

# NATIONAL CLIMATE RESILIENCE FRAMEWORK

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# Introduction

*“Throughout our history, we’re the only nation in the world that has come out of every crisis we’ve entered stronger than we went into it. We’re doing it again here on the climate crisis.”* —President Biden, June 19, 2023

Across America, climate change is accelerating the frequency and fueling the severity of extreme weather events—resulting in tragedies and new realities that once seemed unimaginable. One hundred million Americans have been personally affected by an extreme weather event over the past two years.<sup>1</sup> Communities are enduring historic and catastrophic flooding, wildfires, extreme heat, drought, and more, while longer-term changes in temperature affect ecosystems and the economies that depend on them. The intensifying impacts of climate change are costing lives, disrupting livelihoods, and causing billions of dollars in damages.<sup>2</sup>

In the face of these perils, Americans are not standing idle; they are rising to confront the risks and challenges of climate change in extraordinary and inspiring ways. Communities are restoring natural infrastructure, such as marshes and wetlands, to defend against flooding; installing solar panels and battery storage to limit the strain on the grid and function as back-up power; and integrating Indigenous Knowledge to improve forestry practices that will reduce the likelihood of catastrophic wildfires. These are the types of locally tailored and community-driven solutions that are at the center of the Biden-Harris Administration’s climate resilience strategy—and that are essential to building a climate resilient nation.

The Administration has taken historic steps to provide the Federal support, resources, and investments needed to help America’s communities meet the climate challenges of today—and prepare for the climate stressors of tomorrow. In his first week in office, President Biden signed [Executive Order 14008](#), Tackling the Climate Crisis at Home and Abroad, mobilizing the first-ever, whole-of-government approach to address climate change. Under the President’s direction, every Federal department and agency is focused on strengthening the Nation’s climate resilience, including by tightening flood risk standards, strengthening building codes, scaling technology solutions, protecting and restoring our lands and waters, and integrating nature-based solutions.

At the center of this work is President Biden’s Investing in America agenda – the largest investment in clean energy and climate action in history. The Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) dedicate more than \$50 billion to advance climate resilience strategies in every community in America now, while also slashing greenhouse gas emissions to reduce climate impacts in the future. Because of these signature laws, roads and bridges are being elevated above projected flood zones; the grid is being made cleaner, more flexible, and more reliable; coastal ecosystems are being restored to buffer the impacts of hurricanes; Federal firefighters are getting a boost in pay; housing and buildings are being constructed and retrofitted to better withstand extreme weather; and public lands, forests, and

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<sup>1</sup> [FACT SHEET: Biden-Harris Administration Makes Historic Investments to Build Community Climate Resilience | The White House](#)

<sup>2</sup> [Who will pay for the damage caused by climate change? - BBC Future](#); [Billion-Dollar Weather and Climate Disasters | National Centers for Environmental Information \(NCEI\) \(noaa.gov\)](#)



waters are being managed to mitigate and withstand wildfires and droughts. These Federal investments have also emboldened the private sector to mobilize capital and investments in innovation.

In delivering these transformational investments and driving much-needed policy changes, the Administration is laser-focused on ensuring that no community is left behind. The Administration recognizes that not only are the risks and impacts of climate change disproportionately concentrated in low-income communities and communities of color, as well as in Tribal Nations, but that these communities often face a steeper road to recovery when disaster strikes. To protect all communities in harm's way, the Administration has placed environmental and economic justice at the center of its climate resilience agenda. [Executive Order 14096](#), "Revitalizing Our Nation's Commitment to Environmental Justice for All," which President Biden signed on April 21, 2023, directs every Federal agency to advance environmental justice for all, including work to better protect communities with environmental justice concerns from the increasing impacts of climate change. It is also vital that the Administration is implementing the historic Justice40 Initiative, which set the goal that 40 percent of the overall benefits of certain Federal investments in climate and other key areas flow to disadvantaged communities. Many of the investments in climate resilience discussed in this Framework are Justice40 covered programs.<sup>3</sup> These investments are already resulting in stronger protections from floods, fires, heat, storms, drought, and other climate-related impacts in neighborhoods across America.

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<sup>3</sup> For the most current list of Justice40 covered programs, see [Justice40 Initiative | Environmental Justice | The White House](#). For additional information on agency-specific Justice40 work, see Phase One of the [Environmental Justice Scorecard \(geoplatform.gov\)](#), release April 2023, pursuant to Executive 14008.



# A National Climate Resilience Framework

Although our nation is moving quickly to address the projected risks and impacts of climate change, there is far more work to do in the years ahead. To guide this work, in [June 2023](#) President Biden directed the creation of a first-ever National Climate Resilience Framework to identify key values, priorities, and objectives to help expand and accelerate nationally-comprehensive, locally-tailored, and community-driven resilience strategies.

This National Climate Resilience Framework (“the Framework”) makes clear that building a climate-resilient nation will require an all-hands-on-deck effort across all levels of government (State, local, Tribal, and territorial), leaders of all political backgrounds, and the wide range of philanthropic, non-profit, academic, and private sector institutions. The U.S. Government will and must serve as an active, flexible, coordinated, and committed partner with these entities in helping design and implement resilience strategies that meet the vision and needs of every community. In order to serve in this partner role, the Federal Government will need to have a continued focus on reforming and modernizing Federal programs and policies in ways that strengthen climate resilience – for example, embedding environmental justice into the DNA of Federal departments and agencies, or doubling down on making science, resources, and technologies accessible to everyone. The U.S. Government must also center effective Tribal consultation, respect for sacred sites, and recognition of Tribal sovereignty as important components of climate resilience planning and hazard response.

In addition to reimagining the Federal Government’s role in advancing climate resilience, the Framework also identifies six core objectives—supported by specific actions—that are critical to strengthening the nation’s protections against the impacts of climate change; that make communities safe, healthy, equitable, and economically strong; and that can and should be a focus of climate resilience efforts at all levels:

- Embed climate resilience into planning and management.
- Increase resilience of the built environment to both acute climate shocks and chronic stressors.
- Mobilize capital, investment, and innovation to advance climate resilience at scale.
- Equip communities with information and resources needed to assess their climate risks and develop the climate resilience solutions most appropriate for them.
- Protect and sustainably manage lands and waters to enhance resilience while providing numerous other benefits.
- Help communities become not only more resilient, but also more safe, healthy, equitable, and economically strong.

These objectives—and the specific actions identified to help achieve them—were developed in coordination with resilience experts across the Federal Government. They were further informed by the insights of non-Federal climate resilience stakeholders and recommendations from the



[U.S. Government Accountability Office](#)<sup>4</sup> and the President’s Council of Advisors on Science and Technology.<sup>5</sup>

The Framework was designed to function as a foundation for near-term and longer-term climate resilience efforts across the Federal Government, in coordination with non-Federal partners, including through follow-on implementation plans and actions.

The Framework articulates a common definition of resilience and fundamental principles that will guide the Federal Government’s approach to achieving resilience. The Framework then expands on the six core objectives listed above by providing a high-level description of what each objective would entail, an overview of notable Federal investments and initiatives that have supported the objective to date, and an illustrative list of specific opportunities for cross-sectoral action.

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<sup>4</sup> Thompson, J., Halifax, H., Need, Z., Norris, C., and Royer, D., (2022). *Climate Change: Enhancing Federal Resilience* (GAO-22-106061). Government Accountability Office.

<sup>5</sup> [https://www.whitehouse.gov/wp-content/uploads/2023/04/PCAST\\_Extreme-Weather-Report\\_April2023.pdf](https://www.whitehouse.gov/wp-content/uploads/2023/04/PCAST_Extreme-Weather-Report_April2023.pdf)



# Becoming a Climate-Resilient Nation

For purposes of this framework resilience is defined as *the ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions*. A climate resilient nation is one that is able to cope, adapt, and evolve in the face of current and future climate conditions—ensuring all individuals, households, sectors, and communities have access to safe and affordable housing, flourishing natural ecosystems, equitable health care, nutritious, affordable, and sufficient food supply and clean water, robust education and workforce opportunities, secure and clean sources of energy, and the capacity to thrive. This Framework uses the term “climate resilience” in a manner that is intentionally broad and inclusive of the term “climate adaptation” (i.e., the process of adjusting systems in response to the actual and projected consequences of a changing climate).

## Principles of Climate Resilience

The Federal Government will use the following principles to guide activities and investments to strengthen climate resilience at all levels.

