



U.S. Department of Transportation
Federal Highway Administration

Integrating Natural-Hazard Resilience into Transportation Planning

Texas Statewide Resiliency Working Group

December 10, 2020

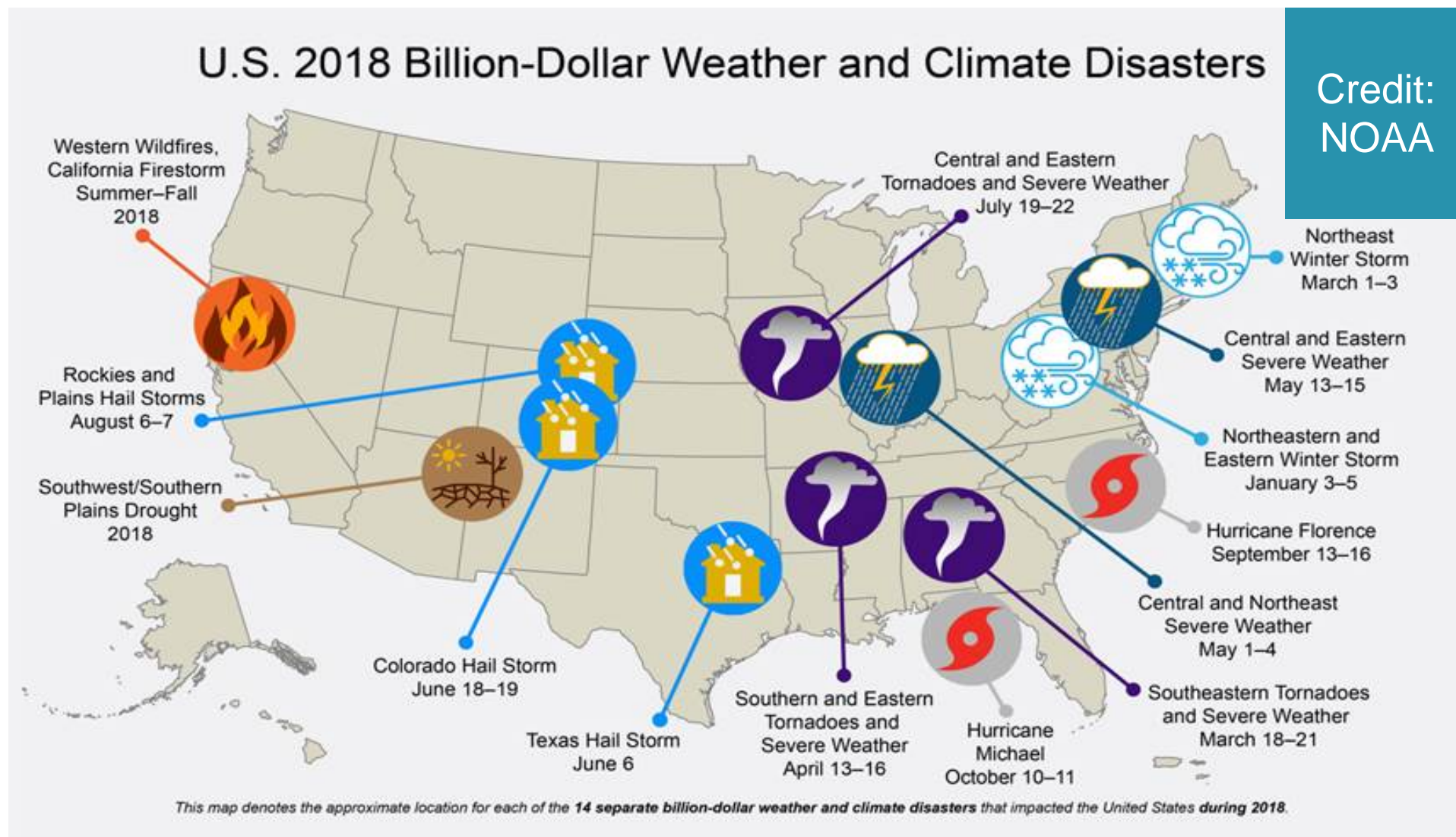
Virtual

Becky Lupes

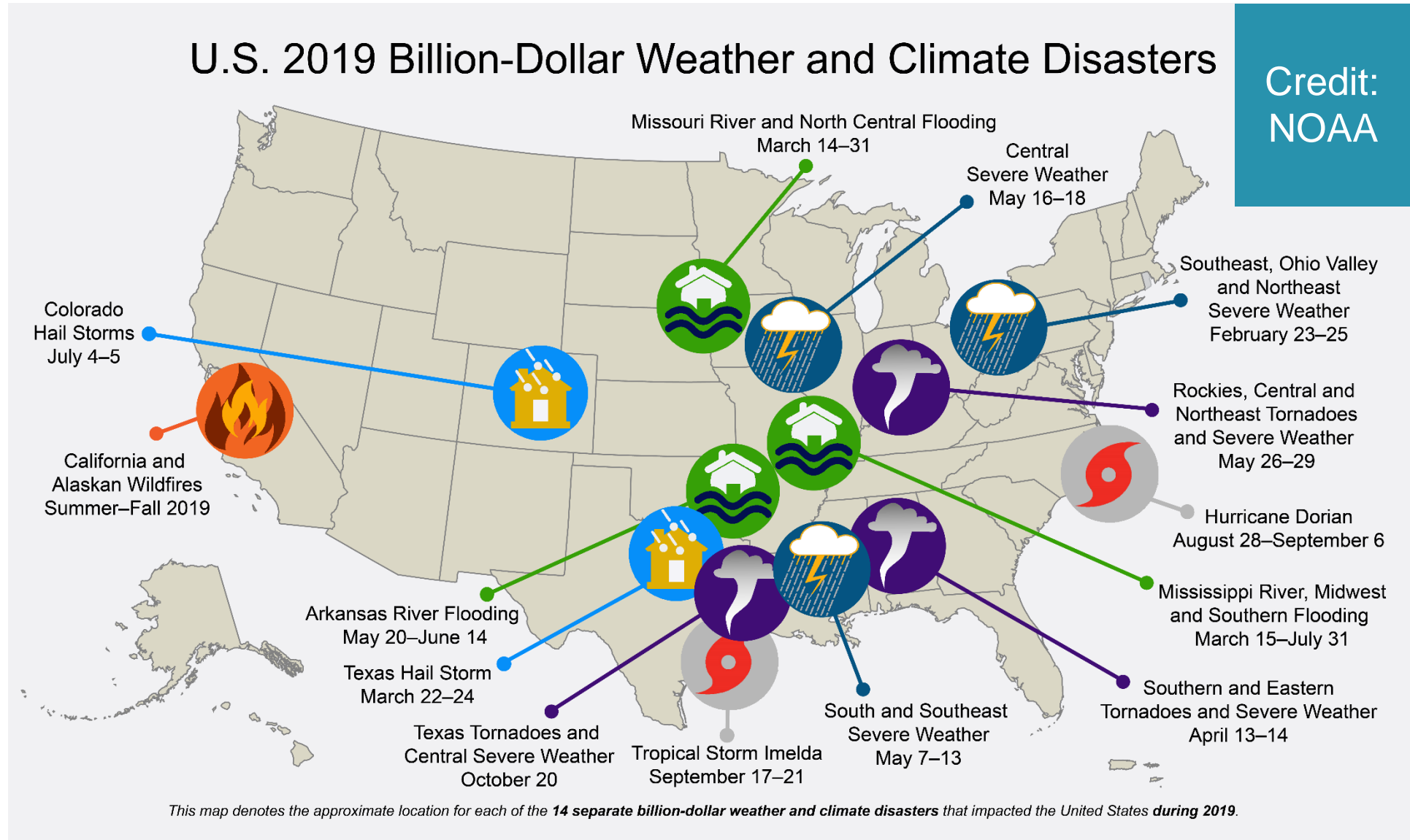
Office of Natural Environment
Federal Highway Administration
Washington, DC



