Resilient PASCO

Risk & Vulnerability Assessment Executive Summary

Prepared by

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Prepared for

PASCO County Florida
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Resilient PASCO

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The Resilient Pasco Project was made possible through the collaboration of Pasco County staff and the consultant team led by Halff and comprised of Fernleaf and Taylor Engineering. Special recognition is given to FloridaCommerce and the U.S. Department of Housing and Urban Development (HUD) for awarding the grant funds which made this project possible.

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Utilities

Special thanks are due to the Pasco County Resilience Work Group (RWG). This group is a collection of Pasco County staff across various departments who provide institutional knowledge and technical support to the Resilient Pasco Project.

Cover Image: Hurricane Idalia Storm Clouds Build Over Port Richey (Source: CNN, 2023).

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INTRODUCTION

This report summarizes the Risk and Vulnerability Assessment (R&VA) completed as Phase 3 of the Resilient Pasco Project (RPP). The R&VA adheres closely to the guidelines outlined in Section 380.093, Florida Statutes, with a primary focus on evaluating the vulnerabilities of critical and regionally significant assets to a range of climate hazards, including tidal flooding, storm surge, sea level rise, precipitation, and compound flooding.

A geodatabase and digital maps produced as part of this project are available to county staff to provide precise data for incorporation in future analysis and decision-making processes.

In line with statutory requirements, this assessment extends its scope to anticipate future challenges by projecting vulnerabilities up to the planning horizons of 2040 and 2070.

The assessment goes beyond statutory requirements by including a long-range projection to 2100 and by incorporating extreme heat as a hazard of focus. The project identified key vulnerabilities and potential areas of concern for critical assets within Pasco County.

Pasco County's R&VA serves to identify critical asset and community vulnerabilities to flooding and heat. The assessment is a vital resource for informing resilience planning and decision-making processes which will support the development of targeted strategies in the county's Resilience and Sustainability Action Plan.

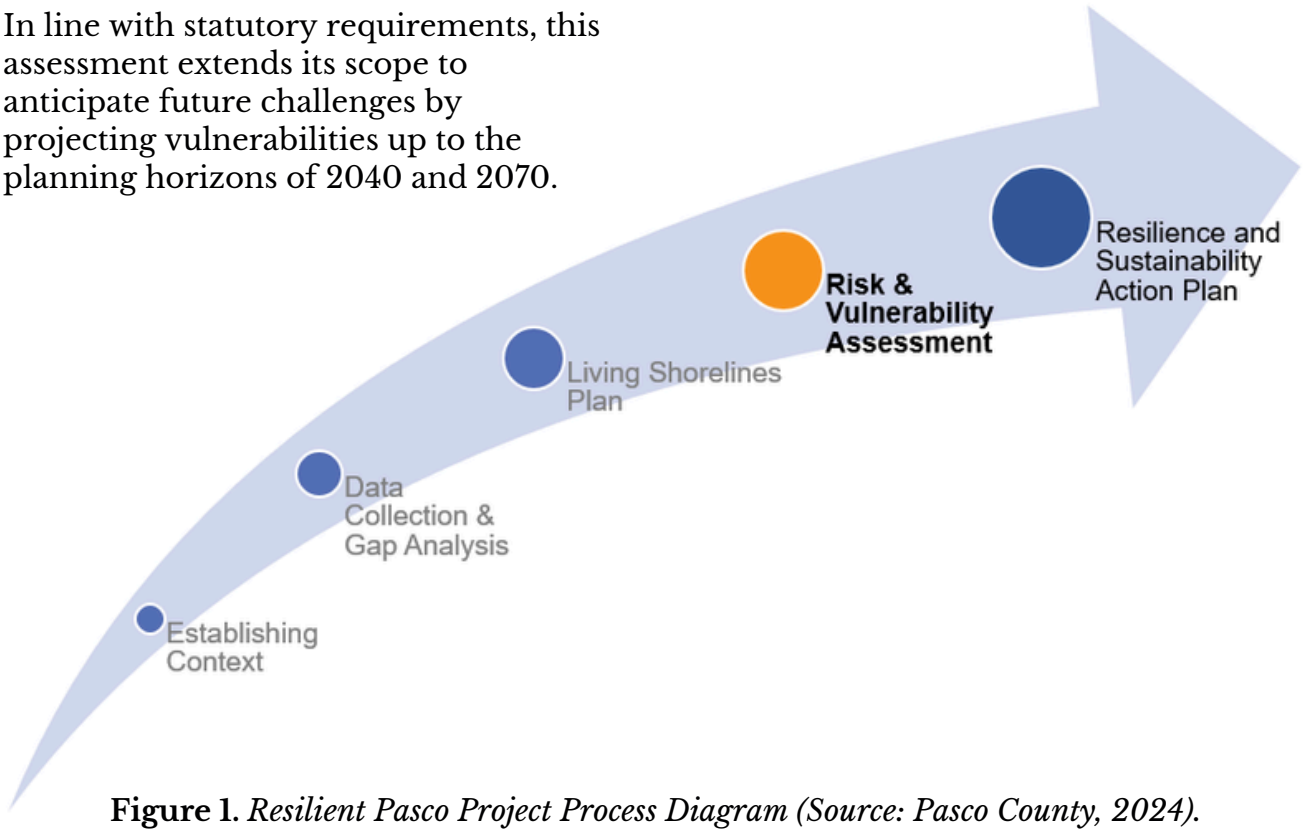

Figure 1. *Resilient Pasco Project Process Diagram (Source: Pasco County, 2024).*

Project Context

According to Sweet et al. (2017), long-term sea level rise driven by global climate change presents clear and highly consequential risks to the United States over the coming decades and centuries. The International Panel on Climate Change (2023) maintains that "Due to relative sea level rise, current 1-in-100 year extreme sea level events are projected to occur at least annually in more than half of all tide gauge locations by 2100 under all considered scenarios" with high confidence.

Today, millions of people in the U.S. already live in areas at risk of coastal flooding, with more moving to the coasts every year. Rising seas will increase the vulnerability of this growing population, along with critical infrastructure related to transportation, energy, trade, military readiness, and coastal ecosystems and the supporting services they provide.

