



S.C. Sea Grant Consortium

# Town of Bluffton Resilience Planning Analysis

April 24, 2025



  
**Sea Grant**  
S.C. SEA GRANT CONSORTIUM





# Overview

- Lowcountry Hazards Center and S.C. Sea Grant Consortium
- Community Engagement
- Policy and Planning
- Mapping and Modeling
- Recommendations

# NATIONAL SEA GRANT

*34 Programs Nationwide*



  
**Sea Grant**  
S.C. SEA GRANT CONSORTIUM

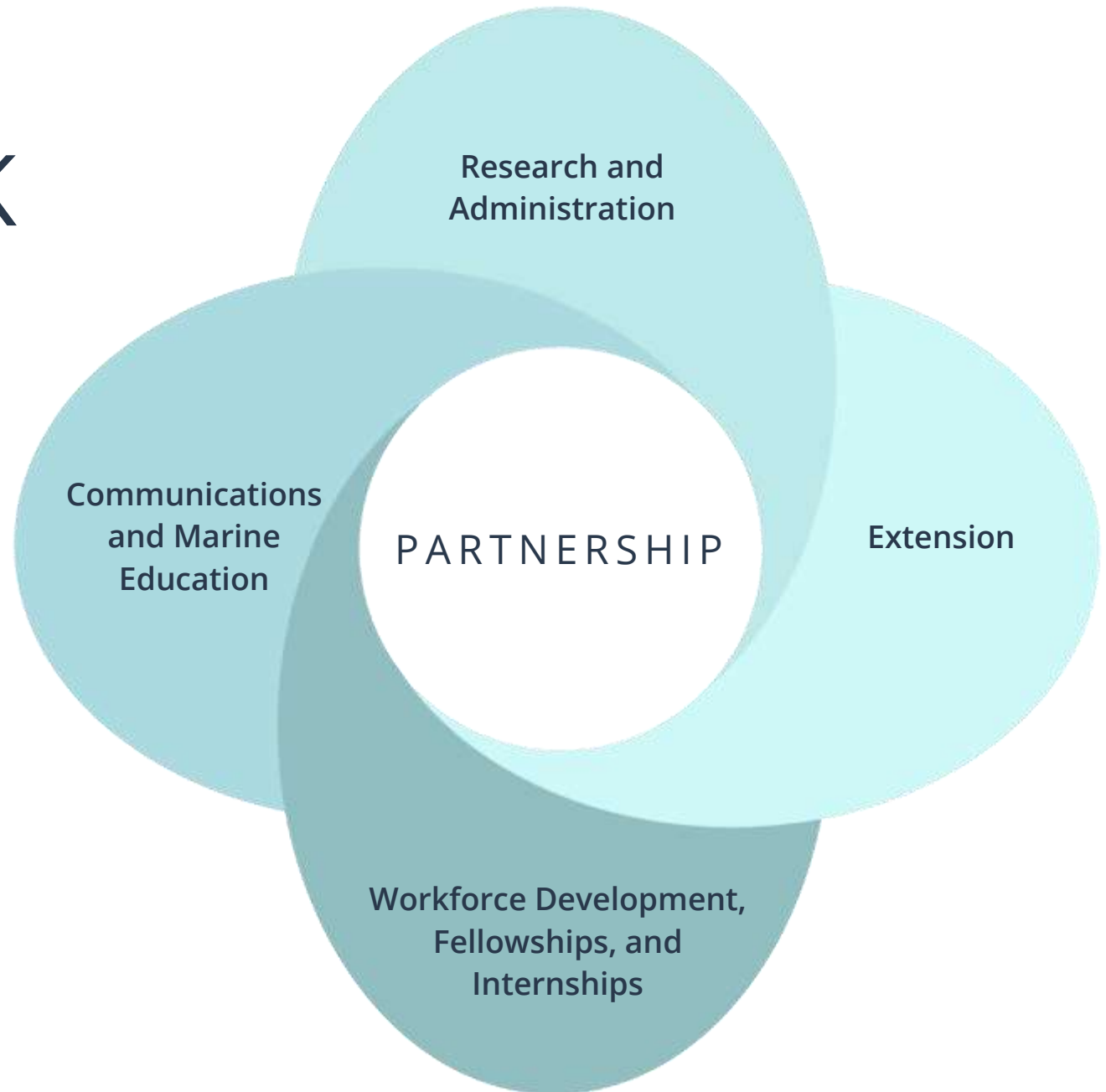
# THE CONSORTIUM IN SOUTH CAROLINA

*9 Member Institutions*



# HOW WE WORK

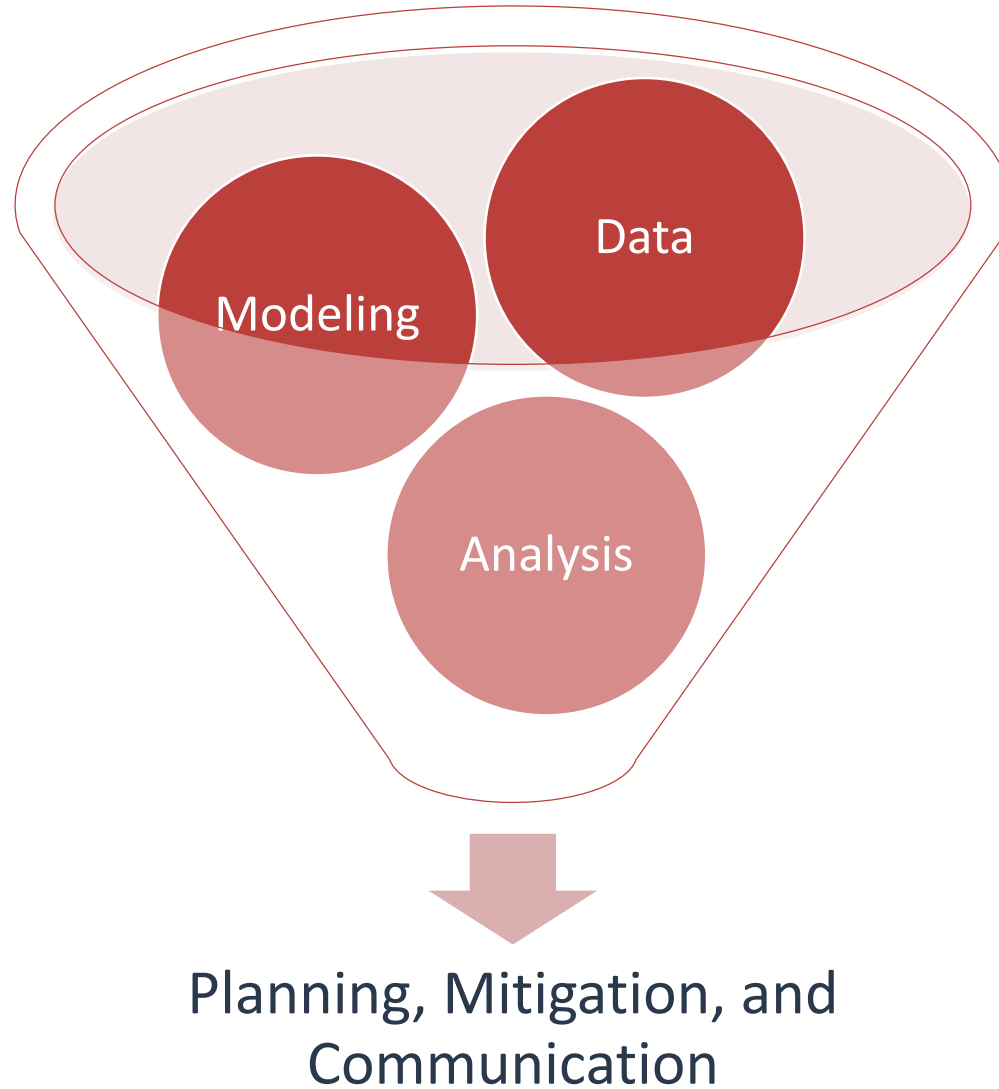
- Community engagement and outreach
- Provide information and skills
- Fellowships and internships
- Educator professional development

