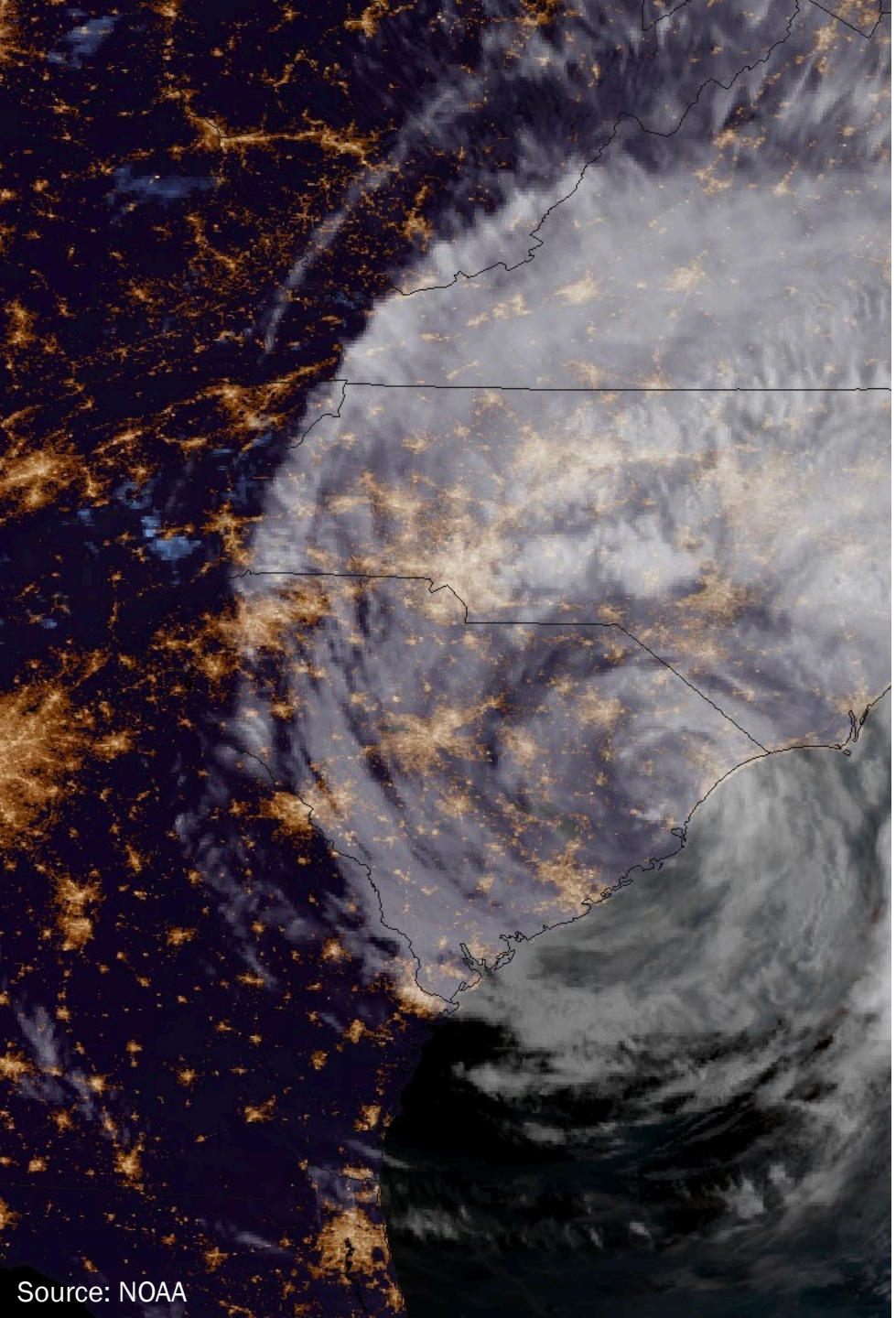

Source: NOAA

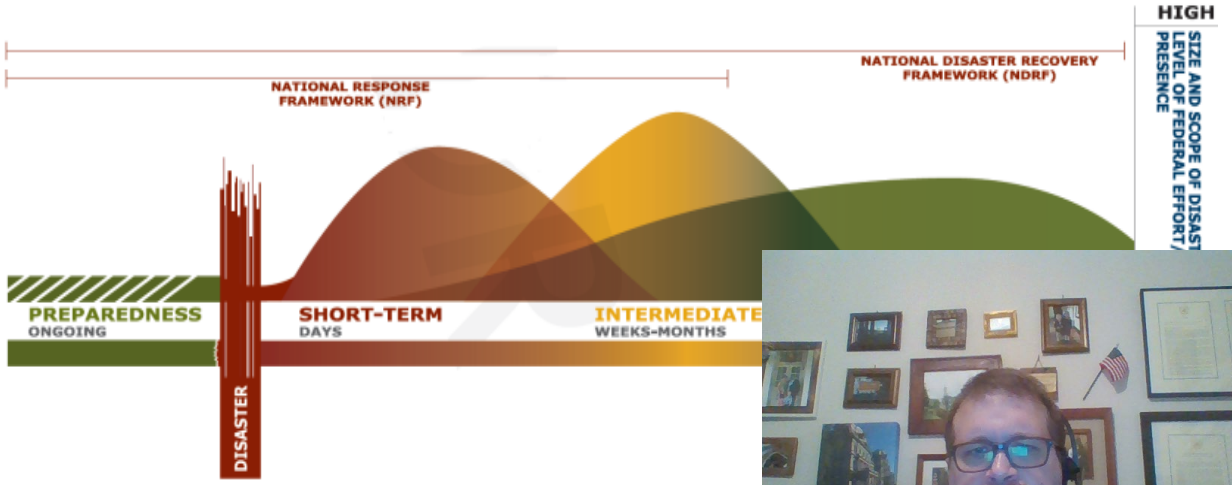
Preliminary Anticipatory Recovery Impact Assessments

SCOTT KAISER | SENIOR GIS ANALYST
J&M GLOBAL SOLUTIONS

JOSHUA BARNES | FORMER NATL RECOVERY COORDINATOR
U.S. DEPT OF HEALTH & HUMAN SERVICES

Background

- Since 2011 Federal departments and agencies have been implementing the National Disaster Recovery Framework (NDRF) to better integrate the federal recovery support following major disasters
- Emergency management has traditionally described itself as a cycle
- Complex, wide-scale disasters and the introduction of the NDRF shifted the approach to implement response and recovery simultaneously.



Problem

- Response impacts are more easily modeled, identified, and quantified
- Recovery impacts are often more pervasive, but less intense and not easily measured (and often don't manifest themselves until weeks or months later)
- When response and recovery actions are implemented in tandem, how do you allocate resources to best support impacted communities?

Premise

- Identifying recovery impacts immediately after a disaster is difficult to capture because impacts are diffuse, and survivors are focused on life-saving and life-sustaining activities
- We do know how much of a hazard was unleashed on an impacted community
- We do know pre-incident vulnerabilities (like flood-prone areas, building code standards, etc.)
- We do know location of key “assets” pre-incident and can extrapola potential impacts based on expected consequences to those facilitie

