Charleston County Multi-Hazard Vulnerability Assessment

Resilience & Sustainability Advisory Committee

June 10, 2025

Stephen Julka

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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**

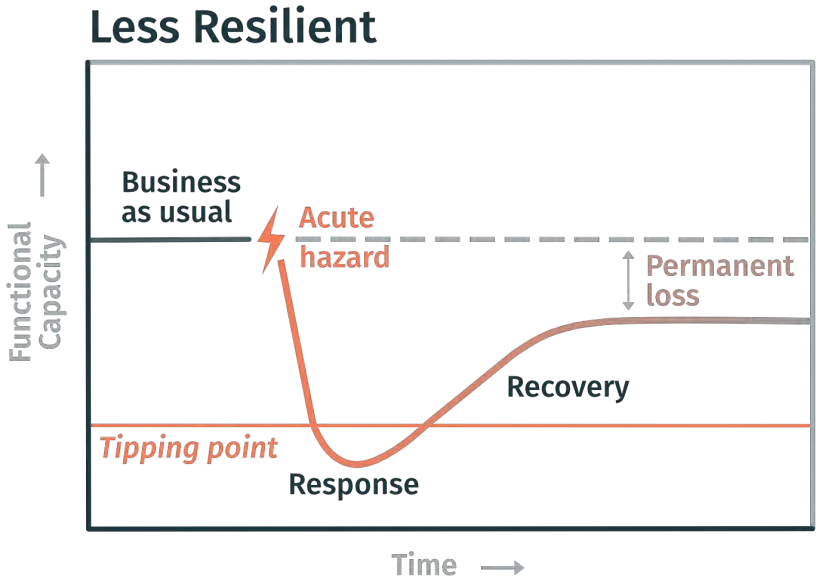
Steps to Resilience

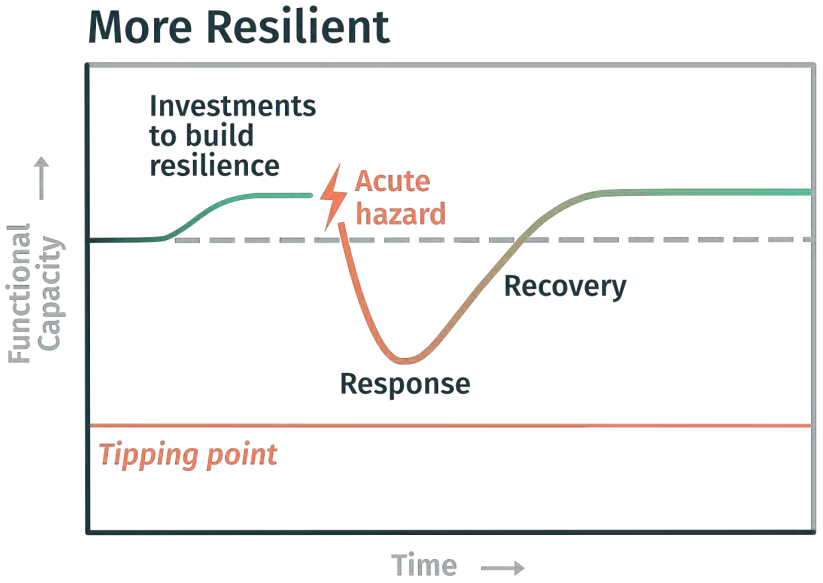
- From the US Climate Resilience Toolkit
- Applied in State, regional, county, municipal planning
- Risk assessment and management framework
- Supported by resources and decision support tools

U.S. Climate Resilience Toolkit
toolkit.climate.gov

toolkit.climate.gov

What is Climate Resilience?





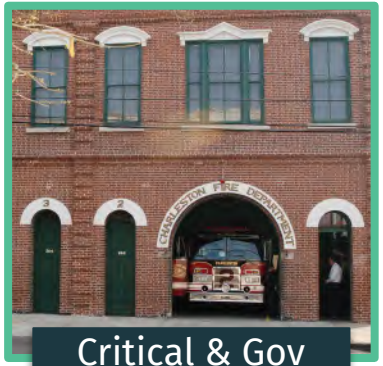
All three homes are exposed to flooding, but their level of vulnerability varies.

People & Community Assets

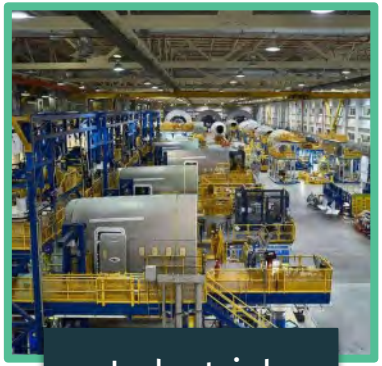
Assets are the tangible things and intangible things people or communities need and value. This includes people, resources, ecosystems, infrastructure, and services.

