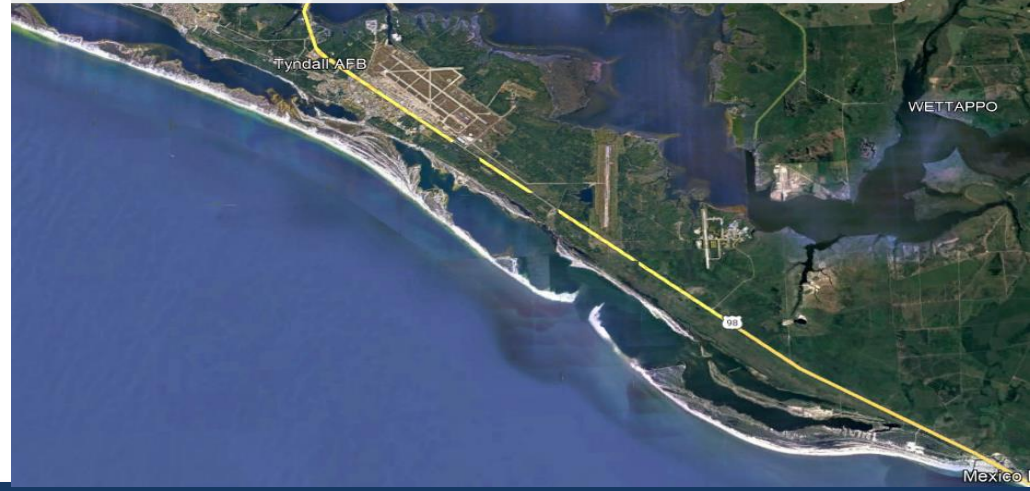
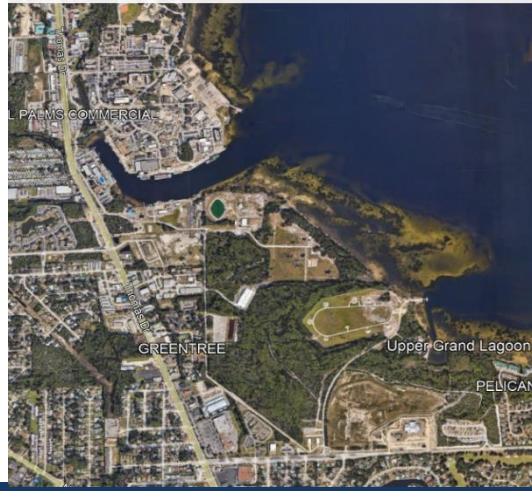
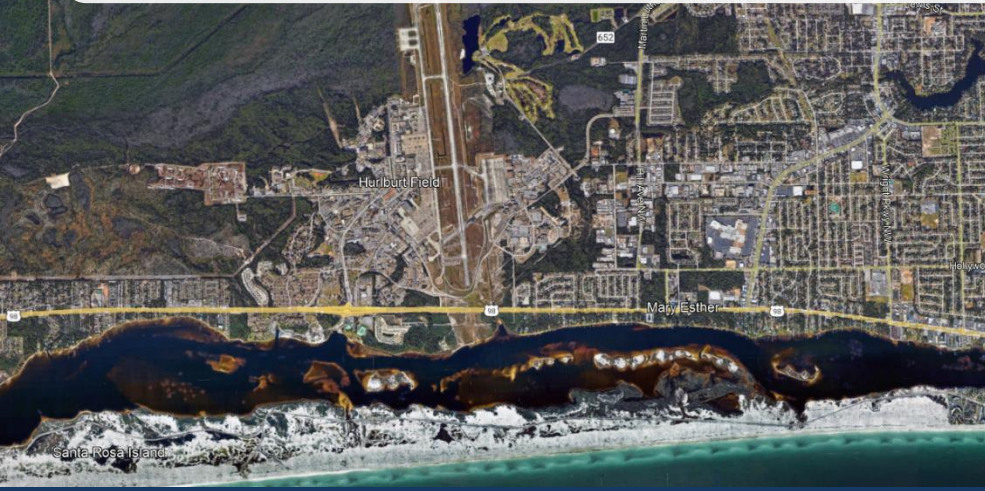


EMERALD COAST MILITARY INSTALLATION
RESILIENCY REVIEW

Technical Advisory Committee Meeting

February 21, 2024



Funded in part by DOD - OLDCC



Jacobs
Challenging today.
Reinventing tomorrow.

AGENDA

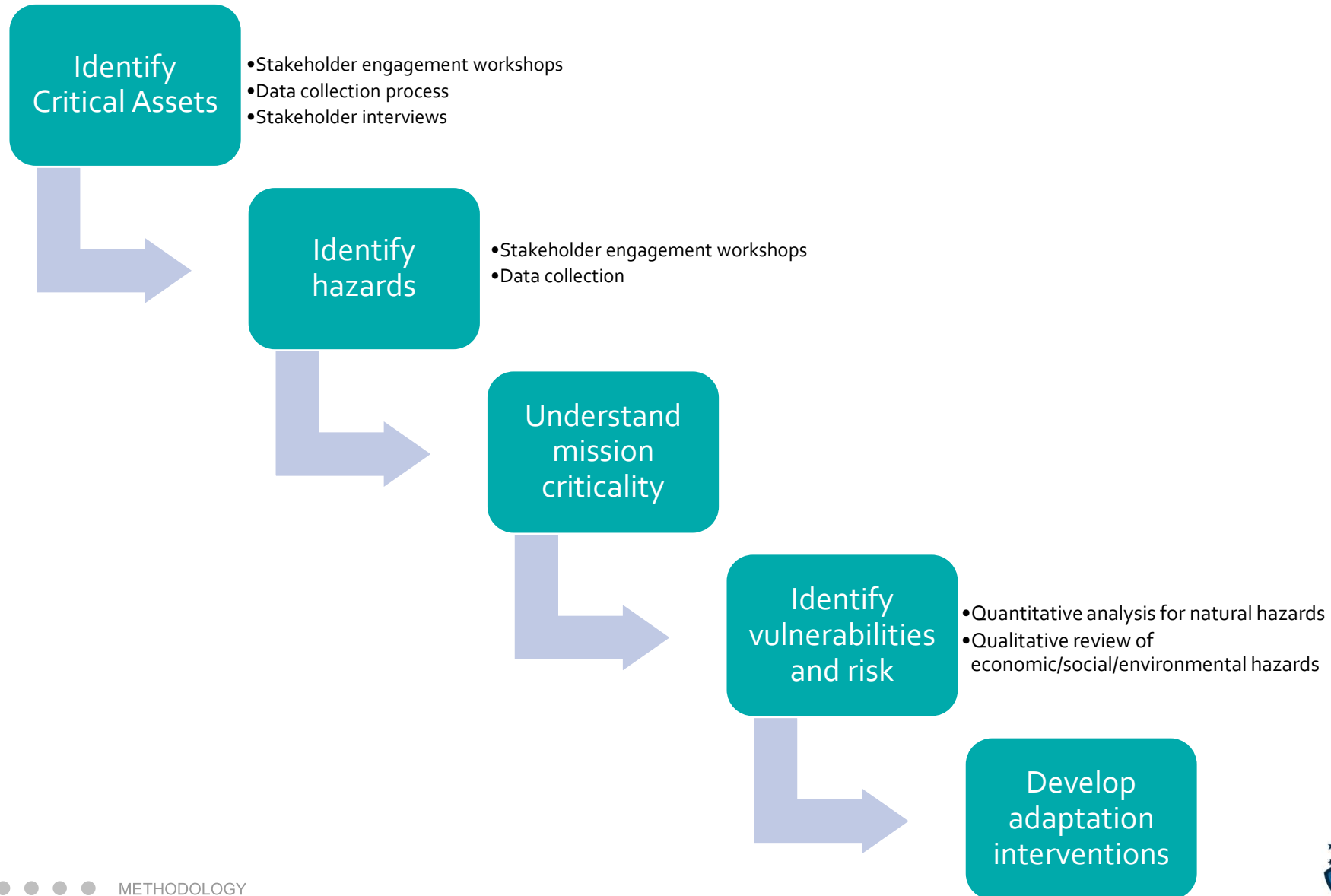
- 1:00pm** **WELCOME & INTRODUCTIONS**
- 1:03 pm** **Vulnerability & Risk Analysis Methodology Review**
- 1:10 pm** **Vulnerability & Risk Analysis Results**
- NAS Pensacola
 - NAS Whiting Field
 - Eglin AFB
 - Hurlburt Field
 - NSA Panama City
 - Tyndall AFB
- 1:50pm** **Wrap-Up/Next Steps**
- Overview of Adaptation Planning Approach
 - Review timeline / schedule of next PC Meeting
- 1:55pm** **QUESTIONS**



