

RGVMPO

Resilience and Sustainability Analysis

SWOT Workshop

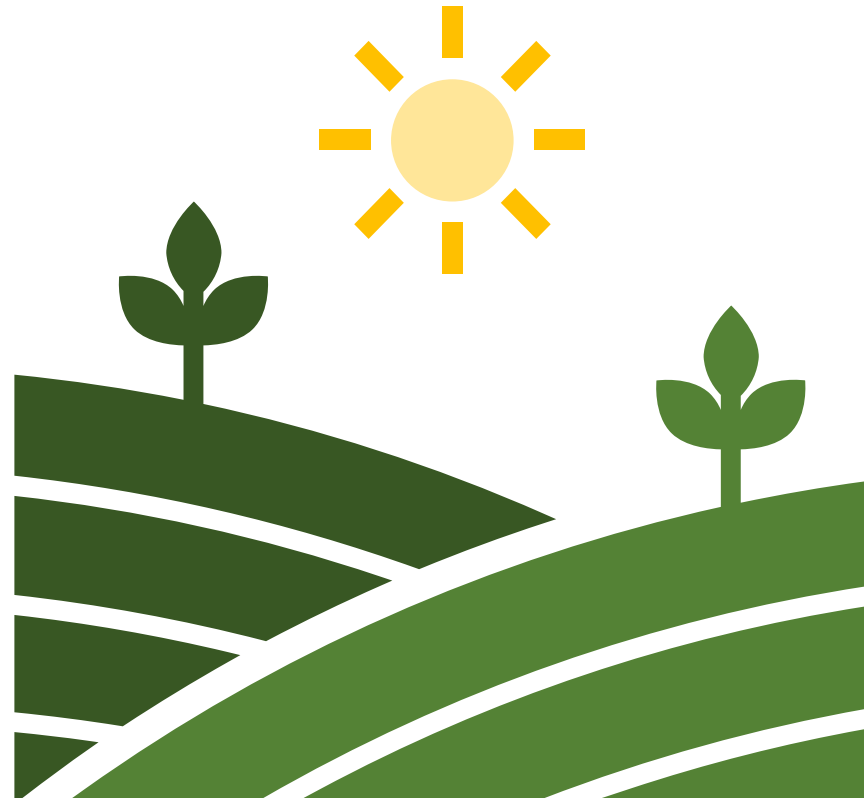
April 17th, 2023



Welcome!

Agenda

1. Overview Presentation
 - Existing Framework
 - Network Assets
 - Safety Analysis
 - Risk Mapping
 - Equity Analysis
2. SWOT Exercise
3. Group Debrief





What is resiliency?

The ability of a system or community to develop policies, practices, and projects that mitigate the lasting effects of chronic and acute stressors.



What is sustainability?

Consists of fulfilling the needs of current generations without compromising the needs of future generations, while ensuring a balance between economic growth, the environment, and social well being.

The background of the slide is a map showing a network of roads or paths. The roads are represented by thick, semi-transparent lines in shades of green and yellow. Numerous small, semi-transparent red dots are scattered across the map, primarily concentrated in the central and left-hand areas, possibly indicating specific locations or data points.

Existing Framework

Existing Resilience and Sustainability Plans

City and County Plans

- Hazard Mitigation Plans by county (coordinated by FEMA)
- Some city plans extensively address disaster preparedness and flood control

Regional Plans

- Metropolitan Transportation Plan, including Active Transportation and Public Transit plans

State Plans

- Statewide Resiliency Plan (in development)
- Coastal Resiliency Master Plan
- Texas-Mexico Border Transportation Master Plan – aims to coordinate disaster response

Federal Plans

- US Department of Transportation's Climate Action Plan
- Border 2025/Frontera 2025: US-Mexico Environmental Program

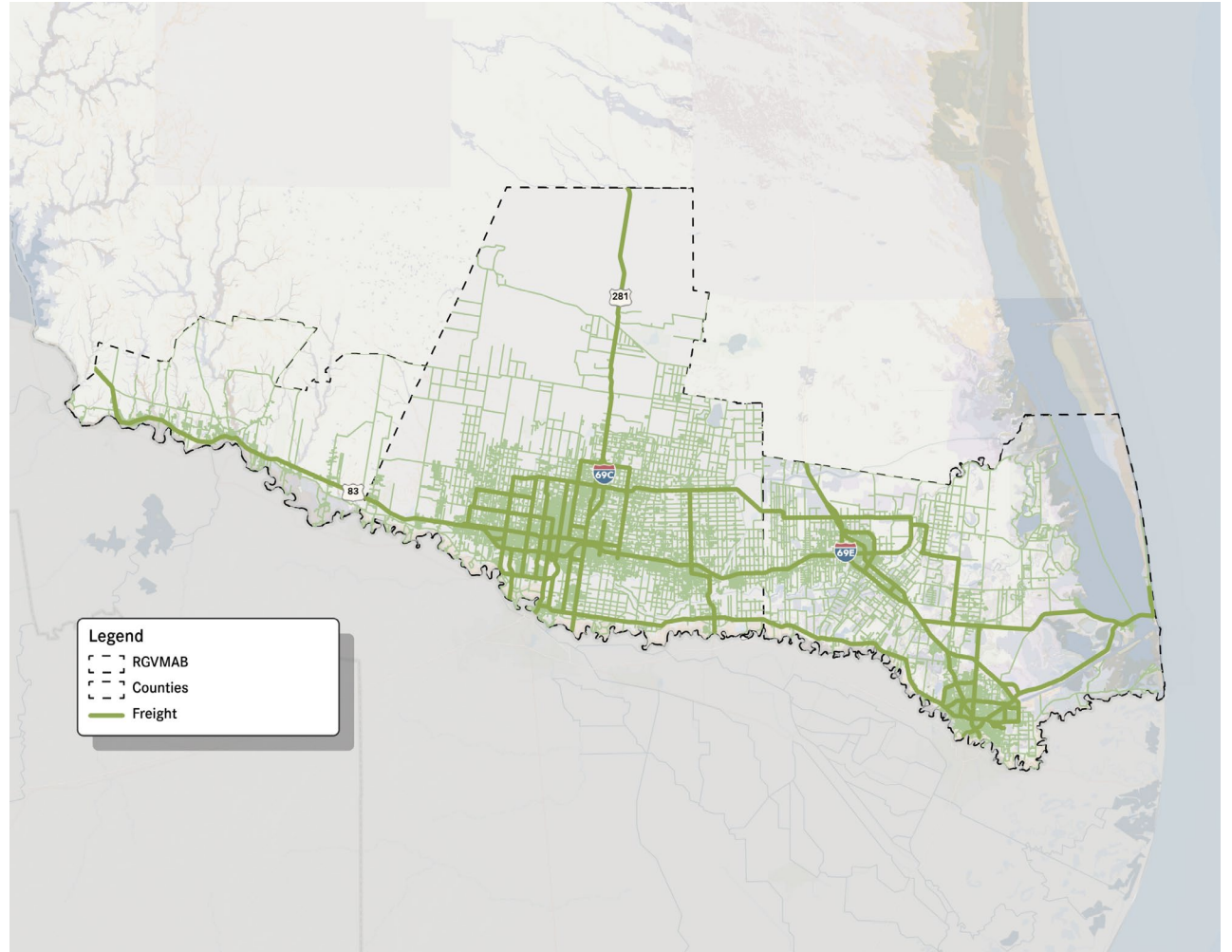
The background is a map with a network of assets overlaid. The assets are represented by thick, semi-transparent lines in shades of blue and green. A prominent blue line runs horizontally across the middle, with several green lines branching off it. There are also some blue lines in the upper left and lower right. The map itself is a light, faded color, showing some geographical features like roads and buildings.

Network Assets

Network Components: Roadways

RVGMAB has about 8,895 miles of roadway total, including a portion of the Texas Highway Freight Network

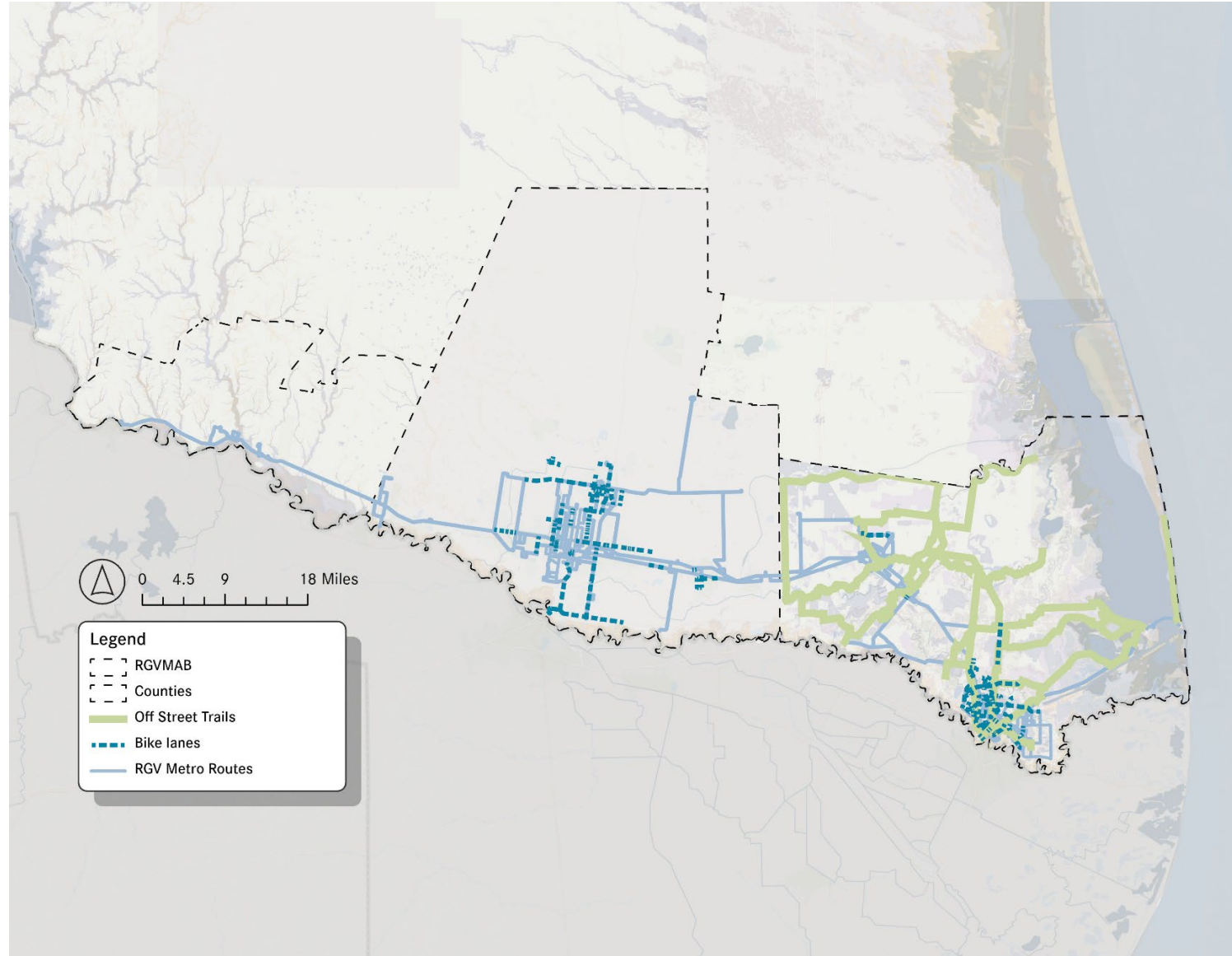
- Includes interstates, the National Highway System, the Texas Trunk System, and Emerging Freight Corridors
- Also includes local or off-system roads



Network Components: Active Transportation

Includes assets used for walking, biking, scootering, and wheelchair access/mobility

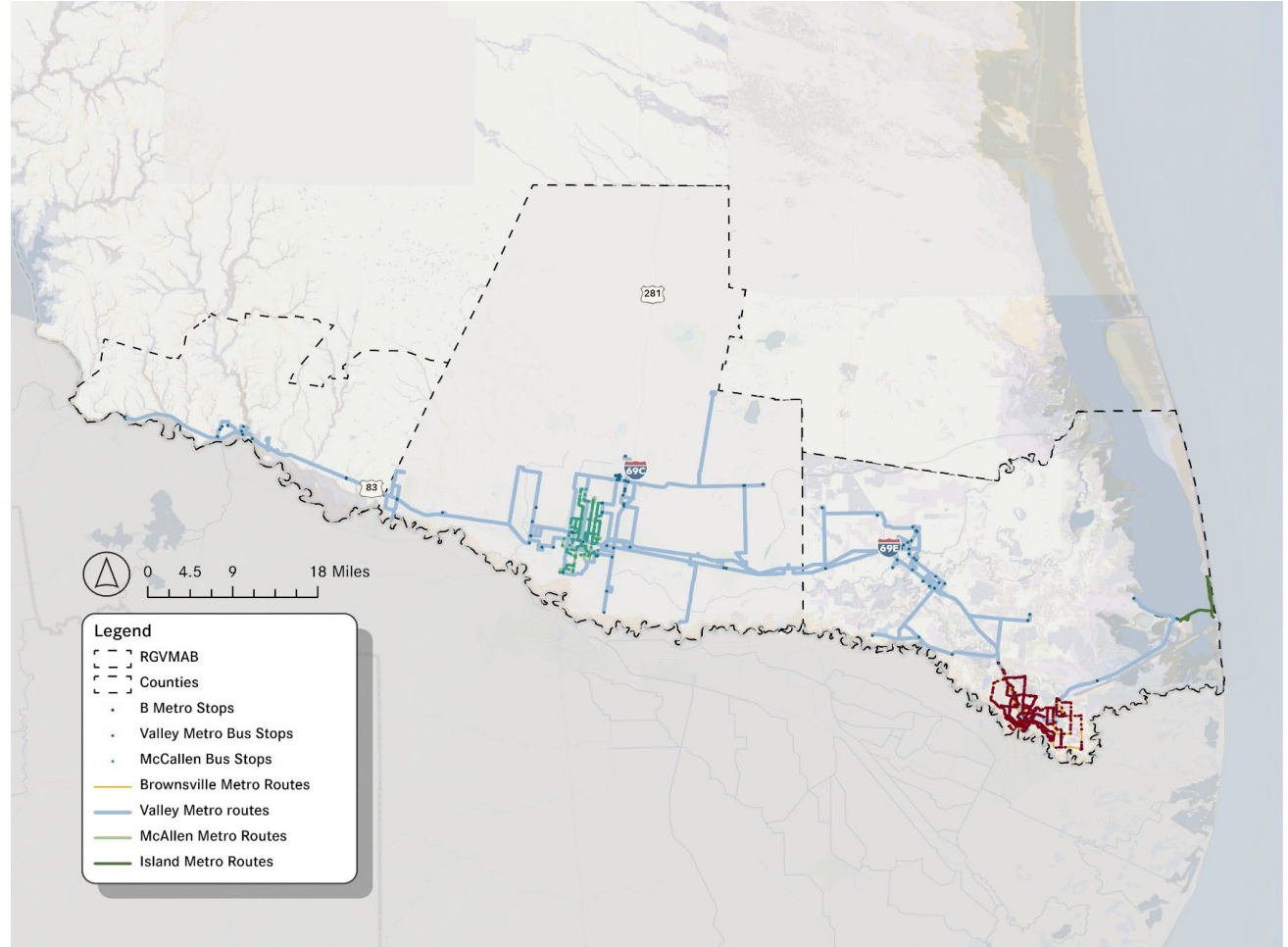
Currently 290 miles of off-street trails and 140 bike lanes