Residential

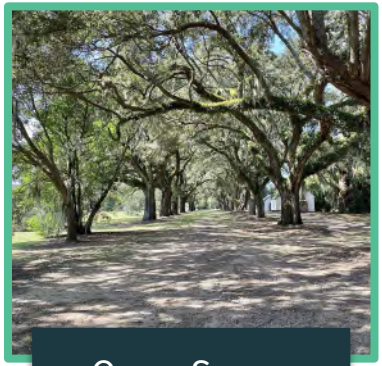
Cultural & Community



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

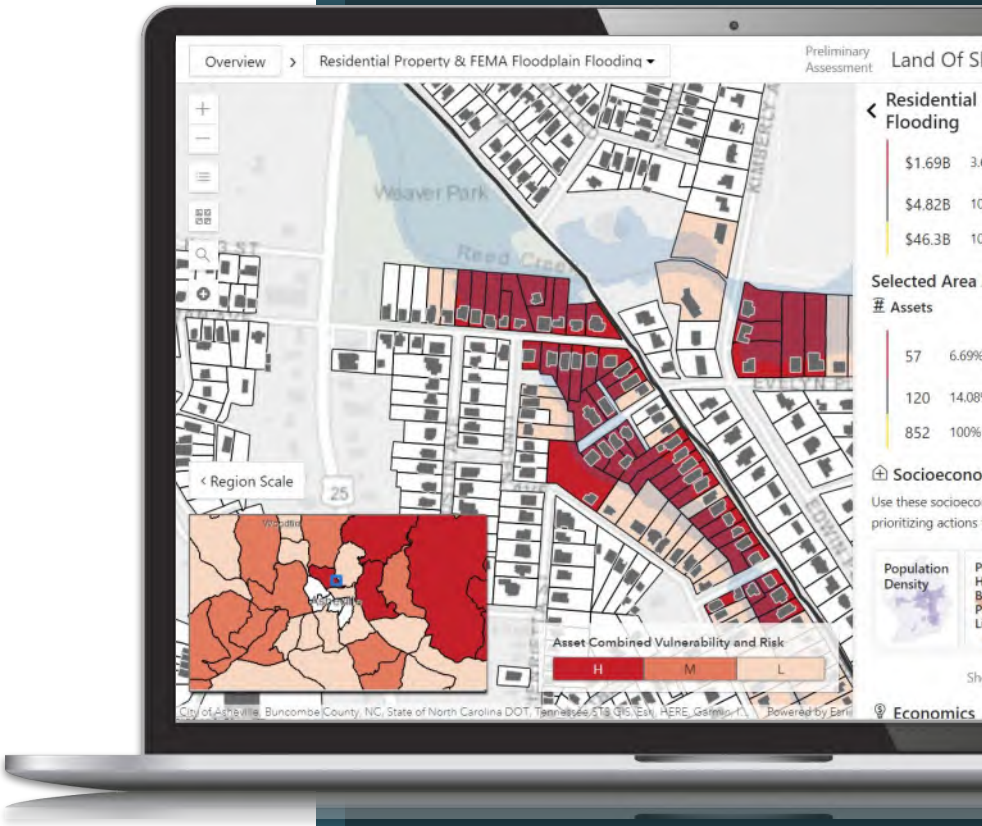
High Winds

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

acceladapt

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

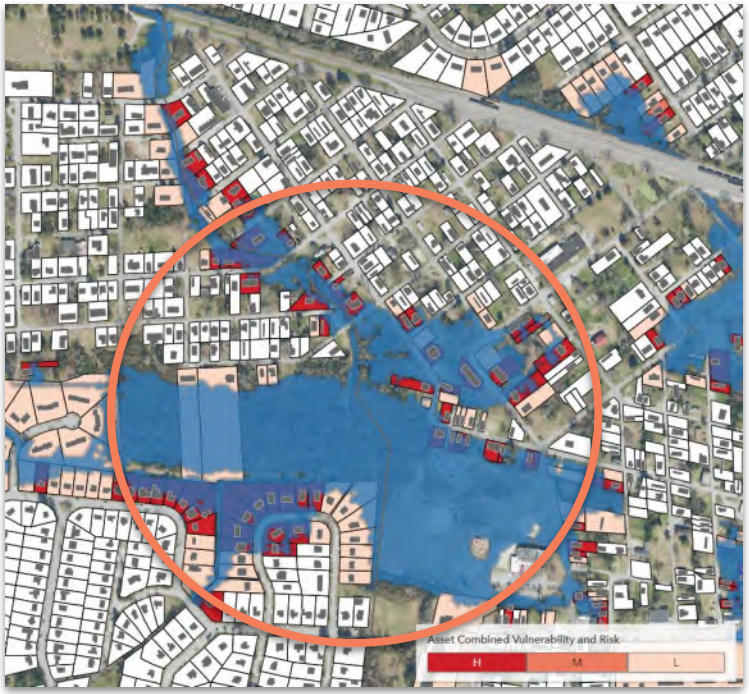
- Quantitative results
- Socioeconomic information
- Regular updates
- Compatible with ArcGIS
- Flexible, scalable



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



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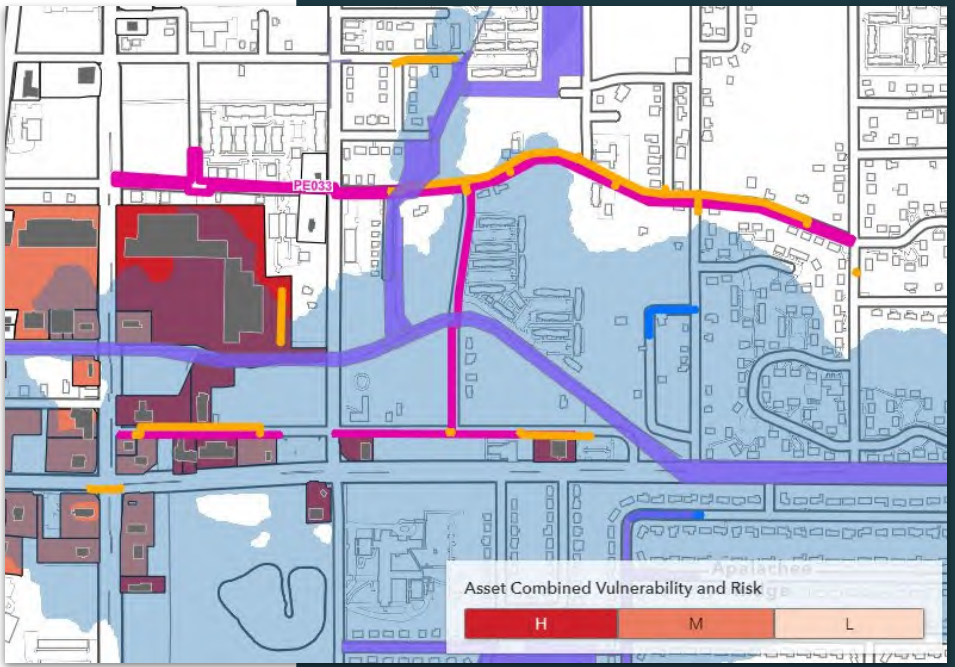
Platform for Inter-departmental Collaboration

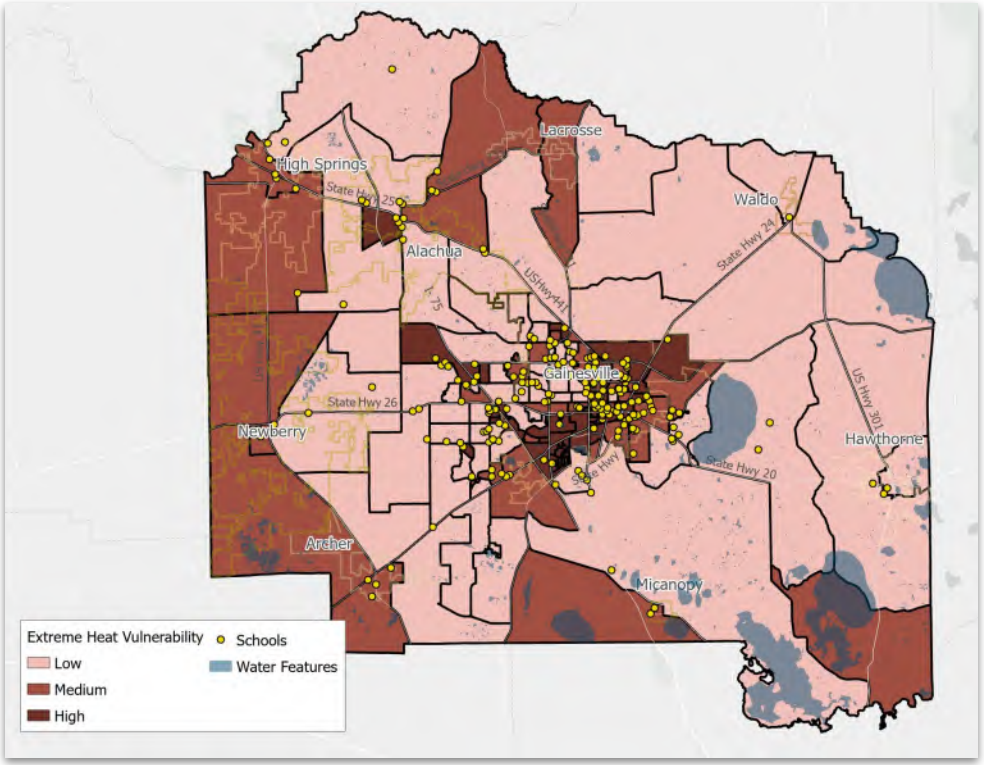
Project Coordination with a Resilience Lens

- 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.



