

Charleston County Multi-Hazard Vulnerability Assessment

Resilience & Sustainability Advisory Committee

June 10, 2025

Stephen Julka



Project Approach

- **Coordination with Chief Resilience Officer**
- **Workshops (8 in person - 7 virtual)**
 - County Staff and Input
 - Community Focus Group
 - Department Heads
- **Council & Committee Updates**
 - Resilience & Sustainability Advisory Committee
 - County Council
- **Staff Training**
- **Final Report & Brief**



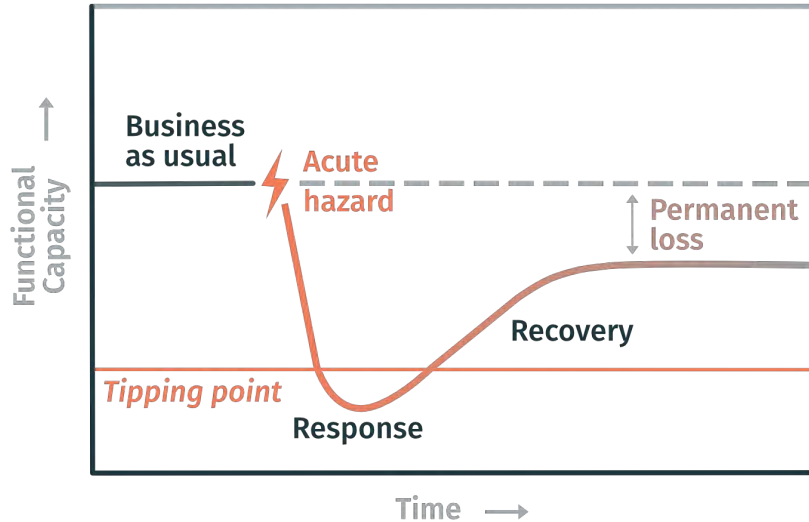
Steps to Resilience

- From the US Climate Resilience Toolkit
- Applied in State, regional, county, municipal planning
- Risk assessment and management framework
- Supported by resources and decision support tools

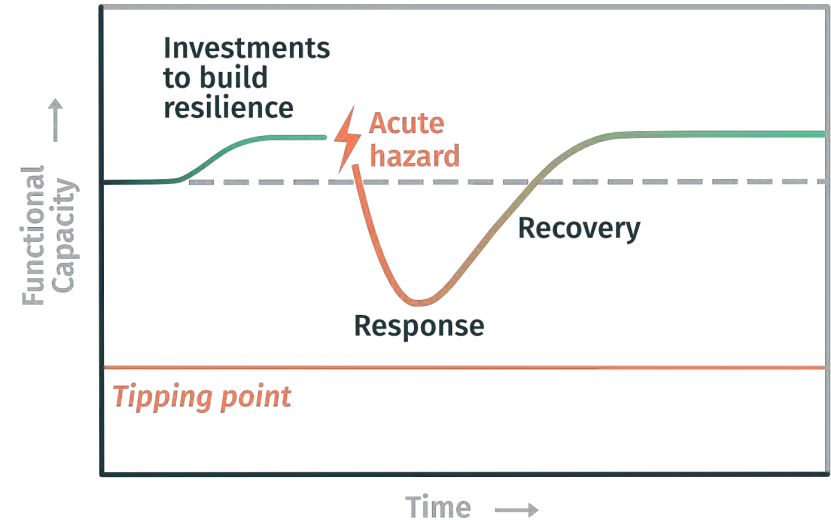


What is Climate Resilience?

Less Resilient



More Resilient

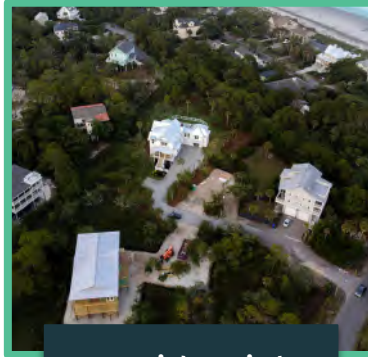




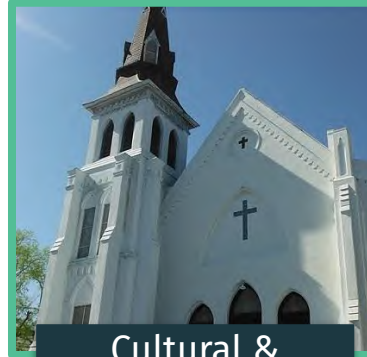
All three homes are **exposed** to flooding,
but their level of **vulnerability** varies.

People & Community Assets

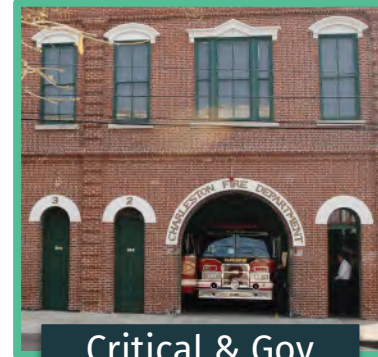
Assets are the tangible things and intangible things people or communities need and value. This includes people, resources, ecosystems, infrastructure, and services.



Residential



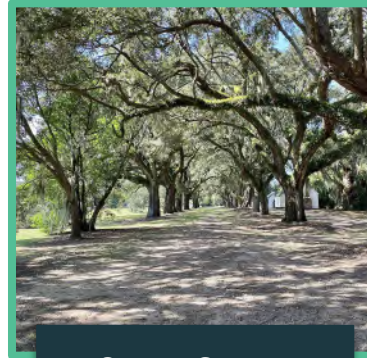
Cultural & Community



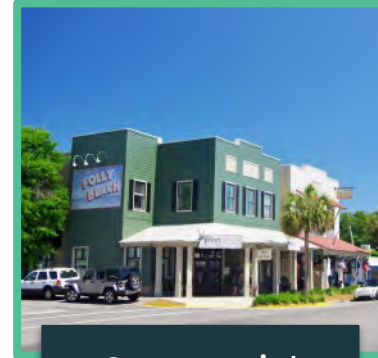
Critical & Gov
Owned



Industrial



Open Space



Commercial

Hazards

Events or conditions that may cause injury, illness, or death to people or damage assets.



**Current and Future
Flooding**
(Tidal, Coastal Surge,
Riverine, Stormwater)



**Extreme
Heat**



Wildfire



Earthquake



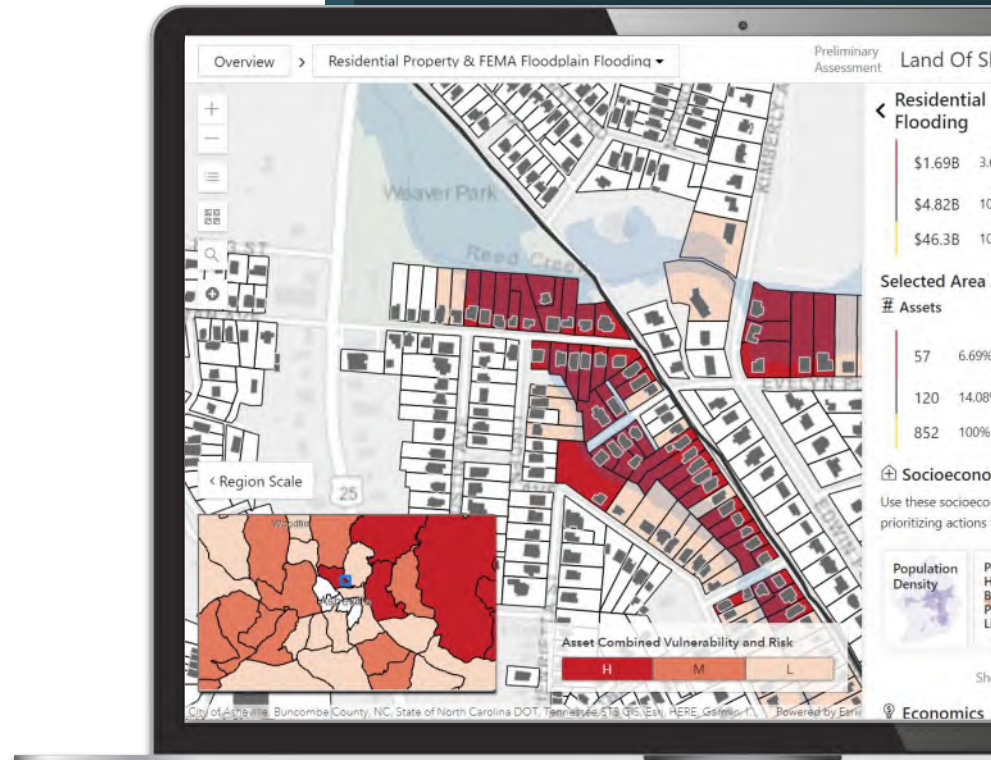
High Winds

Flood data sources include: USGS, FEMA, NOAA, Woodwell Research Center)



AccelAdapt provides web-based interactive vulnerability and risk insights designed for **action**.