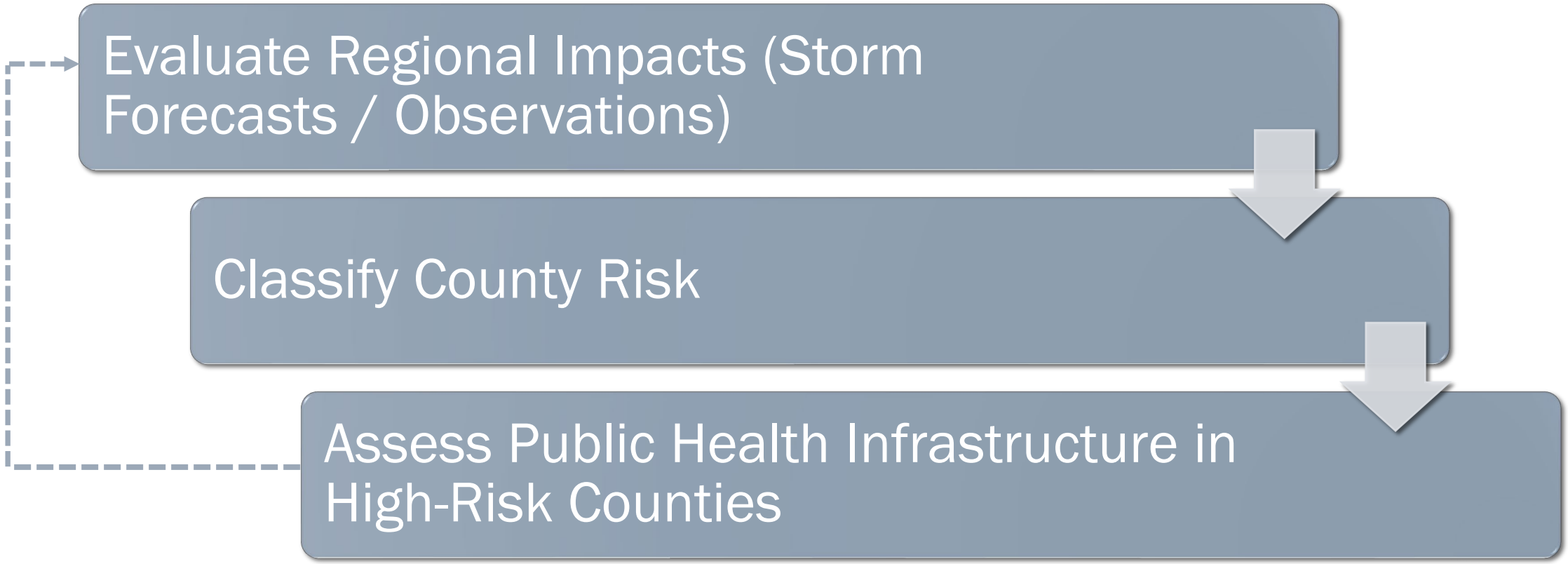
Post-Disaster Assessments

- Time-consuming and potentially resource-intensive to accumulate actionable, location-centric data
- Early data is often inconsistent, anecdotal, and haphazardly collected
- Windshield surveys and post-incident imagery are common data sources
- Effective but not always applicable to every community sector

Preliminary Anticipatory Recovery Impact Assessments

- Geodesign framework and methodology
- Flexible, iterative, scalable
- Relies entirely on publicly available data

Analysis Framework



Storm Comparisons

Storm	Est 7-Day Rainfall (inches)	Coastal Storm Surge Forecast (feet)	Riverine Flooding	Extreme Wind (115mph+)	Landslide Susceptibility
Lane	30+	No	Yes	No	Yes
Florence	10-14, 15-20, 20+	1-6, 10+	Yes	No	No
Michael	5-7, 7+	1-8, 9-12	No	Yes	No