Global and Regional Sea Level Rise Scenarios for the United States, authored by Sweet et al. (2017) and published by NOAA, is widely accepted by states, agencies, and the scientific community and is also an extensively referenced authoritative source for many additional publications on climate impacts and resilience. Although NOAA published updated national sea level rise scenarios in February 2022, the Resilient Pasco Project utilized the 2017 NOAA sea level rise projections (SLR) for intermediate-low and intermediate-high sea level rise scenarios to maintain consistency with the current requirements of Section 380.093, Florida Statutes. **Table 1** provides NOAA 2017 sea level rise projections for 2040, 2070, and 2100 in Pasco County, based on the intermediate-low and intermediate-high scenarios.

Table 1. *NOAA 2017 Intermediate-Low and Intermediate-High SLR Projections for Pasco County (Source: Taylor Engineering, 2024).*

Period	Sea Level Rise Scenario	Pasco County Sea Level Rise (ft)
2020 – 2040	Intermediate-Low	0.4
2020 – 2070		1.0
2020 – 2100		1.5
2020 – 2040	Intermediate-High	0.8
2020 – 2070		2.8
2020 – 2100		5.5

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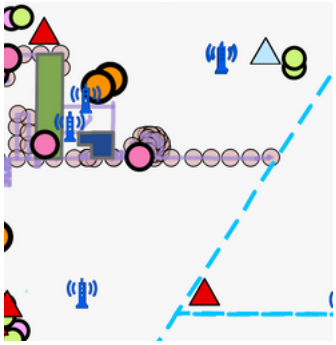
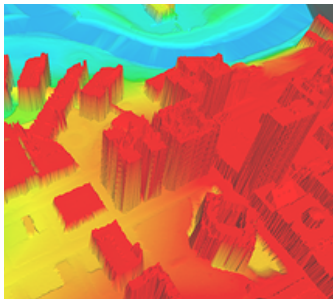
ASSESSMENT PROCESS

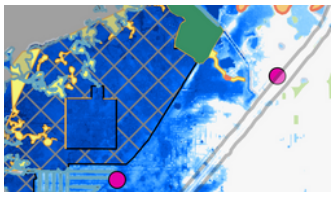
The R&VA conducted for Pasco County under the Resilient Pasco Project employed a comprehensive methodology, as outlined below.



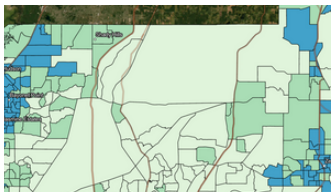
Acquisition of Spatial GIS Data: The project obtained detailed spatial GIS data pertaining to critical and regionally significant assets owned and/or maintained by Pasco County. This included transportation assets and evacuation routes, critical infrastructure assets, community and emergency facilities, as well as natural, cultural, and historical assets, in accordance with Section 380.093, F.S. The total number of assets was identified based on the best available data maintained by Pasco County GIS and other local, state, and regional sources.



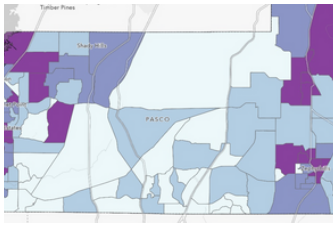
Digital Elevation Model (DEM) and Climate Hazard Data Collection: The project obtained the 2018 SWFWMD LiDAR DEM for Pasco County to evaluate topographic conditions. Climate hazard datasets relevant to current and future conditions, encompassing tidal flooding, storm surge, sea level rise, precipitation, and compound flooding, were also obtained. Flood rasters for 2040, 2070, and 2100 planning horizons were generated.



Exposure and Sensitivity Analyses: The assessment involved conducting exposure and sensitivity analyses to gauge the vulnerability of critical and regionally significant assets to flood hazards. These analyses aimed to ascertain the extent of exposure of assets to flooding and their sensitivity to hazards.



Evaluation of Additional Hazards: Beyond flood risks, the assessment considered other hazards like extreme heat and humidity. Local, regional, and global climate patterns were taken into account to evaluate the potential impacts of extreme heat events and humidity on Pasco County.



Consideration of Social Vulnerability: The project prioritized the integration of Social Vulnerability Index (SVI) data, produced by the Center for Disease Control and Prevention (CDC), specifically tailored for Pasco County to evaluate how various demographic groups and communities might be disproportionately impacted by climate hazards.

AccelAdapt Engine Implementation: The AccelAdapt Engine was deployed to harness community-level data, providing a quantitative assessment of various threats. Through the analysis of "asset-threat pairs," the engine paired critical assets with specific flood types, offering valuable insights.

DEFINITIONS AND APPROACH

This assessment utilized a risk analysis framework based on the U.S. Climate Resilience Toolkit Steps to Resilience Framework developed by the National Oceanic and Atmospheric Administration (NOAA) and partners. The framework, concepts, and descriptions of the application of these concepts in the following pages can be attributed to the Practitioner's Guide to Implementing the Steps to Resilience Framework (Gardiner et al., 2022).

Exposure is defined as the presence of people, assets, and ecosystems in places where they can be adversely affected by hazards (Gardiner et al., 2022). For purposes of this assessment, exposure specifically means that a community asset (e.g., a parcel or roadway) spatially coincides with a specific flood condition. The identified parcel-based assets that were exposed to the flood hazard scenarios at the property level were further evaluated and assigned levels of vulnerability and risk.

Vulnerability describes the susceptibility of exposed assets based on two core concepts (1) potential impact—the degree to which an asset is affected by a given hazard; and (2) adaptive capacity—the ability the asset has to cope. Another term for potential impact is sensitivity. To avoid confusion with deliverables outlined by Section 380.093, F.S., the term potential impact has been used in its place. As depicted in **Figure 2**, potential impact and adaptive capacity are combined to measure and evaluate vulnerability. When combined in the analysis, properties that are highly vulnerable have low adaptive capacity and high potential impact.

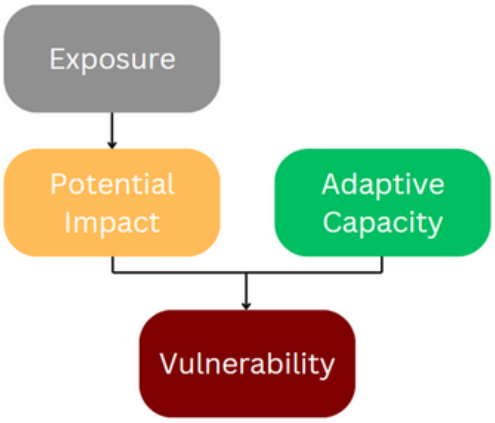


Figure 2. *Components of Vulnerability (Source: U.S. Climate Resilience Toolkit, 2014).*

Risk is evaluated at the property-level and is the combination of probability or relative likelihood of a hazard occurring and the magnitude of impact. It can be expressed as:

Risk = Hazard Probability x Magnitude of Impact

Probability is often determined using the annualized likelihood of the hazard occurring if there is one (Gardiner et al., 2022). For the purpose of this assessment, probability is considered equal across flood hazards. The magnitude of impact, or consequence resulting from the hazard occurring, is determined by the maximum flood depth potentially experienced by the structure. Probability and magnitude of impact are combined to generate one value for risk.

