



U.S. Department of Transportation
Federal Highway Administration

Session 4: Lessons Learned

August 31, 2020









AGENDA

- Lightning Round Recap + Q&A
- Exercise and Discussion: Synthesis of best practices and lessons learned
 - Overall lessons learned and best practices
 - Key focus areas:
 - Approaching **equity** in the resilience planning process
 - Approaching **economic development** in the resilience planning process
 - **Implementing adaptation** projects
 - Resilience **performance measures**
- Presentation: Available resources from FHWA
- Exercise and Discussion: Remaining needs and next steps

POLLEVERYWHERE QUESTION

- What was your key takeaway from Session 3: Resilience Investments?

LIGHTNING ROUND RECAP

	<ul style="list-style-type: none"> • Developing performance measures and tools to incorporate resilience into project prioritization • Plan to conduct a more robust resilience study (funded in LRTP and TIP)
	<ul style="list-style-type: none"> • Project prioritization scoring criteria: repetitive flooding impacts in past five years; hurricane zone designation • Tracking major road closures and data from flood events
	<ul style="list-style-type: none"> • LRTP directly informed by land suitability analyses, environmental analyses, and scenario modeling
<p>Gainesville MTPO</p>	<ul style="list-style-type: none"> • Emergency preparedness activities
	<ul style="list-style-type: none"> • Conducted a vulnerability assessment for major roads • Recent and ongoing studies in the region will provide updated data for the next analysis
	<ul style="list-style-type: none"> • Projects are awarded extra points for addressing resilience • Partnership with Regional Planning Council provides additional opportunities
	<ul style="list-style-type: none"> • All-hazards transportation recovery training: the long-term impacts of major events are just as important to address

LIGHTNING ROUND RECAP

	<ul style="list-style-type: none"> • Held a training on sea level rise mapping tools • LRTP includes climate impacts in the goals and objectives and limits development near the coast
	<ul style="list-style-type: none"> • Assessment of potential environmental issues revealed that all projects on the needs list will need extra environmental support • Incorporating review of equity and underserved populations in resilience efforts
	<ul style="list-style-type: none"> • Working to address critical funding shortfalls for resilience • Working to integrate resilience into project prioritization after receiving some resistance
	<ul style="list-style-type: none"> • Developed a local resilience strategy with local partners • Developed a regional strategic vision focused on resilient land use and transportation planning
	<ul style="list-style-type: none"> • Created flood scenario visualizations • Established an investment program to mitigate stormwater impacts
	<ul style="list-style-type: none"> • Incorporated adaptation measure costs into two planned projects that were located on highly vulnerable and highly critical corridors • Adopted changes to project prioritization criteria – 10% of point total rewards resilience



Mural Exercises

<https://bit.ly/3jvLZXQ>



Click link in chat, or enter URL into **Chrome**



Full link:

<https://app.mural.co/t/icfeei4168/m/icfeei4168/1598631899055/577e8fda04173d90bf90b27111ff5e6224a66731>





Available Resources from FHWA

Peer Exchange: Using the MPO Planning Process to Increase Transportation System Resilience

August 31, 2020

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FHWA AND Resilience

- Adaptation activities eligible for FHWA funding
- FHWA requires resilience to be considered in:
 - Asset management plans (23 CFR 515)
 - Transportation plans (23 USC 134, 23 CFR 450)
 - Emergency relief (23 CFR 667)
 - FHWA programs and policies (Order 5520)
- Extensive FHWA research and technical assistance available.
- FHWA Resilience Website: <https://www.fhwa.dot.gov/environment/sustainability/resilience/>