Source: NBC News

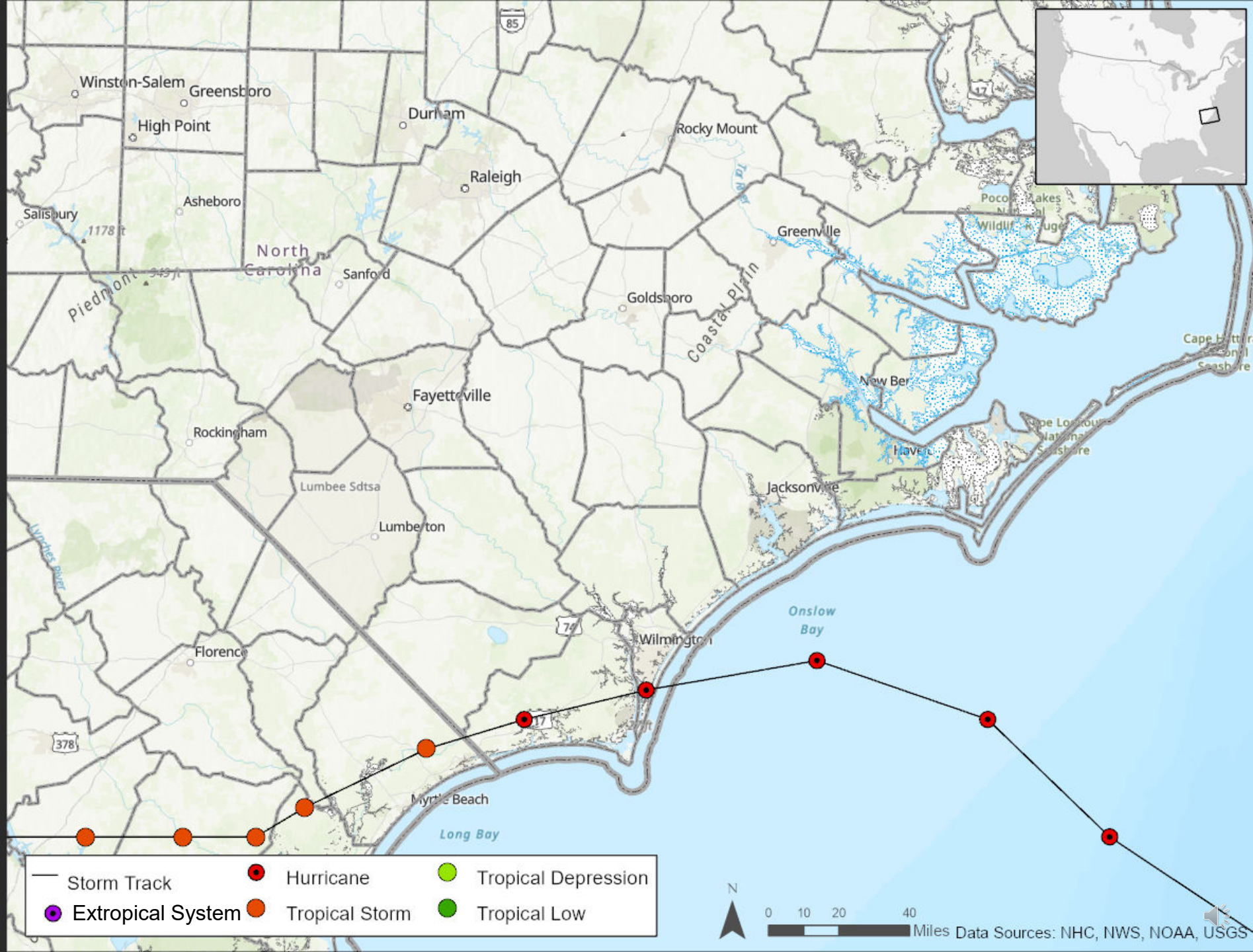
Hurricane Florence

Evaluate Regional Impacts

Coastal Storm Surge

10ft Storm Surge