Network Components: Transit

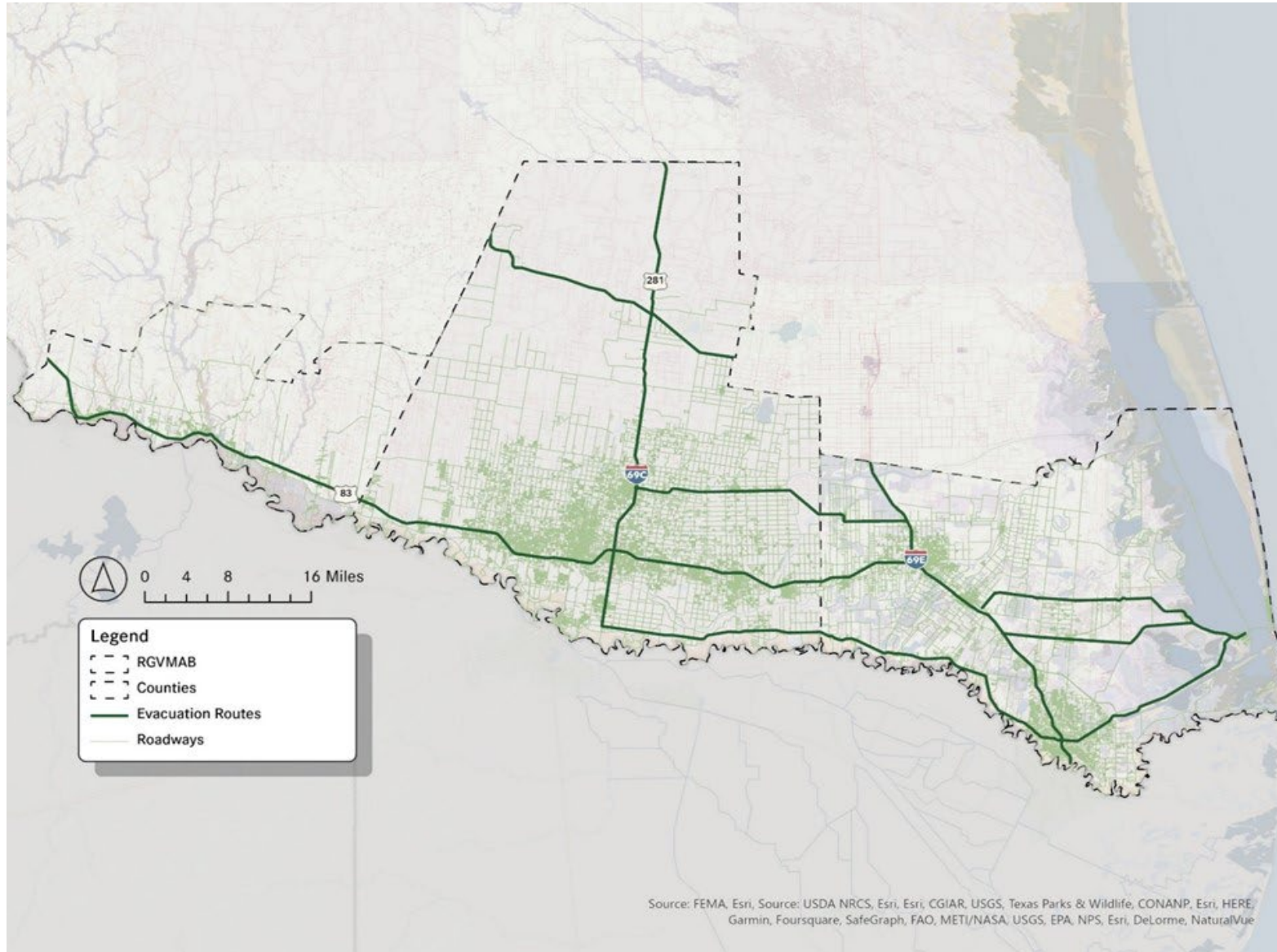
Operating agencies:

1. Valley Metro
 - Over 30 routes and connections and 138 stops
2. Brownsville Metro
 - 15 routes and over 600 stops
3. McAllen Metro
 - 10 routes and 260 stops
4. Island Metro
 - 5 routes

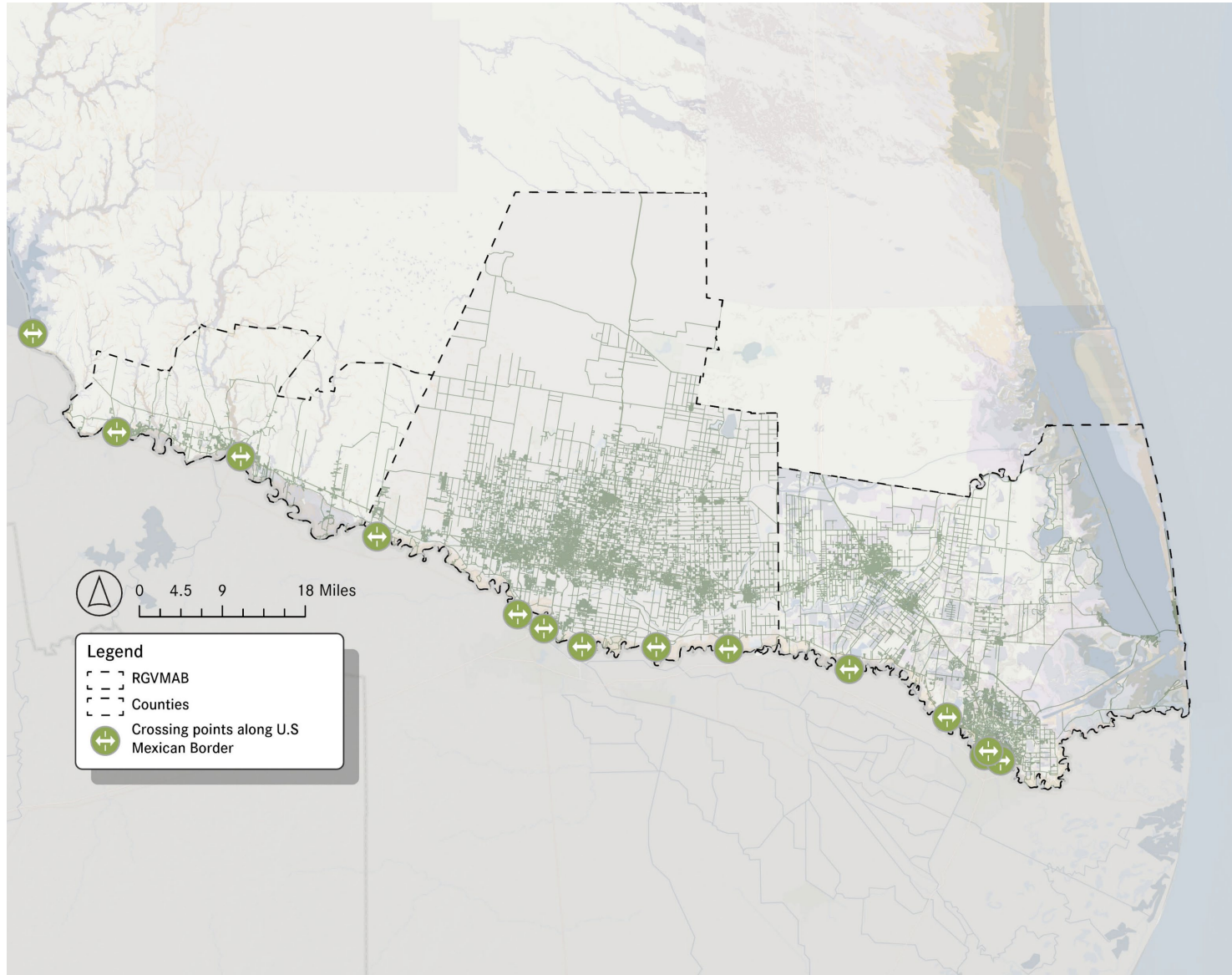


Network Components: Evacuation Routes

12 major
evacuation routes
Interstate 2 and
Interstate
Highway 69 are
potential
contraflow routes



Network Components: Border Crossings

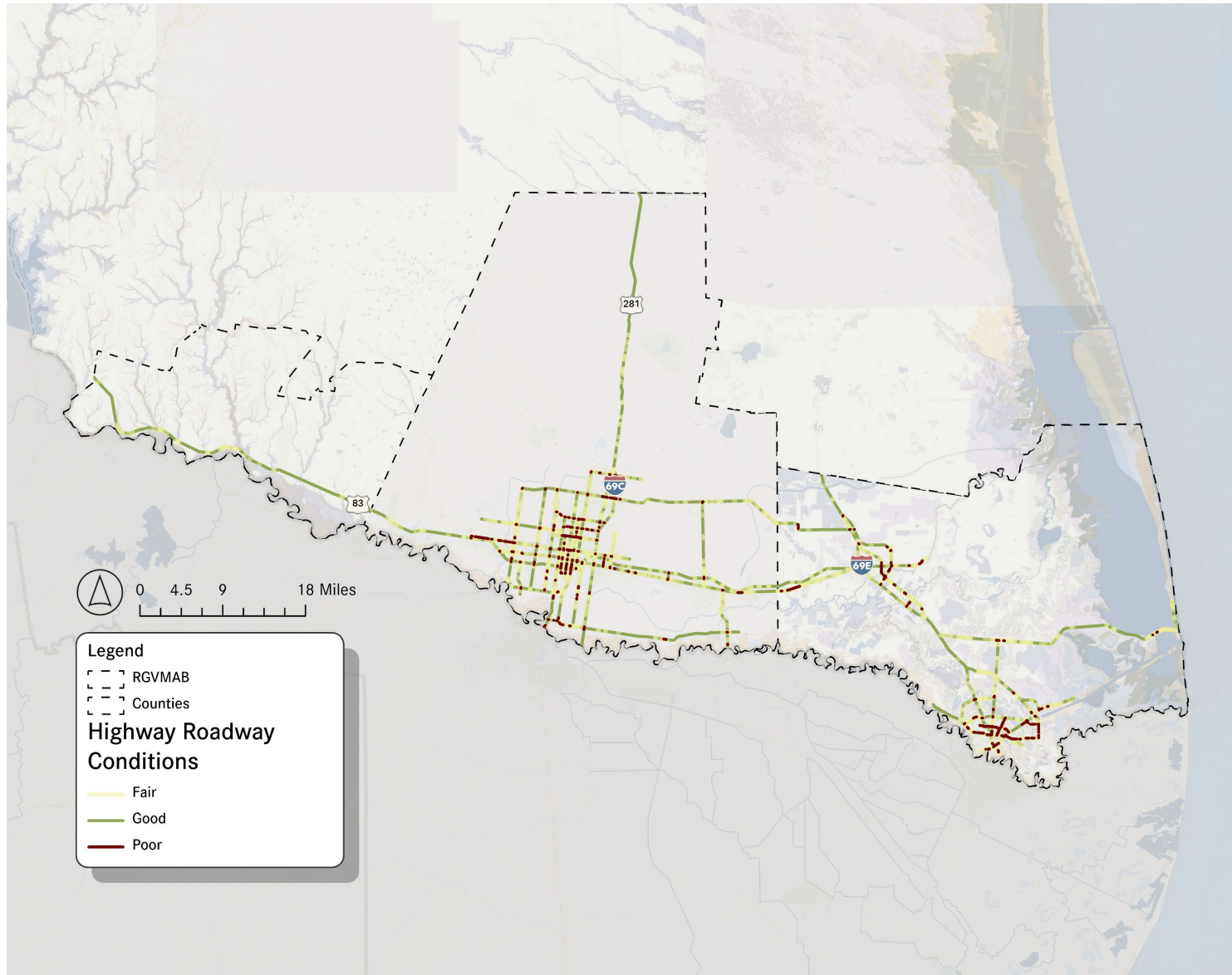


- Hidalgo had the most truck crossings in 2022
- Brownsville had the most train, vehicles, and vehicle passenger crossings
- Roma had the most bus and bus passenger crossings

Road Conditions

RGVMAB has:

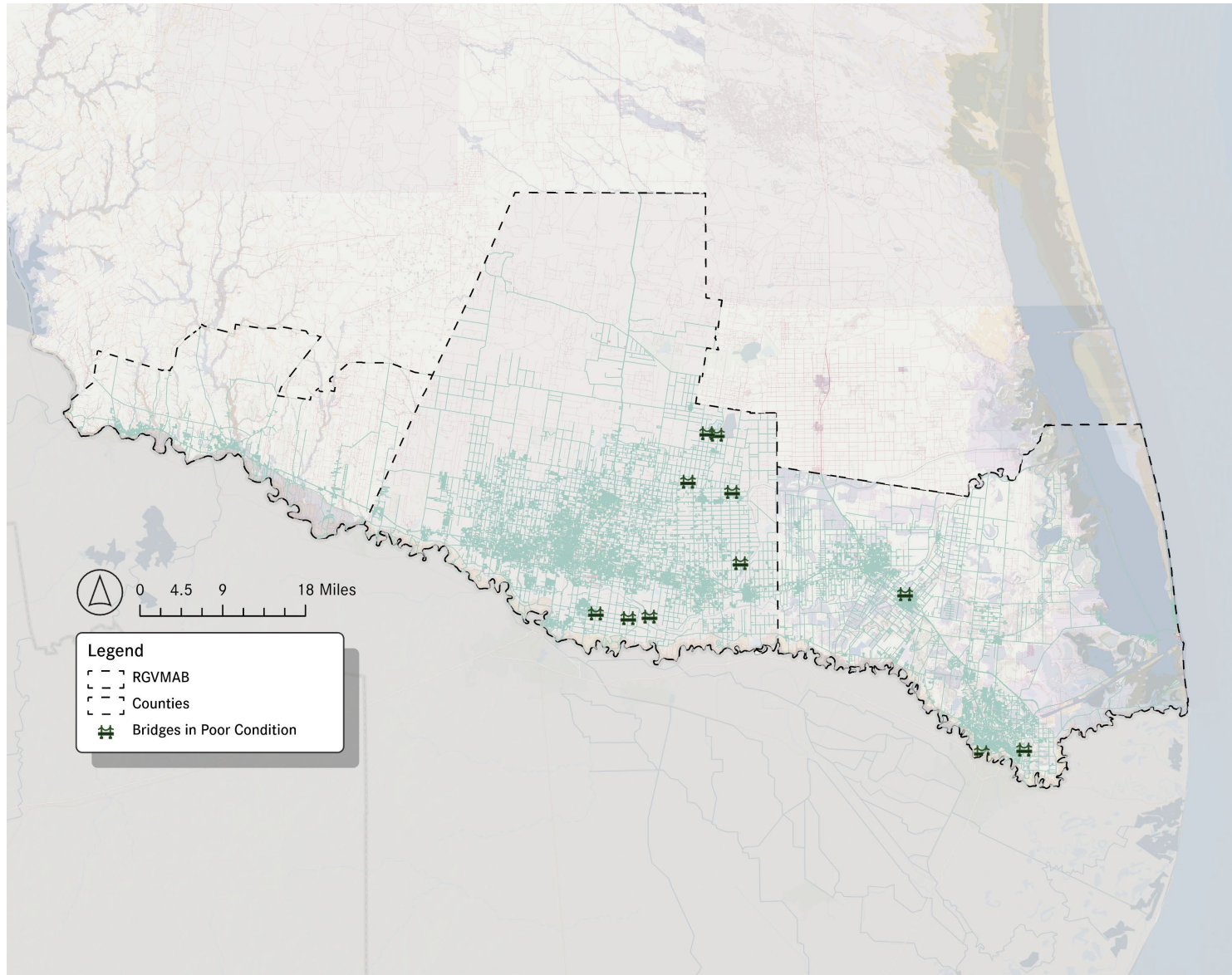
- 591 miles of roadway on the National Highway System; **41 miles (7%) are in poor condition**



Bridge Conditions

RGVMAB has:

- 819 bridges; **11 are in poor condition**
- 13,133,969 sq ft of bridge deck area; **less than 1% is in poor condition**