- **Proactive.** Implement solutions that anticipate and address climate threats and impacts before damages occur. Prioritize activities and investments through risk-based approaches, including approaches that account for complex risks, like cascading impacts and concurrent events, as well as approaches that account for differences in vulnerability and response capabilities within and across communities.
- **Whole-System.** Consider the ways in which communities and natural systems are interconnected, including recognizing that risks and impacts from climate change are borderless. Strive both to leverage synergies (e.g., when increased resilience of one community contributes to the resilience of others) and to avoid maladaptive activities (e.g., when efforts to increase resilience in one community impose harms on another).
- **Equitable and Just.** Pursue solutions that address, and do not exacerbate, disparities between and within communities. Ensure that strategies respond to the needs of underserved and marginalized communities that have historically borne a disproportionate share of climate impacts and costs.
- **People-Centered.** Position the well-being of individuals, families, communities, and society at the center of goals and solutions. Consider the needs and perspectives of all community members, including those that are most vulnerable and have been historically marginalized or disadvantaged.
- **Collaborative and Inclusive.** Work across sectors to identify and pursue shared goals. Create pathways for all community members to be meaningfully involved in decision-making, and conduct active outreach to raise awareness of these pathways and address barriers to participation.
- **Durable.** Implement solutions that serve current and future needs. Ensure that there is continuity of technical expertise and leadership as needed, including by enhancing or building community capacity to sustain and adapt solutions for the long term.



- **Multi-Benefit.** Prioritize solutions, including nature-based solutions, that enhance climate resilience, while simultaneously advancing other community, economic, and societal objectives.

## Objective 1: Embed climate resilience into planning and management.

Building a climate-resilient nation requires evaluating climate alongside other considerations (e.g., financial, workforce, equity) in planning, management, and policy processes. Climate should be evaluated in ways that consider both near-term climate variability and weather extremes, as well as longer-term changes in climate and associated impacts to people along with the natural and built environments. Multiple studies show that the benefits of proactively accounting for and building resilience to climate impacts upfront will typically mitigate the resulting impacts, save lives, and mitigate the costs of damages following an event. [Research](#) conducted by the National Institute of Building Sciences found that on average, every \$1 spent by the Federal Government on disaster mitigation returns \$6 worth of societal benefits, including from reduced future disaster losses.<sup>6</sup>

While adaptation activities are gaining traction across different sectors, adaptation as a whole is not occurring fast enough to keep up with the rate at which the climate is changing. Effectively integrating climate change into planning, design, and management means reducing reliance on past events as analogues for the future. As concluded in the [4<sup>th</sup> U.S. National Climate Assessment](#), [successful adaptation](#) has been hindered by the false assumption that future climate conditions will be similar to past climate conditions. The Assessment noted that incorporating information on current and future climate conditions into design guidelines, standards, policies, and practices would reduce climate risks and impacts. In other words, all elements of planning and management need to seriously and rigorously consider a world in which extreme weather events and natural hazards occur with increasing frequency and severity, and in which many communities and regions face [compounding risks](#).

A community, business, agency, or institution can begin to embed climate considerations in its decision making by conducting a climate risk assessment to understand its particular vulnerabilities to climate change, and developing a climate action and adaptation plan that lays out an appropriate response (see Objective 4). For example, President Biden's [Executive Order on Climate-Related Financial Risk](#) directed the Federal Government to annually publish an [assessment](#) of its exposure to climate risk and to analyze and manage risks that climate change poses to departments and agencies, homeowners, workers, and the financial system. Moreover, at President Biden's direction, nearly 30 Federal agencies have developed [Climate Adaptation Plans](#) to integrate adaptation into their mission delivery and increase resilience to the impacts of climate change. By investing to protect military installations and water systems from climate impacts, building out microgrids at Federal facilities, and updating internal policies to center and mainstream climate resilience in program management and delivery, the ongoing implementation of these plans is meaningfully strengthening our Nation's climate resilience. However, further

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<sup>6</sup> [https://www.nibs.org/files/pdfs/NIBS\\_MMC\\_MitigationSaves\\_2019.pdf](https://www.nibs.org/files/pdfs/NIBS_MMC_MitigationSaves_2019.pdf)





investment in Federal and private sector foundational climate risk data sets and financial models are still needed to more accurately assess climate risk at the local and regional levels.

To maximize effectiveness, climate adaptation plans must be connected to other planning documents and processes, such as organizational performance goals and budgets. In 2021, the Administration laid the foundation for formally accounting for climate risks in the [President's Budget](#). Federal departments and agencies are also integrating climate resilience into grants, loans, and disaster assistance, ensuring that investments made with taxpayer dollars lead to outcomes that are effective even as the climate changes. For example, the Department of Transportation is, as appropriate and consistent with existing law, incorporating resilience as part of the selection criteria in [Notices of Funding Opportunity](#) for discretionary grant programs such as the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) program, which has a long history of funding large infrastructure projects that have a significant local or regional impact.<sup>7</sup>

There is a particular need to better link climate considerations to emergency preparedness and disaster risk planning. The traditional disaster response and recovery cycle is based on assumptions of single events distributed relatively predictably in time and place, and does not account for increasing frequency and severity of future weather events, nor increased vulnerabilities during an emergency due to chronic climate impacts. Building climate-resilient communities will require developing capacity to respond to emergencies—including multiple concurrent emergencies—as well as far greater efforts to reduce risks and make long-term investments in resilient structures and infrastructure (see Objective 2).

At the Federal level, departments and agencies are complementing traditional disaster-response and recovery capabilities with additional services that reduce risks (ensuring that buildings and infrastructure remain safe and functional during and after a disaster) and rebuild better (helping communities rebuild in ways that are more resilient to future threats). For example, the Department of Housing and Urban Development directly supports community resilience planning through its Community Development Block Grant Disaster Recovery (CDBG-DR) programs, with an emphasis on activities in low-income areas.

## Opportunities for Action

- **Advance and simplify community climate planning.** Underserved communities are less likely to have the financial resources needed to plan for current and future climate threats, but are more likely to be at elevated risk of climate-related impacts. The Federal Government can harmonize planning requirements to eliminate the need for communities to develop multiple plans (e.g., hazard mitigation plans, asset management plans, resilience plans) to access Federal funding that supports community resilience. The Federal Government and its partners can also specifically assist Tribal Nations by supporting their [sovereign right](#) to safeguard their lands, culture, and infrastructure, and their authority to pursue Presidential emergency or major disaster declarations in response to extreme-weather events. The [Community Disaster Resilience Zones](#) recently designated by the Federal Emergency Management Agency should help to focus resources to communities most in need.

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<sup>7</sup> <https://www.transportation.gov/sites/dot.gov/files/2022-02/FINAL-2022-RAISE-NOFO.pdf> and [FY 2023 RAISE Grants Notice of Funding Opportunity | US Department of Transportation](#)



- **Strengthen interagency coordination bodies to support community resilience.** A coordination body comprised of experts across all levels of government can help integrate all aspects of climate resilience to address interagency coordination challenges, strategically enhance interagency effectiveness, and work directly with communities to listen to priorities and facilitate place-based technical assistance. Existing structures help coordinate climate resilience building efforts across the Federal government and with partners. For example, the Thriving Communities Network work with public and private sector leaders while the Mitigation Framework Leadership Group coordinates across State, local, Tribal, and territorial governments. Each offers a unique opportunity to strengthen these types of coordination models to bolster place-based community resilience.
- **Tailor and vet future climate risk information and tools.** Transparent and authoritative projections of future risk are essential when planning for climate change, including for emergency management capacity planning, hazard mitigation, and adaptation strategies. Federal agencies need to ensure that information and tools derived from climate projections—such as for floods, sea-level rise, water resources, and wildfires—are responsive to user needs, validated, and accessible. At the Federal level, agencies can follow best practices, such as the U.S. Global Change Research Program's approach to using third-party data in the forthcoming Fifth National Climate Assessment. The Climate Risk and Resilience Portal, developed through a public-private collaboration provides free, dynamically downscaled climate data in useable formats for overlays with the Federal Emergency Management Agency's Resilience Analysis and Planning Tool. Together, these tools provide an important picture of today's infrastructure and people in tomorrow's environment. Non-Federal information and tools need to be vetted before adoption by the Federal Government. These steps will make it easier for communities to accurately assess their exposure to climate risk and safely invest in, design, and retrofit climate resilient infrastructure.
- **Require disclosure of climate risks.** Accurate and broadly shared information on climate risks is essential for evaluation of private assets, well-functioning markets, and financial stability. By requiring disclosure of these risks where feasible and appropriate, Federal, State, Tribal, territorial, and local agencies can help investors make more climate-informed decisions and encourage companies to increase risk-mitigation efforts. For instance, a [proposed rule](#) by the Securities and Exchange Commission would require companies to disclose information on the risks that climate change poses to their strategies, business models, and outlooks, and to describe how they plan to manage these risks. Public and private funders (e.g., grantmaking agencies, venture capitalists) could attach similar risk-disclosure requirements to funding opportunities.
- **Evaluate and monitor efforts to increase access to climate resilience funding.** Federal agencies evaluate BIL- and IRA-funded programs (e.g., pre- and post-evaluation designs for comparing and contrasting alternate program strategies and their associated outcomes) to assess whether programs successfully increased disadvantaged communities' access to resilience funding, what barriers remain (e.g., statutory match requirements, limitations on providing technical assistance to applicants), and what policies, regulations, or legal changes could be implemented to further increase access or remove barriers. Evaluating the effectiveness of agencies' BIL- and IRA-funded projects in delivering tangible resilience



benefits—and synthesizing these evaluation results—can inform future investments by the Federal Government and non-Federal partners.

