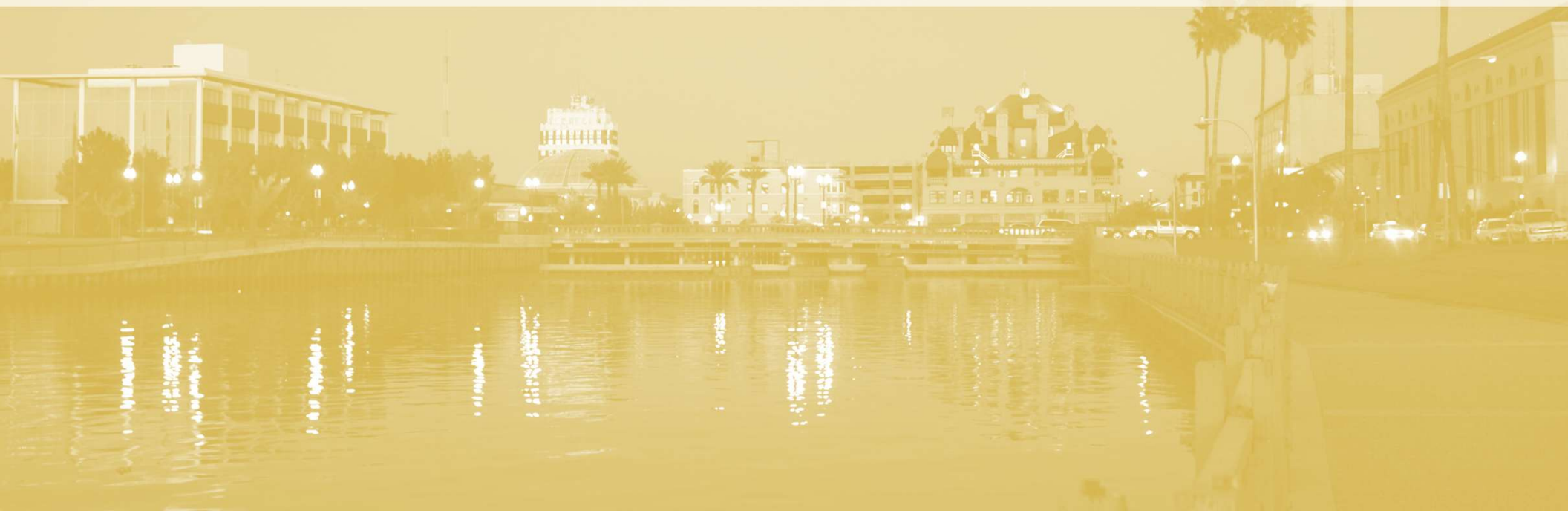


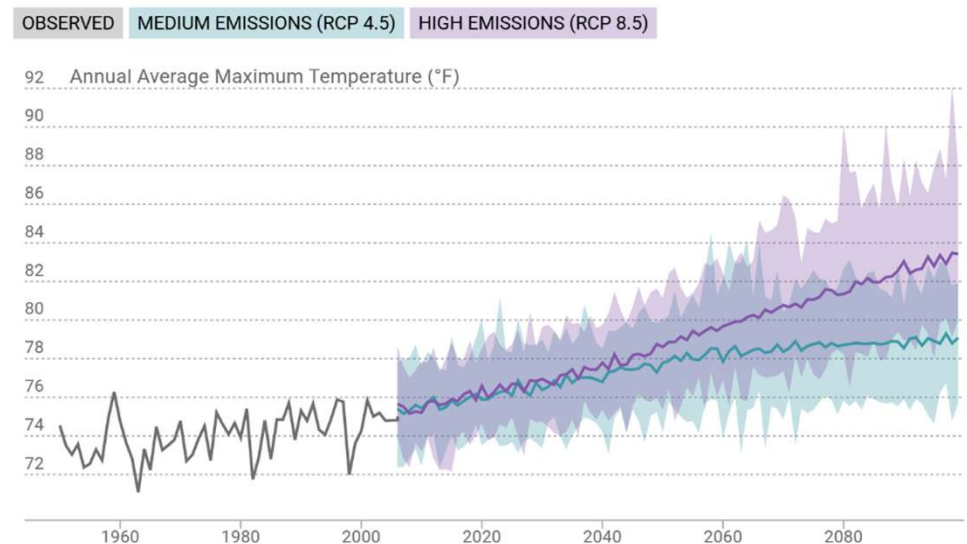
Preliminary Climate Vulnerability Assessment Results