KEY FINDINGS - FLOODING

Transportation Assets and Evacuation Routes

- Under current 1% annual chance storm surge conditions, some evacuation routes and major roads are exposed to potential inundation. While these are low percentages relative to the total, at least 4.5% of evacuation routes and 6.2% of major roads are potentially affected, particularly in areas near the coast.
- Of the 406 lane miles exposed to flooding from a 1% annual chance storm surge under current conditions, almost half (48%) of those are also evacuation routes.
- An increasing number of properties become isolated under tidal flooding and storm surge scenarios in the upcoming decades at both intermediate-low and intermediate-high sea level rise (SLR) conditions.
- A notable portion of census block groups around US-19 contain a large number of properties that could become isolated from emergency services to the 1% annual chance storm surge + 2040 Int-Low SLR scenario (4.22% of parcel-based assets).
- Under the tidal flooding 2070 Int-High SLR scenario, approximately 5% of parcel-based assets are potentially isolated from emergency services.

Critical Infrastructure Assets

- Under current conditions for 1% and 4% annual chance storm surge, 15% and 7%, respectively, of wastewater lift stations are exposed to potential inundation.
- Under current conditions for tidal flooding +2 ft, less than 1% of wastewater lift stations are exposed to potential inundation. Under the tidal flooding +2 ft 2070 int-high scenario, approximately 8% of wastewater lift stations are exposed to potential inundation.
- When considering the adaptive capacity of all critical infrastructure properties assessed for vulnerability and risk to 1% annual chance storm surge, almost half (48%) of these properties are located outside of the flood extent or were built with modernized floodplain regulations at least 1ft above Base Flood Elevation (BFE).

Critical Community and Emergency Facilities

- The majority of properties that are within the flood extent have low adaptive capacity, meaning they were constructed before any floodplain development requirements were put in place.
- Very few properties in this class have medium or high combined vulnerability and risk to future tidal flooding. Under the tidal flooding +2ft 2070 Int-High scenario, only 1% of critical community and emergency facilities are exposed.
- Slightly less than half of the properties are outside of the current conditions 1% annual chance storm surge flood extent.

Natural, Cultural, and Historical Assets

- 35% of Parks, 28% of Pasco Conservation Lands, and 23% of Florida Managed Areas (FLMA) Conservation Lands are exposed to current conditions 1% annual chance storm surge.
- 25% of Parks, 24% of Pasco Conservation Lands, and 23% of FLMA Conservation Lands are exposed to current conditions tidal flooding and 10% or less of each property type is also exposed to current conditions.
- Of the non-parcel-based historical sites identified in Pasco County, 7% are exposed to current 1% annual chance storm surge conditions and this increases to 8% under 2040 Int-High SLR conditions.

Number of Critical Assets Affected Across Flood Scenarios

- **Table 2** provides a quantitative data summary of parcel-based critical assets identified as having medium or high combined vulnerability and risk across each critical asset class and flood scenario.

- The total number of assets was identified based on the best available data maintained by Pasco County GIS and other local, state, and regional sources.

Table 2. *Number of Parcel-based Critical Assets with Medium or High Combined Vulnerability and Risk Across Flood Scenarios (Source: Fernleaf, 2024).*

			Critical Community & Emergency Facilities		Critical Infrastructure Assets		Natural, Cultural, & Historic Assets		Transportation & Evacuation Routes	
	Total Parcel-based Assets		601		987		1,404		31	
1% Annual Chance Storm Surge	Current		36	6%	111	11%	29	2%	3	10%
	Int. Low SLR	2040	39	6%	125	13%	33	2%	3	10%
		2070	48	8%	142	14%	37	3%	4	13%
		2100	54	9%	156	16%	42	3%	4	13%
	Int. High SLR	2040	45	7%	139	14%	35	2%	3	10%
		2070	66	11%	173	18%	54	4%	5	16%
		2100	92	15%	202	20%	60	4%	6	19%
4% Annual Chance Storm Surge	Current		14	2%	42	4%	17	1%	3	10%
	Int. Low SLR	2040	16	3%	53	5%	19	1%	3	10%
		2070	18	3%	64	6%	22	2%	3	10%
		2100	21	3%	82	8%	28	2%	3	10%
	Int. High SLR	2040	18	3%	58	6%	21	1%	3	10%
		2070	38	6%	110	11%	30	2%	4	13%
		2100	69	11%	166	17%	53	4%	5	16%
MHHW + 2ft (Tidal Flooding)	Current		1	<1%	2	<1%	0	0%	0	0%
	Int. Low SLR	2040	1	<1%	2	<1%	2	<1%	0	0%
		2070	2	<1%	6	1%	5	<1%	2	6.4%
		2100	2	<1%	11	1%	6	<1%	2	6.4%
	Int. High SLR	2040	1	<1%	5	1%	5	<1%	1	3%
		2070	5	1%	28	3%	12	<1%	2	6.4%
		2100	24	4%	76	8%	31	2.2%	3	10%

Area of Inundation for Flood Hazard Scenarios

- In accordance with the statutory requirements, an evaluation of the amount of the county area inundated by each flood hazard scenario was performed. Inundation of greater than 50% is considered highly vulnerable under the statute (FDEP, 2022).

- Under current and future conditions for all flood scenarios, less than 25% of the total land area in Pasco County is inundated and is therefore assigned low vulnerability (**Table 3**). It is important to note that persons and property located on the coast have a greater vulnerability to these flood scenarios.

- Storm surge scenarios are a particular area of concern for the West Market Area, with between 30-50% percent area inundated across a majority of the scenarios. Under the 1% annual chance storm surge 2070 intermediate-high sea level rise scenario, 46% of the West Market Area is projected to be inundated.