Risk and Vulnerability Assessment Methodology Review



METHODOLOGY OVERVIEW



HAZARD TYPOLOGIES

1. Natural Hazards



Flooding



Extreme Heat



Sea Level Rise



Wildfire



Extreme Wind (Hurricanes)



Lightning

2. Social/Economic/Environmental Shocks & Stresses



Lack of Childcare



Lack of Attainable Housing



Lack of school capacity



Encroachment



High cost of living



Water Quality



Endangered Species

3. Infrastructure Shocks & Stresses



Aging Infrastructure



Utility service capacity



Lack of redundant utility service



Power and Communications Outages

METHODOLOGY FOR CATEGORIZING ASSETS

Primary Mission Critical Assets : Assets specifically identified as crucial for the primary mission by stakeholders and experts

Secondary Mission Critical Assets: Assets specifically identified as being crucial for the installation's secondary mission by stakeholders and experts

Mission Supportive Assets: Assets that support the community and installation personnel within the community

- Health care facilities, hospitals, emergency operation centers, emergency medical facilities
- Law enforcement, local government facilities, and state government facilities
- Airports, railroads, and non-installation adjacent streets
- Community infrastructure assets (local water systems, private lift stations, neighborhood roads)

Additional Vulnerabilities: Any additional general vulnerabilities noted by stakeholders

Vulnerability Assessment Methodology Review



Asset **EXPOSURE** to Natural and Operational Threats based on Proximity



Asset **SENSITIVITY** based on Effects from Exposure



Asset **VULNERABILITY**
(Exposure to assets may result in Impacts and service Interruptions)

Once vulnerable assets are identified, a risk score is calculated for high-vulnerability assets.

High
Vulnerability
Asset



LIKELIHOOD of Hazard Occurring



CONSEQUENCE of Hazard Event Occurring



IMPACT ON MISSION



Cumulative Asset
Score: RISK TO
MISSION

NAS PENSACOLA



NAS PENSACOLA MISSIONS AND MISSION-CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Assets
Primary Mission	Naval education and training	<ul style="list-style-type: none"> • Water lines from Corry Station to NASP* • Wastewater lines from NASP and Corry Station to Central Reclamation Facility and Bayou Marcus WWTP • Major Roadways and Evacuation Routes to Access Installation • Shorelines
Secondary Mission	Cyber training and operations at Corry Station	<ul style="list-style-type: none"> • Power transmission lines, substations, and Gulf Clean Energy Center • Community stormwater systems
Mission-Supportive	N/A	<ul style="list-style-type: none"> • Community roadways • Community water systems • Community wastewater systems • Communications infrastructure



NAS PENSACOLA PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Type	Asset Name	Worst Hazard	Asset Owner/Operator	Risk to Mission Score
Wastewater treatment facilities and lift stations	Bayou Marcus WRF	Flooding	ECUA	High
Wastewater treatment facilities and lift stations	Central WRF	N/A	ECUA	Low
Wastewater treatment facilities and lift stations	Lift Stations at NASP (main side/back side)	Flooding	ECUA	High/medium
Wastewater treatment facilities and lift stations	Wastewater lines from installation to WRF	Sea level rise	ECUA	Low



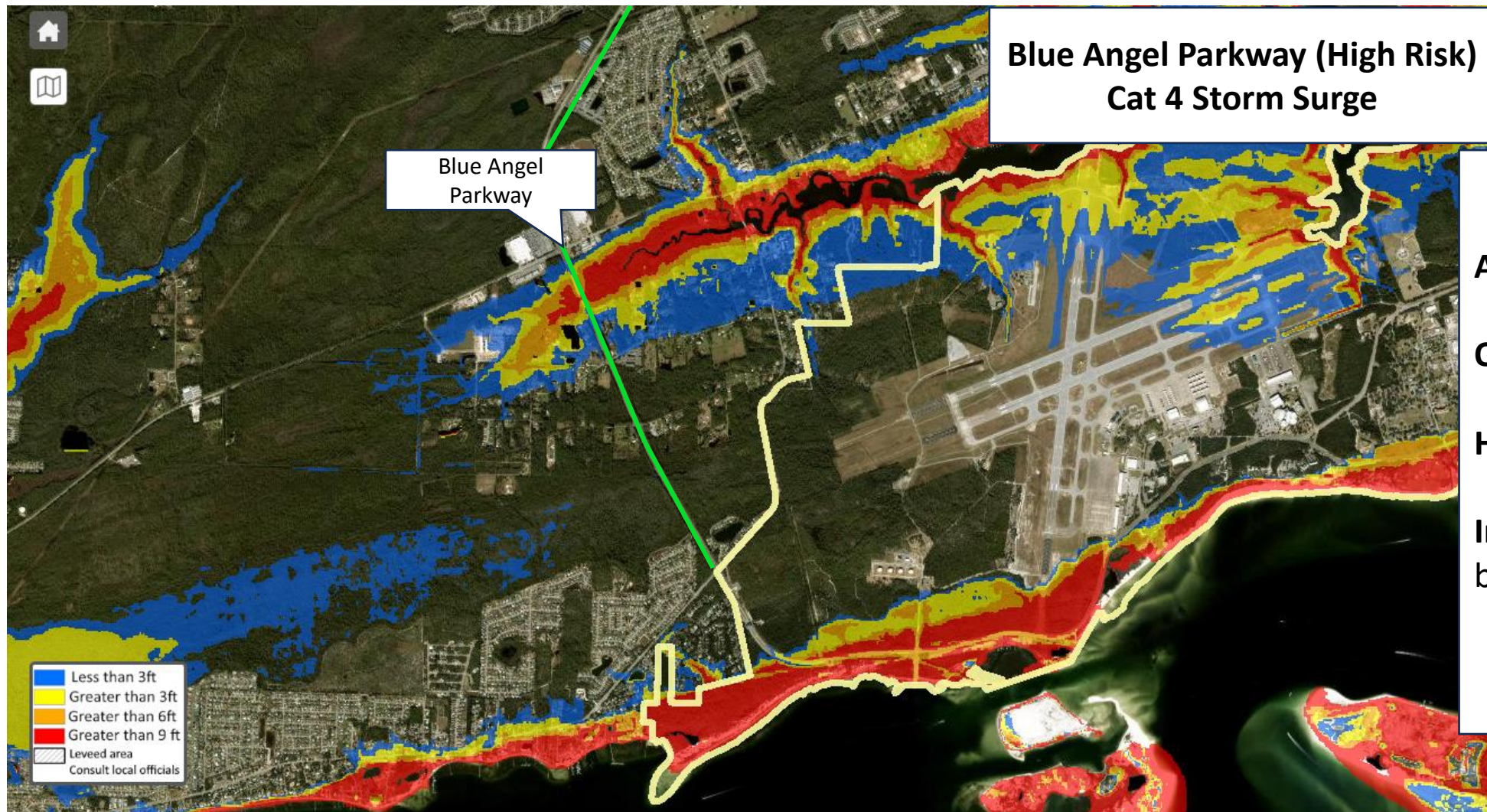
RISK ANALYSIS

NAS PENSACOLA PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Name	Asset Type	Worst Hazard	Asset Owner/Operator	Risk to Mission Score
Gulf Beach Highway (SR 292)	Transportation and Evacuation Routes	Flooding (surge)	FDOT	High
Blue Angel Parkway (SR 193)	Transportation and Evacuation Routes	Flooding (surge)	FDOT	High
Navy Blvd (SR 295)	Transportation and Evacuation Routes	Flooding (surge)	FDOT	High
US-98	Transportation and Evacuation Routes	Flooding (surge)	FDOT	High