Climate Vulnerability Assessment Overview

- Focused on the City of Stockton
- Develop a **vulnerability assessment** for the City of Stockton's infrastructure and communities through geospatial analysis.
- **Climate data:**
 - Extreme heat, drought, and precipitation climate projections are downscaled through Cal-Adapt, developed by the State of California
 - Flooding data uses FEMA flood maps.
 - Climate projections use the “business as usual” Representative Concentration Pathway (RCP) 8.5 scenario for global GHG emissions.
- **Asset data:** Sourced from the City of Stockton and State of California.
- Vulnerability determined as a product of **exposure and sensitivity:**

EXPOSURE x SENSITIVITY = VULNERABILITY



Extreme Heat

- San Joaquin County is projected to see **a significant rise in extreme heat days** – when the daily max temperature is above the 98th percentile of historical temperatures (1961-1990), or **101.6°F**
- Extreme heat is projected to increase from 5 days historically to **over 40 days annually by mid-century (2035-2064)**.

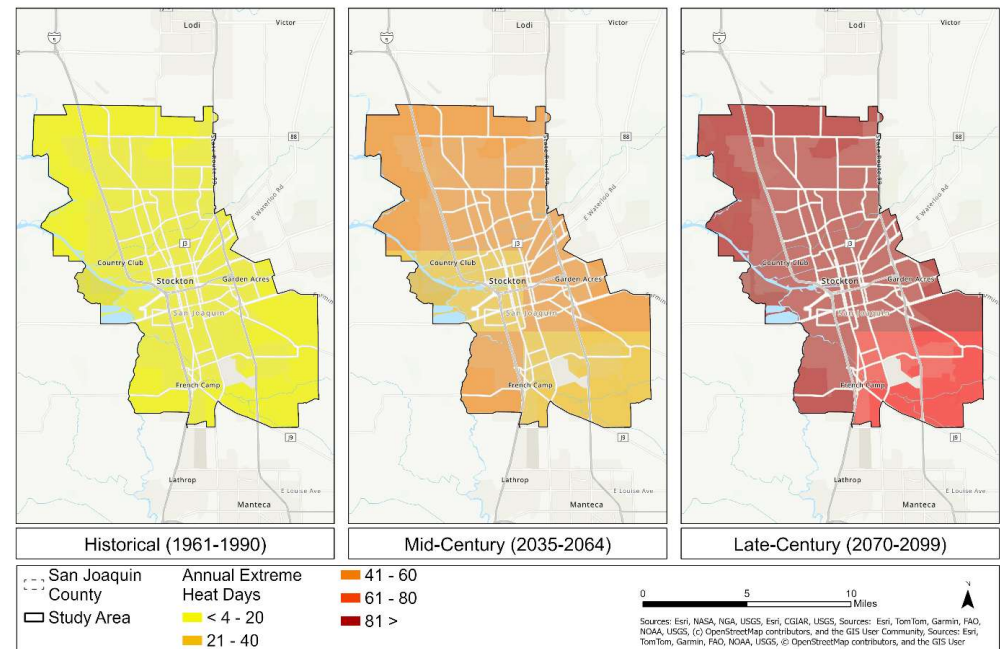


Image: RCP 8.5 Emissions Scenario for the City of Stockton (Cal Adapt)

Drought

- San Joaquin County is projected to experience **longer stretches of dry days**—up to **147 consecutive days annually by mid-century**.
- The 2011–2016 drought led to **\$3.8 billion in agricultural losses**, much of which was concentrated in and around San Joaquin County—highlighting the region’s vulnerability to prolonged dry periods.

