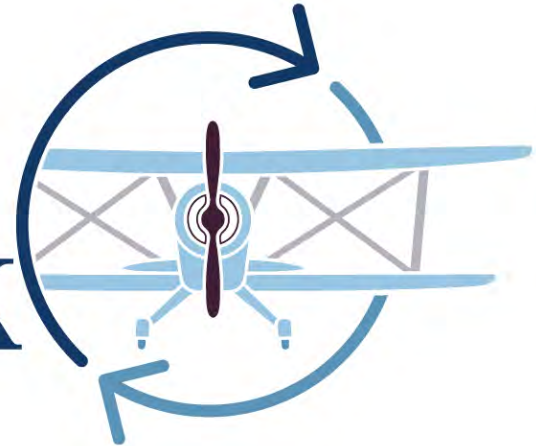


Resilient Coastal Communities Program

February 2024

R E S I L I E N T
Kitty Hawk

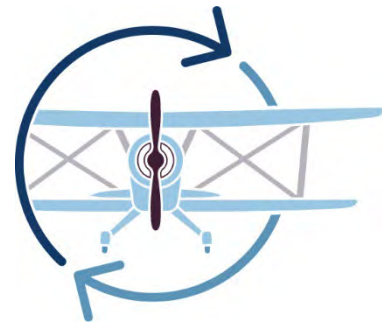


Agenda

- + Introduction & Schedule
- + Public Meeting Results
- + Survey Results
- + Vision and Goals
- + Critical Facilities Map
- + Natural Infrastructure
- + Risk and Vulnerability
- + Schedule next CAT Meeting



Community Action Team



Team of dedicated members concerned about the resiliency of the town

Responsible for:

- Document and data review
 - Discussion
 - Outreach
 - Project prioritization
-
- | | |
|--|--|
| ■ Rob Testerman, Planning Director | ■ Willie Midgett, Director of Public Works |
| ■ Craig Merrill, Planning Board | ■ Mike Talley, Fire Chief |
| ■ David Morton, Retired Building Inspector | ■ Jimmy Helms, Police Lieutenant |
| ■ Carlos Gomez, Civil Engineer | ■ John Delucia, Town Engineer |
| ■ Amy Wells, Kitty Hawk resident | ■ Pete Mantz, Recreation Committee |
| | ■ Paul Henriques, Recreation Committee |

CAT Meeting Schedule

RCCP Grant-specific engagement			
CAT Meeting #1	November 15, 2023	Introduce the RCCP and planning process Appoint a CAT Champion Discuss member roles Assign tasks to members on identifying contacts in vulnerable communities Schedule first public workshop, discuss targeted outreach & next CAT meeting	RCCP Handbook Phase 1, Steps 1-4
CAT Meeting #2	December 19, 2023	Discuss existing plans and efforts, Schedule targeted outreach, prepare draft goals and vision	RCCP Handbook Phase 1, Steps 2-4
CAT Meeting #3	February 2024	Community Action Team meeting to review and discuss risk and vulnerability assessment Schedule second public workshop & next CAT meeting	RCCP Handbook Phase 1, Steps 5-6
CAT Meeting #4	March 2024	Community Action Team meeting to discuss development of potential resilience projects	RCCP Handbook Phase 2, Step 1
CAT Meeting #5	April 2024	Community Action Team meeting to discuss prioritization and draft plan	RCCP Handbook Phase 2, Step 2

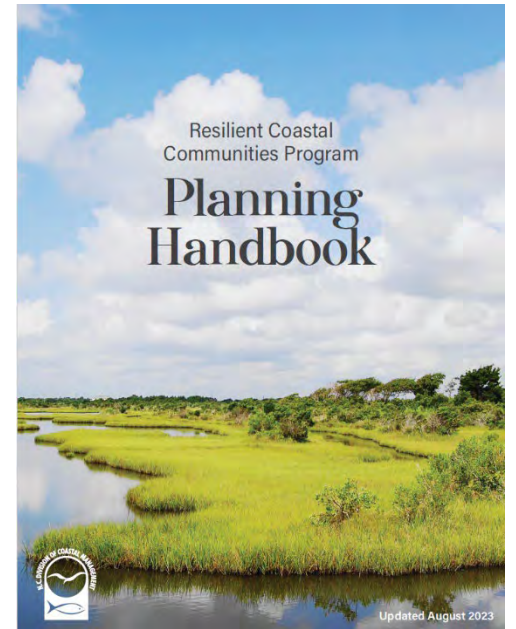
Resilient Coastal Communities Program Objectives



The RCCP Handbook

Phase 1: Community Engagement and Risk & Vulnerability Assessment

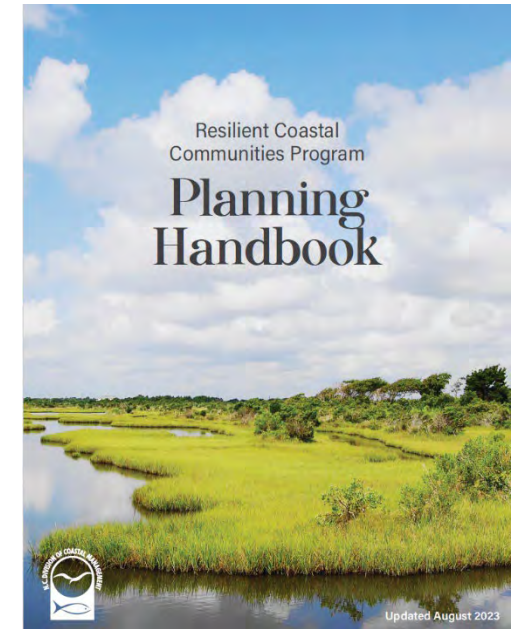
- ✓ Step 1: Develop a Community Action Team
- ✓ Step 2: Review Existing Plans and Efforts
- ✓ Step 3: Set Vision and Goals
- ✓ Step 4: Develop a Community Engagement Strategy
- ✓ Step 5: Identify and Map Critical Assets, Natural Infrastructure, and Socially Vulnerable Populations
- Step 6: Conduct Risk and Vulnerability Assessment



The RCCP Handbook

Phase 2: Planning, Project Selection, and Prioritization

- Step 1: Identifying a Suite of Potential Solutions
- Step 2: Consolidate and Prioritize Projects



Public Meetings and Survey Results



Public Meeting


- Back-to-back drop-in public meetings on January 25 and 26th, 2024 to receive feedback regarding flooding and storm protection.
- The first meeting was held from 6:00-8:00 pm on Thursday evening.
- The second meeting was held on Friday morning from 10:00 am-12:00 pm.



Public Meeting

Vision and Goals

- General support for Vision and Goals
- Natural Resources / green infrastructure goals may need to be revised or clarified

Resiliency Vision and Goals 







DRAFT Vision

“The Town of Kitty Hawk is a thriving, Outer Banks village, focused on improving its long-term viability by prioritizing the enhancement and protection of its natural resources, preparing infrastructure assets, and providing effective response and recovery to residents and visitors.”

Do you support the vision for the town's recovery? (Place dots below)

YES	KIND OF	NOT REALLY	How would you change it? (Write below)
PLACE DOT FOR YES	PLACE DOT FOR KIND OF	PLACE DOT FOR NOT REALLY	WRITE IN RESPONSES HERE

Do these goals reflect your hopes for recovery for Kitty Hawk? (Place dots below)

	YES	KIND OF	NOT REALLY
1		KIND OF	NOT REALLY
2		KIND OF	NOT REALLY
3		KIND OF	NOT REALLY
4		KIND OF	NOT REALLY
5		KIND OF	NOT REALLY
6		KIND OF	NOT REALLY

DRAFT Goals

Goal 1: Protect and improve public infrastructure to reduce impacts from natural hazards and increase coastal resilience.

Goal 2: Maintain and improve the effectiveness and resiliency of public safety response.

Goal 3: Ensure Kitty Hawk continues to be a livable community with diverse economic opportunities.

Goal 4: Provide educational opportunities to increase public awareness and understanding of coastal risks and resiliency.

Goal 5: Safeguard natural resources including existing tree canopy, wetlands, beaches, dunes, and shorelines, and encourage green stormwater infrastructure and low impact development techniques in new development.

Goal 6: Provide guidance for future investment, planning, and regulatory changes to manage stormwater, and limit future property impacts.

Public Meeting

Threats / Hazards

- Soundside Flooding
- Erosion
- Rainy day flooding
- Storms

Tell Us About Potential Hazards RESILIENT Kitty Hawk

Kitty Hawk's coastal location makes it susceptible to extreme natural events such as hurricanes, coastal storms, coastal erosion, sea level rise, and more. Please indicate below which hazard types you are most concerned about.

What types of hazards concern you the most? Instructions: Put a dot on all hazards that concern you.

Flooding; Ocean Overwash		PLACE DOT HERE
Soundside Flooding		PLACE DOT HERE
Beach or Soundside Erosion		PLACE DOT HERE
"Rainy Day" Flooding (Rainwater, Stormwater Flooding)		PLACE DOT HERE
Sea Level Rise		PLACE DOT HERE
Extreme Heat		PLACE DOT HERE
Hurricanes or Tropical Storms		PLACE DOT HERE
Severe Weather (Thunderstorms, Lightning, Tornadoes)		PLACE DOT HERE
Wildfires		PLACE DOT HERE
Rising Groundwater Table		PLACE DOT HERE
Drought		PLACE DOT HERE
Transportation Infrastructure Failure		PLACE DOT HERE
Other Hazards (Open Ended)	 <small>from mobile: hurricanes, tropical storms and other coastal storms ← Gusty 10th floor tropical - tropical waves</small>	WRITE IN RESPONSES HERE

Public Meeting

Flood Prone Areas

- Kitty Hawk Landing
- Kitty Hawk Rd./Twiford St.
- On either side of Kitty Hawk Village
- Ocean side- South of Kitty Hawk Rd. to Tateway Rd

Where do YOU see flooding?

RESILIENT
Kitty Hawk

Please place a dot (or dots) where you have seen flooding occur in Kitty Hawk.