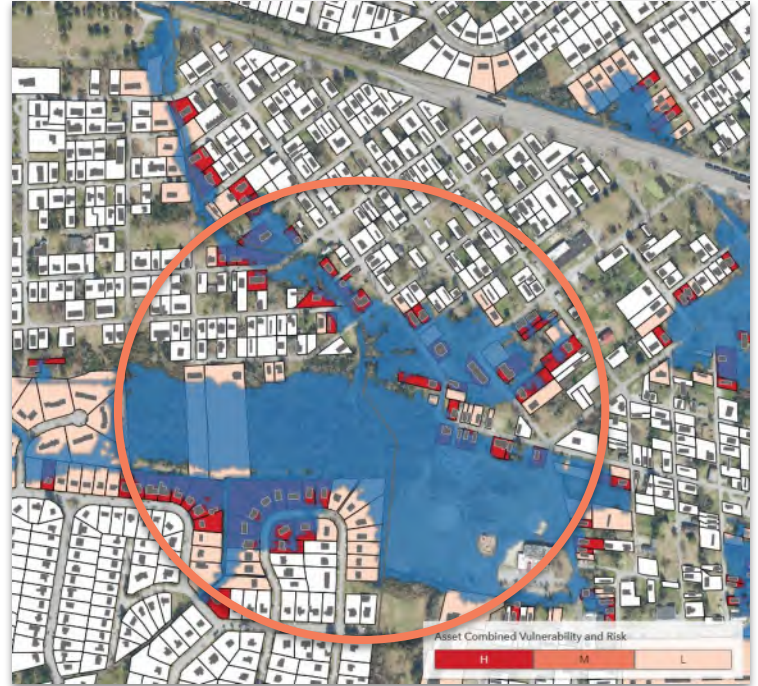
- Quantitative results
- Socioeconomic information
- Regular updates
- Compatible with ArcGIS
- Flexible, scalable



Site Selection for Nature-Based Solutions

Team identified opportunity
to address:

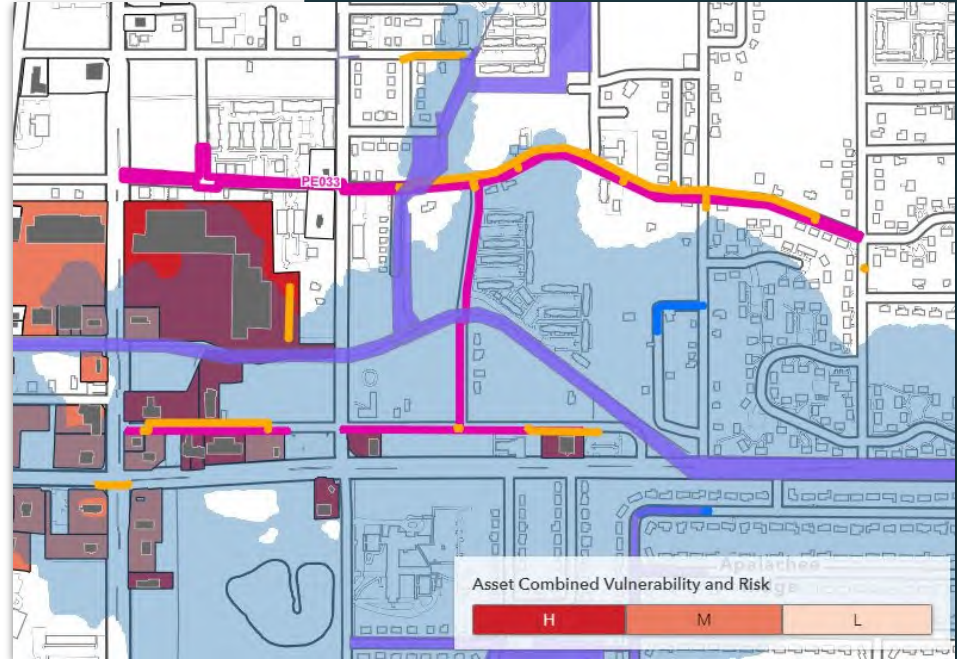
- Increasing tidal flooding and floodplain inundation risk
- Protection of homes and community services in an underserved community



Platform for Inter-departmental Collaboration

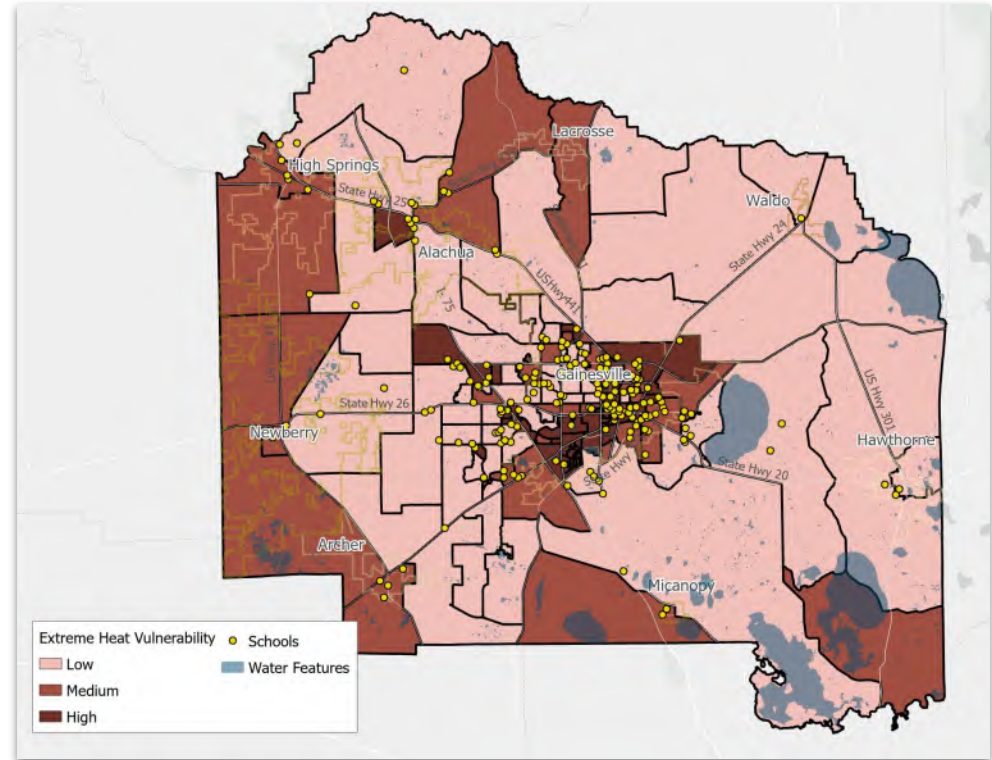
Project Coordination with a Resilience Lens