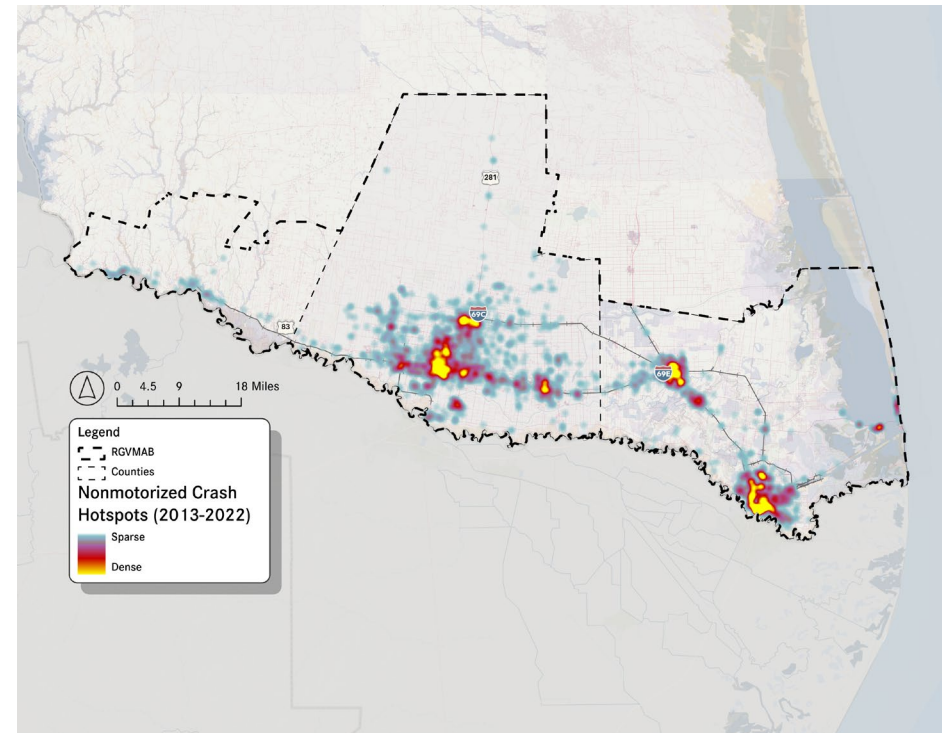
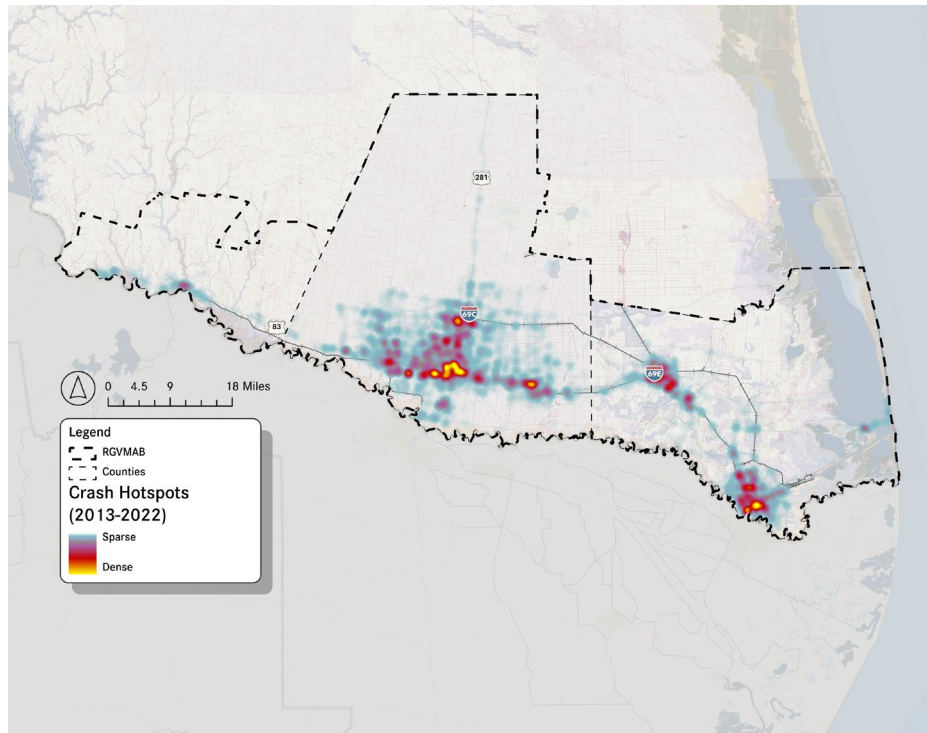




Safety Analysis

Safety Analysis

CRIS data from TxDOT for Cameron, Hidalgo, and Starr counties for 2013 to 2022 and TxDOT's Roadway Inventory



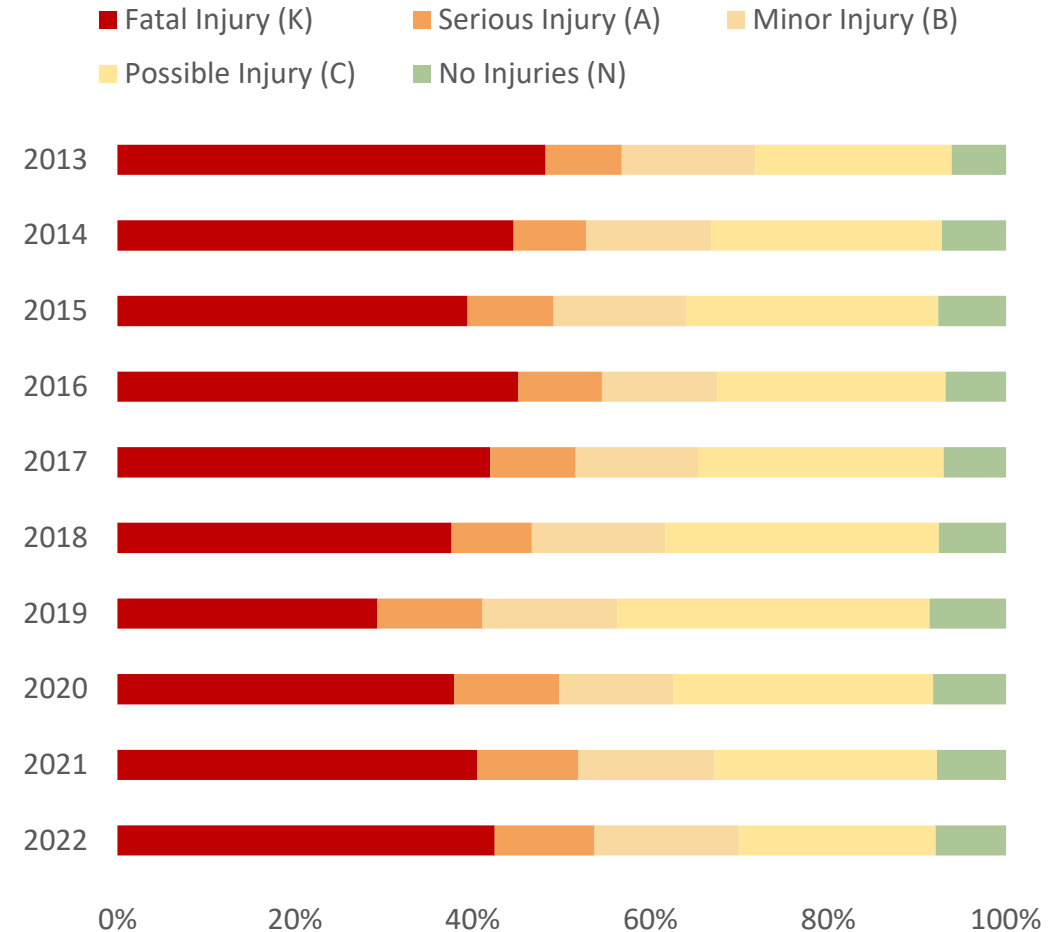
“...a transportation system cannot be sustainable if it is not safe for humans and...nothing is more valuable than human life.”

Safety Analysis: Crash Cost

Total costs for crashes over the 10-year period is **\$25,051,870,900** based on FHWA's *Crash Costs for Highway Safety Analysis*

Largest cost is for fatal injury crashes, followed by possible injury crashes

Crash Severity	Cumulative Cost (2013 to 2022) (2016 dollars)
Serious Injury (A)	\$ 2,526,335,000.00
Minor Injury (B)	\$ 3,651,010,500.00
Possible Injury (C)	\$ 6,768,332,800.00
Fatal Injury (K)	\$ 10,233,632,400.00
No Injuries (N)	\$ 1,872,560,200.00
Unknown (99)	11,441 crashes

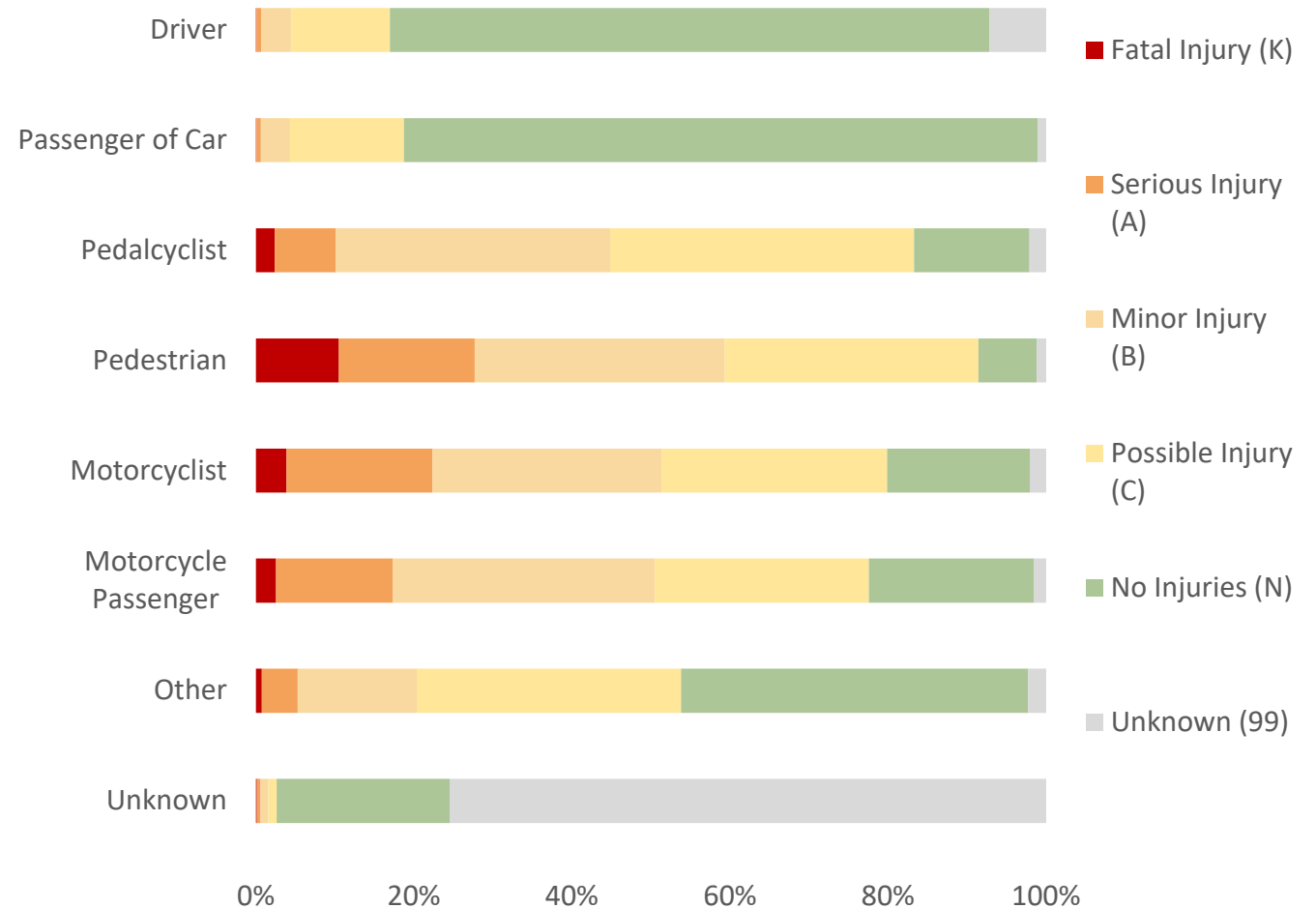


Safety Analysis: Person Level Data

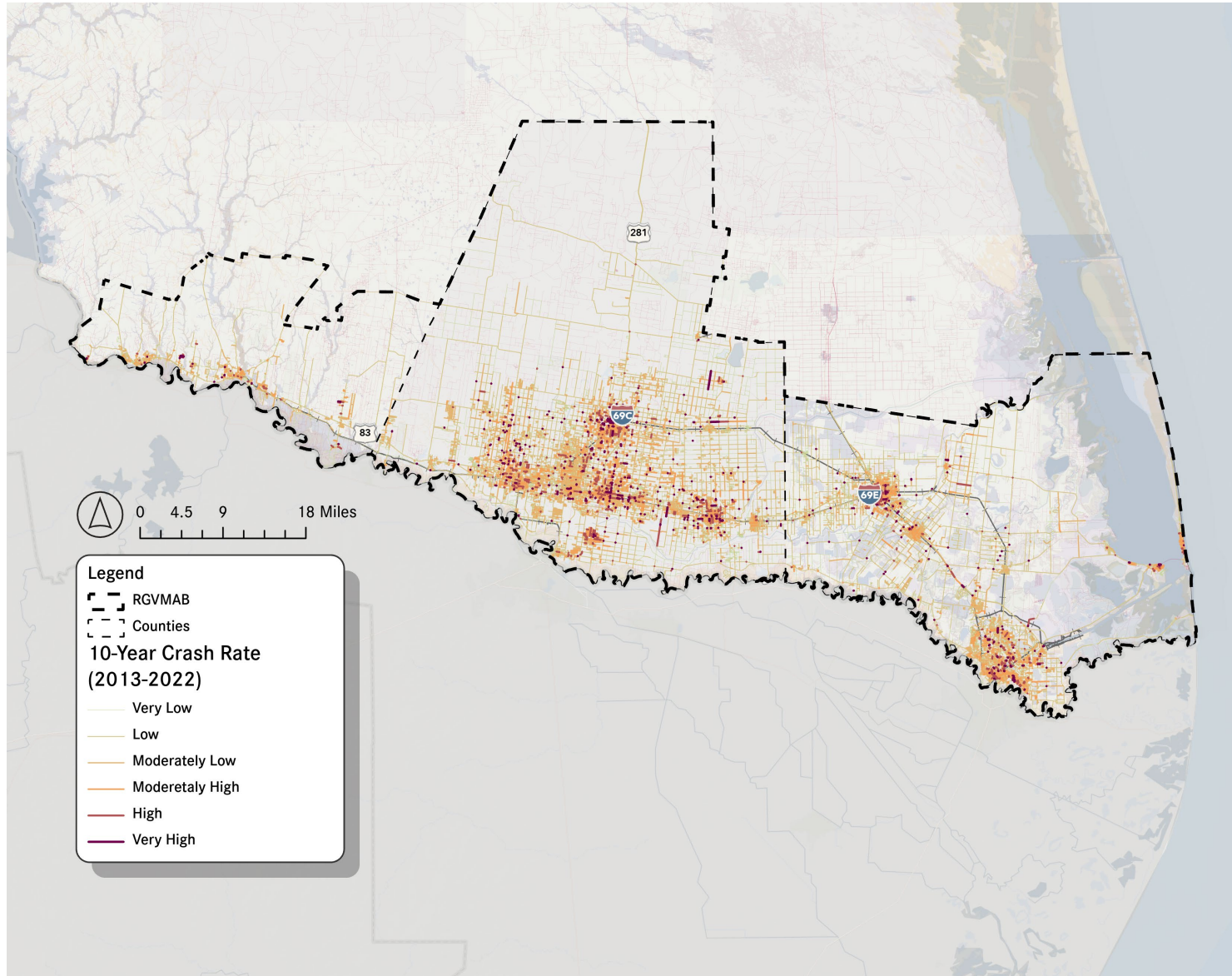
716,914 persons were involved in crashes from 2013 to 2022