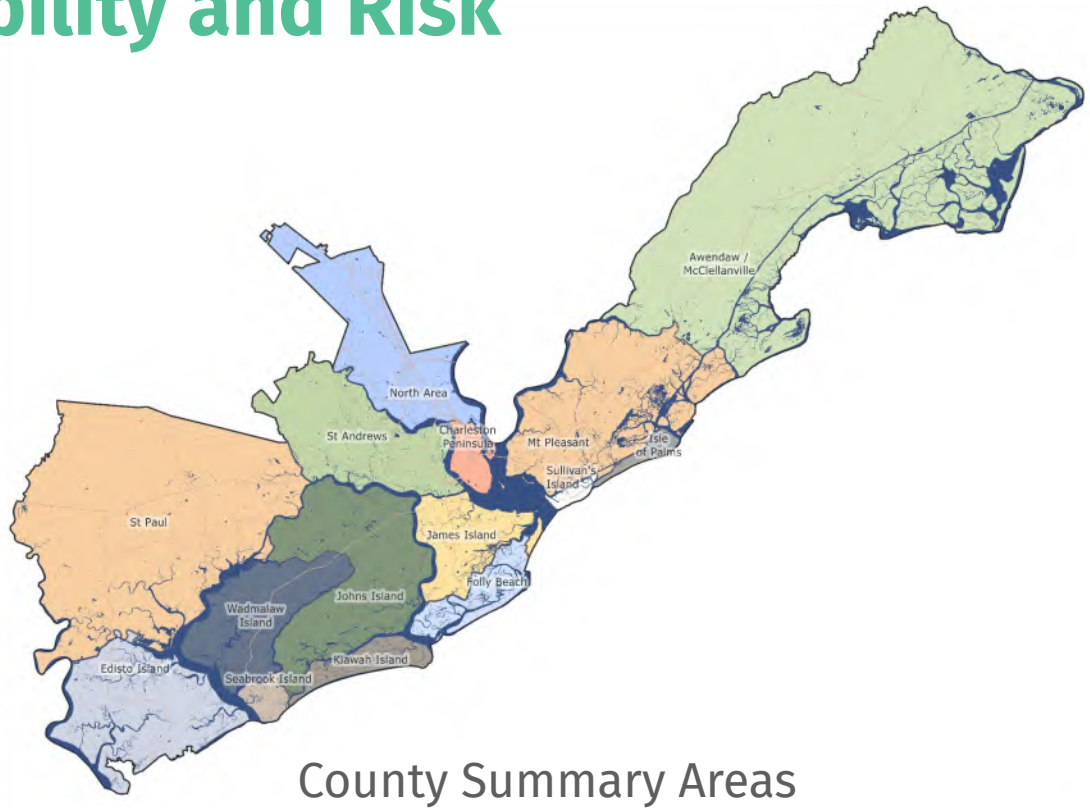
Communicating Project Benefits

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

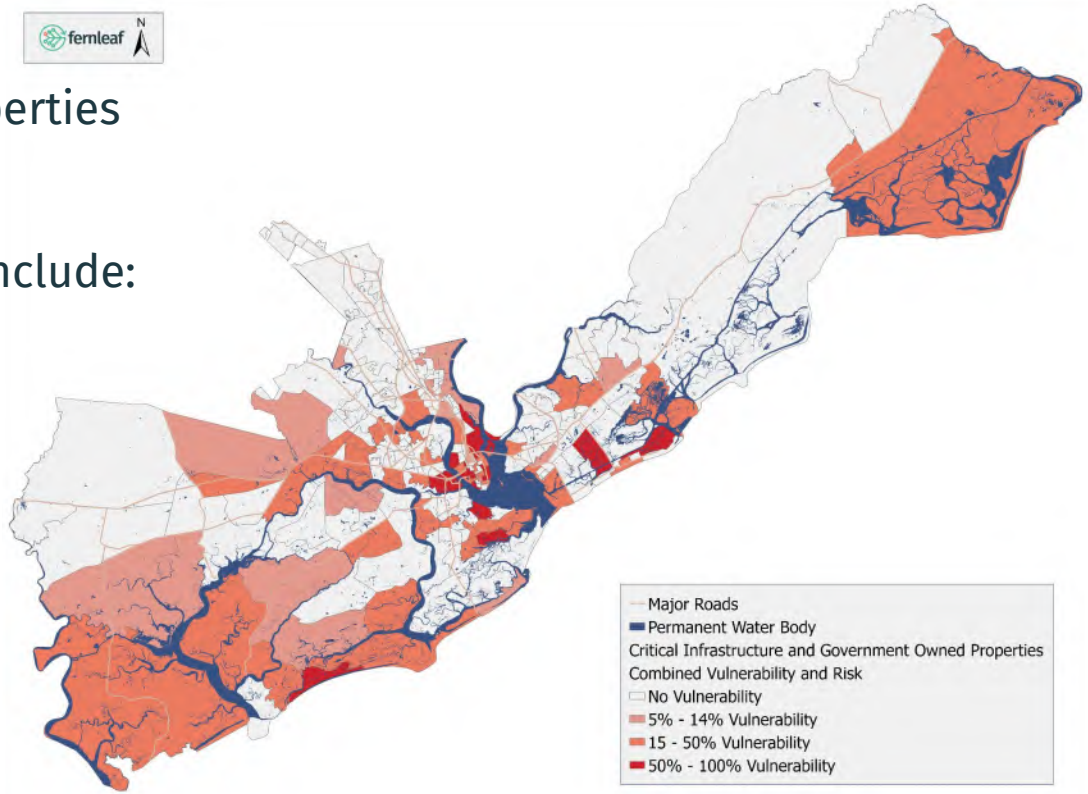
- More than 35,000 properties are vulnerable to high wind due to structures constructed before wind-design requirements
- More than 5,000 properties are in zones susceptible to earthquake. About half of these were constructed before the 1886 earthquake.
- About 18,000 properties are vulnerable to potential 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)

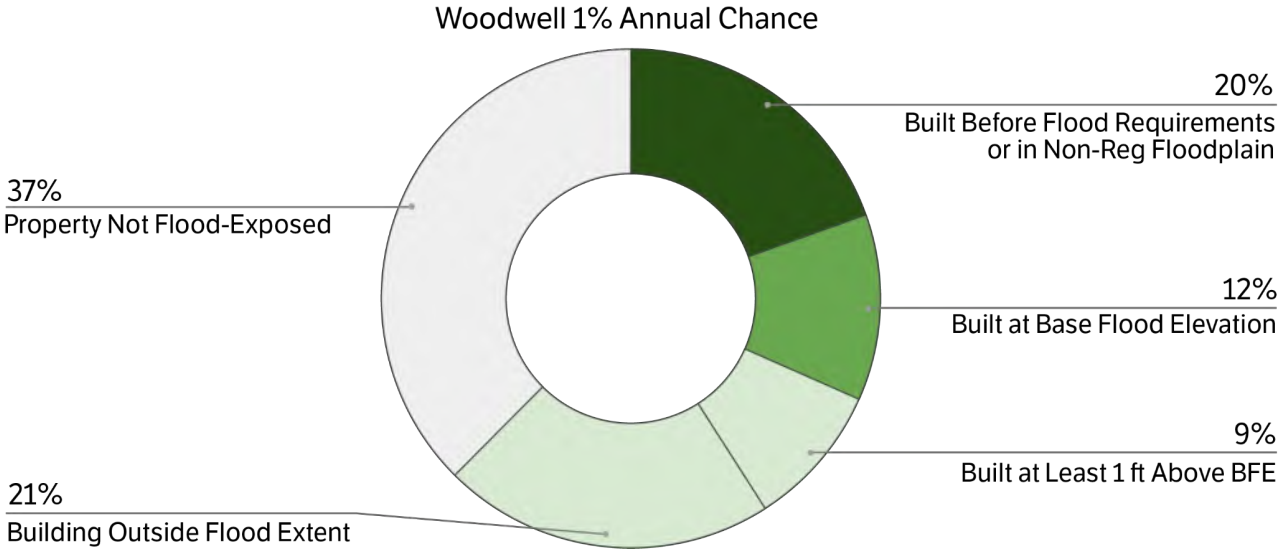
14% of critical infrastructure properties are **vulnerable** county-wide

