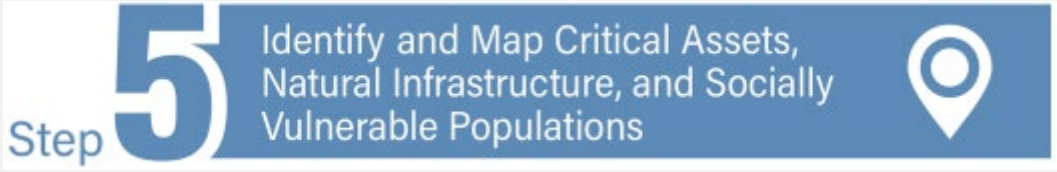
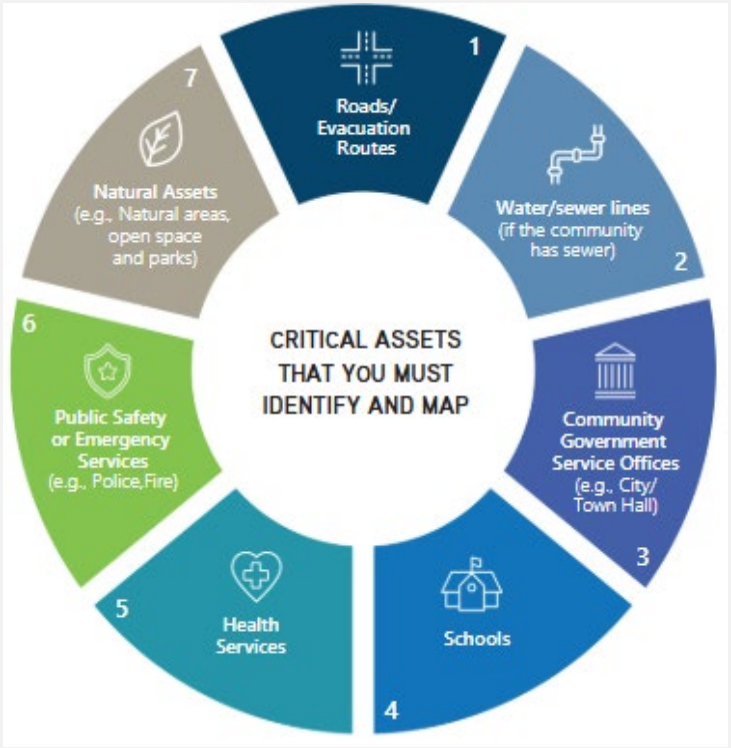
CAROLINA BEACH RCCP
FEBRUARY 18, 2026 CAT MEETING

Town of Carolina Beach | Coastal Protection Engineering (CPE)
Inspire Placemaking Collective | NC Division of Coastal Management