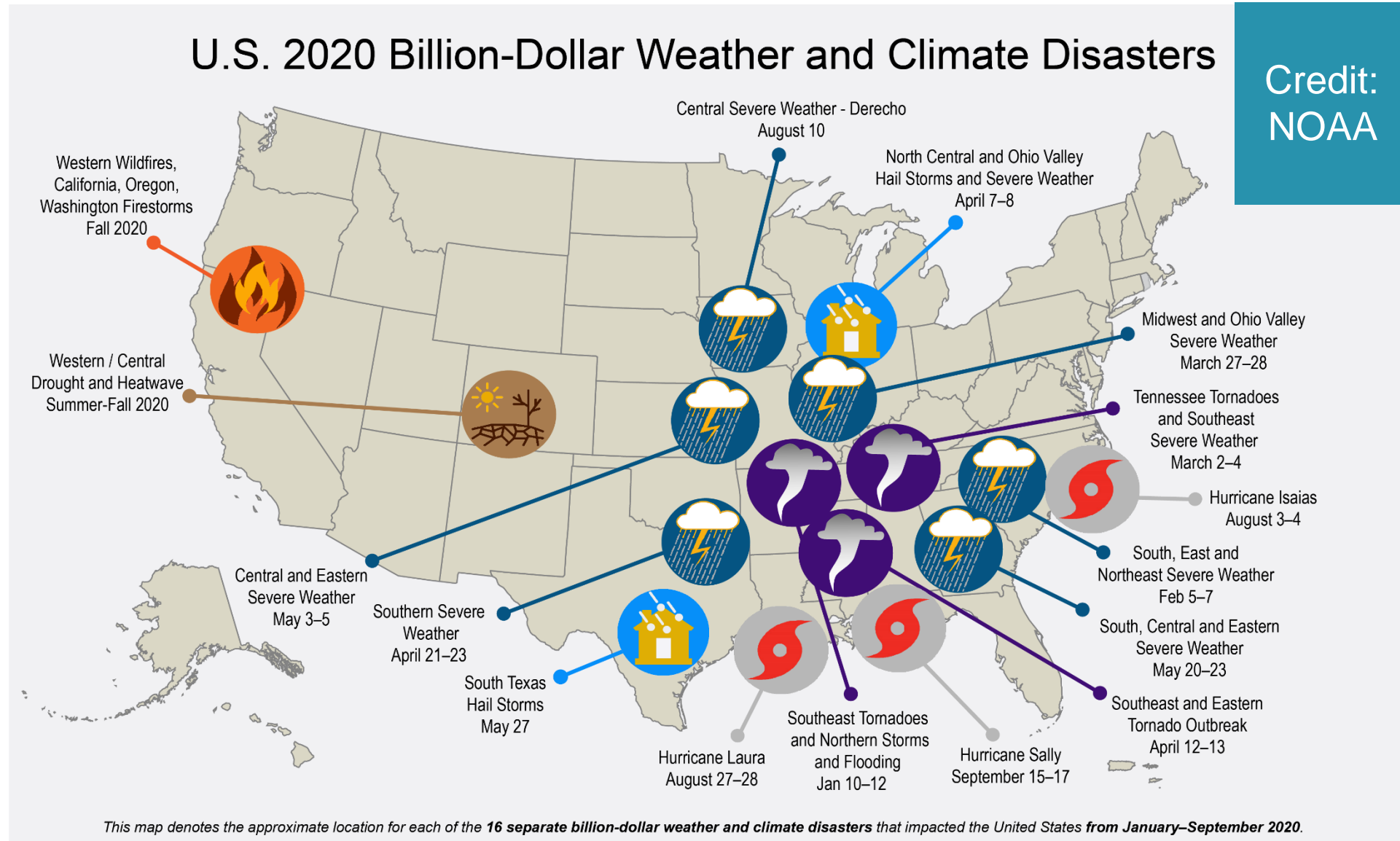
Fourteen Separate Billion-Dollar Disasters in 2018



Fourteen Separate Billion Dollar Disasters in 2019

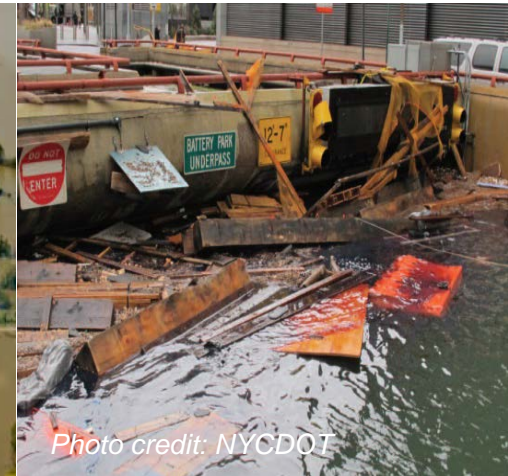


Sixteen Separate Billion-Dollar Disasters in 2020... through September



Transportation System Impacts

USDOT FY 2018-22 Strategic Plan: “DOT will increase its effectiveness in ensuring that infrastructure is resilient enough to withstand extreme weather”



FHWA and Resilience

- FHWA requires resilience to be considered in:
 - Asset management plans ([23 CFR 515](#))
 - [Transportation planning](#) (23 CFR 450)
 - Roads and bridges repeatedly damaged by emergency events (23 CFR 667)
 - FHWA programs and policies ([Order 5520](#))