NAS PENSACOLA PRIMARY MISSION CRITICAL ASSETS & RISK



Asset: Major Roadway

Owner: County

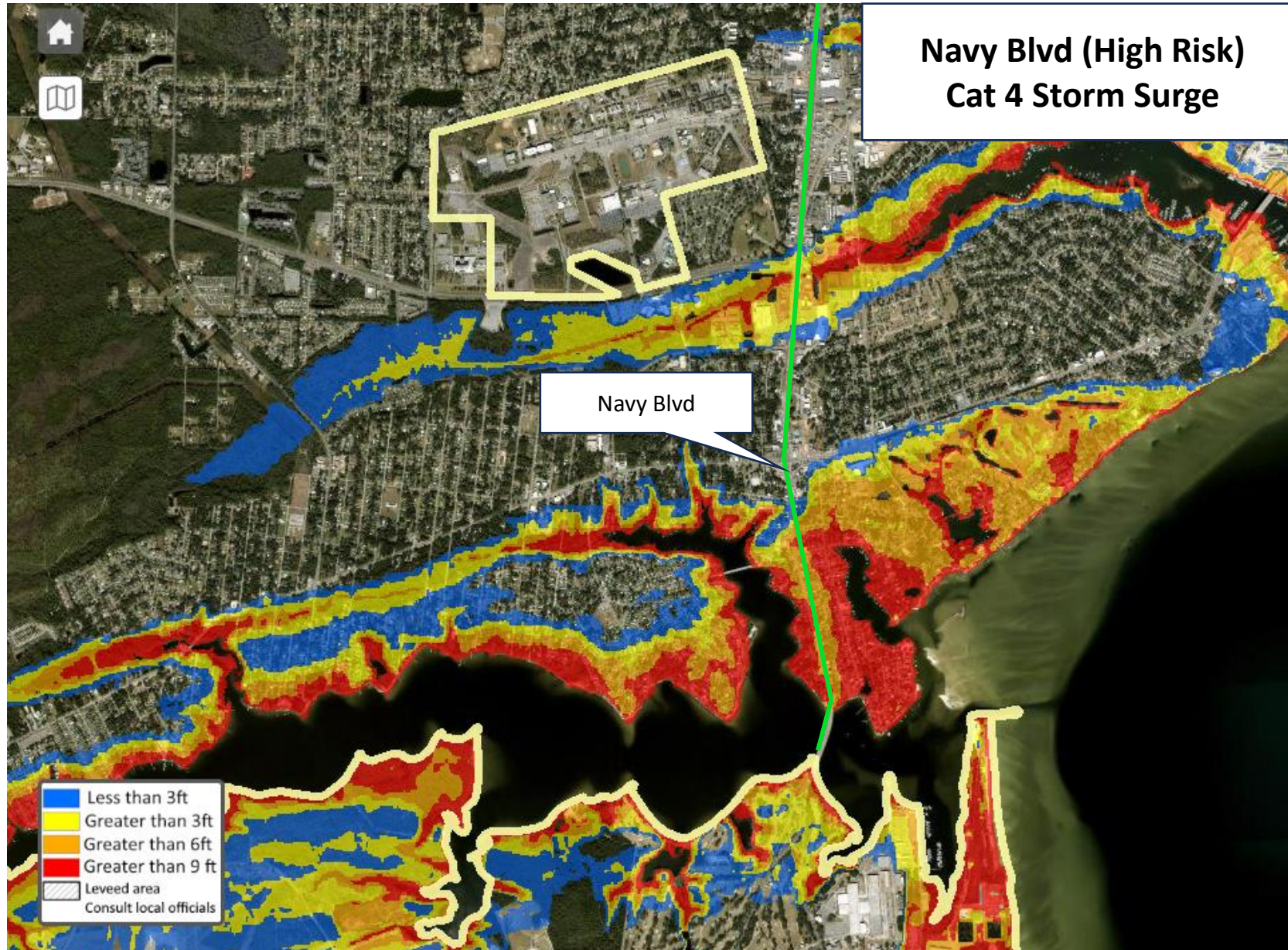
Hazard: Flooding (SLR)

Impacts: Loss of access to back gate



RISK ANALYSIS

NAS PENSACOLA PRIMARY MISSION CRITICAL ASSETS & RISK



Asset: Major Roadway

Owner: County

Hazard: Flooding (SLR)

Impacts: Loss of access to front gate

NAS PENSACOLA PRIMARY MISSION CRITICAL ASSETS & RISK

Hwy 98 (High Risk)
Cat 4 Storm Surge

Hwy 98



Asset type: Major Roadway

Owner: County

Hazard: Flooding (SLR)

Impacts: Access issues



RISK ANALYSIS

NAS PENSACOLA SECONDARY MISSION CRITICAL ASSETS & RISK

Asset Type	Asset Name	Asset Owner/Operator	Asset Risk to Mission
Electric production and supply facilities	Transmission Lines/Substations	FPL	Medium
Electric production and supply facilities	Gulf Clean Energy Center	FPL	Medium



RISK ANALYSIS

MISSION-SUPPORTIVE ASSETS & ASSOCIATED RISK

Asset Type	Asset Name	Asset Owner/Operator	Risk Score
Roads	Community roadways	County, municipal	Medium-low
Wastewater treatment facilities and lift stations	Community wastewater lift stations	ECUA, private	High-low
Water utility conveyance systems	Community Water Lines	ECUA, private	Low
Critical community & emergency facilities	Community Facilities (hospitals, local government)	County, municipal, private	Medium-low



NAS PENSACOLA ADDITIONAL IDENTIFIED VULNERABILITIES

- Shoreline erosion at NASP and barrier islands
- Capacity issues on Blue Angel Parkway and Gulf Beach Highway
- Drainage systems at Corry Station
- Single point of failure – water lines from Corry Station to NASP
- Single point of failure – Pensacola Energy gas line to installation



POSITIVE FINDINGS

- Positive relationships and culture of cooperation between installation, County, and area stakeholders
- Escambia County, City of Pensacola, and installation are proactively managing erosion risks via living shoreline projects
- City of Pensacola identifying city-specific vulnerabilities
- Low risk for mission-critical water and wastewater lines



RISK ANALYSIS

NAS Whiting Field Vulnerabilities and Risks



NAS WHITING FIELD MISSION AND MISSION-CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Assets
Primary Mission	Flight (fixed-wing and rotary-wing) training	<ul style="list-style-type: none">• Drainage systems• OLF and installation access roads• Electrical production and supply facilities• Community firefighting assets• Community water systems (support firefighting)
Mission-Support		<ul style="list-style-type: none">• Community wastewater assets• Community roadways (installation access)• Community facilities (local government, schools, etc.)



NAS WHITING FIELD PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Type	Asset Name	Worst Hazard	Asset Owner/Operator	Risk to Mission Score
Electric Production and Supply	Power Transmission Lines/substations	Wildfire	FPL	High
Electric Production and Supply	Gulf Clean Energy Center (Crist)	Flooding	FPL	Medium
Major Roadways	Highway 90	100-year flood, storm surge	FDOT	Extreme - low (depends on segment)
Major Roadways	Munson Highway (CR 191) over Big Coldwater Creek		Santa Rosa County	High
Major Roadways	Highway 87	100-year flood	Santa Rosa County	High-low
Community drainage infrastructure	Stormwater ponds		Various	Low