- **Set targets and indicators to measure climate adaptation and resilience progress.** Analog targets set to reduce greenhouse gas emissions have been extremely successful at driving progress on climate emissions reduction in the United States. Appropriate shared targets can similarly advance climate resilience through enabling opportunities for rigorous progress assessment. As part of their Climate Adaptation Plans, Federal agencies should set targets and indicators to measure how they are advancing climate adaptation and resilience efforts to address various key aspects of climate resilience, including risk reduction, ecosystem health, human health and well-being, operational durability over time, and economic vibrancy.

## **Objective 2: Increase resilience of the built environment to both acute climate shocks and chronic stressors.**

The built environment shapes the way people live, work, recreate, and interact. From housing, commercial buildings, and industrial facilities to transportation, power and water utilities, and public spaces and parks, every community’s unique built environment is a significant determinant of quality of life. As such, investments in the built environment are also investments in community well-being. The built environment should be considered holistically with the natural environment, since people experience them together and the resilience of one affects the resilience of the other (see Objective 5). A resilient built environment—one that is constructed to the latest building codes, renovated to high-performance resilience standards, and located away from [hazard zones](#) where possible, while ensuring there is an adequate and affordable housing supply—protects people from climate impacts, supports quicker recovery from disruptions, and helps communities thrive (see Objective 6).

Climate resilience should be a key consideration in planning and design for land use and the built environment. Modernized land use development and building codes are key to achieving these objectives. President Biden’s [National Initiative to Advance Building Codes](#) is accelerating adoption of modern building and energy codes that protect people from extreme-weather events and save communities an estimated [\\$1.6 billion](#) a year in avoided damages. Among other outcomes, this initiative will harness \$225 million in BIL funding and \$1 billion in IRA funding from the Department of Energy to support implementation of updated building and energy codes, provide incentives and technical support for communities to adopt modern codes, and provide mapping tools to track code adoption. The initiative is further working to update Federal assistance programs that support the construction and renovation of buildings with the latest building and energy codes and high-performance standards.

Federal agencies are also working directly with codes and standards development organizations to develop resilient and sustainable codes for adoption to ensure buildings and infrastructure are built to the highest standards to be protected from extreme weather and hazards. For instance, the National Oceanic and Atmospheric Administration has [formally partnered](#) with the American Society of Civil Engineers to ensure that Federal climate data, observations, and projections are providing the civil engineering community with the information it needs to plan, design, and operate climate-resilient and sustainable infrastructure and housing.



President Biden’s Investing in America Agenda is deploying record investments in climate-resilient infrastructure, including reliable and affordable high-speed internet and electricity, safer roads and bridges, modern wastewater and sanitation systems, and clean drinking water in a manner that creates good paying jobs in every community. Examples include:

- The Department of Housing and Urban Development’s (HUD) Green and Resilient Retrofit Program, which will bring \$830 million of direct funding and \$4 billion in loan commitment authority to HUD-funded properties that invest in climate resilience, energy efficiency and emissions reductions, clean energy, and low-carbon materials.
- The Department of Energy’s [Grid Resilience and Innovation Partnerships \(GRIP\) Program](#), which is enhancing grid flexibility and preparing the U.S. power system for growing threats of extreme weather and climate change.
- The Department of Transportation’s [PROTECT](#) program, which is making surface transportation more resilient to natural hazards through support of planning activities, resilience improvements, community resilience and evacuation routes, and strengthening at-risk coastal infrastructure.
- The Department of Homeland Security’s Federal Emergency Management Agency’s [Building Resilient Infrastructure and Communities \(BRIC\) Program](#), which supports a variety of hazard-mitigation projects in communities and special districts with approved hazard mitigation plans.
- The U.S. Department of Agriculture’s Rural Development agencies are enhancing the resilience of critical infrastructure in rural communities through investments like Community Facilities Disaster Grants.
- The Department of Health and Human Services developed a guide to opportunities through the IRA to improve the climate resilience of hospitals, health care facilities, and health-sector supply chains.
- The Department of the Interior supports adaptation and funds community relocation planning and design for Tribal communities impacted by rising seas, coastal erosion, and storm surge through the Bureau of Indian Affairs’ Branch of Tribal Climate Resilience.
- The National Endowment for the Humanities’ [Climate Smart Humanities Organizations and Sustaining Cultural Heritage Collections](#) programs are improving resilience of cultural and educational organizations through evaluations of existing buildings and sites and funding improvements to collection and exhibition spaces.

Furthermore, many local government partners are overhauling zoning ordinances to integrate resilience while reducing barriers to adequate housing supply. For example, in Norfolk, Virginia, a [new zoning ordinance](#) requires all new development within the city to meet a resilience quotient. This requirement is measured on a points system covering three separate resilience elements: (1) risk reduction, (2) stormwater management, and (3) energy resilience. At the same time the ordinance encourages development in higher elevation areas to ensure housing supply needs are met. This type of local leadership is essential and should be supported across the Nation. In addition, built environment investments and design should support and



leverage resilience of the natural environment (see Objective 5). Land use planning substantially affects ecosystems and natural resources within and around communities. Facilitating infill development, building conversion, and redevelopment as viable alternatives to green field development are approaches that communities are taking to reimagine their built environments to achieve community goals and plan for long-term climate impacts. Leveraging investments in nature-based solutions and [coordinating siting and design of buildings and infrastructure](#) are essential to ensuring that the built and natural environments work in tandem to support climate-resilient communities.

## Opportunities for Action

- **Incorporate climate information into engineering and architectural standards and planning practice.** Consensus-based engineering standards provide the basis for design of the built environment, but many do not sufficiently address designing to future climate conditions and future climate-related loads (e.g., increased precipitation on roadways, increased energy demand during heat waves, changing geographical extent of extreme heat and cold). The Federal Government can support development of climate resilient standards by engaging in standards-development processes, partnering with architectural, engineering, and planning professional associations, and providing the climate data and projections needed for standards development organizations to incorporate future climate considerations in engineering and architectural design standards that include nature-based features.
- **Ensure that public funding requires climate-resilient infrastructure investments.** Government at all levels can drive climate resilience of the built environment by adopting the latest consensus engineering standards or encouraging their adoption through funding opportunity requirements for all publicly funded or financed infrastructure projects. Federal agencies should include requirements that all Federally-funded and financed infrastructure projects address vulnerabilities posed by future climate impacts over the full-service life of the proposed project, and encourage the use of nature-based features to reduce impacts from climate hazards like stormwater flooding. Agencies should also identify ways to further mitigation opportunities after disasters strike, better connecting resilience funding with disaster recovery efforts. When community infrastructure is being rebuilt, there is an opportunity to ensure the increasing risk is considered. (See Objective 5).
- **Expand adoption of the latest consensus-based building and energy codes and high-performance standards.** Adoption of the latest consensus-based building and energy codes and high performance-standards protects buildings, infrastructure, housing, and people from climate risks. Government agencies can work with communities, standards development organizations, and code and trade organizations to prioritize existing funding and provide technical assistance to increase adoption of these codes and standards across government and non-government owned buildings. Governments can also partner with workforce networks, educational institutions, unions, and associations to efficiently expand the training needed to implement building and energy codes and high-performance standards. Agencies should adopt these codes and high-performance standards for the construction or substantial rehabilitation of publicly funded or financed homes and buildings.
- **Promote resilient energy solutions to protect people and preserve affordable housing and infrastructure.** Incorporating energy-efficient technologies and energy resilience



practices can reduce electricity demand, provide energy backup to housing facilities when there is a power failure, and protect Americans during times of extreme temperatures. Collaboration among Federal agencies and State, local, Tribal, and territorial governments can support the place-based integrative design of distributed energy resources and microgrids, turn housing into distributed power plants, harness rooftop and community solar storage, and enable local generation and consumption of clean electricity.