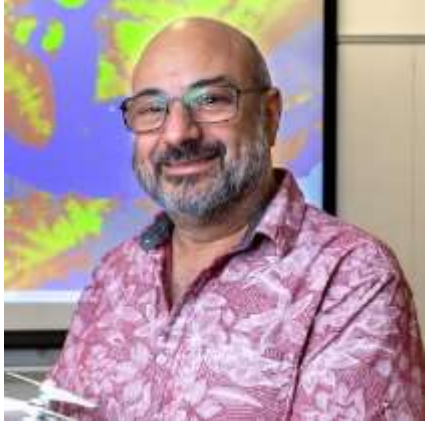




# College of Charleston – SC Sea Grant Partnership

- Science
- Students
- Co-Production





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University*



Shu-Mei Huang


*Coastal GIS  
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Consortium/College of  
Charleston*

# Project Team

# Community Engagement

- Three public engagement events at locations throughout town
  - Bluffton Rotary Community Center
  - Pritchardville Elementary School
  - Historic Bluffton Arts & Seafood Festival
- Residents mapped flood hotspots using Survey123 online survey and at events
  - Deployed signs in flood-prone areas

*Town of Bluffton*  
**Coastal Flooding  
Public Input Opportunities**



*About the Study*

The Town of Bluffton, working with the S.C. Sea Grant Consortium and the College of Charleston, is undertaking a Resiliency Analysis. The public is invited to help us document past floods and assist researchers in understanding how flooding occurs in the Town. For more information on the project, please visit <https://www.sceagrants.org/community-flooding-survey/>.

*Public Input Opportunities*

- Share your experience by completing the online Bluffton Flood Observations Survey. This survey can be found using the website below or the QR Code provided:  
<https://arog.is/10a5Sn>
- Attend one of the three drop-in events detailed below.

