

**Conversations about climate
change impacts on “The Island”
Trenton, NJ**

Meeting 1:
November 17, 2022
6pm



Trinity Episcopal Cathedral
801 W. State Street, Trenton, NJ 08618

**As you arrive, please pick up and fill in the survey at the
door**



Welcome and Introductions

- Michael Kolber, City of Trenton
- Anne Schaffer, United States Environmental Protection Agency
- Jessica Miller, Kearns & West



Why we are here

- To listen to your experiences during flooding events on the Island
- To share information on risks related to climate change on the Island
- To identify vulnerability in the community
- To understand community priorities
- To develop actions and implementation plan for community vulnerability



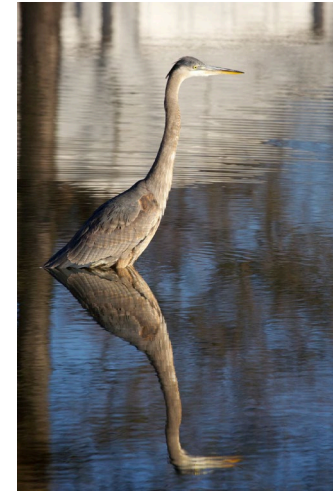
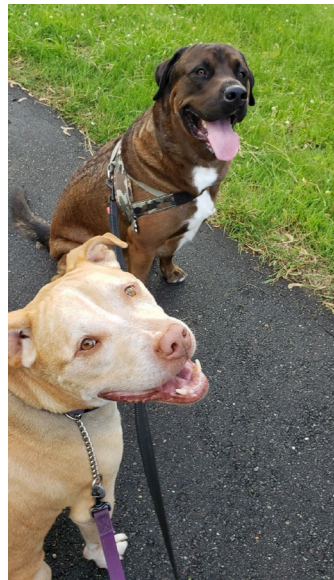
Today's Meeting

- Overview of history of Trenton Island flood vulnerability
- Overview of the vulnerability assessment
- Small group discussions on Island residents' perspectives on flooding
- Next steps and ways to stay involved in the community meetings and discussions



The Island Community

Flora, Fauna, People, and The River

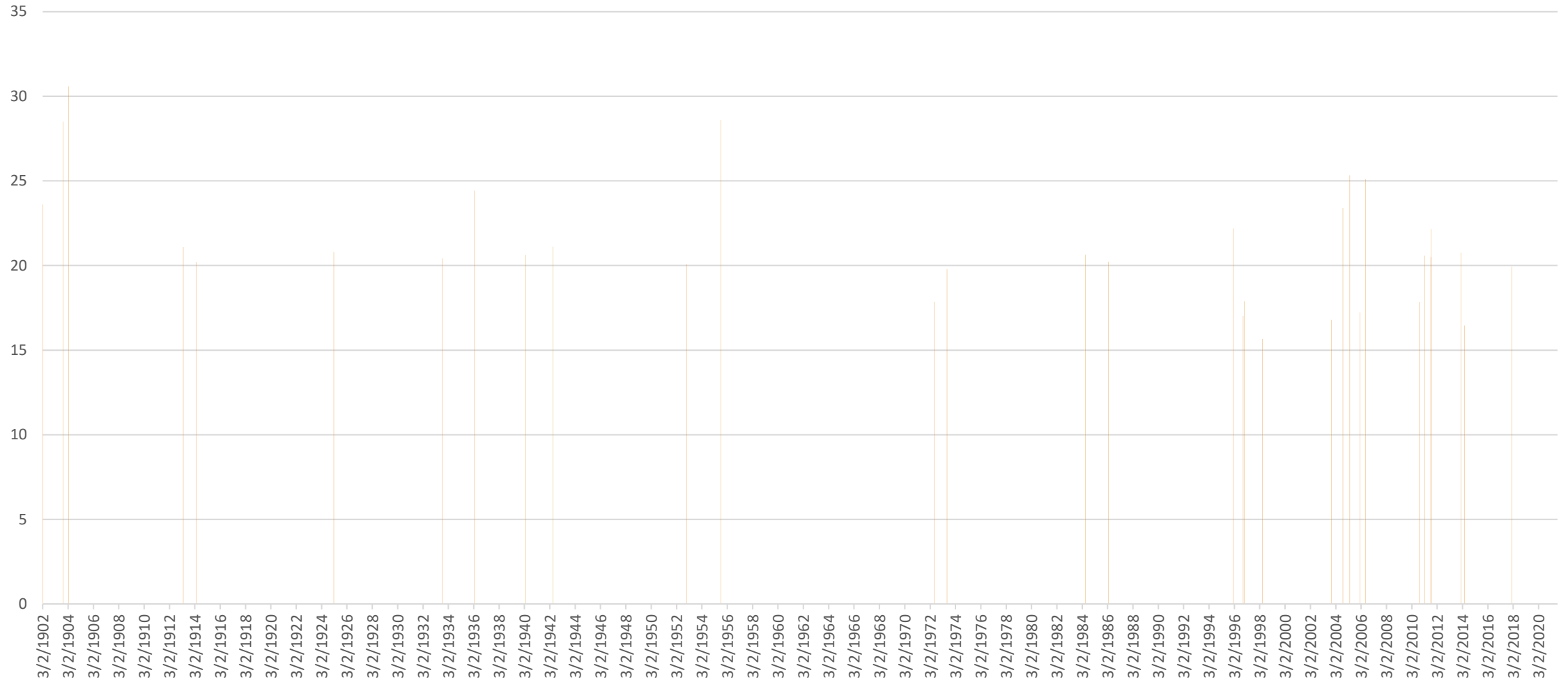


The Island is Unique

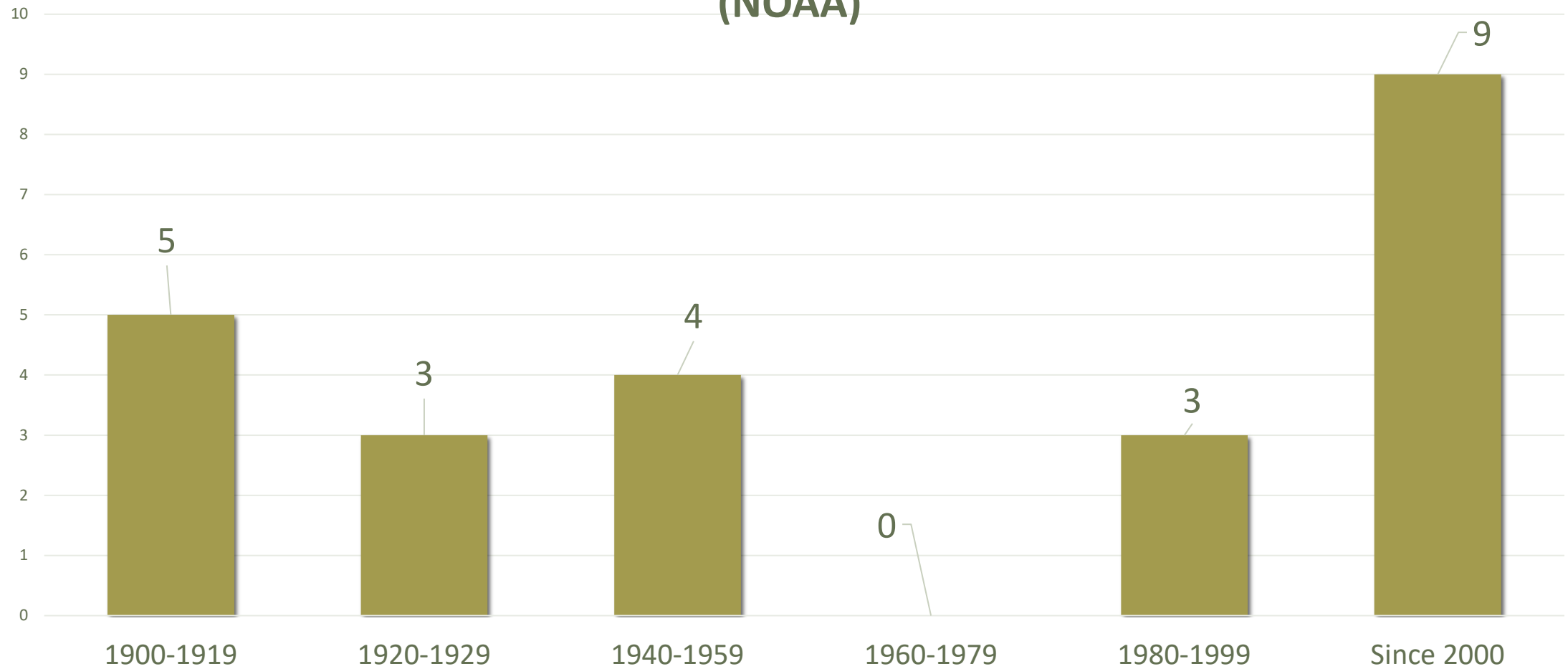
- About 200 Single Family Homes and 10 2-3 story apartment buildings.
- The only neighborhood in Trenton with direct access to the Delaware River
- Physically separated from other parts of Trenton by NJ Rt. 29 (formerly a canal)



High River Crests: 1900-Present (NOAA)



of River Crests Above 20 Feet (NOAA)





Flooding on the Island

- Flooding increasing
- Need to better understand vulnerability to flooding



CITY OF TRENTON

VULNERABILITY ASSESSMENT

RESILIENT NJ



VULNERABILITY ASSESSMENT SCOPE

- **Climate Categories**
 - Coastal Impacts
 - Precipitation
 - Temperature
- **Impact Analysis Subjects**
 - Critical infrastructure
 - Community assets
 - Land use and zoning
 - Vulnerable populations
 - Ecological resources