1-6ft Storm Surge



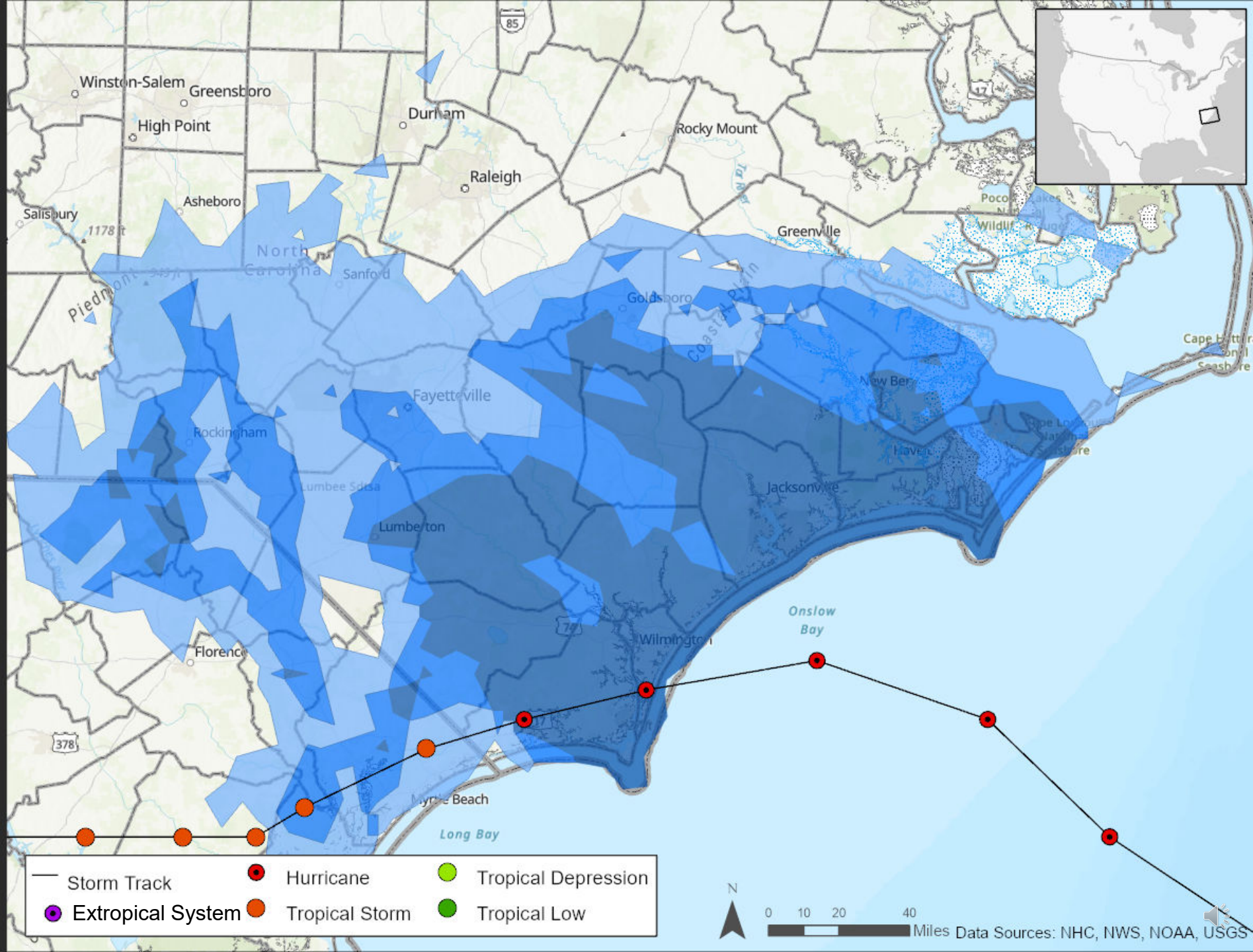
Evaluate Regional Impacts

Coastal Storm Surge

- 10ft Storm Surge
- 1-6ft Storm Surge

Observed Precipitation