Table 3. *Percent of Inundation Across Flood Hazard Scenarios (Source: Fernleaf, 2024).*

Flood Scenario	% Jurisdiction Inundated	Total Area (acres; County area = 488,009.85 ac.)
MHHW + 2ft + Current Conditions	1.7%	8,563
MHHW + 2ft + 2040 Int. Low SLR	2%	9,318
MHHW + 2ft + 2040 Int. High SLR	2%	10,083
MHHW + 2ft + 2070 Int. Low SLR	2.1%	10,456
MHHW + 2ft + 2070 Int. High SLR	2.8%	13,738
MHHW + 2ft + 2100 Int. Low SLR	2.3%	11,380
MHHW +2ft + 2100 Int. High SLR	3.8%	18,742
4% Annual Chance Storm Surge + Current Conditions	3%	14,929.5
4% Annual Chance Storm Surge + 2040 Int. Low SLR	3.2%	15,581.2
4% Annual Chance Storm Surge + 2040 Int. High SLR	3.3%	16,274.8
4% Annual Chance Storm Surge + 2070 Int. Low SLR	3.4%	16,627.6
4% Annual Chance Storm Surge + 2070 Int. High SLR	4%	19,782.4
4% Annual Chance Storm Surge + 2100 Int. Low SLR	3.6%	17,474.3
4% Annual Chance Storm Surge + 2100 Int. High SLR	5%	24,787.6
1% Annual Chance Storm Surge + Current	4%	19,759.9
1% Annual Chance Storm Surge + 2040 Int. Low SLR	4.2%	20,501.9
1% Annual Chance Storm Surge + 2040 Int. High SLR	4.3%	21,232.8
1% Annual Chance Storm Surge + 2070 Int. Low SLR	4.4%	21,634
1% Annual Chance Storm Surge + 2070 Int. High SLR	5%	24,883.3
1% Annual Chance Storm Surge + 2100 Int. Low SLR	4.6%	22,590.8

Annual High Tide Flooding Outlook

"High tide flooding", also known as nuisance flooding, sunny day flooding, or king tide flooding, describes increasingly common flooding conditions along the coast due to rising sea levels, sinking land, and the loss of natural barriers (NOAA, n.d.). Because of rising seas, land subsidence, and the loss of natural barriers, high tide flooding is now twice as frequent in U.S. coastal communities as it was 20 years ago. Predictions from NOAA show that high tide flooding will become more common and more severe over the coming decades (NOAA, n.d.).

- **Figure 1** shows the number of days per year that sea level in Clearwater, Florida is projected to exceed 20.87 in above MHHW conditions, which represents the minor threshold for tidal flooding. The Clearwater Beach station was selected because of its use in other parts of the R&VA to evaluate future sea level rise (SLR) projections; where this station is the closet in proximity to Pasco County. The blue trend line represents the NOAA intermediate-low SLR projection, where the red trend line represents the NOAA intermediate-high SLR projection.

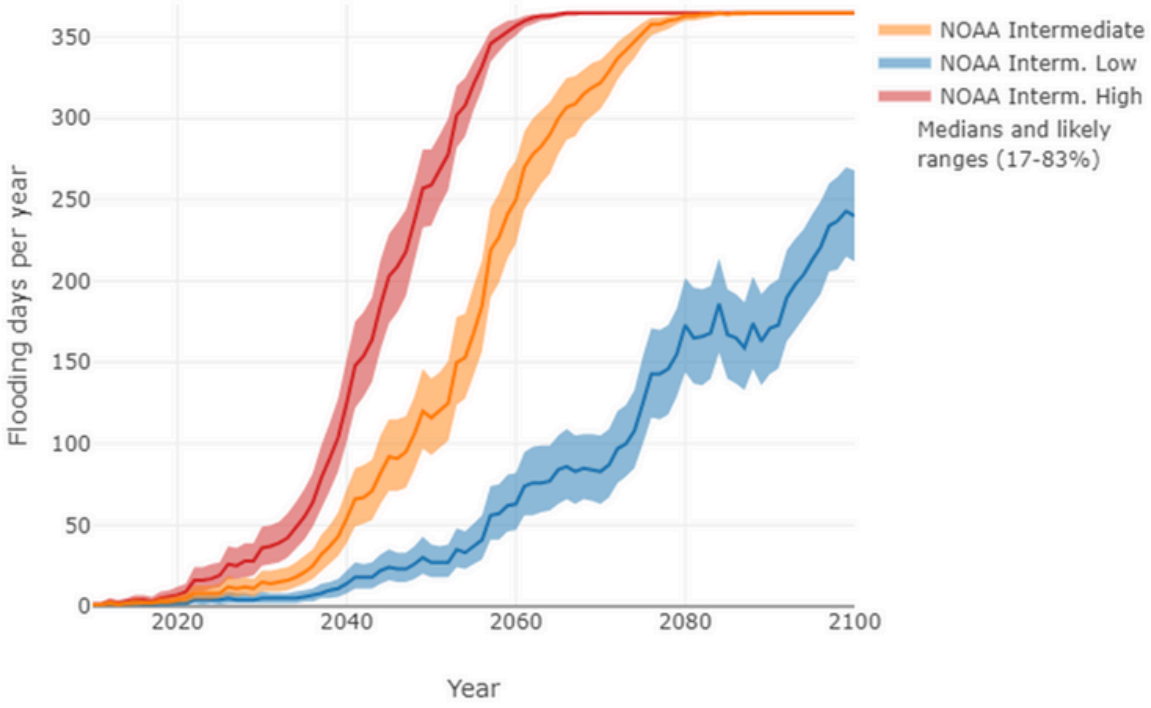


Figure 1. *Future Projections for Annual High Tide Flooding Days at Clearwater Beach, Florida (Source: NASA Sea Level Change: Observations from Space, n.d.).*

- **Figure 1** shows that tidal flooding days are anticipated to increase moving into the planning horizons of 2040, 2070, and 2100. It should be emphasized that this data represents the minor threshold for annual high tide flooding, where increased instances of "nuisance" and "sunny day" flooding are anticipated.

- The NOAA intermediate-low SLR projections forecasts that there will be an average of 14 annual high tide flooding days by 2040, 83 days by 2070, and potentially 240 days by 2100. The NOAA intermediate-high SLR projections forecast that there will be an average of 125 annual high tide flooding days by 2040 and potentially year-round high tide flooding days by 2070 and 2100.

Precipitation Key Findings

Inland flooding occurs when moderate precipitation accumulates over several days, intense precipitation falls over a short period, or a river overflows. A flash flood is caused by heavy or excessive rainfall in a short period of time (NOAA, n.d.).