- About 2/3 of persons involved in crashes are drivers
- Less than 1 percent of persons are pedalcyclists or pedestrians

Pedestrians experience the highest levels of severe outcomes from crashes, followed by motorcyclists



Safety Analysis: Crash Rate

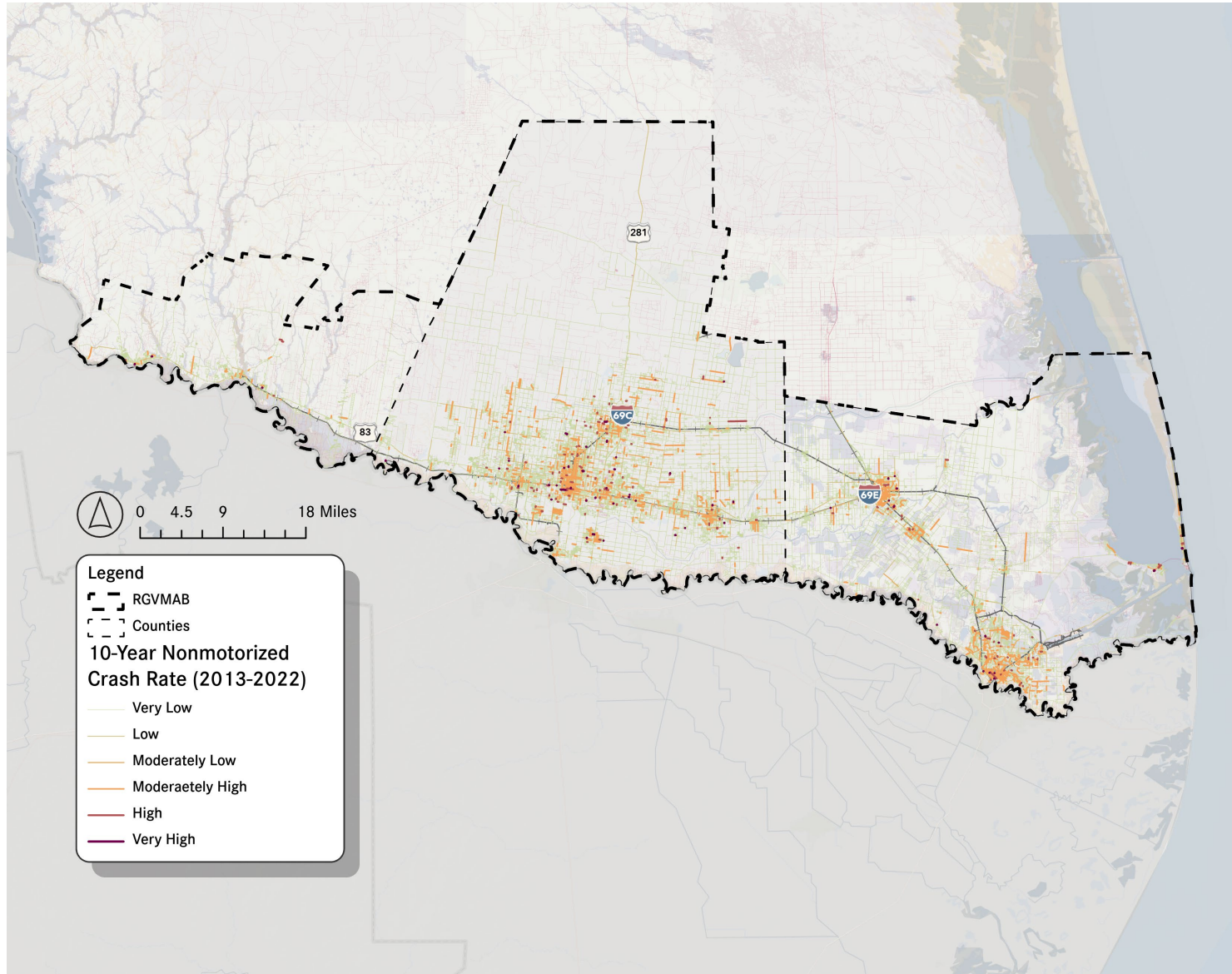


Crash rate maps normalize gross crash counts

FHWA formula was used to calculate accidents per million vehicle miles of travel (ACC/MVM)

High and very high crash rate segments are seen in and around urban areas of the RGVMAB

Safety Analysis: Nonmotorized Crash Rate



Crash rate maps normalize gross crash counts

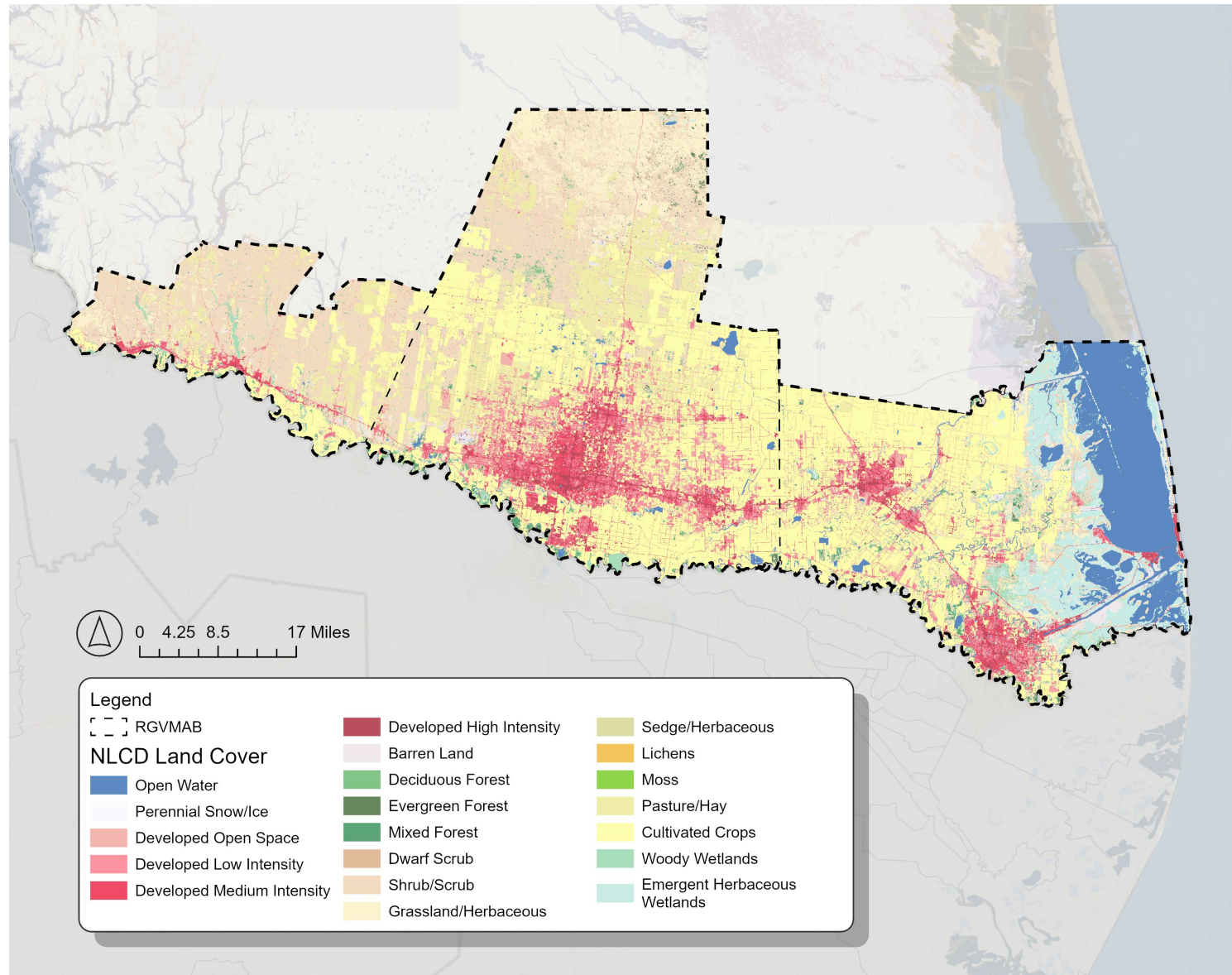
FHWA formula was used to calculate accidents per million vehicle miles of travel (ACC/MVM)

High and very high crash rate segments are seen in and around urban areas of the RGVMAB

Risk Mapping

Risk Mapping: Land Cover

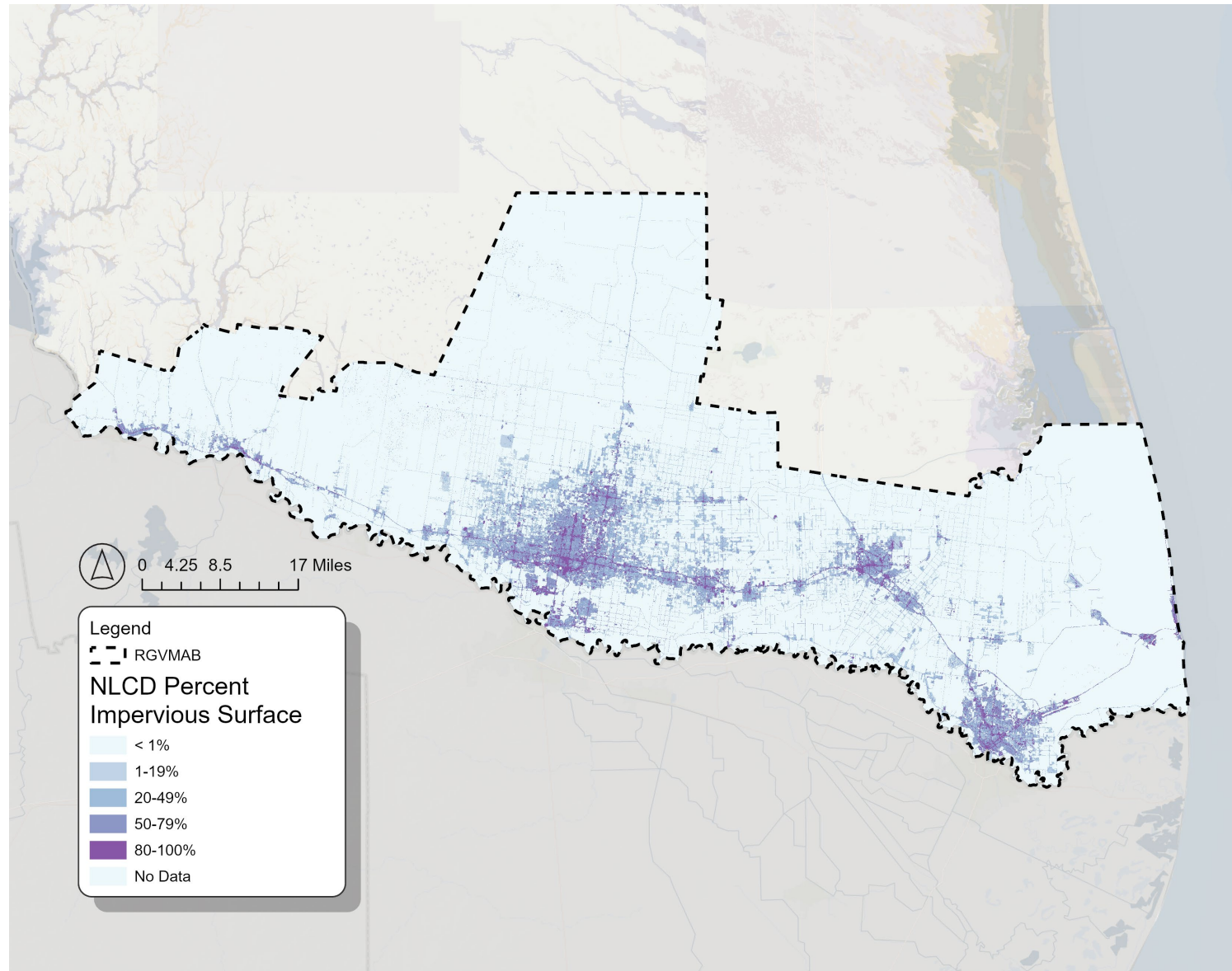
The land cover map depicts the latest on the ground conditions and serves as a foundation to understand risks in the region such as flooding, wildfires, and soil corrosion discussed in this document



Risk Mapping: Impervious Surface

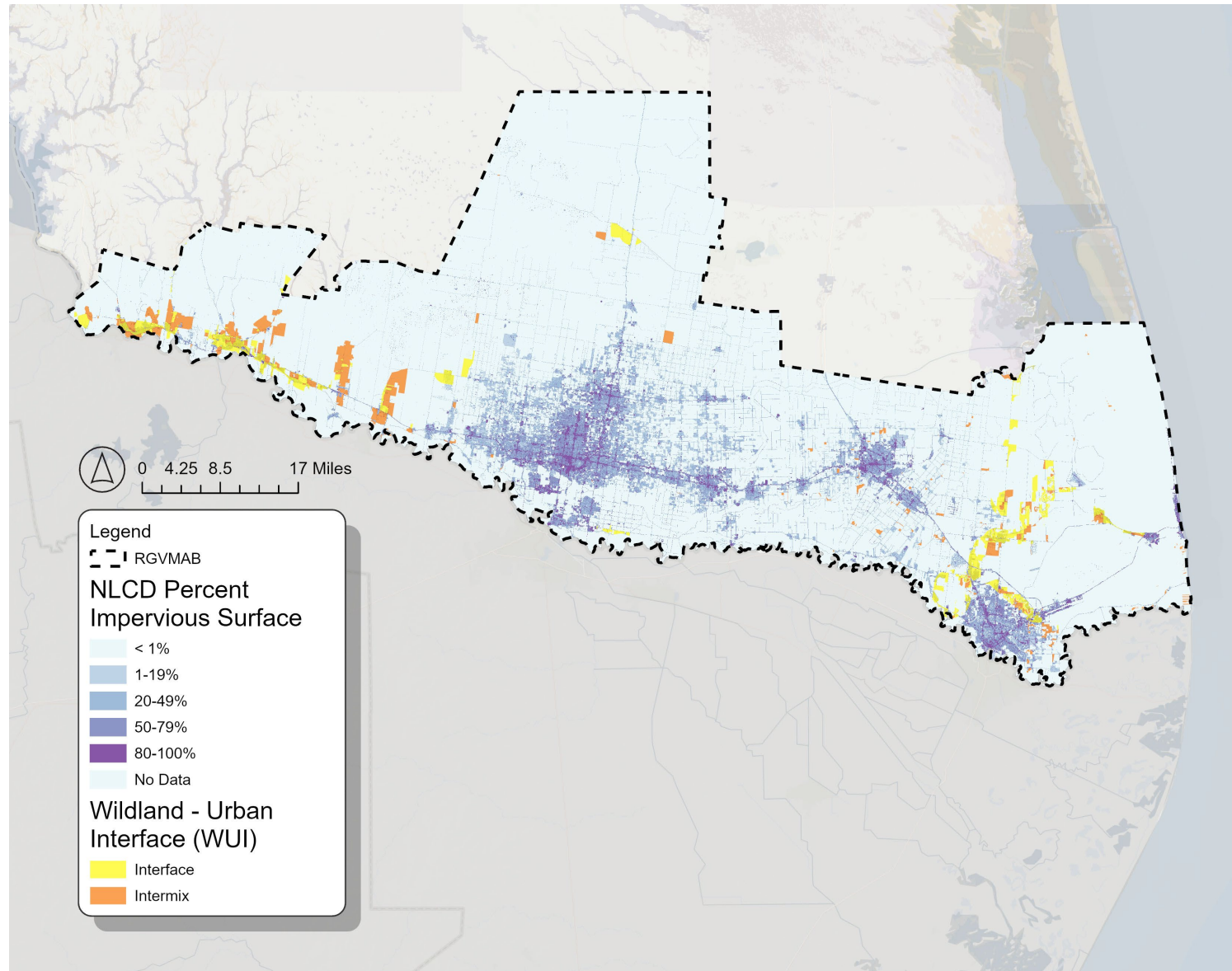
A high percentage of impervious surfaces pose a risk to water quality, flooding, and surface temperatures