- 10-14in
- 15-19in
- 20in+



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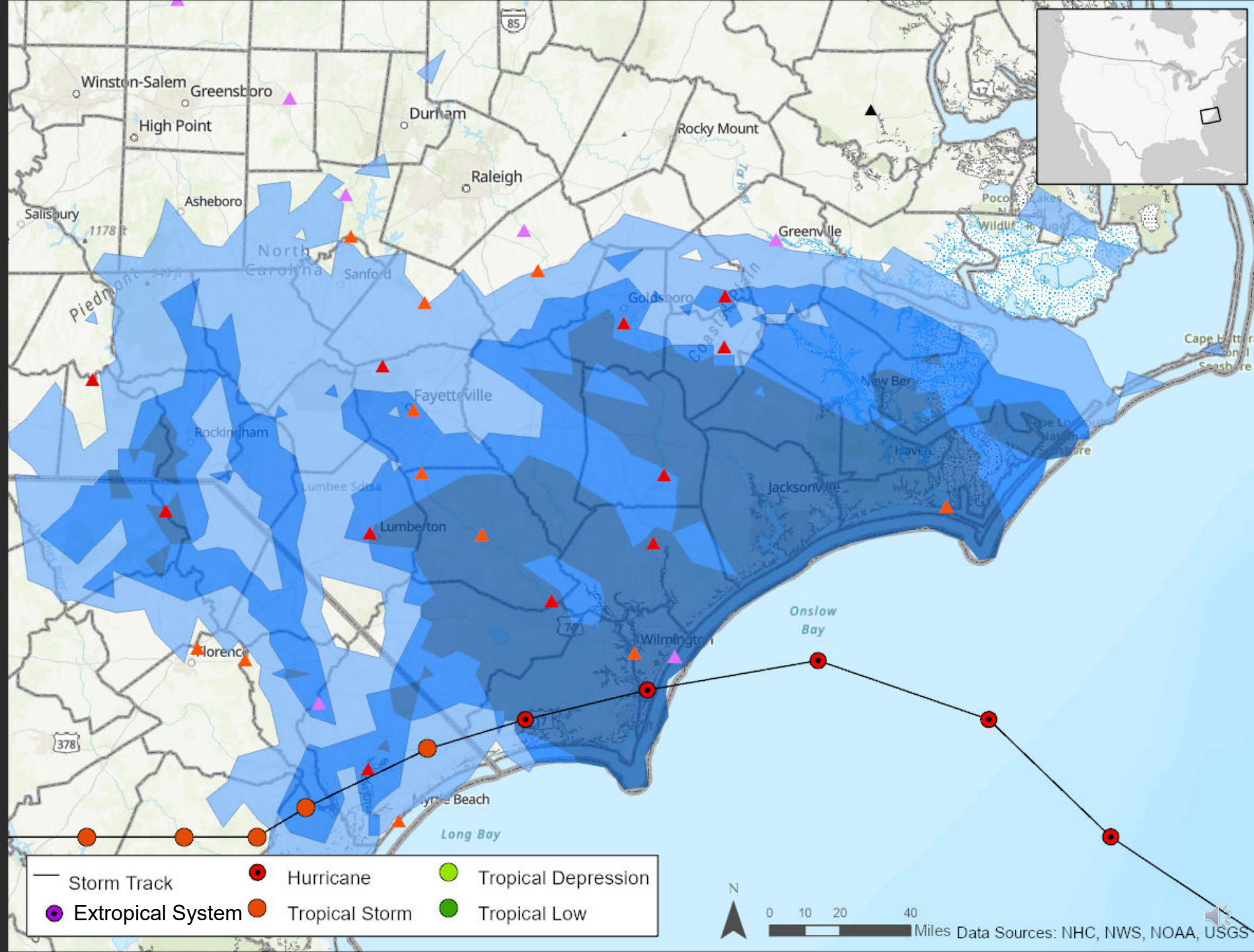
- 15-19in
- 20in+