- Average values for the 1% and 0.2% AEP events for Pasco County based on the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 grids are 12.47" and 17.92", respectively.

- Future precipitation amounts for the AEP events were determined by multiplying the existing amounts by the median future change factors (ranging from 1.09 to 1.23) for each planning horizon.

Compound Flooding Key Findings

"Compound flooding" is flooding caused by complex interactions between two or more oceanographic, hydrological, or meteorological processes such as the combination of pluvial (rainfall-induced flooding, such as flash, surface water, drain, and sewer floods), fluvial (riverine floods), coastal (sea level rise, tides, waves, storm surge, and nuisance floods), or groundwater flooding (Fla. Admin. Code 6S2-8.002).

- Compound flooding potential is quantified using the Spearman's rank correlation coefficient (rs) for the (Q^n,S^n) and (S^n,Q^n) sets of pairs. Higher values of rs suggest a high potential for compound flooding. For the (Q^n,S^n) pairs, the rs was +0.485 with a p-value of 0.112 indicating moderate correlation for surge conditioned on discharge. For the (S^n,Q^n) pairs, the rs was -0.42 with a p-value of 0.229 indicating weak correlation for discharge conditioned on surge.

- Based on limited data availability (i.e., discharge), the potential for compound flooding based on this assessment is deemed **low to moderate** for Pasco County.

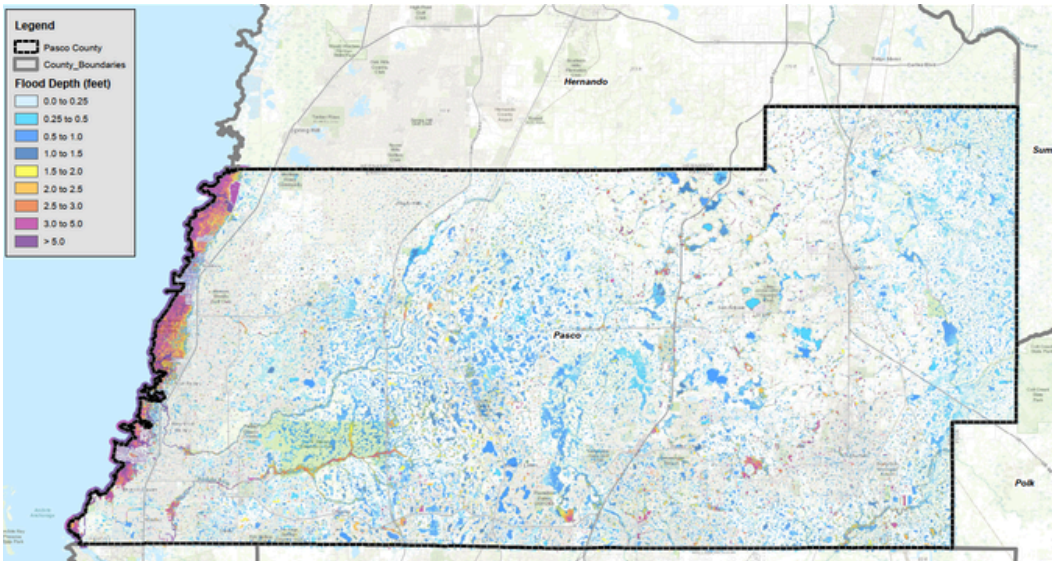


Figure 4. *Hurricane Idalia Maximum Simulated Flood Depths (Source: Halff, 2024).*

SOCIAL VULNERABILITY

Social vulnerability is used in the R&VA to help identify communities that are disproportionately vulnerable to climate hazards because of socioeconomic factors. Disproportionate climate impacts arise from a number of reasons. Socially vulnerable communities are often located in areas prone to multiple threats and they may have limited access to resources needed to prepare for and recover from hazards.

In this assessment, social vulnerability is considered through social and economic metrics at the block group levels from the 2021 American Community Survey (5-year estimates) and through the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) that provides relative measures of social vulnerability through four themes at the census tract level: household composition and disability; socioeconomic status; minority status and language; and housing type and transportation (CDC, 2024).

CDC ATSDR technical documentation defines the SVI scale with 0 as the lowest vulnerability and 1 as highest vulnerability. The documentation classifies the data using quartiles (0 to .2500, .2501 to .5000, .5001 to .7500, .7501 to 1.0) and indicates that the classification goes from least vulnerable to most vulnerable.

Figure 5 provides a visual representation of social vulnerability across Pasco County, where dark purple areas highlight census tracts with high social vulnerability.