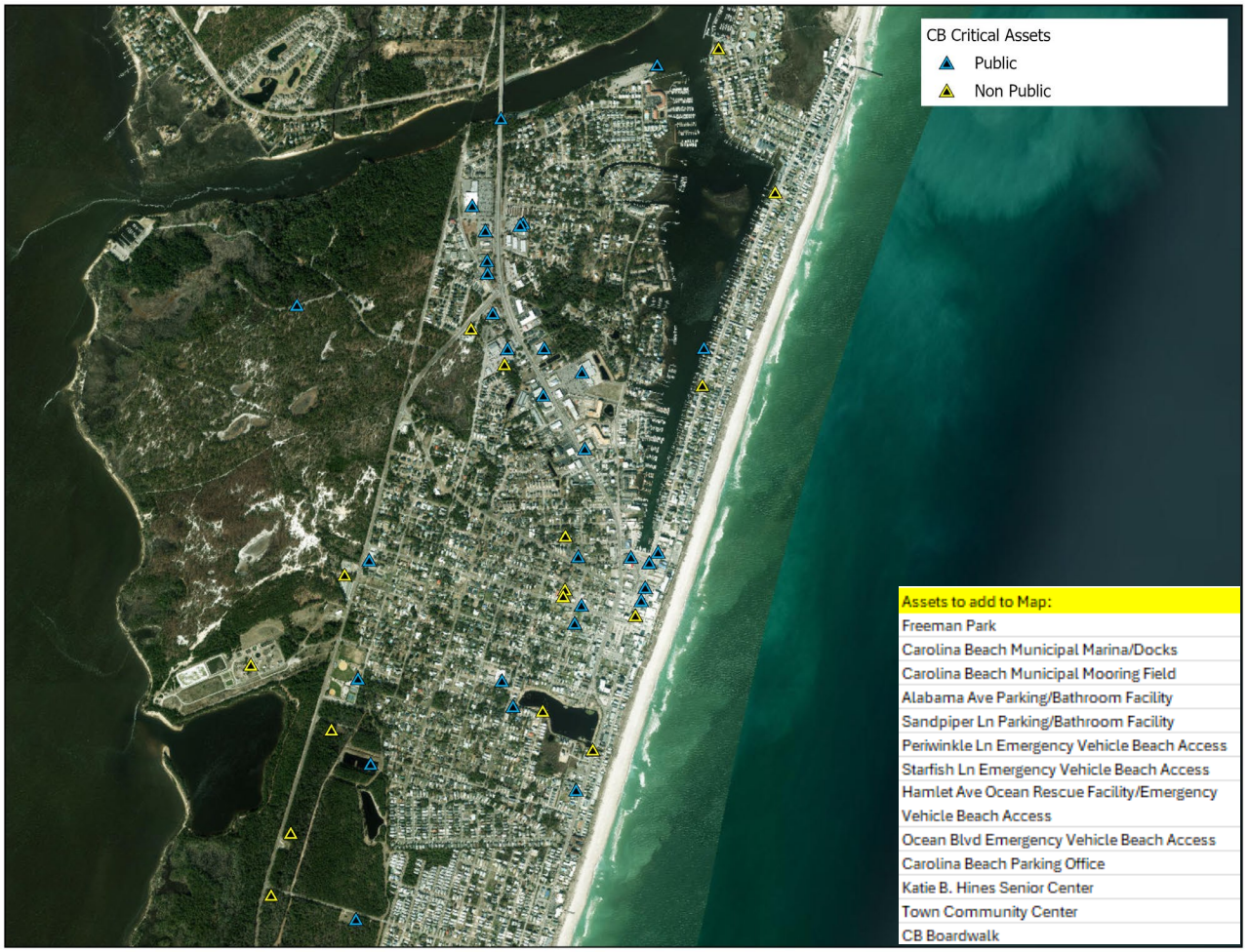
IDENTIFY CRITICAL ASSETS





- Confirm and refine the inventory of **critical infrastructure** relevant to flood risk and community resilience
- Identify and map **key natural features and natural infrastructure** that provide flood protection, water quality, and ecological benefits
- Incorporate **locally important assets** identified by CAT members, Town staff, and community stakeholders
- Validate asset function, condition, and relevance using **local knowledge and available GIS data**
- Distinguish between **public, private, and shared responsibility assets**
- Identify assets with known or recurring **flooding, access, or maintenance challenges**
- Establish a shared understanding of which assets will be **carried forward into the risk and vulnerability assessment**

MAPPED CRITICAL ASSETS FOR CAROLINA BEACH



Dentist
Wilmington Health Family Medicine CB
Dentist
Urgent Care
Pharmacy Walgreens
Pharmacy CVS
Island Kwik Mart
Lumberton Ave Pump Station
Emergency Siren
Power substation
Boat Ramps
Masonboro Sound Water Level/MET Sensor
New Church Structure - Storm Shelter
Maintain Henniker's Ditch Stormwater Drainage Pathway
Carolina Beach Lake Pump house
Water Treatment Facility
Stormwater Pond
Spartanburg Ave Pump Station
CB Town Hall Pump Station
Dow Road Pump Station
Water Tower - Alabama Ave
Texas Ave Pump Station
Town CB Admin/Police
Town CB Water Tower
Mike Chappell Park
Bame Ace Hardware
BellSouth ATT Telecommunications
Critical intersection for storm evacuation
Canal Dr. & Oystershell Ln Sewer Lift Station
Cape Fear Blvd Pumps Station
CB Fire Dept
Sewer Treatment Plant
CB State Park
Grocery Store - Food Lion
Dollar General Groceries/Miscellaneous
Critical intersection for storm evacuation
Critical intersection for storm evacuation
Lake Park Blvd Pump Station
Georgia Ave Pump Station
Clam Shell Ln Sewer Lift Station
Canal Dr Sewer Lift Station
Gas Station
Gas Station
Gas Station
Grocery Store - Sea Merchant
Dow Rd Power substation
Snow's Cut Bridge (primary ingress/egress)
Grocery Store - Publix
Carolina Beach Elementary School

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RISK AND VULNERABILITY ASSESSMENT

Step 6 Conduct Risk & Vulnerability Assessment

Step 6a Minimum Requirements

- Review local or regional hazard mitigation plans, extract data and information, and identify any gaps to fill
- Identify hazards and stressors to include in the risk and vulnerability assessment. At a minimum, they must include flooding (rainfall, tidal, and riverine), storm surge, and 30-year sea level rise projection. NCEM's plus one-foot Water Surface Elevation can serve as a proxy for 30 years of sea level rise.
- Map the geographic extent of the hazards and overlay with community assets identified in Step 5.

RCCP REQUIREMENT: BUILDING FROM EXISTING HAZARD PLANNING

The Resilient Coastal Communities Program (RCCP) Handbook requires that the Risk & Vulnerability Assessment:

- Use the local Hazard Mitigation Plan as the foundation
- Align with FEMA-approved hazard planning
- Focus on hazards already identified for the community

For Carolina Beach, this means building from the:

- Federal Emergency Management Agency (FEMA) Hazard Mitigation framework
- New Hanover County Hazard Mitigation Plan
- Coordinated through North Carolina Division of Emergency Management

Primary hazards identified for our region include:

- Hurricanes & tropical storms
- Storm surge & coastal flooding
- Heavy rainfall flooding
- Severe weather (wind, lightning, hail)

RCCP does not create new hazards.
It refines how these hazards affect local assets.


Photo from WECT News – Aug 2025

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RISK AND VULNERABILITY ASSESSMENT DATA SETS

Sea Level Rise Scenarios
What Does "1–3 Feet" Actually Mean for Carolina Beach?
Why We Show Rise in Feet
•NOAA maps impacts by **feet of sea level rise**
•This shows *what floods*, regardless of the exact year
•Timing depends on emissions and acceleration rates

What the Current Science Suggests for Coastal NC
Based on the NC Coastal Resources Commission Science Panel:
•**~1 foot of sea level rise**
- Likely around **2050**
- This is the most widely used near-term planning benchmark

•**~2 feet of sea level rise**
- Likely between **2060–2075**
- Timing depends on global emissions trends

•**~3 feet of sea level rise**
- Possible by **late century (2080–2100)**

What This Means for Planning
•1 foot is **not 10 years away**
•It is also **not 100 years away**
•It aligns with **mid-century planning (25–30 years)**
•Many public infrastructure assets being built or maintained today will still be in service at that time

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PROTECTING WHAT YOU VALUE…..

