

**AAMPO**



**Alamo Area  
Metropolitan Planning  
Organization  
Resiliency Study**

**Executive Summary**

**July 2024**

# Alamo Area Metropolitan Planning Organization Resiliency Study Executive Summary

## Resilience in Transportation

The Federal Highway Administration (FHWA) defines resilience as “the ability to anticipate, prepare for, or adapt to conditions or withstand, respond to, or recover rapidly from disruptions.” This can include the ability to:

- ▶ Resist hazards or withstand impacts from weather events and natural disasters.
- ▶ Reduce the magnitude or duration of impacts of a disruptive weather event or natural disaster.
- ▶ Have absorptive capacity, adaptive capacity, and recoverability to decrease project vulnerability to weather events or other natural disasters.
- ▶ Consider incorporation of natural infrastructure.

The federal government has not only defined resilience but also invested in a more resilient transportation system. The Bipartisan Infrastructure Law (BIL) established the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program, which provides over seven billion dollars for State Departments of Transportation and \$1.4 billion in competitive grants.<sup>1</sup>

## AAMPO’s Role in Transportation Resilience

The Alamo Area Metropolitan Planning Organization (AAMPO) undertook a study assessing the resilience of the transportation system in the region to understand all potential natural factors that could impact the system now and into the future, and identify a set of actions or investments that could ensure the viability of the system as the region grows.

The region has experienced

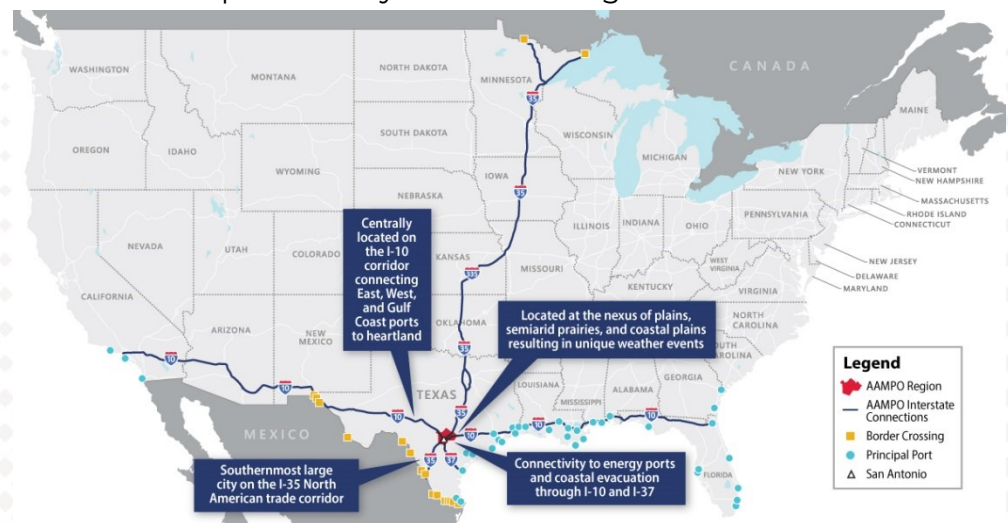


Figure 1. AAMPO sits at the nexus of many economic and critical

<sup>1</sup> Federal Highway Administration. (2023, August 8). *Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program*. <https://www.fhwa.dot.gov/environment/protect/>

transportation disruptions before, and the effects of those disruptions can impact community accessibility, economic viability, and even military readiness. Not only does AAMPO house several critical infrastructure types, but it also houses a large and diverse population. Of the more than two million residents in the region, 42% of residents live in census tracts that are disadvantaged. Whether lacking access to reliable transportation or suffering financial burdens, over 900,000 people in the AAMPO region are hit disproportionately hard when roadways flood and temperatures swell.