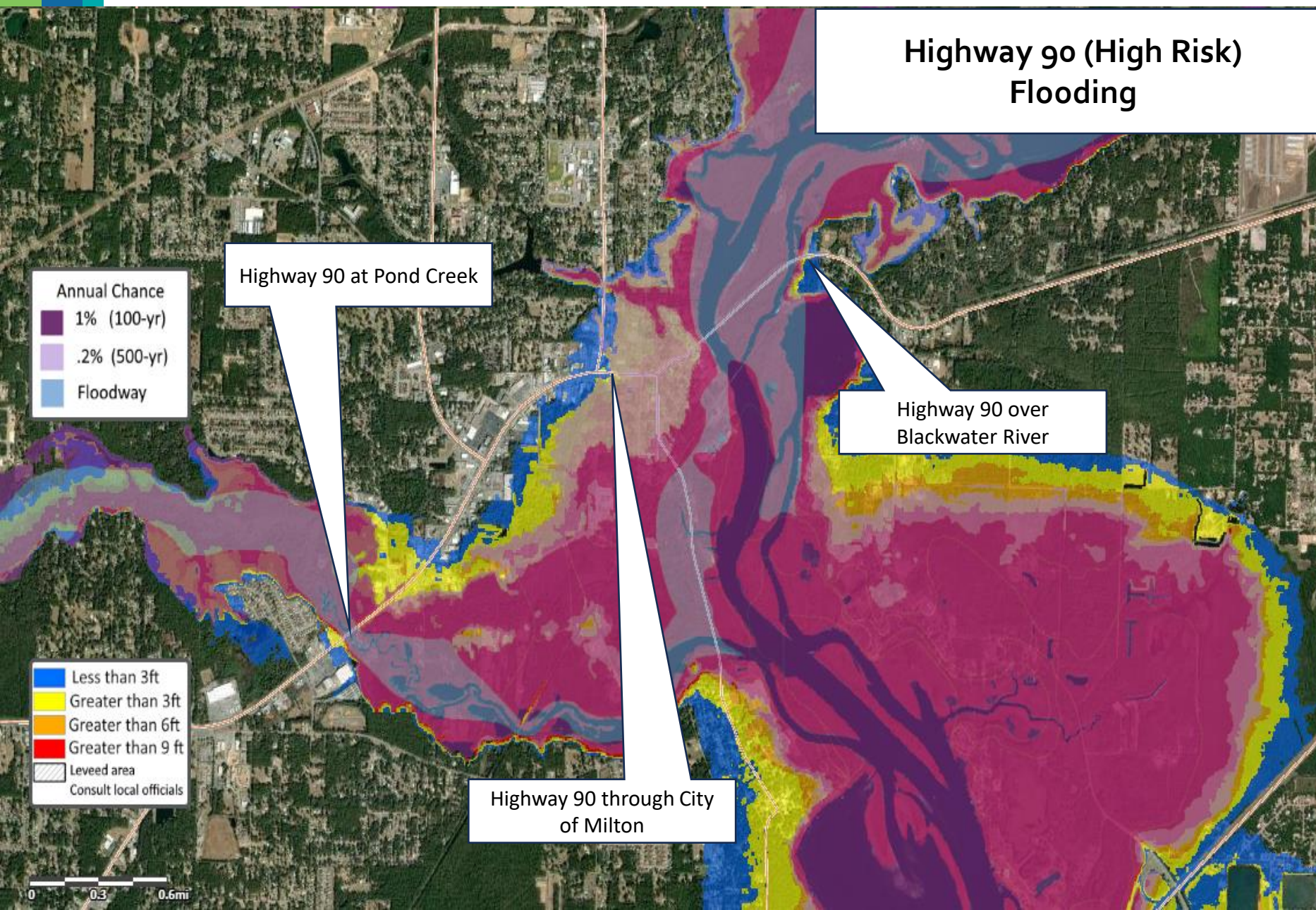
NAS WHITING FIELD PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Type	Asset Name	Asset Owner/Operator	Risk to Mission Score
Community & Emergency Facilities	Fire Stations (various)	SRC	Low
Drinking Water Conveyances	Community Water Lines	Multiple	Low
Wastewater Facilities	Milton WWTF	City of Milton	High



RISK ANALYSIS

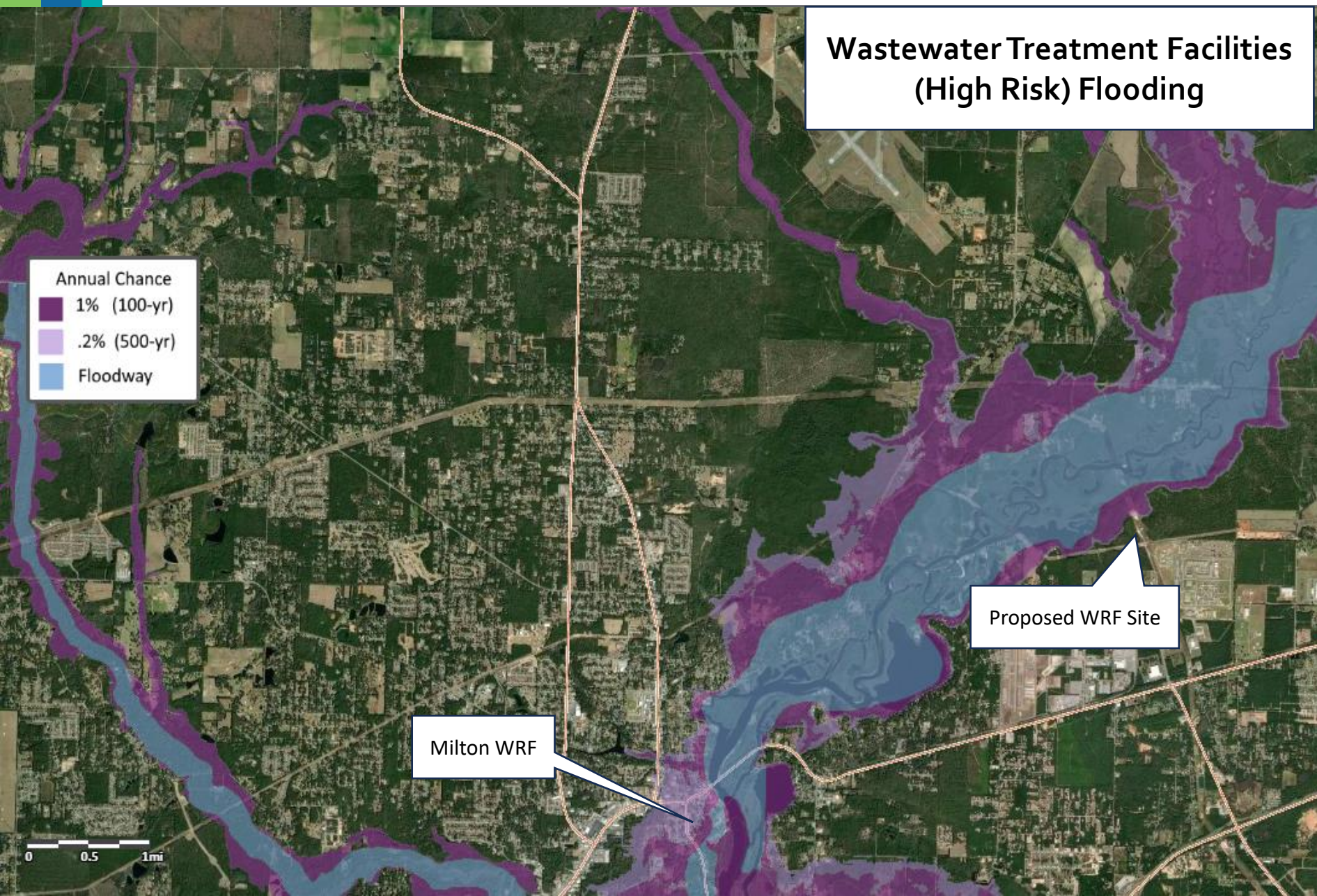
NAS WHITING FIELD PRIMARY MISSION-CRITICAL ASSETS & RISK



Highway 90 (High Risk)
Flooding

Asset Type: Major roadways
Owner: FDOT
Hazard: 100-year flood, storm surge
Impacts: Inhibit access to OLFs and installation

NAS WHITING FIELD PRIMARY MISSION-CRITICAL ASSETS & RISK



Asset Type: Wastewater Treatment Facilities
Owner: City of Milton
Hazard: 100-year flood, surge
Impacts: Wastewater treatment capacity for installation

NAS WHITING FIELD MISSION-SUPPORTIVE ASSETS & ASSOCIATED RISK

Asset Type	Asset Name	Asset Owner/Operator	Risk Score
Roads	Community roadways	County, Municipal	Medium-low
Roads	Base access roadways (East Gate Rd, Langley St (87A))	Santa Rosa County	Low
Drinking Water Conveyances	Community water lines	Pt. Baker, City of Milton, East Milton	Low
Critical Community & Emergency Facilities	Community Facilities (hospitals, local government)	County, municipal, private	Medium-low



NAS WHITING FIELD ADDITIONAL IDENTIFIED VULNERABILITIES

- Lack of redundant potable water service
- Lack of redundant power service
- Lack of highway capacity
- Cellular communications challenges



RISK ANALYSIS

NAS WHITING FIELD POSITIVE FINDINGS

- Positive relationships and culture of cooperation between installation, County, and area stakeholders
- Encroachment is not a concern at the installation
- Installation's inland location reduces vulnerability and risk for mission-critical assets
- Important community assets -> low overall vulnerability
- Most of the roadways used to access the OLFs have medium-low risk to mission



EGLIN AFB and HURLBURT FIELD



EGLIN AFB MISSION AND MISSION CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Assets
Primary Mission	Testing and training	<ul style="list-style-type: none">▪ Electrical production and supply facilities▪ Regional drainage systems▪ Wastewater systems▪ Critical evacuation routes through the base▪ Shorelines▪ Firefighting capability (fire stations)▪ Land around installation (dark skies/flyover areas)
Secondary Mission	7 th Special Forces	<ul style="list-style-type: none">▪ Electrical production and supply facilities
Mission-Supportive	N/A	<ul style="list-style-type: none">▪ Community water systems▪ Community wastewater systems▪ Community roadways▪ Community facilities



HURLBURT FIELD MISSION AND MISSION CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Assets
Primary Mission	Special operations and support	<ul style="list-style-type: none">• Electric production and supply facilities• Shorelines• Housing
Secondary Mission	Air Force Special Forces Command	<ul style="list-style-type: none">• Electric production and supply facilities
Mission-Support		<ul style="list-style-type: none">• Community water systems• Community wastewater systems• Community roadways (installation access)• Community facilities (local government, schools, etc.)