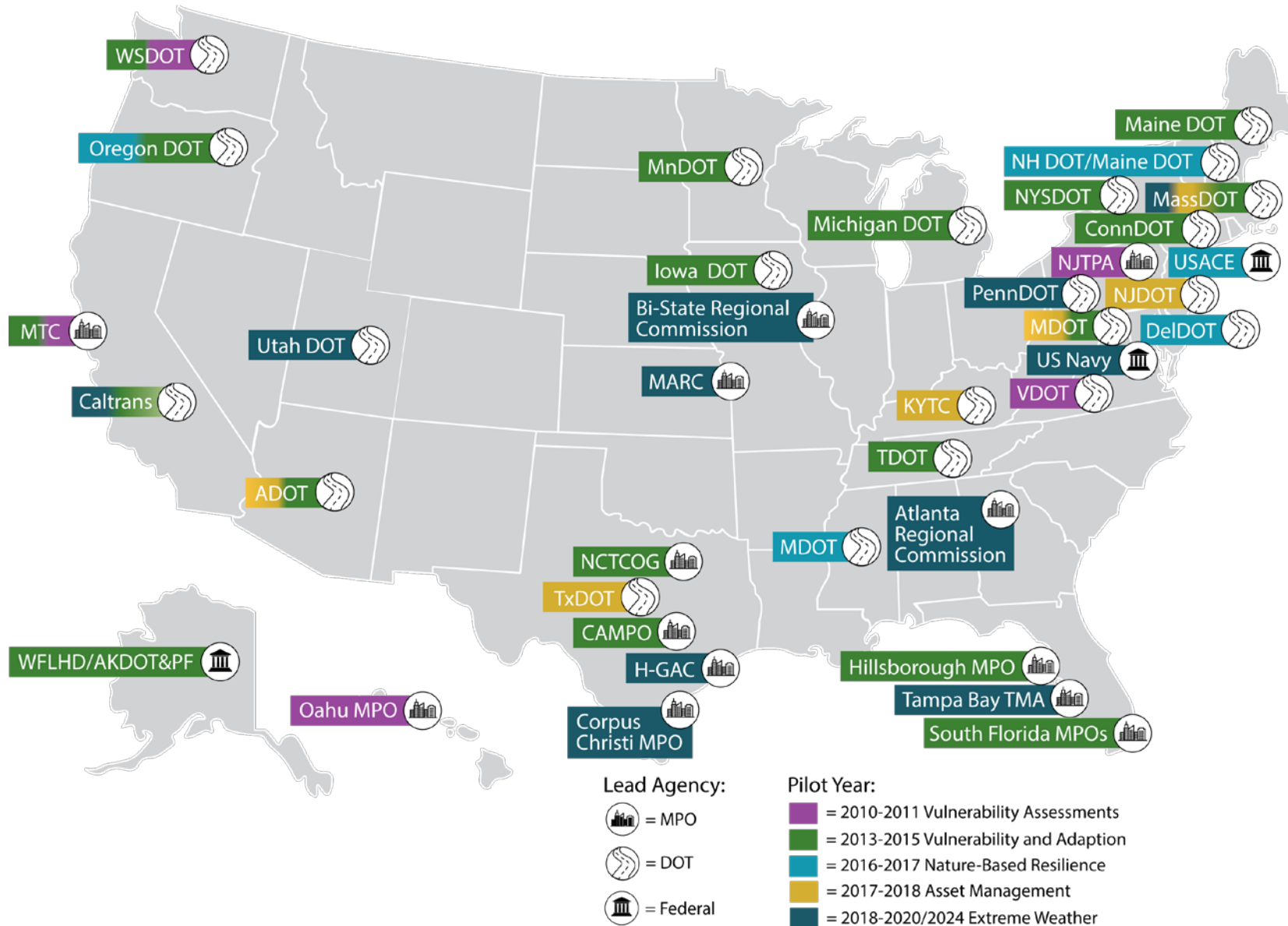


Flooding from Hurricane Harvey, Credit: TTI



