

# Assessing the Progress and Impact of Federal Climate Adaptation: Developing Climate Resilience Indicators and Metrics



White House Council on Environmental Quality

June 2024

## SUMMARY

Across the nation, climate change is leading to more extreme heat and intense storms, rising seas, increased flooding, worsening droughts, and increasingly severe wildfires – devastating communities and economic sectors. In the face of these impacts, it is imperative that the Federal government and its partners in State, local, and Tribal communities work together to build climate resilience.<sup>1</sup> Building a climate-resilient nation will require diverse strategies to prepare for growing climate threats and hazards, adapt to changing conditions, and withstand and recover from acute and chronic disruptions. Measuring the progress and outcomes of these adaptation and resilience strategies is critical to assessing and optimizing their effectiveness.

Climate adaptation planning and implementation across Federal agencies is one way in which the Biden-Harris Administration is demonstrating leadership towards the objectives of the [National Climate Resilience Framework](#). Updated [Federal Climate Adaptation Plans \(CAPs\) for 2024-2027](#), developed in coordination with the White House Council on Environmental Quality (CEQ), represent a growing expertise and capacity among Federal agencies to implement climate adaptation strategies. For the first time, these Plans include a common set of indicators and metrics, to improve assessment and communication of climate resilience efforts across the Federal government.

From 2022 to 2023, CEQ partnered with Federal agencies responsible for preparing CAPs to identify process-related indicators and metrics to improve assessment of how the Federal government is managing climate risks and building operational and mission resilience. This paper serves as a case study and starting point for strengthening development and application of adaptation and resilience metrics across Federal agencies. Furthermore, this work adds to the growing body of knowledge on adaptation and resilience measures and can serve as a model to non-Federal actors looking to develop and implement these measures for their own organizations.

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<sup>1</sup> “Resilience” is defined here as the ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions, is a critical endeavor that must be undertaken at all levels of government. “Climate resilience” is used in an intentionally broad manner and is inclusive of the term “adaptation” and “climate adaptation,” or the process of adjusting systems in response to the actual and projected consequences of a changing climate.

## Introduction

From chronic stressors like drought and sea level rise to acute shocks including more intense hurricanes and flooding, climate change is impacting every region of the United States. Both chronic and acute climate stressors, which strain economic, social, and cultural resources, are projected to increase in the short- and long-term. Investing in adaptation and resilience to address these challenges today will save billions of dollars in losses in the long-run, protect human health, increase quality of life, and safeguard and conserve natural ecosystems. Proactive efforts to adapt and build resilience can prioritize support for disadvantaged communities who are disproportionately vulnerable to the impacts of climate change and face a more challenging road to recovery when disasters occur.

The U.S. government employs over 4 million people, spends \$700 billion annually on goods and services, owns more than 300,000 buildings, and manages 640 million acres of public land. This extensive footprint, distributed across all 50 states and the U.S. territories, faces mounting climate risks while also offering profound opportunities to pursue adaptation and resilience solutions. As part of the Biden-Harris Administration's efforts to prepare for and adapt to climate risks, Federal "principal" agencies<sup>2</sup> are required to periodically develop Climate Adaptation Plans (CAPs) under section 211 of Executive Order (E.O.) 14008, [\*Tackling the Climate Crisis at Home and Abroad\*](#);<sup>3</sup> section 5(d) of E.O. 14030, [\*Climate-Related Financial Risk\*](#);<sup>4</sup> and section 503 of E.O.14057, [\*Catalyzing Clean Energy Industries And Jobs Through Federal Sustainability\*](#).<sup>5</sup> In support of the [National Climate Resilience Framework](#), these CAPs describe how agencies will sustain operations and mission delivery while supporting communities across the country in adapting and building resilience to the effects of climate change.

Tracking Federal progress and evaluating successful outcomes is challenging given the breadth and diversity of Federal agencies' missions. Nonetheless, advancing efforts in this space is important for managing climate-related financial risk to the Federal government and ensuring wise investment of taxpayer resources. The [Fifth National Climate Assessment](#) discusses challenges around developing adaptation and resilience metrics, including how to quantify the benefits of avoided losses and harm, ensure metrics are granular enough to address the needs of communities with environmental justice concerns, and evaluate short- versus long-term consequences of adaptation actions. On the international level, work is being undertaken to develop metrics and indicators in the context of the Global Goal on Adaptation, an element of the 2015 Paris Agreement. Most recently, at the 2023 U.N. Climate Change Conference, Parties established a two-year work program to advance the development of indicators for measurement

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<sup>2</sup> Executive Order 14057 Sec. 603(h) defines principal agencies as the following: Departments of State, the Treasury, Defense (including the United States Army Corps of Engineers), Justice, the Interior, Agriculture, Commerce, Labor, Health and Human Services, Housing and Urban Development, Transportation, Energy, Education, Veterans Affairs, and Homeland Security; the Environmental Protection Agency; the Small Business Administration; the Social Security Administration; the National Aeronautics and Space Administration; the Office of Personnel Management; the General Services Administration; and the National Archives and Records Administration.