Flooding from Hurricane Harvey, Credit: TTI



April 2017 flooding in Washington State, Credit: WSDOT

Transportation Planning Resilience Requirements - MPOs

Planning factor on resiliency, reliability, and stormwater mitigation:

The metropolitan transportation planning process shall be continuous, cooperative, and comprehensive and provide for consideration and implementation of projects, strategies, and services that will **improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.**

Transportation Planning Resilience Requirements - MPOs

Consult agencies responsible for natural disaster risk reduction:

In developing metropolitan transportation plans and transportation improvement programs (TIPs), MPOs should consult with agencies and officials responsible for other planning activities within the metropolitan planning area that are affected by transportation (including State and local planned growth, economic development, tourism, **natural disaster risk reduction**, environmental protection, airport operations, or freight movements) or coordinate its planning process (to the maximum extent practicable) with such planning activities.

Transportation Planning Resilience Requirements - MPOs

Assess strategies to reduce vulnerability to natural disasters:

Metropolitan transportation plans shall include an assessment of capital investment and other strategies to preserve the existing and projected future metropolitan transportation infrastructure, provide for multimodal capacity increases based on regional priorities and needs, and **reduce the vulnerability of the existing transportation infrastructure to natural disasters.**

Transportation Planning Resilience Requirements - States

Planning factor on resiliency, reliability, and stormwater mitigation

The statewide transportation planning process shall be continuous, cooperative, and comprehensive and provide for consideration and implementation of projects, strategies, and services that will **improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.**

.

Transportation Planning Resilience Requirements - States

Reference emergency relief and disaster preparedness plans

Long-range statewide transportation plans shall reference, summarize, or contain any applicable short-range planning studies; strategic planning and/or policy studies; transportation needs studies; management systems reports; **emergency relief and disaster preparedness plans**; and any statements of policies, goals, and objectives on issues, as appropriate, that were relevant to the development of the plan.

23 CFR 667 – Periodic Evaluations of Damaged Facilities

- States to evaluate alternatives to mitigate damage to roads and bridges repeatedly repaired due to emergency events
- All NHS roads, highways, and bridges (Nov 23, 2018)
- All roads, highways, and bridges (including non-NHS) **evaluated prior to inclusion in a STIP** (Nov 23, 2020)