Step 6 Conduct Risk & Vulnerability Assessment

Our Risk & Vulnerability Assessment - The Big Picture
This process (Phase 1) is how you qualify for state funding to build projects (Phase 4).

The Three Pillars (RCCP Framework)

Exposure: "The Threat from the Tide“ - Mapping where ocean-side surge and sound-side flooding (e.g., Canal Dr.) meet our streets.

Sensitivity: "What’s at Risk?“ - Identifying which assets, like Canal Drive, the Lake Park area or the Basin, are most easily damaged.

Adaptive Capacity: "Our Tools to Recover“ - Highlighting existing protections, like the Beach Renourishment Program and dunes.

Call to Action!

"Your input helps us rank these projects to ensure they reflect community priorities."

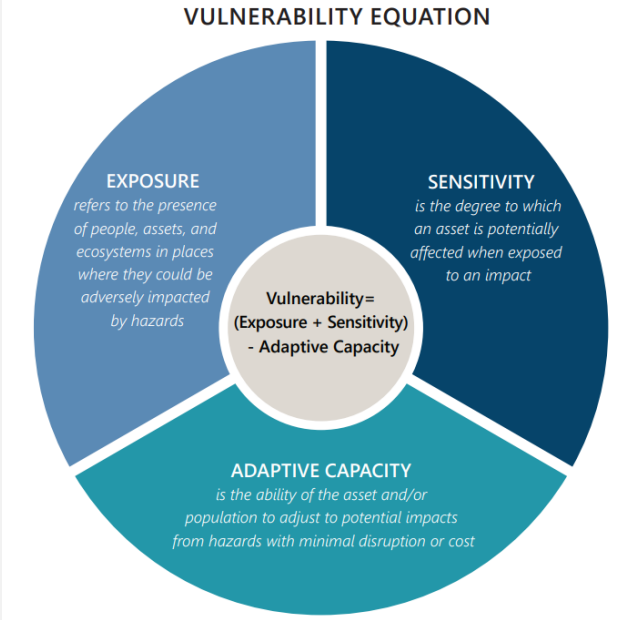


Figure 8 | The vulnerability equation used to derive community vulnerability to climate and non-climate related hazards.

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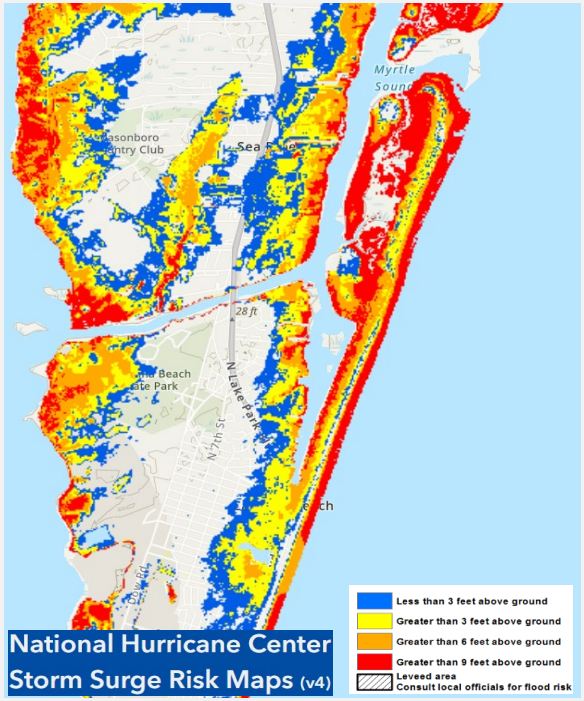
RISK AND VULNERABILITY ASSESSMENT DATA SETS

POTENTIAL HAZARDS

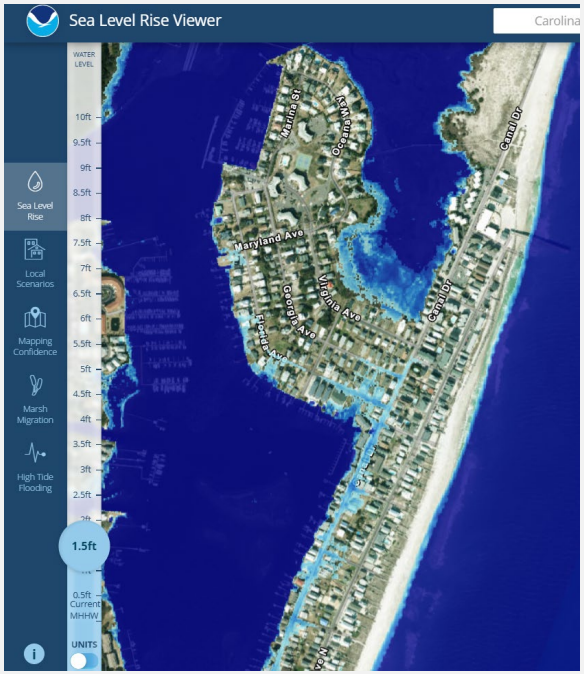
- Sea level rise
- Flooding (rainfall, tidal, and riverine)
- Damaging storms, tornadoes, and winds
- Storm surge
- Shoreline erosion
- Drought, Heat Waves, and Wildfire

NON-CLIMATE STRESSORS

- Aging or potentially undersized infrastructure
- Population dynamics
- Economic shifts
- Increased subsidence
- Altered drainage patterns
- Land cover change (i.e., increased development and impervious surface area)