Urban Heat Island (UHI) caused by a high percentage of urban impervious surface contributes to cities experiencing warmer temperatures than surrounding rural by typically (1–7°F)

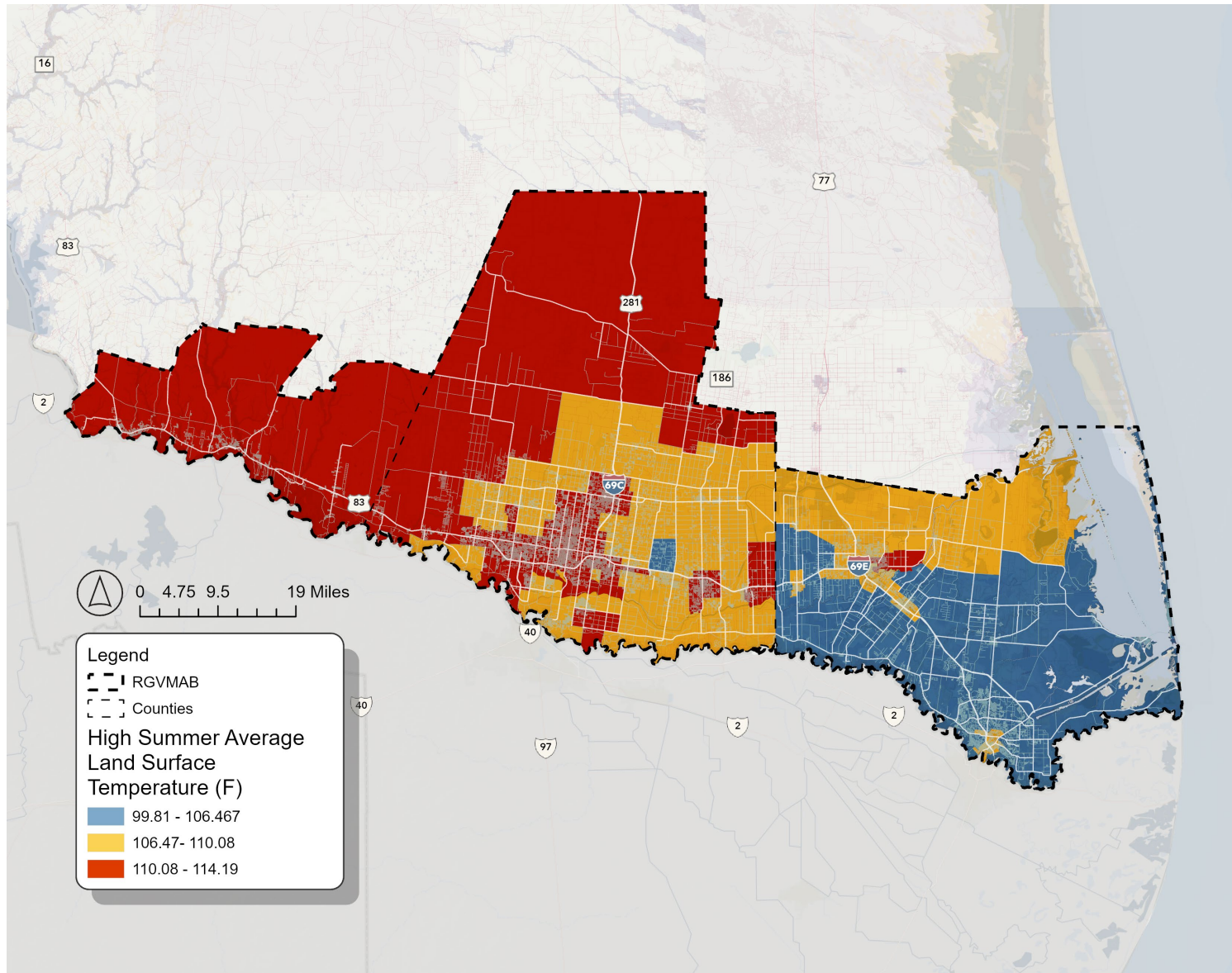


Risk Mapping: WUI Fires

Wildland-Urban Interface is an area where people and homes meet or blend with wildland vegetation; the communities residing in these areas are at risk of WUI fires



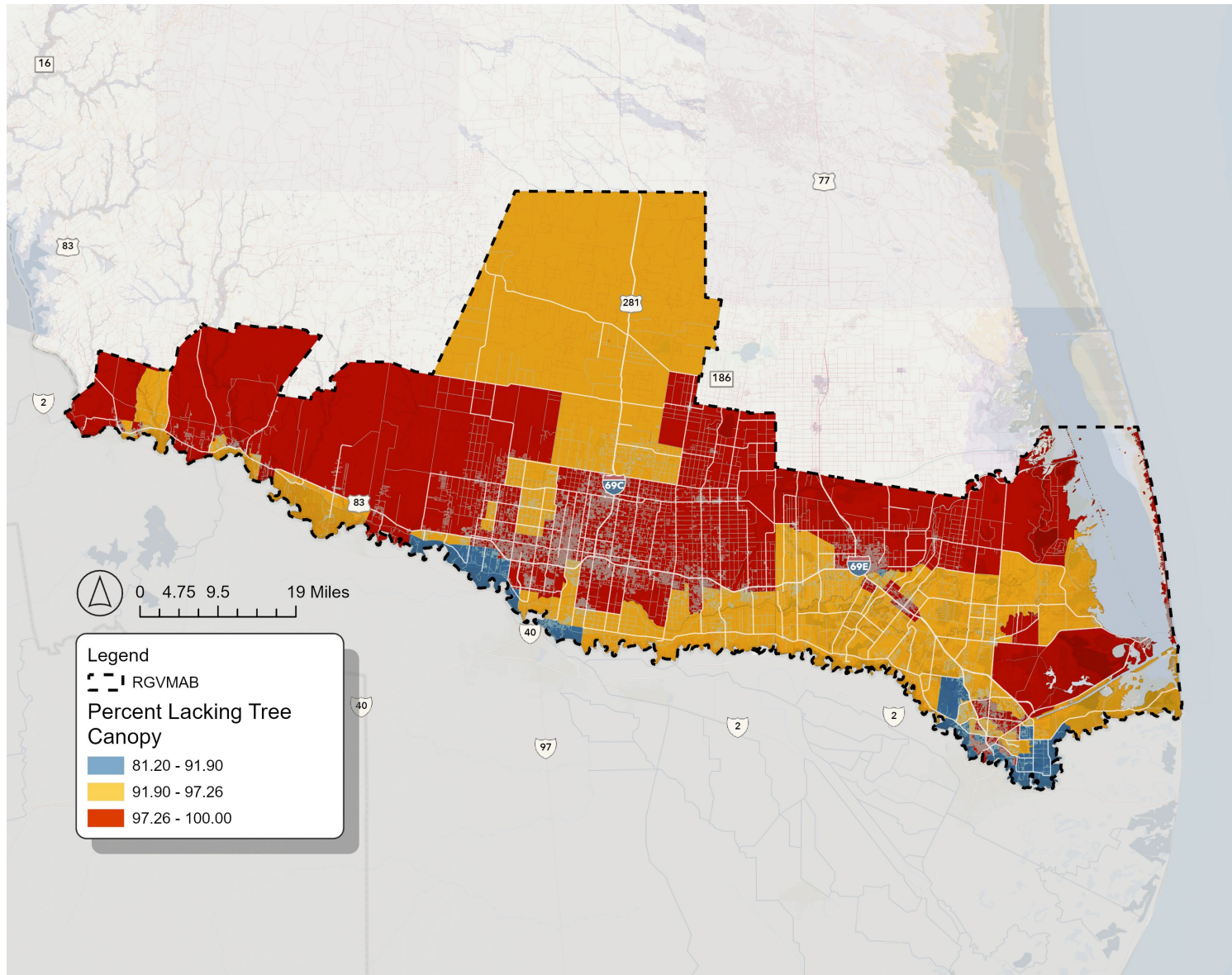
Risk Mapping: Extreme Heat



Extreme heat can have negative effects on residents of the RGVMAB and lead to major health concerns such as:

- heat cramps
- heat exhaustion
- heatstroke
- hyperthermia

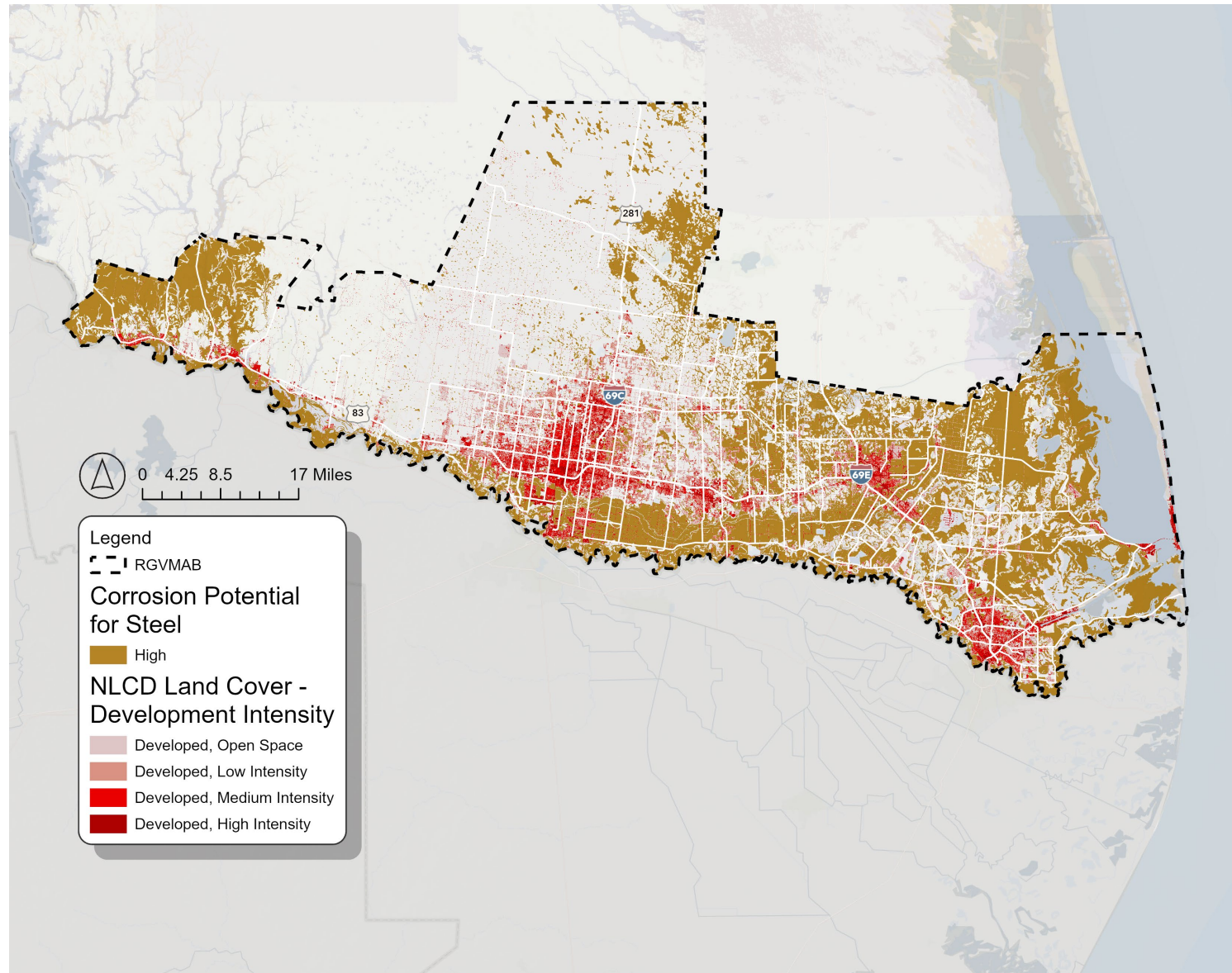
Risk Mapping: Extreme Heat and Trees



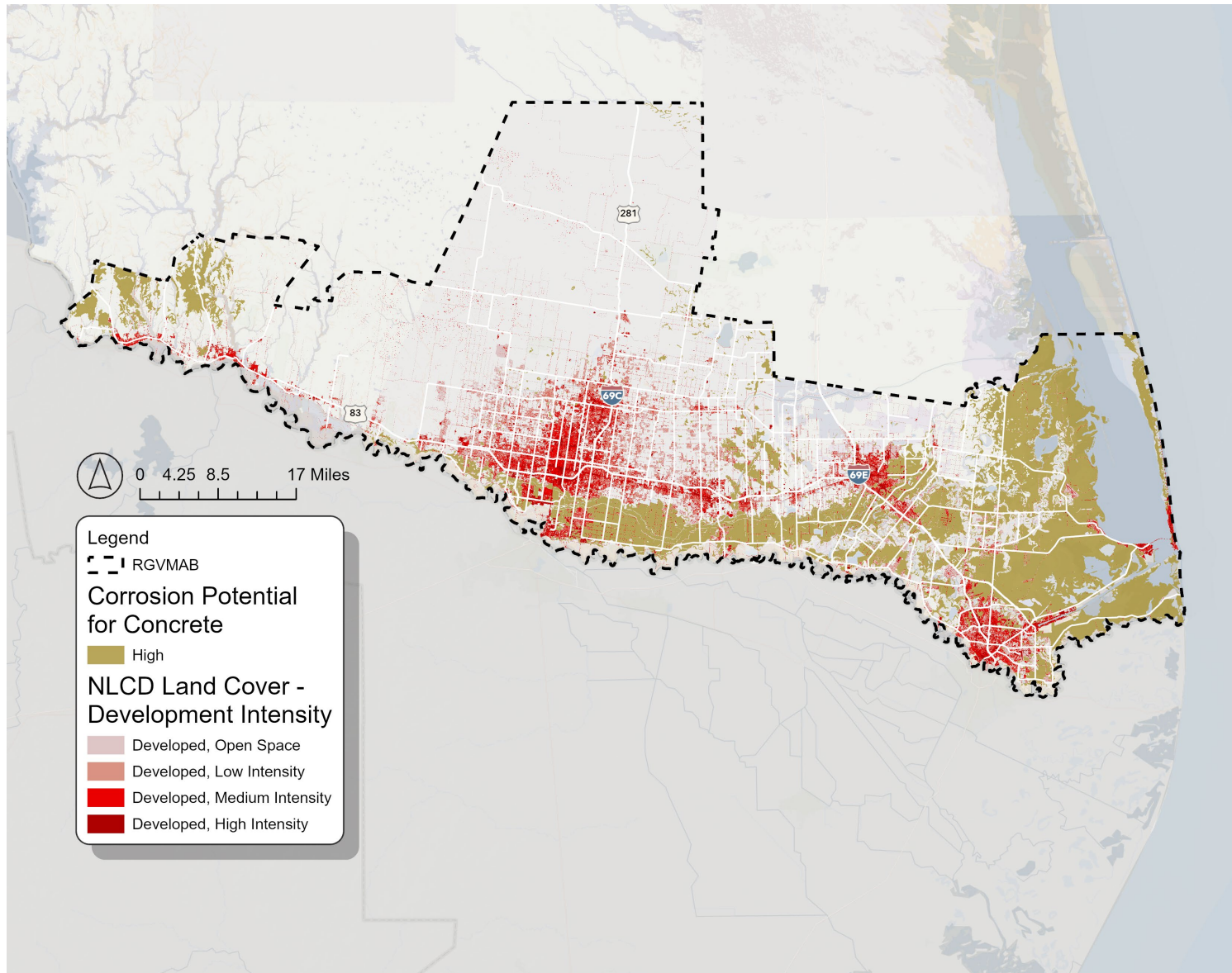
Maximizing tree canopy across the study area can help mitigate extreme heat events, urban heat islands, air pollution, and threats to water quality and quantity