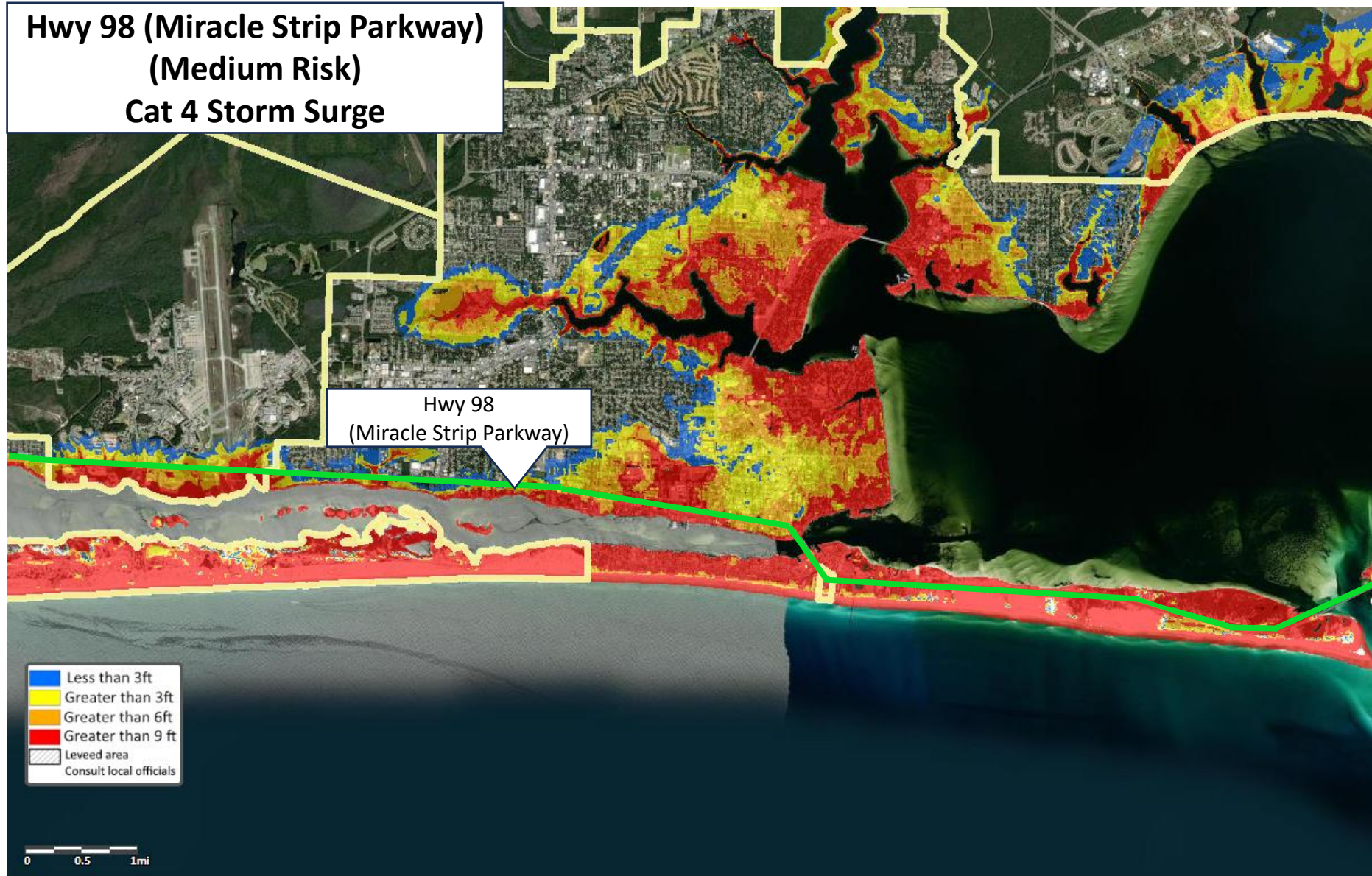
EGLIN AFB/HURLBURT FIELD PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Type	Asset Name	Relevant Hazards	Asset Owner/Operator	Risk to Mission Score
Electrical Production and Supply Facilities	Power transmission and distribution lines/substations	Wildfire	CHELCO	High-medium
	Power transmission lines/substations	Wildfire, flooding	FPL	Medium
Transportation and Evacuation Routes	Highway 98 (Miracle Strip Parkway)	Flooding (surge)	FDOT	Medium
Transportation and Evacuation Routes	Highway 85	Flooding	FDOT	Medium
Transportation and Evacuation Routes	Highway 285	Flooding	FDOT	Medium



EGLIN AFB / HURLBURT FIELD PRIMARY MISSION CRITICAL ASSETS & RISK

Hwy 98 (Miracle Strip Parkway)
(Medium Risk)
Cat 4 Storm Surge



Asset Type: Major Roadway

Owner: FDOT

Hazard: Flooding (Surge)