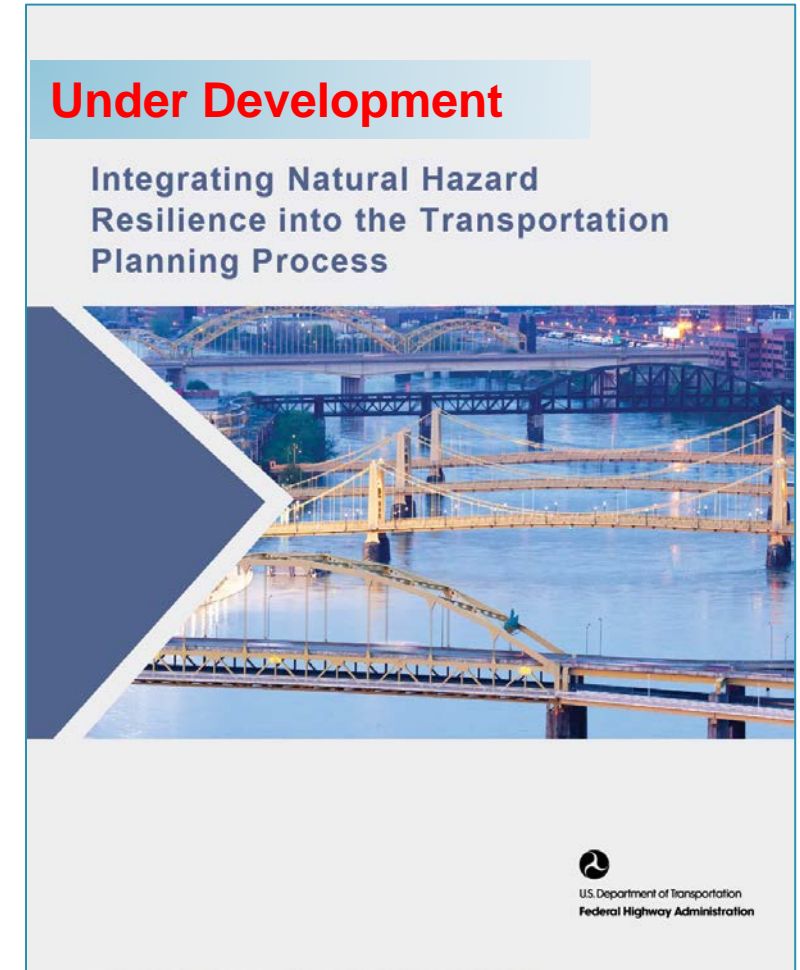


Replacement structure under construction Photo Credit: TxDOT

Q&A: https://www.fhwa.dot.gov/programadmin/23cfr667_qa.cfm

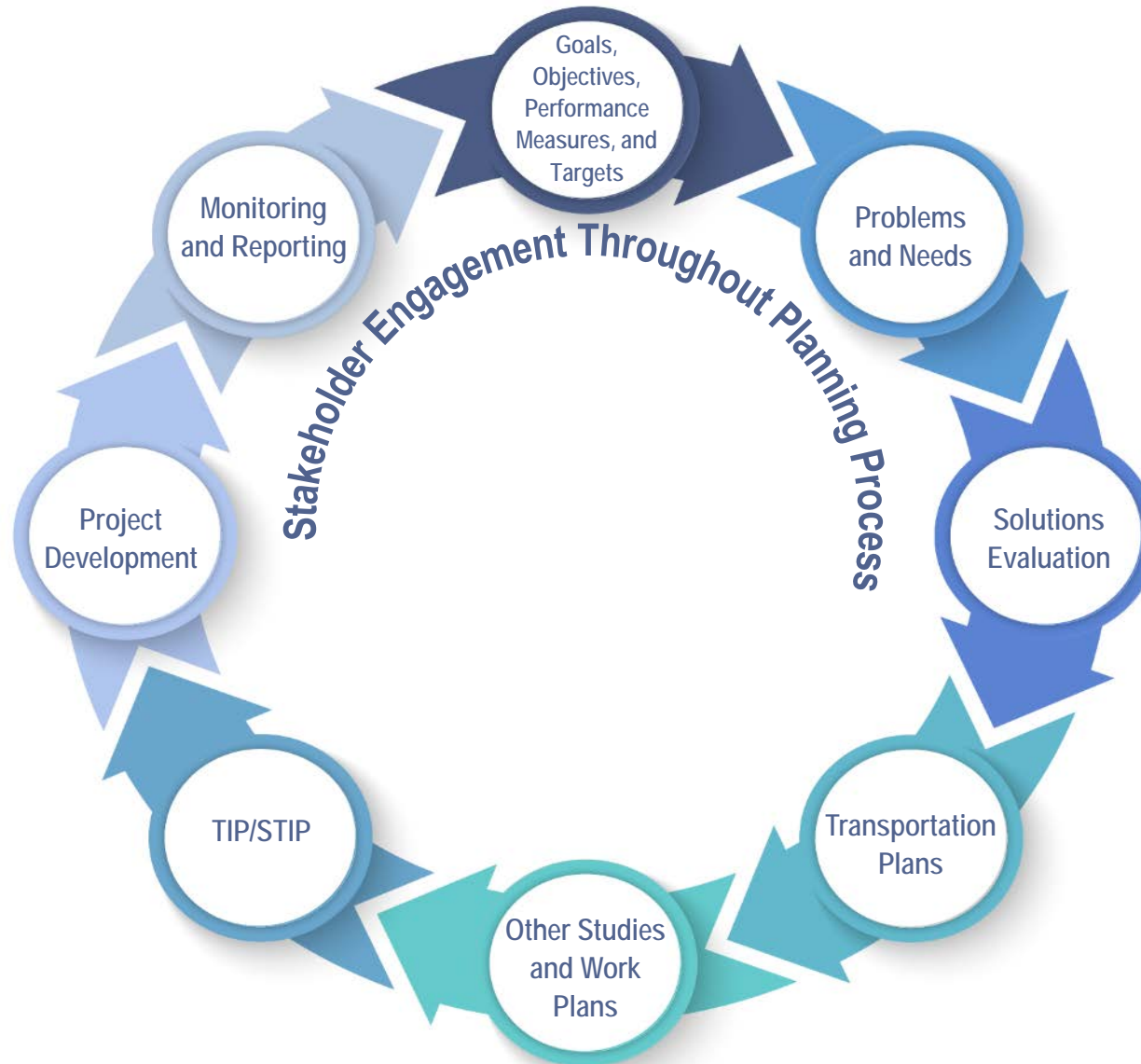
FHWA Research on Planning for Resilience

- Workshops and peer exchanges (on going)
- Fact sheet (January 2017)
- White paper (May 2018)
- Handbook (coming soon!)