Risk Mapping: Steel Corrosion Potential

Areas with high potential for steel corrosion can experience widespread damage to buildings, roads, bridges, and other steel infrastructure

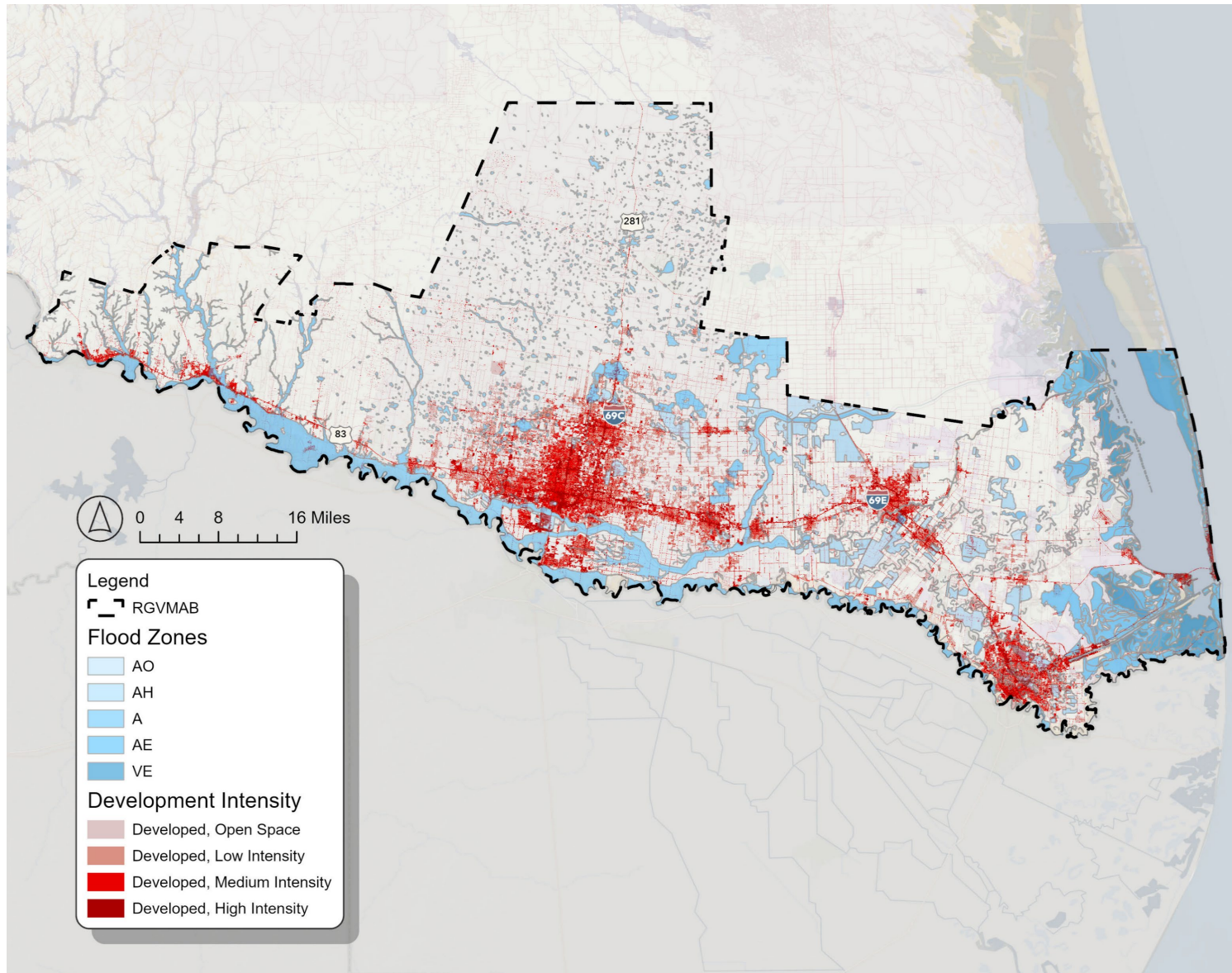


Risk Mapping: Concrete Corrosion Potential



Areas with high potential for concrete corrosion can experience widespread damage to critical sewage pipelines, bridges, and other critical assets made of concrete

Risk Mapping: Flooding

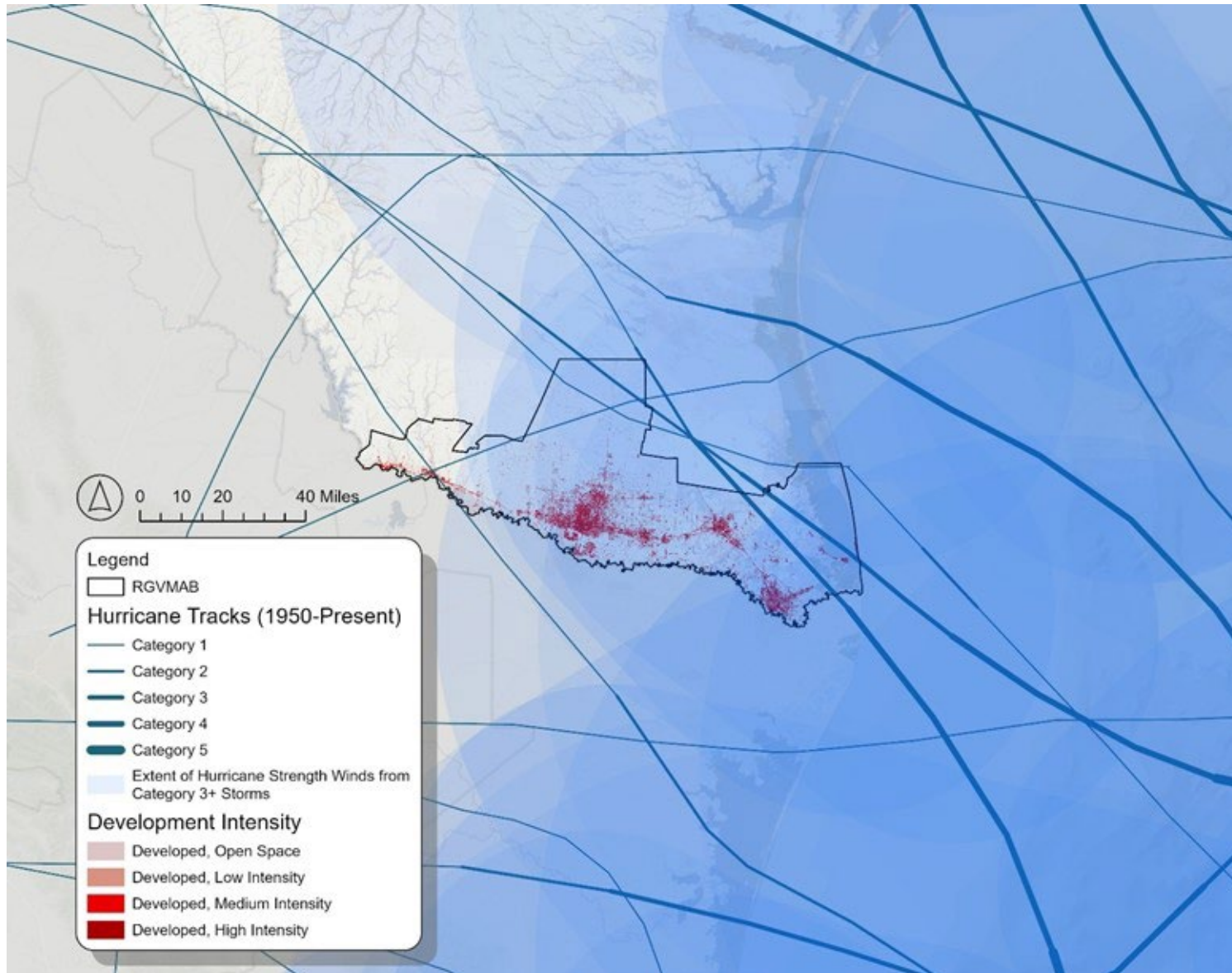


Regional flooding is caused by both riverine and tidal flooding

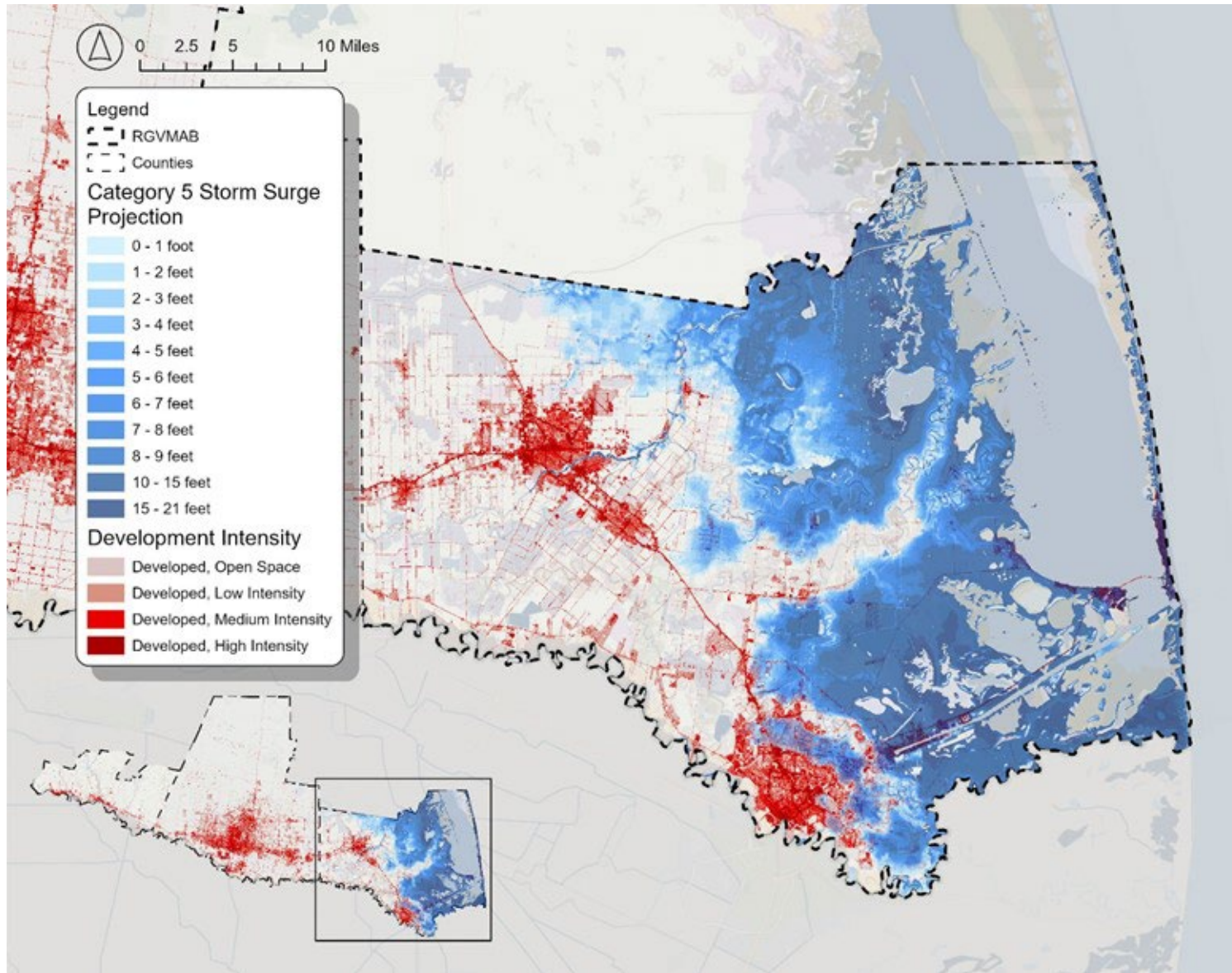
Flood zones AO, AH, A, AE, and VE represent a 1% annual flood risk

Risk Mapping: Past Hurricane Tracks

Hurricane tracks mapped represent all that passed within 150 miles of the study area since 1950

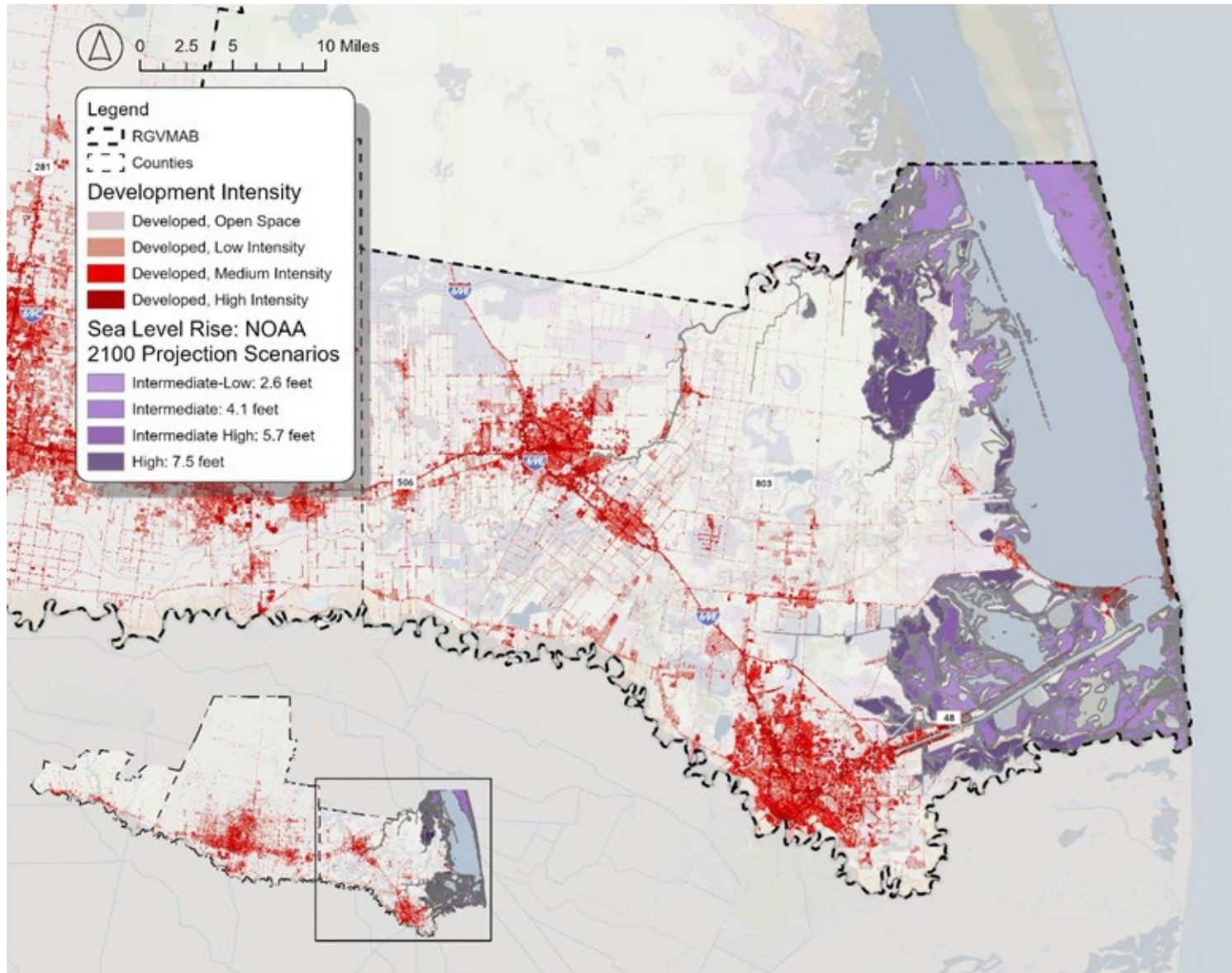


Risk Mapping: Storm Surge



The map shows NOAA's projections for a category 5 storm surge, and to the elevations in which the hypothetical floodwater would rise

