

UC Davis

Policy Briefs

Title

Challenges and Opportunities for Integrating Climate Adaptation Efforts Across State, Regional and Local Transportation Agencies

Permalink

<https://escholarship.org/uc/item/8h85049w>

Authors

Aultman-Hall, Lisa
Dowds, Jonathan

Publication Date

2015-04-01

Challenges and Opportunities for Integrating Climate Adaptation Efforts across State, Regional and Local Transportation Agencies

Lisa Aultman-Hall, University of Vermont
Jonathan Dowds, University of Vermont

For more information, contact Lisa Aultman-Hall
laultman@uvm.edu

POLICY BRIEF

Issue

The costs that climate and extreme weather disruptions are imposing on the transportation system are significant and rising. These disruptions – ranging from dust storms to landslides to floods – adversely impact the reliability of the transportation system. Increasingly, the burden of preparing for and recovering from extreme weather events is straining the resources of transportation agencies. There is a growing urgency to adapt the transportation infrastructure and institutional processes to be more resilient to these extremes. Adaptation actions can include:

1. hardening, relocating or even abandoning infrastructure assets; and
2. improving communications procedures and data collection, developing emergency response plans and changing maintenance schedules.

Currently, climate adaptation efforts are hindered by shortfalls in financial resources and technical expertise, the need for improved data to inform design, and insufficient integration of state and local planning efforts.

Policy Implications

Overcoming the challenges inherent in climate adaptation will necessitate additional resources for state and local agencies. Each step in the climate adaptation planning process (Figure 1) requires technical and financial resources. While many of these steps overlap with existing agency responsibilities, adaptation planning adds additional costs to these responsibilities.

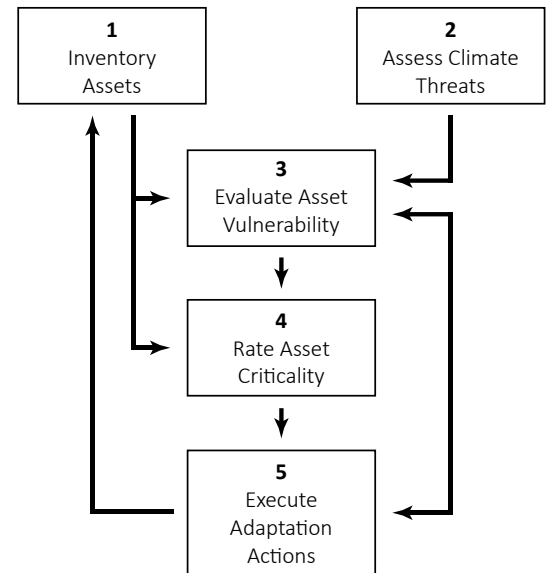


Figure 1: Five-step Common Framework for Climate Adaptation Planning for Transportation Systems.

Ensuring efficiency and effectiveness will require increased collaboration among transportation agencies at state and local levels. The transportation network functions as a single system, with access and redundancy provided by a variety of modes and infrastructure owned by multiple agencies. Thus adaptation planning is most effective when considering the system holistically. In addition conducting many of these steps collaboratively eliminates wasteful duplication of efforts across agencies (Table 1).

National policy leadership and continued tool development are needed for several steps in the adaptation planning process, especially 1) guidance on appropriate emissions and climate change scenarios to use for planning purposes, and 2) methods for rating asset criticality.

Research Findings

We assessed the adequacy of current tools, efforts and vertical collaborations.

STEP	CONCEPTUAL UNDERSTANDING	PRIMARY RESPONSIBILITY	ADEQUACY OF TOOLS AND DATA	CHALLENGES
Inventory and Monitor Assets	High	Local/ infrastructure owning agency	Moderate to High: Asset management tools offer a solid base for comprehensive asset inventories. Data quality is highly variable across agencies and jurisdictions	Funding and time constraints to populate and maintain databases.
Assess Climate Threats	High	State	Poor to Moderate: Tools for modeling climate inputs are increasingly sophisticated but appropriate inputs for these tools are uncertain. The spatial and temporal resolution of tools are limited.	Uncertainty with regard to emissions scenarios; further downscaling method development
Evaluate Vulnerability	High	Local/ infrastructure owning agency	Poor to High: Vulnerability modeling is dependent on climate inputs. Modeling tools are better for sea level rise than other threats.	Quality and resolution of future climate data
Rate Asset Criticality	Moderate	State; or Metropolitan or Rural Planning Organizations	Poor. Quantitative/ comprehensive tools have yet to be developed.	Lack of consensus on criticality methodology; politicization of process.
Select and Execute Adaptation Actions	Moderate	Infrastructure adaptations – owning agency; Procedural – all agencies.	Tools are poor to moderate for infrastructure actions (vulnerability output lacks the resolution needed by engineers for design purposes) but high for process adaptations.	Limitations in prior steps, lack of data for design standards; challenges in cost-benefit analysis; funding

Table 1: Agency Capacity and Responsibility to Implement Adaptation Framework Components

The quality of the data and tools available for each adaptation step is variable (Table 1). In addition, the capacity of agencies to utilize these tools also varies considerably with local agencies generally having less in-house technical capacity.

Criticality assessment to facilitate prioritization is a notable methodological gap. Many agencies reported difficulty with criticality assessment and several also reported that the process could become politicized. Improvements in these complex network-based methods are needed.

While uncertainty about future climate conditions is a barrier to adaptation planning, some strategies can be implemented immediately. Procedural adaptations are comparatively low cost and beneficial regardless of the magnitude of extreme events. Some infrastructure adaptations provide co-benefits such as increased access or wildlife permeability and may be

worth pursuing even in the face of uncertainty.

Further Reading

This policy brief is drawn from the full report, “Challenges and Opportunities for Integrating Climate Adaptation Efforts across State, Regional and Local Transportation Agencies,” Jonathan Dowds and Lisa Aultman-Hall. Find full report here: bit.ly/2MV2L3W

The National Center for Sustainable Transportation is a consortium of leading universities committed to advancing an environmentally sustainable transportation system through cutting-edge research, direct policy engagement, and education of our future leaders.

Consortium members: University of California, Davis; University of California, Riverside; University of Southern California; California State University, Long Beach; Georgia Institute of Technology; and The University of Vermont

Visit us at ncst.ucdavis.edu

Follow us on: 