- **Support climate-resilient land use and zoning reforms to sustainably densify development in lower-risk areas.** Development continues to expand into high climate-risk areas, in large part due to lack of affordable, developable land in less risky areas. Effective land use and zoning designations establish the foundation for decades of development and are key to avoiding future climate impacts. The Federal Government can partner with State, local, Tribal, and territorial governments, as well as professional planning associations to provide technical assistance and share best land use, zoning, and siting practices that ensure adequate housing supply and reduce long-term climate risk. Collaboration across these sectors can advance best practices such as optimizing property acquisition funding with comprehensive planning and zoning reforms that reduce climate vulnerabilities and ensure communities can grow.
- **Require consideration of nature-based solutions for Federal investments wherever appropriate.** Nature-based solutions can be entirely non-structural or can replace or support built infrastructure. Encouraging Federal activities and projects to incorporate nature-based solutions that enhance resilience will reinforce a culture of “starting with nature.” To support this, Federal agencies can issue or update departmental directives, policies, and guidance to require robust consideration of nature-based alternatives and make it easier to deploy those alternatives at the state and local levels.

### **Objective 3: Mobilize capital, investment, and innovation to advance climate resilience at scale.**

Climate change poses threats to U.S. financial markets and institutions, businesses, and manufacturers, as well as non-profit institutions—including libraries, schools, museums, and other cultural organizations—that are central to community health and economic development. The U.S. Government is already investing in and making rapid progress on the [game-changing clean energy technologies](#) and [projects](#) needed to achieve national climate mitigation objectives.

There is tremendous opportunity to further harness U.S. innovation capacity towards climate resilience. Building a climate-resilient nation will require development, improvement, and scaling of advanced water treatment systems and drought-tolerant crops, efficient cooling technologies and building materials that reflect heat and insulate, forecasting and surveillance systems to track wildfires, and myriad other solutions. Mobilizing capital, investment, and innovation in climate resilience will both help the Nation better prepare for climate impacts and position the United States at the forefront of a global climate resilience market that could be worth as much as \$2 trillion per year by 2026.



Yet innovators and startups often struggle to move promising ideas from the research and development phase to the scaling and commercialization phase. Bridging the gap that separates the “lab” and the “market” often requires dedicated support. At the Federal level, the Environmental Protection Agency’s [\\$14 billion National Clean Investment Fund](#) is awarding grants to national nonprofit financing institutions capable of partnering with the private sector to provide accessible, affordable financing for tens of thousands of clean-technology and resilience-building projects across the country. This new financing will be focused on enabling families, small businesses, communities, and others to access the capital they need to support projects—with at least 40% of capital flowing into low-income and disadvantaged communities. The Department of Energy’s [Solar and Wind Grid Services and Reliability Demonstration Program](#) provides \$26 million for industry, utilities, and laboratories to test projects that will enhance energy security and yield a more reliable power grid. The National Oceanic and Atmospheric Association’s [Ocean-Based Climate Resilience Accelerators Program](#) includes a \$60 million investment in small businesses to accelerate climate resilience technologies including modeling tools to translate coastal, ocean, and Great Lakes data into resilience decision support services.

Building a climate-resilient nation also requires greater availability of flexible and patient financial resources for climate resilience projects. Resilience projects are underinvested in due to numerous factors like payback periods that can be long and/or uncertain, benefits may go to a community rather than solely to investors, and traditional accounting mechanisms tend to focus on direct financial benefits (e.g., losses avoided), while limiting consideration of many indirect benefits (e.g., water quality improvement or cultural preservation). The Office of Management and Budget is developing [new guidance](#) to help Federal agencies and other institutions better account for many of these indirect benefits when performing cost-benefit analysis. Federal agencies are also working with states and the private sector to expand financing for climate resilience. For instance, the Department of Energy’s Commercial Property Assessed Clean Energy (CPACE) initiative [provides financing](#) that building owners and operators can use to make resilience upgrades in states with enabling legislation.

Furthermore, property and casualty (P&C) insurance is a critical tool for protecting against climate risks. When structured as an appropriate risk-transfer mechanism, P&C insurance can encourage pre-disaster mitigation efforts through lower premiums for more resilient properties, as well as signal areas at greater risk through appropriate premium increases. Appropriately structured P&C insurance can also speed post-disaster recovery by providing greater financial relief and stability than typical emergency assistance. However, as climate change increases the frequency of catastrophic, very high-loss events, P&C insurance and reinsurance are becoming increasingly unattainable and unaffordable. The Department of the Treasury is currently working with insurers to assess how climate risks are impacting insurance markets across the country—paving the way for data-driven policies that address gaps in coverage and affordability. Joint investments in climate risk reduction can also create a more attractive marketplace for insurers.

## Opportunities for Action

- **Increase access to early-stage capital for climate adaptation and resilience.** Businesses and incubators—including climate resilience start-ups—need working capital to build and operate, yet accessing working capital is challenging for businesses with no proven record. Public and private funders can support these startups by creating financial products that



provide working capital to businesses. The Small Business Administration’s Small Business Investment Company program can be used to drive greater access to patient capital for climate entrepreneurs in underserved communities.

- **Support research-to-market pathways for climate resilience innovators.** Incentivizing and creating an environment conducive to climate-based innovation is key to developing climate resilience. Supporting technology incubators and innovation clusters (e.g., advance market commitments, low-interest financing, and grant funding) can drive development and implementation of regionally relevant climate adaptation solutions in ways that harness community-based expertise and deliver economic benefits.
- **Utilize the power of procurement.** Leveraging government purchasing power and awarding contracts for mission-critical goods and services that are managing their exposure to physical and transition risks from climate change—such as data and telecommunications infrastructure, medical supplies, food, and energy—is key to ensuring the climate resilience of our day-to-day services. At the same time, integrating climate risk considerations into purchasing power can shape markets, accelerate innovation, and incentivize Federal dollars being spent to achieve resilience goals. In addition to purchasing and awarding contracts for durable goods that minimize climate risks, the Federal Government can improve energy security and catalyze supply chain benefits by leveraging its capacity to reward utilities for rapidly deploying carbon-free electricity at scale.
- **Expedite climate resilience patents.** Intellectual property protections can encourage private investments in priority areas, including climate resilience. The Federal Government has already established programs designed to expedite patents for climate mitigation technologies, and should continue to consider the extent to which a parallel program could be developed for climate resilience.
- **Expand and explore insurance solutions to improve climate resilience.** Insurance-related investments that promote resilience and risk mitigation may contribute to keeping insurance premiums affordable. Offering discounted insurance premiums to policyholders for implementing mitigation measures can encourage resilience investments, which may reduce economic and insured losses from climate-related events. Insurers, State insurance regulators, and communities can collaborate on expanding existing state premium discount [programs](#), by looking at Federal programs such as the Community Rating System (CRS) for the National Flood Insurance Program (NFIP). Insurers, communities, and State and Federal policymakers also can continue to explore potential technological, modeling, and other innovations in the insurance sector for analyzing and reducing risk. The Federal and State governments can continue to promote awareness of risk mitigation discount programs and other efforts to promote resilience. Flood insurance—whether purchased from the NFIP or private insurance companies—is a key tool for property owners to protect themselves financially from losses caused by floods. For low- and moderate-income households in particular, the high cost of flood insurance can be a significant barrier to obtaining coverage. As flood risk increases with climate change, Americans need solutions that make flood insurance more affordable so that they can plan for and protect against their flood risk.
- **Comprehensively assess the availability of insurance coverage.** The Federal Government, through the Department of the Treasury’s Federal Insurance Office (FIO), is working with leading insurance carriers and other stakeholders to assess insurance coverage availability,





particularly in regions of the country vulnerable to climate-related impacts. FIO has proposed the collection and analysis of homeowners' insurance data from large insurers, which is part of an ongoing, iterative process to assess the potential for major disruptions of private insurance coverage. This analysis, combined with continuing engagement with interagency and external stakeholders, may help pave the way for solutions that address issues surrounding coverage availability in underserved and high-risk communities, including for Tribes and territories.

## **Objective 4: Equip communities with information and resources needed to assess their climate risks and develop the climate resilience solutions most appropriate for them.**

There is no one-size-fits-all approach to building climate resilience; communities experience climate change in different ways and respond according to their unique capabilities and cultures. A key objective of climate resilience efforts should therefore be to ensure that communities are equipped to assess their risks and prepare accordingly. Central to this approach is providing communities with evidence-based and easy-to-use information, tools, and services. Just as a revenue forecast helps a city set a budget, and a weather app helps people decide what to wear in the morning, so too can forward-looking climate resources help individuals and communities “know what’s coming” and take steps to reduce their climate risks and vulnerability.