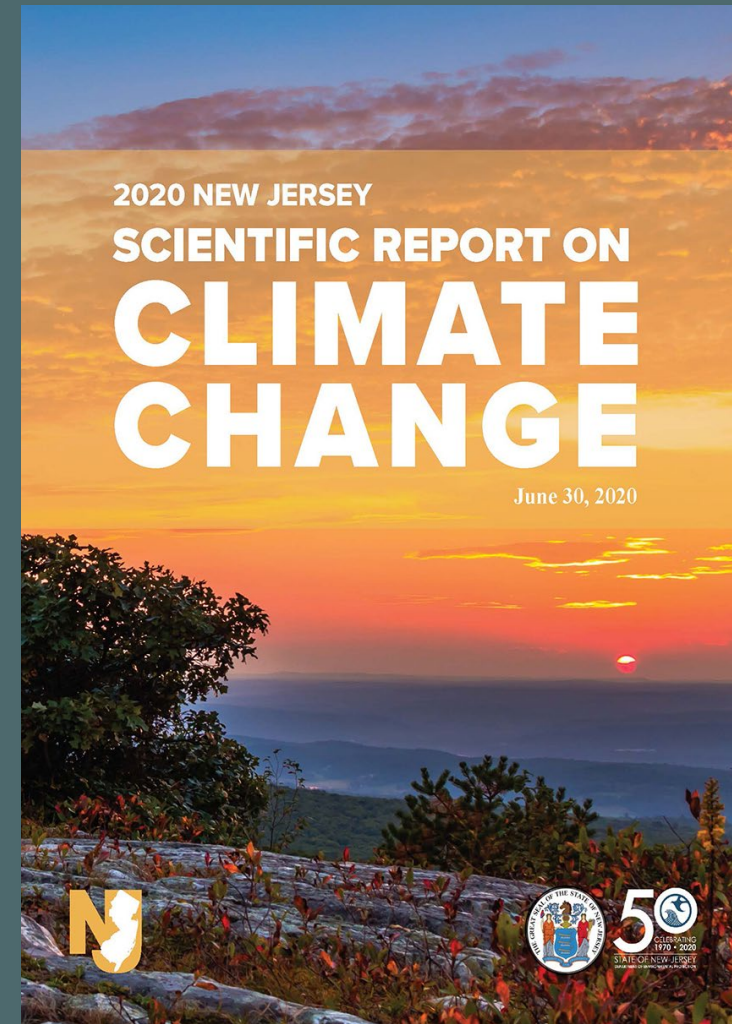


PRECIPITATION



NEW JERSEY PRECIPITATION PREDICTIONS

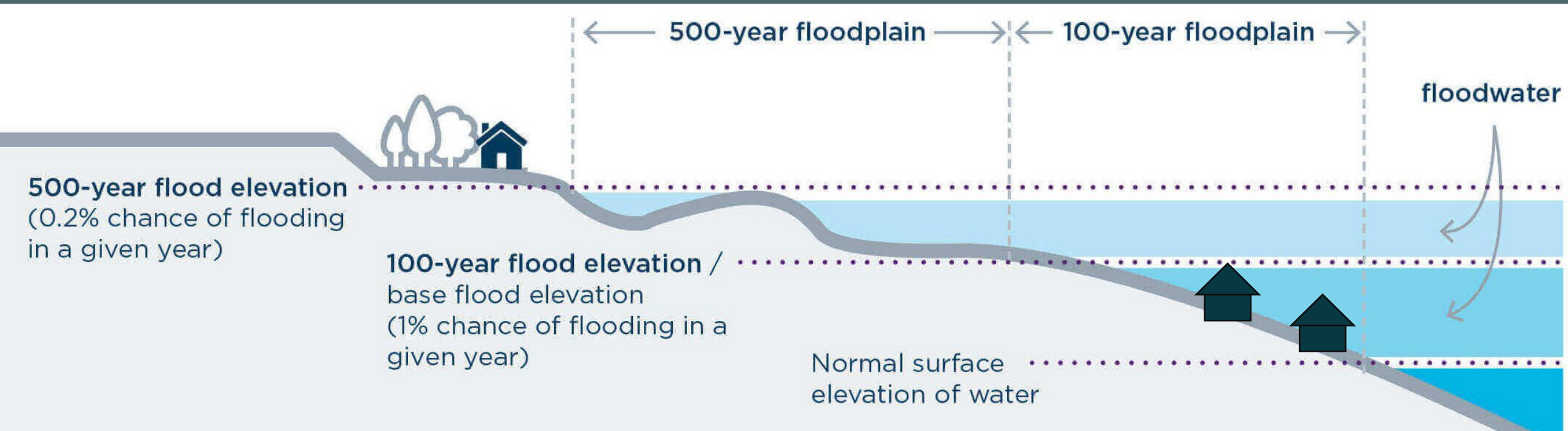
- Annual precipitation in New Jersey is expected to increase by 4% to 11% by 2050.
- The intensity and frequency of precipitation events is anticipated to increase due to climate change.
- The size and frequency of floods will increase as annual precipitation increases.
- Tropical storms have the potential to increase in intensity due to the warmer atmosphere and warmer oceans that will occur with climate change.
- Droughts may occur more frequently due to the expected changes in precipitation patterns.



-2020 New Jersey Scientific Report on Climate Change

WHAT IS A FLOODPLAIN?

- A floodplain is an area next to a river or stream that is subject to flooding.
- FEMA (Federal Emergency Management Agency) models flood events and publishes floodplain mapping for use in regulation.
 - FEMA uses a 1% annual chance of flooding as their baseline.



FLOODPLAINS CONSIDERED IN THIS ASSESSMENT







- **FEMA Zone AE**
 - 1% annual chance flood.
 - Also known as the '100-year flood' or 'base flood'.
- **FEMA Risk MAP**
 - From the Risk Mapping, Assessment and Planning (Risk MAP) program.
 - FEMA, state and local leaders collect current and historic flood-related data and then meet to review this data, as part of the discovery process to get a complete picture of the area's flood risk.
- **Flood Vulnerability Planning Areas**
 - Based on proposed expansions to the New Jersey Flood Hazard Area
 - FEMA 1% Base Flood Elevation + 3 ft
 - NJ Flood Hazard Area Design Flood Elevation + 2 ft

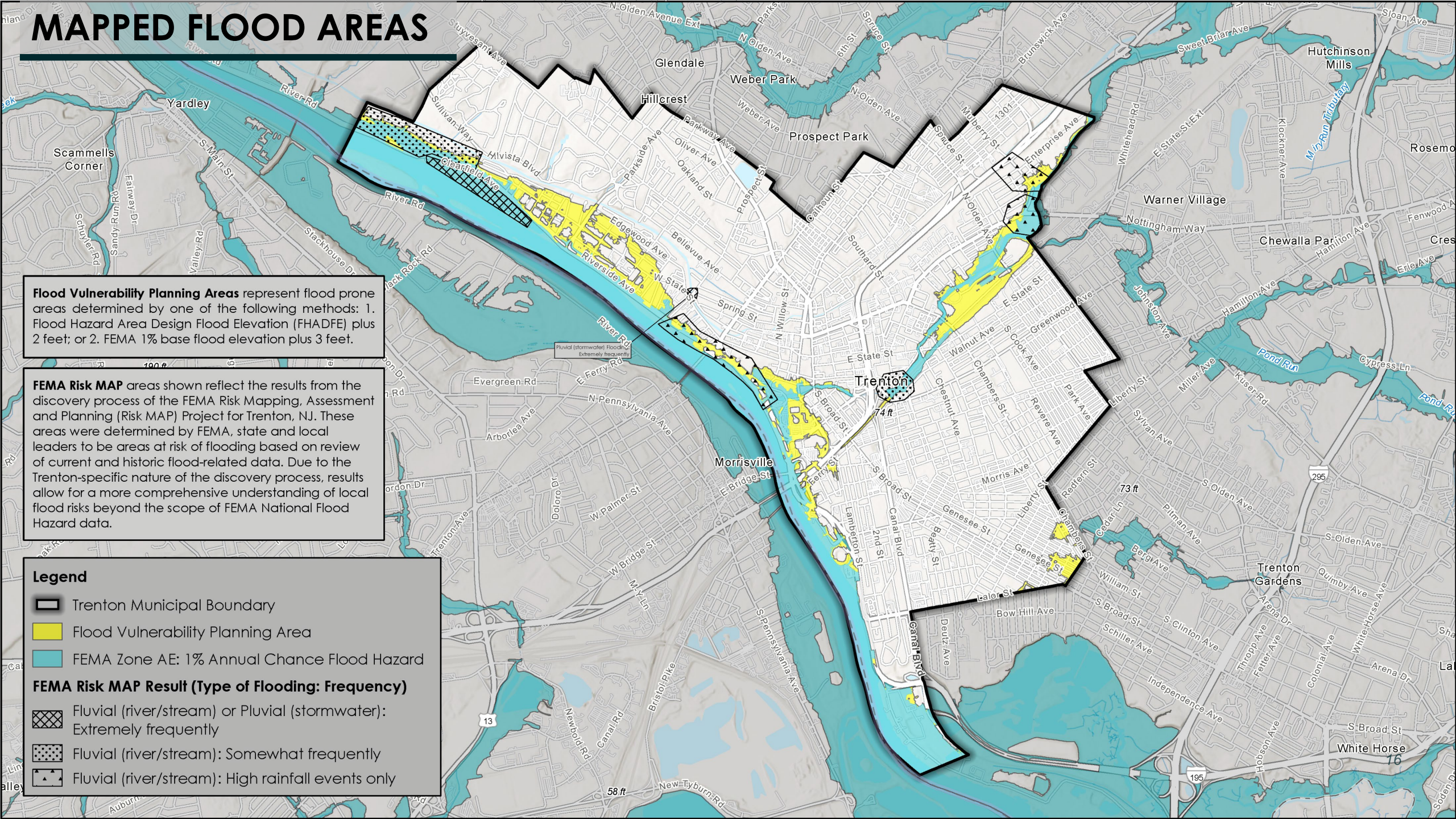
MAPPED FLOOD AREAS

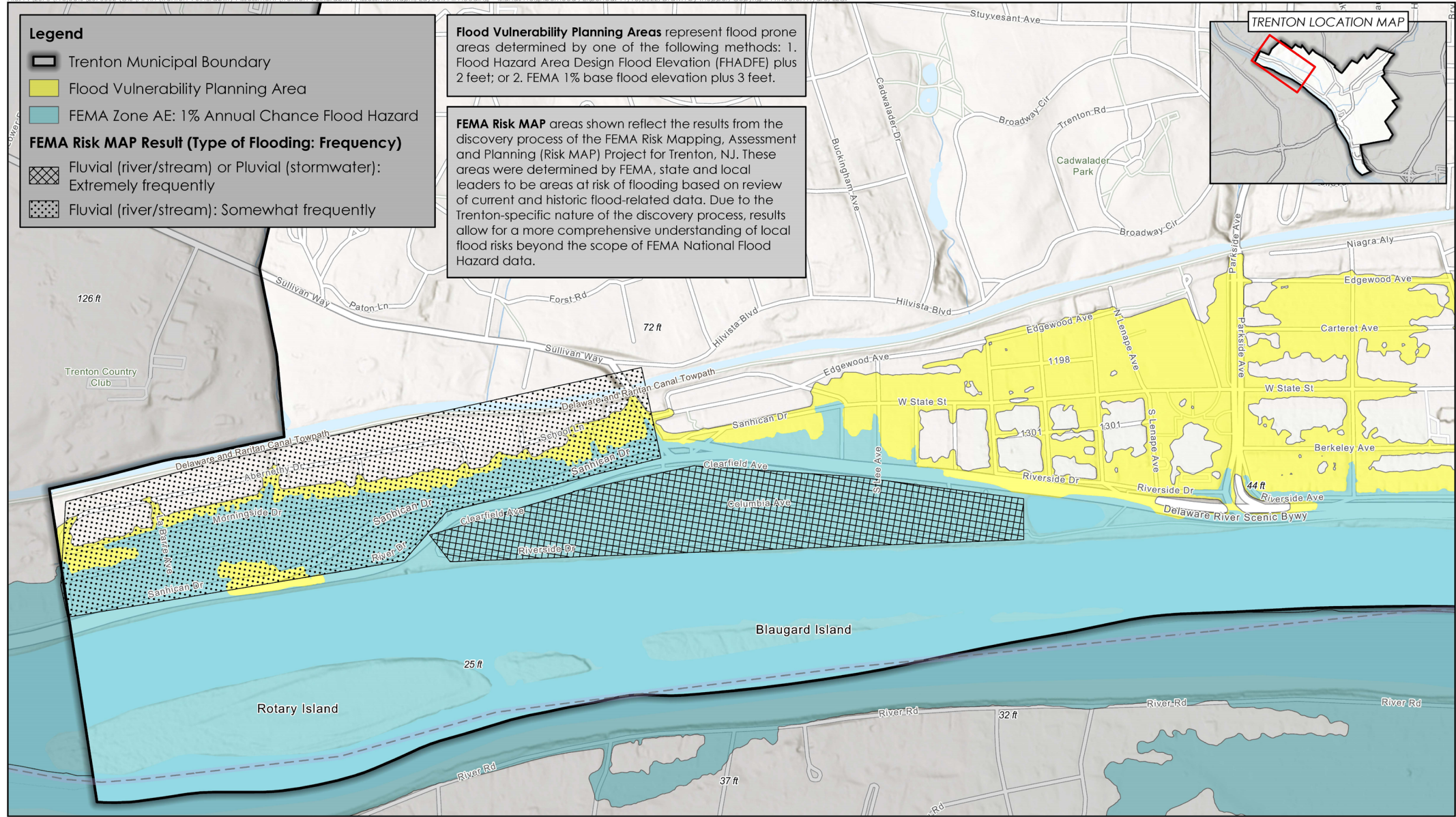
Flood Vulnerability Planning Areas represent flood prone areas determined by one of the following methods: 1. Flood Hazard Area Design Flood Elevation (FHADFE) plus 2 feet; or 2. FEMA 1% base flood elevation plus 3 feet.