- Stormwater
- Electric/Gas
- Streets/Sidewalks
- Water/Sewer

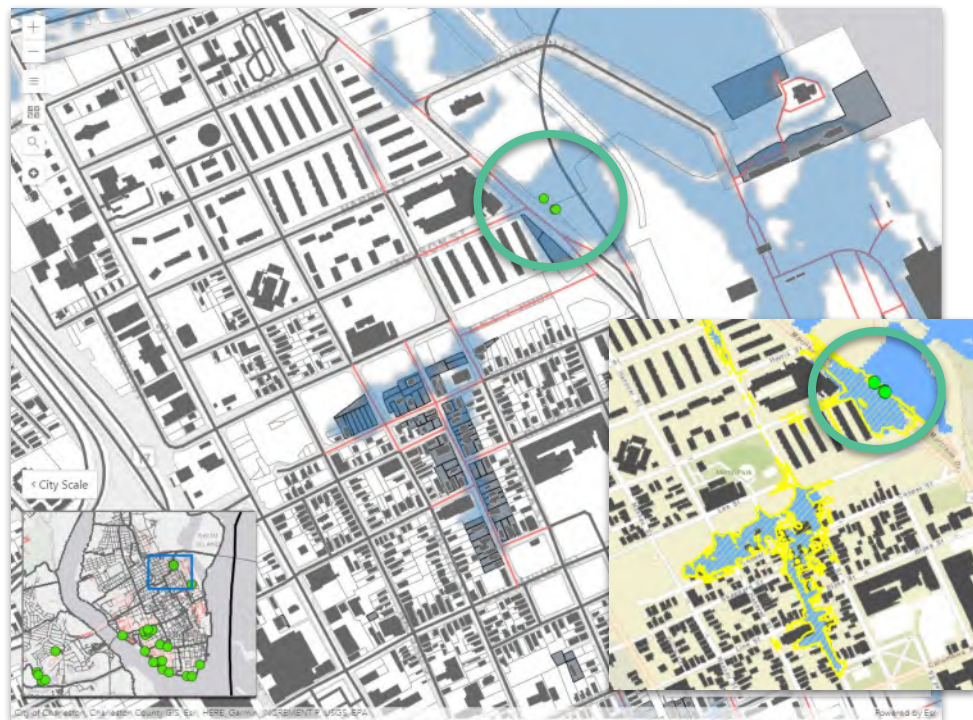


Actionable Insights

About **a quarter** of public and private school properties and day cares are located in highly heat vulnerable areas.

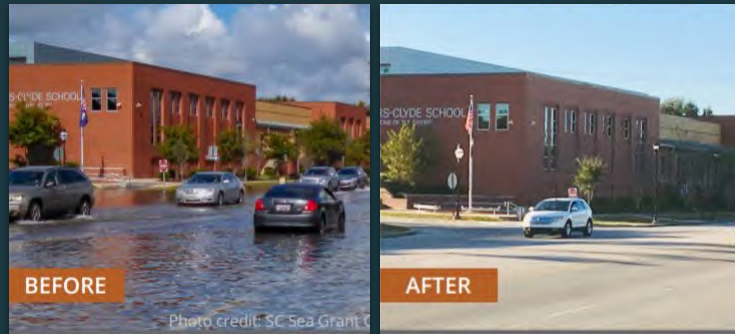


Communicating Project Benefits



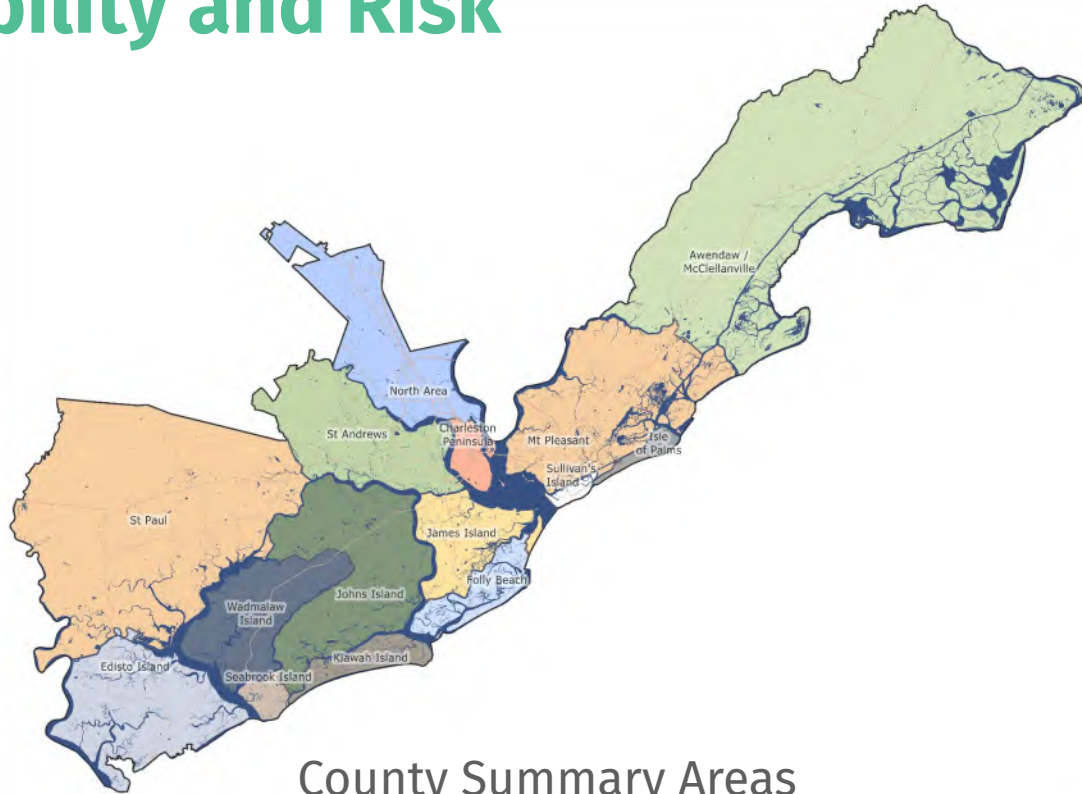
Tidal flooding reduction from 3 check valves:

- 50% of Churches
- 20% of Public Housing
- 10% of Critical Facilities



Quantified Vulnerability and Risk

- Report provides vulnerability and risk data and a summary of findings
- County-wide for all hazards and community assets
- 15 individual planning area summaries



County Summary Areas

Multi-hazard Findings

- More than 35,000 properties are vulnerable to high wind due to structures constructed before wind-design requirements
- More than 5,000 properties are in zones susceptible to earthquake. About half of these were constructed before the 1886 earthquake.
- About 18,000 properties are vulnerable to potential for wildfire
- Many community assets have multi-hazard vulnerabilities (especially for flooding, wind, earthquake)
- Road access is a critical vulnerability for flooding and wildfire
- The 20-yr flood vulnerability is close to that of the 100-yr flood vulnerability