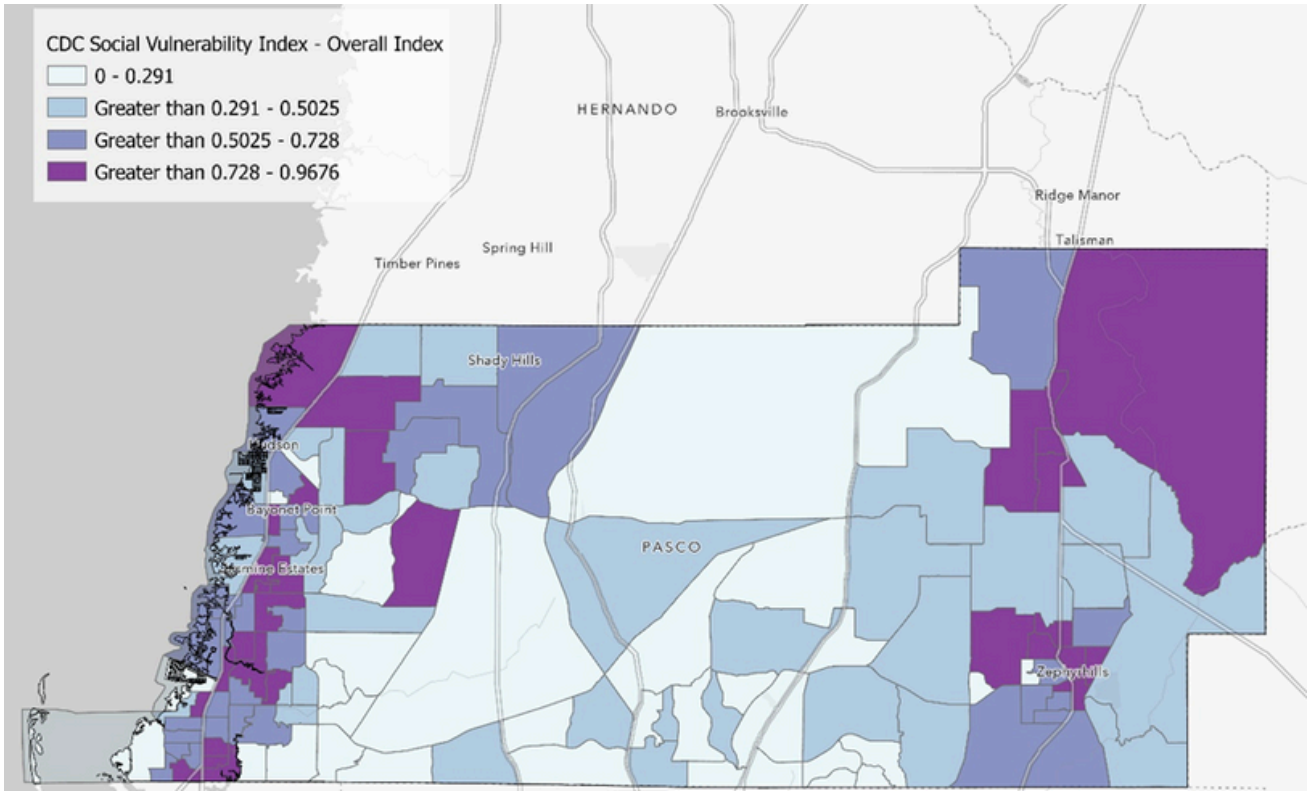


Figure 5. *CDC Social Vulnerability Index (SVI) for Pasco County (Source: Fernleaf; CDC, 2024).*

EXTREME HEAT FINDINGS

Pasco County, over the past 30 years, has experienced an increase of approximately 5.9°F of maximum temperatures during the summertime months. For the Tampa Bay area, from 1961 to 2021, the frequency (number of heat waves occurring each year) has increased by an average of 9.6 events each year. The duration (length of each individual heat wave) of heat wave events has increased by approximately 2 days (NOAA, 2022; Habeeb et al., 2015).

Extreme heat events, or heat waves, are periods of excessively hot and/or humid weather that can last for multiple days. The loss of vegetation to development can lead to higher temperatures in cities, referred to as the urban heat island effect (**Figure 6**), and can exacerbate the effects of extreme heat events (U.S. EPA, 2022). Compared to rural areas, these more highly developed areas have higher daytime temperatures that can persist into the night. Factors such as impervious surfaces in the built environment contribute to higher temperatures as they absorb and radiate heat. In contrast, vegetation, particularly tree canopy, dissipates temperatures and provides respite during an extreme heat event (Chu et al., 2023; NIHHIS, n.d.). As such, neighborhoods characterized by extensive development, such as commercial and residential areas, are more exposed to extreme heat conditions.

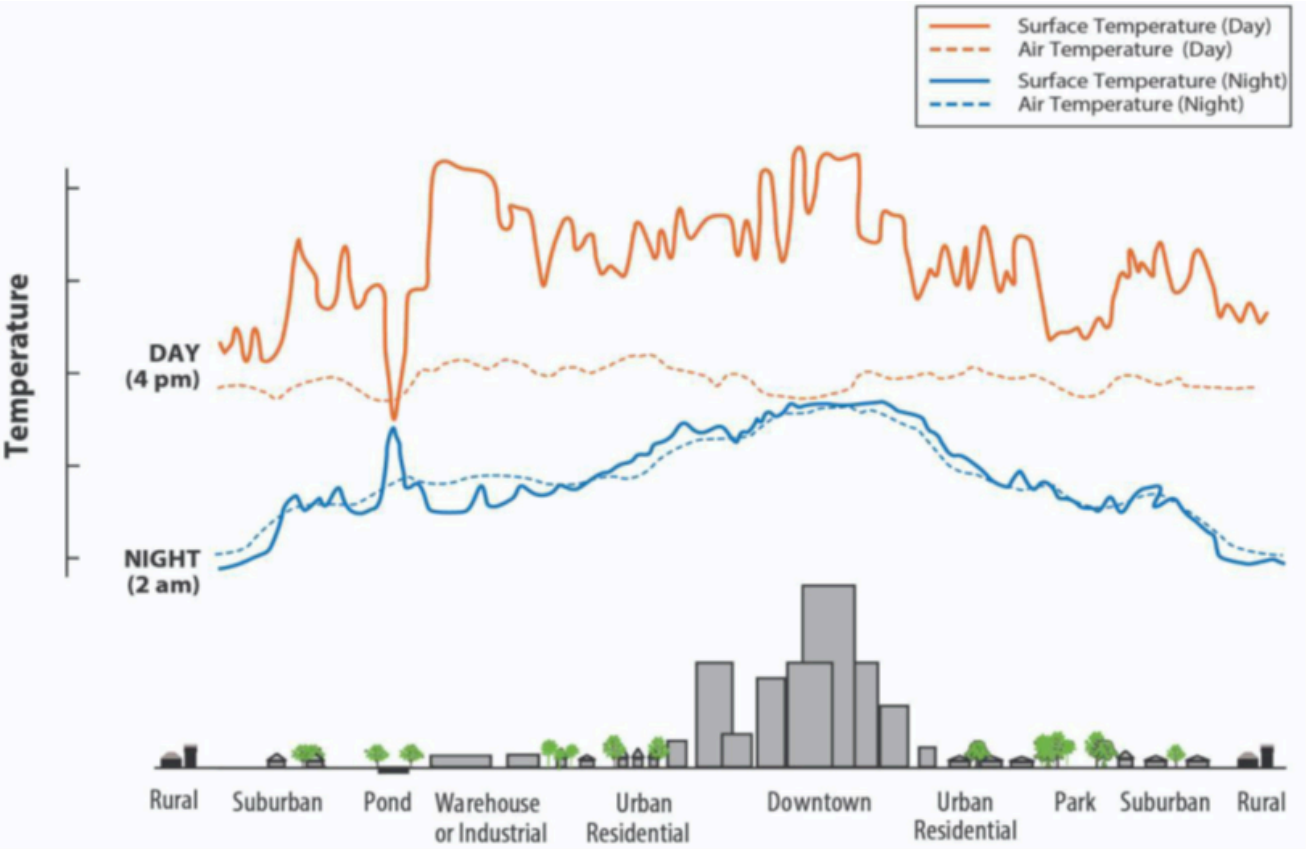


Figure 6. *U.S. Environmental Protection Agency urban heat island effect diagram depicting elevated temperatures in areas with dense concentrations of pavement and buildings (Source: U.S. EPA, 2022).*

Adaptive capacity is defined as the ability of a person, asset, or system to withstand and adjust to a hazard, take advantage of new opportunities, or cope with change (Gardiner et al., 2022). Higher median incomes suggest greater financial stability, which can translate to increased access to resources necessary for coping with extreme heat. Similarly, areas with a higher percentage of tree canopy coverage tend to experience lower temperatures compared to those with less greenery.