FEMA Risk MAP areas shown reflect the results from the discovery process of the FEMA Risk Mapping, Assessment and Planning (Risk MAP) Project for Trenton, NJ. These areas were determined by FEMA, state and local leaders to be areas at risk of flooding based on review of current and historic flood-related data. Due to the Trenton-specific nature of the discovery process, results allow for a more comprehensive understanding of local flood risks beyond the scope of FEMA National Flood Hazard data.

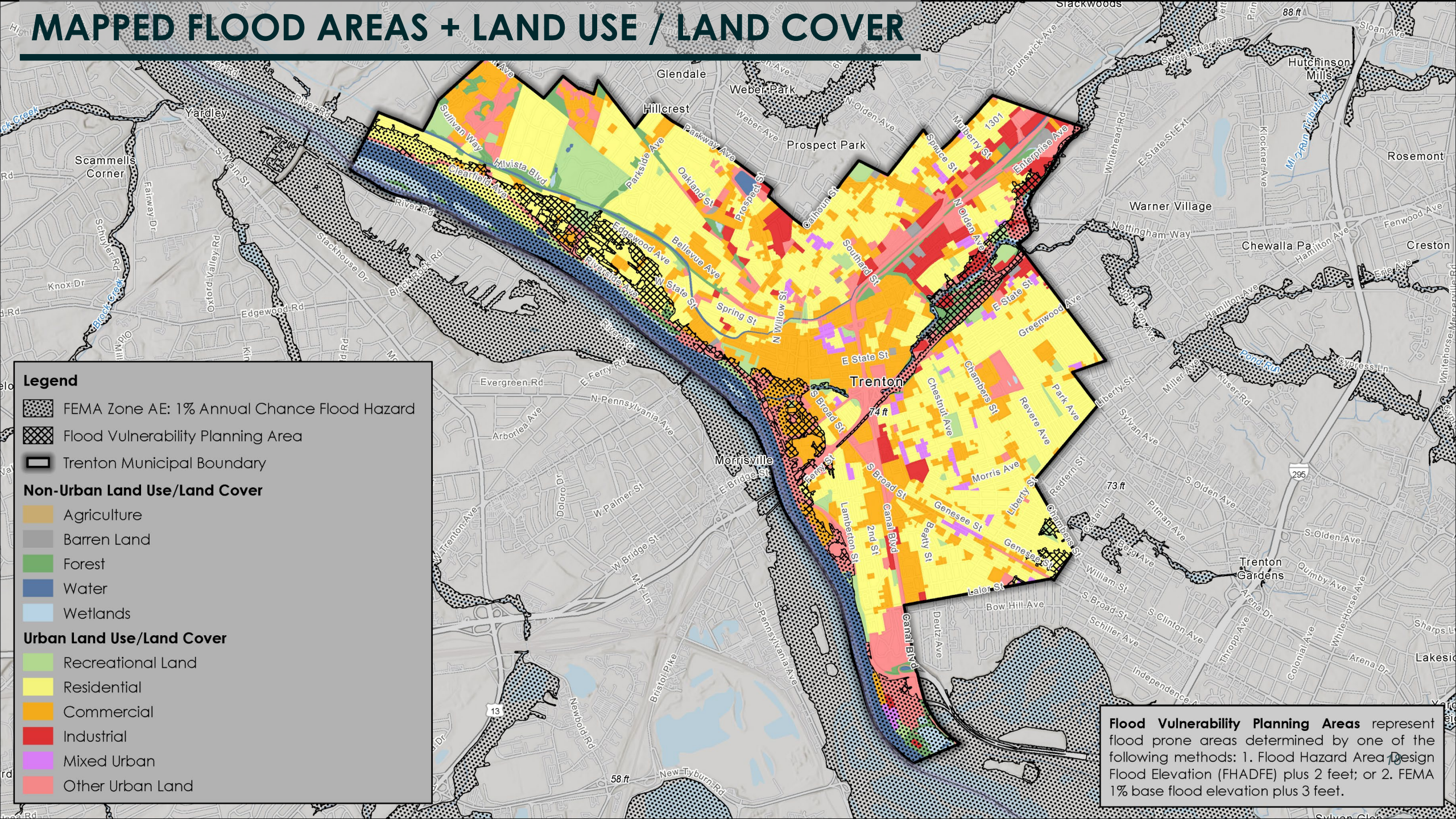
Legend

-  Trenton Municipal Boundary
-  Flood Vulnerability Planning Area
-  FEMA Zone AE: 1% Annual Chance Flood Hazard
- FEMA Risk MAP Result (Type of Flooding: Frequency)**
-  Fluvial (river/stream) or Pluvial (stormwater): Extremely frequently
-  Fluvial (river/stream): Somewhat frequently
-  Fluvial (river/stream): High rainfall events only





MAPPED FLOOD AREAS + LAND USE / LAND COVER



Legend

- FEMA Zone AE: 1% Annual Chance Flood Hazard
- Flood Vulnerability Planning Area
- Trenton Municipal Boundary

Non-Urban Land Use/Land Cover

- Agriculture
- Barren Land
- Forest
- Water
- Wetlands

Urban Land Use/Land Cover

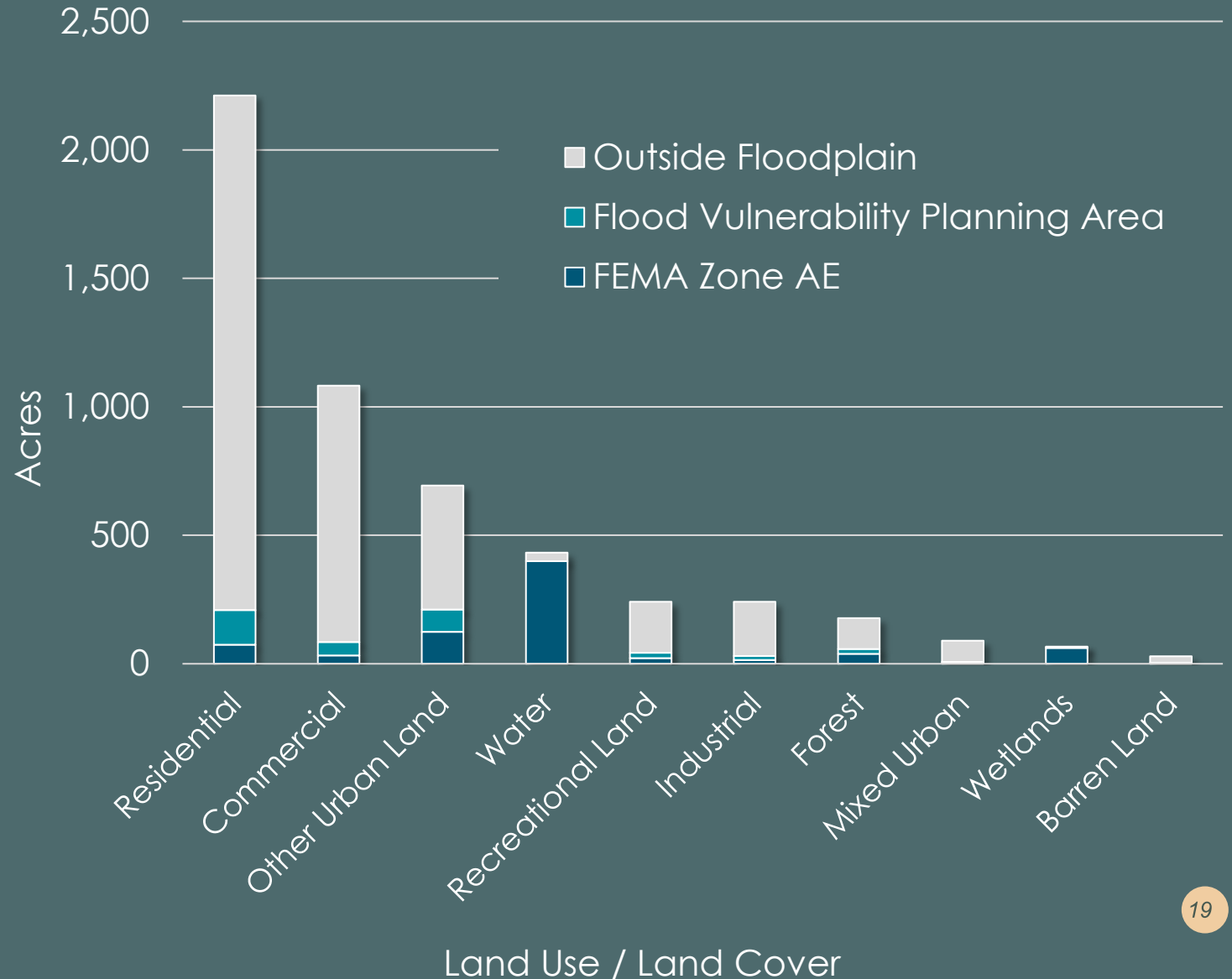
- Recreational Land
- Residential
- Commercial
- Industrial
- Mixed Urban
- Other Urban Land