**EVENT 1**

LOCATION: BLUFFTON ROTARY,  
11 RECREATION COURT,  
BLUFFTON, SC 29910

DATE: THURSDAY, JULY 18, 2024  
6:00PM - 7:00PM

**EVENT 2**

LOCATION: PRITCHARDVILLE  
ELEMENTARY SCHOOL,  
9447 EVAN WAY, BLUFFTON, SC 29910

DATE: TUESDAY, AUGUST 20, 2024  
6:00PM - 7:00PM

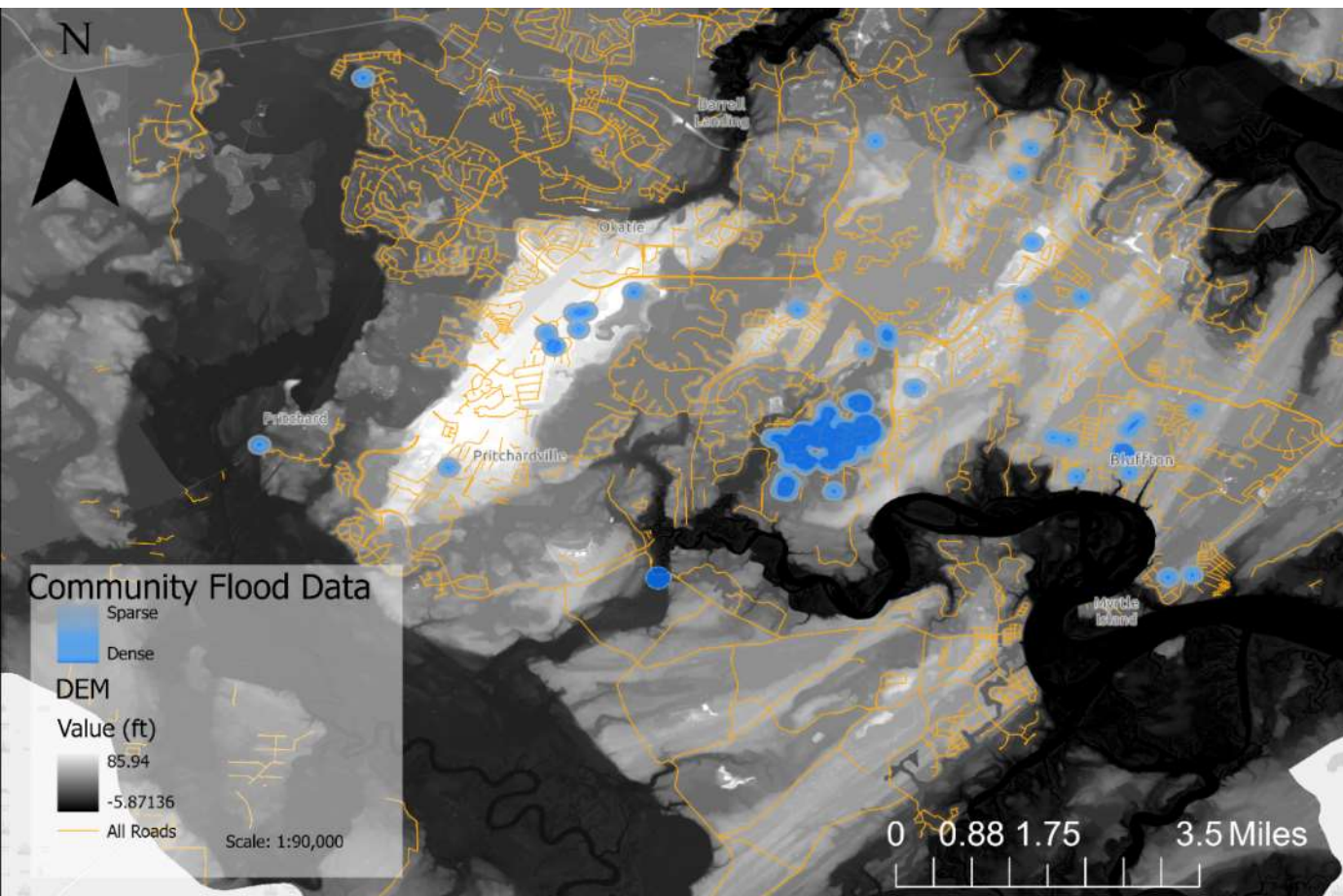
**EVENT 3**

LOCATION: ARTS AND SEAFOOD FESTIVAL,  
TOWN BOOTH AT STREET FEST

DATE: SATURDAY, OCTOBER 19, 2024  
10:00AM - 5:00PM







- 85 survey responses
  - Paper, in-person, online
- Hotspots of current flood issues



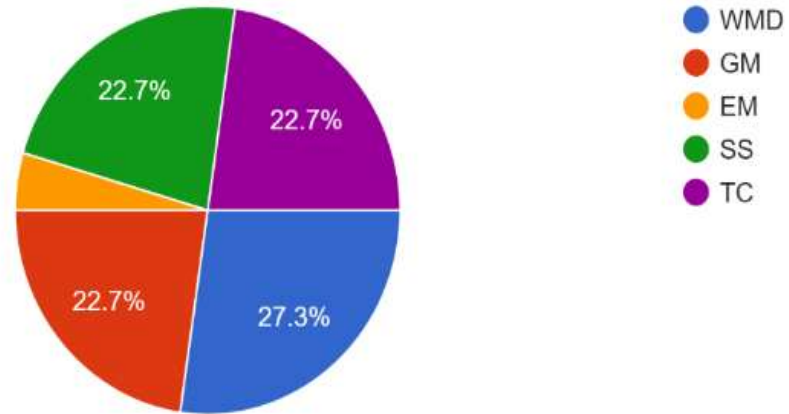
# Flood Surveys

# Resilience Concerns

- Conducted survey of Town staff from multiple departments and Town Council to determine greatest needs/concerns
- Highest concerns:
  - Water Quality
  - Evacuation Routes
  - Wetland Loss
  - Flooding Inundation
  - Green/Blue Space
  - Rainfall Runoff
  - Storm Frequency and Inten

Please note your group affiliation: Watershed Management Division = WMD Growth Management = GM Emergency Management = EM Senior Staff = SS Town Council = TC

22 responses

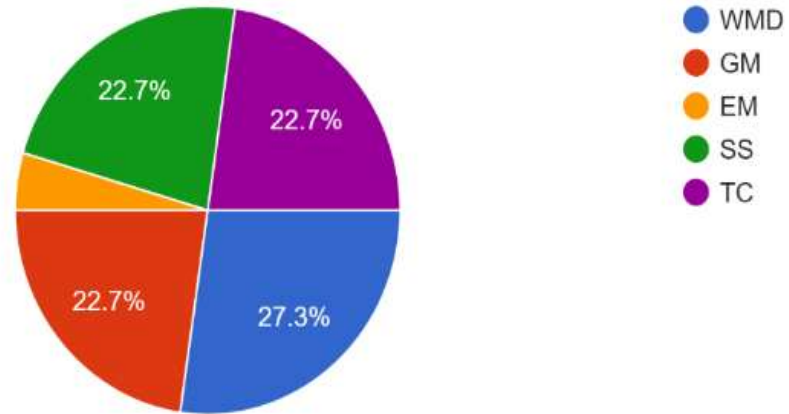


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22 responses







# Policy and Planning

- Partnered with National Sea Grant Law Center to conduct review of local wetland protection ordinances
- Conducted review of policy and land acquisition options to strengthen resilience



# Mapping and Modeling





# Bluffton Development Agreements

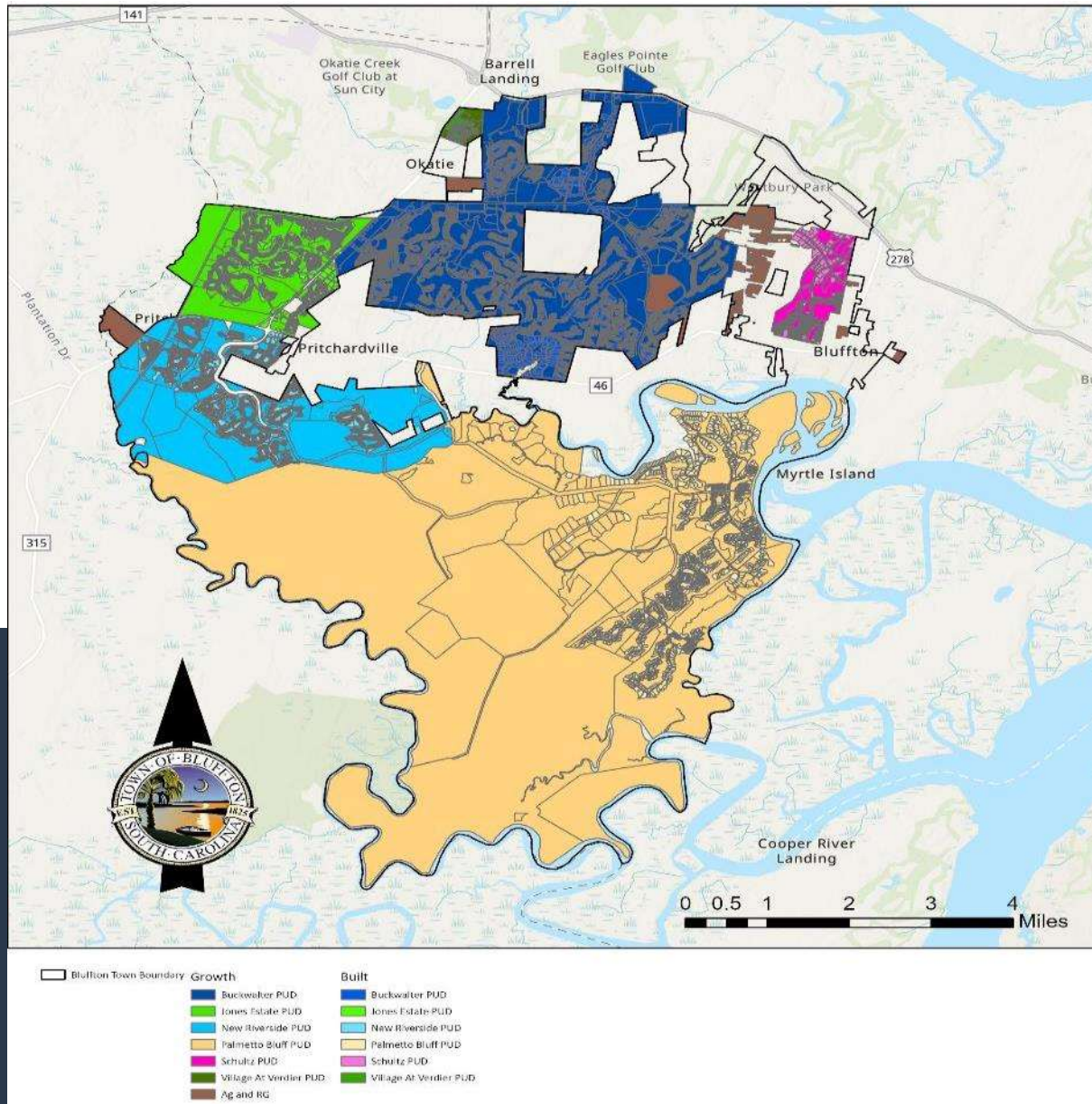
- Development Agreement: a legal binding agreement between local government(s) and property owner(s) for the long-term development of large tracts of land
- Purpose:
  - Plan for future to include the maximum build out and includes general uses, **density** and general site layout
  - Vested right for term of the agreement...
  - Reservation or dedication of land for public purposes...
- Referred to as Planned Unit Development agreements (**PUDs**)