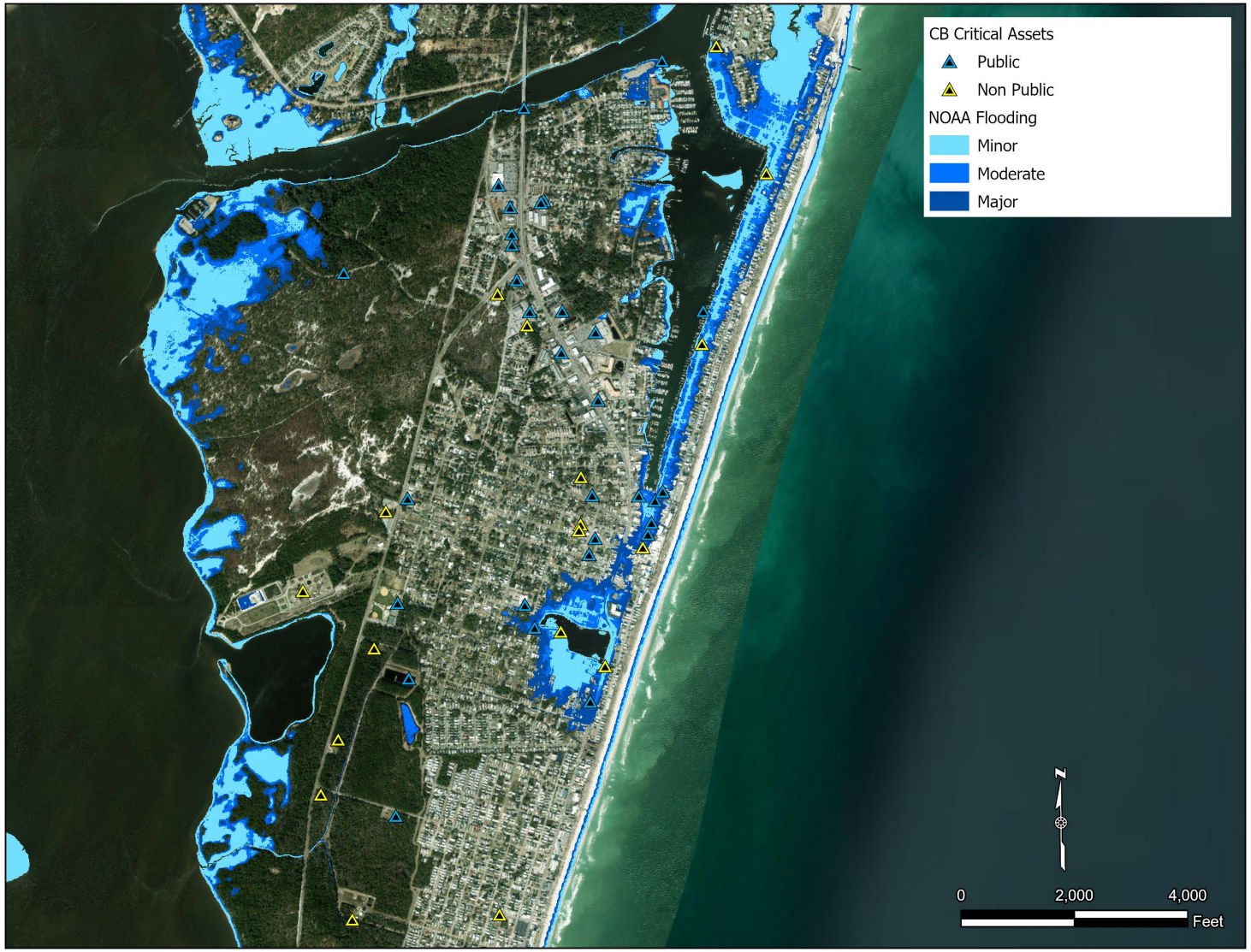


National Hurricane Center Storm Surge Risk Maps (v4)