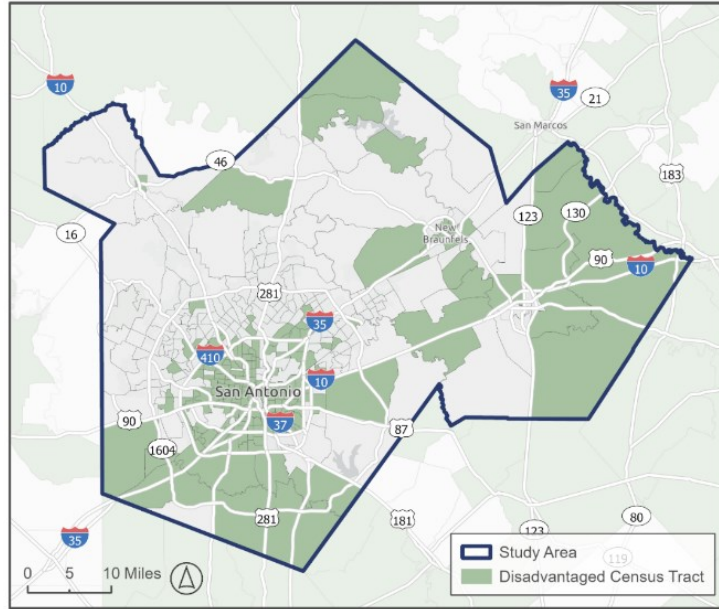


Figure 2. Disadvantaged census tracts in the AAMPO region.

This study explored these concerns and how natural factors could impact transportation infrastructure in the region. This report also makes recommendations to build on this study and develop a Transportation Resilience Improvement Plan, including prioritized regional projects, for AAMPO and partner agencies.

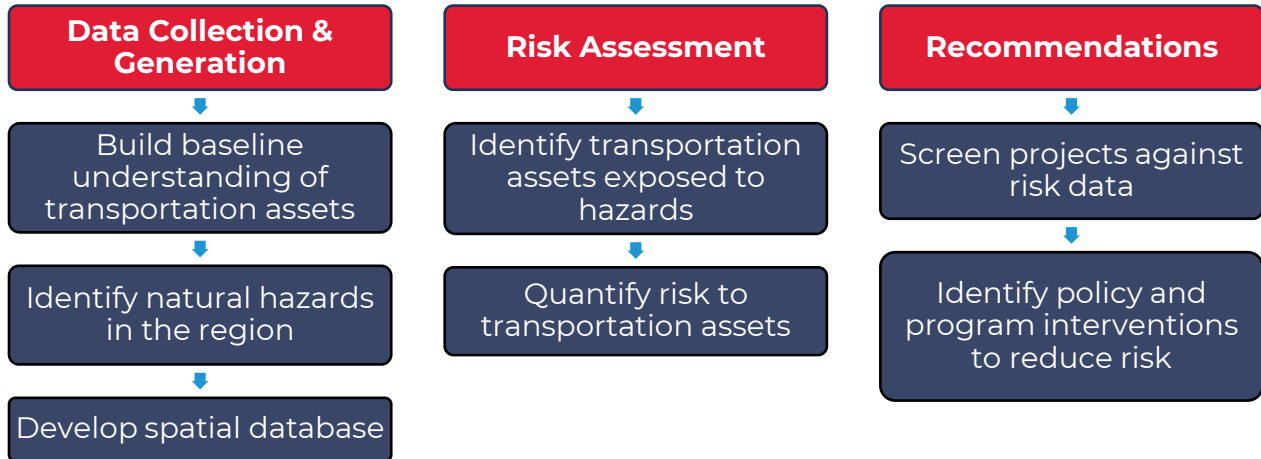
### Partnerships To Further Resilience

AAMPO worked with state and regional partners over the past two years to develop this critical work to support the region’s resilience journey. A Study Oversight Committee (SOC) was heavily involved in the data collection for the study and will continue to be a large part of the engagement for follow-up work carried out by AAMPO. The Oversight Committee included the following entities:

- ▶ Bexar County
- ▶ City of Boerne
- ▶ City of Cibolo
- ▶ City of Live Oak
- ▶ City of New Braunfels
- ▶ City of Saint Hedwig
- ▶ City of San Antonio
- ▶ City of Schertz
- ▶ City of Seguin
- ▶ City of Selma
- ▶ Comal County
- ▶ Guadalupe County
- ▶ Guadalupe-Blanco River Authority
- ▶ Joint Base San Antonio (JBSA)
- ▶ Kendall County
- ▶ San Antonio Airport (SAT)
- ▶ San Antonio River Authority
- ▶ San Antonio Water System (SAWS)
- ▶ TxDOT
- ▶ VIA Metropolitan Transit

## Steps of the Study

The study was completed in three phases:



## Transportation Assets in the Region

Several transportation assets were included in the Resiliency Study, depicted in the below figures.