Example types of infrastructure include:

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



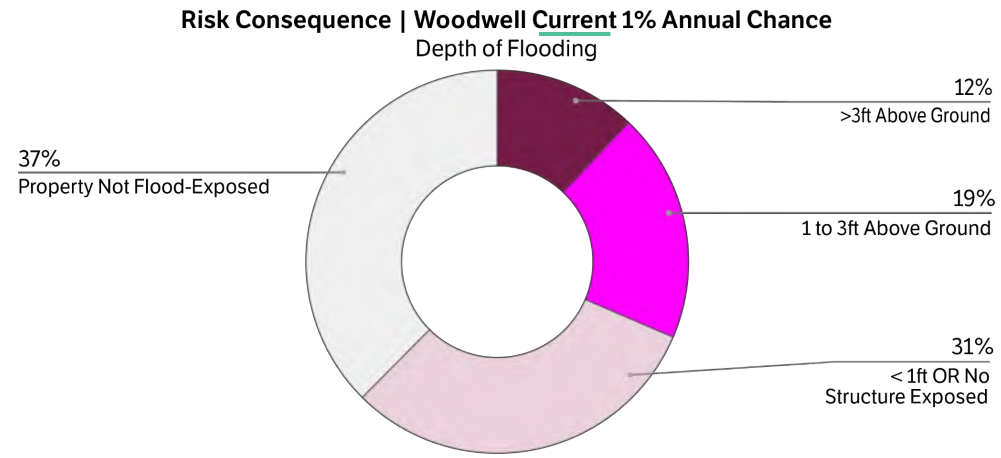
Key Takeaway: Flood Vulnerability Outside of Regulatory Floodplain

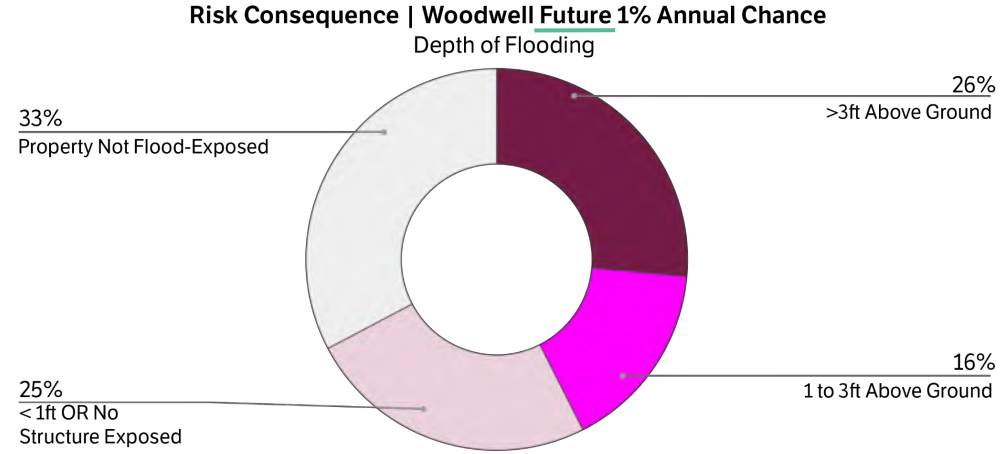


20% of all properties in the County are not elevated.

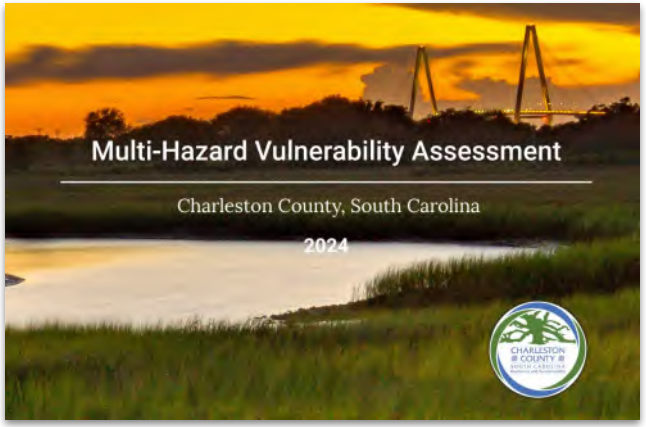
Key Takeaway:
Future Flooding Will Increase in Severity

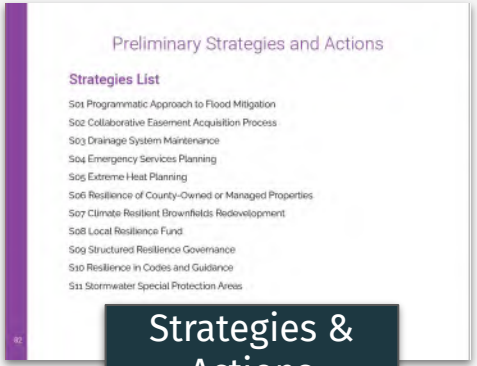
The number of properties with potential for 3 ft of flooding will **more than double** with 2.5 ft of sea level rise.



