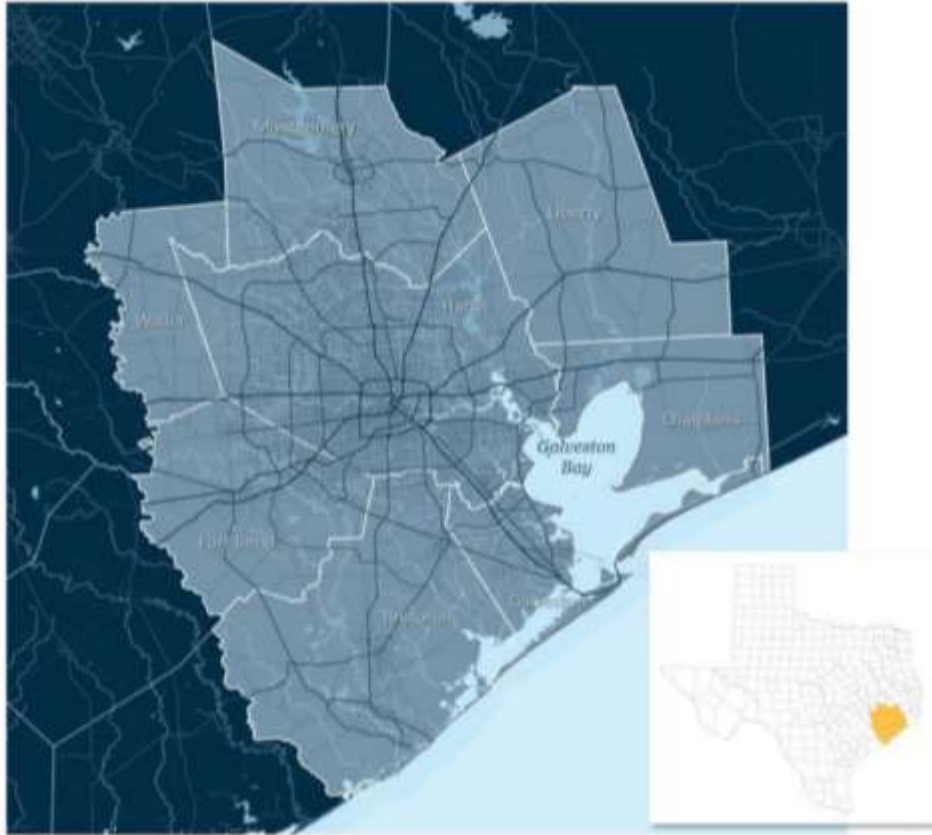


## Resilience and Durability to Extreme Weather in Transportation Planning

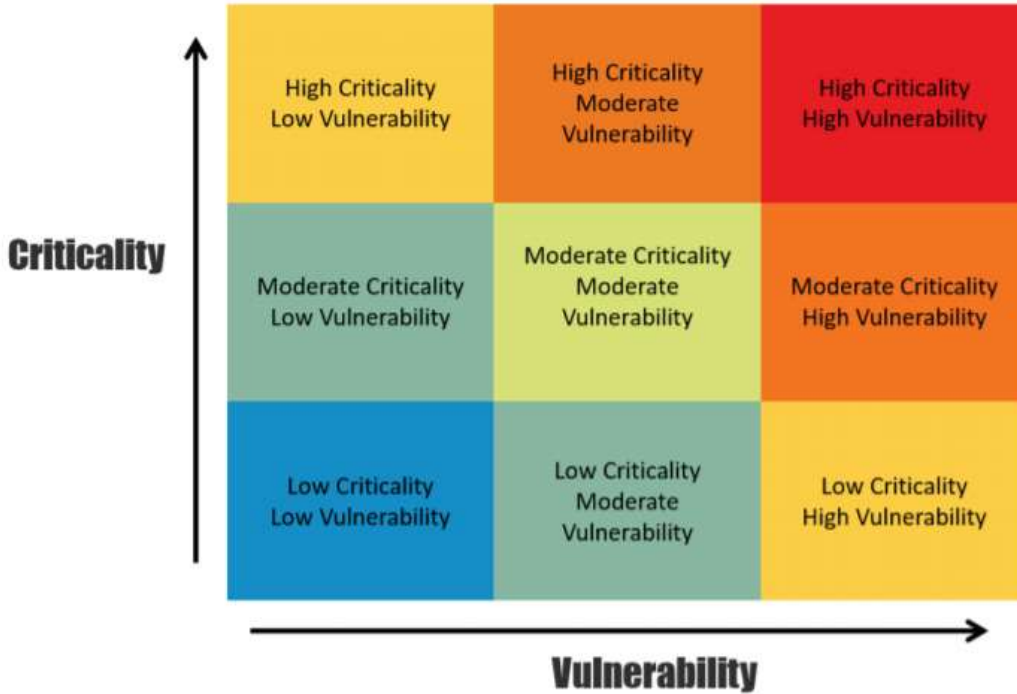
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**Figure 1: Houston-Galveston Metropolitan Planning Organization Area**

To address threats posed by extreme flood events, storm surge, and sea level rise in the region, the Houston-Galveston Metropolitan Planning Organization, in collaboration with the Texas Department of Transportation, partnered with the Federal Highway Administration on Resilience and Durability to Extreme Weather Pilot Program applied research in 2018. The goals were to (1) Assess the criticality and vulnerability of regional transportation assets to extreme weather events; (2) Develop a suite of recommendations for local governments for a more resilient transportation network; and (3) Use analysis from the Pilot Program to inform future publications and project selection criteria. The Pilot Program team analyzed two types of transportation infrastructure assets: Major Roads and Bridges. The team ran scenarios for flooding, storm surge, and sea level rise events to assess the impact on identified assets, specifically assessing criticality and vulnerability. Out of the 762 centerline freeway miles and 6,440 major road miles assessed in the region, 92 centerline freeway miles (12%) and 551 major road miles (9%) were highly critical. Thirteen percent of freeway centerline miles and 12% of major road miles were highly vulnerable to flooding, storm surge, and sea-level rise.



**Figure 2: Criticality-Vulnerability Matrix**

The intersection between the criticality and vulnerability assessments—known as the Criticality-Vulnerability Matrix—was developed by the team to identify assets that are both highly critical and highly vulnerable and therefore a priority for mitigation strategies in the Pilot Program area. Around 9.5 freeway centerline miles and 48 miles of major roads were highly critical and highly vulnerable to extreme weather events. The Pilot Program team developed the online Regional Resilience Tool to display the criticality and vulnerability of road segments. The lessons learned from the Pilot Program team’s analysis can be considered in four major areas: data availability and quality, data analysis, access to this Pilot Program’s findings, and commitment to collaborate and continue transportation resilience planning. The findings of the Pilot Program will be integrated into current and future planning studies, including the Low-Impact Development Study, Regional Transportation Plan, Transit-Oriented Development Study, Complete Streets Program, Sub-regional Studies, and a Region-wide Resiliency Study.