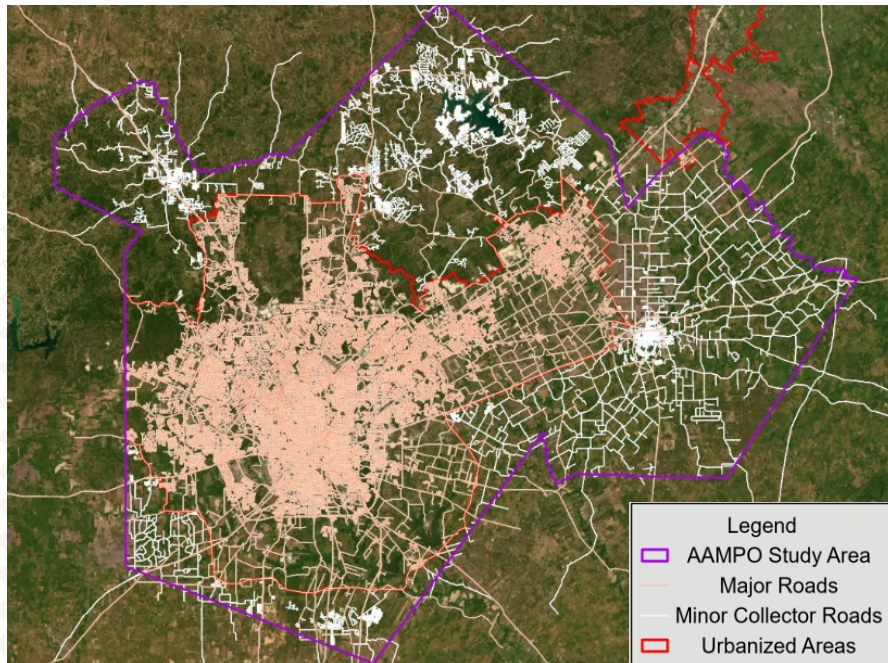


Figure 3. Roadways included in the study.



## Regional Natural Hazards

Previous hazard studies and analyses in the region were reviewed to determine the hazards to be analyzed, depicted in the below figure.



Figure 6. Natural hazards assessed in the study.

## Where Are The Risks?

Precipitation, flooding, and extreme heat were identified as the most pressing hazards facing the region. The following figures depict the current and projected future weather conditions.

## Precipitation

Most of the region has historically seen 9-13 inches of rainfall in a 100-year storm. However, in the future, parts of the region may see up to 33 inches of rain in a 100-year storm. The following figures show these rainfall changes over time.

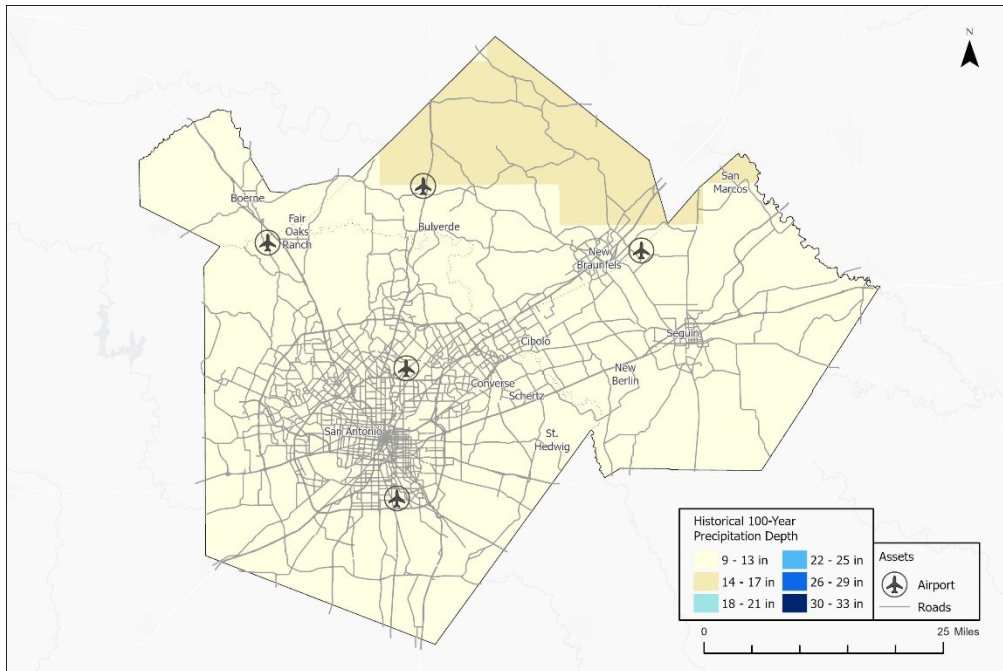


Figure 7. Historical precipitation.

