

Why GAO Did This Study

Changes in the climate pose a risk to the safety and reliability of the U.S. transportation system, according to the 2018 *Fourth National Climate Assessment*. Congress authorized about \$45 billion per year in federal funding for roads through 2021 and appropriated about \$900 million per year in disaster assistance for fiscal years 2016 through 2020. In 2013, GAO included *Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks* on its High-Risk List. Enhancing climate resilience—acting to reduce potential losses by planning for climate hazards such as extreme rainfall—can help manage climate risks.

GAO was asked to review climate resilience efforts for federally funded roads. This report examines (1) FHWA's climate resilience efforts and (2) options to further enhance them. GAO reviewed FHWA documents and a non-generalizable sample of projects that used FHWA's climate resilience resources, analyzed the content of 53 reports and pieces of legislation to identify options, interviewed stakeholders and agency officials, and analyzed options and FHWA efforts using GAO's October 2019 *Disaster Resilience Framework*.

What GAO Recommends

Congress should consider providing direction to FHWA to implement one or more options to enhance the climate resilience of federally funded roads. GAO also is making one recommendation that the Department of Transportation (DOT) consider these options when prioritizing climate resilience actions. DOT concurred with this recommendation.

View [GAO-21-436](#). For more information, contact J. Alfredo Gómez at (202) 512-3841 or gomezj@gao.gov.

CLIMATE RESILIENCE

Options to Enhance the Resilience of Federally Funded Roads and Reduce Fiscal Exposure

What GAO Found

During the last decade, the Federal Highway Administration (FHWA) undertook targeted efforts to encourage states to enhance the climate resilience of federally funded roads, such as by developing agency policy, providing technical assistance, and funding resilience research. GAO identified projects in four states that planned or made resilience enhancements using FHWA's resources. For example, Maryland used FHWA resources to raise a bridge by about 2 feet to account for projected sea level rise. Such efforts show the potential to enhance the climate resilience of federally funded roads on a wider scale.

GAO identified 10 options to further enhance the climate resilience of federally funded roads through a comprehensive literature search and interviews with knowledgeable stakeholders (see table). Some of these options are similar to recommendations made previously by GAO. Each option has strengths and limitations. For example, adding climate resilience requirements to formula grant programs could compel action but complicate states' efforts to use federal funds.

Options to Further Enhance the Climate Resilience of Federally Funded Roads

1. Integrate climate resilience into Federal Highway Administration policy and guidance.
2. Update design standards and building codes to account for climate resilience.
3. Provide authoritative, actionable, forward-looking climate information.
4. Add climate resilience funding eligibility requirements, conditions, or criteria to formula grant programs.
5. Expand the availability of discretionary funding for climate resilience improvements.
6. Alter the Emergency Relief (ER) program by providing incentives for, or conditioning funding on, pre-disaster resilience actions.
7. Expand the availability of ER funding for post-disaster climate resilience improvements.
8. Establish additional climate resilience planning or project requirements.
9. Link climate resilience actions or requirements to incentives or penalties.
10. Condition eligibility, funding, or project approval on compliance with climate resilience policy and guidance.

Source: GAO analysis of literature and interviews with knowledgeable stakeholders. | GAO-21-436

Implementing multiple options offers the most potential to improve the climate resilience of federally funded roads, according to knowledgeable stakeholders and GAO's analysis using the *Disaster Resilience Framework*, a guide for analyzing federal disaster and climate resilience efforts. This *Framework* states that integrating strategic resilience goals can help decision makers focus on a wide variety of opportunities to reduce risk. FHWA officials said that they likely would need additional authority from Congress to act on some, or a combination of, options and that the most effective way for Congress to ensure its priorities are implemented for any option is to put it in law. The most recent authorization of federal funding for roads covers fiscal year 2016 through fiscal year 2021, which ends on September 30, 2021. This provides Congress with an opportunity to improve the climate resilience of federally funded roads and better ensure they can withstand or more easily recover from changes in the climate. Providing FHWA with additional authority to implement one or more of the options could enhance the climate resilience of more—or all—federally funded roads.