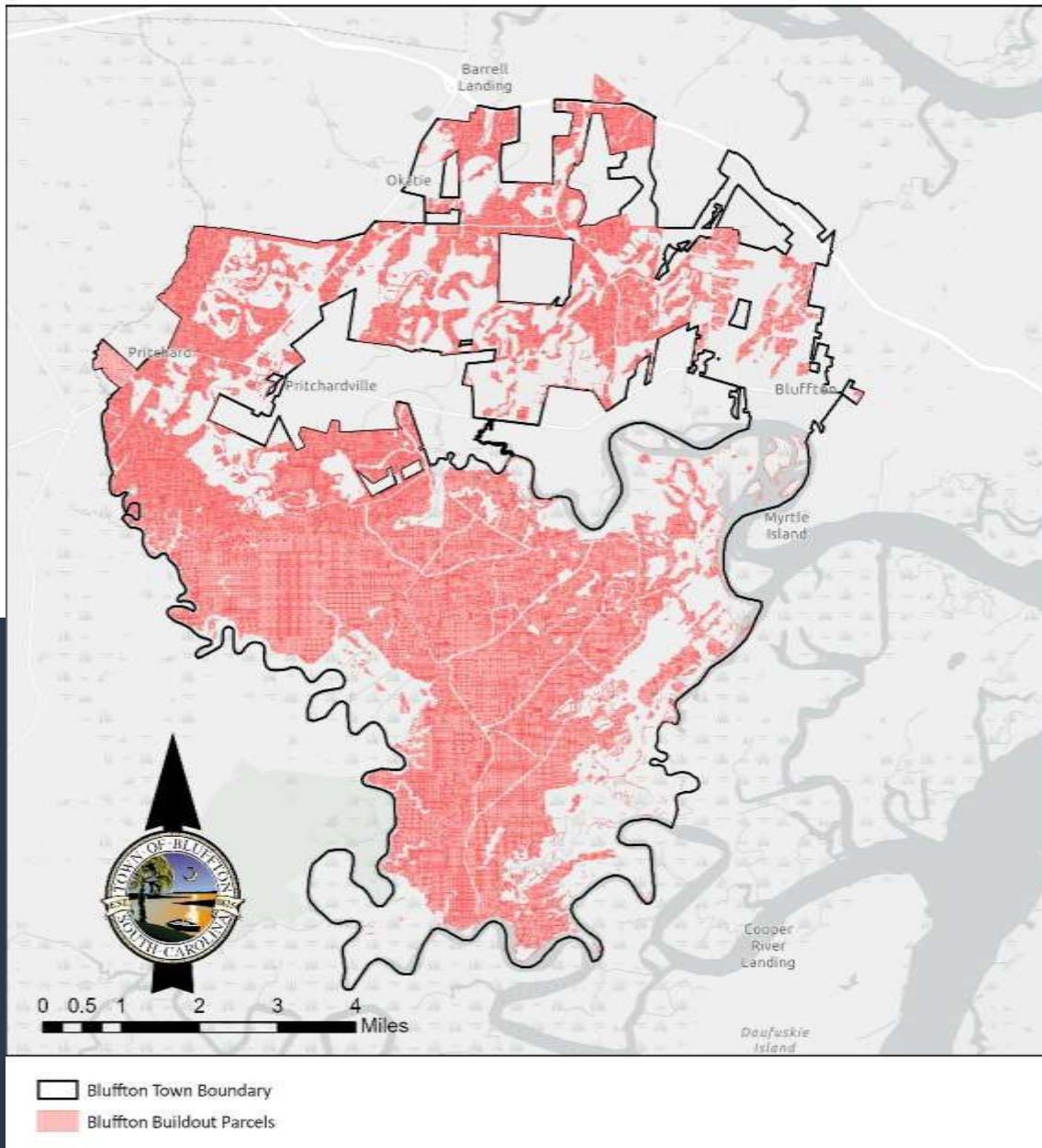


# Planned Unit Development Agreements (PUDs)

Remaining Residential Dwelling Units (as of 12/31/24):

- Buckwalter: 2,176
- Jones Estate: 413
- New Riverside: 724
- Palmetto Bluff: 2,515
- Shultz Tract: 66
- Village at Verdier: 9
- **Total: 5,903**