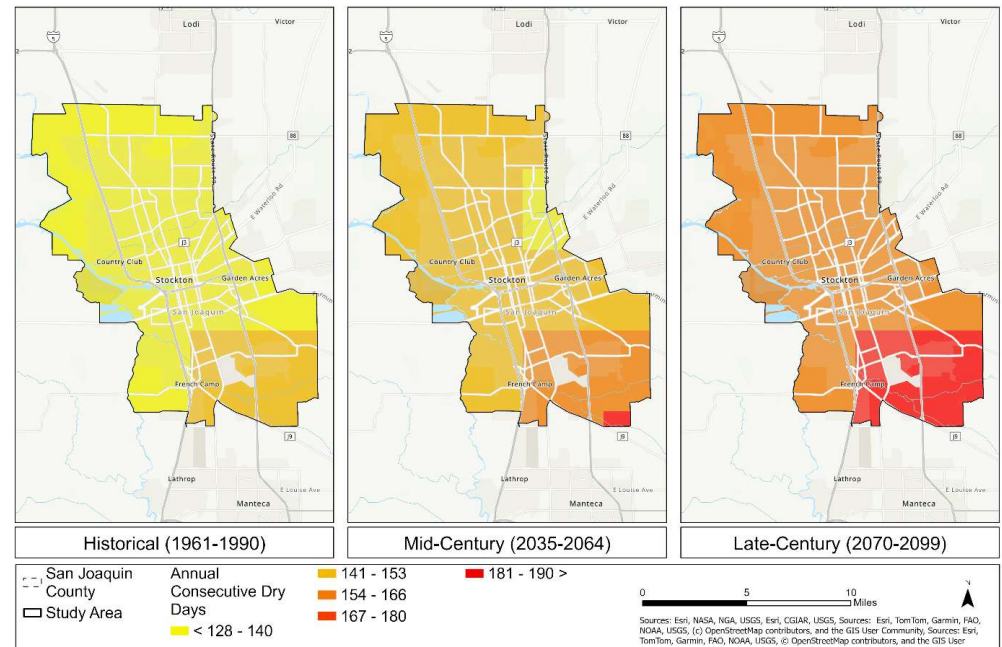
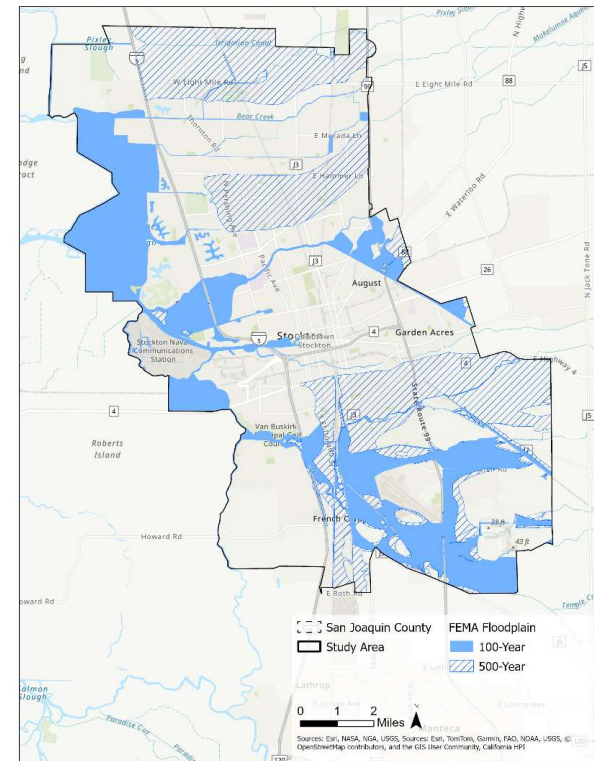


Image: RCP 8.5 Emissions Scenario for San Joaquin County (Cal Adapt)

Precipitation, Sea Level Rise, and Flooding

- By the end of the century, **southern Stockton** is projected to experience some of the **highest one-day precipitation totals** in San Joaquin County, increasing flood risk.
- By the end of the century, sea levels could rise as much as 7-10 feet, **threatening San Joaquin County's levee system**.