Context

- Town Limits
- Points of interest
- Town Hall
- Law Enforcement
- Fire Stations
- EMS



Public Meeting

Community Assets

- Fire, police and emergency services
- Infrastructure
- Municipal facilities
- Businesses

Tell Us About Community Assets RESILIENT Kitty Hawk

Kitty Hawk's critical assets includes the community's natural resources (wetlands, forests, beaches, dunes, creeks, and floodplains) in addition to buildings that provide fundamental services for the community, such as government buildings.

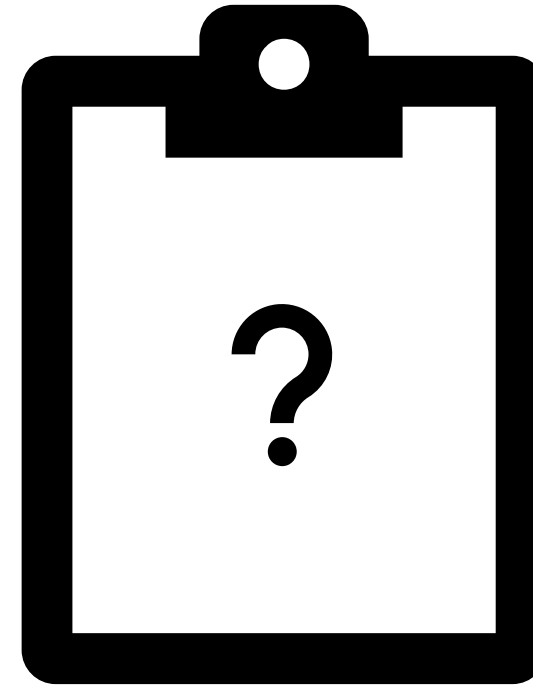
Instructions: Rank the following community assets in Kitty Hawk.
Use stickers numbered **1** through **5**.
1 = most important ; 5 = least important

Fire Station, Police Station, Emergency Services	1 2 3 4 5
Infrastructure (Bridges, Roads, Stormwater Conveyance / Ditches)	1 2 3 4 5
Utility Infrastructure (Water, Electricity, Etc.)	1 2 3 4 5
Town Municipal Facilities	1 2 3 4 5
Small Businesses	1 2 3 4 5
Parks and Town Recreational Facilities	1 2 3 4 5
Gas Stations	1 2 3 4 5
Pharmacies	1 2 3 4 5
Medical Offices	1 2 3 4 5
Grocery Stores	1 2 3 4 5
Hardware Stores	1 2 3 4 5
Other Assets (Open Ended)	1 2 3 4 5

WRITE IN RESPONSES HERE

Survey

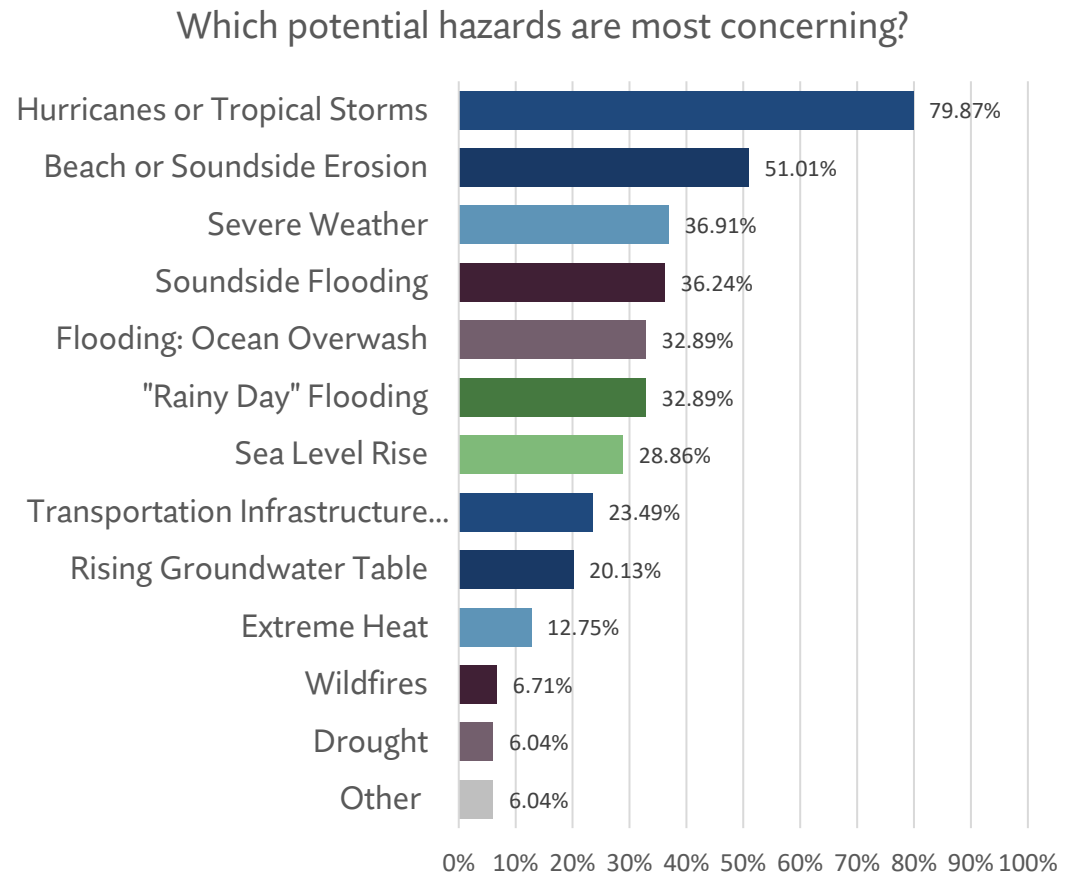
- How do you relate to Kitty Hawk?
- Where do you live?
- What types of hazards concern you the most?
- Rank community assets.



Survey

Threats/Hazards

- Hurricanes or Tropical Storms
- Beach or Soundside Erosion
- Severe Weather

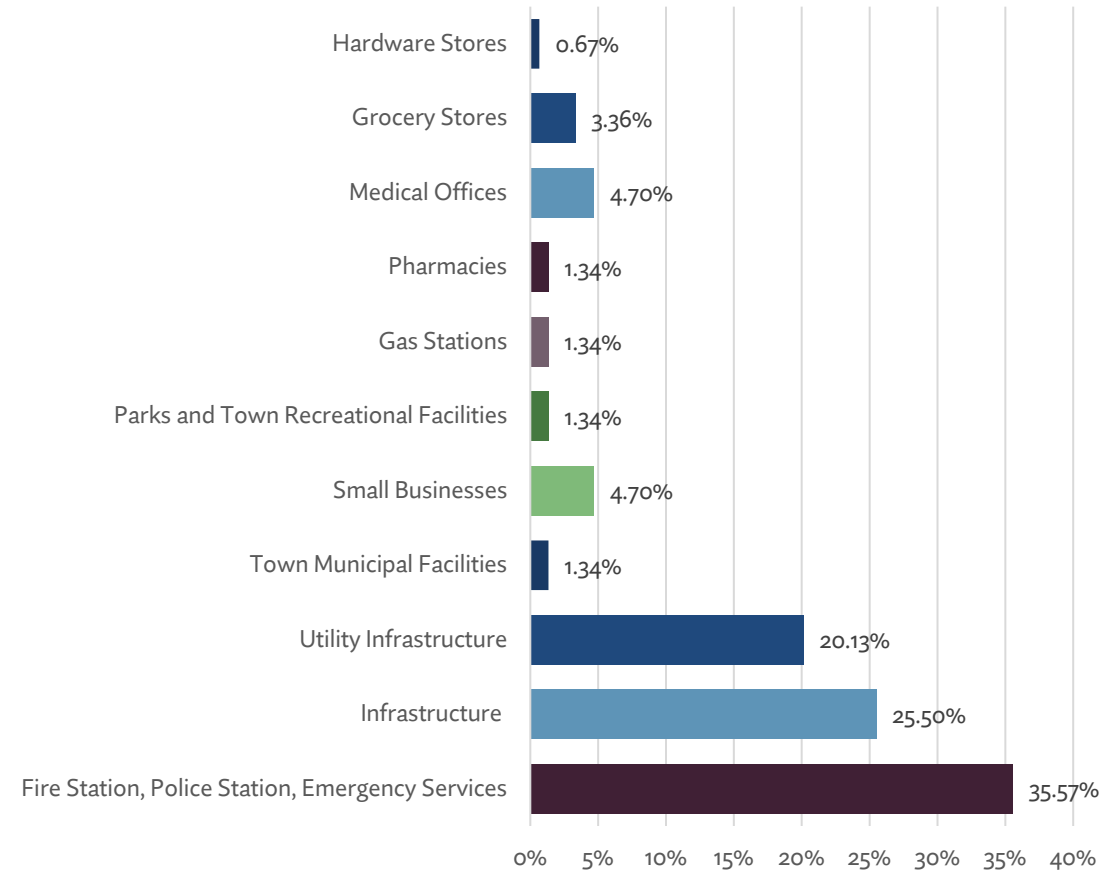


Survey

Community Assets

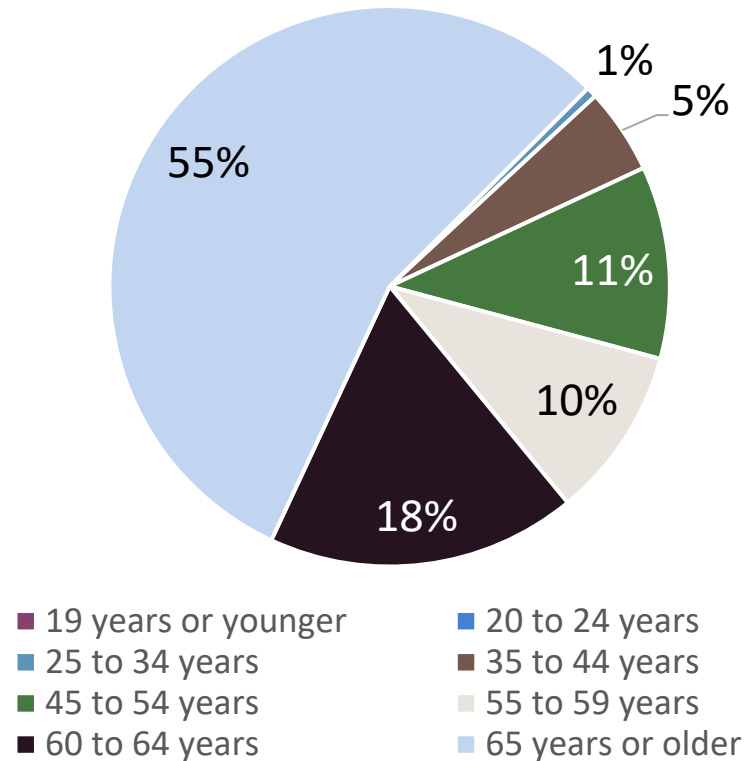
- Fire Station, Police Station, Emergency Services
- Infrastructure
- Utility Infrastructure

Which community asset is most important to be prioritized in this plan?