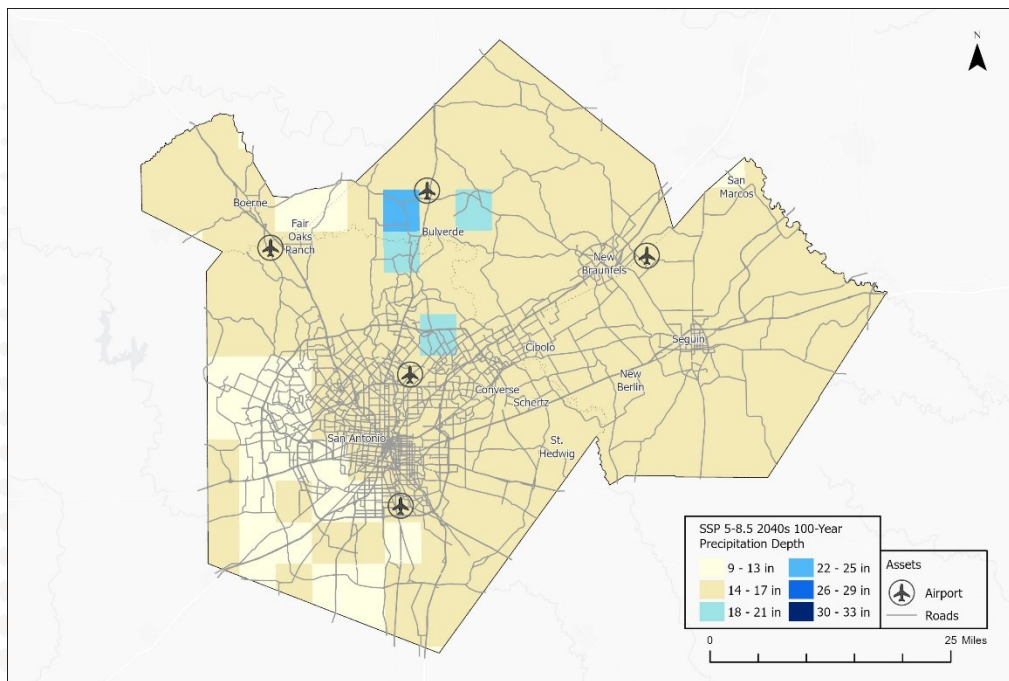


Figure 8. Precipitation projections for the 2040s.

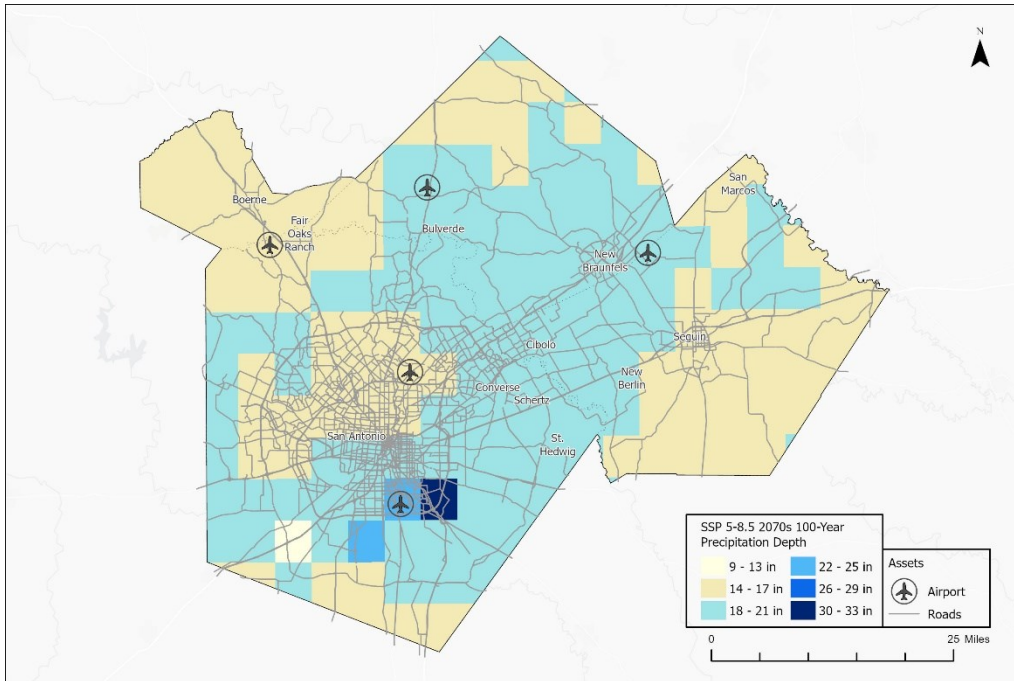


Figure 9. Precipitation projections for the 2070s.