The U.S. Government is an authoritative source of climate information, data, and modeling, with wide reach and resources, and is working alongside partners to develop and provide evidence-based and actionable resources. The Administration has created a number of products that draw upon extensive climate information to give a comprehensive picture of how the climate is changing and what that means for our communities—the forthcoming [Fifth National Climate Assessment \(NCA5\)](#), for example, will provide a rich source of authoritative climate information across all U.S. regions and key sectors. The [Climate Mapping for Resilience and Adaptation \(CMRA\)](#) portal and the [Sea Level Rise Viewer](#) allow users to interactively explore climate hazards in their area, while the [Climate and Economic Justice Screening Tool \(CEJST\)](#) can guide investments in climate resilience by identifying disadvantaged communities likely to be disproportionately impacted by climate change, along with other environmental and socioeconomic burdens. Through its groundbreaking [Held in Trust](#) initiative, the National Endowment for the Humanities is working with cultural experts to develop resources tailored to the cultural sector, including risk maps, learning modules to develop climate action and resilience plans, and establishing local communities of practice to promote mutual aid and preparedness efforts. These resources are examples of the information available to aid community climate and resilience planning.

[Research shows](#) that resources to inform decision making are often most effective when developed in collaboration (or are “co-produced”) with community members, through meaningful engagement. Community leaders, public officials, and individuals generally get more value out of informational resources that integrate relevant, community-specific perspectives, insights, knowledge, and experiences. Co-production is also key to identifying and filling information gaps and to building sustained relationships between subject-matter experts and information users. The Administration is elevating Indigenous Knowledge in Federal



research, policy, and decision making—and identifying promising practices for relationship building and knowledge co-production—through a first-of-a-kind [Indigenous Knowledge Guidance for Federal Agencies](#). This is just one example of ways in which government agencies can work with communities to develop valuable and needed information resources to support climate resilience.

The *availability* of information resources is often not sufficient to support communities. Communities must be able to *identify, access, navigate, and use* relevant resources to design and adopt appropriate solutions to the specific climate risks they face. This often requires additional support and technical assistance that the Administration is directly providing to disadvantaged communities. Federal agencies are designing and adopting tailored solutions through technical assistance centers like the [Environmental Justice Thriving Communities Technical Assistance Centers](#). Federal agencies are also providing on-the-ground support to connect climate information with decision needs through regional science and services organizations, such as the National Oceanic and Atmospheric Administration’s [Climate Adaptation Partnerships](#) program, the U.S. Department of Agriculture’s [Climate Hubs](#), the U.S. Geological Survey’s [Climate Adaptation Science Centers](#), the Bureau of Indian Affairs’ [Regional Tribal Climate Resilience Liaison Program](#), and the Environmental Protection Agency’s [Regional Climate Adaptation Network](#). The U.S. Global Change Research Program also developed a guide on [Selecting Climate Information to Use in Climate Risk and Impact Assessments](#) to help Federal agency officials and others incorporate climate science into planning and decision making. In addition, the [U.S. Climate Resilience Toolkit](#) provides a [Steps to Resilience](#) framework to help decision makers identify climate hazards and develop solutions. For cultural organizations, the Smithsonian’s [Cultural Rescue Initiative](#) compiles Federal and private resources for non-profits, homeowners, Tribes, and local governments on protecting cultural heritage threatened or impacted by disasters.

To build a resilient nation where climate considerations are embedded throughout decision-making processes (Objective 1), it is essential that the Federal Government and partners do even more to increase the Nation’s collective climate literacy and strengthen the capacity to plan and act. Engaging with individuals and organizations at all scales, and increasing capacity to understand and apply climate information, will enable the design of solutions that meet communities’ needs.

## Opportunities for Action

- **Train additional technical assistance providers.** Many communities need support identifying their climate risks, vulnerabilities, and options. Skilled “translators” can articulate and align climate science and data (including the limitations and uncertainties in these data) and help communities identify and address their climate risks, vulnerabilities, and needs. These “translators” also act as force multipliers of Federal Government resources, including funding opportunities, research, and decision-support tools. Through existing programs, including the Federal Emergency Management Agency’s Direct Technical Assistance opportunity within its Building Resilient Infrastructure and Communities (BRIC) program, [Federal Interagency Thriving Communities Network](#), USDA’s Rural Partners Network, Silver Jackets, the Cooperative Extension System and Sea Grant Extension, and regional science and service organizations, the Federal Government can catalyze a new



generation of “translators” who are trusted and well-positioned to increase climate resilience capacity as experts in local communities.

- **Emphasize meaningful involvement and community engagement in public participatory approaches to drive implementation of resilience and adaptation programs and services.** Community engagement and participatory approaches—including culturally-informed approaches, as well as co-production of data, tools, and solutions—are critical in ensuring that public programs aiming to support climate resilience are responsive to community needs and that goals and objectives are achieved. Federal agencies can advance appropriate and sustained community engagement around climate information through implementation of [A Federal Framework and Action Plan for Climate Services](#) and other relevant efforts. Public and private cultural funders can establish community archiving and documentation programs to demonstrate the impact of a changing climate on endangered cultural communities and resources and to highlight successful adaptation solutions, through close engagement with affected communities.
- **Accelerate action to ensure coordinated, effective, and efficient development and delivery of climate services across agencies.** This action is needed to increase the utility and accessibility of climate information for communities and others. Multiple agencies currently provide climate services to their constituents, underscoring the need for good coordination and communication. The [National Science and Technology Council’s Fast Track Action Committee concluded](#) that the 14-agency U.S. Global Change Research Program (USGCRP) should provide enhanced coordination and the [FY25-OMB-OSTP Budget Priorities Memo](#) highlights this coordination by USGCRP and acceleration of climate services as a top-level budget priority. As an initial step, the USGCRP should conduct an inventory of key climate services to identify capabilities, gaps, and areas of needed efficiency.
- **Address key data and information gaps.** Current information gaps are hindering the development of actionable information for communities. While maintaining U.S. climate information and data networks, prioritization should be focused on enhancing information and services in geographies where climate data are sparse and climate-related vulnerabilities are high (e.g., Alaska, Hawaii, U.S. territories); developing and deploying improved, accessible early-warning systems provided in multiple-languages for climate-related threats and hazards, building off work on drought and heat; and improving integration of physical, natural, and social sciences to gain a more comprehensive picture of climate risks, options for adaptation (including costs, benefits, and tradeoffs between gray, green, and hybrid solutions), and decision making under uncertainty. Emphasis should be placed on increasing accessibility of climate services by a broad range of users, including individuals with limited English proficiency and people with disabilities. A Federal data policy could be developed to guide the design and deployment of climate data and services, adhering to open science principles and providing a mechanism for maintaining quality assurance to ensure services are scientifically-credible and usable.
- **Advance and deploy online information resources to support climate resilience solutions and planning.** Better online climate information, at the scales appropriate to inform decision making, is needed across the country. The U.S. Climate Resilience Toolkit and Climate Mapping for Resilience and Adaptation (CMRA) portal will be updated and leveraged as



primary knowledge-sharing hubs underpinning co-design and co-production of adaptation and resilience solutions, including by sharing real-world case studies on past and current resilience-building efforts. The Federal Government will also deploy the National Climate Assessment Interactive Atlas, an online mapping tool that will share downscaled projections of temperature and precipitation at decision-relevant timescales and spatial scales. These pilots are implementations of the Climate Resilience Information System, which will provide the information infrastructure needed for easy and consistent access to observed climatologies, climate projections, and other decision-relevant climate-related data. Collectively, these online resources represent a major opportunity to better support communities in localizing climate hazard data with other relevant information, such as infrastructure and social and economic conditions.

- **Enhance climate models and model-derived risk projections.** Climate models provide information that decision makers need in order to plan and develop strategies for addressing the impacts of climate change (e.g., to inform building codes and standards, see Objective 2). There are a number of opportunities where the Federal Government and partners can enhance the quality of projections available, including vetting and expanding foundational climate risk data sets; developing models with high spatial resolution within and outside of the Continental United States (OCONUS) areas; using specialized, hazard-specific models to assess current and future climate-related hazards and risks; and enhancing modeling of extreme weather risks at higher-resolution spatial scales (as recommended by the [President's Council of Advisors on Science and Technology](#)). Equally important will be research and development of models and risk projections that integrate information on projected changes in land use, population, the built environment, and local economies to assess future risks to communities and economic sectors. Lastly, the Federal Government can develop a strategy for incorporating climate science into catastrophe risk modeling, and improve public access to this information, leveraging existing capabilities in climate, environment, weather, and natural hazard modeling.
- **Improve capabilities to understand and address flood risk.** Federal agencies can advance the science of flood risk through targeted interagency research and coordination, focusing on areas of greatest uncertainty (e.g., rain-induced flooding, storm-water driven flooding, unmapped areas). The flood science community can also enhance the availability and accessibility of climate-informed scientific products to Federal agencies and stakeholders, providing information that enhances communities' ability to access and apply this information. The Federal Government also needs to map large swaths of the United States that have not yet been mapped for flood risk. Efforts should also focus on supporting Federal agency implementation of the Federal Flood Risk Management Standard (FFRMS), including the development of a FFRMS Decision Support Tool and trainings to enhance the abilities of agencies and non-Federal partners to apply flood-related climate-informed science data and tools.
- **Improve capabilities to understand and address wildfire risk.** Federal agencies can improve interagency coordination, expand joint activities, and strengthen existing partnerships with State, local, Tribal, and territorial governments and the private sector to better prepare for, manage, and recover from wildfires. Comprehensive and collaborative assessments, such as those that informed the National Cohesive Wildland Fire Strategy and the final report of the Wildland Fire Mitigation and Management Commission, can guide



whole-of-government efforts to mitigate wildfire risk, especially the growing risk posed by catastrophic wildfire to our communities and natural landscape.

