, and mitigate risk.

Leverage debt to grow funding and finance.

- ✔ **General Obligation Bonds:** Common municipal bond structure issued by a local government (secured by an income or carbon tax) to finance major infrastructure and other resilience investments that provide long-term public benefits. Bonds are sold to investors by municipalities (or states) and secured by the available revenue streams (taxes). Low transaction costs, relatively well understood, does not require new legislation.
- ✔ **Revenue Bonds:** Similar to general obligation bonds except the revenue source backing the bond and paying the debt service is the project being financed. For example, a highway can be financed with a revenue bond if tolls collected are used as debt service.
- ✔ **Green Bonds:** Loan for a fixed period, structured as a revenue bond, that goes toward environmental projects and often associated with tax incentives. Traditionally very infrastructure-centric and less useful to further more holistic, human-centric resilience efforts. Historically, they have been used to raise capital for specific clean power, carbon-reducing projects. However, green bonds increasingly are used to finance non-carbon projects including stormwater management, transportation, land use projects, and waste management, among others. More appealing than bank loans, they offer longer maturity periods, third-party credit enhancement and more flexible covenants. When issued by government entities, they are tax-exempt.
- ✔ **Resilience Bonds:** An experimental finance mechanism not yet in the marketplace, they are a variation of catastrophe bonds that link insurance and resilience projects to monetize avoided losses (reduction of insurance claims). The resulting risk-reduction “resilience rebates” can be a source of predictable funding for insurance policyholders to invest in as a means to finance resilience projects
- ✔ **Catastrophe Bonds:** Catastrophe bonds provide a means to manage financial risk associated with extreme natural disasters and, essentially, are a form of insurance and triggered when disaster strikes. When a disaster (hurricane, storm surge, flood, earthquake, etc.) reaches a given threshold (monetary losses or another quantifiable indicator) within the bond term (typically 3-5 years), the insurance purchaser keeps a certain amount of the bond to pay off losses and the investor loses some or all of their investment. Attractive to investors because 1) they are not associated with other financial risks and 2) provide attractive rates of return and become more valuable investments when the estimate of financial loss due to a natural hazard goes down. They are now regularly used by government-sponsored insurance programs, including the California Earthquake Authority, Florida Citizens Property Insurance, Louisiana Citizens Insurance, Amtrak, and the Texas Windstorm Insurance Association.

Generate revenue specifically for resilience.

- ✔ **Utility Rates:** A traditional approach to generating revenue is to tap utility revenues by adjusting rates, although the use of these funds is restricted to actions consistent with the utility’s purpose. With electric utilities, this can be done through rate-setting decisions by state regulators. Stormwater utilities around the US have been raising rates to pay for flood-prevention improvements. An advantage of using bonds and utility rates is that they spread the costs across very large numbers of payers, which allows the increases to be minimized. But this spread also means that the benefits of resilience building that may be realized are not tied to the costs that one will pay.

(48) For one list of funding strategies, see Jesse Keenan’s “Climate Adaptation Finance and Investment in California” available at http://opr.ca.gov/docs/20181106-Keenan_Climate_Adaptation_Finance_and_Investment_in_California_2018.pdf [Accessed September 2021].

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- ❖ **Insurance Surcharges:** In 2019, Rebuild By Design (RBD) produced a report, “Resilient Infrastructure for New York State,” that identified two options for raising revenue to strengthen climate resilience infrastructure statewide without taking money from existing transportation, environmental, or infrastructure funding. One option – a bond that voters must approve – could provide billions of dollars. But, RBD noted, it would be a one-time and non-recurring source of revenue. The other option was to create a surcharge on property-casualty insurance, which at 2% could generate \$17.6 billion over 10 years. RBD argued that a surcharge would be “progressive” because higher-income people insure more expensive items. Gov Andrew Cuomo chose to go with a bond issue.⁵⁰
- ❖ **Carbon Pricing:** The energy sector is another potential target. California invests in resilience with funds obtained from the carbon-pricing market it uses to reduce carbon emissions. In 2019, the state’s cap-and-trade auctions generated more than \$2 billion that was appropriated by the legislature. Investments included:
 - \$2 million for coastal resilience planning.
 - \$10 million for community fire planning and preparedness.
 - \$85 million for fire prevention.
 - \$100 million for resilience drinking water systems.
 - \$2 million for resilience planning in the San Francisco Bay area.
- ❖ **Dedicated Tax Revenue:** Revenue Funding can be sourced from property taxes, sales taxes, resilience special districts, or tax increment financing.