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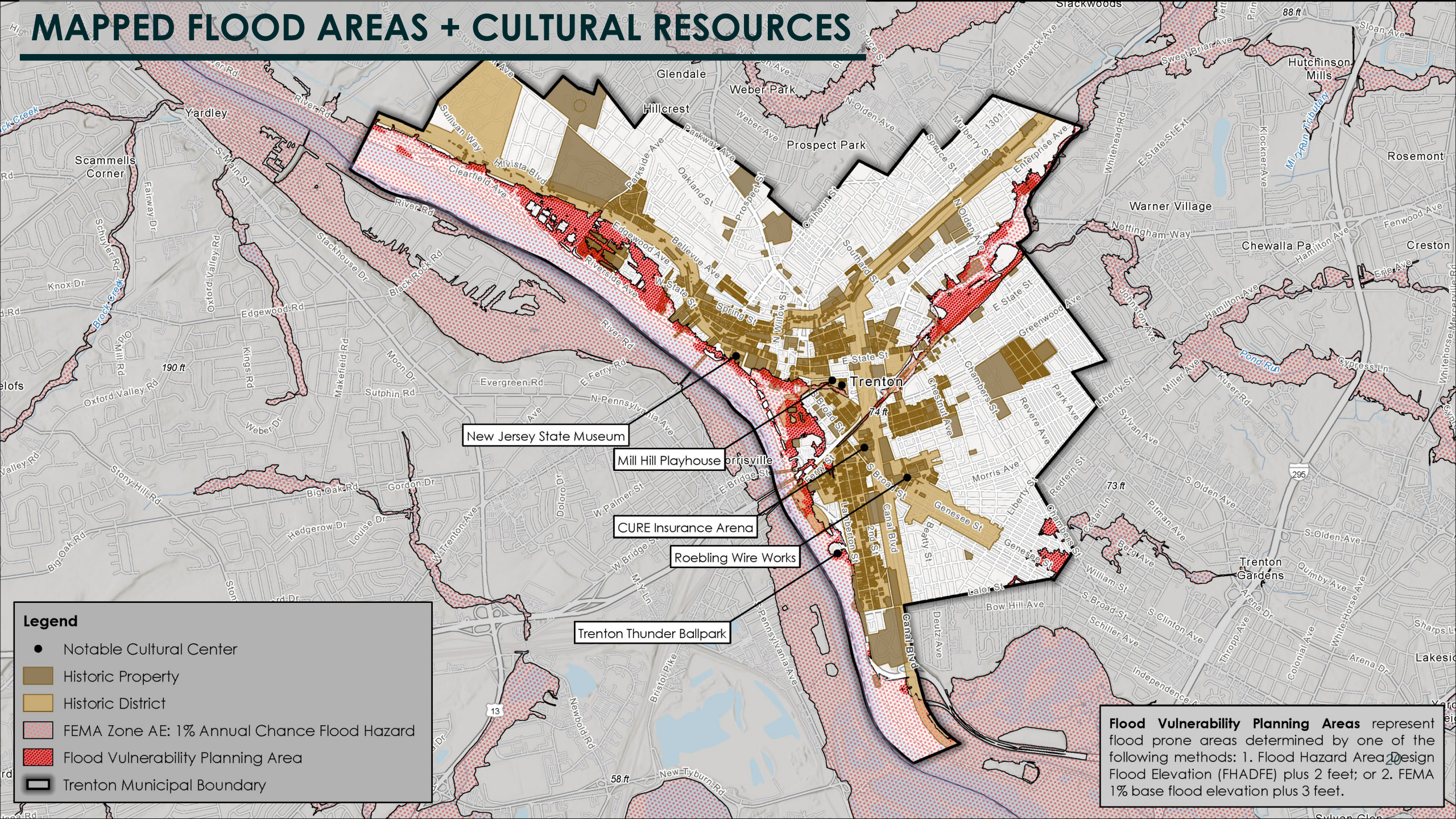
MAPPED FLOOD AREAS + LAND USE / LAND COVER

Flood Risk Area Expansion:

Residential	+182%
Commercial and Mixed Use	+161%
Industrial	+118%
Recreational Land	+96%
Other Urban Land	+70%
Forest	+47%
Mixed Urban	+17%



MAPPED FLOOD AREAS + CULTURAL RESOURCES



Legend

- Notable Cultural Center
- Historic Property
- Historic District
- FEMA Zone AE: 1% Annual Chance Flood Hazard
- Flood Vulnerability Planning Area
- ▭ Trenton Municipal Boundary

Flood Vulnerability Planning Areas represent flood prone areas determined by one of the following methods: 1. Flood Hazard Area Design Flood Elevation (FHADFE) plus 2 feet; or 2. FEMA 1% base flood elevation plus 3 feet.

New Jersey State Museum

Mill Hill Playhouse

CURE Insurance Arena

Roebing Wire Works

Trenton Thunder Ballpark

Trenton

Trenton Gardens

Glendale

Hillcrest

Prospect Park

Hutchinson Mills

Rosemont

Warner Village

Chewalla Park

Creston

190 ft

74 ft

73 ft

88 ft

58 ft

13

295

MAPPED FLOOD AREAS + CULTURAL RESOURCES

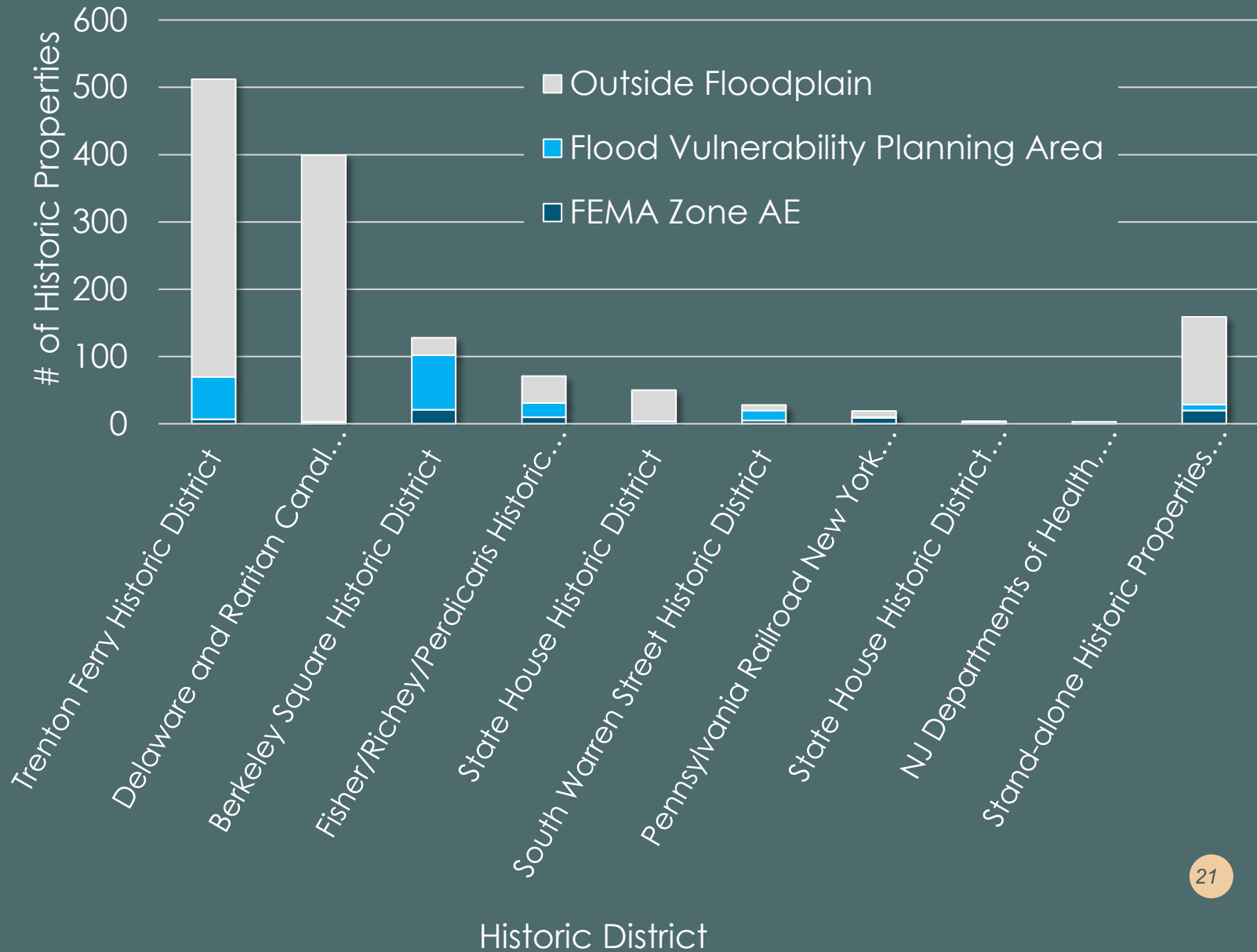
Flood Risk Area Expansion:

Berkeley Square Historic District
21 → 102 (+81)