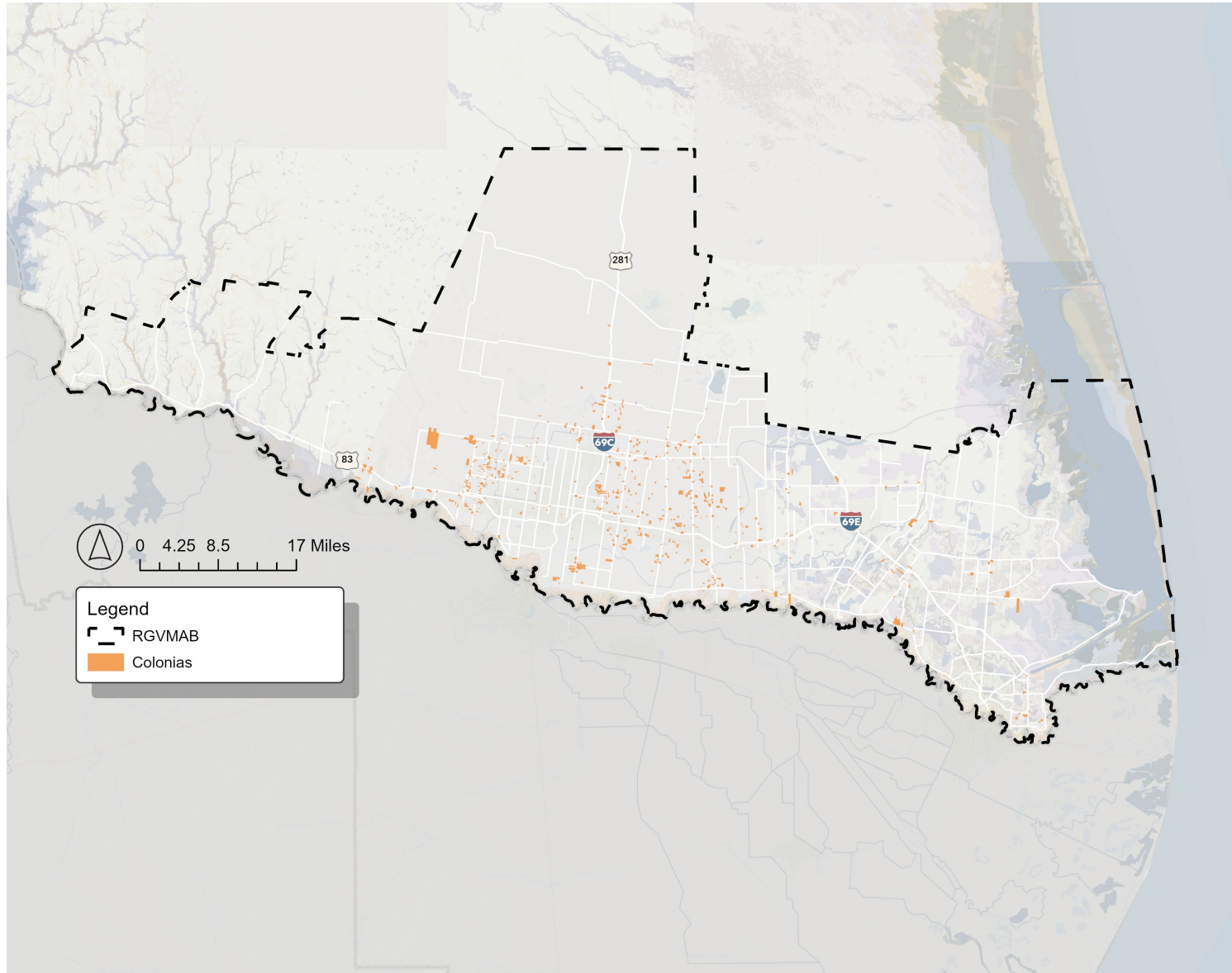
Risk Mapping: Sea Level Rise



Areas of development directly impacted by sea level rise are:

- Coastal communities of South Padre Island, Port Isabel and Laguna Heights
- Industrial areas around Brownsville Harbor

Risk Mapping: Housing

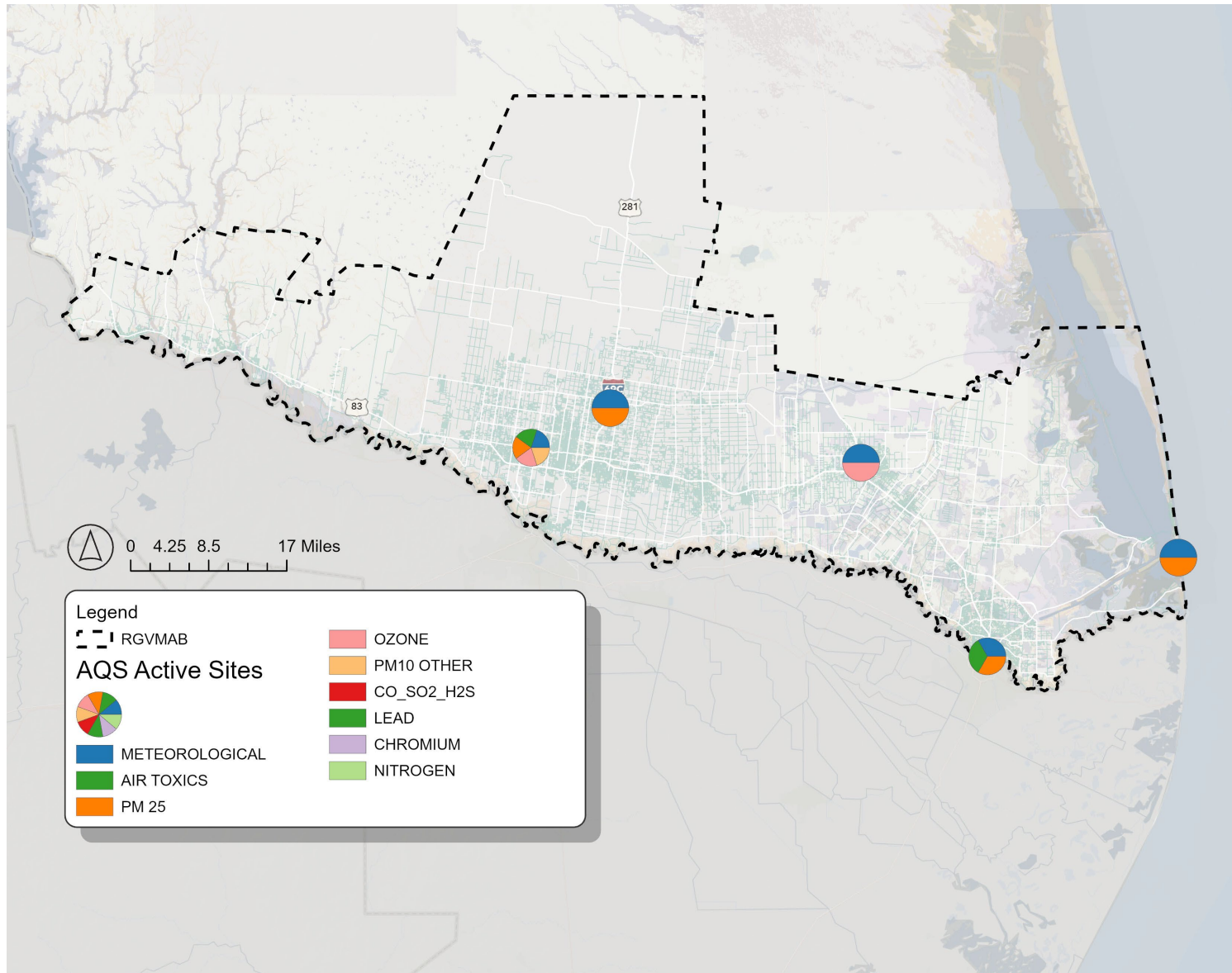


Las colonias lack basic infrastructure such as water, electricity, and wastewater management, making them much more vulnerable to hazards and pollution; there are 705 colonias within Cameron and Hidalgo counties

A map showing a region with various sustainability mapping overlays. A blue line represents a water body or river, and a yellow dashed line represents a boundary or boundary. The map is divided into several colored regions: light blue, light grey, and light red. The text "Sustainability Mapping" is overlaid on the map.

Sustainability Mapping

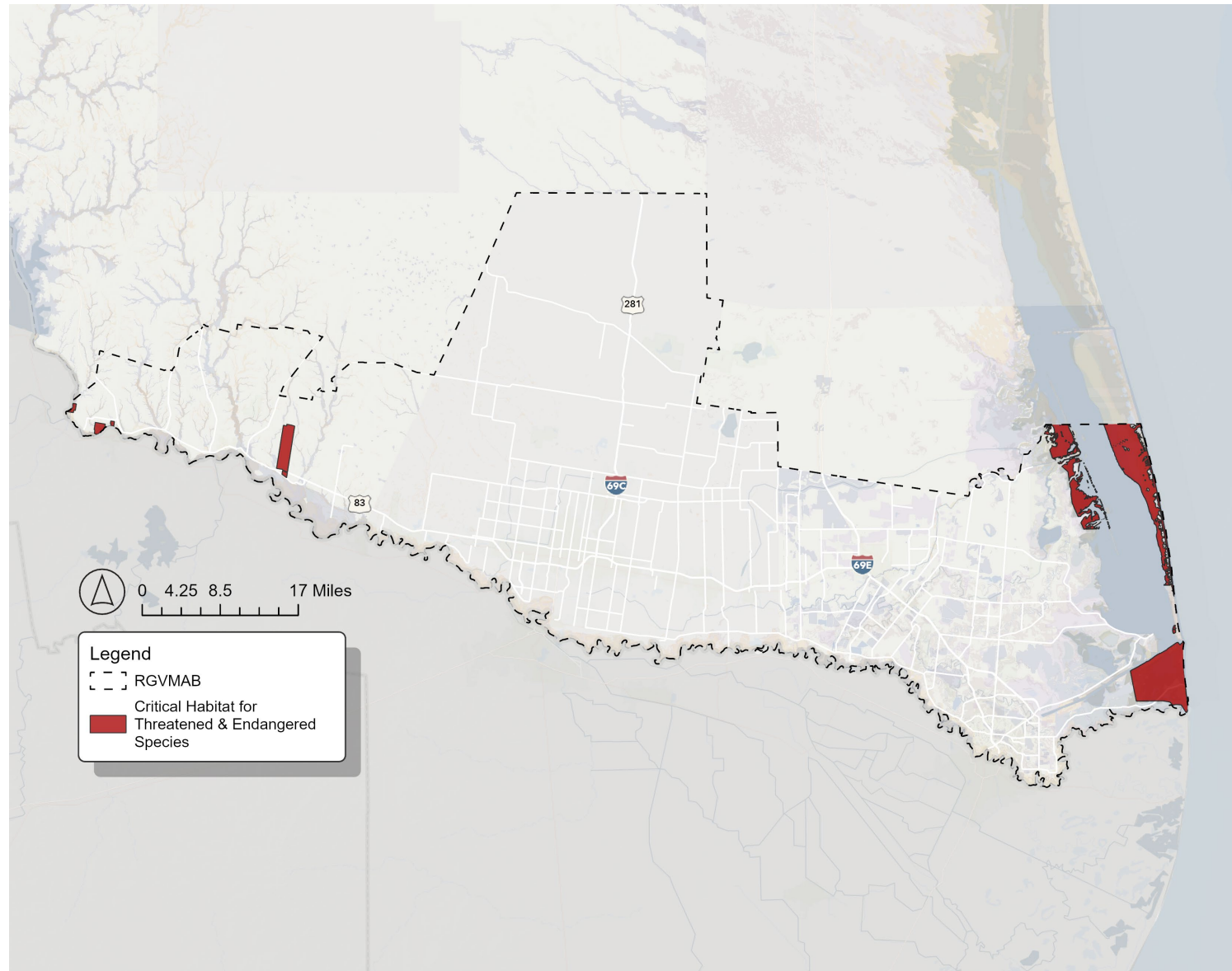
Sustainability Mapping: Air Quality



Major air pollutants today are ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide, toxic air pollutants, and greenhouse gases; displayed are 5 major air quality monitoring sites in the RGVMAB

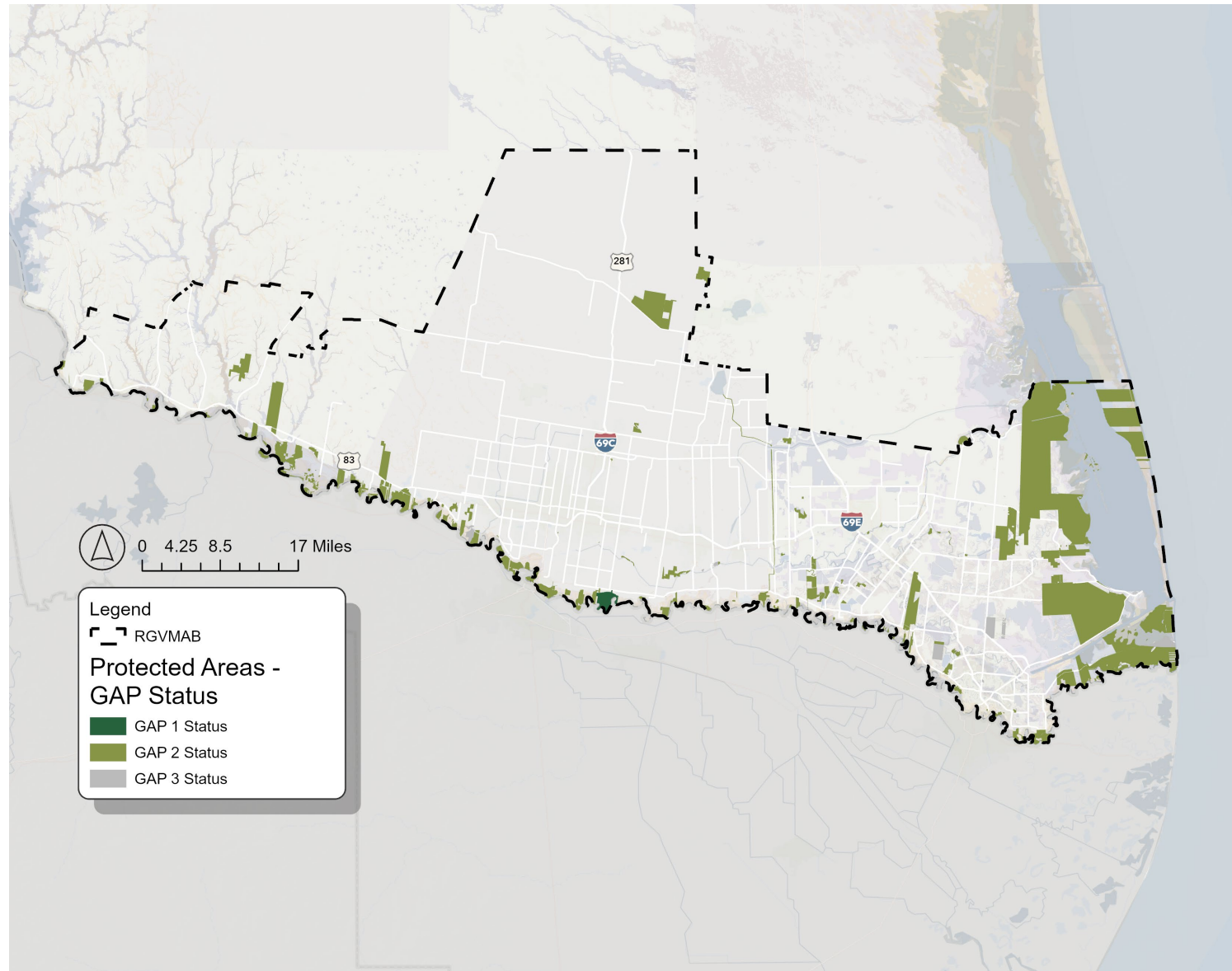
Sustainability Mapping: Critical Habitat

Critical habitats are areas of habitat that are essential to the conservation of endangered or threatened species and may need special management or protection