The Georgia Outdoor Stewardship Act became effective in July 2019²⁹ after the General Assembly’s House bill amending the state constitution passed with 83% of voters supporting the amendment. The act dedicates a portion of existing sales and use tax on outdoor sporting goods to support clean water and land acquisition projects that increase resilience across the state. The Trust for Public Land partnered with state and local leaders to design and pass the conservation ballot measure.³⁰
- ❖ **Tourism and Recreation Fees:** Revenue collected by assessing small fees for voluntary programs such as paying for parking tickets online, registering for recreation programs, creating a property tax account, etc. Municipalities can use fees to increase revenue available for sustainability- and resilience-focused projects.

Explore and incentivize private investment.

- ❖ **Environmental/ Social Impact Bonds:** Pay-for-success approach that transfers risk. Performance-based contract privately financed. Financiers paid back by public entity if pre-established metrics are met.
- ❖ **Public Private Partnerships:** Designed to leverage additional capacity and financing for delivery of infrastructure projects while also increasing stakeholder engagement in project delivery. Can be used to bring private expertise and capital to the design, financing, construction, operation and/maintenance of a publicly owned asset. Regional example: Chesapeake Bay Watershed CBP3. Many require enabling legislation.
- ❖ **Trading schemes:** Includes offsets in which developers can manage stormwater on another property to meet regulations or trading; developers or agencies can purchase credits on a market. Private funding, private property.
- ❖ **Infrastructure Bank:** Used to coordinate infrastructure development and investment during recovery and beyond. Serves to centralize a state’s infrastructure planning to maximize funding efficiency rather than making funding decisions on a project-by-project basis. The bank combines federal disaster relief funds and state funds and can leverage those funds to encourage private investments to finance resiliency improvements to the state’s infrastructure.

Incentivize action and mitigate risk.

- ✓ **Insurance of Tax Incentives:** Used to lower premiums for resilient building or exclude from taxable income qualified disaster mitigation payments. "Qualified disaster mitigation payment" is any amount paid under the Stafford Act or the National Flood Insurance Act (NFIA) to a property owner for hazard mitigation for the property. An opportunity exists to expand this definition to include more holistic project goals (not just avoided property damage from disaster) by creating "resilience retrofit tax credits," which are state tax credits that could trigger federal tax relief as well as incentivize policy change. Consider the [Department of Energy's Database of state incentives for Renewables and Efficiency](#).
- ✓ **Insurance Pooling:** Through catastrophe risk pools, sectors and regions can pool risk in a diversified portfolio, retain some of the risk through joint reserve and capital, and transfer excess risk to the reinsurance and capital market. Since it is unlikely that all regions will be hit by a major disaster within the same year, the diversification creates a more stable and less capital-intensive portfolio that is cheaper to insure. Insurance pools by sector exist throughout the United States for wind damage, wildfire, and agriculture

UNITED STATES CLIMATE ALLIANCE

The Alliance was formed in 2017 to help fill the void left by the previous administration's decision to withdraw the U.S. from the Paris Agreement. Governors in the Alliance commit to collectively reduce greenhouse gas emissions by at least 26-28 percent below 2005 levels by 2025 and at least 50-52% below 2005 levels by 2030, and collectively achieve overall net-zero GHG emissions as soon as practicable and no later than 2050.

Together, Alliance states have built a foundation of ambitious climate action that provides a durable roadmap for national policy makers and the Biden administration. The Alliance is also forging a new state-federal partnership and its states will continue to play an integral role in helping the U.S. achieve its climate goals and advance a clean energy transition while supporting impacted workers and communities.

Alliance states have shown in recent years that bold climate action can help drive economic growth across multiple industries. In fact, between 2005 to 2018, Alliance states collectively outpaced the rest of the country in both emissions reductions and economic output, achieving an estimated 14 percent decrease in emissions and a nearly 17 percent increase in per-capita economic output. These trends held in 2019 and the Alliance's recent analysis showed that its member states created more than 133,000 new jobs in clean energy industries from 2016 to 2019 – surpassing the rest of the nation – as they pursued bold climate action. Even in the face of the devastating impacts from the coronavirus pandemic and the resulting economic downturn over the past year, state-led climate action continues.



**Climate
Resilience
Consulting**

Climate Resilience Consulting exists to create a world with more lives saved and livelihoods enhanced in the face of climate change disruption, especially for those facing disproportionate risks to hazards. Our mission is to enable communities, governments and stakeholders to be proactive, to adapt to meet the global challenge of climate change. We work with clients to create practical solutions that enhance markets and communities through resilience to climate change.

<https://www.climate resilience consulting.com/>

Gardner, Camilla, Coffee, Joyce and Phillips, Jennifer. October, 2021 "United States Climate Alliance Governors Resilience Playbook," <http://www.usclimatealliance.org/>