### Flooding

As depicted below, flooding poses millions of dollars in risks to the region’s transportation assets. If no action is taken to prevent or reduce the risks from flooding, airport buildings could incur over \$120M in damages, while bridges face over \$88M in projected damage costs.

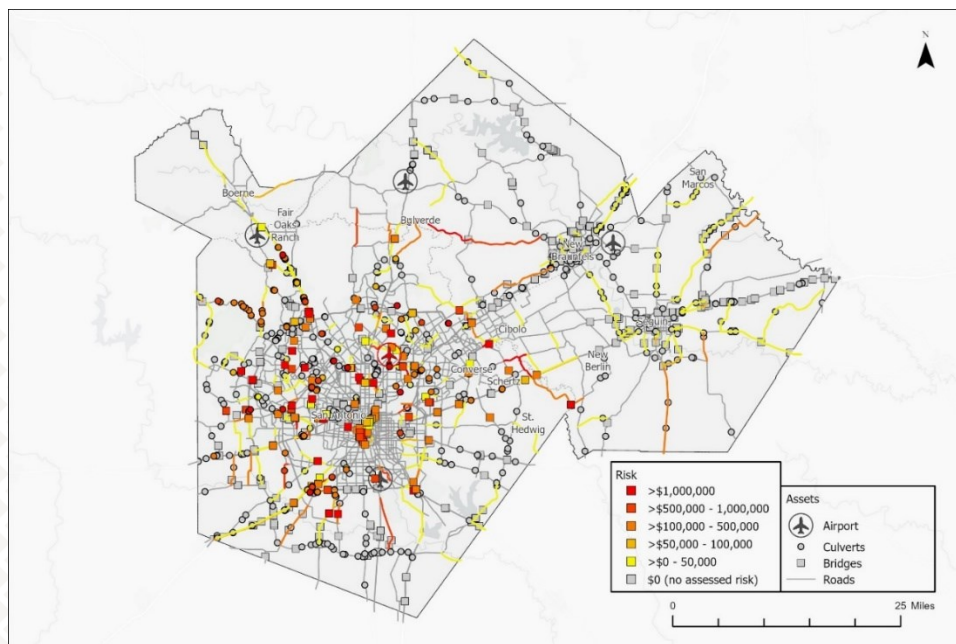


Figure 10. Dollars of flood risk by asset.

## Extreme Heat

When combined with humidity, extreme heat can feel even hotter, which is known as heat index, or the “feels like” temperature. While AAMPO is used to seeing days up to 103°F, the region will have high heat days above 103°F more often. The following figures show how these hot days will increase over time.