Findings from exposure and adaptive capacity assessments highlight the current distribution of heat-related risks across the county. Areas with higher levels of urbanization and lower adaptive capacity, characterized by limited tree canopy coverage and lower median incomes, are more susceptible to extreme heat events.

Locations east of US-19, Dade City and the greater Zephyrhills area were found to have the highest vulnerability to extreme heat based on the exposure and adaptive capacity assessments. **Figure 7** depicts levels of extreme heat vulnerability of census block groups in Pasco County based on low, moderate, and high vulnerability.

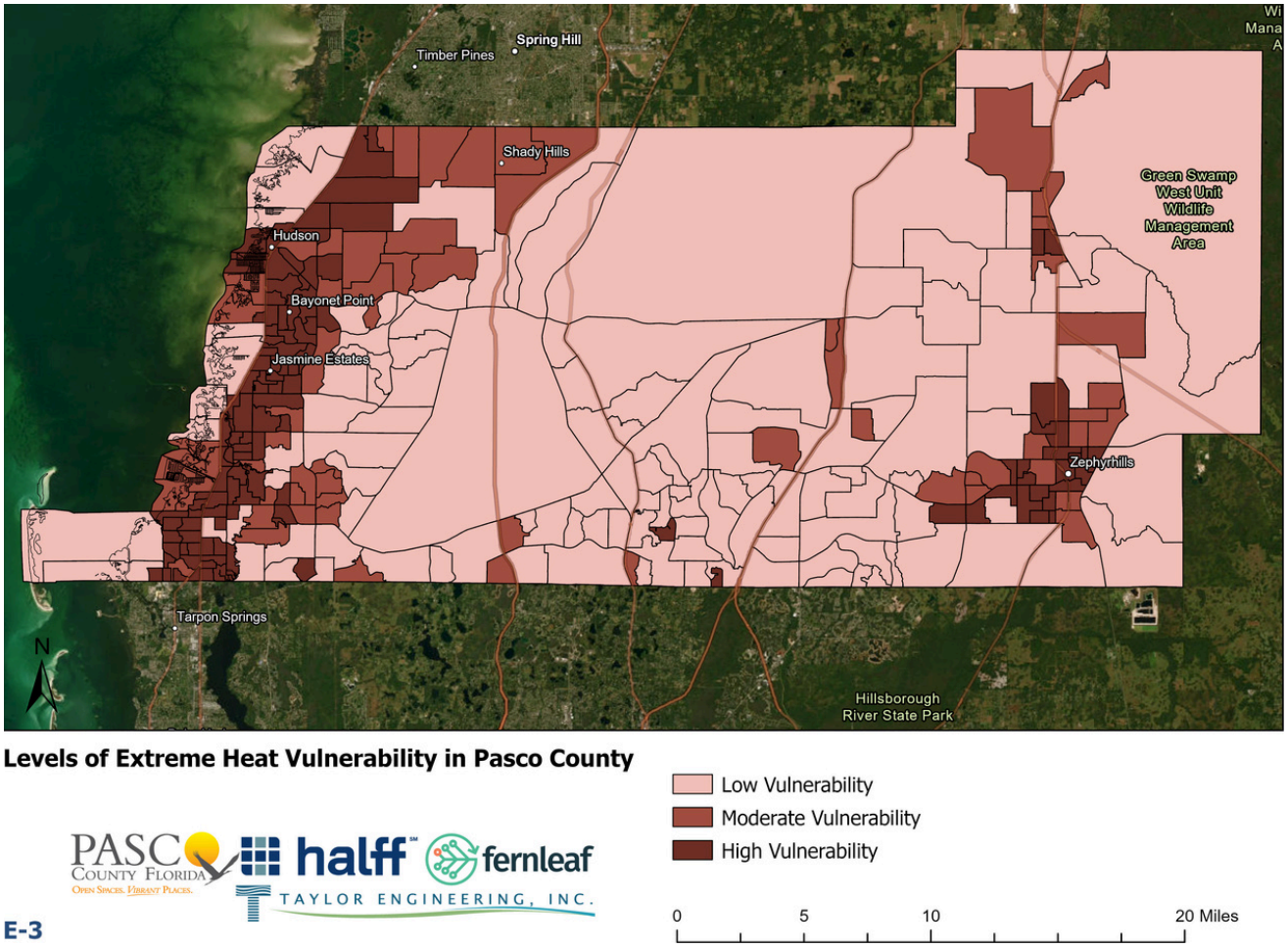


Figure 7. *Levels of Current Extreme Heat Vulnerability in Pasco County (Source: Fernleaf, 2024).*

FOCUS AREAS

The Resilient Pasco Project delineated and mapped the spatial boundaries of three focus areas, including: the West Market Area; the Greater Zephyrhills Area; and Land O' Lakes Area. Each focus area considered the respective hazard components applicable to current and future coastal flooding, extreme heat, and inland flooding in relation to the location's social vulnerability. Focus areas and sub-areas will be further analyzed to evaluate specific mitigation and adaptation strategies in the Resilience and Sustainability Action Plan.

The West Market Area plays an important role in Pasco County's development strategy, as outlined in the Comprehensive Plan. This area, nestled along the Gulf of Mexico shoreline, is comprised of thousands of public, residential, and commercial properties. Storm surge and tidal flooding are primary concerns to communities in this area. Sub-areas applicable to Holiday, Aripeka-Sea Pines, and Jasmine Estates were further delineated to provide neighborhood-scale insights. These were selected based on their relatively high social vulnerability index and exposure to climate hazards studied in this assessment.

Land O' Lakes was selected as a focus area for inland flooding due to the expansive sections of wetlands and conservation lands, all of which are prone to flooding. The watershed is also supported by the Cypress Creek Preserve which covers a large portion of the land mass in Land O' Lakes. These significant water features provide multiple benefits to the community including climate regulation and resource access but can also create increased risk to flooding during heavy rainfall events.