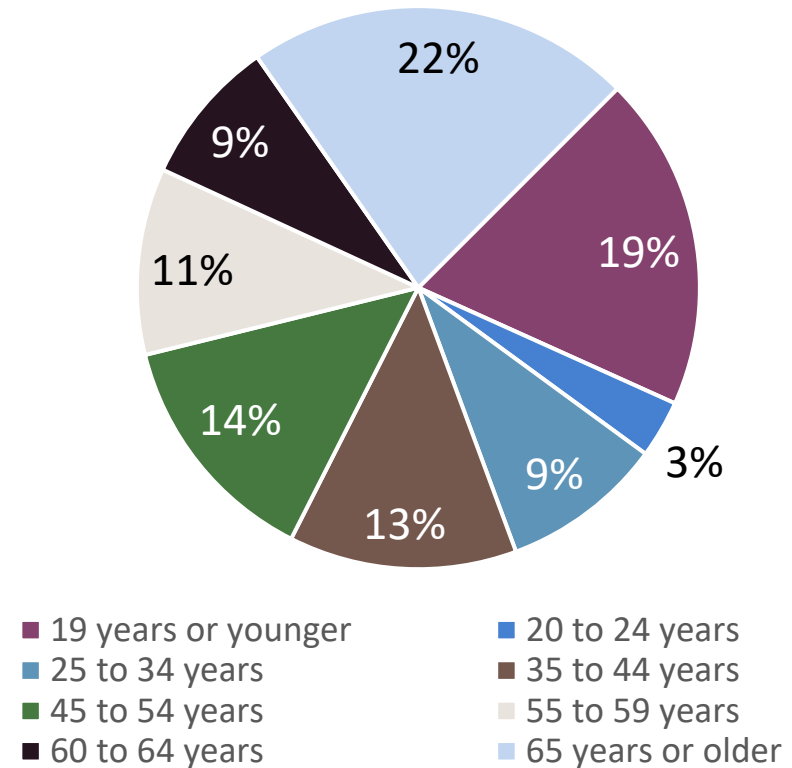


Comparison: Survey Participants + 2020 Census Data

What Best Describes Your Age?

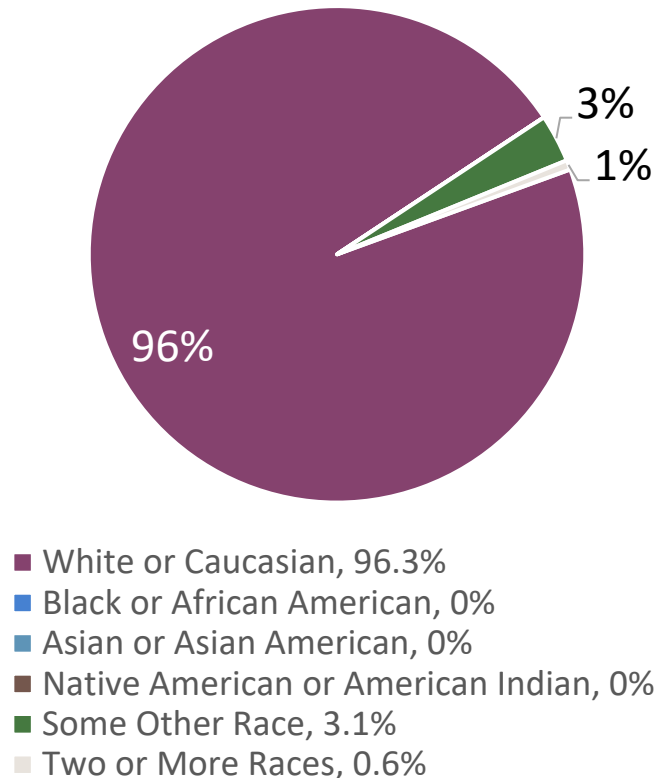


2020 Age Cohorts

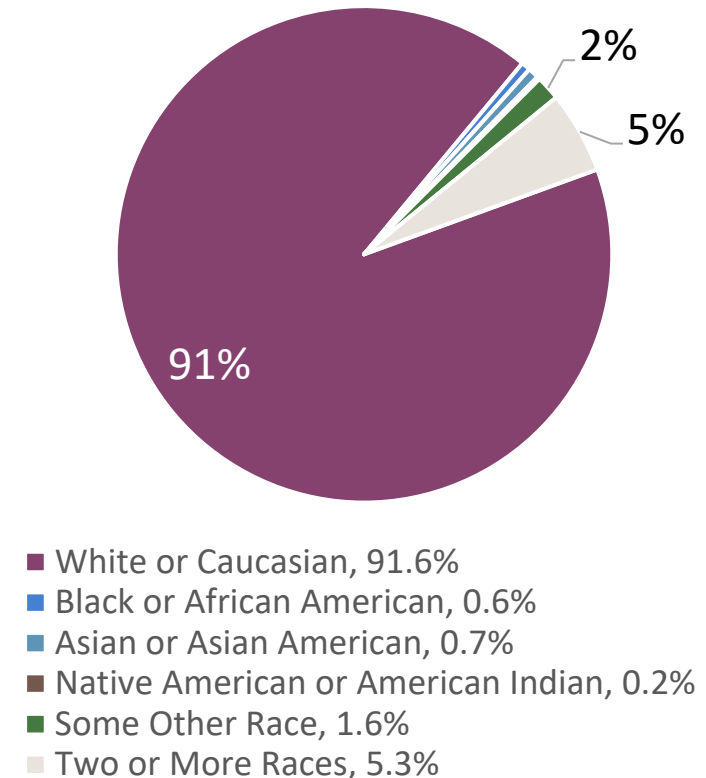


Comparison: Survey Participants + 2020 Census Data

What Best Describes Your Race?

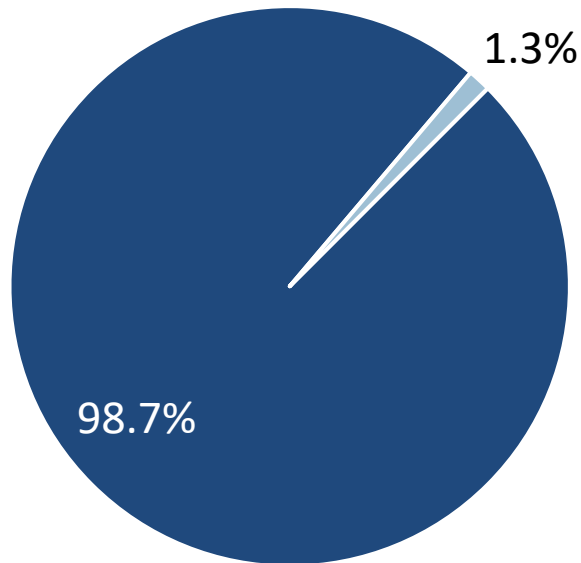


2020 Racial Make Up



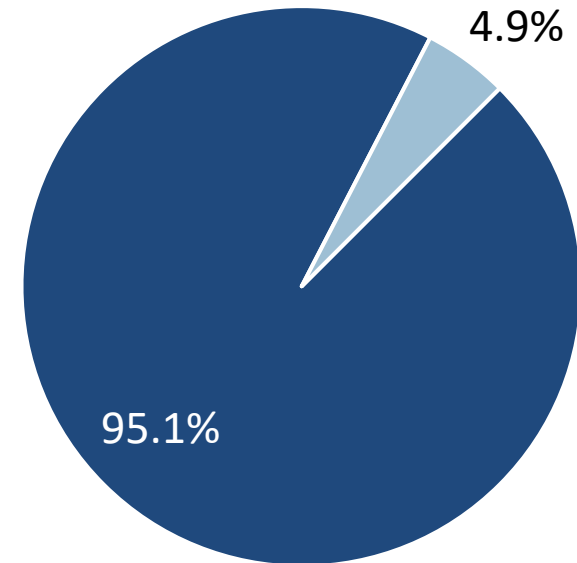
Comparison: Survey Participants + 2020 Census Data

What Is Your Ethnicity?



■ Not Hispanic or Latino/x/e ■ Hispanic or Latino/x/e

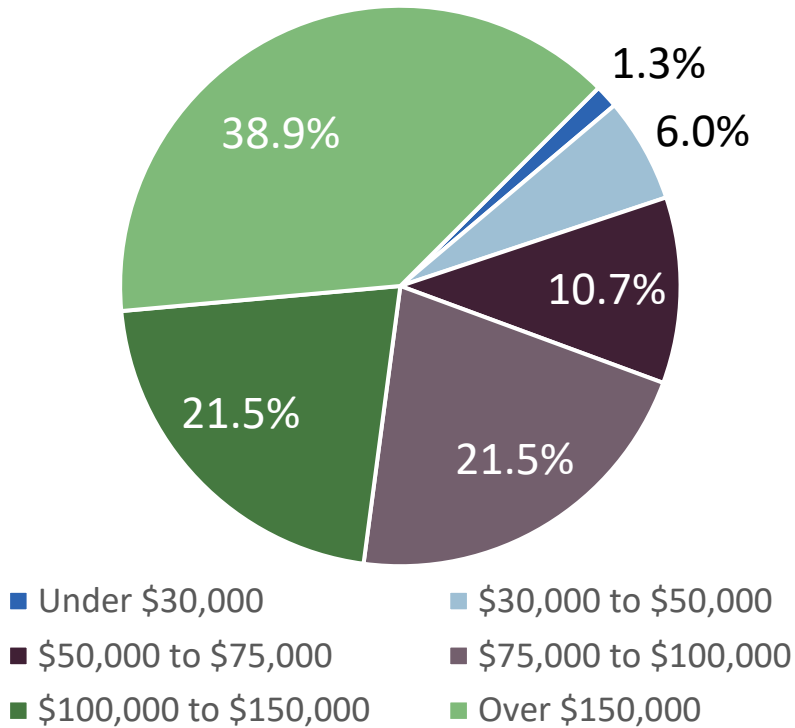
Ethnicity (2020)