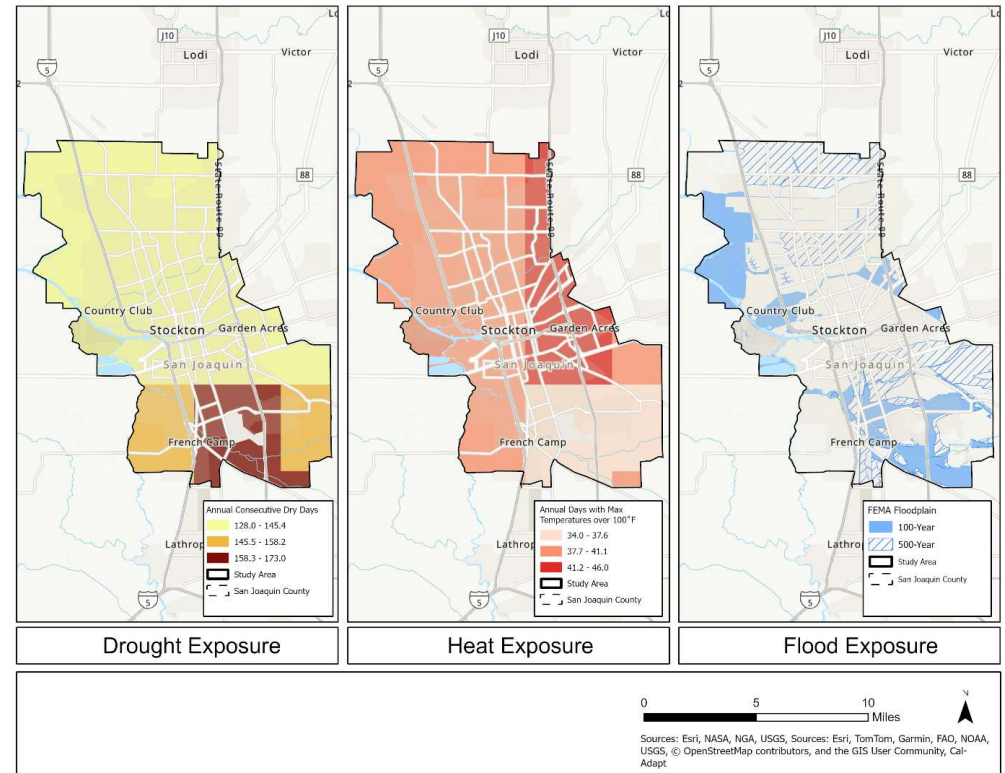
Climate Vulnerability Assessment – Asset Data

Sub-Category	Asset	Number of Assets	Source
PHYSICAL ASSETS			
Transportation	Roadways	1360 miles of roads and streets	City of Stockton
	Railways	106 miles of railway	
	Port of Stockton	1 port	AECOM
	Bike Routes	326 miles of bike routes	City of Stockton
Critical Buildings	Schools	139 schools	City of Stockton
	Community Center (Senior and Recreation Centers)	7 centers	
	Hospitals and Clinics	6 hospitals/clinics*	
	Police Stations	5 police stations	
	Fire Stations	12 fire stations	
Critical Infrastructure	Sewer Pump Stations	35 sewer pump stations	City of Stockton
	Stormwater Pump Stations	80 stormwater pump stations	
	Storm Sewer System Lines	842 miles	
	Sanitary Sewer System Lines	1,057 miles	
	Water Distribution Lines	679 miles	
	Water Treatment Plants	2 plants	AECOM
	Wastewater Treatment Plants	1 plant	
NATURAL SYSTEMS			
Natural Systems	Wetlands	3 square miles	California Energy Commission
	Parks	91 parks	City of Stockton

*some clinics may be missing according to the City of Stockton GIS department

Climate Hazard Exposure Ratings

Climate Hazard	Source	Indicator	Low Exposure Range	Moderate Exposure Range	High Exposure Range
Extreme Heat	Cal-Adapt (4th Climate Change Assessment)	Annual days with max temperatures over 100°F	34.0 – 37.6 days	37.7 – 41.1 days	41.2 – 46.0 days
	Cal EPA	Urban Heat Island Index	0.3	0.4	0.6
Flooding	FEMA Flood Map Hazard Severity Zones	100- or 500-year floodplain	Not in any floodplain	In the 500-year floodplain	In the 100-year floodplain
Drought	Cal-Adapt (4th Climate Change Assessment)	Annual number of consecutive dry days	128.0 – 145.4 days	145.5 – 158.2 days	158.3 – 173.0 days