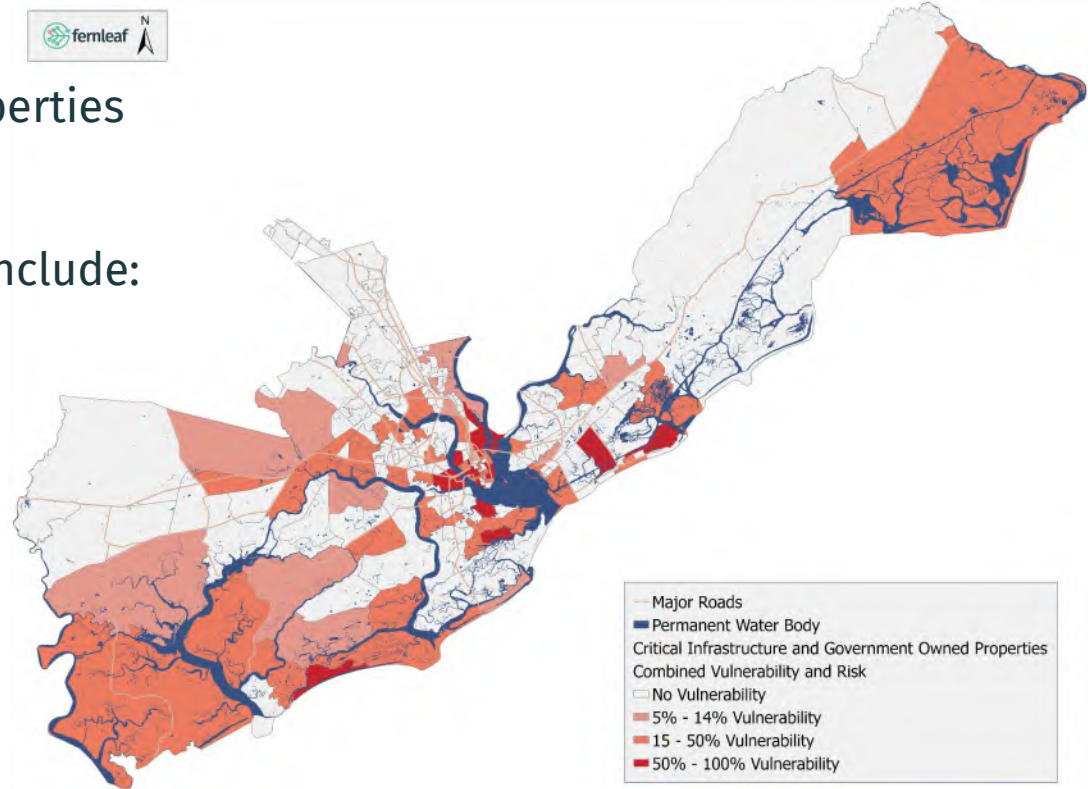
Assessment: Critical Infrastructure & 20-yr Flooding (USGS)



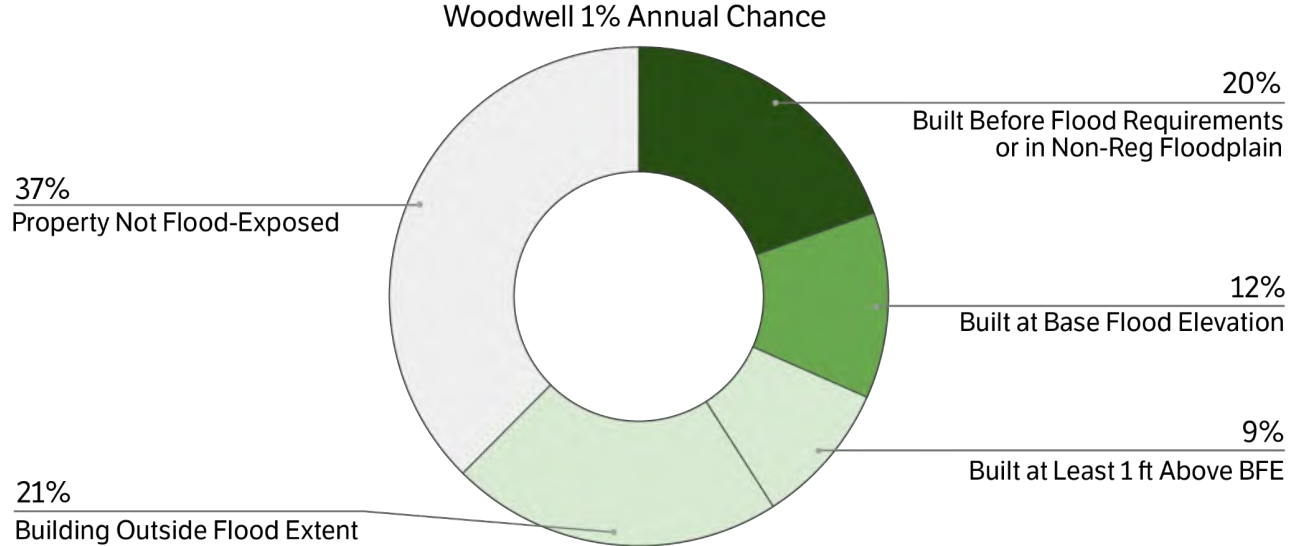
14% of critical infrastructure properties are **vulnerable** county-wide

Example types of infrastructure include:

- Schools
- Communications
- Police/Fire/EMS
- Hospitals
- Pump/lift stations



Key Takeaway: Flood Vulnerability Outside of Regulatory Floodplain



20% of all properties in the County are not elevated.

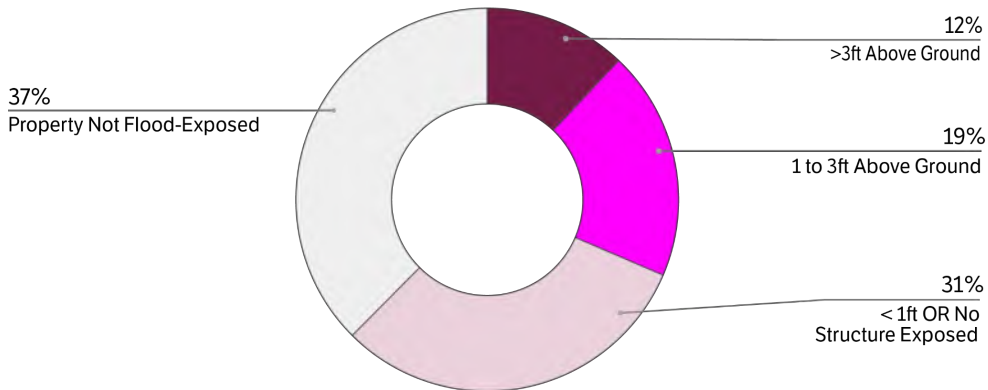
Key Takeaway:

Future Flooding Will Increase in Severity

The number of properties with potential for 3 ft of flooding will **more than double** with 2.5 ft of sea level rise.

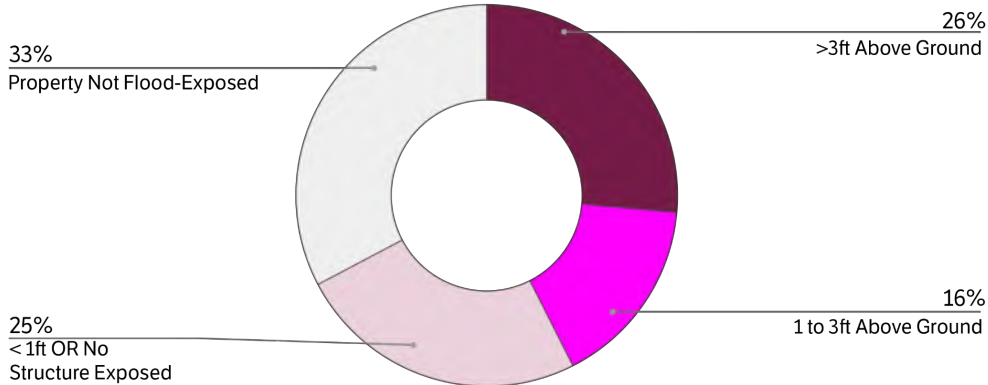
Risk Consequence | Woodwell Current 1% Annual Chance

Depth of Flooding

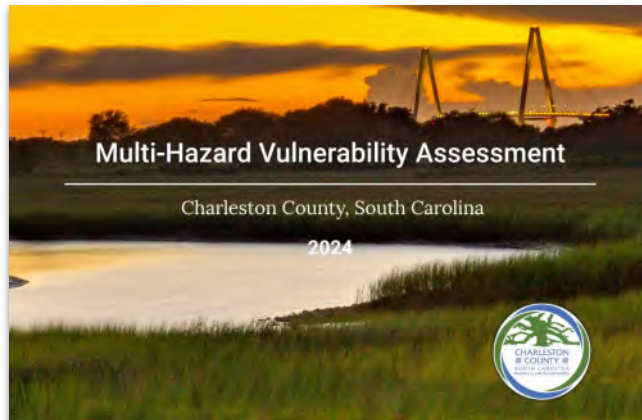


Risk Consequence | Woodwell Future 1% Annual Chance

Depth of Flooding



Final Report and Resources



Preliminary Strategies and Actions

Strategies List

- S01 Programmatic Approach to Flood Mitigation
- S02 Collaborative Easement Acquisition Process
- S03 Drainage System Maintenance
- S04 Emergency Services Planning
- S05 Extreme Heat Planning
- S06 Resilience of County-Owned or Managed Properties
- S07 Climate Resilient Brownfields Redevelopment
- S08 Local Resilience Fund
- S09 Structured Resilience Governance
- S10 Resilience in Codes and Guidance
- S11 Stormwater Special Protection Areas