<sup>3</sup> 86 FR 7619 (Feb. 1, 2021).

<sup>4</sup> 86 FR 27967 (May 25, 2021).

<sup>5</sup> 86 FR 70935 (Dec. 13, 2021).

of progress towards the adaptation targets adopted in the UAE Framework for Global Climate Resilience.

The National Climate Resilience Framework challenged CEQ and Federal agencies to include targets and indicators in the 2024-2027 Climate Adaptation Plans to better assess and communicate governmentwide efforts to advance climate adaptation and resilience. In anticipation of preparing updates to the CAPs in late 2023, CEQ worked with adaptation and resilience leaders from a range of Federal agencies to identify resilience metrics that could be included in the CAPs. This paper describes the development of these metrics, their application in the 2024-2027 CAPs, and lessons learned to help those advancing this work in the future or looking to develop resilience indicators and metrics for communities or other levels of government.

### **Developing Climate Resilience Indicators and Metrics for Federal Agencies**

The goal of this effort, coordinated by CEQ, was to develop a collection of indicators that could be used to assess climate resilience efforts across all Federal agencies and ensure these indicators could also be applied at sub-agency levels.

In this work, **indicators** describe adaptation and resilience actions taken by Federal agencies and define a set of values against which metrics are measured. **Metrics** are measures used to track progress and assess success of climate adaptation and resilience actions. Indicators and metrics can be divided into two types to assess adaptation resilience planning and action:

1. **Process-related.** Providing information on planning, resource allocation, and operational aspects of adaptation and resilience actions.
2. **Outcome-related.** Providing information about the performance of the targeted system or organization under stresses and shocks.

To facilitate identification of a common set of metrics, in 2022 to 2023, CEQ held a series of workshops with adaptation and resilience leaders from Federal agencies with diverse missions, assets, geographic distributions, and workforces.<sup>6</sup> The initial focus of this effort was on the development of process-related indicators. The 2021 CAPs, agency strategic plans, and other climate adaptation literature were used as a basis to prioritize and refine indicators that would be relevant across the range of Federal agencies who prepare CAPs and provide a meaningful assessment of progress.

The five selected indicators describe whether:

1. Climate resilience is integrated into program planning and budgeting.
2. Data management systems and tools are updated to reflect climate change information.
3. Agency CAPs address multiple hazards and stressors and demonstrate nature-based solutions, equitable approaches, and mitigation co-benefits to adaptation and resilience objectives.

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<sup>6</sup> Two of the five workshops in this series were co-hosted by CEQ, Duke University, and The Pew Charitable Trusts. The time, ideas, and subject matter expertise of those involved were critical to this effort.

4. Federal assets and supply chains have been evaluated for climate-related risk and relevant response protocols have been updated.
5. Federal agency staff have been trained in climate adaptation and resilience and related protocols and procedures.

While the focus of this effort was identifying a common set of process-related indicators, initial effort was also taken to identify outcome-related indicators that would be relevant to the range of Federal agencies. Given the diversity of agency missions, developing a common set of outcome-related indicators that are relevant and applicable across more than 20 agencies will be very challenging. Further effort will be required to build out a robust set of outcome-related indicators. However, this initial effort did illustrate commonality of some systems across Federal agencies—such as personnel and facilities—that could be used as starting points for future outcome-related indicators.

### Deployment of Federal Climate Resilience Process-Related Indicators

Building off the collaborative interagency process, CEQ introduced a common set of process-related indicators and metrics for the 2024-2027 Climate Adaptation Plans. These indicators and metrics represent an important step towards better understanding the scope and progress of climate adaptation and resilience activities governmentwide. In preparing its CAP, each Federal agency responded to the following prompts:

<b>Indicator 1</b>	<b>Climate adaptation and resilience objectives and performance measures are incorporated in agency program planning and budgeting by 2027.</b>
<b>Metric 1.1</b>	<p><b>Step 1:</b> Agency has an implementation plan for 2024 that connects climate hazard impacts and exposures to discrete actions that must be taken. (Yes/No/Partially)</p> <p><b>Step 2:</b> Agency has a list of discrete actions that will be taken through 2027 as part of their implementation plan. (Yes/No/Partially)</p>
<b>Metric 1.2</b>	Agency has an established method of including results of climate hazard risk exposure assessments into planning and decision-making processes. (Yes/No/Partially)
<b>Metric 1.3</b>	Agency has an agency-wide process and/or tools that incorporate climate risk into planning and budget decisions. (Yes/No/Partially)
<b>Metric 1.4</b>	<p><b>Step 1:</b> By July 2025, agency will identify grants that can include consideration and/or evaluation of climate risk. (Yes/No/Partially)</p> <p><b>Step 2:</b> Agency modernizes all applicable funding announcements/grants to include a requirement for the grantee to consider climate hazard exposures. (Yes/No/Partially)</p>
<b>Indicator 2</b>	<b>Data management systems and analytical tools are updated to incorporate relevant climate change information by 2027.</b>