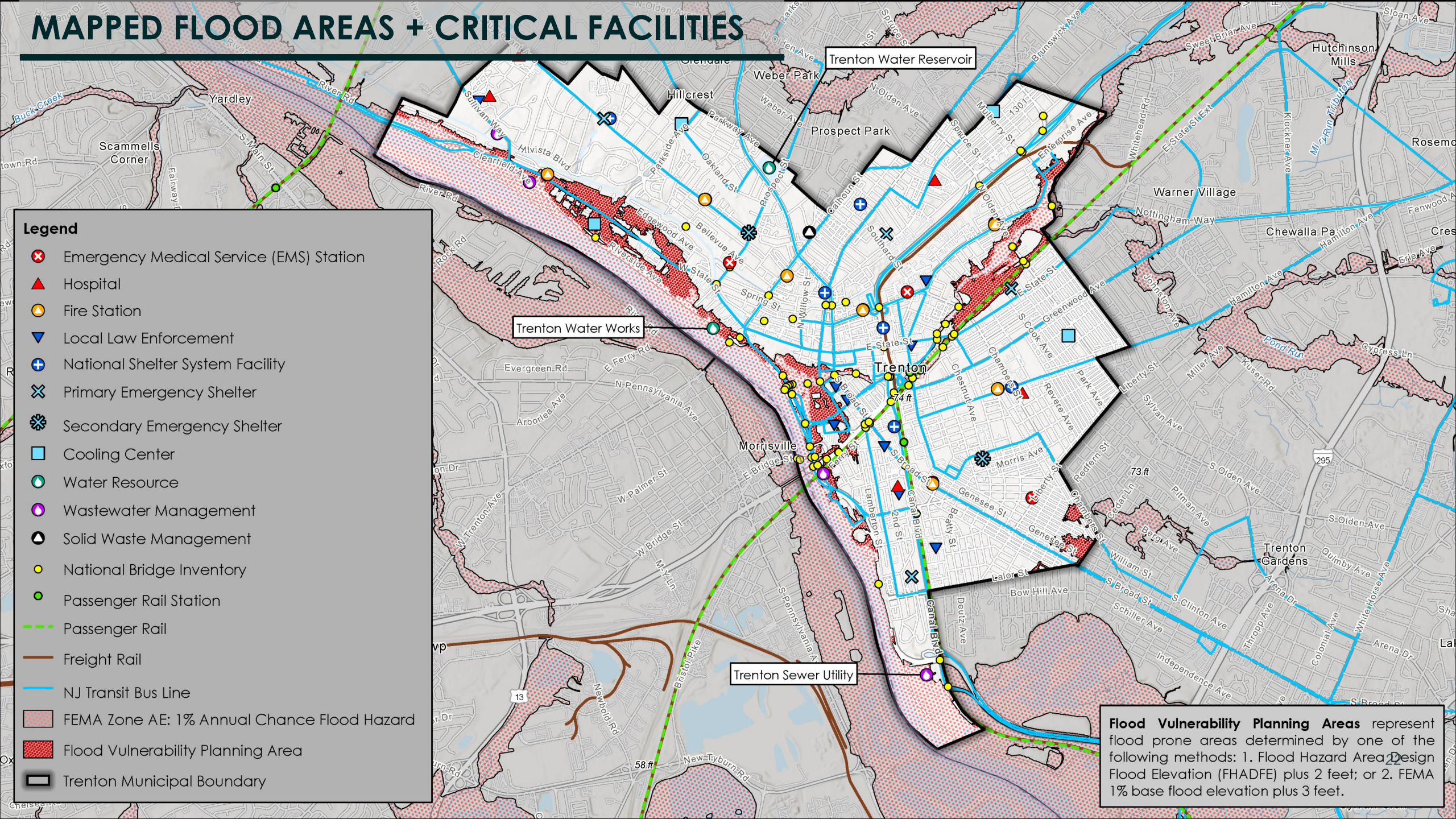
Trenton Ferry Historic District
7 → 70 (+63)

Fisher/Richey/Perdicaris Historic District
10 → 31 (+21)

South Warren Street Historic District
5 → 20 (+15)



MAPPED FLOOD AREAS + CRITICAL FACILITIES



Legend

- ⊗ Emergency Medical Service (EMS) Station
- ▲ Hospital
- Fire Station
- ▼ Local Law Enforcement
- + National Shelter System Facility
- ⊗ Primary Emergency Shelter
- ⊗ Secondary Emergency Shelter
- Cooling Center
- Water Resource
- Wastewater Management
- ▲ Solid Waste Management
- National Bridge Inventory
- Passenger Rail Station
- Passenger Rail
- Freight Rail
- NJ Transit Bus Line
- ▨ FEMA Zone AE: 1% Annual Chance Flood Hazard
- ▨ Flood Vulnerability Planning Area
- Trenton Municipal Boundary

Flood Vulnerability Planning Areas represent flood prone areas determined by one of the following methods: 1. Flood Hazard Area Design Flood Elevation (FHADFE) plus 2 feet; or 2. FEMA 1% base flood elevation plus 3 feet.

MAPPED FLOOD AREAS + CRITICAL FACILITIES

- **FEMA Zone AE:**

- Trenton Waterworks
- Ferry Street Pump Station
- Clearfield Ave. Lift Station
- Trenton Transit Center
- Portion of Bus Lines 418, 601, 606, 608, 609, 611, 619, 624

- **Flood Vulnerability Planning Area:**

- Trenton Fire and Emergency Services Engine 9
- Portions of Bus Lines 343, 603, 607



QUESTIONS?



Vulnerability Assessment

- To learn more about the Vulnerability Assessment:

BRSINC.COM/RESILIENTNJ-TRENTON/



Questions for Group Discussion

What do you love about the Island? Why did you choose to move there?

Have you ever experienced flooding on the Island?

Did you evacuate? If so, how was the process of leaving for you? Where did you go? Did you have any trouble leaving or coming back?

What could be done to reduce the problems you have had with evacuating and flooding?

Notes from Group Discussion

Value of this Place: Residents love the Island

Communications: Need clear, authoritative communication channels. Trustworthiness and use value of local resources are in question (ex: People's reliance on NOAA hydrology data). Clarity of messaging (ex: mandatory vs not mandatory evacuation; preferred evacuation routes). Inter-municipal service coordination. Bridging the gap for new residents.

Community Purpose and Coordination: The Island is a closeknit community with shared purpose and appreciation. May have higher risk tolerances, be more self-reliant, and have traumatic experiences. People want to take individual experience and contribute to community safety and betterment (ex/ teaching others what to do with their mechanical systems, evacuation routes/strategies, etc.)

Resources and Emergency Response: Unique experiences can correlate with unique risks. Today, flooding for the Island is different than other parts of City of Trenton and can strain different resources on different timeframes. Affordability and viability of solutions are in question and need to be explored together.



Next Steps

Community Tour:

January 9th, 2023, at 10 am

Parking lot in front of Stacy Park at the end of Riverside Drive

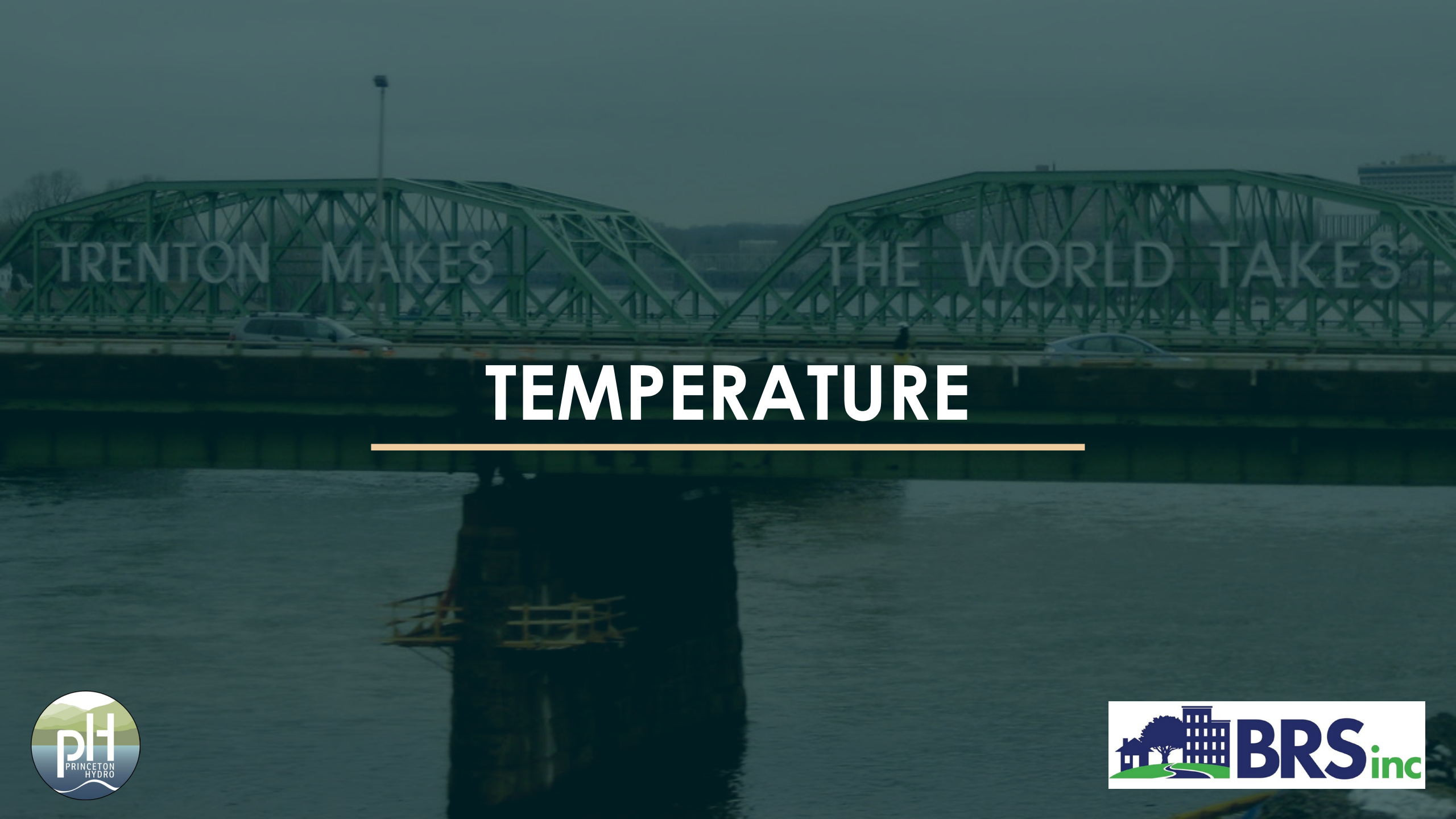
Meeting 2:

February 22, 2023, at 6pm

Trinity Episcopal Cathedral at 801 W. State Street, Trenton, NJ 08618



Thank you for
coming!