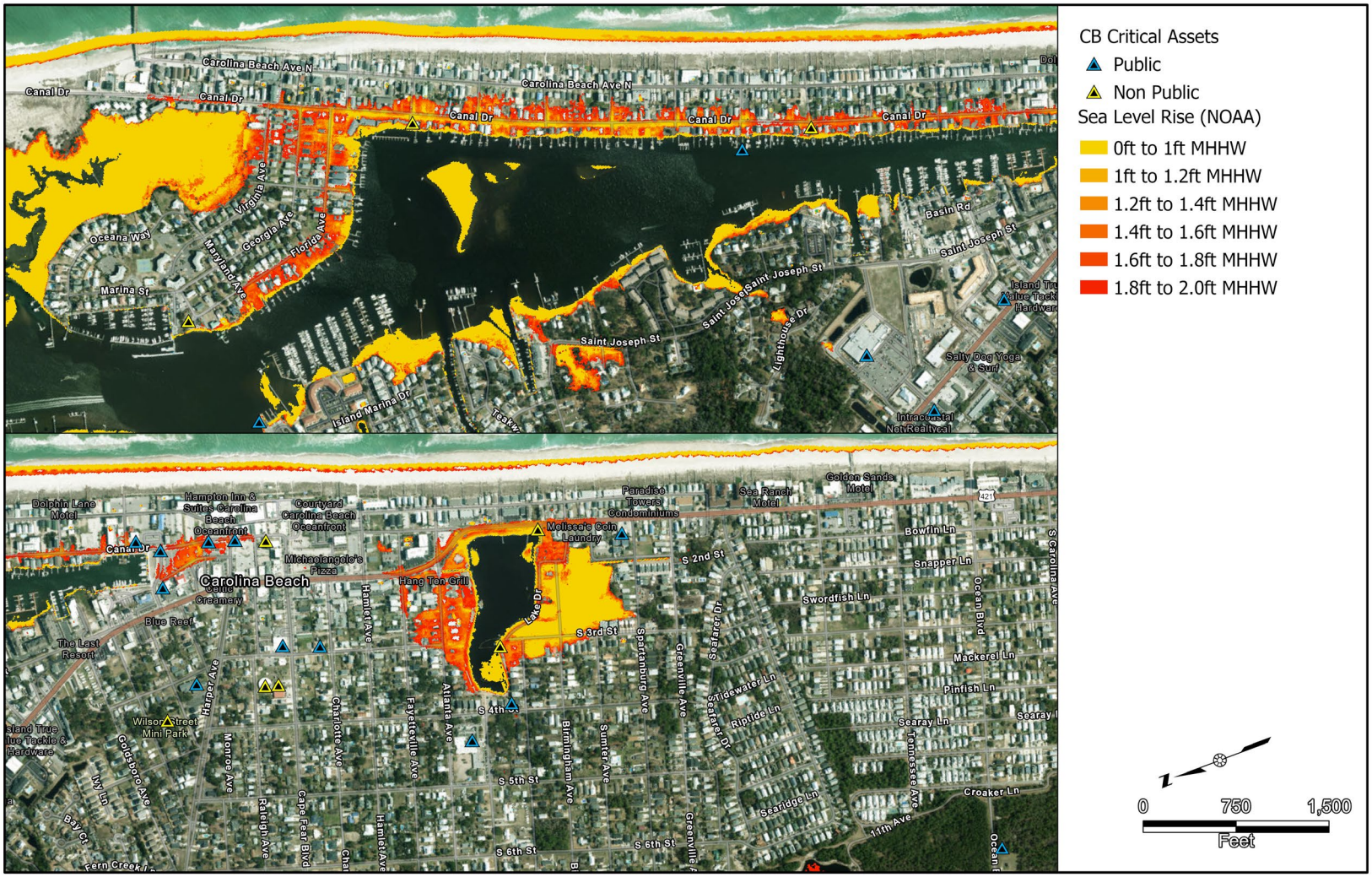


NOAA HIGH TIDE FLOODING DATA



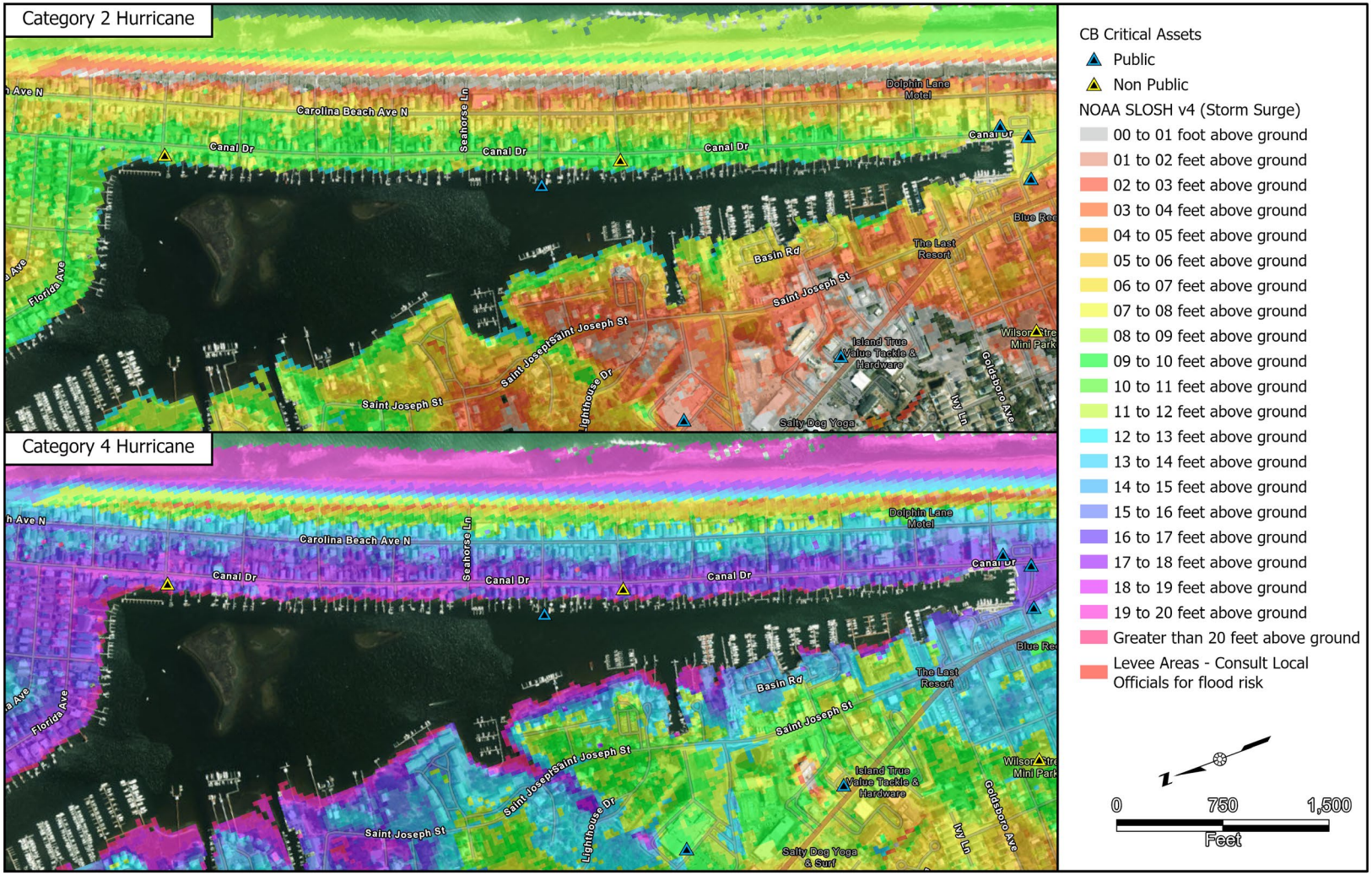
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NOAA SEA LEVEL RISE DATA FOR CAROLINA BEACH