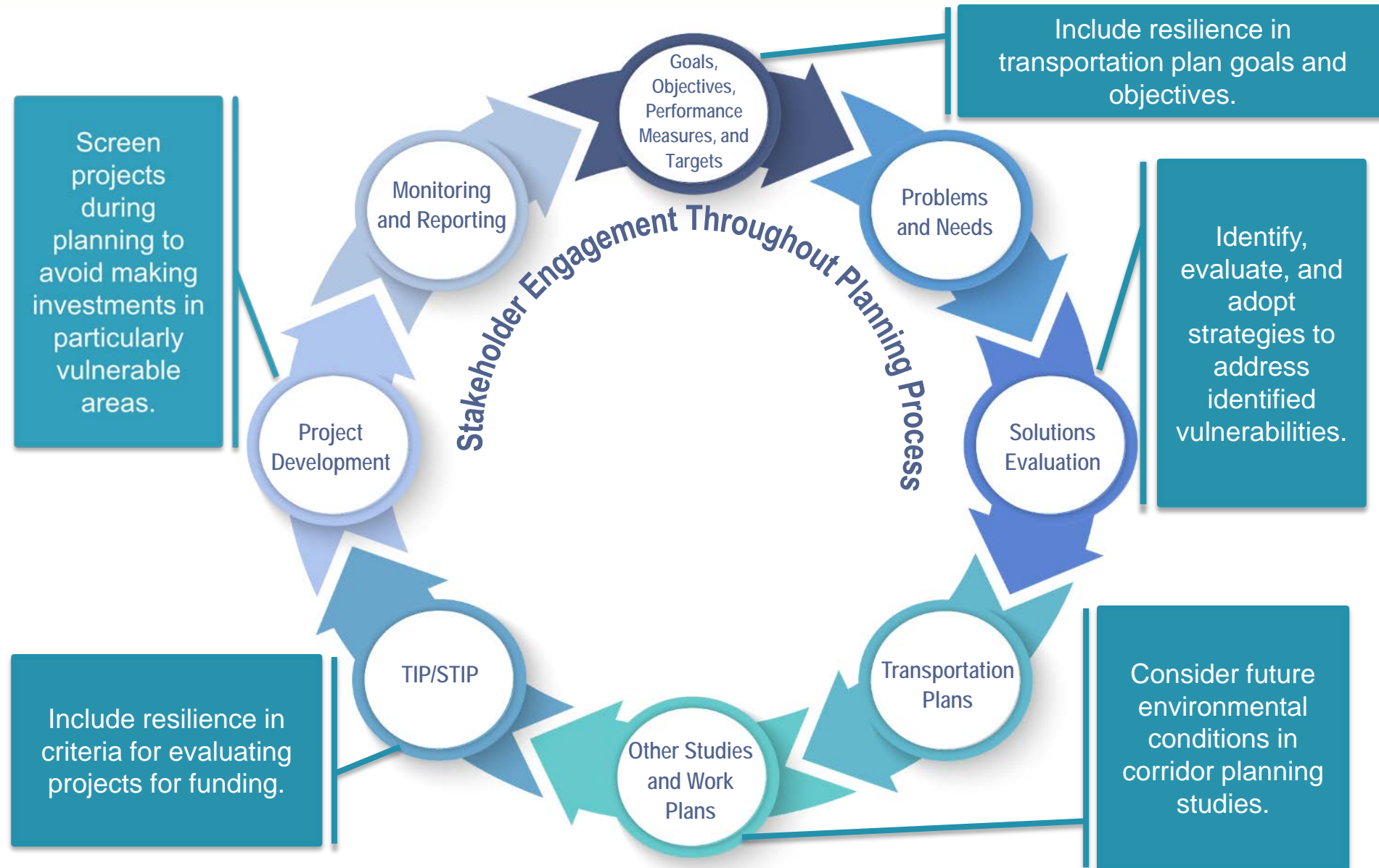


https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/planning/

Typical Transportation Planning Process

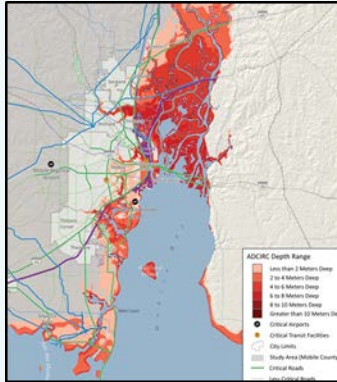


Considering Resilience in the Transportation Planning Process



FHWA Resilience Resources

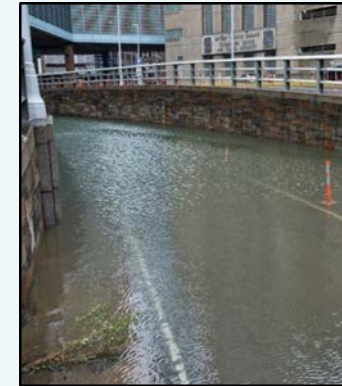
Gulf Coast 2 Study



Resilience Pilots with State DOTs & MPOs



Hurricane Sandy Project



Engineering Assessments Study

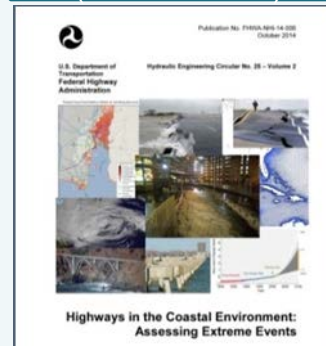


<https://www.fhwa.dot.gov/environment/sustainability/resilience/>

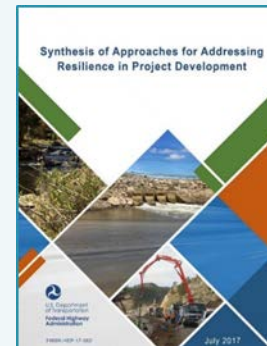
Vulnerability & Adaptation Framework



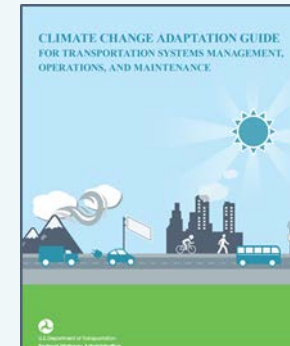
Engineering Guidance (HEC-25 & 17)