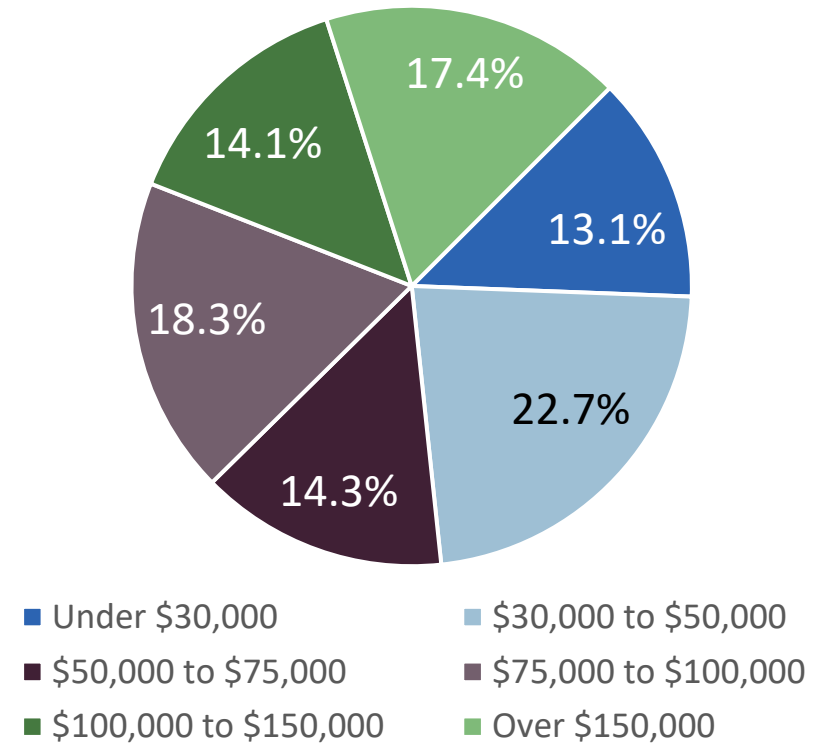
■ White/Non-Hispanic ■ Hispanic

Comparison: Survey Participants + 2020 Census Data

What best describes your
household income?



2020 Household Income



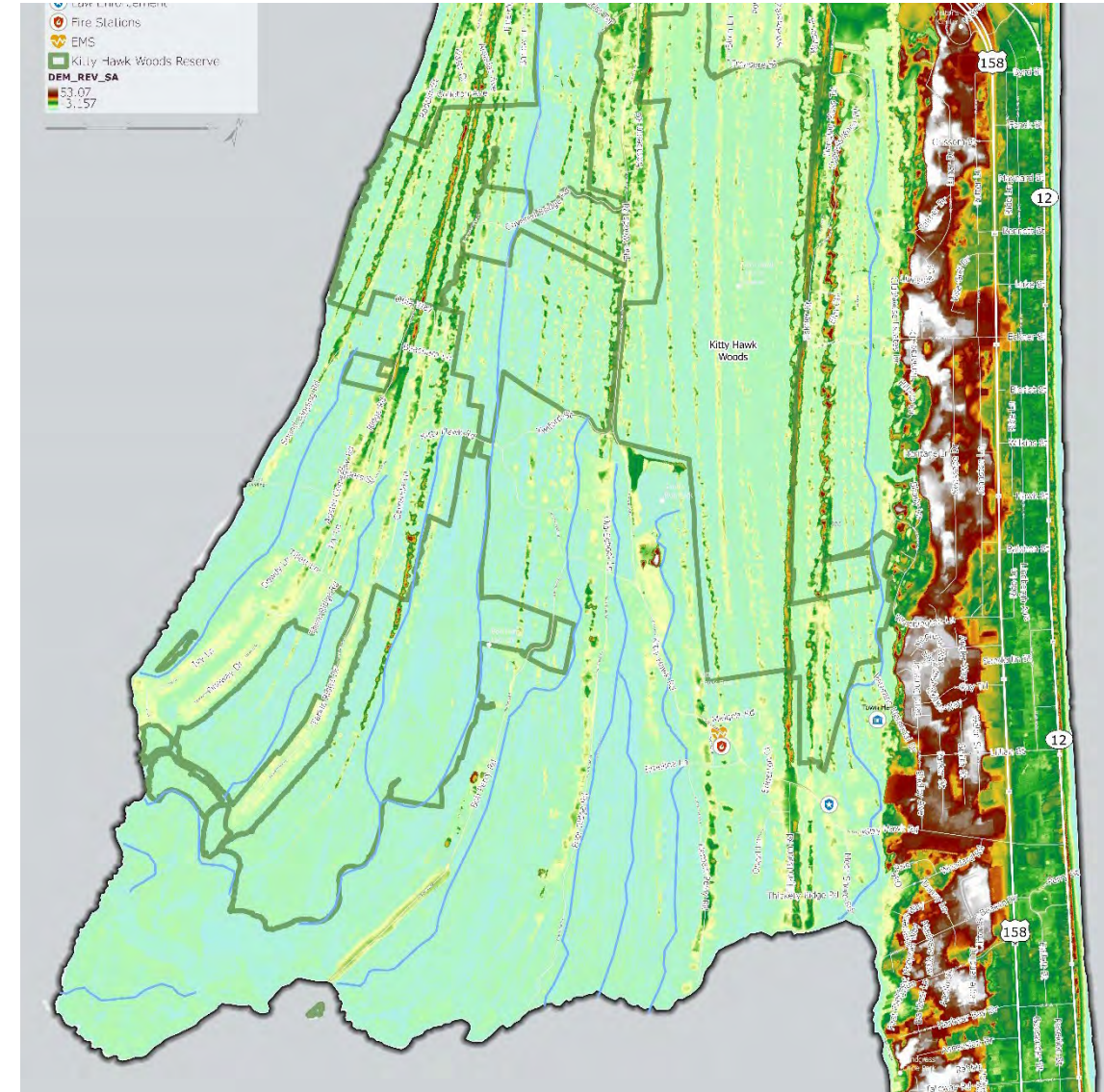
Vulnerability

+

Hazard Mitigation Plan

Flooding Risk Assessment

- **Total Population At Risk**
 - 1,082 out of 3,270 people (33.1%)
- **Elderly Population at Risk (65 & older)**
 - 165 out of 498 (33.1%)
- **Children at Risk (5& Under)**
 - 59 out of 177 (33.3%)



Hazard Mitigation Plan

Flooding Risk Assessment

Estimated Buildings Impacted

■ Total Buildings At Risk

- 911 or 32.5% of Total buildings impacted by the 100-year floodplain with estimated damages of over \$ 14 million

■ Residential Buildings at Risk

- 855 or 30.5% with estimated damages at nearly \$12.5 million

■ Commercial Buildings at Risk

- 49 or 1.7% with estimated damages of nearly \$1.4 million

■ Public Buildings at Risk

- 7 or .2% with estimated damages of \$450,000

Figure 4.29 – Characteristics of a Riverine Floodplain

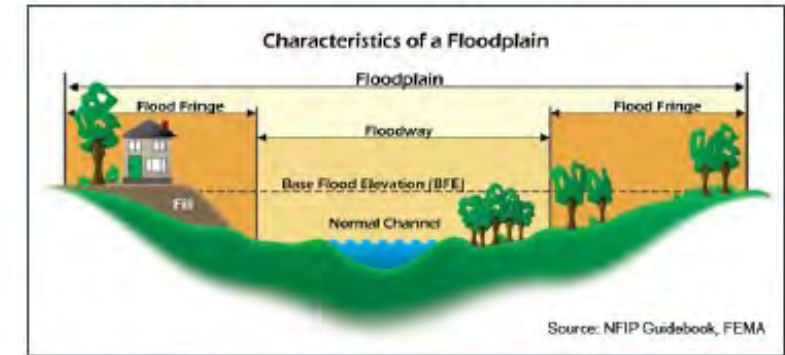
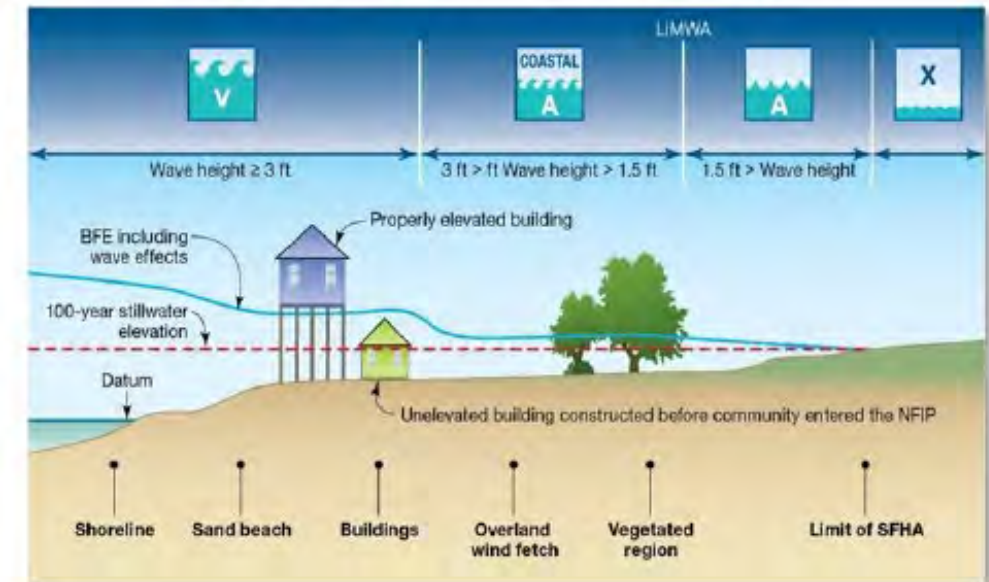