Strategies & Actions

Appendices

Appendix A: Complete Flood Hazard Assessment Findings

SOCIAL STRESSORS AND DISPROPORTIONATE IMPACTS

In Charleston County, the CEJST identifies 22 disadvantaged census tracts (Figure A-6). The central region, stretching from Lenoirville down the neck of the Peninsula, shows a concentration of disadvantaged communities, with over half of the tracts in this section of the county facing significant burdens in one or more categories. Nearly all tracts in this area experience four or more of the eight burdens. One census block, just north of Union Heights, stands out as having all eight burdens, highlighting the severity compounding social stressors in this area. Health disparities in this tract include high rates of asthma (90th percentile), diabetes (88th percentile), and heart disease (90th percentile), and low life expectancy (90th percentile). Environmental concerns are also present, with proximity to superfund sites (90th percentile) and exposure to toxic wastewater discharge (90th percentile).

Four tracts in the western part of the County, covering Edisto Island, Wadmalaw Island, Adams Run, Hollywood, Murrelet, Blenheim, and Rockville are identified as disadvantaged for transportation based on the average relative cost and time spent commuting for work or essential services (94th percentile). Two of these tracts also have a high rate of diabetes (94th percentile). In the eastern part of the county, the census tract that includes the Towns of Jamesburg and McClellanville faces a combination of legacy pollution from a former military training site, transportation barriers (98th percentile), and high exposure to wastewater discharge (94th percentile).

Food insecurity was identified as a significant challenge in the conversations with community partners. The Food Access Research Atlas (FARA) developed by the US Department of Agriculture provides information about food insecurity by identifying low income and low food access tracts. Tracts highlighted in Figure 22 are the most vulnerable communities in the county, with over 50% of the population living in low income, or more than 35% of the population living in low food access, or both.

Additional Findings

Flood Appendix B: Planning Area Summaries of Flood Hazards

Charleston County's 16 planning areas reflect a unique mix of urban centers, rural landscapes, unincorporated zones, coastal regions, and marshlands. Planning areas were previously designated by the County in order to recognize the diverse needs of its community, taking into account environmental factors, historical significance, and local growth trends.

Information about the vulnerability and risks for each planning area is summarized in the following pages and can be used as a reference for planners and stakeholders, helping them make informed decisions that honor the unique characteristics of each area.



Planning Area Summaries

FEMA NFHL 1% AND 2% ANNUAL CHANCE FLOODING SCENARIO

- All 6 lodging facilities (hotels, motels, etc.) are vulnerable.
- 1 of the 2 communications properties and 1 of the 2 utility properties are vulnerable.
- All vacant residential properties in Folly Beach are exposed, as well as all parcels identified as protected land.

USGS COSMOS CURRENT 1% ANNUAL CHANCE FLOODING SCENARIO

- 3 of the 6 lodging properties identified in Folly Beach are vulnerable to this threat.
- 1 communication property (owned by AT&T) and 1 utility property are vulnerable.
- 360 vacant residential properties (94%) and all but a 12% of protected land is exposed.

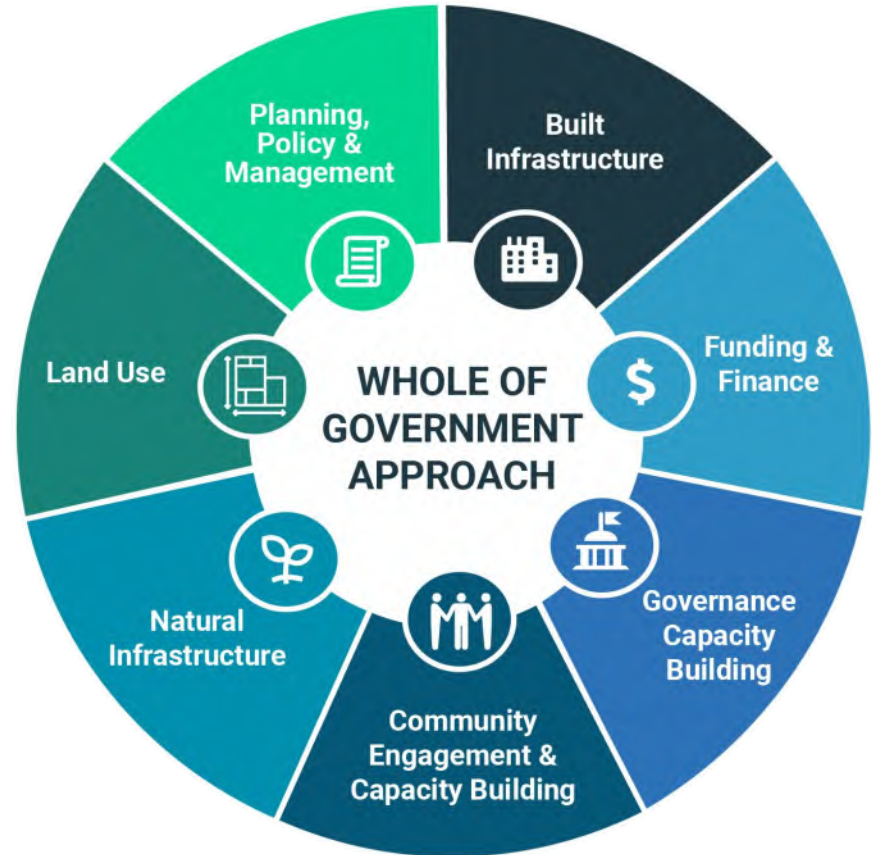
WOODWELL CURRENT 1% ANNUAL CHANCE FLOODING SCENARIO

- All but 1 lodging facility are vulnerable.
- 1 communication facility and 1 utility parcel are vulnerable.
- All but 2 vacant residential properties (12% total) are exposed and all but 1 parcel is identified as protected land.

Preliminary Strategies and Actions

Whole-of-Government Approach

- Actions within existing plans, programs, operations
- New multi-benefit strategies
- Actions that target key vulnerabilities and match the scale of the issues
- Robustness in the face of future change



Develop a programmatic approach to flood mitigation to increase efficiency and effectiveness of flood risk reduction initiatives and ultimately expand investments in flood mitigation



Ensure that County emergency services are prepared for increasing impacts from extreme flooding events by operationalizing flooding vulnerability assessments and other relevant information for planning, siting, and external coordination

Enhance resilience of and through County-owned facilities and infrastructure

Develop a systematic approach to drainage system maintenance



Develop a strategic and collaborative process for acquisition of stormwater easements to support long-term sustainability of stormwater management infrastructure

Enhance resilience of and through County-owned facilities and infrastructure

Support resilience in ordinances to ensure that future growth and development is climate-smart



Reactivate the County's Brownfields Redevelopment Program to pursue climate-resilient community revitalization in neighborhoods facing disproportionate environmental burdens

Reassess the approach to stormwater Special Protection Areas to refine objectives and leverage them as a tool to guide development intensity



Develop a collaborative and comprehensive heat education, warning, and response program with local agencies, community-based organizations, medical institutions, and state agencies



Explore and leverage diverse public and private funding, and finance sources to develop a robust local resilience fund capable of sustaining resilience investments at the pace and scale necessary to address escalating climate risks



Establish structures and processes for collaborative resilience governance and decision making