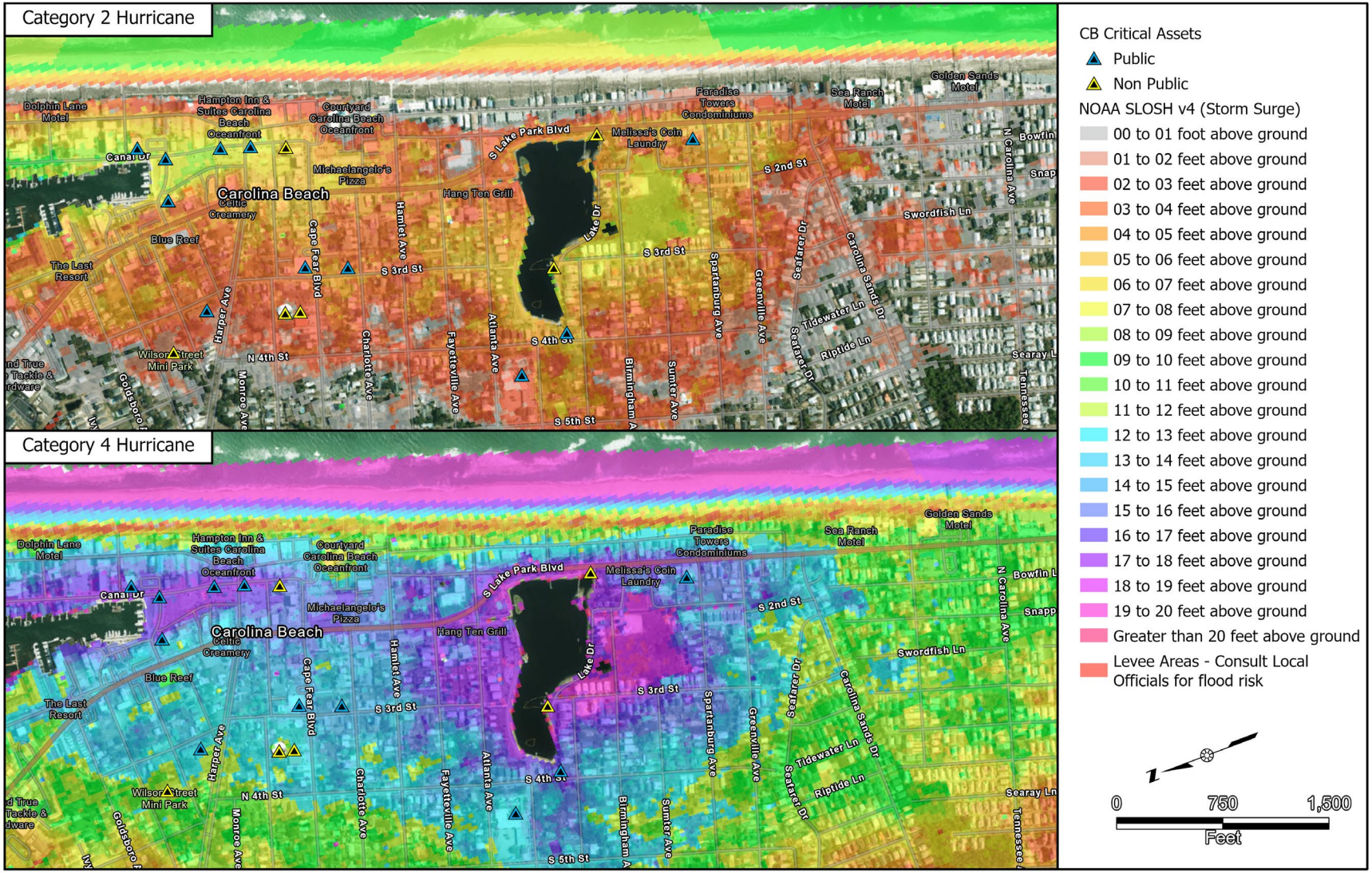
COASTAL PROTECTION ENGINEERING

NOAA STORM SURGE DATA FOR CANAL DRIVE AREA



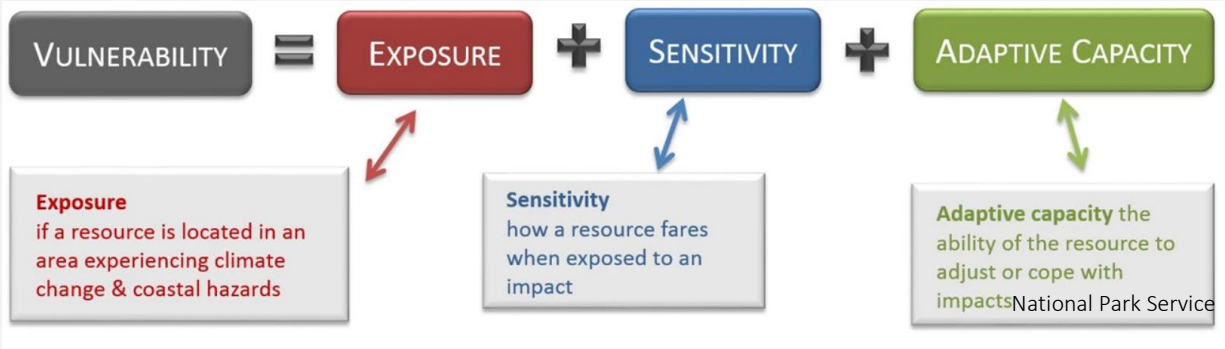
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NOAA STORM SURGE DATA FOR CAROLINA LAKE AREA



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RISK AND VULNERABILITY ASSESSMENT – Understanding the Core Concepts



I'll use the analogy of a **coastal home during a storm** to make these concepts relatable.