USGS Stream Gauge (Flood Stage)

- Major
- Moderate
- Minor
- Action



Classify County Risk

Coastal Storm Surge

10ft Storm Surge

1-6ft Storm Surge

Observed Precipitation

10-14in

15-19in

20in+

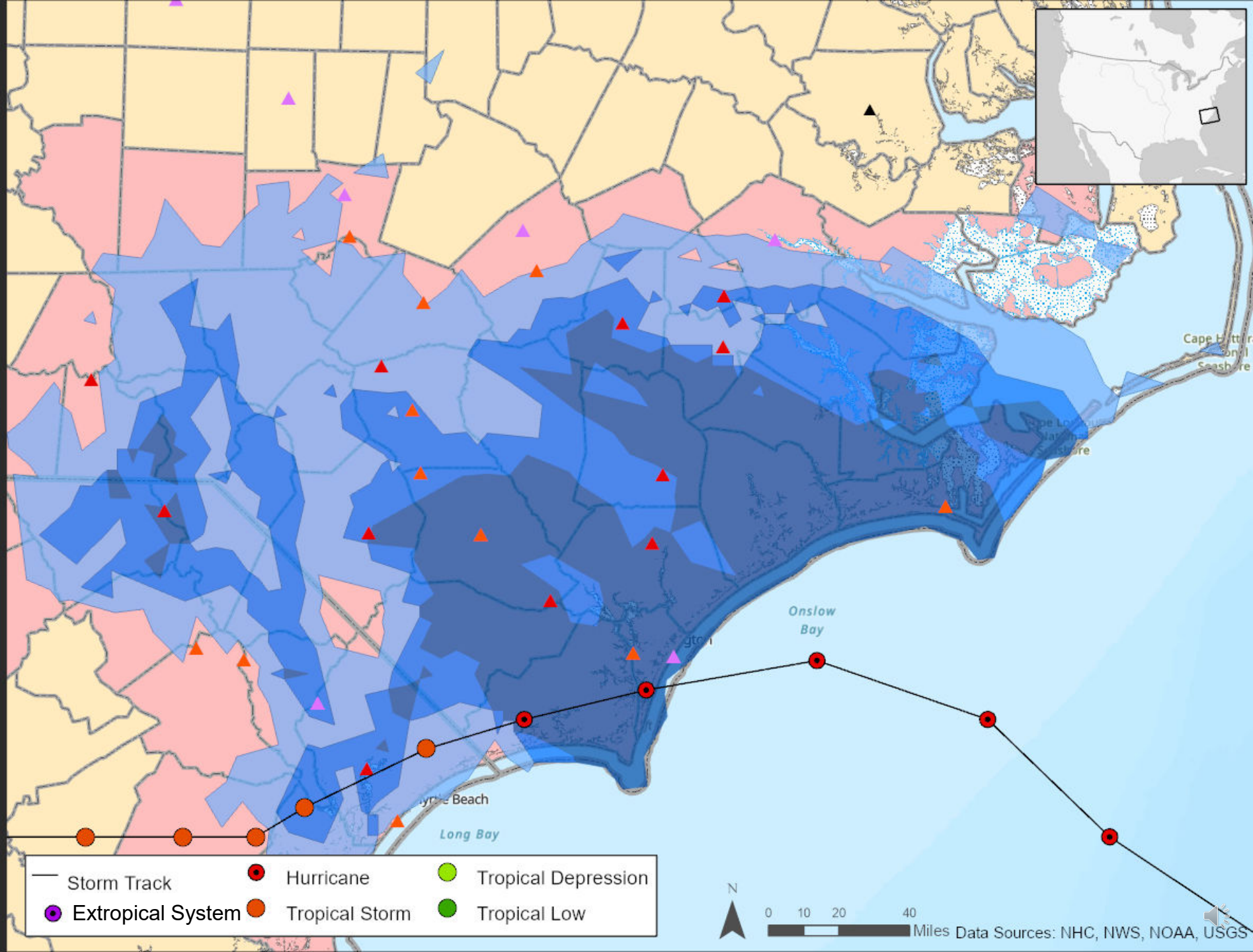
USGS Stream Gauge (Flood Stage)