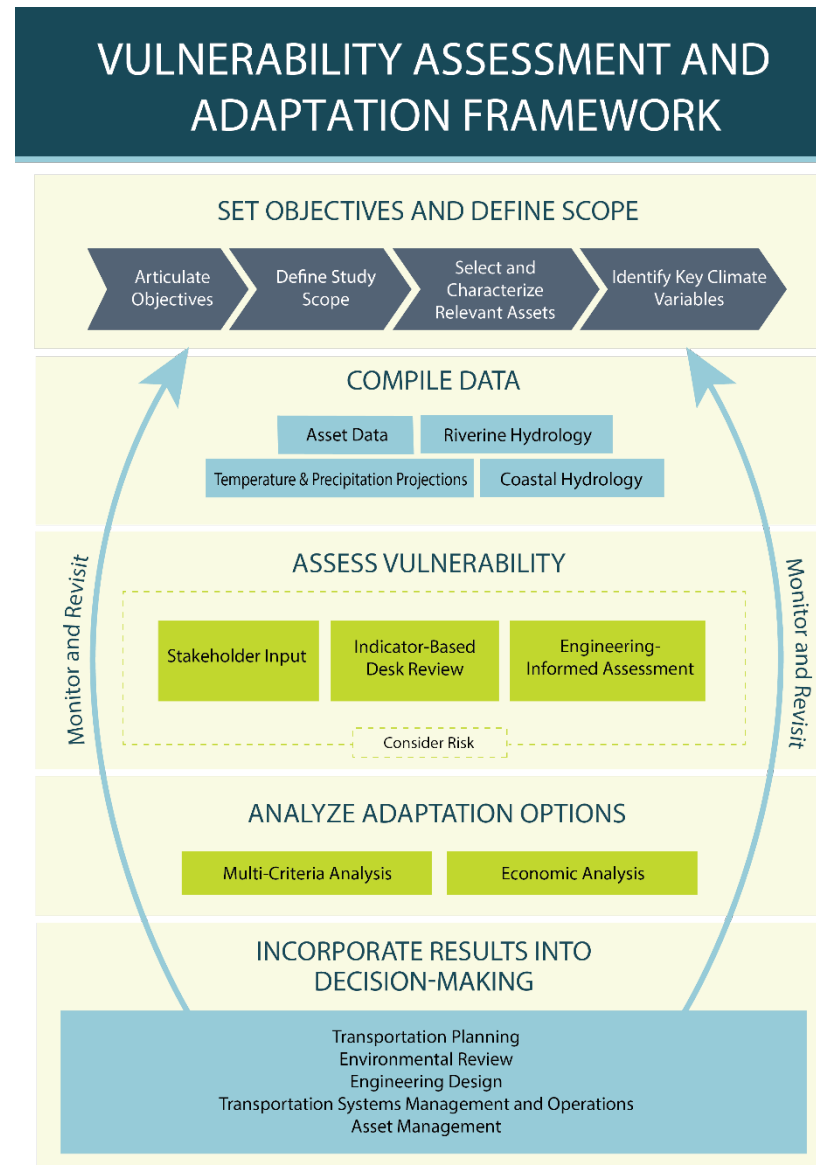
April 2017 flooding in Washington State, Credit: WSDOT