- **Support both new and existing robust communities of practice to enable peer-to-peer learning around climate science information, adaptation planning and implementation, and navigating Federal programs and resources.** Many communities across the nation applying for Federal dollars or undergoing adaptation planning would benefit from mutual assistance and support from peers. The Federal Government can support these communities of practice by convening knowledge exchanges through boundary organizations (e.g., regional science and services organizations), fostering emerging public-private partnerships, especially those with frontline communities, and amplifying “resilience accelerators” to connect communities, researchers, planners, and designers.
- **Promote place-based, people-centered climate solutions.** As established throughout this Framework, climate resilience must be tailored to communities’ specific needs. To enable this tailored approach, the Federal Government can strengthen engagement with mayors, county officials, and regional entities, focusing on the development of co-designed climate service solutions and capacity-building initiatives. This could include incorporating climate resilience considerations into landscape conservation designs and leveraging capacity building programs to ensure communities have access to data and information. Following implementation, existing programs can be leveraged to showcase these climate solutions and successes in regions, cities, and towns, and to summarize adaptation and resilience strategies, building an evidence base useful for all communities.
- **Work alongside Indigenous scholars and community experts on data, science, and trainings.** Indigenous communities are keepers of their Indigenous Knowledge and have their own expertise, experience, and approaches in how to pass on and share that knowledge. Federal programs must provide access to the data it has available to support Indigenous decision making, while also seeking to incorporate Indigenous Knowledge in management and scientific research, where appropriate, and respecting and protecting data sovereignty. The Administration should ensure that Tribal Nations, territorial governments, and Indigenous communities have access to data, address existing data gaps on Tribal lands in Federal Government data systems, and support partnerships with Tribal Colleges and Universities to develop curricula, Tribal- and Indigenous-led training, and experiences that bring together Indigenous Knowledge and science to address climate resilience. Federal agencies should align their efforts with, and continue to advance implementation of the [White House Guidance on Indigenous Knowledge](#).
- **Support local and regional coordination amongst Tribal, territorial, and Indigenous communities that results in peer-to-peer learning and sharing of resilience and adaptation best practices.** The Bureau of Indian Affairs’ [Regional Tribal Climate Resilience Liaison Program](#) is a model of a Federal program for effective coordination executed in partnership with and under the leadership of inter-Tribal organizations. The Administration should also continue to support information sharing efforts, such as the Indigenous Peoples, Lands, and Resources chapter of the [Fifth National Climate Assessment](#), continued updates to the [Status of Tribes and Climate Change Report](#), the biennial [National Tribal and Indigenous Climate Conference](#), and the Indian Country Energy and Infrastructure Working Group.



## **Objective 5: Sustainably manage lands and waters to enhance resilience while providing numerous other benefits.**

The country's lands, waters, and oceans and the many important services that they provide to nature and society, are at increasing risk due to climate change. Agricultural production has been affected by increases in temperatures affecting farmworker health and more occurrences of heat stress in livestock, as well as more frequent extreme weather events that include drought and flooding that reduce crop yield. Critical ocean habitats, like California's kelp forests and Florida's coral reefs, have declined by 90 percent in less than 10 years due to above normal ocean temperatures and increased ocean acidification. Forests are experiencing more frequent and intense wildfires often turning them from an important tool in the fight against climate change (a carbon sink) into the opposite (a carbon emission source). Water temperatures in freshwater lakes and rivers are warming, creating breeding grounds for the spread of invasive species. Domestically and abroad, scientists are sounding the alarm that a biodiversity crisis—driven by habitat loss frequently linked with climate change—threatens nearly [one million species](#) with extinction, undermining the health of the natural systems that supply our food, air, water, medicines, and other societal benefits and impacting the ability of our private lands to produce food, fiber, and fuel. Climate impacts not only affect biodiversity, but are also altering the way humans, animals, and environments interface, contributing to disease spread and outbreaks among vulnerable species.

Investments in nature through conservation and restoration are critical for managing these impacts and are equally integral as *solutions* to the climate crisis. Some researchers estimate that nature-based solutions can boost progress towards [climate mitigation goals by up to 30%](#). Nature-based solutions can also enhance climate resilience, reducing impacts from climate-related hazards, protecting human health and well-being, supporting biodiversity, and providing clean air and water, while helping to create and retain natural resource-related jobs, sustaining livelihoods, and boosting local economies. For example, investments in well-managed forests can reduce risks of catastrophic wildfire and harmful smoke, while also providing clean drinking water, increased recreational opportunities, cultural and subsistence resources, and long-term sustainability of the forest product industry. Similarly, investments in restoring and connecting wetlands and floodplains can mitigate flooding, while also improving water quality, enhancing agricultural productivity, and providing critical habitat for wildlife.

Building a climate-resilient nation requires significant efforts to protect, restore, connect, and conserve the country's nature and natural systems. President Biden's [America the Beautiful Initiative](#) is a call to action for the Federal Government and non-Federal partners to advance voluntary conservation and stewardship efforts led by State, Tribal, and local governments, communities, fishers, ranchers, farmers, and landowners. Already, the Administration has made great strides in delivering on the America the Beautiful Initiative. President Biden conserved more lands and waters in his first year than any president since John F. Kennedy; to date, he has conserved more than 21 million acres of lands and waters.

Through the Investing in America Agenda, tens of billions of dollars are being directed to conservation, restoration, and nature-based solutions with climate resilience benefits. In March 2023, the Department of the Interior unveiled its Restoration and Resilience Framework, which will guide \$2 billion in IRA and BIL funding to restore ecosystems and revitalize local economies. The framework has guided awards of hundreds of millions of dollars already



awarded to projects across the country. Meanwhile, there is over \$2 billion across multiple agencies to support restoring streams and rivers to allow fish to move freely and restore freshwater systems, including \$250 million from the U.S. Fish and Wildlife Service who is working [alongside NOAA](#) to expand marine ecosystems that also enhance fisheries and benefit local communities. The IRA also directs more than \$18 billion to U.S. Department of Agriculture conservation programs to support the adoption of agricultural practices with demonstrated greenhouse gas reduction or carbon sequestration benefits; many of these techniques, such as the use of cover crops, also have climate resilience co-benefits.

In addition to mobilizing historic levels of investment, the Biden-Harris Administration has advanced first-of-its kind policy specific to nature-based solutions and land and water management. In November 2022, the Administration released the first-ever [National roadmap](#) for accelerating and addressing barriers to nature-based solutions and a companion [Resource Guide](#) to help Federal agencies and partners implement these solutions. The Administration is also embedding nature into planning and management decisions (see Objective 1), and the White House Office of Management and Budget recently released [draft guidance](#) strongly encouraging Federal agencies to consider nature-based solutions and nature-based features in their infrastructure investments (see Objective 2). Further, the Administration established a system of [Natural Capital Accounts](#) to measure the economic value—including the resilience benefits—that natural systems deliver. These accounts will enable us as a society to more accurately connect changes in nature with changes in economic performance and invest accordingly.

The Federal Government must also take into account future climate conditions and ecological transformations that are underway in order to protect both nature and people. The U.S. Global Change Research Program is conducting the first-ever [National Nature Assessment](#) to take stock of the country's lands and waters, the benefits they provide, and their intersections with climate change. Meanwhile, agencies like the U.S. Department of Agriculture that support public and private land management are [integrating climate adaptation](#) into their programs and forward-looking decision-making through implementation of strategies to address the wildfire crisis, water availability in the West, and reforestation in the National Forest System.

At the core of all Federal investments and actions related to climate resilience of our Nation's lands and waters is meaningful community leadership and engagement including consultations and partnerships with Tribal Nations, local stakeholders, and those who own, manage, and rely on the country's lands and waters. Federal programs are already investing more in engagement and consultation up front, and are building sustained Federal community partnerships, such as the [Thriving Communities Network](#) as well as the Ocean Justice Strategy called for in the [Ocean Climate Action Plan](#). These investments will ensure that local communities and stakeholders are leading on conservation and restoration and advance environmental justice and equity, including for disadvantaged and historically underserved communities, improve the distribution of benefits from nature-based projects to reach those most vulnerable to climate risks, expand opportunities for incorporating local and Indigenous Knowledge into informational resources (see Objective 4), and increase returns on nature-based investments by ensuring that they are community-led.