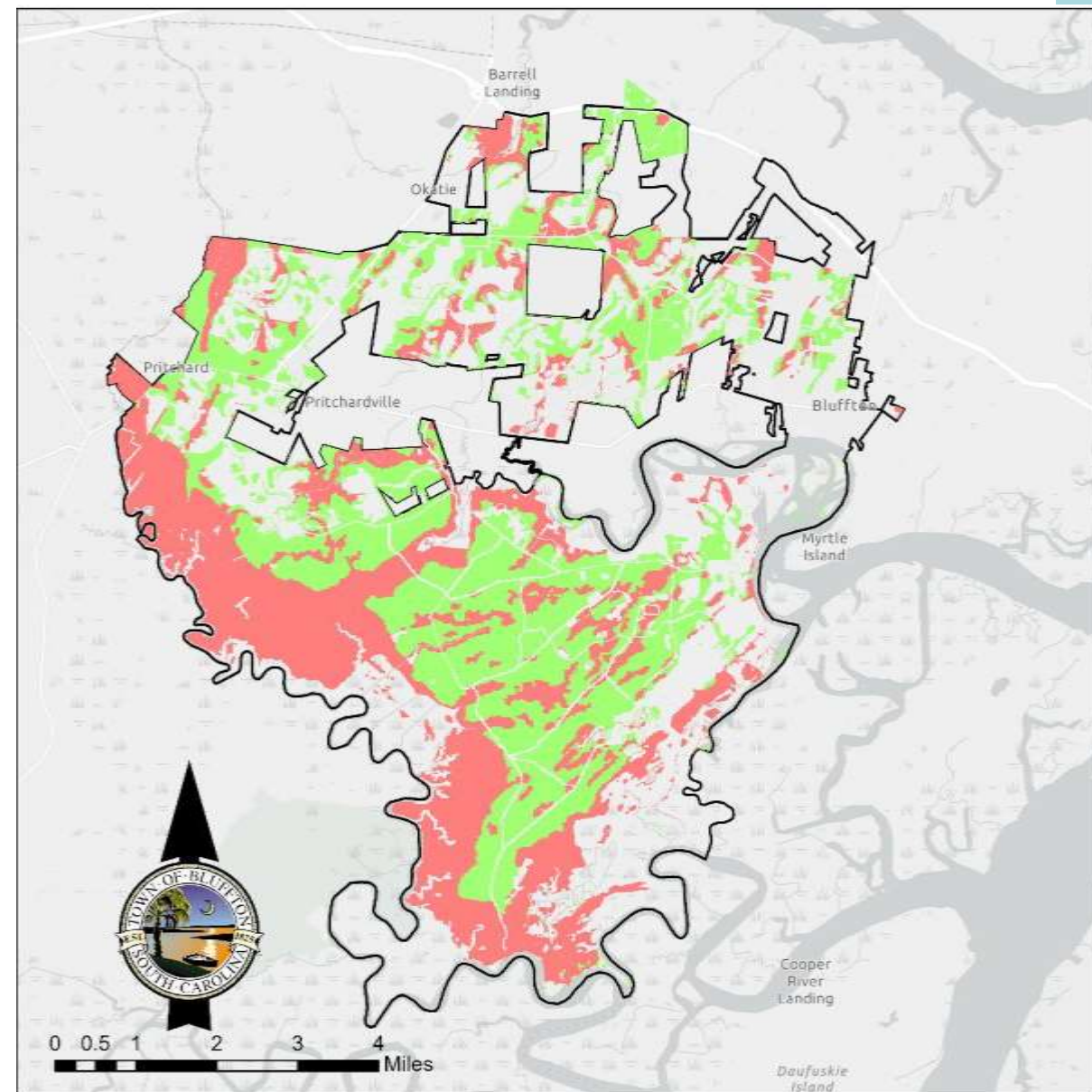
# Buildout Analysis

- Simulates subdivision of all developable parcels (>5 acres) into maximum development density
- Density from PUD agreements
- Removed SCDES critical area, water features, rights of way
- Resulted in 99,423 potential parcels
  - Far exceeded 5,903 remaining for development
- Used to analyze risk based on areas of development



# Flood Risk

- Utilized First Street Flood Model from SC Office of Resilience
- Flood model that incorporates:
  - Rainfall
  - Riverine Flooding
  - Coastal Storm Surge
- Year 2023 and 2053 conditions
- Overlaid with current and future potential (buildout) development



- Bluffton Town Boundary
- Flooding 1 in 100 yr 2023
- No Flooding
- Flooding

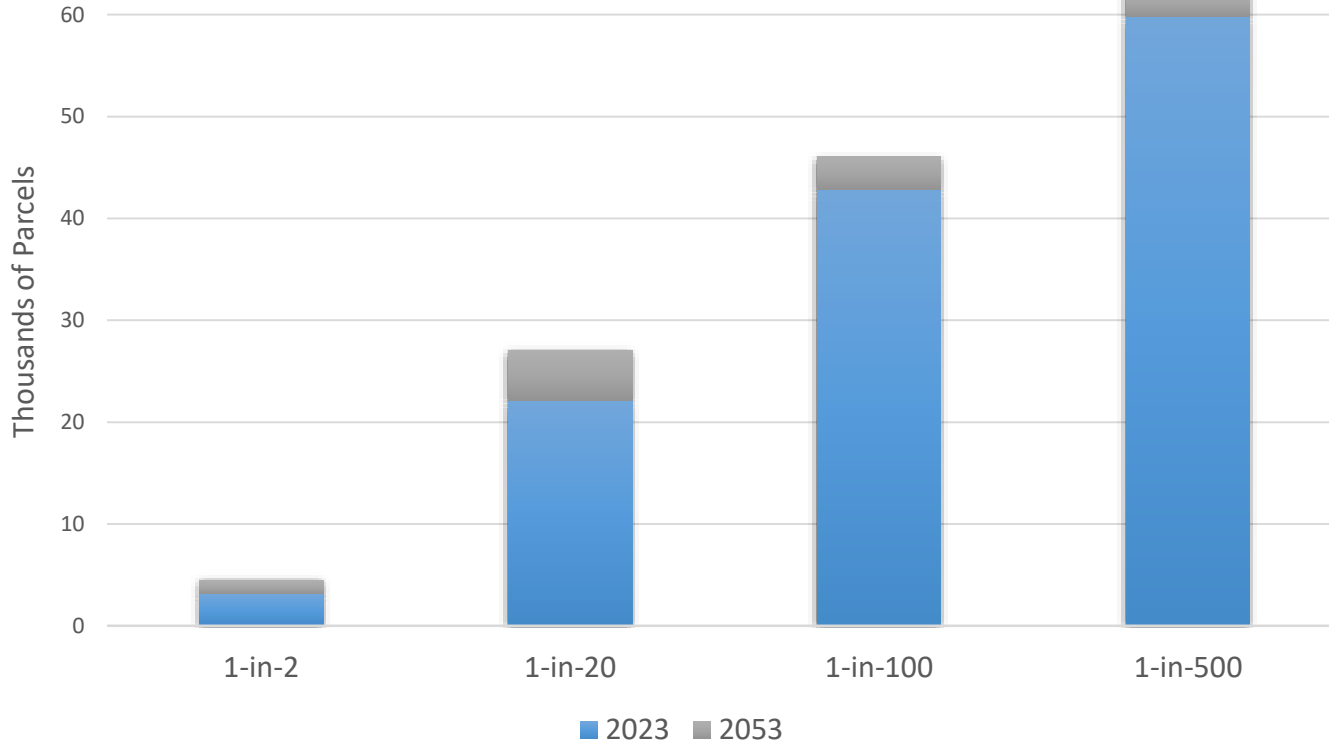
# Damage Assessment

- U.S. Army Corps of Engineers Depth-Damage Curves
- Percentage of damage from different flood depths depending on size of home
- Average home value from 2021 U.S. Census Bureau estimates
- Reveals damages avoided based on location of development