FHWA Resilience Pilots To Date



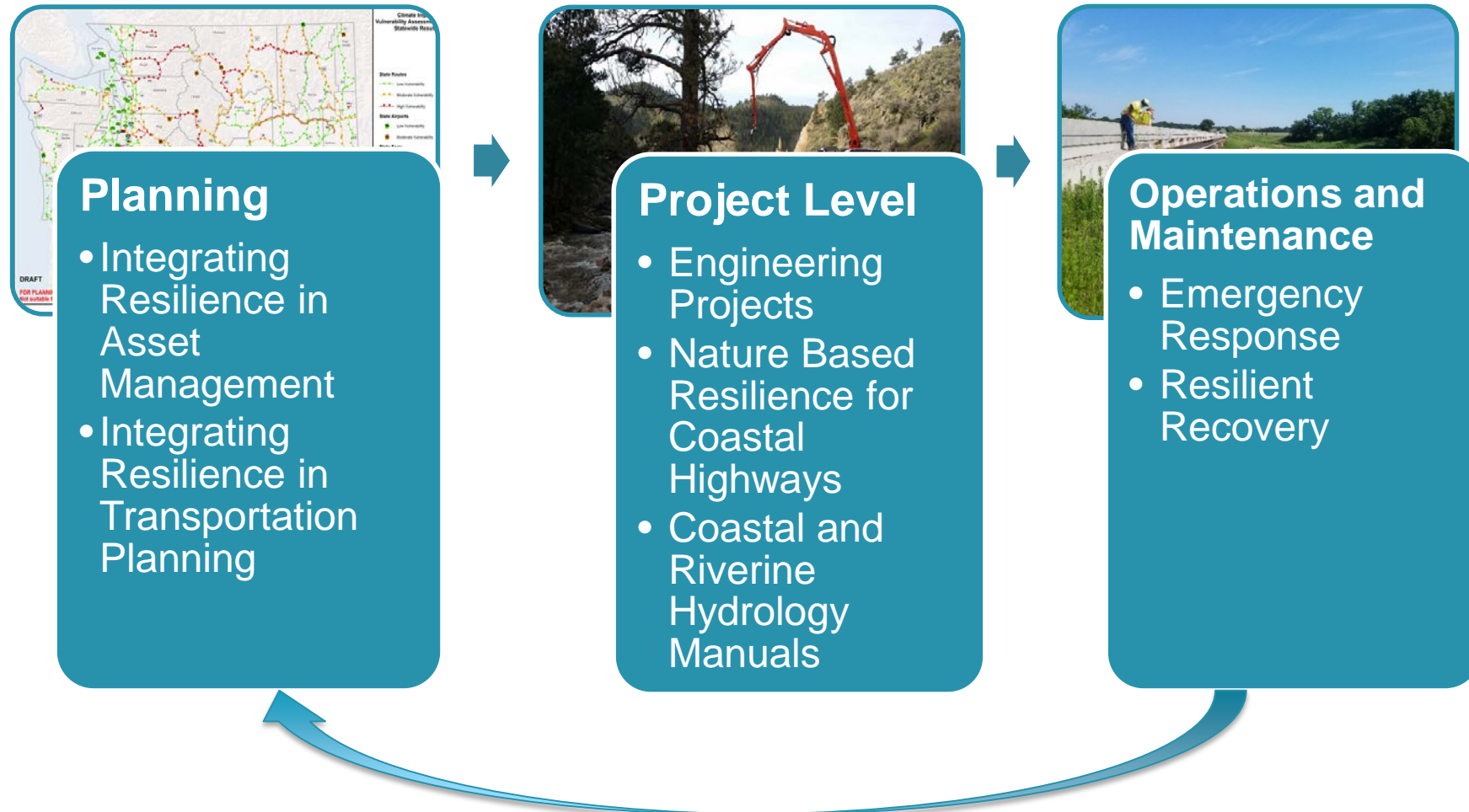
Vulnerability Assessment and Adaptation Framework, 3rd Edition

- Provides an in-depth and structured **process** for conducting a vulnerability assessment.
- Features **examples** from assessments conducted nationwide.
- Incorporates information from recent FHWA and other Federal **partner projects**.
- Includes links and references to related **resources and tools**.