TEMPERATURE



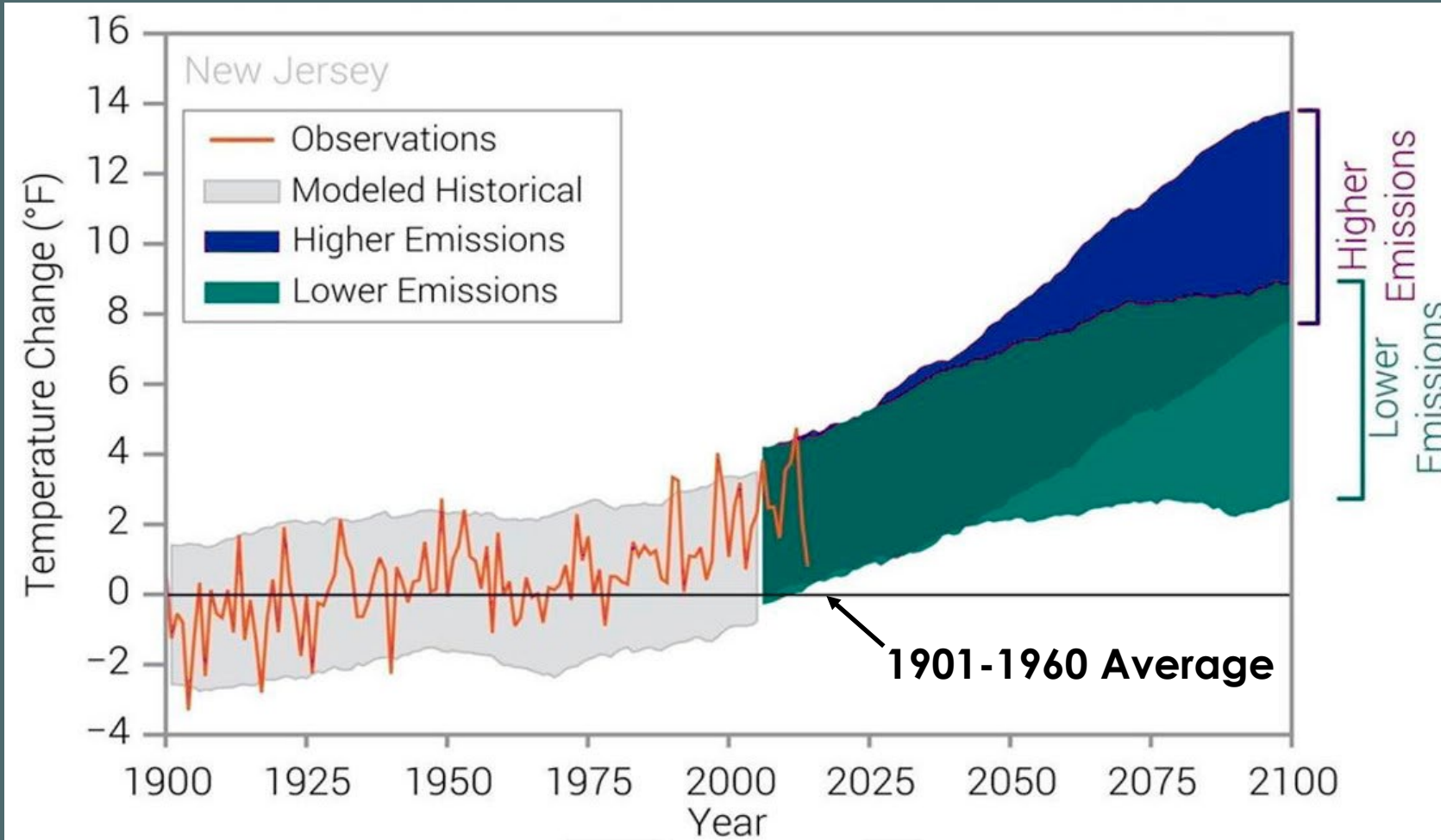
NEW JERSEY TEMPERATURE PREDICTIONS

- New Jersey is warming faster than the rest of the Northeast region and the world.
- Since 1895, New Jersey's annual temperature has increased by 3.5°F.
- Historically unprecedented warming is projected for the 21st century with average annual temperatures in New Jersey increasing by 4.1°F to 5.7°F by 2050.
- Heatwaves are expected to impact larger areas, with more frequency and longer duration by 2050.
- Climate change could result in a 55% increase in summer heat-related mortalities.

Trenton's Regional Annual and Seasonal Increases in Air Temperatures, 1895 to 2019

Season	Temperature Increase (°F)
Winter	+4.6
Spring	+2.9
Summer	+3.1
Fall	+2.8
Annual	+3.4

NEW JERSEY TEMPERATURE PREDICTIONS



Year	Low Emissions	High Emissions
2050	+ 1°F - 6°F	
2100	+ 3°F - 9°F	+ 6°F - 13°F

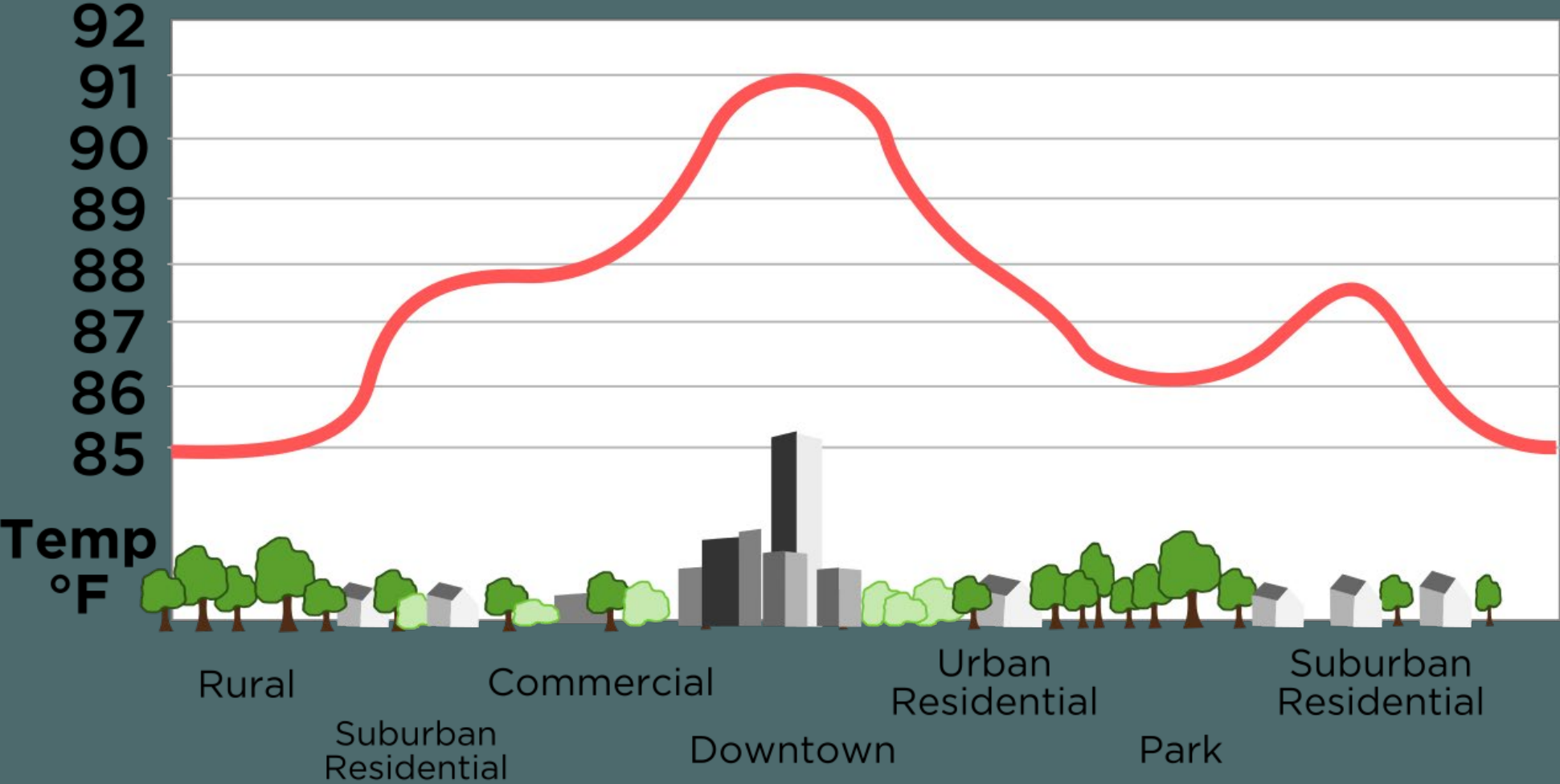
-2020 New Jersey Scientific Report on Climate Change

Observed and Projected Changes in Near-Surface Air Temperature for New Jersey.

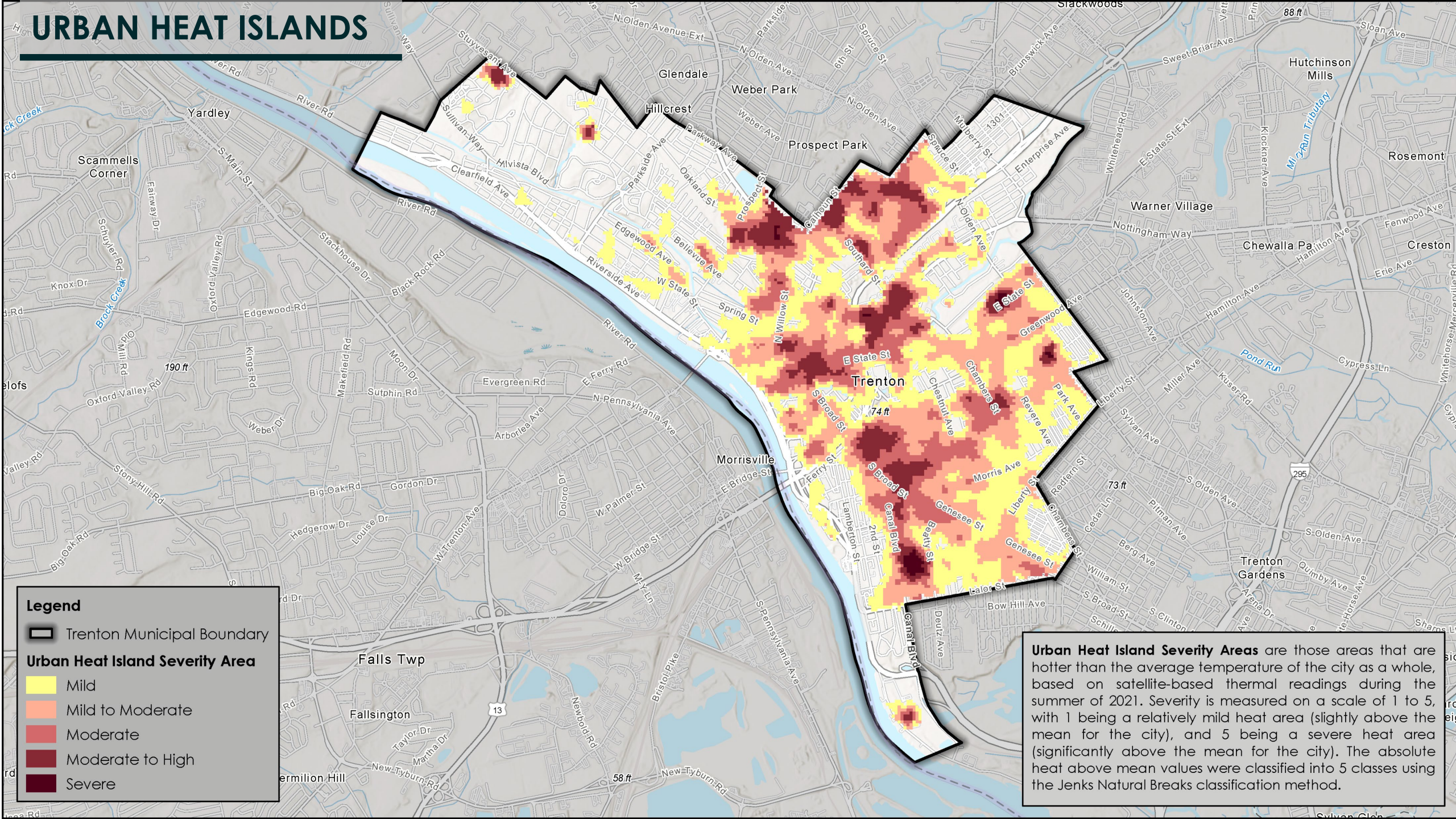
Observed data are for 1900-2014. Projected changes are for 2006-2100 (Runkle et al. 2017).