Impacts: Access issues

EGLIN AFB / HURLBURT FIELD PRIMARY MISSION CRITICAL ASSETS & RISK

**Hwy 85 – (Medium)
Cat 4 Storm Surge**

Highway 85

Annual Chance
1% (100-yr)
.2% (500-yr)
Floodway

Asset Type: Major Roadway

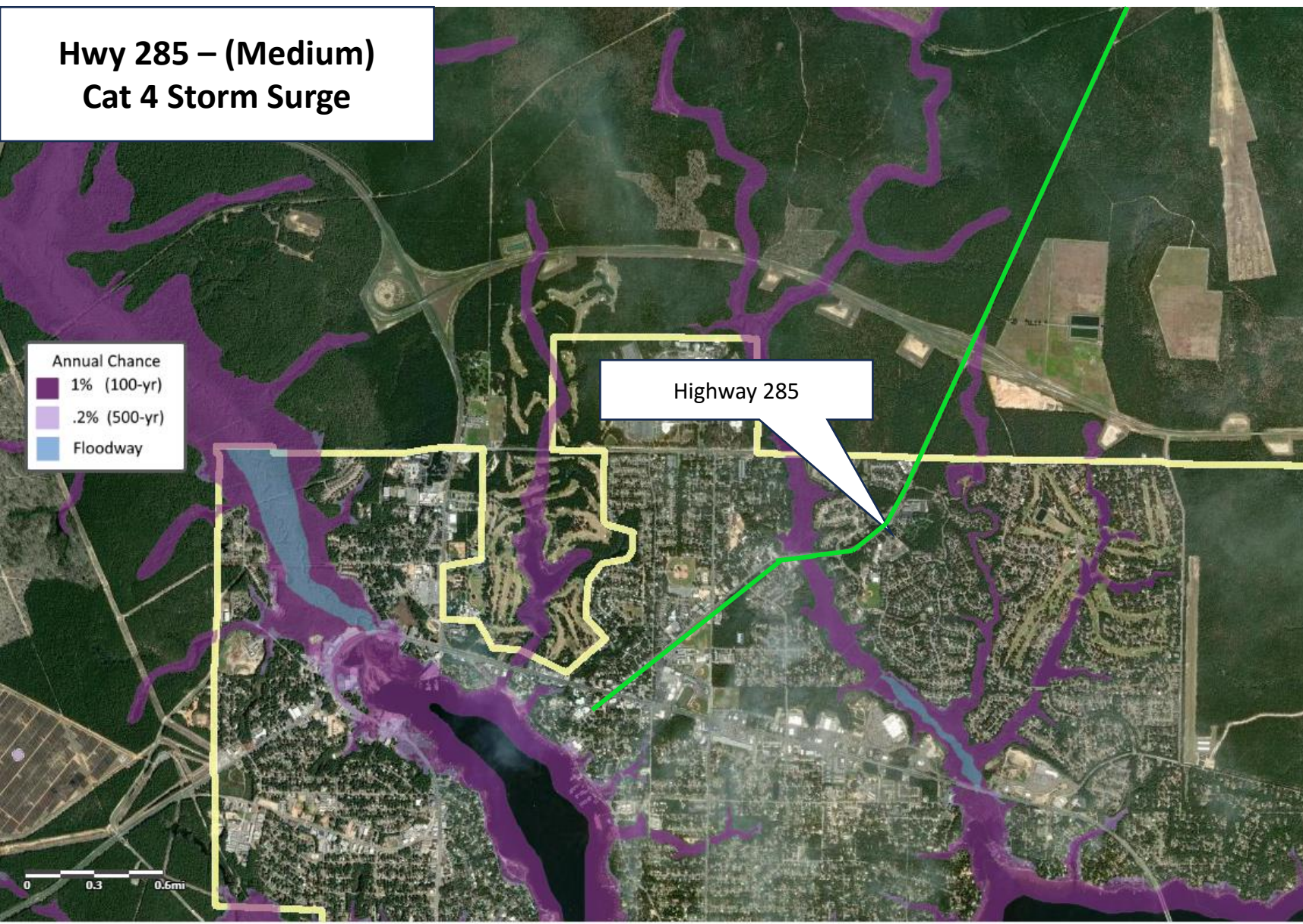
Owner: FDOT

Hazard: Flooding

Impacts: Access issues

EGLIN AFB / HURLBURT FIELD PRIMARY MISSION CRITICAL ASSETS & RISK

**Hwy 285 – (Medium)
Cat 4 Storm Surge**



Asset Type: Major Roadway

Owner: FDOT

Hazard: Flooding

Impacts: Access issues

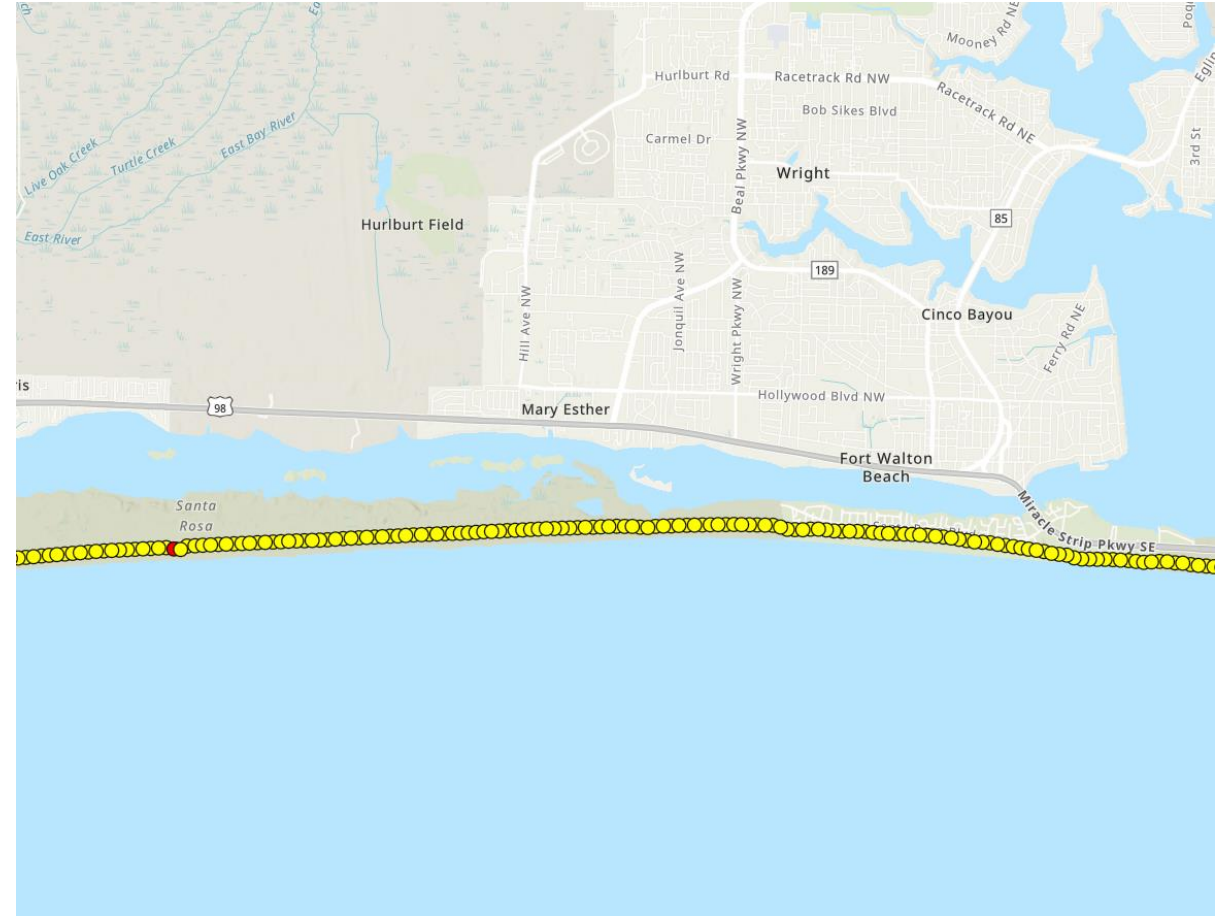
MISSION-SUPPORTIVE ASSETS & ASSOCIATED RISK

Asset Type	Asset Name	Asset Owner/Operator	Risk Score
Wastewater treatment facilities and lift stations	Community wastewater lift stations	Various	High-low
	Arbennie-Pritchett WRF	Okaloosa County	Low
Roads	Community roadways	Municipal	High-low
Drinking Water Conveyances	Community water lines	Various	Low
Critical Community & Emergency Facilities	Community facilities (hospitals, local government)	County, municipal, private	Medium-low



EGLIN AFB/HURLBURT FIELD ADDITIONAL IDENTIFIED VULNERABILITIES

- Encroachment (land management/dark skies)
- Encroachment on EGTTR
- Shoreline Erosion on Okaloosa Island and Santa Rosa Island
- Lack of highway capacity (SR 85, Highway 98)



RISK ANALYSIS

EGLIN AFB/HURLBURT FIELD POSITIVE FINDINGS

- Positive relationships and culture of cooperation between installation, counties, and area stakeholders
- Okaloosa County proactively working w/ Eglin AFB on encroachment
- Region has identified erosion risks and is working on addressing them
- Minimal high compound risks
- Wastewater infrastructure that supports Eglin has very low vulnerability.
- Many critical infrastructure assets that directly support installations experience low flood exposure



A group of divers, seen from behind, are sitting on a concrete ledge in a swimming pool. They are wearing black wetsuits and have large silver scuba tanks attached to their backs. They are all looking towards a man in a yellow shirt and a grey cap who is standing in the water, facing them. The pool is large and has a concrete deck. In the background, other people can be seen on a higher level of the pool area.

NSA Panama City

NSA PANAMA CITY MISSION AND MISSION CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Infrastructure
Primary Mission	Dive Training (Naval Diving and Salvage Training Center)	<ul style="list-style-type: none">• St. Andrew's Bay Electric production and supply facilities• Communication infrastructure• Major roadways and evacuation routes• Shorelines• Water treatment and conveyance infrastructure connected to installation• Wastewater infrastructure from NSAPC to Panama City Beach Wastewater Treatment Plant
Secondary Mission	<ul style="list-style-type: none">• U.S. Coast Guard Operations• Research, Development, Testing, and Evaluation (RDT&E)	<ul style="list-style-type: none">• Coast Guard Station Panama City
Mission-Supportive	N/A	<ul style="list-style-type: none">• Community water systems• Community wastewater systems• Community roadways• Community assets (schools, law enforcement, etc.)