ONGOING FHWA RESILIENCE EFFORTS

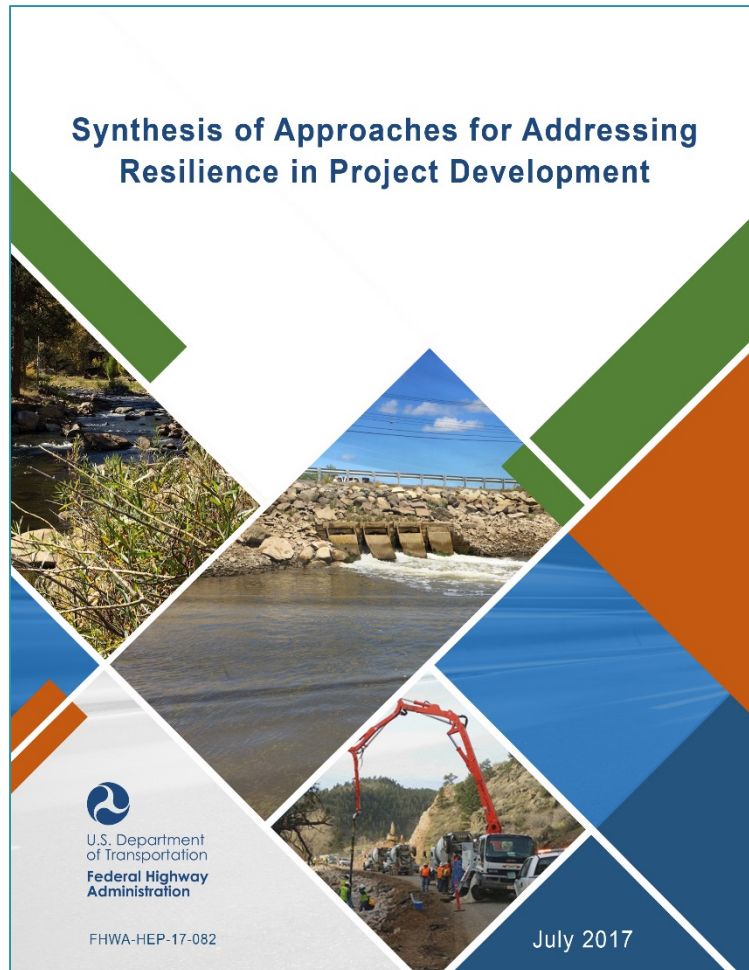
Goal: Integrate consideration of resilience in transportation decision making.



Report Overview

Available at:

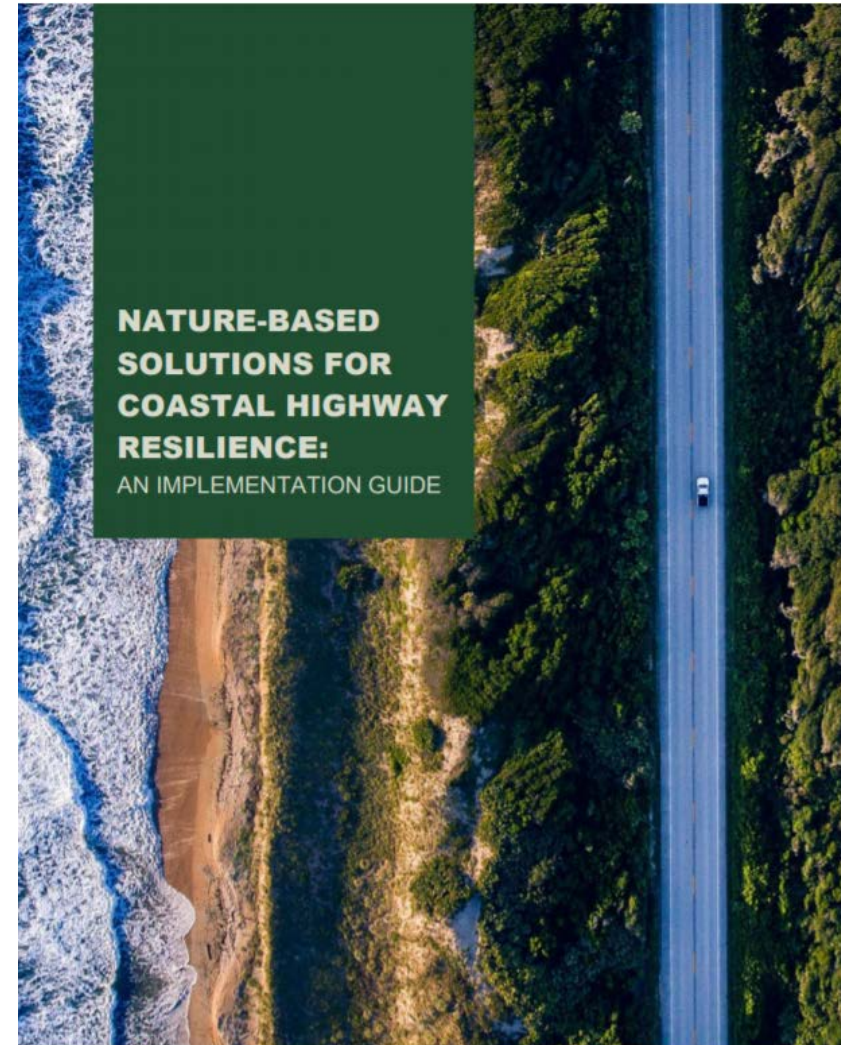
https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/teacr/synthesis/index.cfm