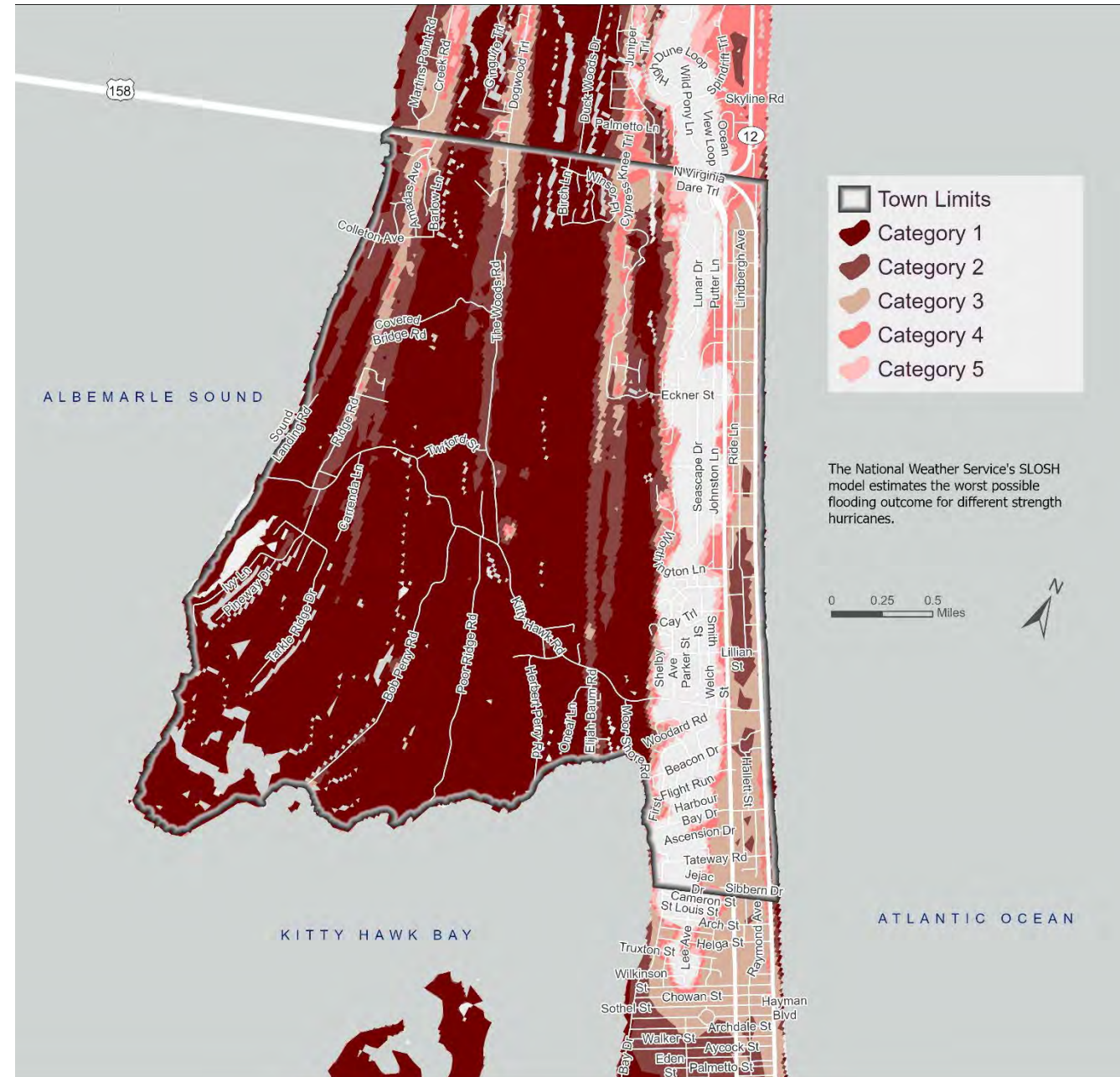
Figure 4.30 – Characteristics of a Coastal Floodplain



Storm Surge

- Models worst case scenario directional storm surge flooding
- Most of Kitty Hawk is susceptible to a Category 1 or 2 storm

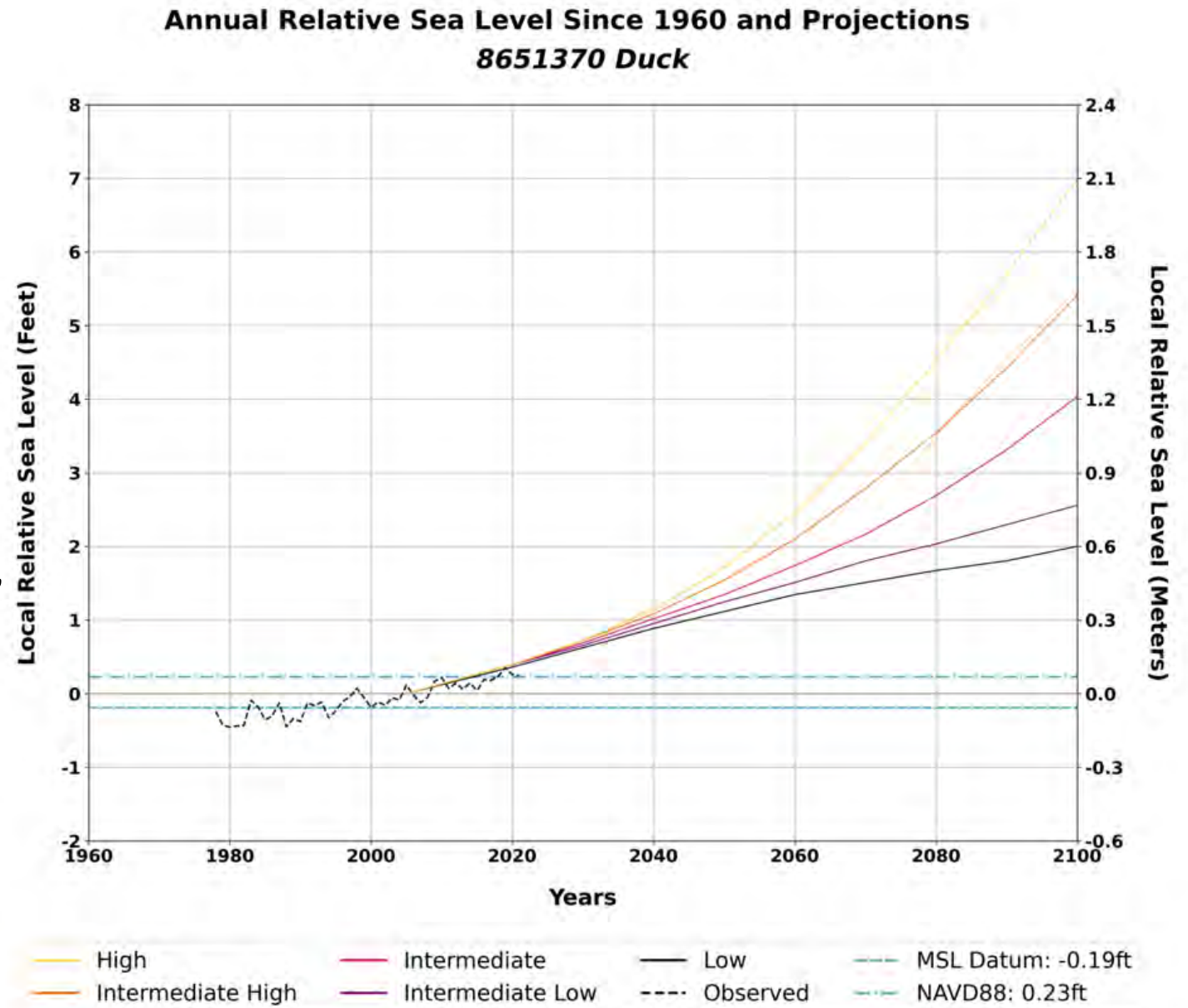
Source: NOAA SLOSH Model



Sea Level Rise

The **intermediate-high** scenario predicts an increase of just over 2 feet by the year 2060.

The **intermediate** scenario predicts slightly under 2 feet, and the intermediate low and low scenarios predict about 1 ½ feet.