•**Exposure ("What touches it?")**: The degree to which people, property, or natural systems are in the path of hazards like sea-level rise, storm surge, or erosion.

- •*Public Example:* "Is your house located in the 100-year flood zone? If yes, you have high exposure."

•**Sensitivity ("How bad does it hurt?")**: The degree to which an asset is affected or damaged when exposed to a hazard.

- •*Public Example:* "Is your house built on stilts (low sensitivity) or is it a one-story house on a slab (high sensitivity)?"

•**Adaptive Capacity ("How can we cope?")**: The ability of a community, infrastructure, or natural system to adjust to climate change, moderate damages, or recover quickly.

- •*Public Example:* "Do you have flood insurance, a strong evacuation plan, and a supportive community to help you recover? That is high adaptive capacity."

RISK AND VULNERABILITY SCORING

3. Scoring Methodology (The Technical Part)

A. Exposure Score (1-5)
- **1 (Low):** Outside 100-year flood zone, elevation > 10ft.
- **3 (Medium):** Within 100-year flood zone, moderate storm surge risk.
- **5 (High):** Directly on the shoreline, frequent flooding, < 3ft elevation.

B. Sensitivity Score (1-5)
- **1 (Low):** Elevated structure, flood-proof materials, no critical equipment in basement.
- **3 (Medium):** Standard construction, some history of minor damage.
- **5 (High):** Old building, critical services (power/data), low-lying, history of severe damage.

C. Adaptive Capacity Score (1-5)
- *Note: For Adaptive Capacity, high capacity reduces vulnerability, so a 5 often means high capability to adapt (e.g., lots of money/tools), and 1 means low capability.*
- **1 (Low):** No money for upgrades, no insurance, no city plan.
- **3 (Medium):** Some insurance, some protective measures in place.
- **5 (High):** Extensive flood infrastructure (seawalls), high insurance coverage, strong community, evacuation plans.

Draft Vulnerability Scoring Matrix: Carolina Beach

Asset Category	Specific Example (from Town List)	Exposure (1-5)	Sensitivity (1-5)	Adaptive Capacity (1-5)	Final Rank
Water & Sewer	Sewer Lift Stations / Treatment Plant	4	5	[CAT]	TBD
Water Supply	Town Wells / Water Towers	2	5	[CAT]	TBD
Transportation	Snow's Cut Bridge / Evacuation Routes	3	5	[CAT]	TBD
Emergency Svc	Fire Dept / Police / Storm Shelter	2	5	[CAT]	TBD
Communication	BellSouth ATT / Emergency Sirens	3	4	[CAT]	TBD
Drainage	Henniker's Ditch / Stormwater Ponds	5	3	[CAT]	TBD
Power	Power Substations	3	5	[CAT]	TBD
Public Health	Urgent Care / Pharmacies / Grocery	3	4	[CAT]	TBD
Maritime/Rec	Boat Ramps / CB State Park	5	2	[CAT]	TBD

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RISK AND VULNERABILITY SCORING

Asset or Neighborhood	Exposure (The Hazard)	Sensitivity (The Damage)	Adaptive Capacity (The Recovery)	Final Vulnerability Rank
Canal Drive / North End	**5** (Frequent sunny-day & storm flooding)	**5** (Loss of road access and home damage)	**2** (Low elevation; limited alternate routes)	**Very High (Critical)**
Boardwalk & Business District	**4** (High surge risk from ocean/basin)	**5** (Extreme economic and structural impact)	**3** (Some elevated builds; robust local response)	**High**
Wastewater Lift Stations	**3** (Risk during major storm surge)	**5** (Critical failure; public health risk)	**2** (Fixed infrastructure; expensive to move)	**High**
Lake Park Area	**4** (Significant freshwater/stormwater buildup)	**3** (Localized property & road damage)	**3** (Existing drainage systems help, but limited)	**Moderate**
Oceanfront Dunes	**5** (Direct impact from storm surge/waves)	**2** (Natural systems are built to shift)	**5** (Strong Beach Renourishment Program)	**Low**

NEXT STEPS - PHASE 2

PHASE 2 INCLUDES THE FOLLOWING KEY STEPS:

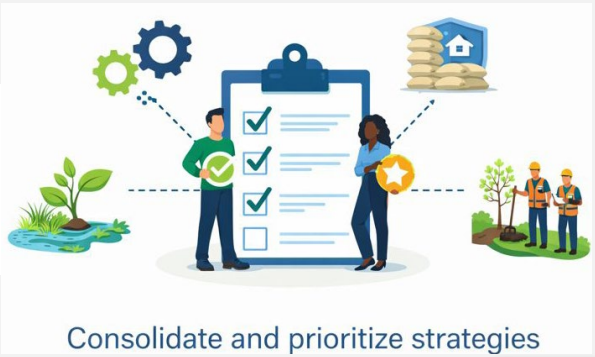
1. REVIEW YOUR RISK AND VULNERABILITY ASSESSMENT
2. IDENTIFY A SUITE OF POTENTIAL SOLUTIONS THAT ALIGN WITH THE RESULTS OF YOUR ASSESSMENT
3. DEVELOP, CONSOLIDATE, AND PRIORITIZE PROJECTS