- Information on why, where, and how to integrate resiliency considerations into the project development process
- Lessons learned, FHWA guidance, adaptation options, and knowledge gaps for:
 - Coastal Hydraulics
 - Riverine Flooding
 - Pavement and Soils
 - Mechanical and Electrical Systems

FHWA Nature-based Solutions

- **FHWA Goal:** Provide research and technical assistance to transportation agencies on how they can use nature-based solutions (such as wetlands, dunes, beaches, and reefs) to reduce coastal flood and erosion risks to highways.
- **FHWA Products:**
 - 5 pilot projects, 2018
 - Regional peer exchanges, 2018
 - [Implementation Guide](#), 2019
- **Funding Opportunity:** FHWA is collaborating with NOAA on [Effects of Sea Level Rise research grant program](#). 2021 call will include focus on how nature-based solutions can improve transportation resilience.



Resilience in Asset Management

- State DOTs required to develop **asset management** plans that identify and address risks to the National Highway System (NHS) pavements, bridges, and performance (23 USC 119(e))

“including risks associated with current and future environmental conditions, such as extreme weather events, climate change, seismic activity, and risks related to recurring damage and costs as identified through the evaluation of facilities repeatedly damaged by emergency events carried out under part 667 of this title.” (23 CFR 515)

- 6 Resilience in Asset Management Pilots (2017-19): Arizona, Texas, Kentucky, Maryland, Massachusetts, New Jersey
- Forthcoming handbook (expected in 2020):
 - Developing asset inventory informed by natural hazard/vulnerability assessments
 - Identifying and managing risks
 - Conducting life cycle planning
 - Creating resilient investment strategies and financial plans

www.fhwa.dot.gov/asset/pilot

RESILIENCE IN TRANSPORTATION PLANNING

- State and metro **transportation planning** include resilience as a planning factor (23 USC 134, 23 CFR 450)
- **Metropolitan transportation plans** shall include an assessment of capital investment and other strategies to... reduce the vulnerability of the existing transportation infrastructure to natural disasters (23 CFR 450.324(f)(7))
- **Project: Integrating Resilience into the Transportation Planning Process**
 - Workshops and Peer Exchanges
 - Fact Sheet (January 2017)
 - White Paper (May 2018)
 - Handbook (Coming 2020)