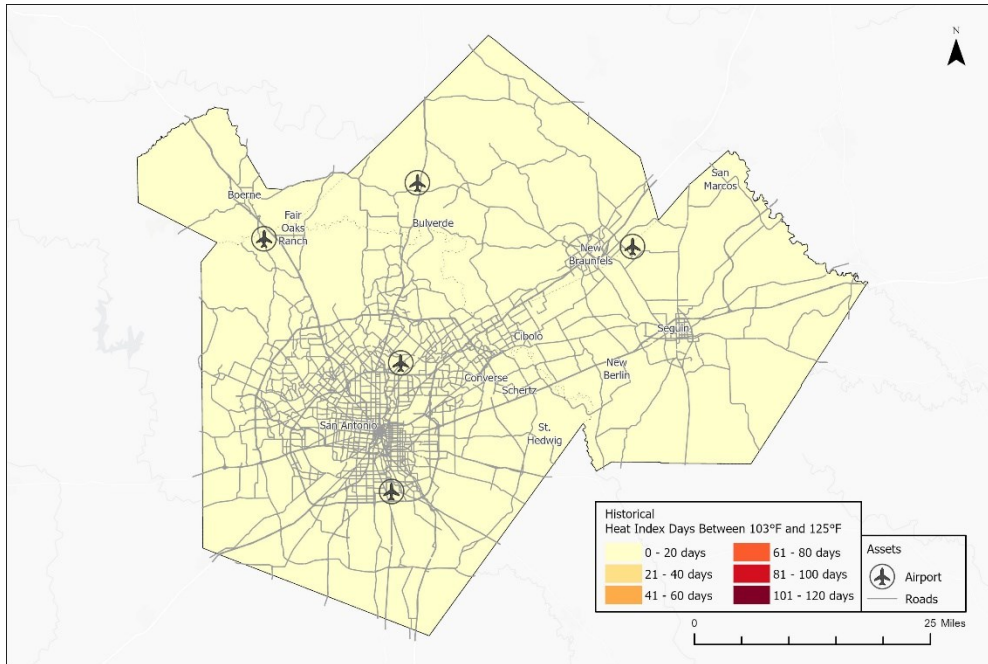


Figure 11. Historical average number of 103 °F - 125°F days per year

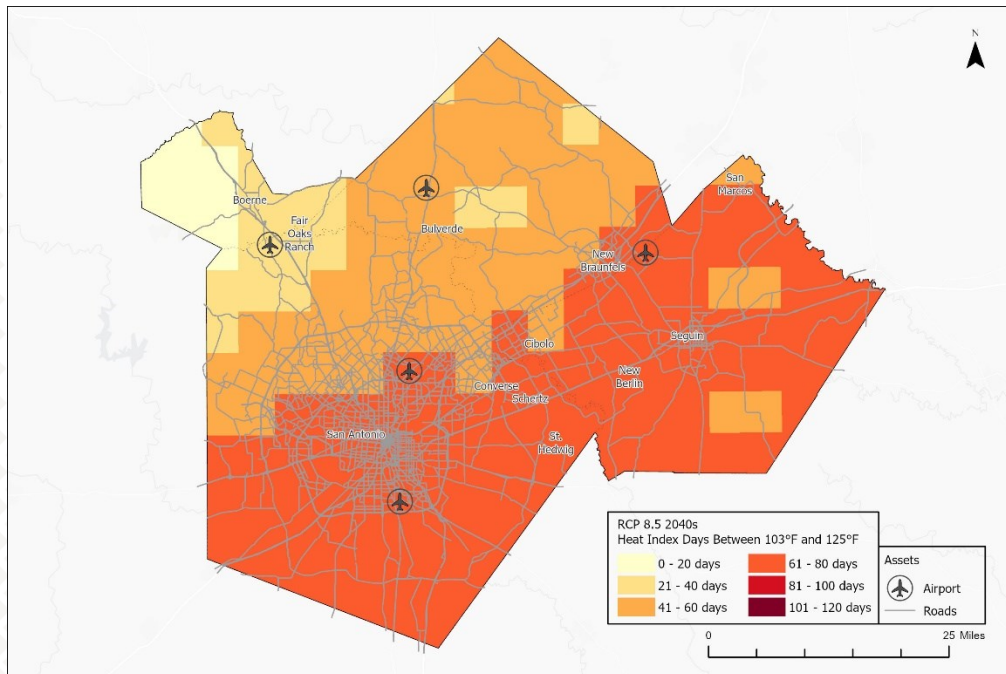


Figure 12. Average Number of 103°F - 125°F days per year by the 2040s.

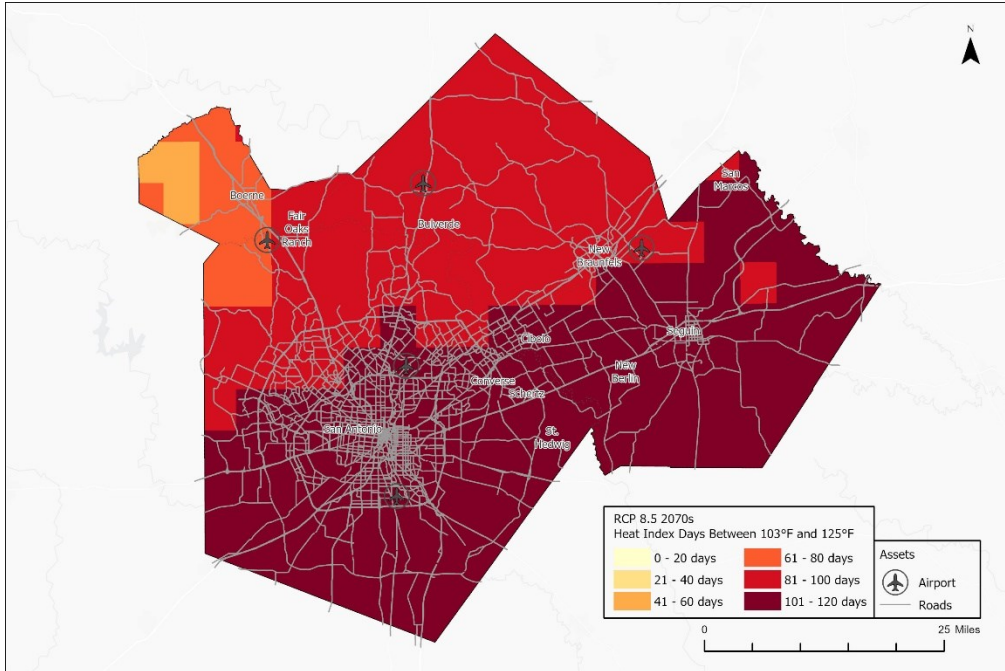


Figure 13. Average number of 103°F - 125°F days per year by the 2070s.