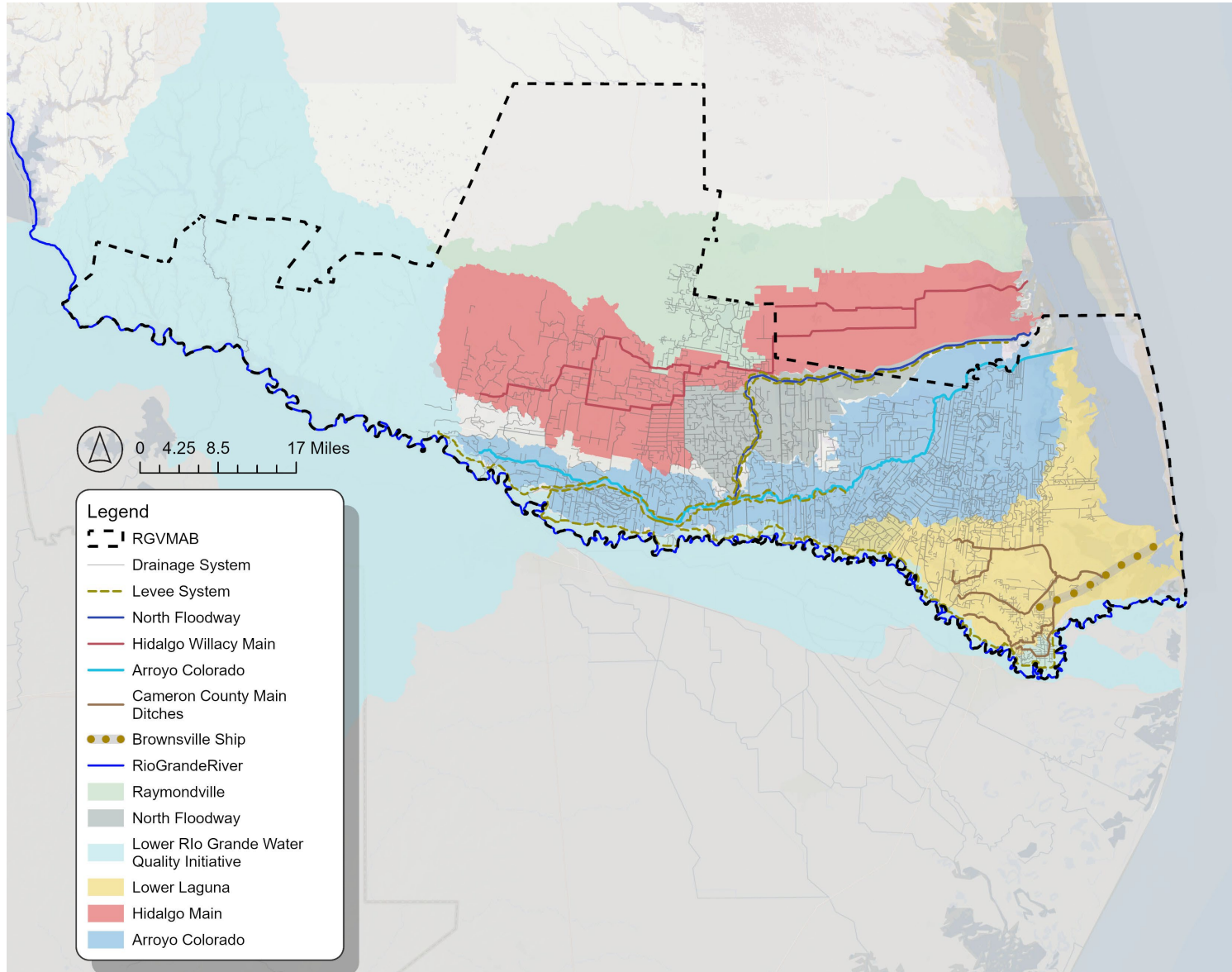


Sustainability Mapping: Protected Lands

33 Protected Areas
under GAP Status (1-3)
within the RGVMAB



Risk Mapping: Watershed Protection Plans



Watershed Protection Plans (WPP) are developed to identify potential sources of waterbody damage and provide frameworks to reduce pollution and improve water quality in streams and rivers

Raymondville, Hidalgo Main, North Floodway, Arroyo Colorado, and Lower Laguna Madre are under WPPs



Equity Analysis

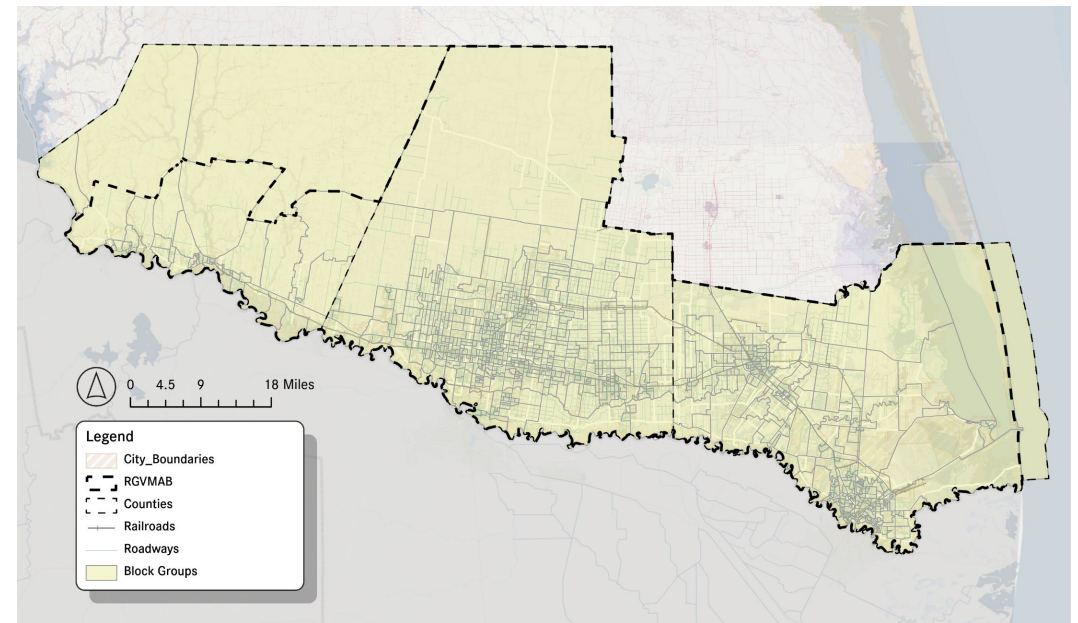
Equity Analysis

- Policy Framework

- Title VI of the Civil Rights Act of 1964
- Executive Order 12898
- Executive Order 13985
- Executive Order 14008 (including the Justice40 Initiative)
- U.S. DOT Order 1000.12(c), U.S. DOT Order 5610.2(a)
- FHWA Order 6640.23A
- Age Discrimination Act of 1975
- Americans with Disabilities Act (ADA) of 1990
- Section 504 of the Rehabilitation Act of 1973
- Executive Order 13166

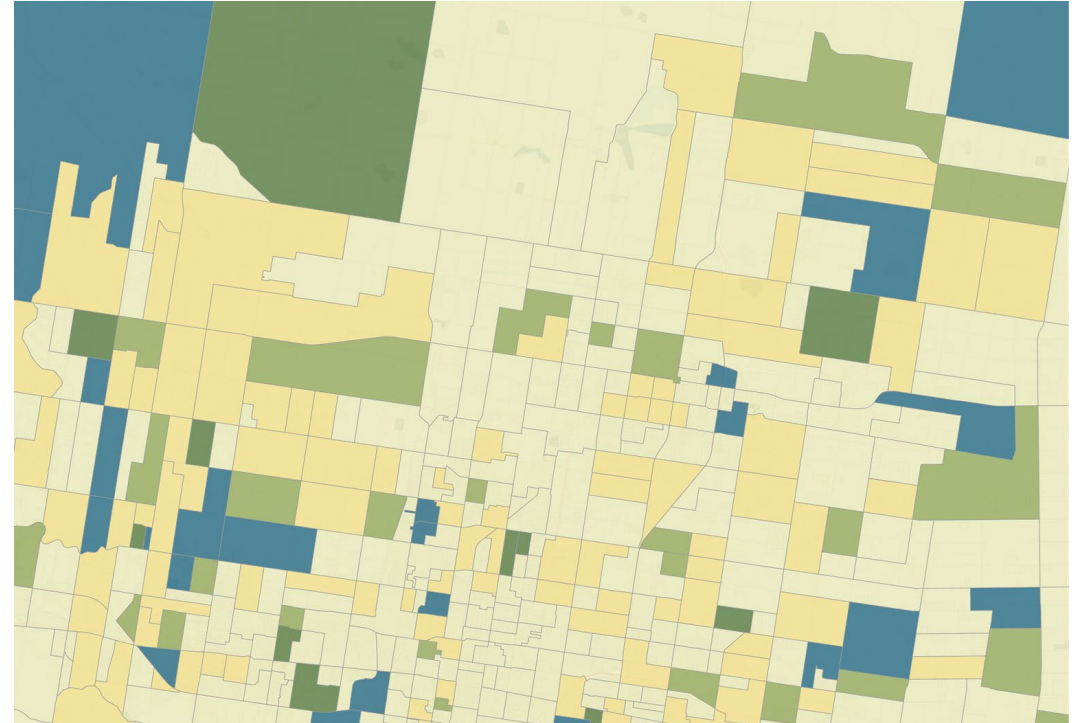
- Data Source

- American Community Survey, 5-year estimates for 2021



Equity Analysis: Scoring and Ranking

- Scoring
 - The portion of the indicator within the block group was divided by the average portion of indicator for the tri-county region
 - Conveys an indicator's distance from the regional mean and highlights block groups with higher portions of an indicator (scores above 1)
- Ranking
 - Raw scores were converted to ranks to allow for uniform analysis using standard deviations



Score	Low	Medium	Slightly High	Moderately High	Very High
	< the mean	Mean + 1 SD	1 SD - 1.5 SD	1.5 SD - 2 SD	2 SD +

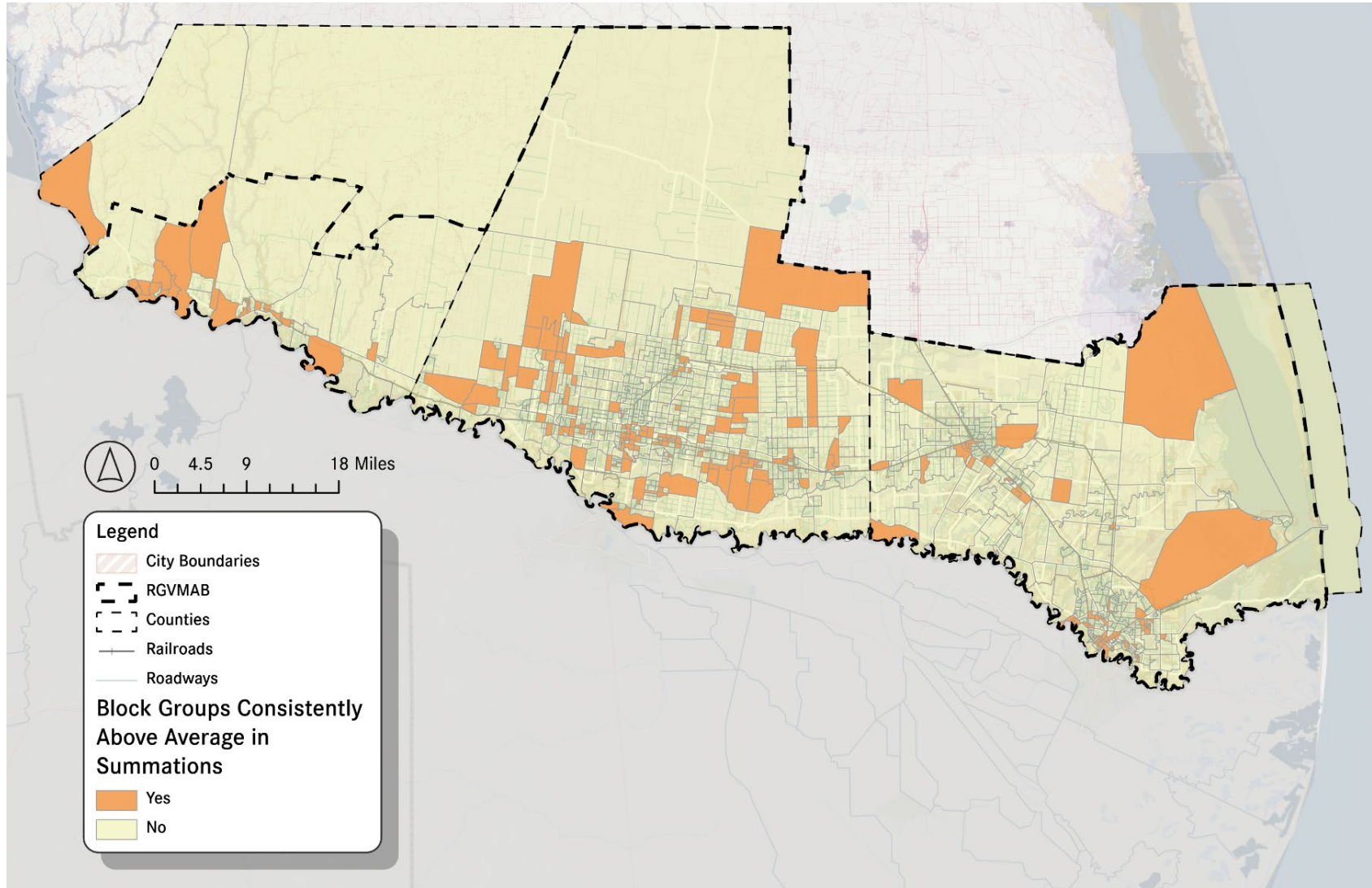
Equity Analysis: Scores

Indicator	Cameron County	Hidalgo County	Starr County
Aging individuals (≥65)	1.04	0.99	0.84
House heating fuel: no source	0.84	0.98	2.35
Households with no internet access	1.03	0.94	1.53
Housing types: boat, RV, van, etc.	0.44	1.38	0.22
Housing types: mobile homes	0.77	1.15	0.79
Housing units lacking complete kitchen facilities	0.82	0.95	2.82
Housing units lacking plumbing facilities	0.68	1.2	0.73
Housing-cost burdened	0.98	1.02	0.88
Individuals in poverty	0.98	0.99	1.24
Individuals living in group quarters	1.18	0.85	1.64
Individuals with a disability	1.18	0.85	1.64
Individuals without a high school diploma	0.96	1	1.24

Equity Analysis: Scores

Indicator	Cameron County	Hidalgo County	Starr County
Limited English proficiency (LEP) individuals	0.86	1.06	1.25
Limited English proficiency (LEP) individuals: Asian and Pacific Island languages	1.04	1.05	0.04
Limited English proficiency (LEP) individuals: Indo-European languages	1.56	0.76	0
Limited English proficiency (LEP) individuals: other	0.7	1.25	0
Limited English proficiency (LEP) individuals: Spanish	0.86	1.06	1.26
Minority individuals	0.99	1.00	1.07
Older Home (>1980)	1.32	0.81	1.07
Owner-cost burdened	0.9	1.06	0.95
Renter-cost burdened	1.02	0.98	1.06
Single-parent households	1	0.97	1.32
Single-parent households: Female headed	0.95	1.00	1.44
Single-parent households: Male headed	1.24	0.88	0.81
Unemployed individuals	0.78	1.06	1.82
Youth (≤17)	0.97	1.01	1.08
Zero vehicle households	1.06	0.92	1.6

Equity Analysis: Comprehensive Map



Highlighted are block groups that scored above average in multiple summation scores, and may experience a higher-than-average level of risk and vulnerability



SWOT Workshop

SWOT Exercise

Break into Groups

1. **S**trengths
2. **W**eaknesses
3. **O**pportunities
4. **T**hreats





Group Debrief

Thank You!

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