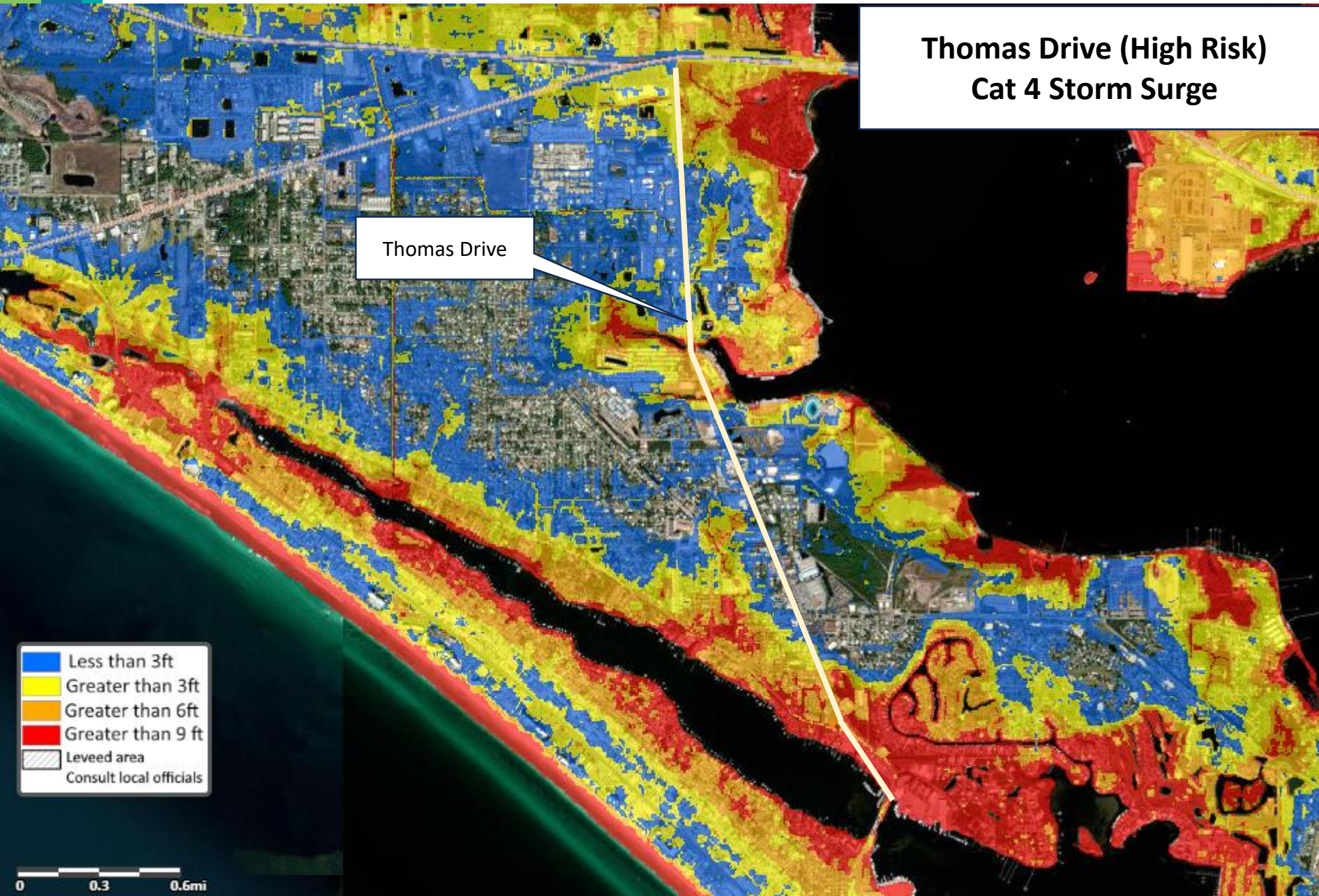


NSA PANAMA CITY PRIMARY MISSION - CRITICAL ASSETS & RISK

Asset Name	Asset Type	Relevant Risk	Asset Owner/Operator	Risk to Mission Score
Thomas Drive	Major Roadway	Flooding	Bay County	High
Panama City Beach Parkway	Major Roadway	Flooding	FDOT	High
Highway 98	Major Roadway	Flooding	FDOT	High
Power transmission lines and substations	Electric Production and Supply Infrastructure	Wind, Hurricane	FPL	High - Medium
U.S. Coast Guard Station	Military Facility	Flooding (SLR, surge)	DHS	High
Communications towers	Communications	Wind	Various	Medium
Base-connected water infrastructure	Water conveyances	Flooding (SLR)	Bay County	Low
Panama City Beach WWTP	Wastewater Treatment	Flooding (100-year, surge)	Panama City Beach	Medium



NSA PANAMA CITY PRIMARY MISSION - CRITICAL ASSETS & RISK



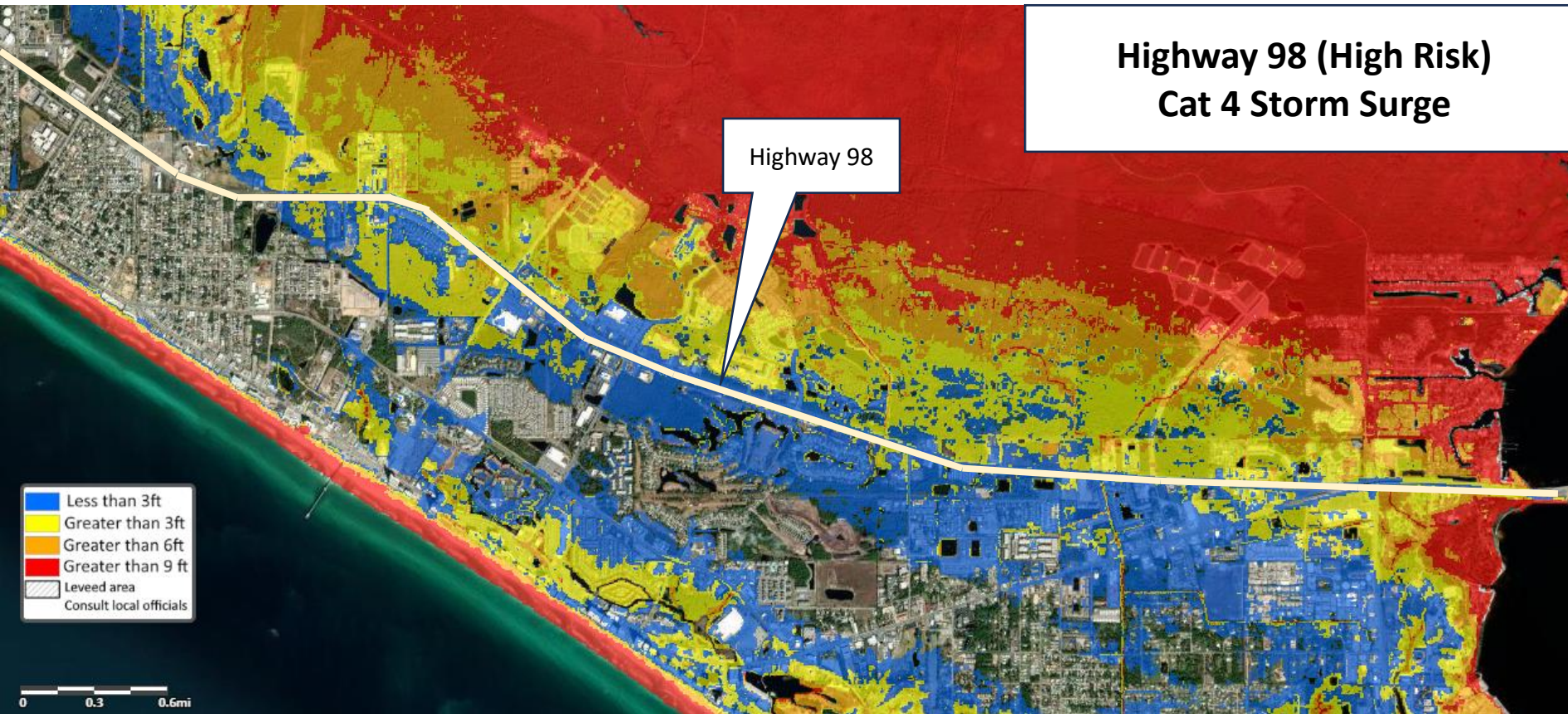
Asset type: Major roadways

Owner: FDOT

Hazard: 100-year flood, surge

Impacts: Inhibit access to installation

NSA PANAMA CITY PRIMARY MISSION - CRITICAL ASSETS & RISK



Asset Type: Major roadways

Owner: FDOT

Hazard: 100-year flood, Cat 4-5 Surge

Impacts: Inhibit access to installation



RISK ANALYSIS

MISSION-SUPPORTIVE ASSETS & ASSOCIATED RISK

Asset Name	Asset Type	Asset Owner/Operator	Risk Score
Community roadways	Roads	County, Municipal	Medium-low
Community water Lines	Water utility conveyance systems	Bay County	Low
Community wastewater lines/lift stations	Wastewater treatment facilities and lift stations	Bay County, Panama City Beach	High – low
Community facilities (hospitals, local government)	Critical community & emergency facilities	County, municipal, private	Medium-low



ADDITIONAL IDENTIFIED VULNERABILITIES

- Dredging needs in St. Andrew's Bay – support traversal through Bay for training
- Encroachment in Bays can impact operations and security
- High future temperatures, coupled with lack of urban tree canopy, pose future health risks to personnel and residents throughout the County
- Lack of Highway Capacity (Highway 98)



NSA PANAMA CITY POSITIVE FINDINGS

- Positive relationships and culture of cooperation between installation, County, and area stakeholders
- Bay County, Panama City Beach have been proactively managing erosion (which affects NSAPC beach sites), resulting in moderately – highly resilient shorelines
- Low vulnerability for water and wastewater infrastructure that support installation
- Overall, low vulnerability for assets
- Adaptation and mitigation measures for protecting the installation energy infrastructure are feasible



An aerial photograph of Tyndall Air Force Base, Florida, showing the base's runways, taxiways, and surrounding landscape. A semi-transparent F-35 fighter jet is overlaid on the image, positioned diagonally across the frame. The jet's tail fin features the text "5 TYNDALL".