Major

Moderate

Minor

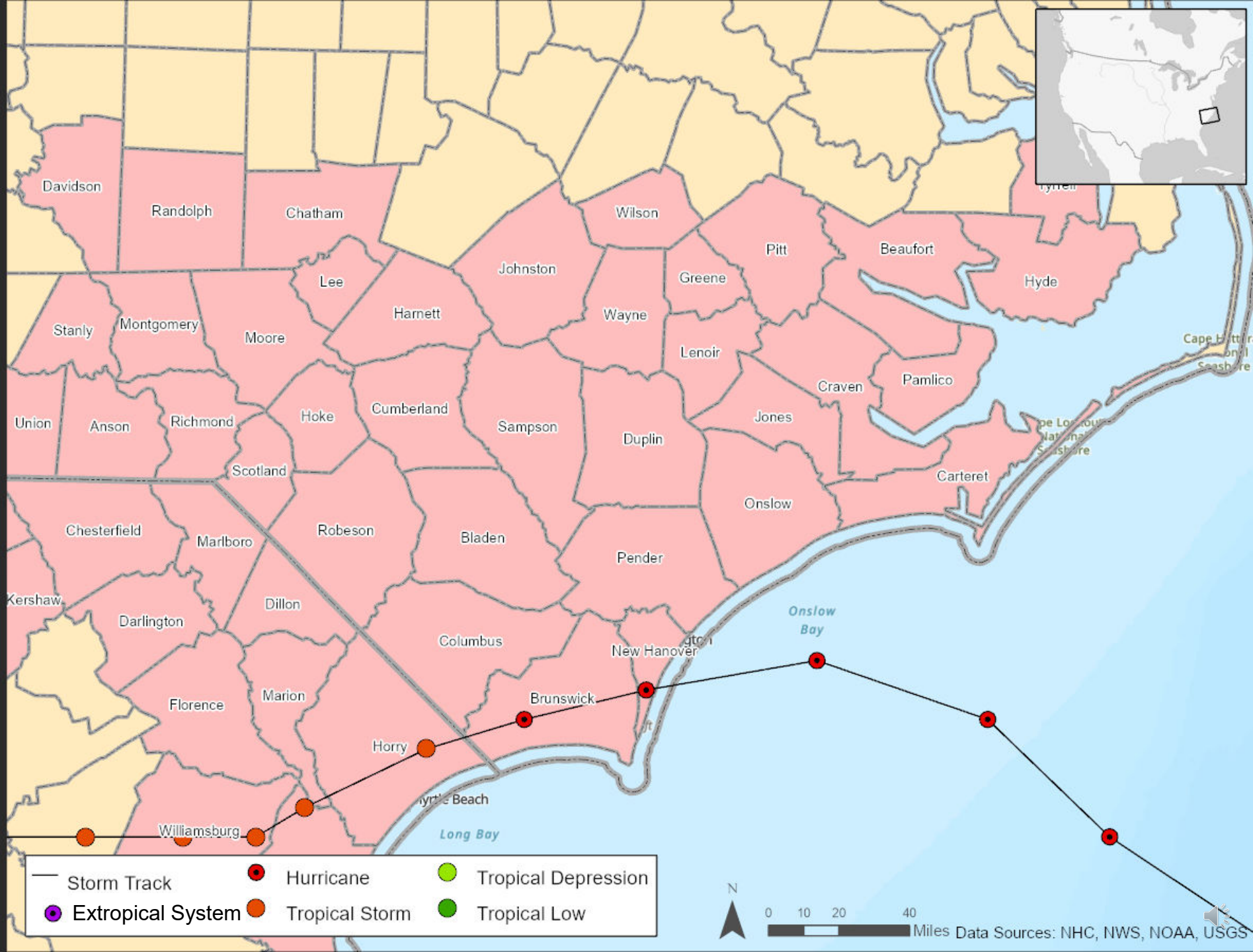
Action