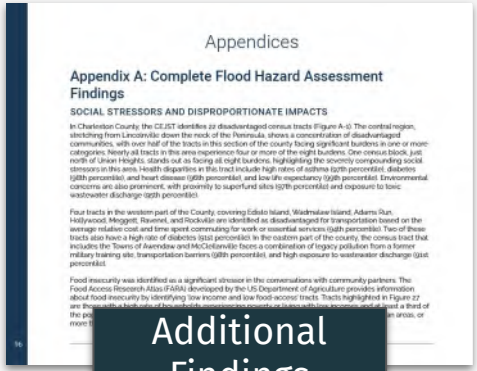


Final Report and Resources

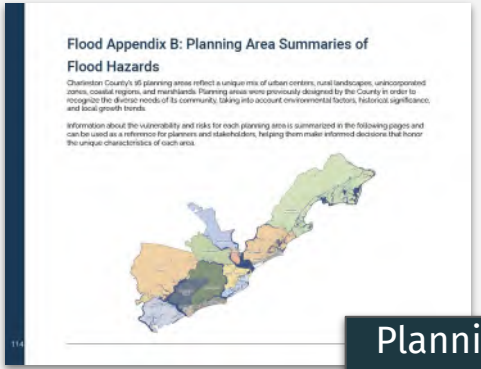


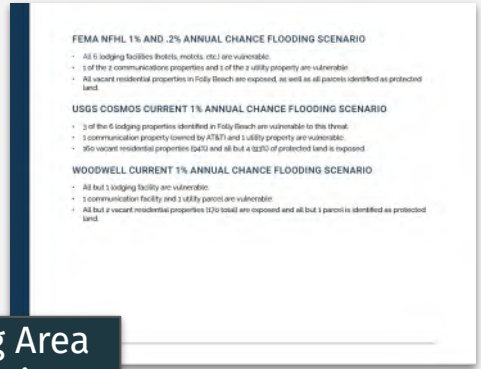


Strategies & Actions



Additional Findings



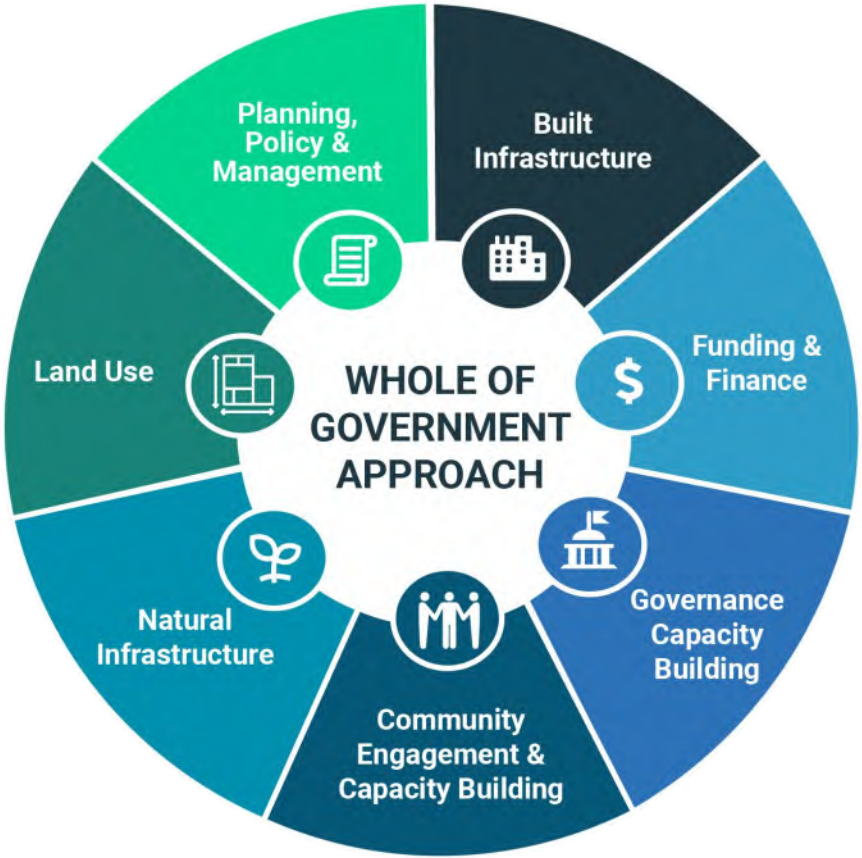


Planning Area Summaries

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

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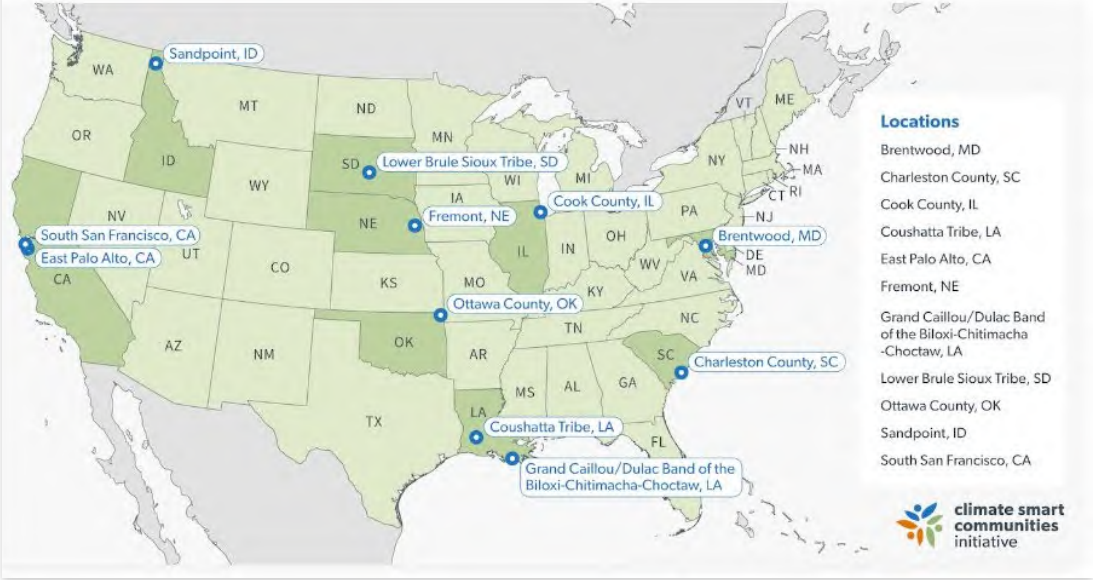
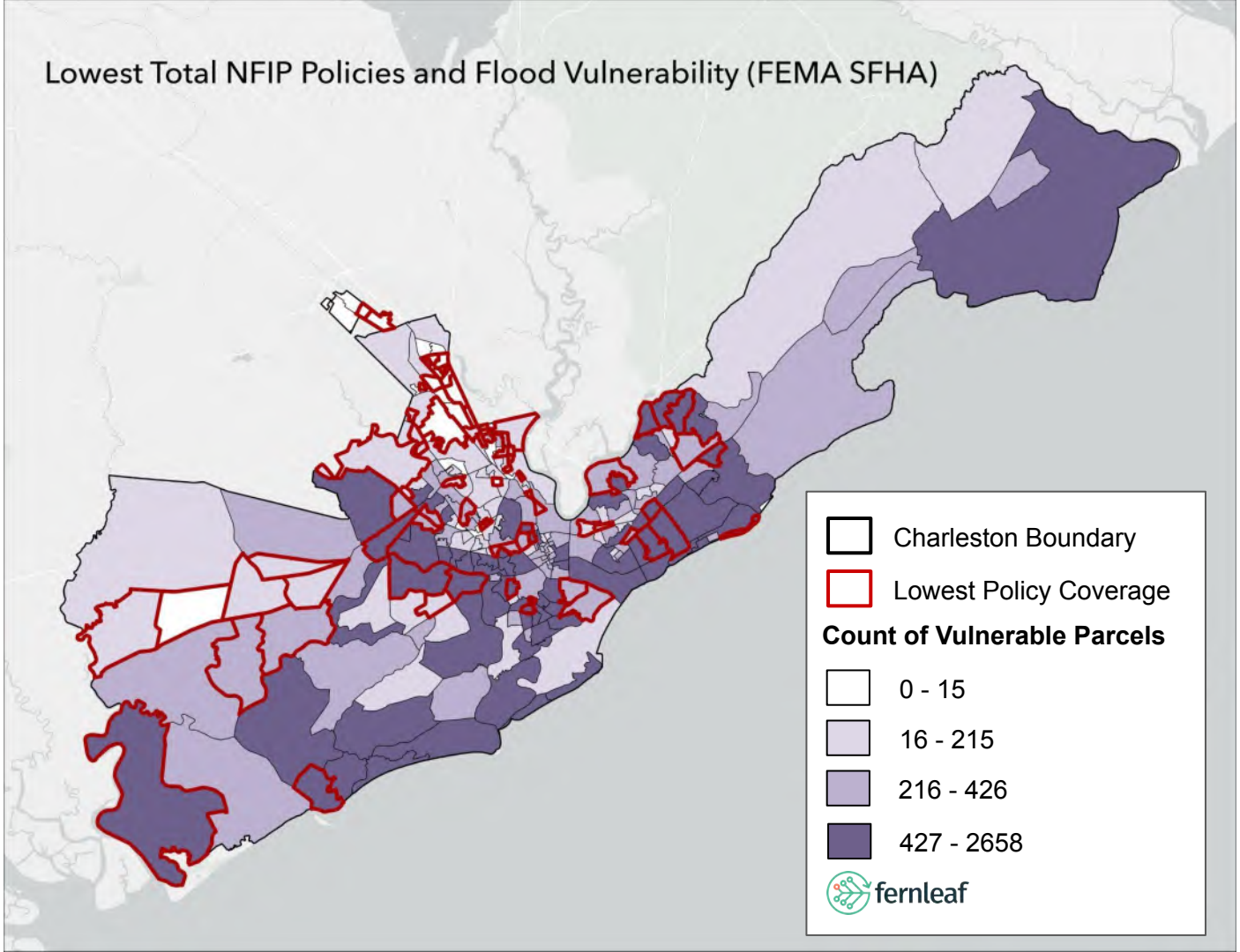
LAMC
LOWCOUNTRY ALLIANCE FOR MODEL COMMUNITIES