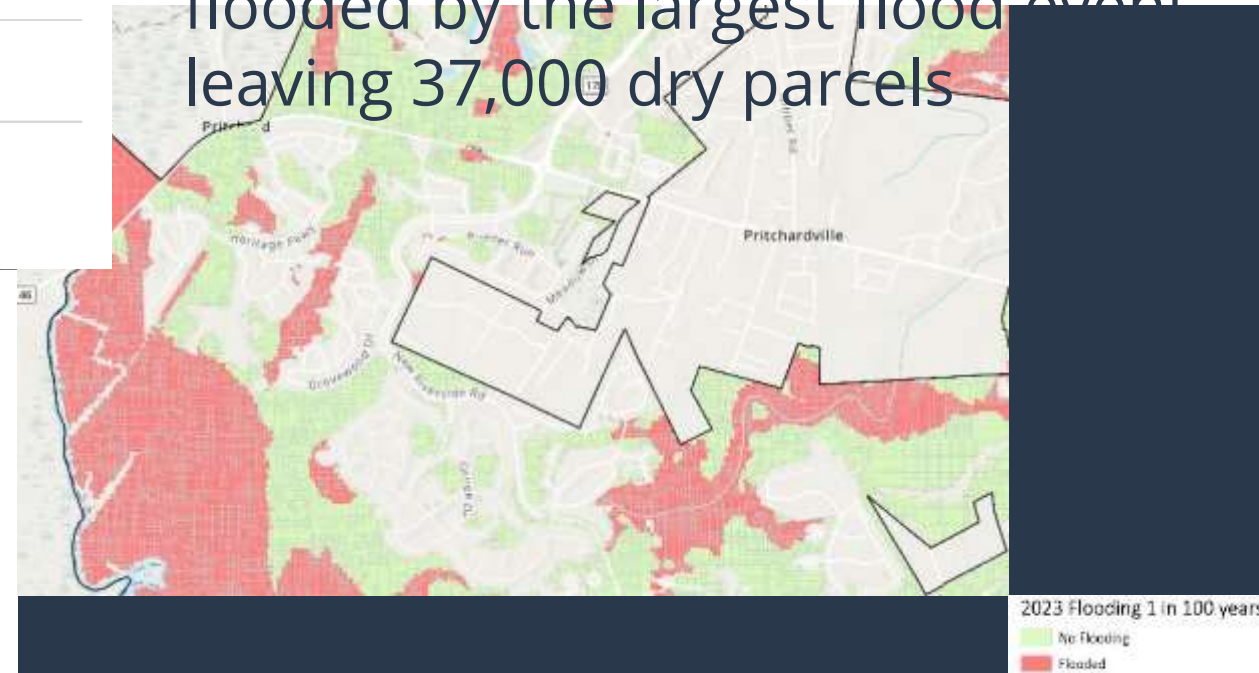
**US Army Corps  
of Engineers®**

Buildout Parcel Vulnerability



- Large increase in vulnerability as flood event size increases
- Future conditions increase flood vulnerability
  - Greatest % increase for smaller events
- 63% of buildout parcels were flooded by the largest flood event leaving 37,000 dry parcels

# Vulnerability of Buildout Parcels





# Policy Scenarios

## Forested Wetlands Protections

- Wetlands store, hold and filter water during storm events
- Calculated flood coverage and damages within and outside of wetland areas