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

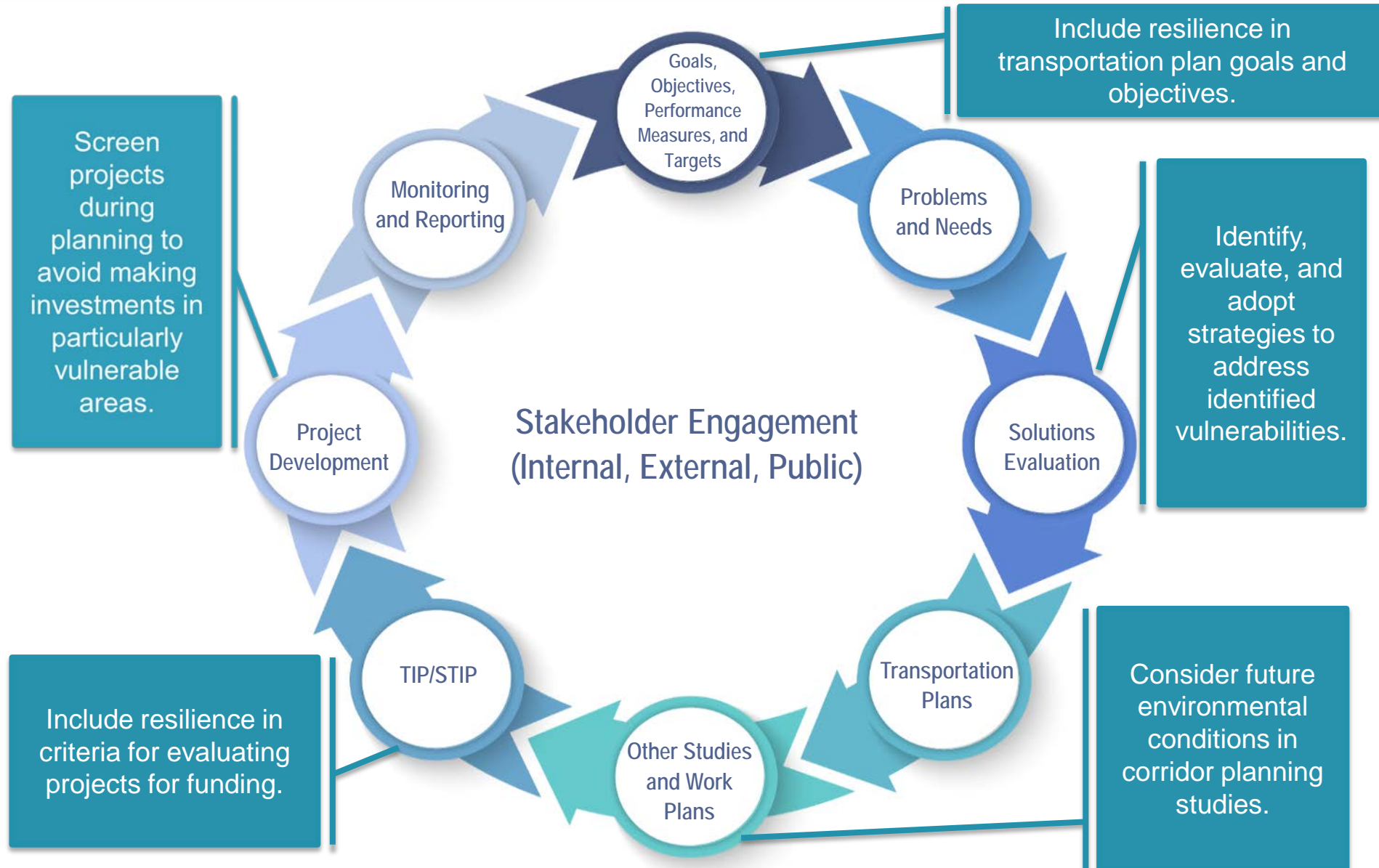
What is the Handbook?



Resources include:

- A range of options for considering resilience throughout the transportation planning process.
- Information for every step in the planning process, including key resources.
- Real-world examples of how agencies are integrating resilience into transportation planning.

Transportation Planning Process



Stakeholder Engagement

- Raise Awareness
- Build Support
- Expand Your Network
- Find Resources
- Become a Resource

Integration Action	Potential Approaches
Build a culture of resilience	<ul style="list-style-type: none"> ▪ Identify a champion(s) ▪ Garner support from leadership
Enhance internal communication and build support across departments	<ul style="list-style-type: none"> ▪ Delegate tasks according to expertise ▪ Establish resilience goals, objectives, performance measures, and targets ▪ Plan for and schedule collaboration efforts ▪ Set up committees
Coordinate with and solicit information from external partners, agencies, or institutions	<ul style="list-style-type: none"> ▪ Formal avenues of coordination (e.g. interagency workgroups) ▪ Ad hoc avenues of coordination ▪ Serve as a resource to external stakeholders
Communicate effectively with the public	<ul style="list-style-type: none"> ▪ Reach out to vulnerable communities ▪ Use avenues already in place in your agency ▪ Pursue creative engagement strategies