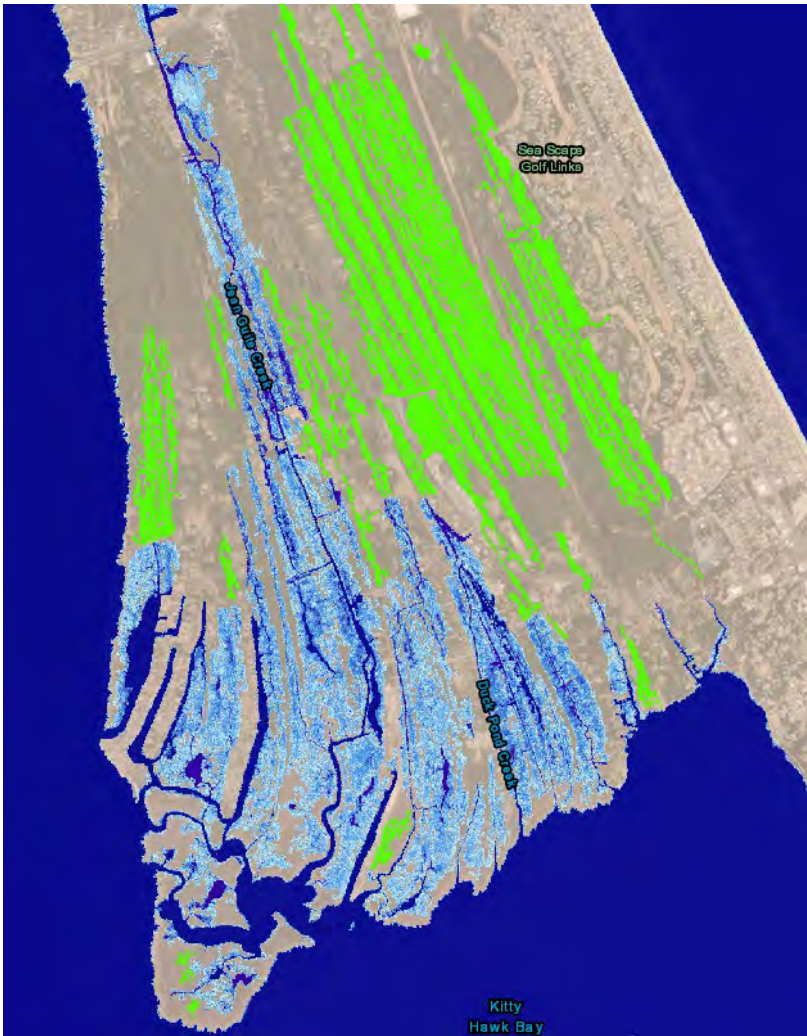


Sea Level Rise

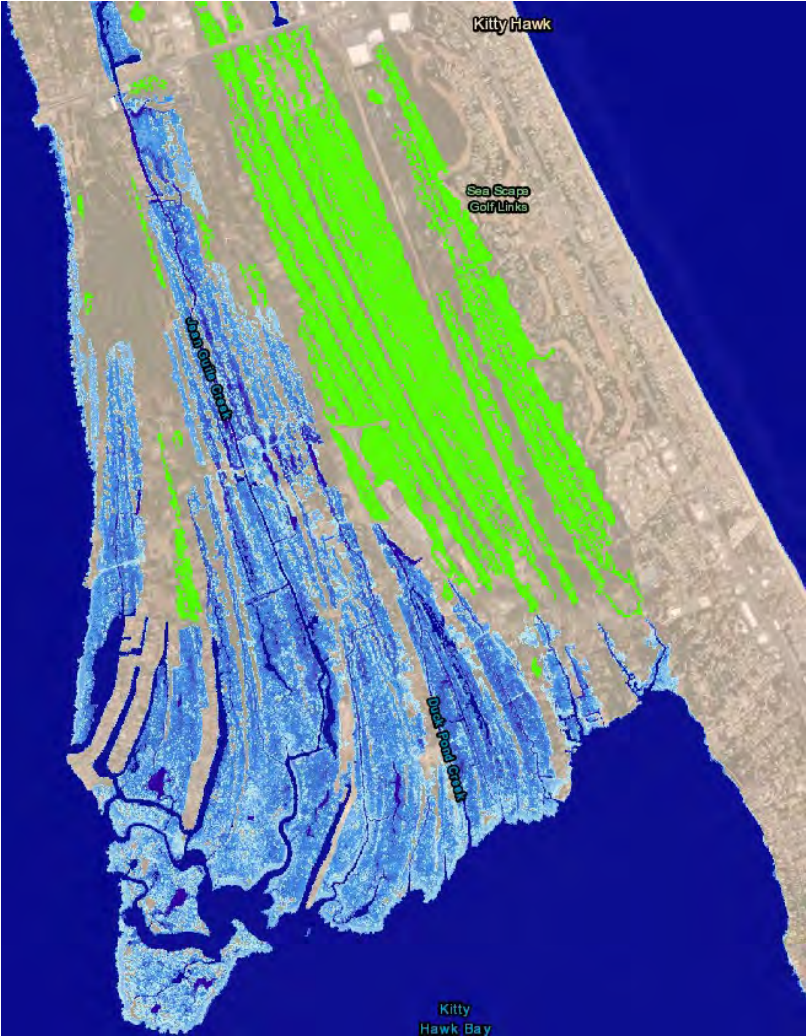
Images shown are in between intermediate and intermediate high scenarios

Intermediate anticipates 1.08 ft increase by 2040, 1.80 ft by 2060, and 2.76 ft by 2080

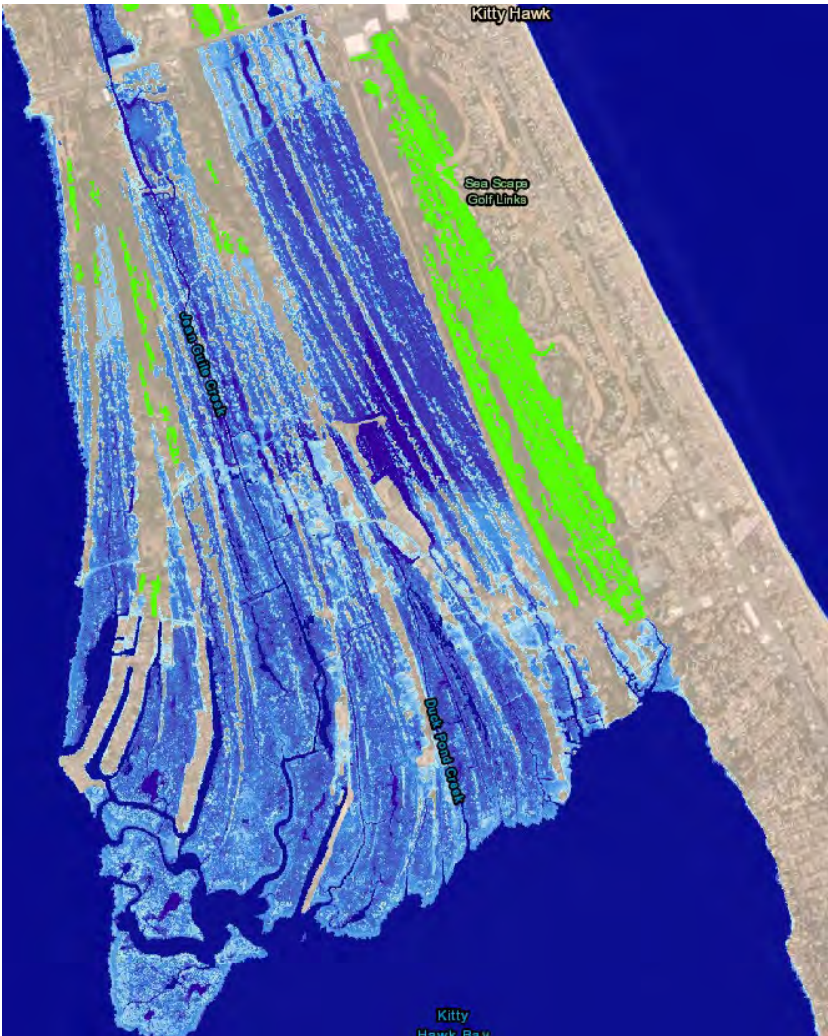
Intermediate high anticipates 1.15 ft increase by 2040, 2.17 ft by 2060, and 3.61 ft by 2080



2040



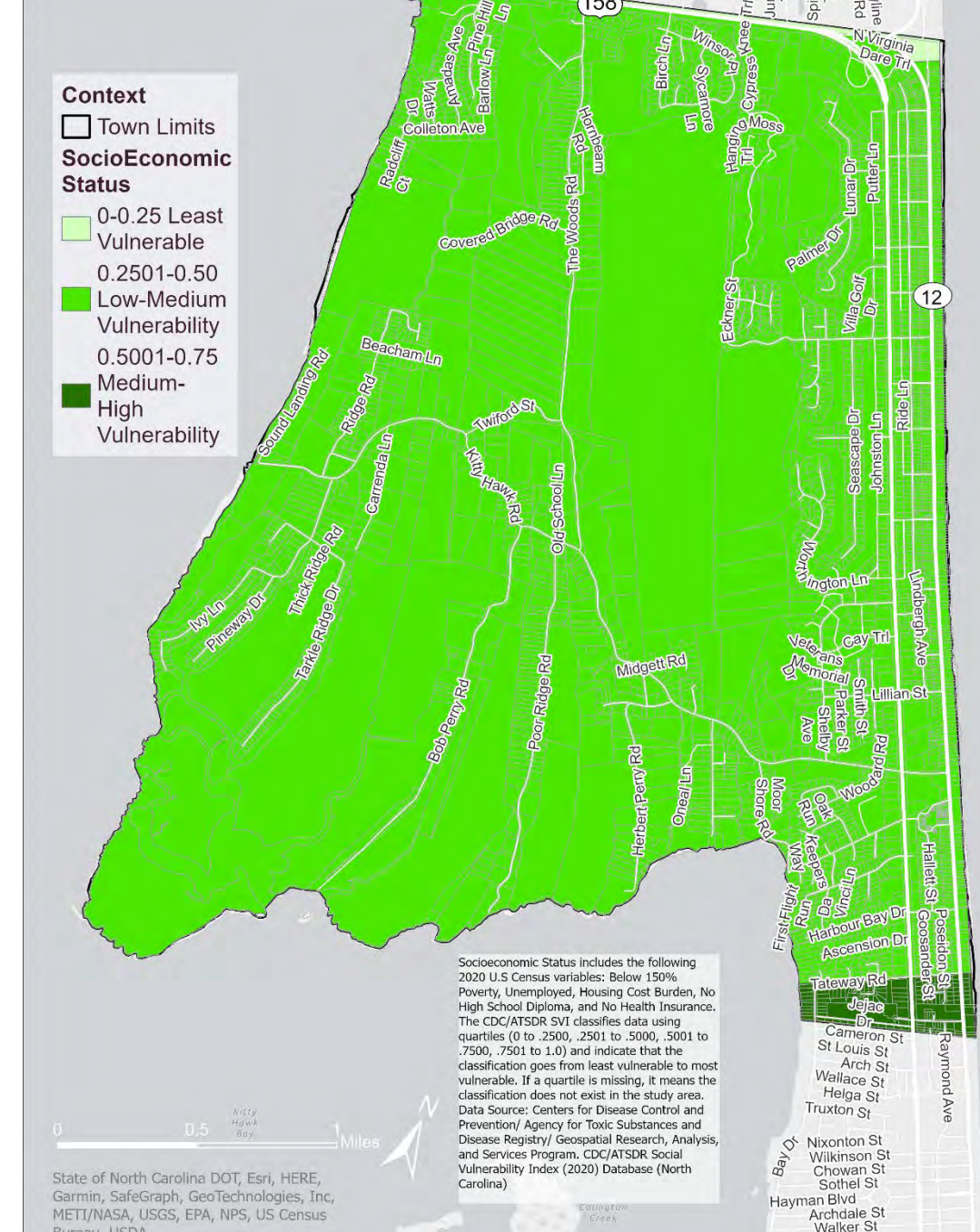
2060



2080

Socioeconomic Vulnerability

- Below 150% Poverty (~150 People)
- Unemployed (~130 People)
- Housing Cost Burden
- No High School Diploma
- Other Vulnerable populations
 - Age 65+ (~630 People)
 - W/Disability (~400 People)
 - Minority (~125 People)