High heat days can greatly impact disadvantaged communities – for example, people who rely on public transit as their main form of transportation. The below figure overlays the VIA bus routes with the number of days over 103°F by the 2070s, revealing VIA riders will be facing months of dangerous days of heat that could cause heat cramps, heat exhaustion, and even heat stroke.

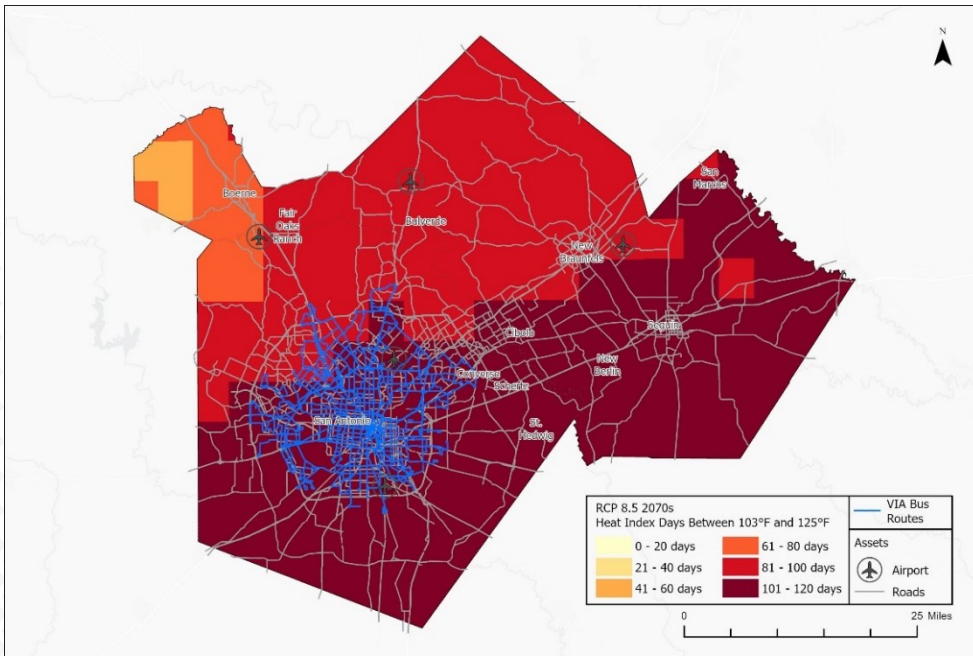
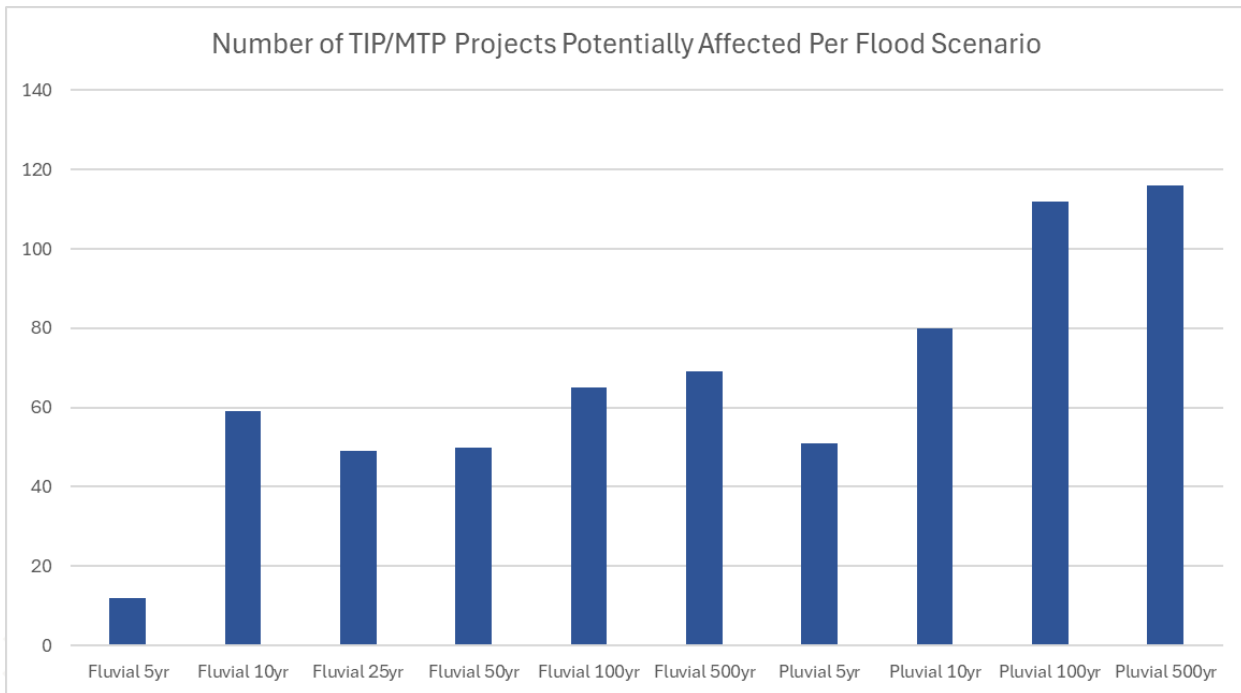