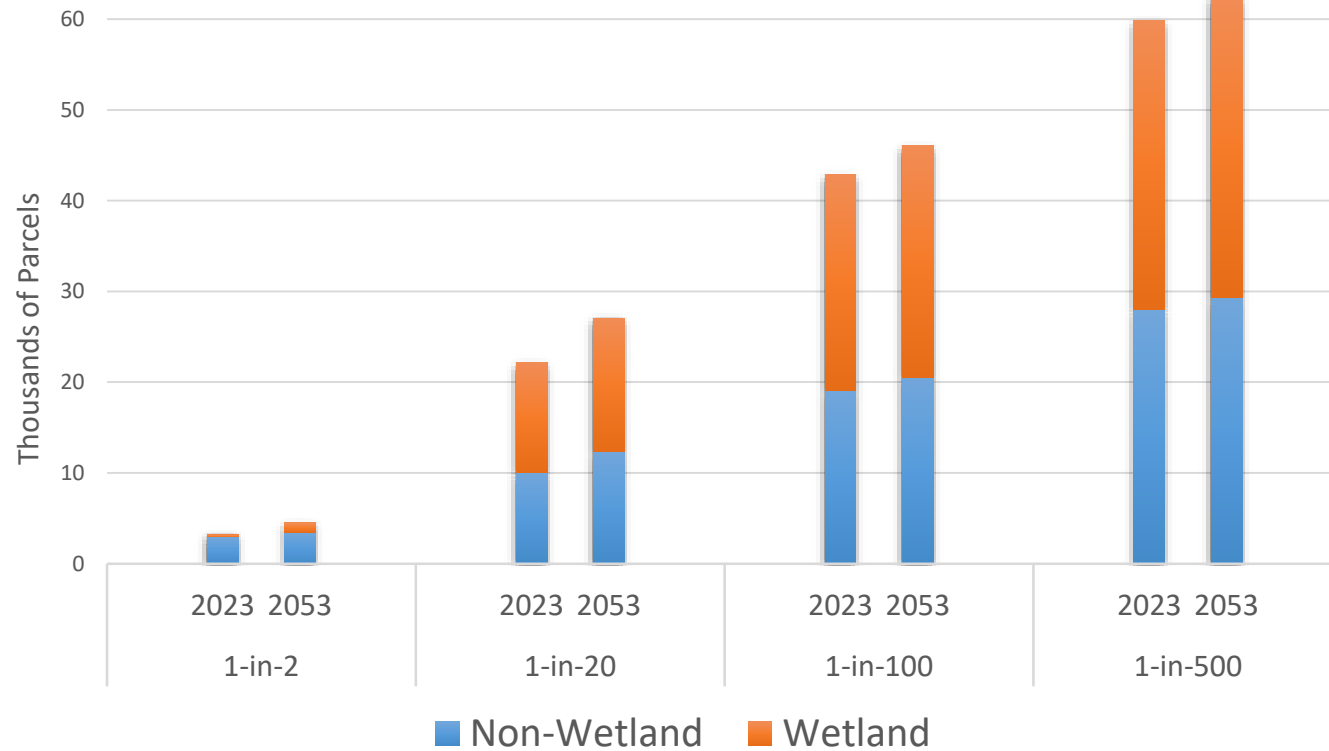
## Elevation-Based Zoning

- Lower elevations tend to accumulate water first during storm events
- Categorized low, moderate, and high elevation groups for each PUD
- Calculated flood coverage and



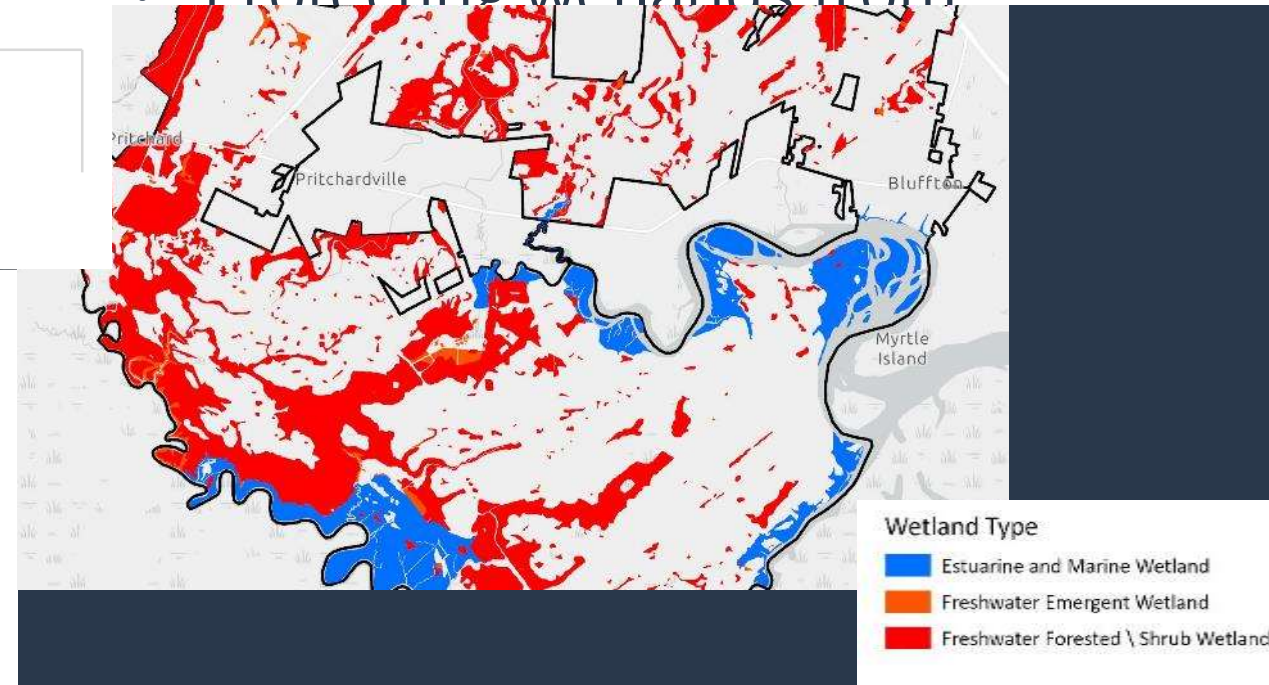


### Wetlands - Buildout Parcel Vulnerability

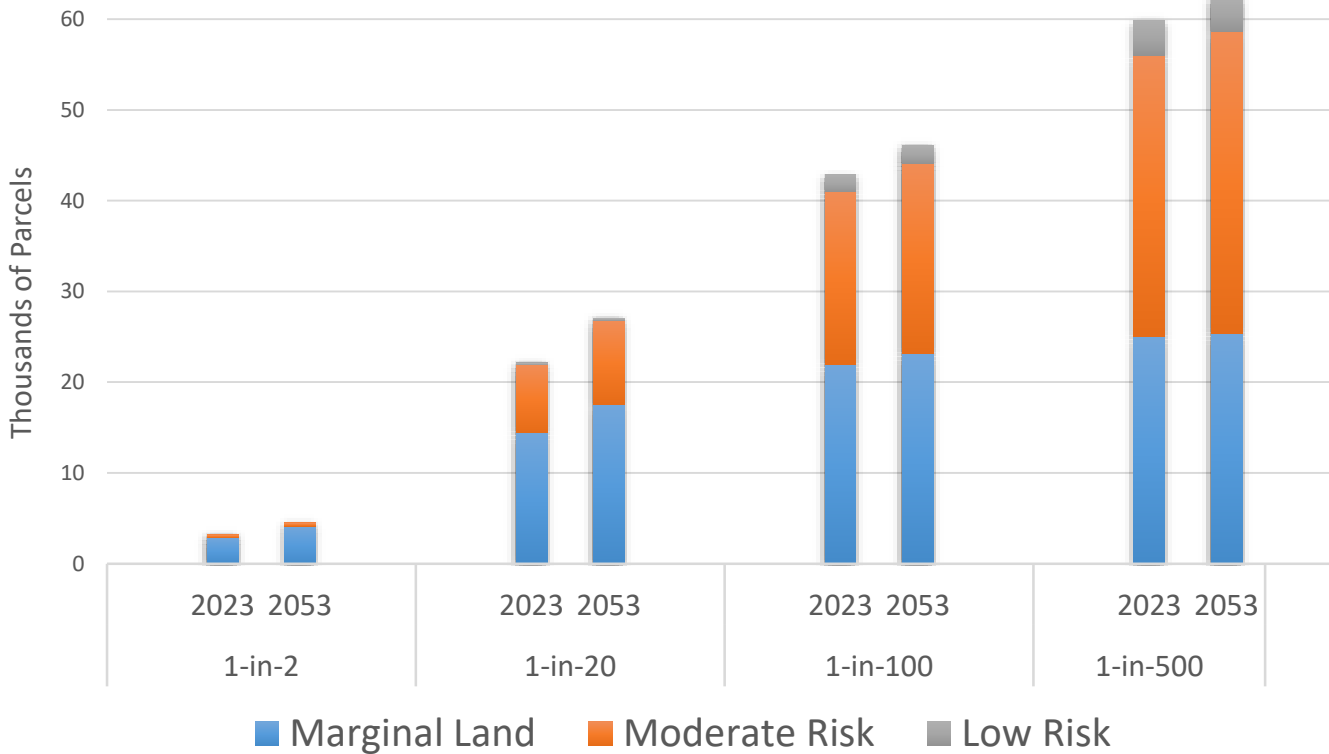


- Over half of vulnerability comes from wetland parcels for all but smallest event
- Wetland parcels held \$1.84 billion worth of modeled damages for the 1-in-100 storm event with 2023 conditions
- Protecting wetlands from