Critical Assets and Natural Infrastructure



Critical Assets that Must be Identified

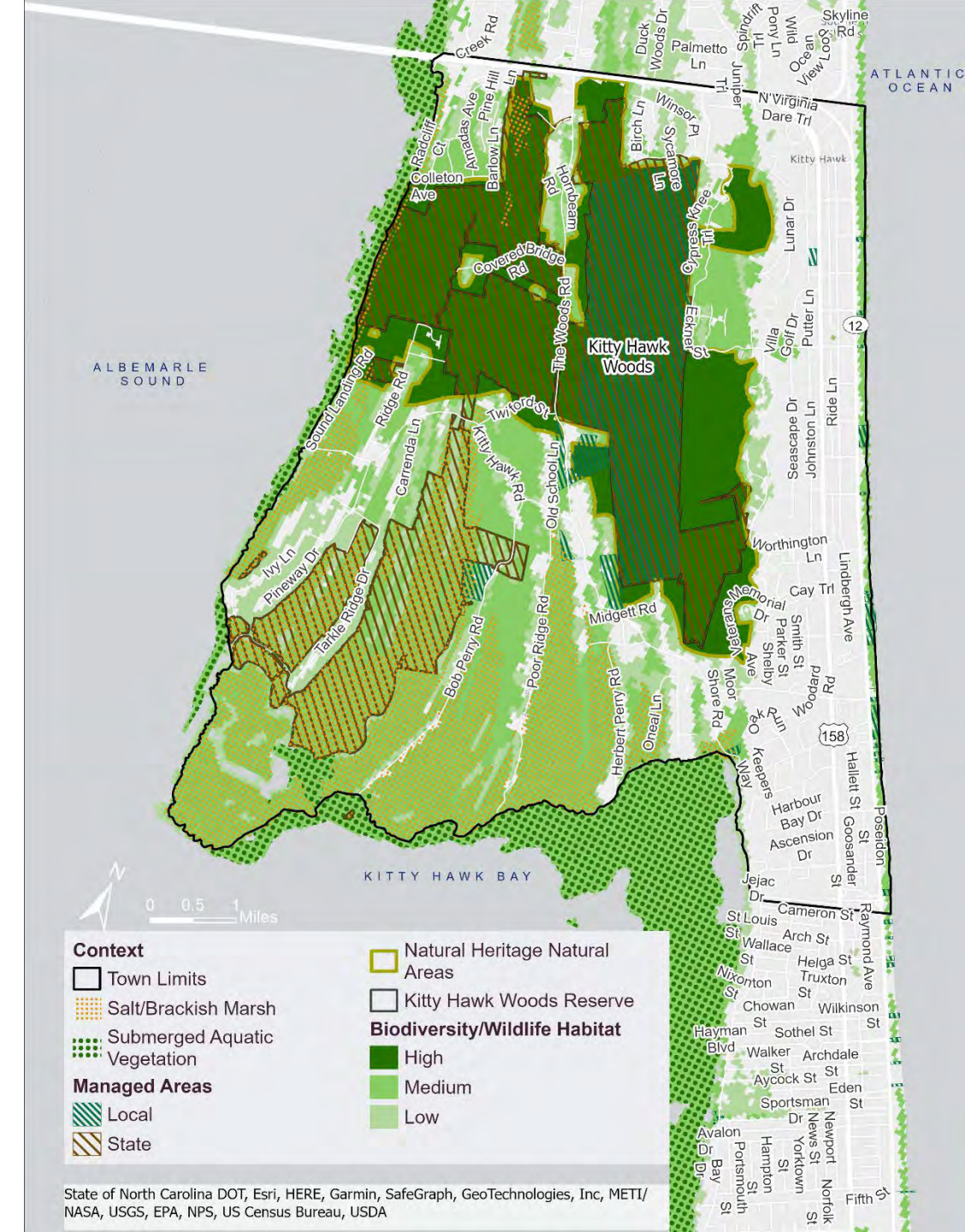
1. Are the assets critical for the continuity of daily operations?
2. Are the assets central to economic functioning and vitality?
3. Are the assets integral to social services?
4. Are the assets critical for life and safety?
5. Are the assets irreplaceable if damaged or destroyed?
6. Are the assets an integral part of community cohesiveness?
7. Do the assets have a history of damage from natural hazards?
8. What places and natural areas are important to the community's heritage?



Figure 6 | Required Critical Assets to Map

Natural Infrastructure

- Kitty Hawk Woods
- Managed Areas
- Natural Heritage Natural Areas
- Wetlands
- Floodplains
- Beaches and Dunes



Critical Assets Map

- 1 - Church/Religions
- 2 - Emergency Services
- 3 - Kitty Hawk Elementary
- 4 - Gas Station (7-Eleven)
- 5 - Dominion Energy Office
- 6 - Food Lion
- 7 - Walmart
- 8 - Harris Teeter
- 9 - Home Depot
- 10 -Government
- 11 - Emergency Services
- 12 - Gas Station (BP)
- 13 - Walgreens
- 14 - Medical
- 15 - Medical
- 16 - Medical
- 17 - Gas Station (Shell)
- 18 - Gas Station (Mobil)
- 19 - Church/Religious
- 20 - Lifeguard Station
- 21 - USPS
- 22 - Gas Station (7-Eleven)
- 23 - Church/Religious
- 24 - Church/Religious
- 25 - Dominion Substation
- 26 - Town Hall
- 27 - Emergency Services
- 28 - Church/Religious
- 29 - Church Religious
- 30 - Emergency Services
- 31 - Public Works
- 32 - Bob Perry Boat Ramp & Waste and Recycling Center
- 33 - Bob Perry Landing
- 34 - Gas Station (Citgo)
- 35 - Emergency Services

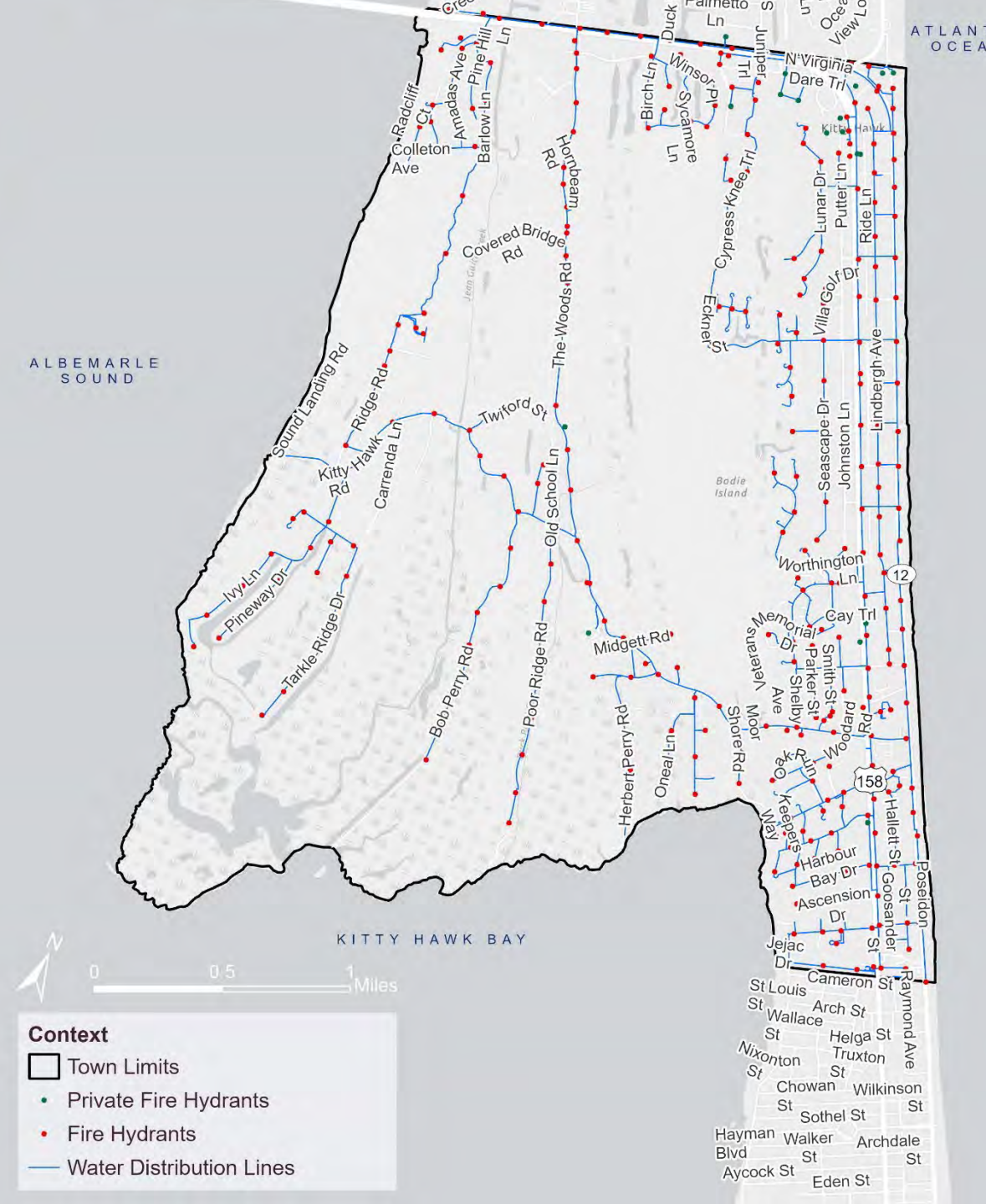
Context

- Town Limits
- Stormwater Pipes
- Sump Standpipes
- Evacuation Route
- Electric Substation
- Transmission Power Lines
- Critical Infrastructure



Supporting Infrastructure

- Water Lines and Hydrants
- Stormwater infrastructure (not shown on this map)



Risk and Vulnerability Assessment



Asset Summary

Summary of Asset Ownership and Value	
Asset Ownership	Estimated Value
Private	\$122,822,920
Public	\$57,818,982
Total	\$180,641,902

