



U.S. Department of Transportation  
**Federal Highway Administration**

# FHWA Resilience Resources

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Morris Landing, NC. Photo Credit: Tina Hodges

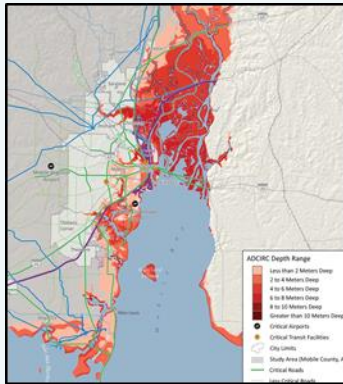


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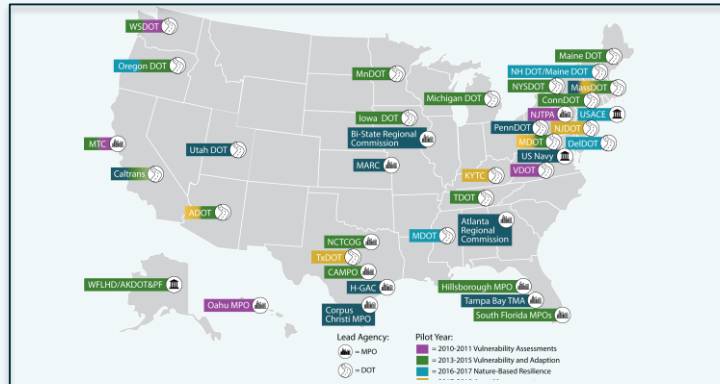


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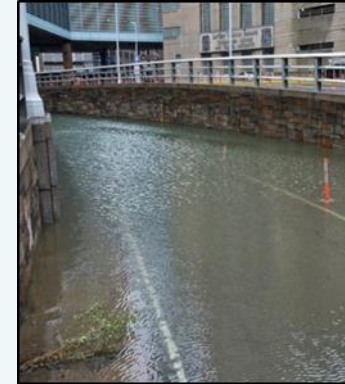
## Gulf Coast 2 Study



## Resilience Pilots with State DOTs & MPOs



## Hurricane Sandy Project



## Engineering Assessments Study

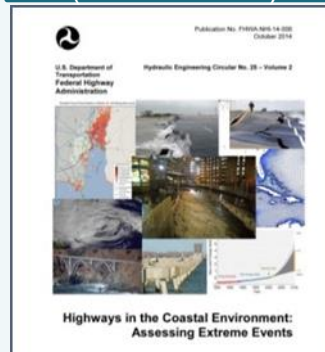


<https://www.fhwa.dot.gov/environment/sustainability/resilience/>

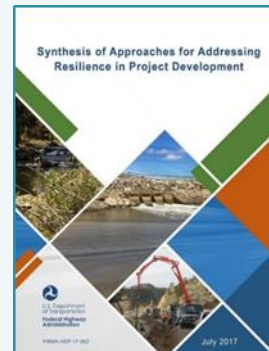
## Vulnerability & Adaptation Framework



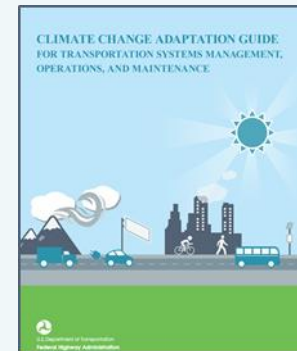
## Engineering Guidance (HEC-25 & 17)