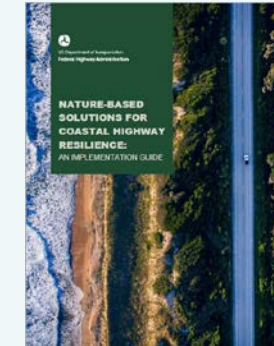
Project Development



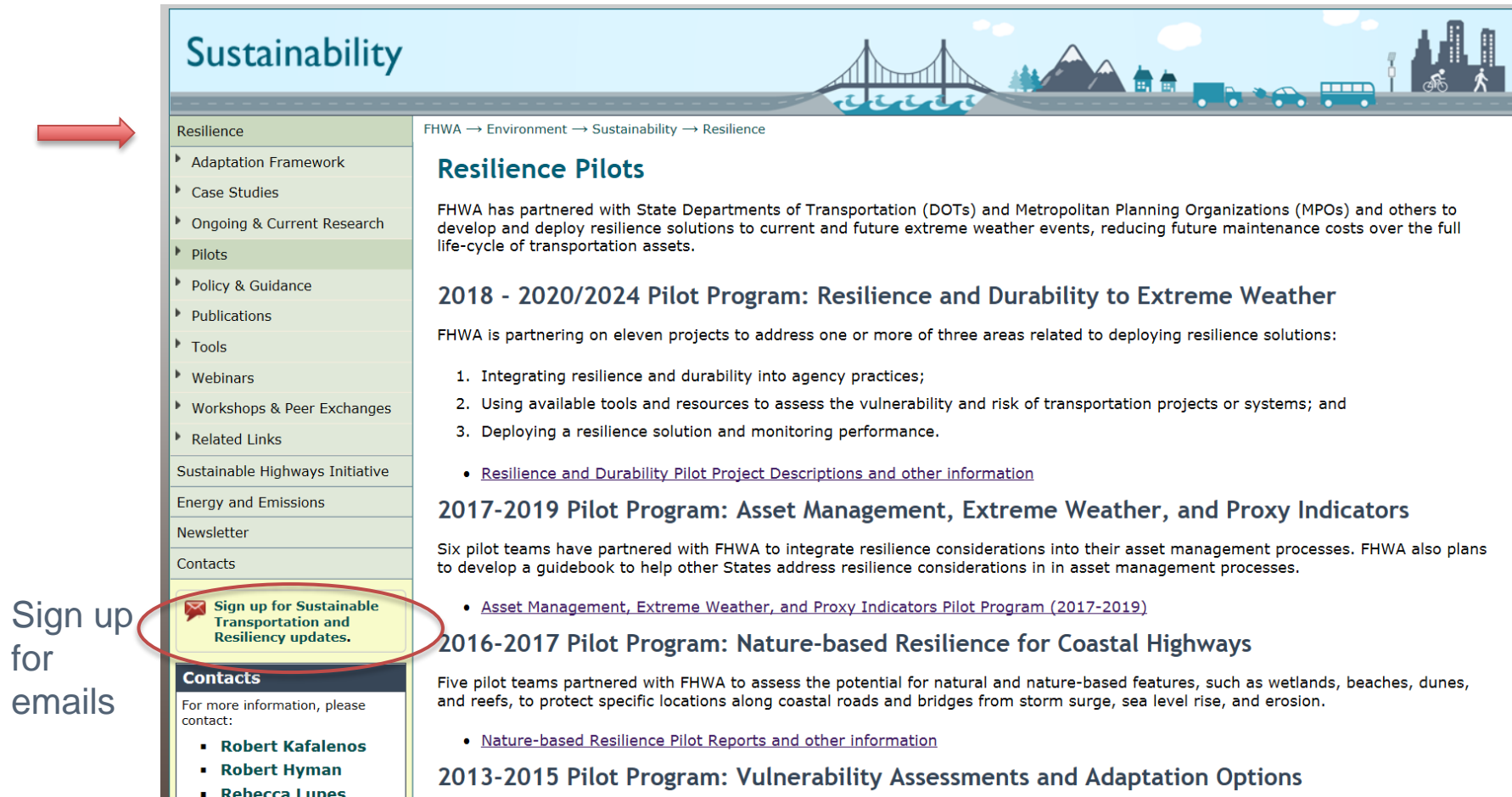
Operations & Maintenance



Nature-Based Solutions



Climate Resilience Website



The screenshot shows the FHWA Sustainability Resilience website. A red arrow points to the 'Resilience' link in the left sidebar. Another red circle highlights the 'Sign up for Sustainable Transportation and Resiliency updates' link in the sidebar, with the text 'Sign up for emails' next to it. The main content area features a breadcrumb trail 'FHWA → Environment → Sustainability → Resilience' and a 'Resilience Pilots' section. This section includes a paragraph about FHWA's partnership with DOTs and MPOs, followed by three pilot programs: 2018-2020/2024, 2017-2019, and 2016-2017. Each program has a list of participating states and a link to more information. The 2013-2015 pilot program is also listed at the bottom.

Sustainability

FHWA → Environment → Sustainability → Resilience

Resilience Pilots

FHWA has partnered with State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) and others to develop and deploy resilience solutions to current and future extreme weather events, reducing future maintenance costs over the full life-cycle of transportation assets.

2018 - 2020/2024 Pilot Program: Resilience and Durability to Extreme Weather

FHWA is partnering on eleven projects to address one or more of three areas related to deploying resilience solutions:

1. Integrating resilience and durability into agency practices;