Developing Goals, Objectives, Performance Measures, and Targets

Developing Goals, Objectives, Performance Measures, and Targets

Standard Sub-steps

Review existing goals, objectives, performance measures, and targets

Establish goals

Establish objectives

Select performance measures and targets

Resilience Integration Actions

Determine if natural hazards and changing future environmental conditions will affect existing goals, objectives, performance measures, and targets

Develop an informal resilience goal

Revise an existing formal goal to incorporate resilience

Develop a formal stand-alone resilience goal

Revise existing objectives to incorporate resilience

Develop stand-alone resilience objectives

Develop performance metrics and targets to measure resilience



Evaluating Solutions

Evaluating Solutions

Standard Sub-steps

Establish evaluation criteria

Gather relevant strategies identified in existing studies or plans

Release call for projects

Evaluate and prioritize among solutions

Resilience Integration Actions

Include resilience as a topic in priority-setting discussions

Integrate resilience priorities into evaluation criteria

Gather information on relevant resilience strategies from sources within your jurisdiction

Gather information on relevant resilience strategies from sources relevant to your context

Request resilience ideas in calls for projects

Apply pre-established evaluation criteria that include resilience considerations

Prioritize resilience solutions based on urgency/importance and implementation feasibility



Other Studies and Work Plans

Other Studies and Work Plans

Standard Sub-steps

Develop short-term work plans

Develop longer term strategic plans
or capital investment plans

Conduct corridor planning studies
or other sub-area studies

Develop asset management plans

Resilience Integration Actions

Integrate resilience into short-term work plans

Integrate resilience into longer term strategic plans or
capital investment plans

Integrate resilience into corridor planning studies or
other sub-area studies

Integrate resilience into asset management plans



Developing the STIP and TIP

Developing the STIP and TIP

Standard Sub-steps

Identify revenue and funding sources

Develop the method for identifying project costs

Develop criteria for allocating revenue

Develop a project list from the adopted transportation plan

Prioritize projects for implementation

Adopt STIP/TIP

Resilience Integration Actions

Identify funds available for resilience improvements

Screen projects to identify facilities repeatedly requiring repair and reconstruction due to emergency events

Prioritize projects using one or more resilience evaluation criteria



Project Development

Project Development

Standard Sub-steps

Initiate project planning

Environmental review

Resilience Integration Actions

Build awareness of the need for resilience considerations in project design

Recommend natural hazard risk screening as part of project initiation forms

Discuss resilience at public outreach meetings

If appropriate, recommend incorporating resilience into the project purpose and need

Provide relevant planning documentation to streamline environmental review



Website, Contact Info, Thank you!

The screenshot shows the FHWA Sustainability Resilience website. A red arrow points to the 'Pilots' link in the left sidebar. A red circle highlights the 'Pilots' link in the sidebar and the 'Sign up for Sustainable Transportation and Resiliency updates.' link in the footer. Another red circle highlights the 'Contacts' section in the footer, which lists Robert Kafalenos, Robert Hyman, and Rebecca Ludes. The main content area features a 'Resilience Pilots' section with a list of pilot programs from 2013 to 2024.

Pilots

Sign up for emails

Contacts

- Robert Kafalenos
- Robert Hyman
- Rebecca Ludes

Sustainability

Resilience

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

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

Thank you!

www.fhwa.dot.gov/environment/sustainability/resilience/



Mural Exercise: Remaining Needs and Next Steps



NEXT STEPS

- FHWA and FDOT will share resources, including:
 - Resource packet with additional examples and information (send any updates, if needed!)
 - PPT slides
 - Mural board
 - Participant information
- FHWA will prepare a peer exchange summary report
- **Keep the conversation going!** Reach out to your peers.

**THANK
YOU!**