Figure 14. VIA bus routes overlaid with the average number of 103°F - 125°F days per year by the 2070s.

## Risks to the Metropolitan Transportation Plan and Transportation Improvement Program

To understand how one of the region's most pressing risks, flooding, might impact the region's planned transportation improvements, AAMPO screened the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) project list as of May 2024 against the flood maps generated for the study. The below figure summarizes the number of projects that are exposed to each flood scenario. Understanding which projects may be at risk from flooding allows project teams to account for future conditions and adjust the projects to ensure they are safe for the public through these types of disasters.



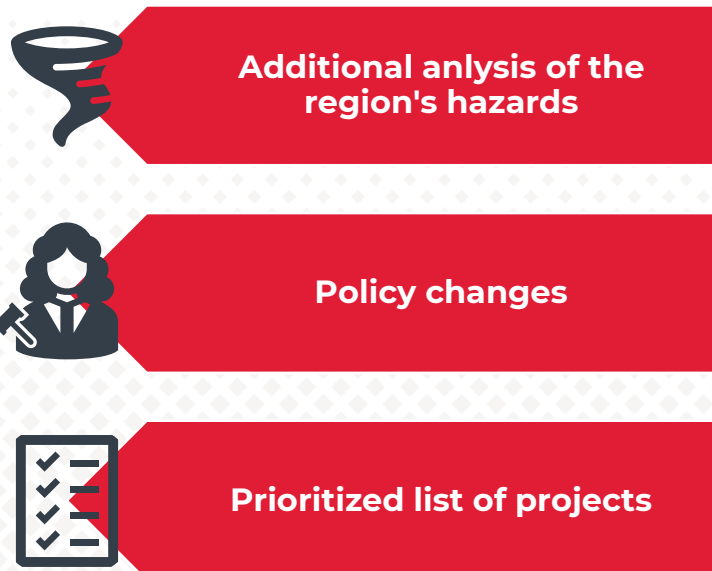
## Emerging Considerations

While this study focused on current and future natural hazards and weather issues, the AAMPO region also faces many other emerging challenges and opportunities that should be tracked as the resilience conversation progresses.



## The Road to Resilience

As a result of this study, AAMPO plans to take several steps to further invest in the resilience of the region's transportation system, depicted below.



AAMPO will be able to take these next steps with support from FHWA through a PROTECT Program Grant awarded in 2024. AAMPO plans to develop a Transportation Resilience Improvement Plan that will not only build out a PROTECT-compliant plan for AAMPO but also compile a compendium of accessible, user-friendly resources that build upon the data gathered and analysis conducted as part of this Resiliency Study. These resources will enable partners in the region to not only identify assets for resilience investments but also apply for future resilient transportation funding opportunities through the PROTECT Formula Funds as well as future discretionary fund cycles.

As the AAMPO region continues to grow and adopt new technologies, it will be crucial to ensure the region's core infrastructure is future-proofed to support generations to come. The findings of the AAMPO Resiliency Study are just the beginning of solidifying the region's comprehensive resilience strategy to safeguard transportation infrastructure for the communities who rely on it. AAMPO is committed to improving the resilience of the region's multimodal transportation system for all who live, work, and visit.