CSCI Awards More Than $1 Million to 11 Communities

By Douglas Meyer · August 6, 2024




Lowest Total NFIP Policies and Flood Vulnerability (FEMA SFHA)
Charleston Boundary
Lowest Policy Coverage
Count of Vulnerable Parcels
0 - 15
16 - 215
216 - 426
427 - 2658
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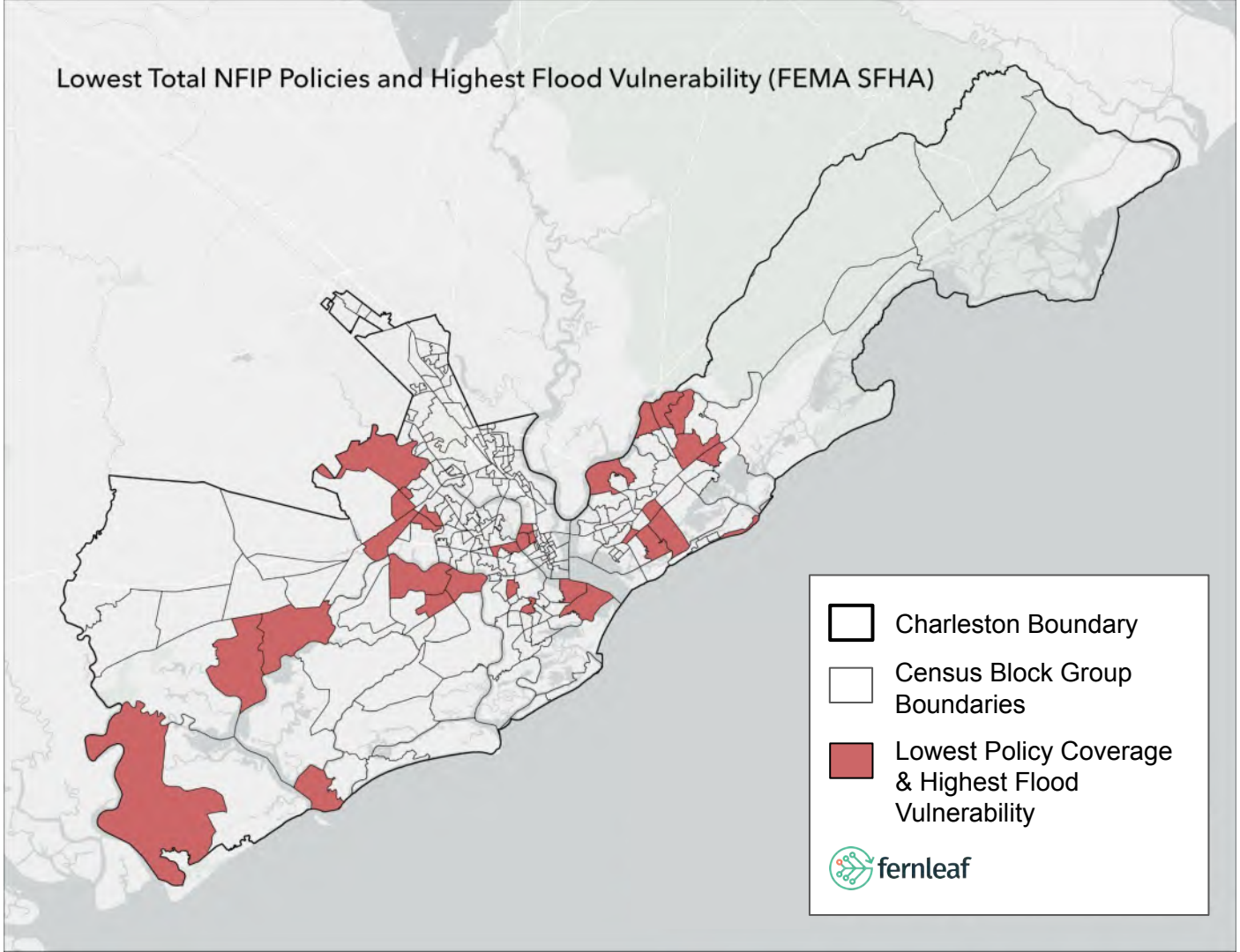
Lowest Total NFIP Policies and Highest Flood Vulnerability (FEMA SFHA)
Charleston Boundary
Census Block Group Boundaries
Lowest Policy Coverage & Highest Flood Vulnerability
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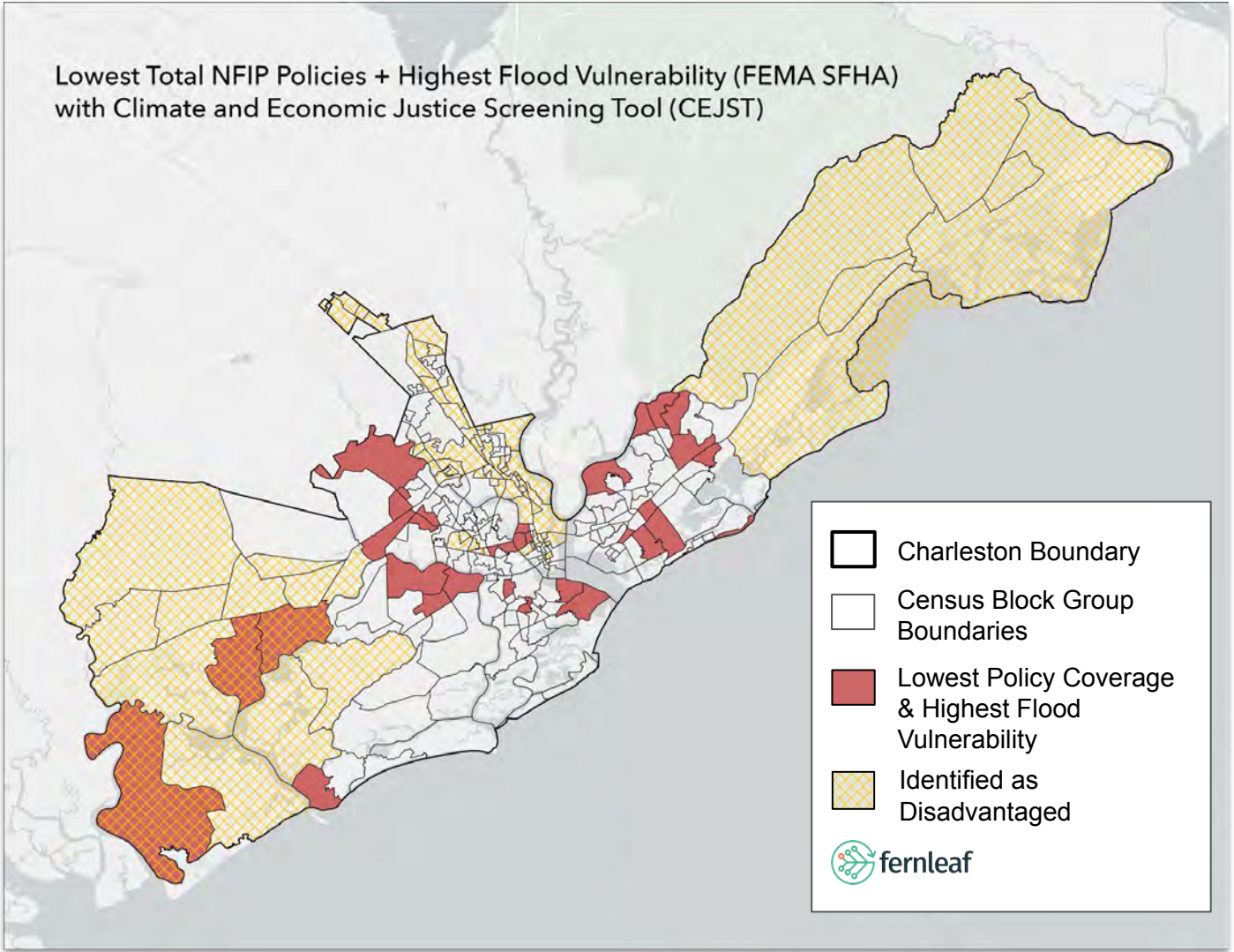
Lowest Total NFIP Policies + Highest Flood Vulnerability (FEMA SFHA)