TYNDALL AIR FORCE BASE

TYNDALL AIR FORCE BASE MISSION AND MISSION-CRITICAL INFRASTRUCTURE

	Mission	Mission-Critical Infrastructure
Primary Mission	Flight Operations (325th Fighter Wing)	<ul style="list-style-type: none">• Electrical production and supply facilities• Housing• Shorelines• Major roadways and evacuation routes• EGGTR
Secondary Mission	First Air Force Command Center	<ul style="list-style-type: none">• Electrical production and supply facilities• Communications infrastructure
Mission-Supportive	N/A	<ul style="list-style-type: none">• Community water systems• Community wastewater systems• Community roadways• Community assets (schools, law enforcement, etc.)



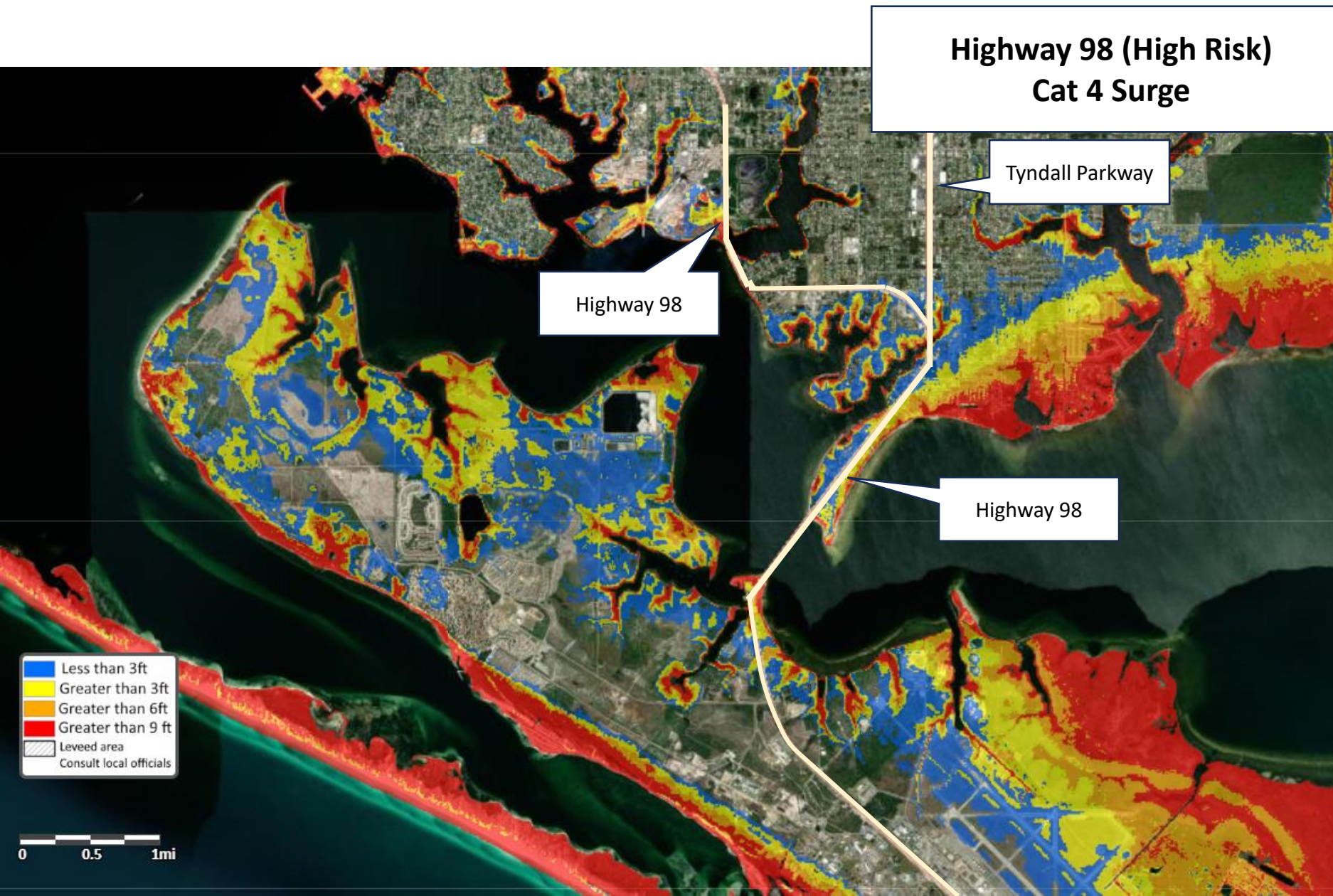
TYNDALL AFB PRIMARY MISSION-CRITICAL ASSETS & RISK

Asset Name	Asset Type	Relevant Hazard	Asset Owner/Operator	Risk to Mission Score
Substations	Electrical Production and Supply Facilities	Flooding	FPL	High-medium
Power transmission lines/substations	Electrical Production and Supply Facilities	Wind, lightning	FPL	Medium
Highway 98	Major Roadway	Flooding	FDOT	High-medium
AWT (Wastewater Treatment Plant)	Wastewater Treatment and Lift Stations	Flooding	Bay County	Medium
Water lines to installation	Drinking water conveyances	SLR	Bay County	Low



RISK ANALYSIS

TYNDALL AFB PRIMARY MISSION-CRITICAL ASSETS & RISK



Asset type: Major roadways/evacuation routes

Owner: FDOT

Hazard: Storm surge (Cat 4-5)

Impacts: Inhibits installation access

TYNDALL AFB MISSION-SUPPORTIVE ASSETS & ASSOCIATED RISK

Asset Type	Asset Name	Asset Owner/Operator	Risk Score
Wastewater Treatment and Lift Stations	AWT (Wastewater Treatment Plant)	Bay County	Medium
Drinking water conveyances	Water lines to installation	Bay County	Low
Roads	Community roadways	County, Municipal	Medium-low
Drinking Water Conveyances	Community water lines	Bay County	Low
Wastewater conveyances	Community wastewater lines/lift stations	County, Municipal	Medium-low
Critical Community & Emergency Facilities	Community facilities (hospitals, local government)	County, municipal, private	Medium-low



ADDITIONAL IDENTIFIED VULNERABILITIES

- Barrier islands suffered significant impacts after Hurricane Michael
- Lack of available housing poses significant threat to mission
- Lack of highway capacity (Tyndall Parkway, US 98)
- New growth in Panama City and adjacent communities requires additional water and wastewater infrastructure capacity.
 - Potable water in South Fork neighborhood
 - Roadways
- High future temperatures, coupled with lack of tree cover, pose future health risks to personnel and residents throughout the County



TYNDALL AFB POSITIVE FINDINGS

- Positive relationships and culture of cooperation between installation, County, and area stakeholders
- Tyndall rebuild is positioning itself as a resilient military installation – model for resilient design standards for the region
- Medium – low vulnerability and risk for water and wastewater infrastructure that supports the installation
- Overall, low vulnerability for assets.



RISK ANALYSIS



NEXT STEPS/DISCUSSION

NEXT STEPS/DISCUSSION ITEMS

- Incorporating stakeholder feedback
- Connecting with stakeholders and reviewing risks to their infrastructure
- Begin to develop adaptation interventions
 - Develop list of adaptation projects
 - Determine adaptation metrics to determine project feasibility
 - Identify priority projects (workshops)
- Next meetings: Adaptation Project Prioritization Workshops
 - Tentative dates: March 18th – 22nd

Link to Survey



DISCUSSION ITEM – AMERICA THE BEAUTIFUL CHALLENGE 2024 RFP

- Goal is to streamline grant funding opportunities for new voluntary conservation and restoration projects
- Approx. \$119 million available
- Applicant webinar due Thursday, February 29th, 1-3 pm (central time)
- Pre-proposals due by end of day on April 4, 2024



RISK ANALYSIS



QUESTIONS