<b>Metric 2.1</b>	Agency has identified the information systems that need to incorporate climate change data and information, and will incorporate climate change information into those systems by 2027. (Yes/No/Partially)
<b>Indicator 3</b>	<b>Agency CAPs address multiple climate hazard impacts and other stressors, and demonstrate nature-based solutions, equitable approaches, and mitigation co-benefits to adaptation and resilience objectives.</b>
<b>Metric 3.1</b>	By July 2025, 100% of climate adaptation and resilience policies have been reviewed and revised to (as relevant) incorporate nature-based solutions, mitigation co-benefits, and equity principles. (Yes/No/Partially)
<b>Indicator 4</b>	<b>Federal assets and supply chains are evaluated for risk to climate hazards and other stressors through existing protocols and/or the development of new protocols; response protocols for extreme events are updated by 2027.</b>
<b>Metric 4.1</b>	<b>Step 1:</b> Agency has assessed climate exposure to its top 5 most mission-critical supply chains. (Yes/No/Partially) <b>Step 2:</b> By July 2026, agency has assessed services and established a plan for addressing/overcoming disruption from climate hazards. (Yes/No/Partially)
<b>Metric 4.2</b>	Agency has identified priorities, developed strategies, and established goals based on the assessment of climate hazard risks to critical supplies and services. (Yes/No/Partially)
<b>Indicator 5</b>	<b>By 2027, agency staff are trained in climate adaptation and resilience and related agency protocols and procedures.</b>
<b>Metric 5.1</b>	<b>Step 1:</b> By December 2024, 100% of agency leadership have been briefed on current agency climate adaptation efforts and actions outlined in their 2024 CAP. (Yes/No/Partially) <b>Step 2:</b> Does the agency have a Climate 101 training for your workforce? (Yes/No/Partially) If yes, what percent of staff have completed the training? <b>Step 3:</b> By July 2025, 100% employees have completed climate 101 trainings. (Yes/No/Partially)

CEQ will use the initial responses in the 2024-2027 CAPs to refine and improve these indicators and metrics for continued use in future reporting and planning. For Federal agencies, these indicators and metrics will be useful in setting goals and assessing progress on climate adaptation and resilience, both within the framework of their CAPs and in other agency-level planning activities. More broadly, these measures will improve understanding of the breadth of agency activities, assessment of progress, and evaluation of the impact of the Federal government in advancing climate adaptation and resilience. For example, for Metric 3.1, on review and revision of relevant policies for climate adaptation and resilience, 36 percent of agencies responded affirmatively, 59 percent responded with partially, and 5 percent responded that they have not yet completed this effort, reflecting the agency progress and capacity for this effort. In future progress reporting of CAP implementation, agencies will provide updated responses to the

indicators and metrics as well as specific updates on activities that fall within the scope of each indicator, which will provide insight into progress being made on incorporating climate risk into policies.

## **Conclusions**

This interagency effort led to the successful deployment of process-related indicators and metrics for climate adaptation and resilience in the 2024-2027 Federal Climate Adaptation Plans. Federal agencies improved their understanding of the systems within their scope that are vulnerable to the effects of climate change and built their capacity to assess the progress and success of their adaptation activities. These common metrics deployed across more than 20 agencies will provide the public a clearer view of the progress of Federal agencies with respect to adaptation and resilience. These measures will also be useful for identifying gaps in agency capacities or resources to address climate change impacts; for example, the availability and usefulness of relevant climate data to include in agency data systems.

In continuing efforts to improve assessment of Federal adaptation and resilience, CEQ will apply the following lessons learned and best practices:

1. Identify the full scope of the system vulnerable to the effects of climate change or capable of advancing climate adaptation and resilience.
2. Work with a diverse collection of adaptation practitioners from a range of Federal entities.
3. Implement an iterative approach to developing indicators and metrics.
4. Balance the quantity and granularity of indicators.
5. Use a blend of qualitative and quantitative measures.
6. Consider a maturity model or stepwise metrics to identify incremental progress.
7. To ensure consistency, develop documentation to explain the intent of each indicator and metric.