**climate smart
communities
initiative**



fernleaf

adaapta

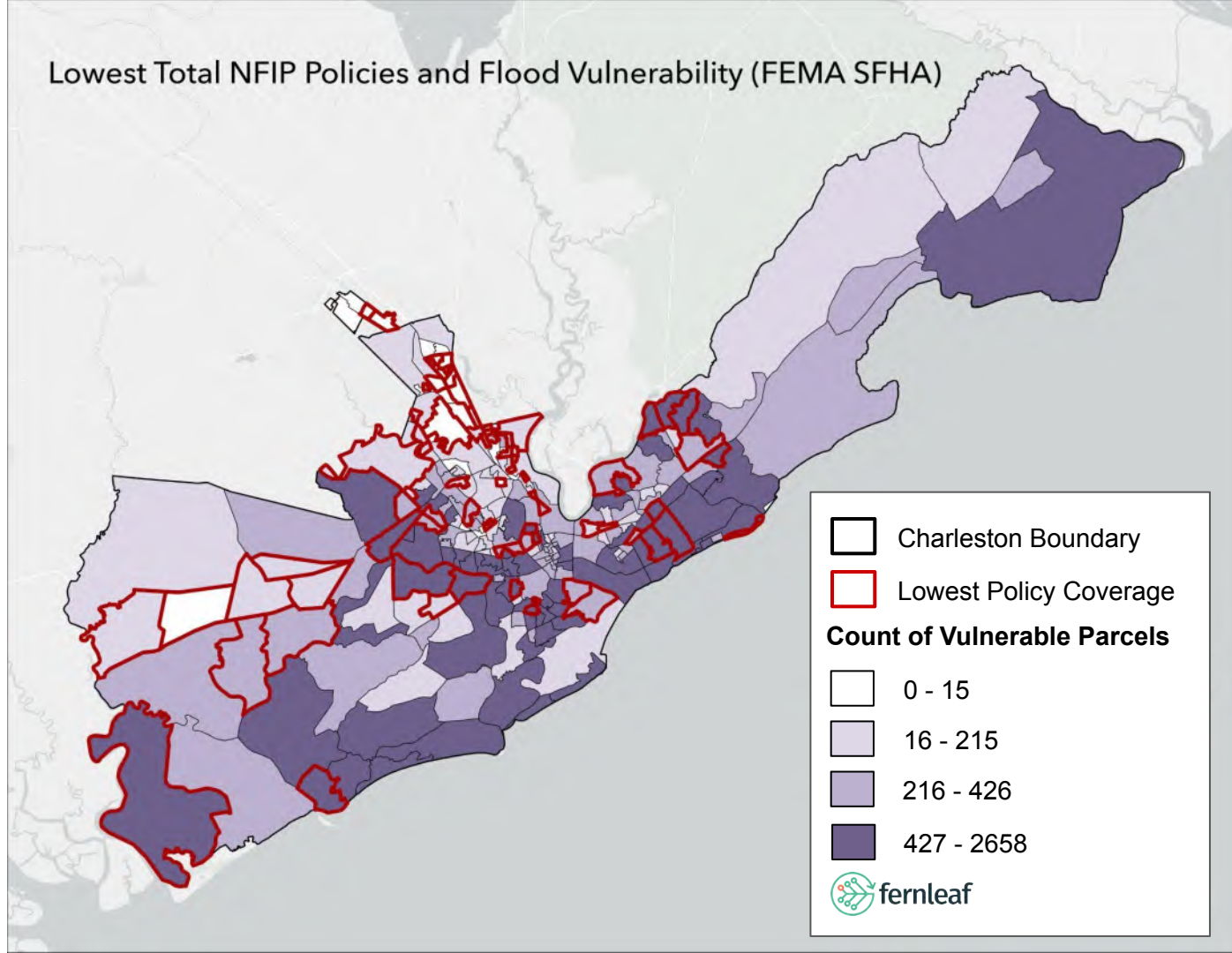


CSCI Awards More Than \$1 Million to 11 Communities

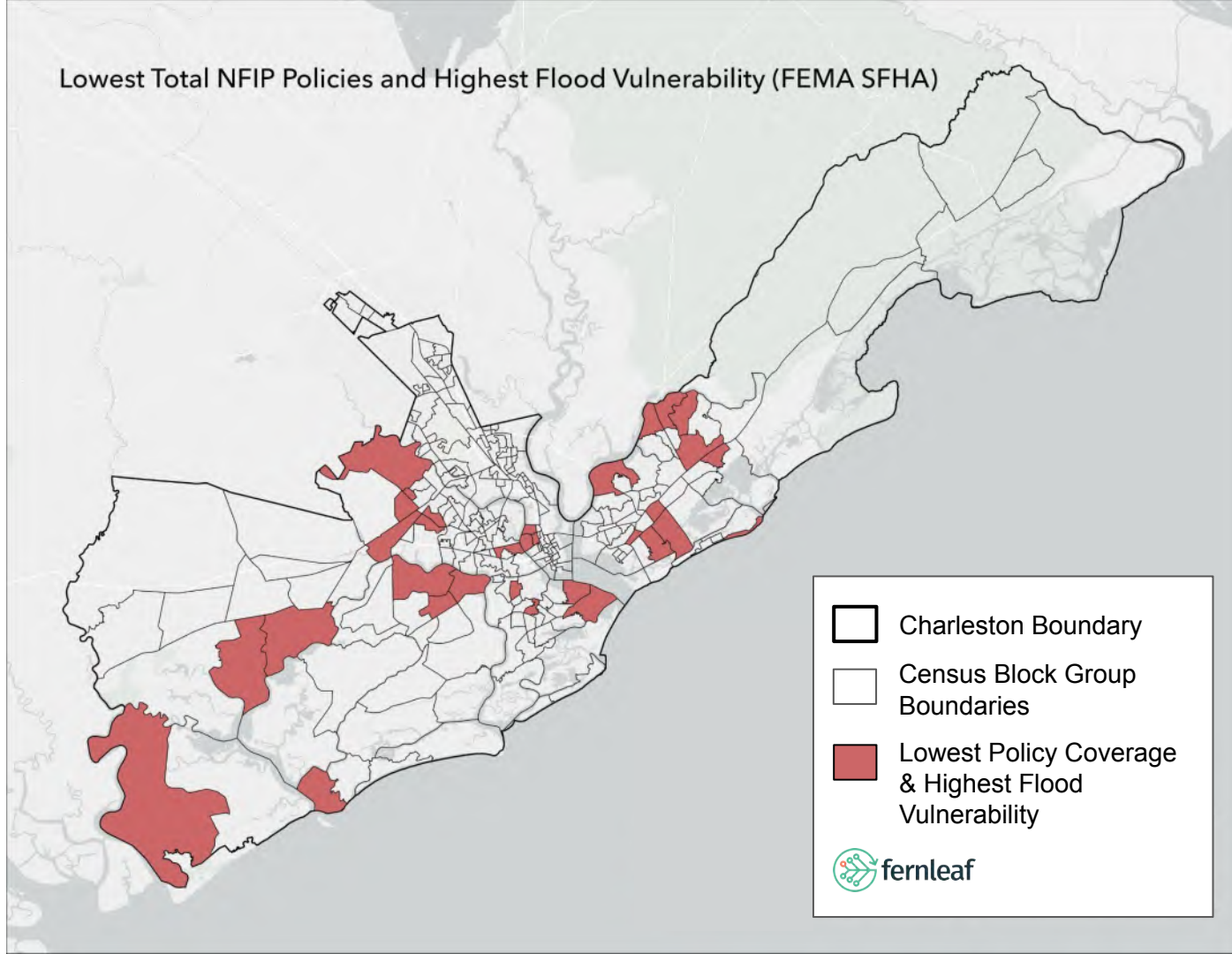
By Douglas Meyer • August 6, 2024