## Opportunities for Action

- **Continue to support locally-led conservation and restoration efforts through the America the Beautiful Initiative.** Agencies can and should continue to expand their work to support voluntary, locally-led efforts to protect, conserve, connect, and restore key lands



and waters that may also assist in offsetting greenhouse gas emissions—such as wetlands (including nearshore habitats, mangroves, and peatlands), coral reefs, and ancient and mature forests—while at the same time providing strongholds for species richness in the midst of climate change.

- **Integrate changing climatic conditions into natural resource management plans.** Continuing to consider and prioritize climate change in Federal natural resource planning will improve outcomes of conservation and sustainable management, resulting in climate-resilient ecosystems and ecosystem services. When appropriate, these plans should seek to maintain intact and connected landscapes, support wildlife, increase ecological connectivity, establish migration corridors, sequester and store carbon, use technology to facilitate monitoring of climate resilience and mitigation potential, and promote watershed and ecosystem function.
- **Continue to increase the role of Tribal Nations in land management.** The Biden-Harris Administration has made strides in elevating Nation-to-Nation engagement, incorporating Indigenous Knowledge into Federal decision-making, and ensuring Tribal co-stewardship of lands and waters including through a number of [new commitments and initiatives](#) announced at the November 2022 Tribal Nations Summit. Recognizing Tribal Nations as stewards of the country’s lands and waters since time immemorial, it remains critical to continue to invest in and support Tribal capacity to protect, conserve, and restore Tribal and Federal lands and waters.
- **Ground nature-based solutions in Indigenous Knowledge.** Indigenous communities have long utilized nature-based solutions—such as cultural fire for catastrophic fire prevention and ecosystem health—to enhance climate resilience. In December 2022, the Administration [released guidance](#) for Federal agencies on how to incorporate Indigenous Knowledge into Federal decision-making. This guidance will also support better consultation and engagement with Tribes and other indigenous communities with an aim of including traditional nature-based solutions in climate resilience planning and implementation, and to facilitate the co-management and co-stewardship of natural and cultural resources.
- **Prevent, eradicate, and control invasive species.** Agencies can strengthen coordinated Federal and non-Federal approaches to prevent, eradicate, and control the highest risk invasive species, a number of which are increasing in range due to climate change by advancing the efforts of the Department of the Interior’s National Invasive Species Council. This includes integrating climate science planning to inform strategic invasive species management actions, and integrating invasive species awareness (through literacy and training) and risk mitigation into broader climate resilience efforts (for example, infrastructure, supply chains, and transportation) to help safeguard those investments.
- **Support private landowners and businesses to innovate and adapt to a changing climate.** Integrating consideration of climate risk and adaptation options into financial and technical assistance programs that incentivize climate-smart land management can help families and businesses manage their climate-related risks. Such programs could, for example, fund conservation practices that maintain and improve soil health, water quality, and watershed and habitat function. Ensuring collaboration with State, local, Tribal, and territorial partners will also be essential to maximize the climate-related benefits of these programs.





- **Establish minimum criteria for nature-based alternatives.** Developing government-wide minimum design and planning criteria for nature-based solutions can support broader understanding of what constitutes a “nature-based” alternative. This improved understanding can lead to broader deployment of nature-based solutions.
- **Support practices for effective, efficient, and transparent Federal, State, local, Tribal, territorial government permitting processes for nature-based solutions.** Accelerating permitting processes for appropriate, well-established, nature-based solutions can speed implementation of resilience-enhancing actions. Agencies should create new mechanisms to improve Federal permitting and review processes, and support similar efforts among State, local, Tribal, or territorial governments.
- **Document performance of nature-based solutions.** Conducting systematic research on the reliability, operation, and maintenance of nature-based solutions will increase confidence in their use, support maintenance and upgrades, and enable their integration into decision support tools. In particular, research is needed on the performance of nature-based solutions at large scales and over long time periods to ensure longevity of function and durability of installation.
- **More fully account for natural assets’ contributions to adaptation and resilience in Federal decision making.** Aligning agency guidance, practices, and capacities on valuing environmental and ecosystem services can improve accounting for resilience costs and benefits in benefit-cost analyses. In addition, agencies can better reflect the value of resilience to the nation’s economy by contributing capacity, data, and resources to the [Natural Capital Accounts](#) and the underlying System of Environmental Economic Statistics.
- **Integrate changing wildfire risks into resource management, wildland fire mitigation, and emergency management actions.** Agencies can assist landscapes, communities, and the wildland fire workforce [adapt](#) to novel fire regimes and longer fire seasons, while reducing risks to people and to nature. Federal actions for natural resource management, wildland fire mitigation, and emergency management should be informed by fire-related climate science, fire ecology, interdisciplinary perspectives, Indigenous Knowledge, and best practices in adaptive management. Land use practices should also be evaluated to determine how they can reduce wildland fire risks. The National Cohesive Wildland Fire Strategy and Wildfire Mitigation and Management Commission final report provides specific recommendations for addressing impacts across landscapes and communities.
- **Protect wetlands and other key freshwater and coastal resources in the face of climate change and other stressors.** [Well-managed floodplains and wetlands provide myriad benefits](#) to human health and safety, including crucial flood control benefits, water quality, and healthy habitats for fish and wildlife. The natural benefits that rivers, lakes, wetlands, and coastal ecosystems like marshes and mangroves provide food security benefits through productive fisheries and flood protection through flow regulations and will only become more important as our climate changes. Federal agencies should increase coordination and work within their existing authorities to conserve and restore freshwater and coastal ecosystems under their jurisdictions, and should partner with State, local, Tribal, and territorial governments to enhance stewardship at all levels of government. This includes working with ranchers, farmers, and resource-dependent businesses to improve water



conservation, and land and forest stewardships to restore degraded watersheds in priority drought impacted areas to improve water security.

- **Continue to invest in creating green spaces and protect urban natural spaces to mitigate extreme heat and air pollution.** Offering Federal funding, tools, and expertise to help communities implement tree-planting and greenscaping programs can reduce the impacts of extreme heat and improve air quality, particularly in nature-deprived communities in urban areas resulting in positive contributions to overall community wellness. The U.S. Department of Agriculture Forest Service [Urban and Community Forestry](#) program is one vehicle for providing technical and financial assistance to communities for urban forests and tree canopies, with a particular focus on disadvantaged communities who are most affected by climate impacts. Urban greening programs can reduce cooling costs for low-income and overburdened communities, reducing health conditions that are exacerbated by heat and poor air quality.
- **Increase opportunities for public-private partnerships that advance conservation for climate resilience.** Federal agencies that manage lands and waters are uniquely situated to advance public-private partnerships to incentivize delivery of conservation actions on natural and working lands and waters to advance climate resilience while maximizing co-benefits, such as provision of carbon storage and biodiversity benefits.

## **Objective 6: Help communities become not only more resilient, but also more safe, healthy, equitable, and economically strong.**

A community's climate resilience is closely linked to its economic, social, and physical well-being. Communities with diverse economies, strong civic engagement, food and water security, and access to essential services like equitable transportation, affordable housing and health care will be more resilient to climate threats. For example, investments in a community's health care system—including in medical supply chains, health care facilities, and outreach networks—will improve not just the overall health and well-being of community members during normal operations, but also their capacity to mitigate, adapt to, and recover from the compounding impacts of extreme weather events and long-term climate stresses. Moreover, individuals with underlying health conditions tend to be more vulnerable to extreme weather events, such as heat waves, meaning that measures that improve communal health improve climate resilience. The [Federal Plan for Equitable Long Term Recovery and Resilience](#) presents opportunities for leveraging Federal resources to promote social, behavioral, and community health alongside climate resilience.

Increasing the water and energy efficiency of our housing stock through opportunities such as the Department of Housing and Urban Development's [Green and Resilient Retrofit Program](#) makes homes more resilient to climate impacts like intense hurricanes and heat waves. Installing community-scale solar and storage, microgrids powered by renewable energy, and other distributed clean energy resources through opportunities such as the Department of Energy's Community Power Accelerator program, improve local air quality, while creating local energy systems that provide power during grid disruptions. Planting trees and expanding greenspaces in



urban environments improves physical and mental health and increases food security and recreational opportunities, while mitigating extreme heat and flooding (see Objective 5).