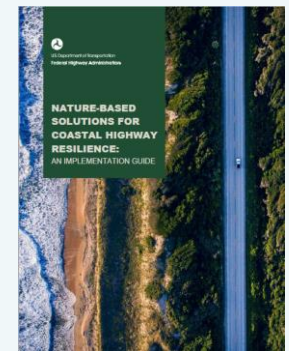
## Project Development



## Operations & Maintenance



## Nature-Based Solutions



# Nature-Based Solutions

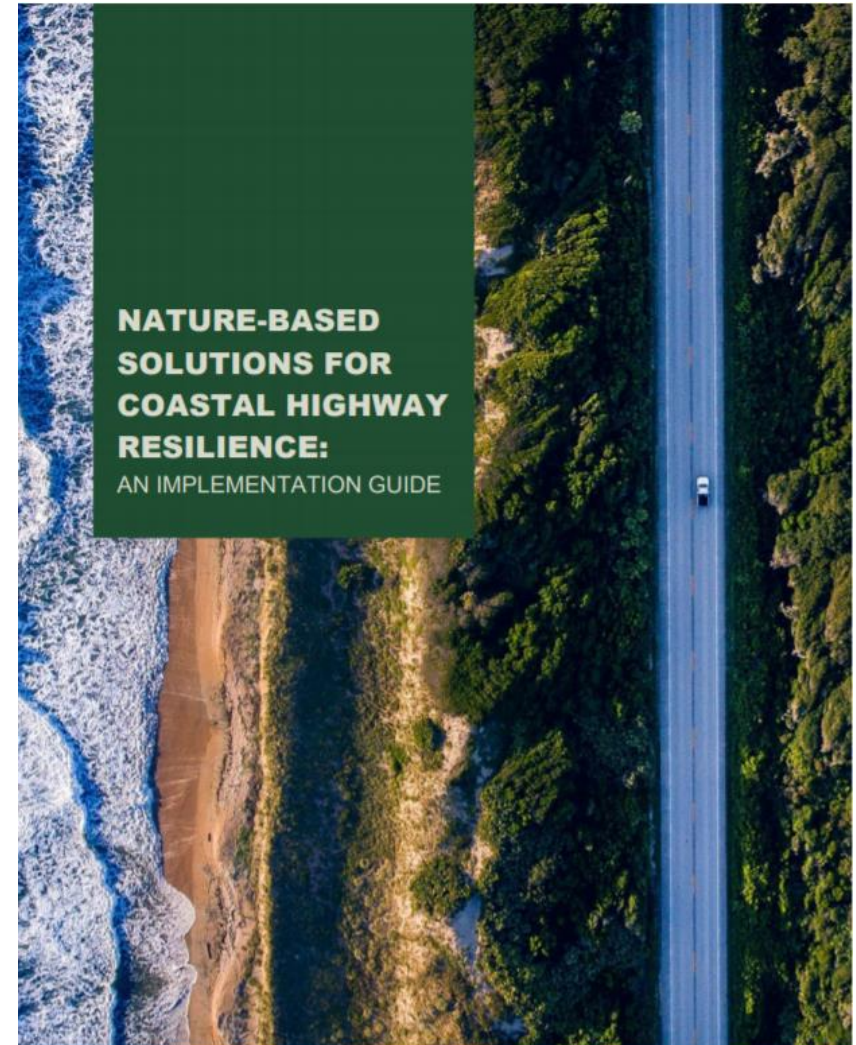
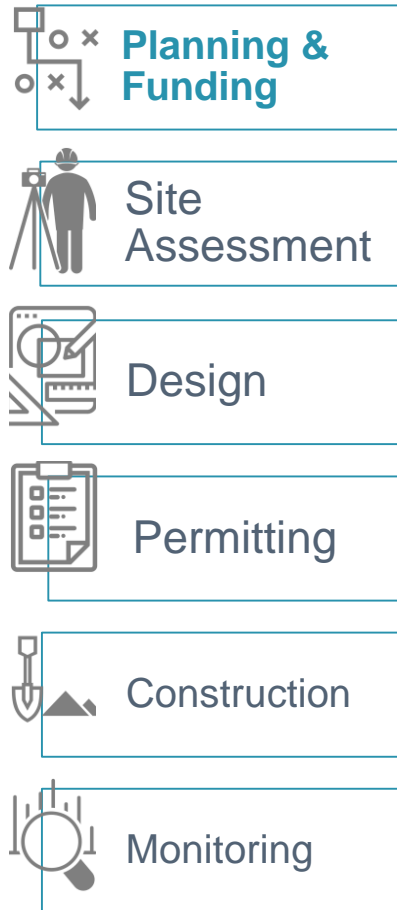


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## Implementation Guide Contents:

- Technical factsheets
- Benefits
- Typical costs
- Examples
- Implementation considerations

[Download Implementation Guide](#)





# Resilience in Asset Management



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- 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](http://www.fhwa.dot.gov/asset/pilot)