2. Using available tools and resources to assess the vulnerability and risk of transportation projects or systems; and
3. Deploying a resilience solution and monitoring performance.

- [Resilience and Durability Pilot Project Descriptions and other information](#)

2017-2019 Pilot Program: Asset Management, Extreme Weather, and Proxy Indicators

Six pilot teams have partnered with FHWA to integrate resilience considerations into their asset management processes. FHWA also plans to develop a guidebook to help other States address resilience considerations in in asset management processes.

- [Asset Management, Extreme Weather, and Proxy Indicators Pilot Program \(2017-2019\)](#)

2016-2017 Pilot Program: Nature-based Resilience for Coastal Highways

Five pilot teams partnered with FHWA to assess the potential for natural and nature-based features, such as wetlands, beaches, dunes, and reefs, to protect specific locations along coastal roads and bridges from storm surge, sea level rise, and erosion.

- [Nature-based Resilience Pilot Reports and other information](#)

2013-2015 Pilot Program: Vulnerability Assessments and Adaptation Options

Sign up for emails

Sign up for Sustainable Transportation and Resiliency updates.

Contacts

For more information, please contact:

- **Robert Kafalenos**
- **Robert Hyman**
- **Rebecca Ludes**

<https://www.fhwa.dot.gov/environment/sustainability/resilience/>

THANK YOU!

Website: <https://www.fhwa.dot.gov/environment/sustainability/resilience/>