## Forested Wetlands Vulnerability

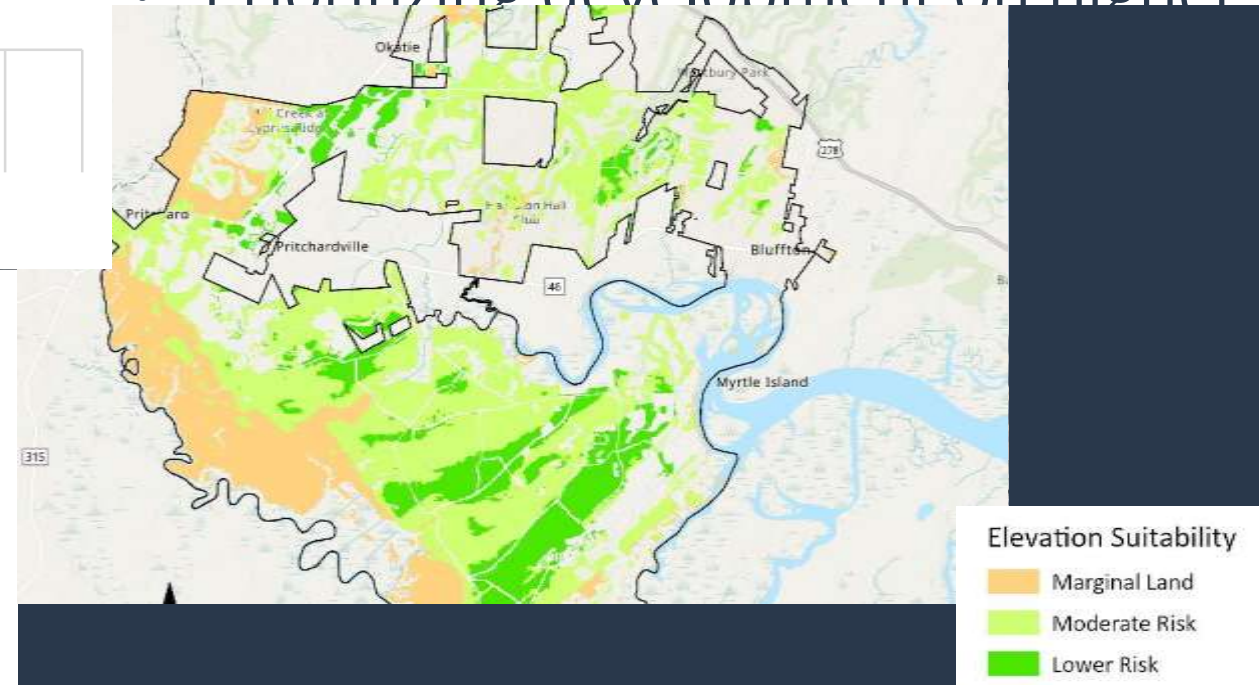


Elevation Groups - Buildout Parcel Vulnerability



- Marginal/Moderate Risk parcels held \$3.51 billion worth of modeled damages for the 1-in-100 storm event with 2023 conditions
- Low Risk contain 0-6% of flooded parcels and damages for any scenario
- Prioritizing development on higher

# Elevation Group Vulnerability



# Ability to Reach PUD Agreements

## Forested Wetlands

Planned Unit Development	Non-Wetland Available	Remaining Dwelling Units	Proportion Non-Wetland
Buckwalter	10,960	2,176	<b>504%</b>
Jones Estate	4,597	413	<b>1,113%</b>
New Riverside	10,408	724	<b>1,438%</b>
Palmetto Bluff	28,335	2,515	<b>1,127%</b>
Shultz Tract	604	66	<b>915%</b>
Village at Verdier	200	9	<b>2,222%</b>

- ✓ Able to reach remaining dwelling units with Non-Wetland parcels

# Ability to Reach PUD Agreements

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- ✓ Able to reach remaining dwelling units with Non-Wetland parcels

## Elevation Groups

Planned Unit Development	Remaining Dwelling Units	Low Risk Available	Proportion Low Risk
Buckwalter	2,176	2,923	<b>134%</b>
Jones Estate	412	1,045	<b>254%</b>
New Riverside	724	2,880	<b>398%</b>
Palmetto Bluff	2,515	8,976	<b>357%</b>
Shultz Tract	66	176	<b>267%</b>
Village at Verdier	9	40	<b>444%</b>

- ✓ Able to reach remaining dwelling units with Low Risk parcels





# Recommendations

Strengthen Wetlands Protection: Consider adopting stricter wetland protection policies to preserve sensitive areas and reduce future flood vulnerability. Options include:

- Implementing overlay zoning districts (e.g. marsh migration overlay zoning)
- Expanding the Preserve District



# Recommendations

Implement Elevation-Based Zoning: Introducing elevation-based zoning would reduce flood risks by ensuring new development occurs in safer, higher-elevation areas.

- This strategy has been successfully adopted by other municipalities, such as the City of Charleston, SC, and the City of Norfolk, VA.



# Recommendations

Update Flood Management Policies: Bluffton should update its floodplain management policies, potentially aligning them with successful models from other regions, like Hilton Head Island, SC, to ensure that new developments adhere to stricter flood protection standards.

- For example, Bluffton's 2021 flood damage ordinance, which does not restrict development within flood hazard areas, could be adapted to provide wetlands protection





# Recommendations

Consider strengthening local financial incentive and land acquisition programs

- Strengthening the Transfer of Development Rights (TDR) program
- Investigate land acquisition programs and build public-private and nonprofit partnerships (e.g. Nature Conservancy, Open Land Trust)
- Bolster existing land acquisition fund (e.g. fees from real estate development transactions or development agreements)
- Use tax abatement or other financial discounts for development in less vulnerable areas
- Require impact fees for development in flood-prone areas