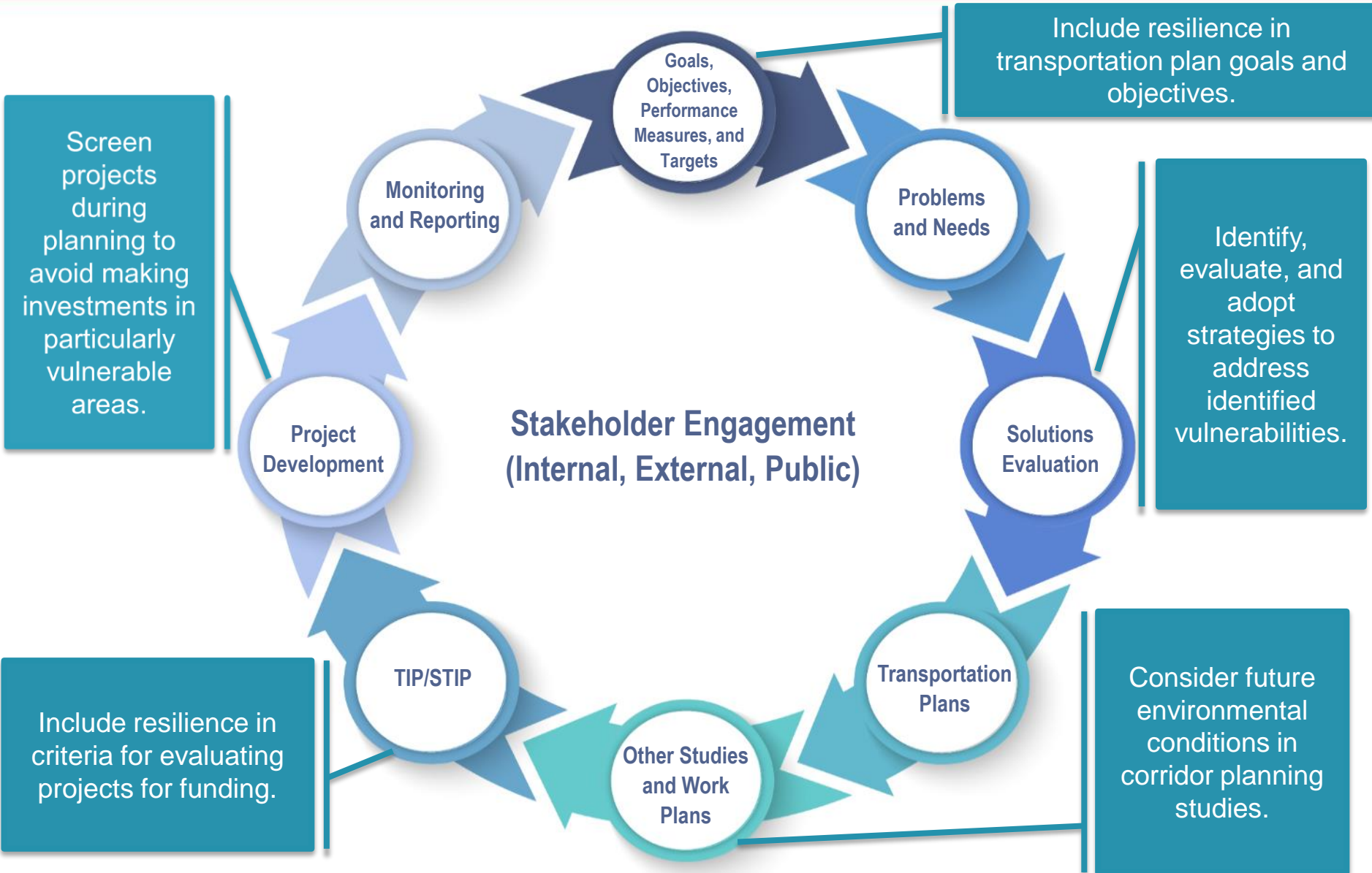
- State and metro **transportation planning** include resilience as a planning factor (23 USC 134, 23 CFR 450)
- **Metropolitan transportation plans** shall include an assessment of capital investment and other strategies to... reduce the vulnerability of the existing transportation infrastructure to 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/](https://www.fhwa.dot.gov/environment/sustainability/resilience/ongoing_and_current_research/planning/)

# Transportation Planning Process



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# Rapid Resilience Assessments



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A small team of FHWA, State DOT, and contractor subject matter experts are available to conduct “Rapid Resilience Assessments” of affected locations 6-8 weeks after an event and report on their observations:

- *What appeared to happen?*
- *What were the impacts?*
- *What seemed to demonstrate resilience?*
- *What are some options to improve the resilience of repaired or reconstructed facilities?*