Asset and Population Sensitivities

- Sensitivity determines how likely it is an asset or population will be disrupted, damaged, or harmed by exposure to a hazard.
- Sensitivities for assets were developed based on research and reviewed with City of Stockton departments.
- Population sensitivities used data from American Community Survey, Healthy Places Index, and the Climate Change and Health Vulnerability Indicators tool

Indicator	Source	Hazards	Rationale
Percent of Population Aged 16 and Older Working Outdoors	ACS 5 Year Estimates 2019-2023 (table C24010)	Heat	More sensitive to extreme heat due to prolonged exposure during high-temperature events.
Percent Population with a Disability	ACS 5 Year Estimates 2019-2023 (table DP02_0072PE)	Flooding	Individuals with disabilities may have reduced mobility or access to resources, making evacuation and recovery during floods more difficult.
Percent of Population Aged 65 and Older	ACS 5 Year Estimates 2019-2023 (table S0101_C01_030E)	Heat, Flooding	Older adults are more vulnerable to heat-related illness and may have limited ability to evacuate during floods.
Linguistic Isolation - Percent of households with no one aged > 5 years speaking English well	ACS 5 Year Estimates 2019-2023 (table DP02_011PE)	Heat, Flooding	Language barriers can limit access to emergency alerts, preparedness information, and recovery resources during disasters.
HPI Percentile (lower values = less healthy)	California Healthy Places Index	Heat, Flooding	Lower HPI scores indicate communities with poorer health outcomes and fewer resources, increasing vulnerability to climate hazards.
Poverty Rate (200% FPL)	ACS 5 Year Estimates 2019-2023 (table S1701_C01_042E)	Heat, Flooding	Low-income populations often have limited access to cooling, safe housing, and emergency resources, increasing risk during extreme events.
Percent Impervious Surface Cover - Population Weighted Average	Climate Change and Health Vulnerability Indicators, California Department of Public Health 2016	Flooding	High impervious surface cover reduces natural drainage, increasing flood risk and severity in urban areas.

Example Vulnerability Findings

SCHOOLS

Vulnerability Rating	None	Low	Moderate	High
Drought	0	7	79	53
Share of all facilities (%)	0%	5%	57%	38%
Extreme Heat	0	112	20	7
Share of all facilities (%)	0%	81%	14%	5%
Flooding	106	0	0	33
Share of all facilities (%)	76%	0%	0%	24%

COMMUNITY CENTERS

Vulnerability Rating	None	Low	Moderate	High
Drought	0	4	3	0
Share of all facilities (%)	0%	57%	43%	0%
Extreme Heat	0	0	3	4
Share of all facilities (%)	0%	0%	43%	57%
Flooding	3	0	0	4
Share of all facilities (%)	43%	0%	0%	57%

Example Vulnerability Findings

ROAD AND STREETS

Vulnerability Rating	None	Low	Moderate	High
Drought	-	104.7	740.7	514.9
Share of all facilities (%)	0%	8%	54%	38%
Extreme Heat	-	1,049.0	214.1	97.3
Share of all facilities (%)	0%	77%	16%	7%
Flooding	1,074.1	-	221.0	65.3
Share of all facilities (%)	79%	0%	16%	5%

WATER TREATMENT PLANTS

Vulnerability Rating	None	Low	Moderate	High
Drought	0	0	2	0
Share of all facilities (%)	0%	0%	100%	0%
Extreme Heat	0	1	0	1
Share of all facilities (%)	0%	50%	0%	50%
Flooding	1	0	0	1
Share of all facilities (%)	50%	0%	0%	50%

Next Steps

- Incorporate urban heat island analyses results into vulnerability assessment
- Develop maps of vulnerability assessment results
- Finalize vulnerability assessment memo
- Develop risk assessment
- Refine adaptation strategies