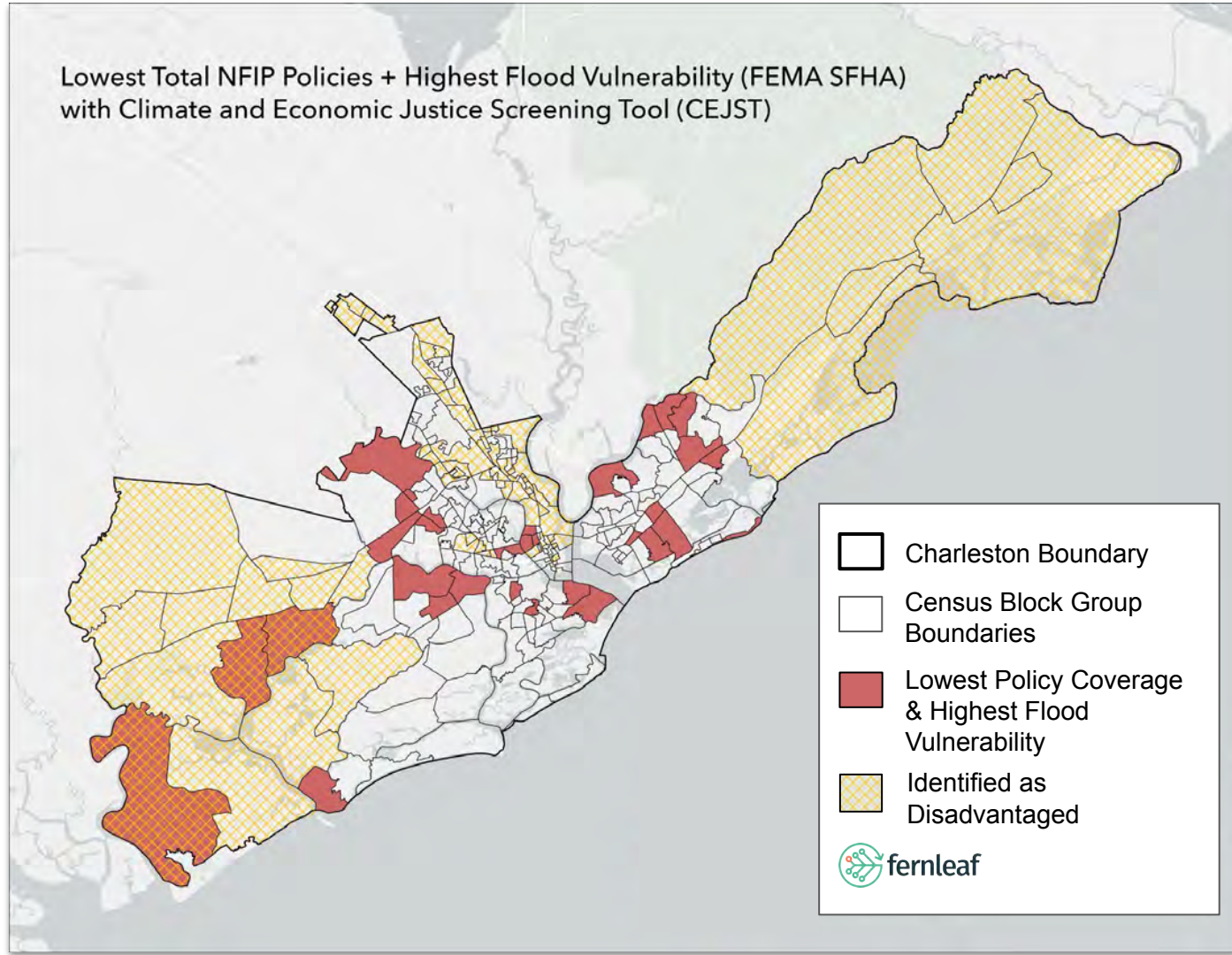
Lowest Total NFIP Policies and Flood Vulnerability (FEMA SFHA)



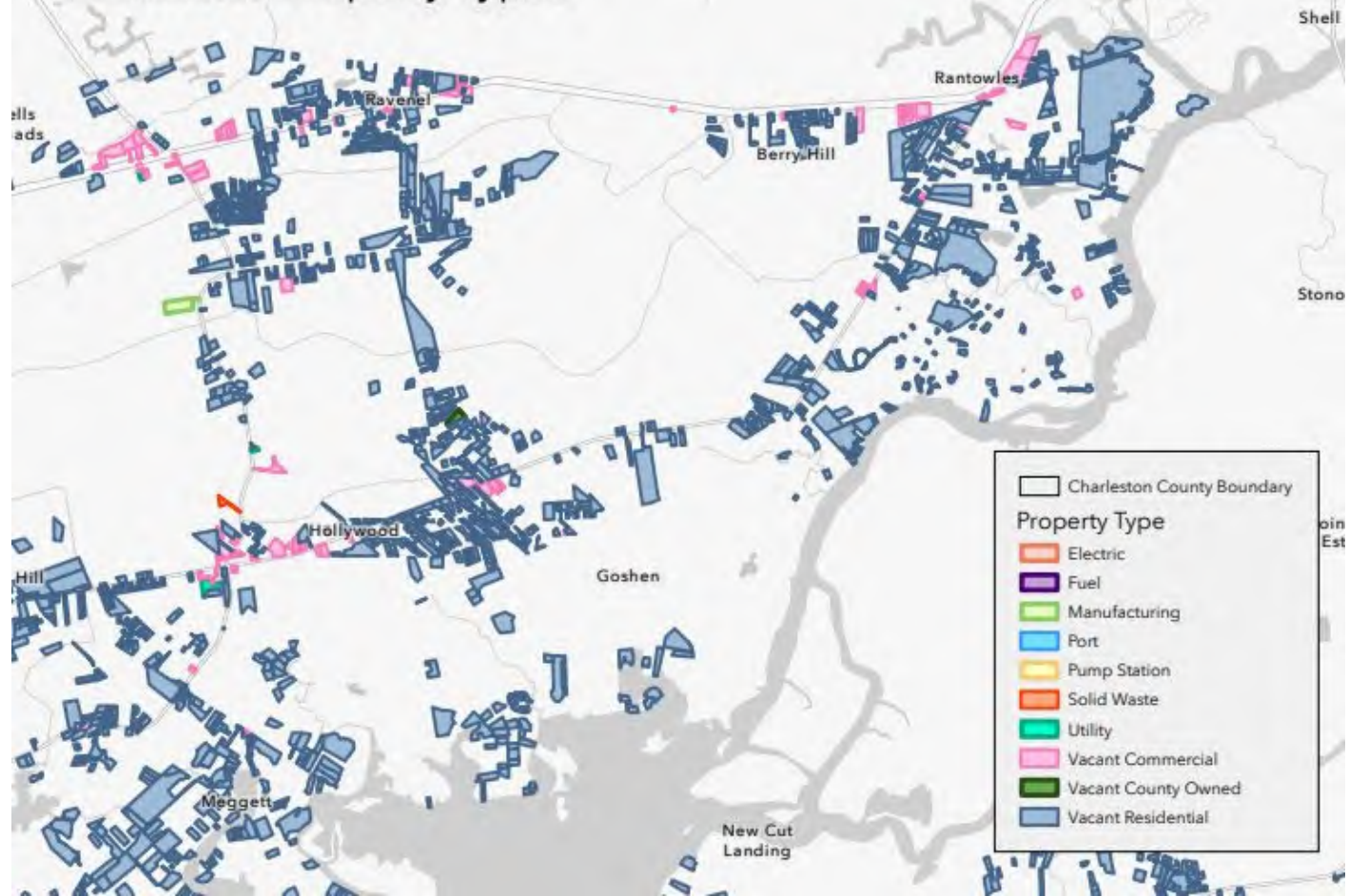
Lowest Total NFIP Policies and Highest Flood Vulnerability (FEMA SFHA)