THE URBAN HEAT ISLAND EFFECT

URBAN HEAT ISLAND PROFILE



URBAN HEAT ISLANDS



Legend

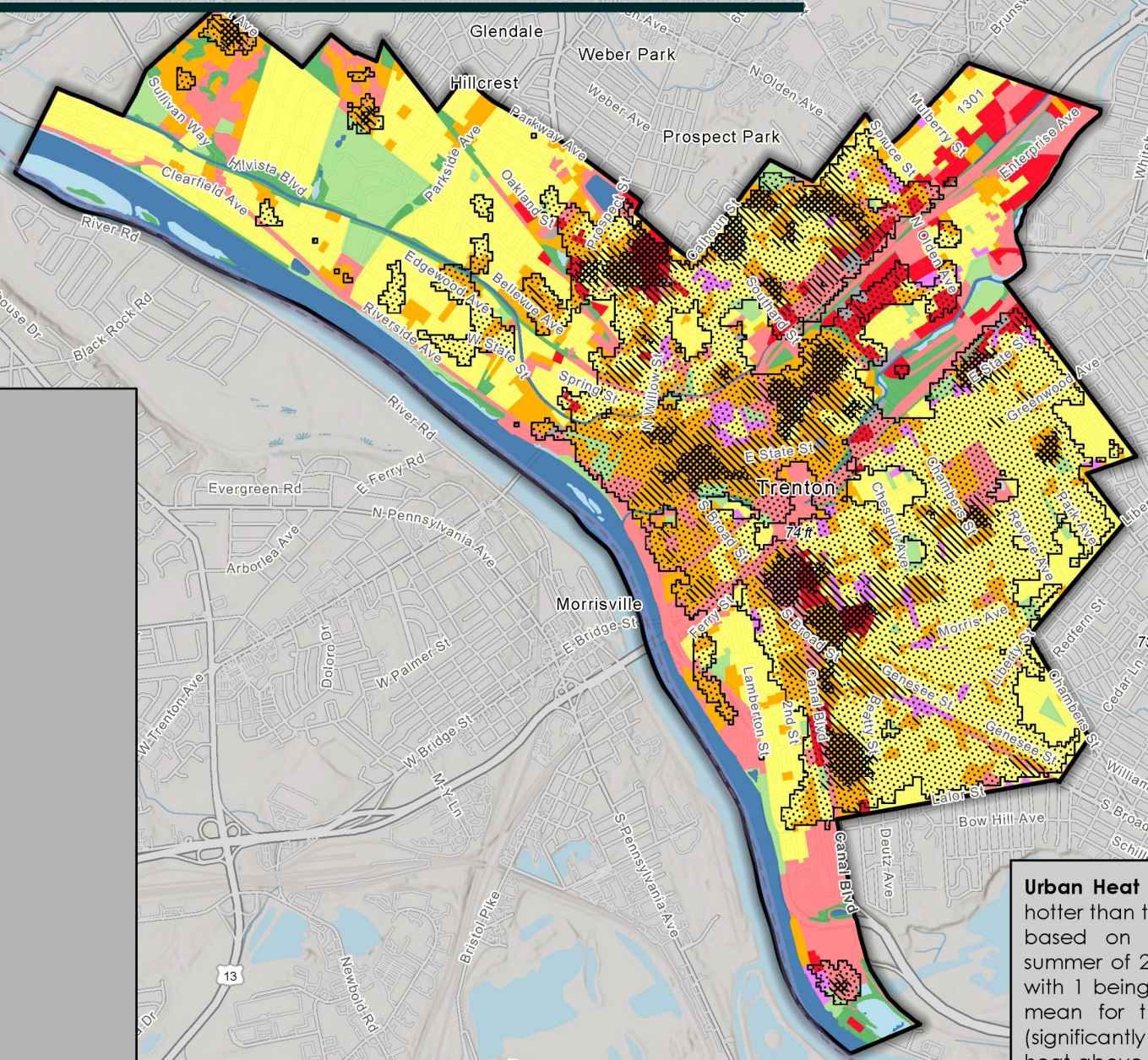
- Trenton Municipal Boundary
- Urban Heat Island Severity Area**
 - Mild
 - Mild to Moderate
 - Moderate
 - Moderate to High
 - Severe

Urban Heat Island Severity Areas are those areas that are hotter than the average temperature of the city as a whole, based on satellite-based thermal readings during the summer of 2021. Severity is measured on a scale of 1 to 5, with 1 being a relatively mild heat area (slightly above the mean for the city), and 5 being a severe heat area (significantly above the mean for the city). The absolute heat above mean values were classified into 5 classes using the Jenks Natural Breaks classification method.

URBAN HEAT ISLANDS + LAND USE / LAND COVER

Legend

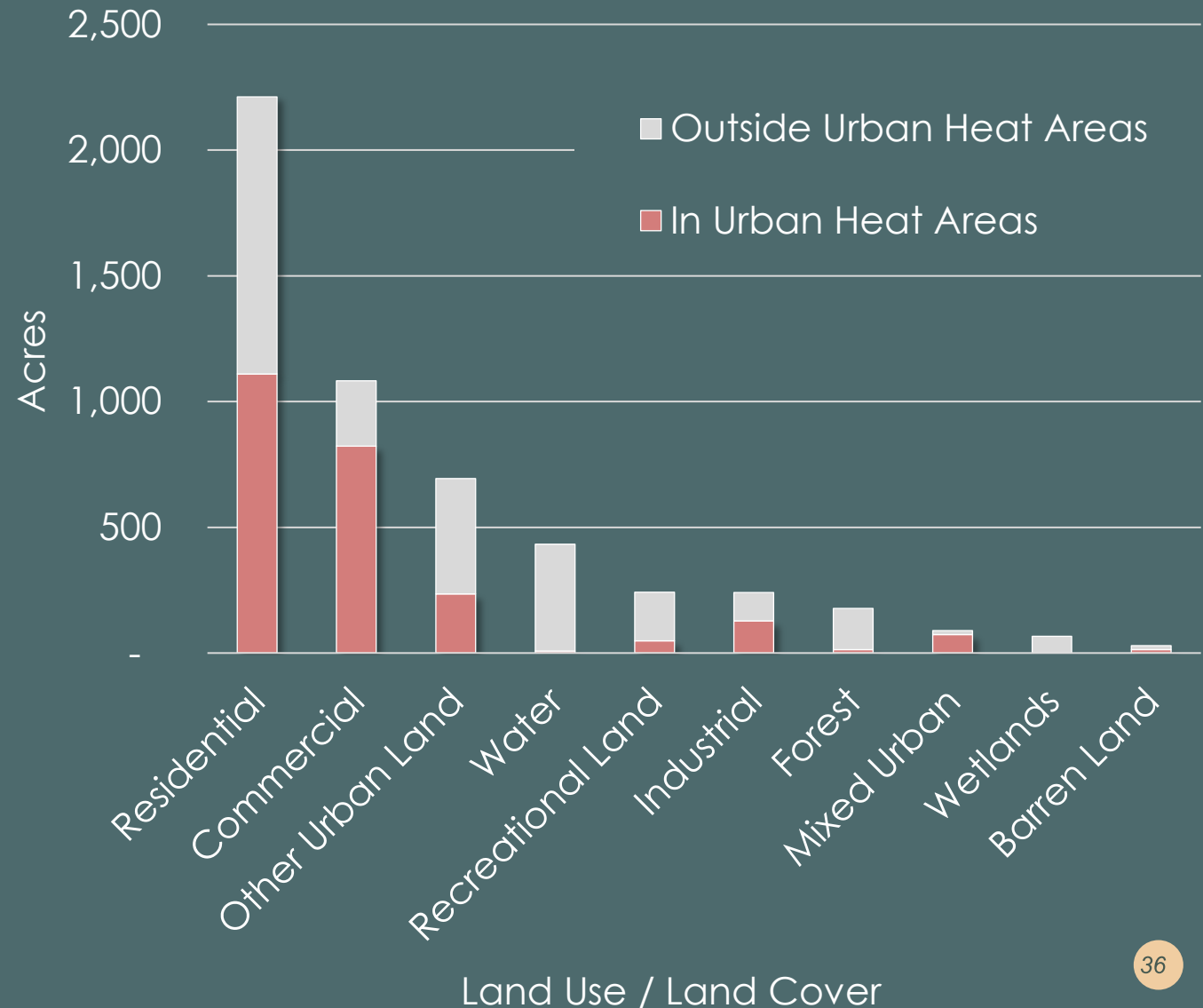
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- Non-Urban Land Use/Land Cover**
-  Agriculture
-  Barren Land
-  Forest
-  Water
-  Wetlands
- Urban Land Use/Land Cover**
-  Recreational Land
-  Residential
-  Commercial
-  Industrial
-  Mixed Urban
-  Other Urban Land



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TRENTON'S URBAN HEAT ISLANDS + LAND USE / LAND COVER

- **Forest, water, wetlands, and recreational land are less likely to be within urban heat areas.**
 - **< 2% of water and wetlands**
 - **8% of forest**
 - **20% of recreation land**
- **Residential and industrial land are about equally likely to be within or outside of urban heat areas.**
- **Commercial and mixed urban lands are more likely to be within urban heat areas**
 - **76% of commercial lands**
 - **82% of mixed urban lands**