Step 1 Identify a Suite of Potential Solutions



Identify a Suite of Potential Solutions

Step 2 Consolidate and Prioritize Projects



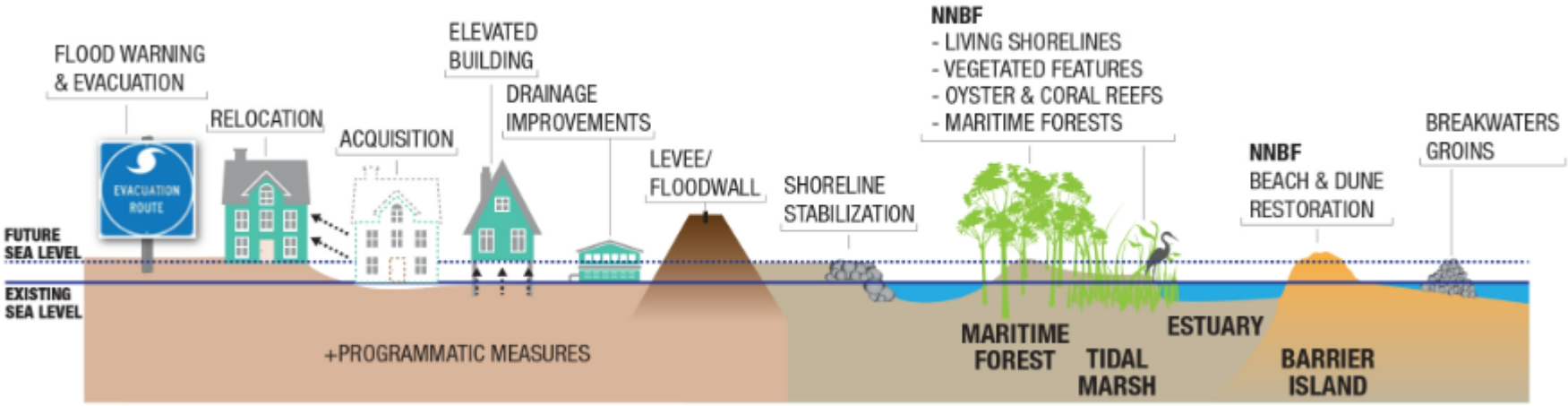
Consolidate and prioritize strategies

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Step 1

Identify a Suite of Potential Solutions

Approaches to Coastal Risk Reduction

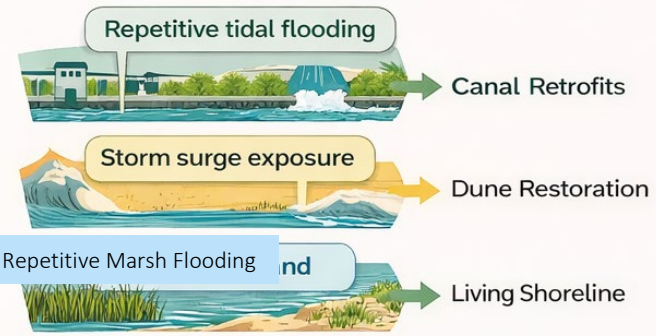


Source: U.S. Army Corps of Engineers (NACCS, 2015)

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Step 2 Consolidate and Prioritize Projects

Hazards → Strategies – Carolina Beach



Strategy → Location Matrix – Carolina Beach

Strategy	Oceanfront Dunes	Carolina Beach Lake	Canals	North End Dunes	Tier
Canal Retrofits	✓		✓	✓	Tier 1
Dune Restoration	✓	✓		✓	Tier 1
Living Shoreline	✓	✓	✓	✓	Tier 2

Tier 1 - High Priority • Tier 2: Medium Priority

Strategy → Location Matrix – Carolina Beach

Tier 1 - High Priority • Tier 2: Long-term / Monitor

RCCP Phase 2
Strategy Prioritization Scorecard

Objective: Consolidate and prioritize top resilience strategies for implementation.

1 - Low / Limited 5 - High / Strong

Strategies	Risk Reduction & Resilience Benefit	Feasibility	Cost & Funding Potential	Community Support & Equity	Environment & Co-Benefits	Total
Living Shoreline	5	4	4	4	5	26
Stormwater Pump Upgrade	4	3	3	4	5	20
Dune Restoration	5	5	4	4	4	27
Tier 1 - High Priority	5	4	3	4	4	27

Table Key:
- 1 - Low / Limited
- 2
- 3
- 4
- 5 - High / Strong

Prioritization Tiers
- Tier 1 - High Priority Projects
  - Implement first
- Tier 2 - Medium Priority Projects
  - Good but may need further development
- Tier 3 - Longer-Term Strategies
  - Monitor & revisit later

Risk Reduction & Resilience Benefit
- Reducing risk to high-priority areas, assets

Feasibility
- Technical, permitting, and maintenance feasibility

Cost & Funding Potential
- Costs and funding eligibility

Community Support & Equity
- CAT and public support, equity and social benefits

Environmental & Co-Benefits
- Nature-based, water quality, multiple benefits

Implementation Timeline
- Short- vs. long-term; planning vs. shov'el-ready

5 = High / Strong	Highly effective	Low impact	Low cost
5 = High feasible	Highly feasible	1 = Very difficult	Very difficult
5 = Cost-effective/eg$'e	Cost-effective/digible	2 = High cost / few grants	High cost / few grants

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RELEVANT LINKS

https://app.climatecentral.org/coastal-risk-finder

https://www.nhcgov.com/222/Southeastern-North-Carolina-Regional-Haz

https://experience.arcgis.com/experience/203f772571cb48b1b8b50fdcc3272e2c/page/Category-1

https://sunnydayflooding.com/view-data/

https://www.climate.gov/maps-data/dataset/sea-level-rise-map-viewer

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