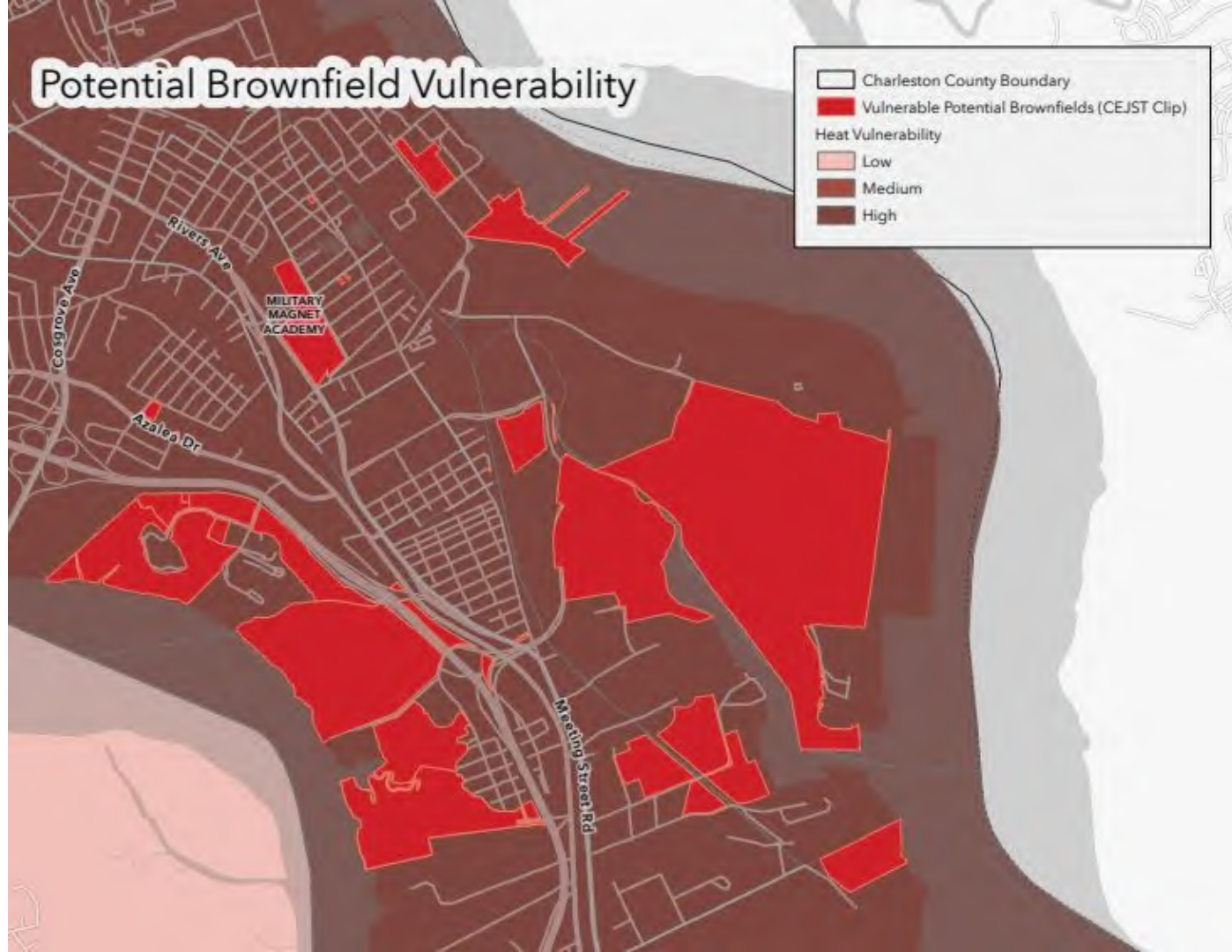
Lowest Total NFIP Policies + Highest Flood Vulnerability (FEMA SFHA)
with Climate and Economic Justice Screening Tool (CEJST)



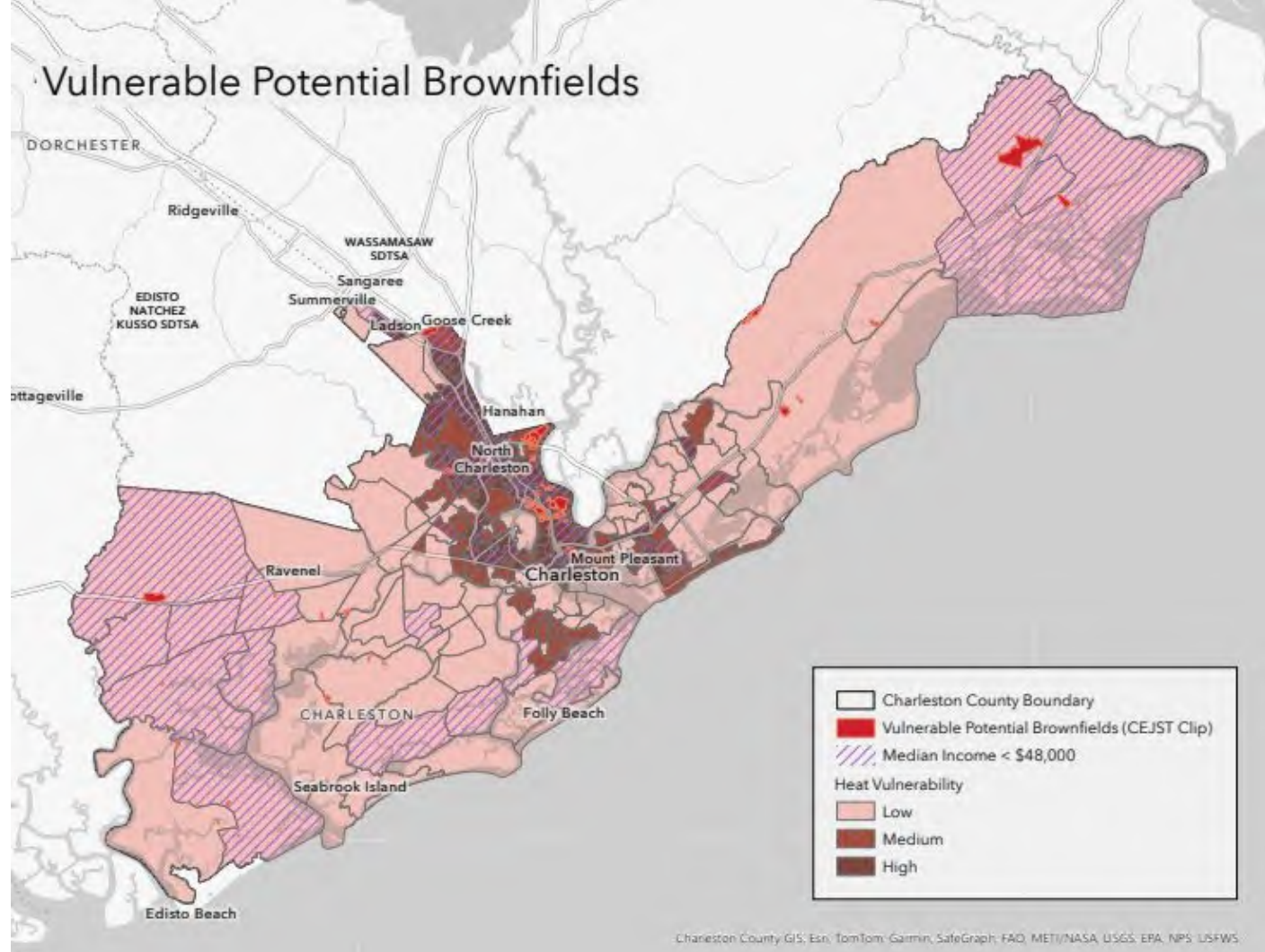
Brownfield Property Types



Potential Brownfield Vulnerability



Vulnerable Potential Brownfields



Next Steps

- Building awareness: identifying and communicating vulnerabilities
- Opportunity to incorporate the assessment into planning initiatives.
- Continued engagement with community leaders and focus group.
- Use of assessment for grant applications and funding opportunities.
- Project in County selected by the Climate Smart Communities Initiative for Fernleaf to develop a Flood Mitigation strategy (at no cost to the County).