The greater Zephyrhills area was identified as a focus area for extreme heat vulnerability to more closely examine the impacts of extreme heat on a local level. Located in central Pasco County, the area is largely residential suburban and mixed-use commercial, with parts of the area lacking green space. This lack of green space is a contributing factor to urban heat island effect and adds to the exposure risk from extreme heat.

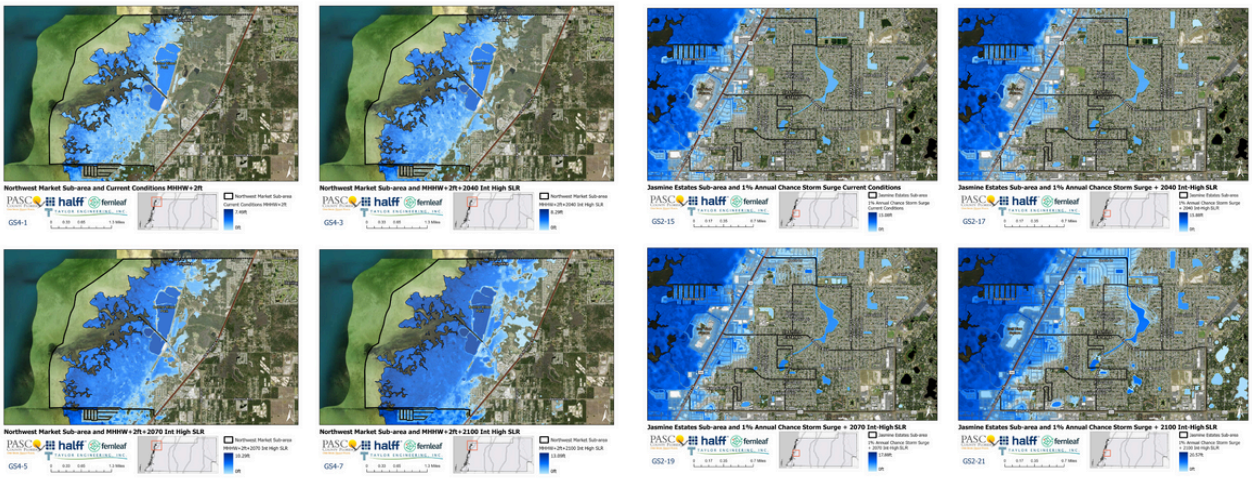


Figure 8. *Example Focus Area Maps Depicting Tidal Flooding (Left) and Storm Surge (Right) Across Current Conditions, 2040, 2070, and 2100 (Source: Fernleaf, 2024).*

NEXT STEPS

As the Resilient Pasco Project moves forward, several critical next steps will ensure the effectiveness and applicability of findings to local conditions.

By diligently pursuing these next steps, Pasco County will strengthen its ability to proactively address risks and vulnerabilities, foster community resilience, and adapt to the challenges posed by a changing climate.

Next steps will include:

Collaboration and Engagement: The project will actively engage elected officials, county staff, municipalities, community groups, and the general public to raise awareness and integrate local inputs throughout the assessment process. Collaboration with stakeholders will ensure that the assessment outcomes reflect the diverse needs of Pasco County residents.

Development of Resilience and Sustainability Action Plan (RSAP): Pasco County will leverage the final assessment findings and the AccelAdapt vulnerability assessment platform to prioritize resilience and climate adaptation planning efforts county-wide.

In each of these steps, mapping and analysis outcomes will be referenced to verify that strategies identified are informed by the best available data. **Figure 9** provides an example mapping product made possible through the R&VA, depicting the flood exposure of critical community and emergency facilities to storm surge.

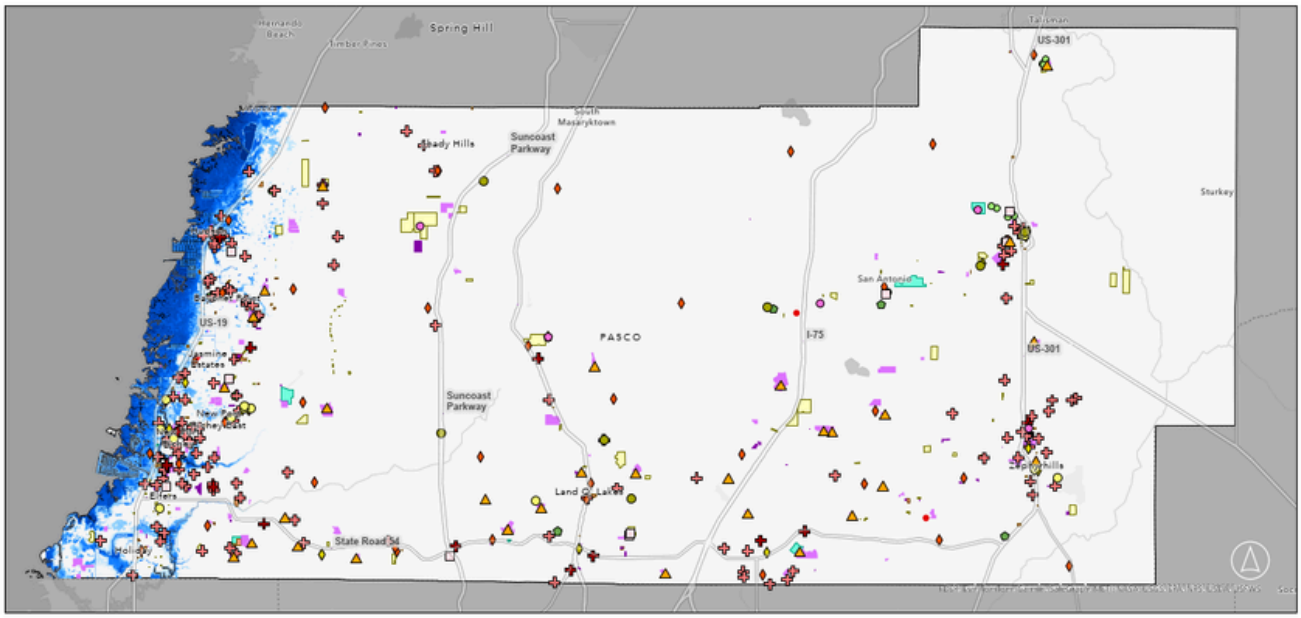


Figure 9. *Example Exposure Map Depicting Vulnerabilities of Community and Emergency Facilities to Current Conditions 1% Annual Chance Storm Surge (Source: Fernleaf, 2024).*

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