Commercial Urban Heat Area



RESIDENTIAL URBAN HEAT AREA

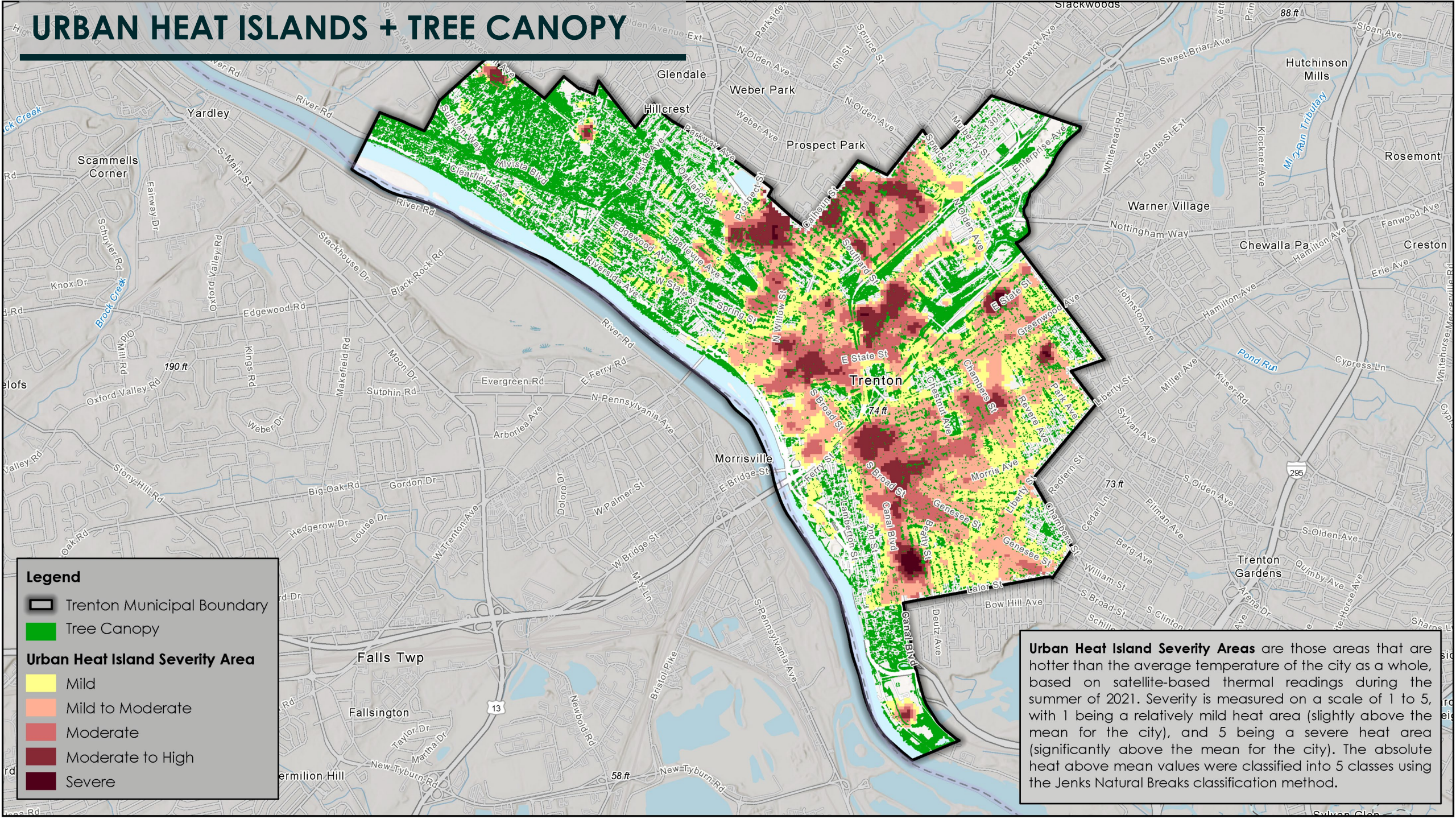
Outside of an Urban Heat Area



Inside of an Urban Heat Area



URBAN HEAT ISLANDS + TREE CANOPY



Legend

- Trenton Municipal Boundary
- Tree Canopy

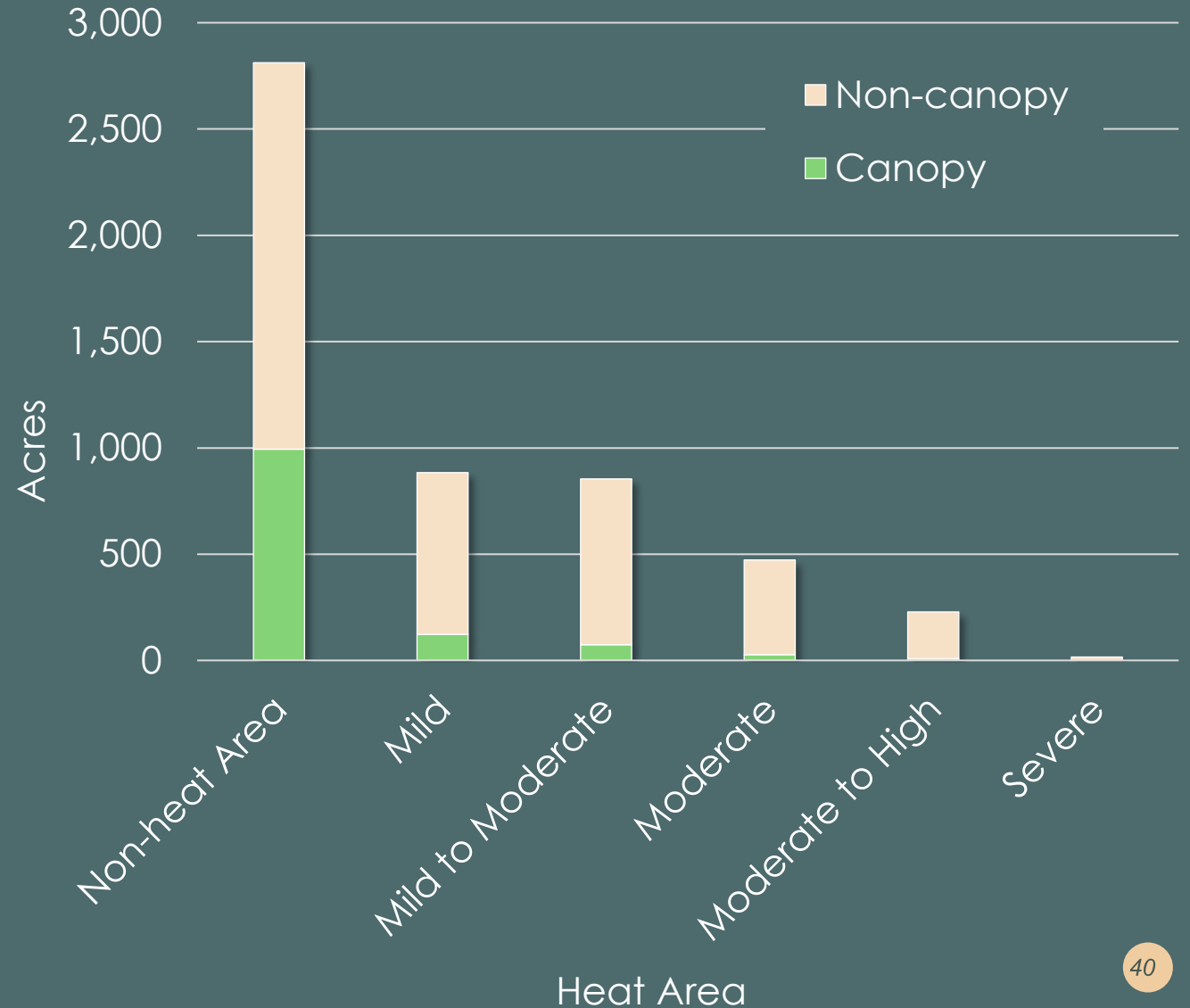
Urban Heat Island Severity Area

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TRENTON'S URBAN HEAT ISLANDS + TREE CANOPY

- About 23% of the city is covered by tree canopy.
- About 91% of urban heat areas are within non-canopy areas.
- About 81% of canopy covered areas are outside of urban heat areas.



URBAN HEAT ISLANDS + VULNERABLE POPULATIONS

Legend

- Trenton Municipal Boundary
- U.S. Census Tract

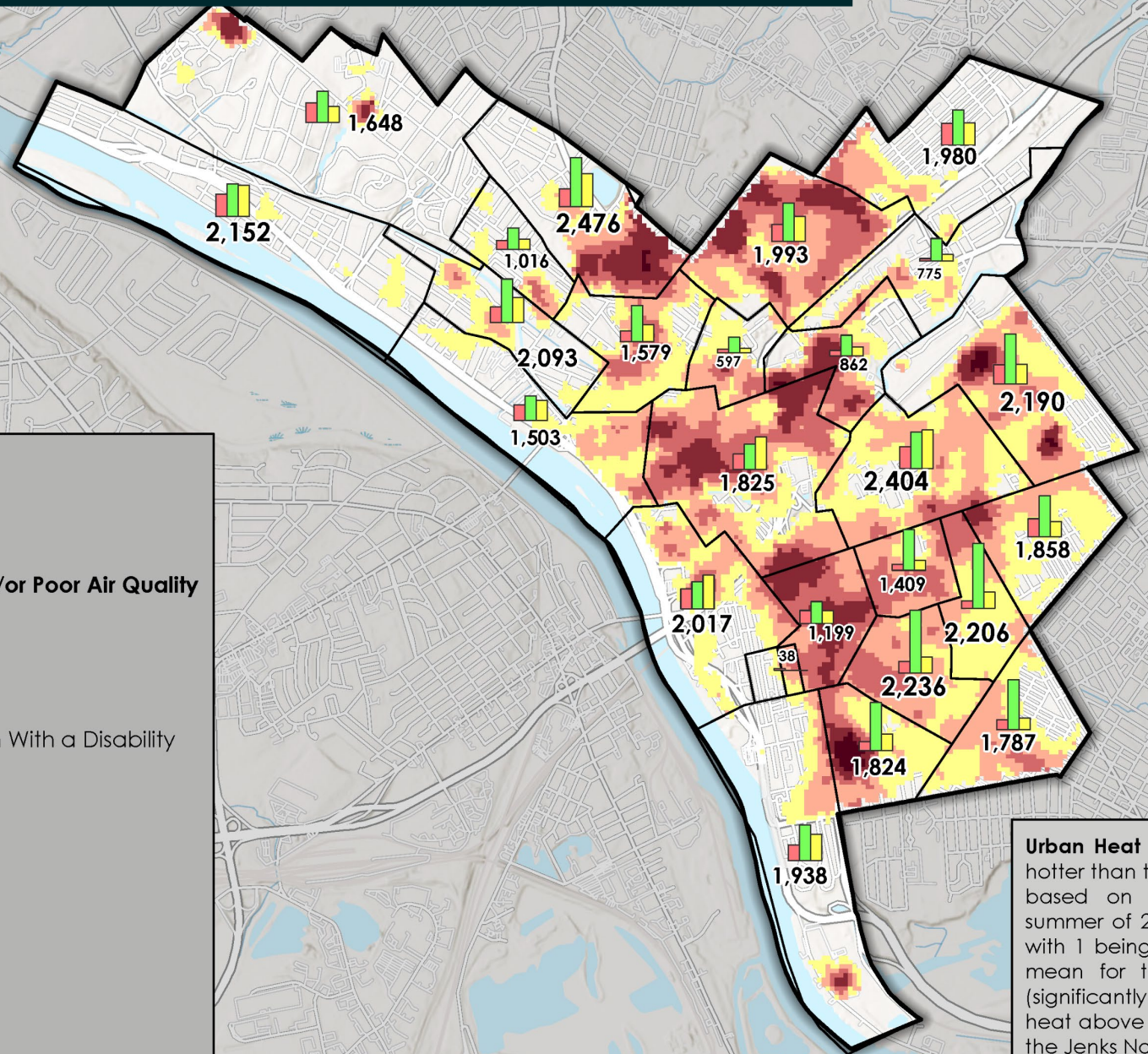
Population Vulnerable to Extreme Heat and/or Poor Air Quality

- Persons Aged 65 and Older
- Persons Aged 17 and Younger
- Civilian Noninstitutionalized Population With a Disability

2,000
1,000
0

Urban Heat Island Severity Area

- Mild
- Mild to Moderate
- Moderate
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QUESTIONS?