Across sectors, workforces and workplaces must adapt to climate change. Investments in climate resilience can deliver tangible workforce benefits. These include the development of new local jobs, new specialties in existing jobs, and improved health and safety. For example, the National Oceanic and Atmospheric Administration’s [Climate-Ready Workforce](#) plan will invest \$60 million to place workers in high-quality jobs that advance climate resilience and the [American Climate Corps](#) will train young people in high-demand skills for jobs in the clean energy economy. Yet providing climate-related job and training opportunities is necessary, but not sufficient for ensuring workers’ health, safety, and resilience, especially when job opportunities are often outdoors or otherwise exposed to climate hazards like heat or floods. This is why incorporating worker health and safety protections that take climate impacts into account is necessary for a thriving workforce today and in decades to come. The public sector at all levels can reform processes and policies related to climate-ready workforce development to prioritize considerations and protections for worker health and safety. Moreover, collective bargaining can strengthen workers’ protections against climate-exacerbated issues in the workplace, which underscores the importance of ensuring workers have good jobs with the free and fair choice to join a union.

Communities can establish local “resilience hubs” to capitalize on the cross-cutting benefits of resilience-related investments. These hubs can be community centers, libraries, cultural organizations, parks and recreation buildings, and other public-serving spaces that serve communities year-round as gathering places and as critical safe spaces before, during, and after disasters. These buildings and sites are designed or retrofitted to withstand multiple types of disasters and climate threats. Resilience hubs—and the trusted staff that work there—can offer workforce development and training opportunities related to sustainability and resilience; deliver needed and uninterrupted social, legal, and health services; help preserve cultural practices and heritage at risk from climate threats; and build community capacity to develop the climate resilience solutions most appropriate to them (see Objective 4). A variety of Federal funding is available for communities to launch resilience hubs, including through the Federal Emergency Management Agency’s [Building Resilient Infrastructure and Communities \(BRIC\)](#) program, the Department of Energy’s [Energy Efficiency and Conservation Block Grant Program](#), and the Environmental Protection Agency’s [Environmental and Climate Justice Communities Grants](#).

In some cases, helping communities thrive means supporting communities who may want to relocate away from places that climate change is rendering uninhabitable. Rising sea levels could [displace 2 million Americans](#) by 2100; millions more are likely to move due to intensified severe weather, wildfire, and chronic stresses like drought and extreme heat. Supporting voluntary relocation of communities, neighborhoods, and families at severe risk of personal injury, property damage, or loss of livelihood who need and desire to move is sometimes the best or only strategy for meaningfully reducing that risk. Supporting community-driven relocation also means supporting receiving communities—the places where people may relocate to—such as by directing funding and capacity for social services or expediting development of additional affordable housing. The Department of Housing and Urban Development’s [Climate Resilience Implementation Guide for Community Driven Relocation](#) provides a step-by-step guide for communities seeking to implement a community-driven relocation program. Additionally, through BIL and IRA funding, as well as other appropriations, the Department of the Interior, the



Federal Emergency Management Agency, and the Denali Commission have committed \$135 million to support the relocation efforts of [11 severely impacted Tribal Nations](#). The U.S. Department of Agriculture is also supporting relocation activities for 14 rural Alaskan villages and Tribes through the Natural Resource Conservation Service Watershed and Flood Prevention Operations Program.

## Opportunities for Action

- **Ensure access to lifeline services remains stable through both acute and chronic climatic events.** Disruptions to lifelines—such as energy, communications, water, health, and transportation services—because of climate change increases threats to health and wellbeing across communities. In order to help communities recover lifelines post-disaster, the Federal Government can continue to partner with local utilities, hospitals, governments, and the private sector to proactively build resilience and reduce disruption across these services in anticipation of climate events.
- **Build a climate-ready and climate-educated workforce.** Building a climate-ready and climate-educated workforce requires broad and comprehensive education and professional development. The Federal Government can invest in all levels of education—including K-12, vocational schools, college, and postsecondary education and training—to ensure the workforce is prepared to implement strategies that reduce risk, maximize resilience, safeguard cultural heritage, and respond to community needs. Agencies can implement curricular resources and leverage existing climate training opportunities to equip workers with essential principles on [climate resilience and trade-specific competencies](#)—this includes supporting registered [apprenticeship programs](#) and partnerships between labor unions, employers, and community/technical colleges. The Federal Government can also expand and create fellowships and peer-to-peer climate resilience-focused changes to promote networks, transferrable learning, and collaborative training opportunities between the governments, labor unions, educational institutions, the private sector, and communities.

This can be facilitated through the following ways:

- Work with public universities, Tribal Colleges and Universities (TCUs), Historically Black Colleges and Universities (HBCUs), and Minority-Serving Institutions, including Hispanic Serving Institutions, and community colleges to cultivate opportunities and networks that expand the workforce needed to build a climate resilient nation.
- Provide support for innovative curriculum development through partnership development and place-based learning. For example, the Federal Government can implement place-based, climate resilience-oriented national service and career training programs through agencies like AmeriCorps that support a range of disciplines.
- Work with schools and colleges to create innovative fellowship and mentorship programs that let students work on real-world climate issues.
- Attract top international talent in STEM fields through using the expanded access of legal immigration through J-1, O1-A, and F-1 visas, as well as through sponsoring fellowships put in place by the Biden-Harris Administration.



- [Find state and local workforce development boards](#) to engage relevant partners including employers, community colleges and other institutions of higher education, labor unions, community-based organizations, and others who make up the education and workforce development ecosystem. Workforce development boards may also be able to assist partners in accessing services and Federal funds provided by the Workforce Innovation and Opportunity Act (WIOA).
- **Facilitate access to funding and technical assistance for community-driven relocation.** Community-driven relocation requires extensive services to support both communities and individuals (transportation, housing, schools, jobs, and counseling services) thrive. Agencies can increase access to funding by improving regional coordination with trusted community partners to help communities assess their options, and by identifying and removing barriers in funding application processes, including waving cost share for communities undertaking significant community-wide relocation efforts.
- **Support State, local, Tribal, and territorial governments developing resilience plans that consider impacts for both relocating and receiving communities.** Deliberate, strategic planning of relocation logistics can help reduce disruptions and empower self-determination of individuals and communities who choose to relocate. Such planning can also better align the financing of the relocating and receiving communities, minimize the impact on families, and restore or protect relinquished lands. Supporting receiving communities is closely linked to expansion of affordable, climate-resilient housing (see Objective 2); one of the driving reasons that individuals and communities do not relocate before, or even after a disaster is difficulty finding comparable housing at an affordable price.
- **Expedite and improve voluntary buyout processes.** Voluntary buyouts can be a key driver of relocation, but must be developed equitably, to ensure they are more accessible to underserved groups. The Federal Government can improve this means of relocation by promoting buyouts as part of a local government’s comprehensive community-wide resilience plan. For instance, the Federal Government could explore accessing and establishing a uniform, coordinated Federal application process for buy-out projects with simplified damage assessments and cost-benefit analyses, thereby reducing the burden on homeowners. Federal actors can also provide up-front funding and capacity building for state and local authorities, which would help communities incorporate buyouts in a pre-disaster hazard mitigation plan.
- **Evaluate community-driven relocation programs to improve policies over time.** Evaluating relocation programs and processes and facilitating knowledge sharing between communities considering or undergoing relocation is critical to understanding and improving their effectiveness. Federal agencies should evaluate their acquisition and regulatory tools that facilitate relocation, including buyout programs, the transfer of development rights, leasebacks, land swaps, and conservation land trusts, as well as ongoing Tribal relocation demonstration projects.
- **Increase awareness and training for climate-related health risks.** Climate change poses threats to individuals’ current and future health conditions and exacerbates existing health threats, particularly for vulnerable populations, such as the elderly, the young, pregnant women, and those living with chronic disease. The Federal Government can work alongside the medical community and local governments to enhance monitoring of climate-related



hazards such as impaired air quality and extreme heat. The Federal Government can also work with non-Federal partners to ensure that health providers are literate, trained in, and ready to respond to potential health threats from climate change and to ensure that the public is aware of actions they can take to protect themselves from climate-related hazards.

- **Support essential workers, first responders, and health professionals in responding to climate stresses.** Climate impacts like extreme heat, wildfire, and severe storms increase demands across public service sectors. The often-strenuous conditions of responding to climate emergencies can take a toll on the mental and physical health of the essential workers, first responders, and health professionals who support continuity of public services during these emergencies. The resilience of services depends on the resilience of these workers, and governments at all levels should ensure that these workers are provided with the personal protective equipment, training, adequate staffing, and access to care they need to remain healthy and ready to work.
- **Enhance the resilience of the nation’s health care system with a focus on safety net institutions.** Extreme weather events such as heat waves can result in tighter allocation of energy resources and disruptions of water resources and supply chains, threatening the continuity and effective functioning of health systems and the health of people that rely on them. The Federal Government can support health system resilience through an integrated program of tools and resources, technical assistance, and dedicated funding for resilience retrofits.