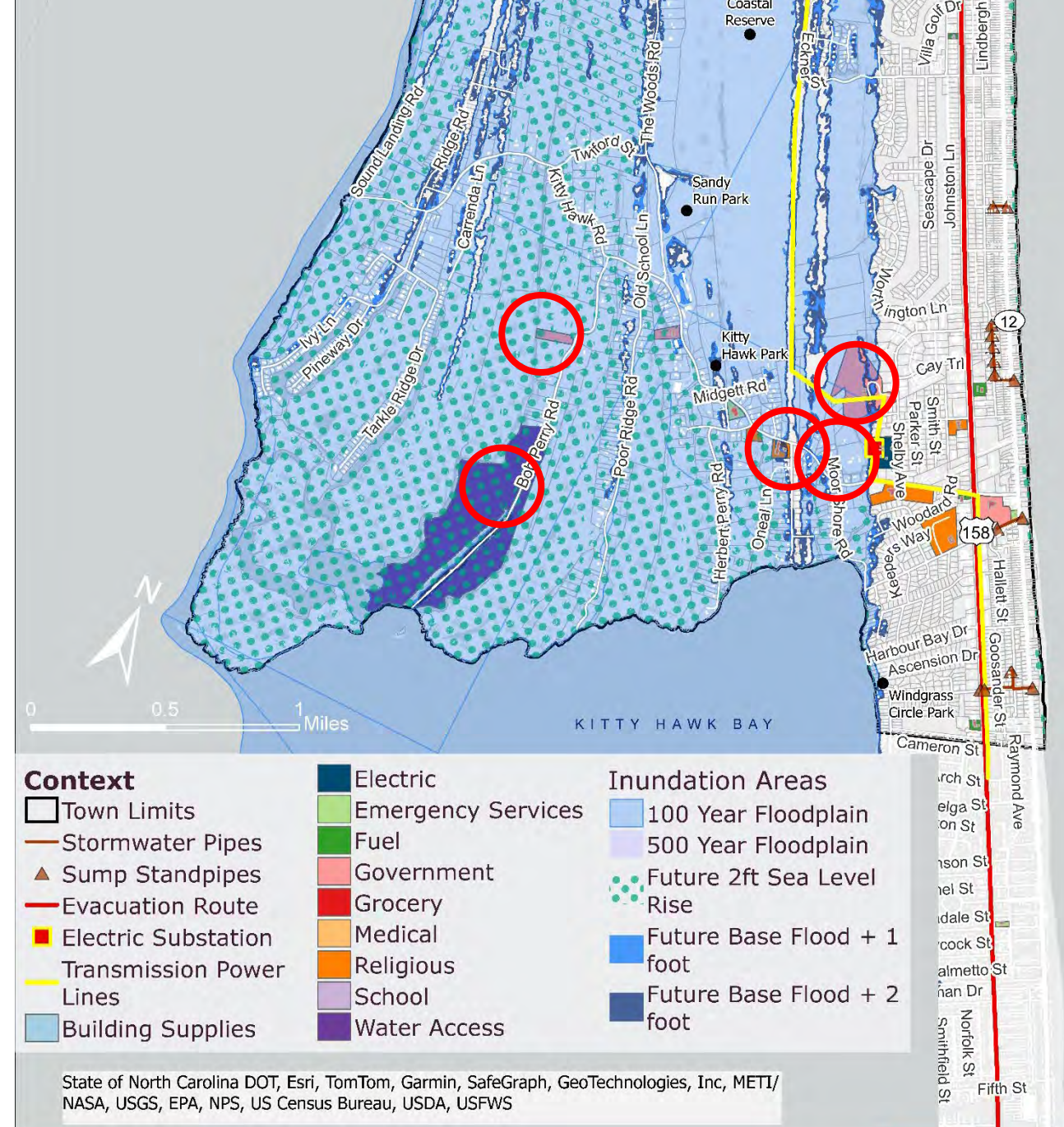
Summary of Asset Type and Value	
Asset Type	Estimated Value
Building Supplies	\$11,868,000
Electric	\$30,778,673
Emergency Services	\$ 8,748,616
Fuel	\$7,705,021
Government	\$11,320,385
Grocery	\$35,615,700
Medical	\$20,055,100
Religious	\$21,671,733
School	\$31,061,800
Water Access	\$1,816,874
Total	\$180,641,902

Quantifying Vulnerability

Field	Vulnerability-SLR	Vulnerability –SLOSH	Vulnerability- Future FLD	VUL_Comp
Long Name	Vulnerability to sea level rise of 2'	Vulnerability to storm surge from hurricanes and tropical storms	Vulnerability to flooding during the 1% annual flood chance storm after 2' SLR	Composite Vulnerability
Description	3=highest (Building impact or majority of property by projected SLR water level; 2=moderate (Property impacted alone); 1= low (all others)	3=highest (susceptible to flooding in Category 1 hurricanes); 2=moderate (susceptible to flooding in Category 2 hurricanes); 1=low (susceptible to flooding in Category 3-5 hurricanes)	3=highest (inundated or within the current and future SFHA at the 2' SLR scenario); 2=moderate (in the current and future SFHA at the 2' SLR scenario); 1=low (no buildings or property impacts)	Mathematical sum of all vulnerability measurements = Vulnerability- SLR+ Vulnerability-SL OSH+ Vulnerability Future FLD
Notes	2' of SLR corresponds to the anticipated in the next 30-35 years using NOAA's Intermediate scenario.	Uses National Weather Service SLOSH model to understand potential inundation expected during hurricanes of varying intensity, based on worst-case directional approach.	This approximates the potential impacts of future rainfall and storm events that are not associated with coastal vulnerability. Uses the NCEM dataset that explores what the future 1% annual flood chance area (Special Flood Hazard Area) might resemble after 2 feet of sea level rise.	To assist in prioritizing by vulnerability, which does not necessarily correlate with operational importance or community importance. This is essentially the Sensitivity Score defined in the handbook on pg. 35.

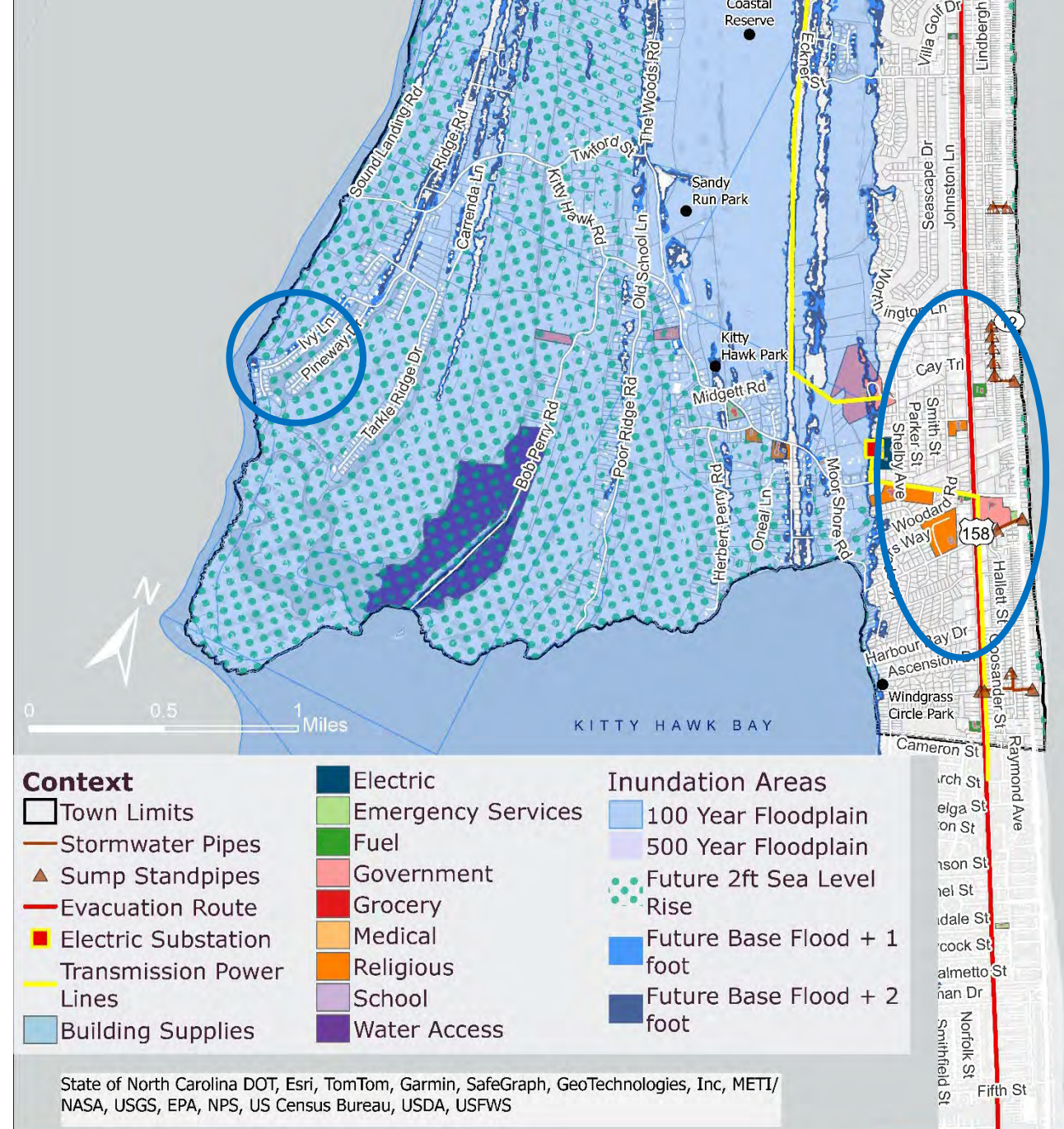
Vulnerable Assets (Draft v1)

- Town Hall
- All Saints Episcopal Church
(in Southern Shores)
- Kitty Hawk United Methodist
- Bob Perry Landing
- Kitty Hawk Police Department
- Boat Ramp



Other Vulnerabilities and Factors

- Ocean overwash
- Rainy day localized flooding
- Heat exposure
- Adaptive capacity (i.e. potential to elevate)
- Other public input



What's Next?

Today

- Discuss Critical Assets map and risk assessment
- Set date/time for next CAT meeting

Upcoming

- Finalize risk assessment
- Develop project recommendations
- CAT #4
- Public meeting #2
- Rank projects / CAT #5

Project Website:

<https://www.kittyhawknc.gov/departments-and-services/planning-and-inspections/>

Contact: Rob Testerman, Planning Director,

Rob.Testerman@kittyhawktown.net