with Climate and Economic Justice Screening Tool (CEJST)
Charleston Boundary
Census Block Group Boundaries
Lowest Policy Coverage & Highest Flood Vulnerability
Identified as Disadvantaged
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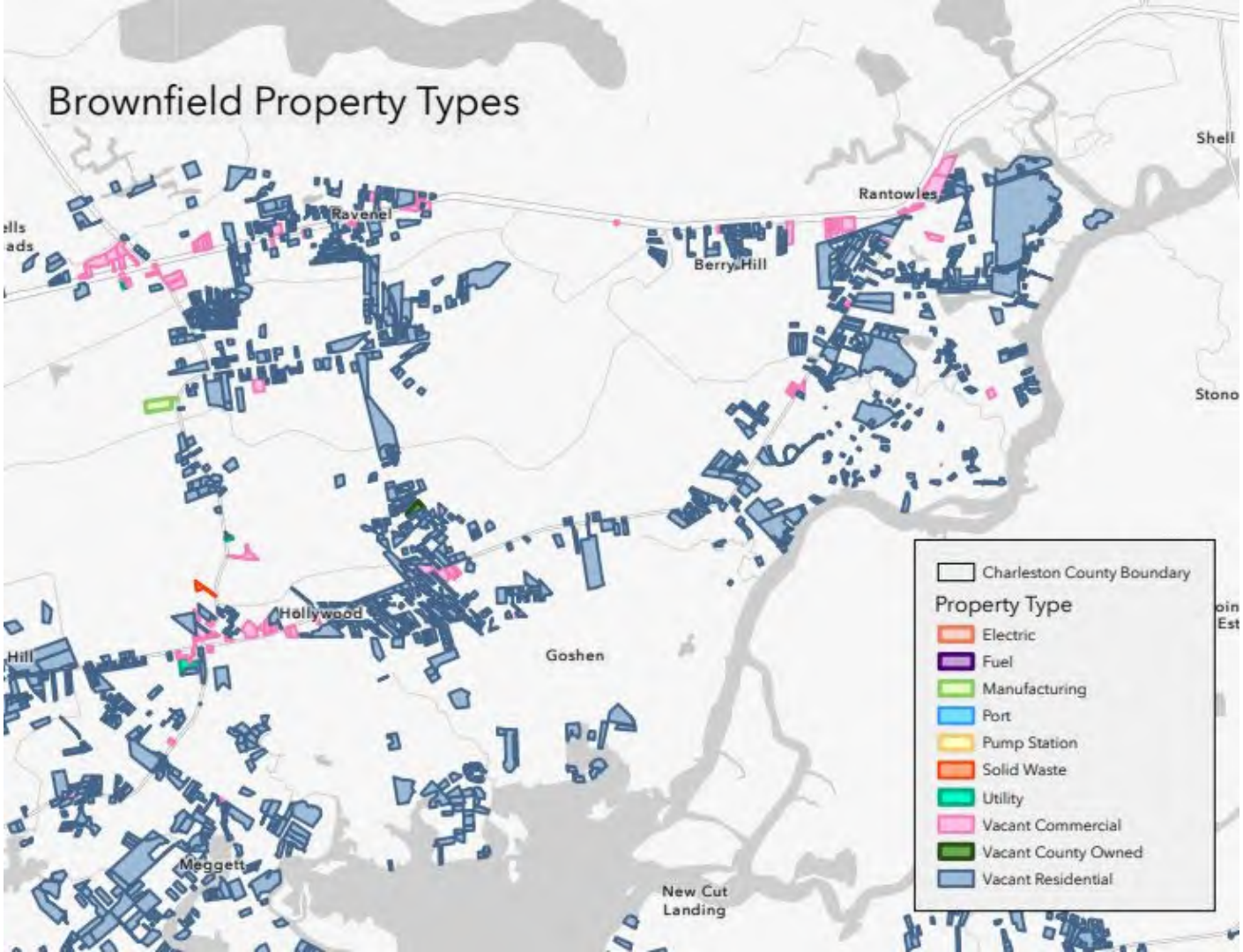
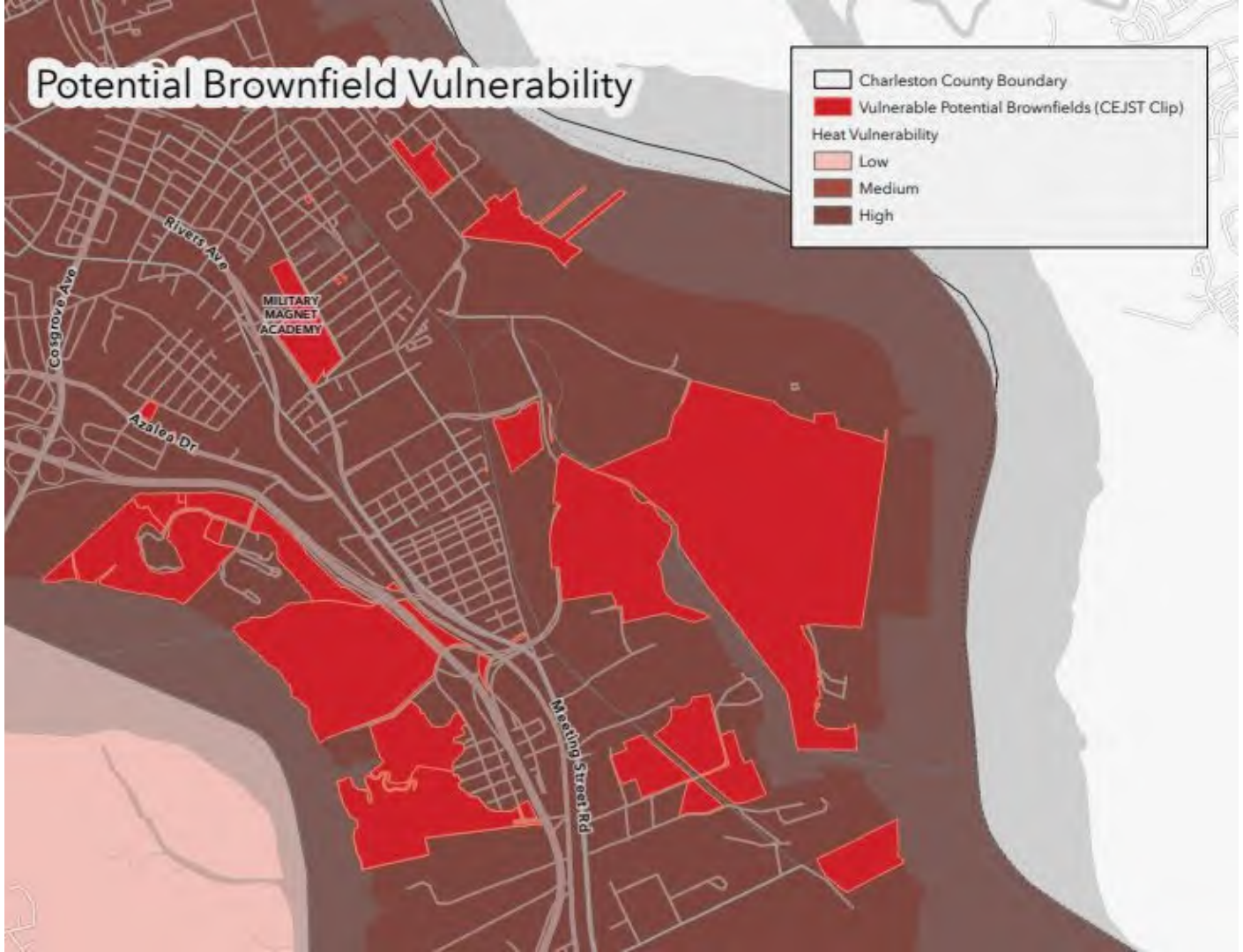
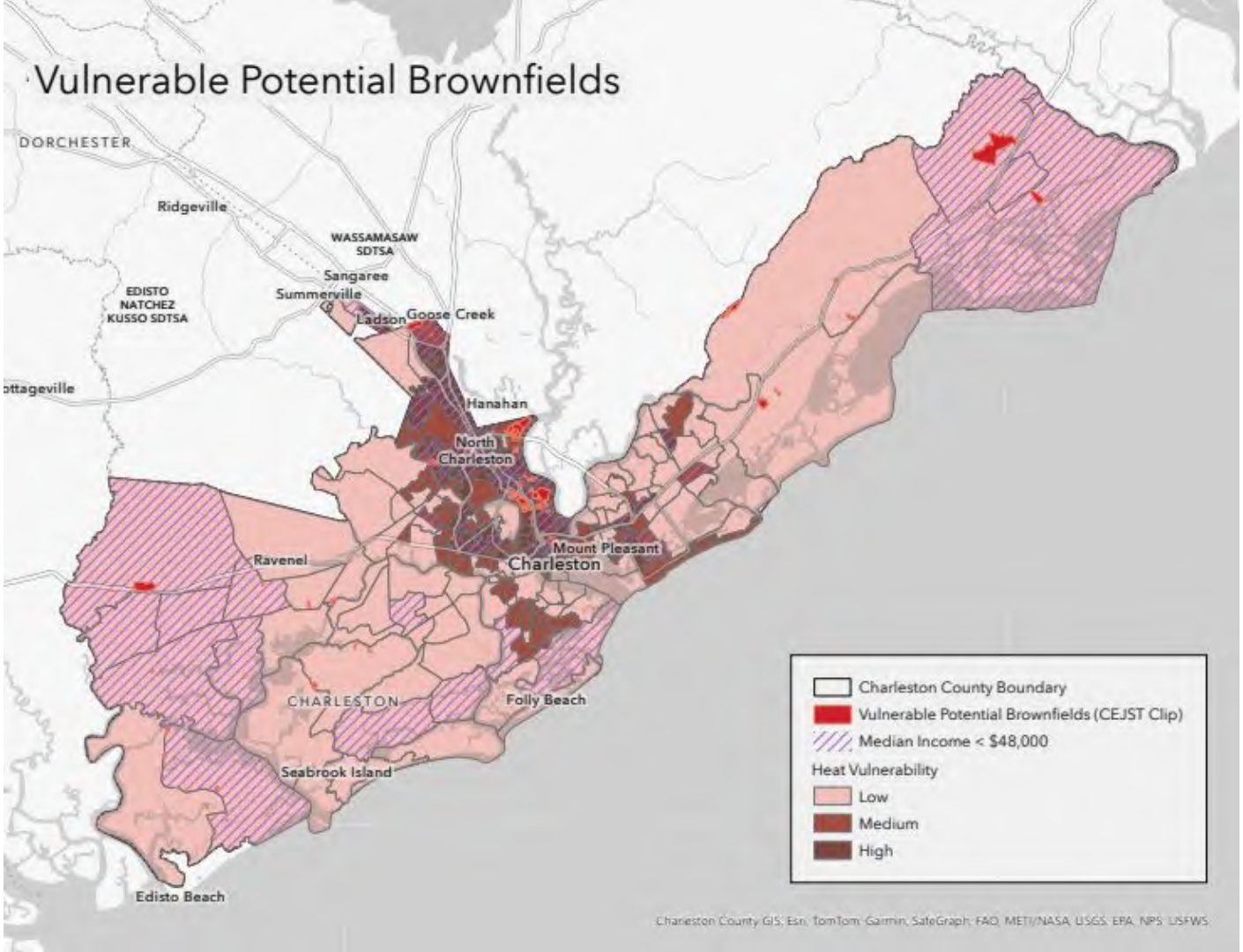

Brownfield Property Types
Ravenel
Berry Hill
Rantowles
Shell
Stono
Hollywood
Goshen
Hill
Meggett
New Cut Landing
Charleston County Boundary
Property Type
Electric
Fuel
Manufacturing
Port
Pump Station
Solid Waste
Utility
Vacant Commercial
Vacant County Owned
Vacant Residential


Potential Brownfield Vulnerability
Charleston County Boundary
Vulnerable Potential Brownfields (CEJST Clip)
Heat Vulnerability
Low
Medium
High
Rivers Ave
Cosgrove Ave
MILITARY MAGNET ACADEMY
Azalea Dr
Meeting Street Rd


Vulnerable Potential Brownfields
DORCHESTER
Ridgeville
WASSAMASAW SDTSA
Sangaree
Summerville
EDISTO NATCHEZ KUSSO SDTSA
Ladson
Goose Creek
Hanahan
North Charleston
Mount Pleasant
Charleston
Ravenel
CHARLESTON
Folly Beach
Seabrook Island
Edisto Beach
Charleston County Boundary
Vulnerable Potential Brownfields (CEJST Clip)
Median Income < $48,000
Heat Vulnerability
Low
Medium
High
Charleston County GIS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS

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).