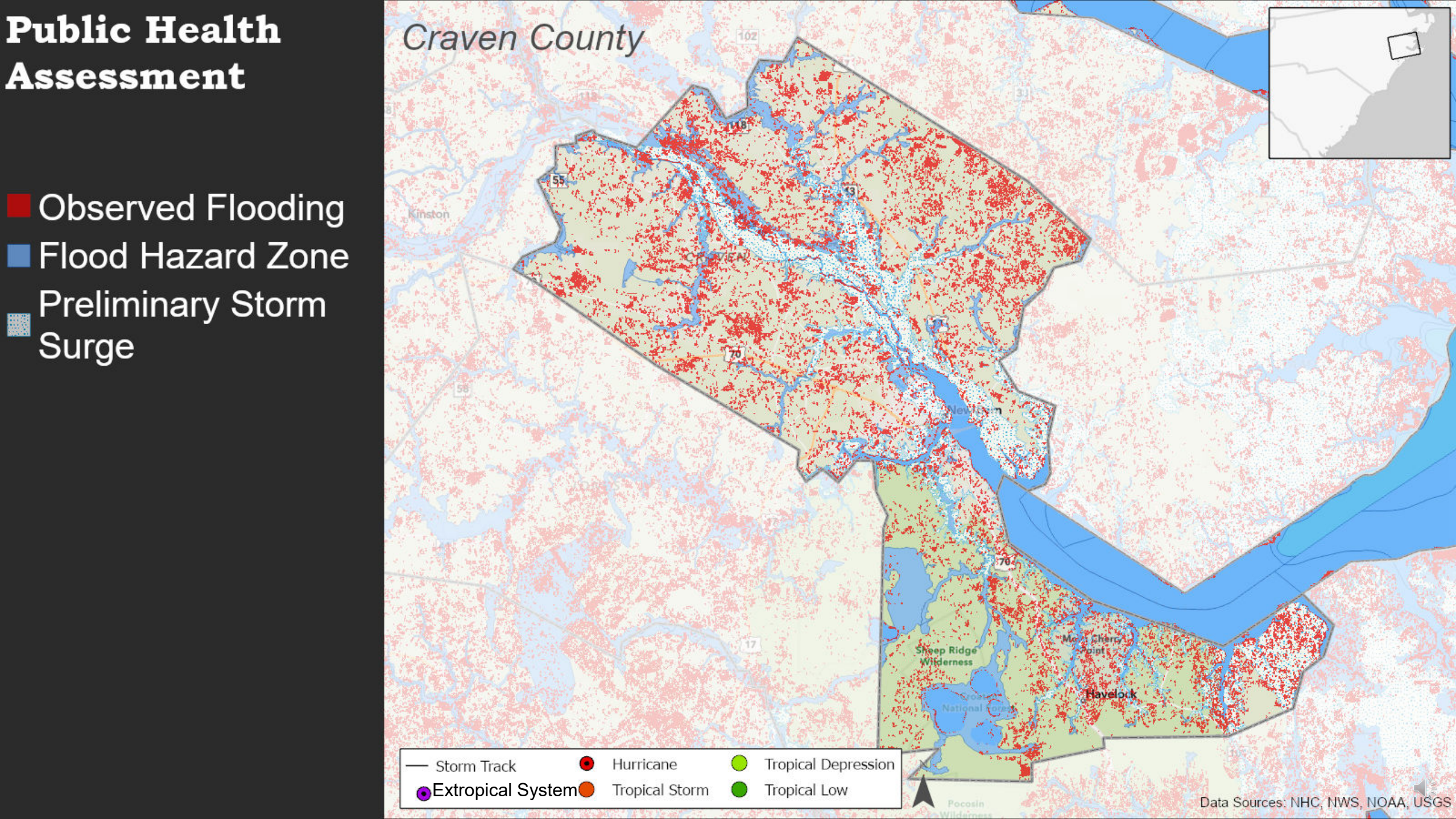
Classify County Risk

County Risk

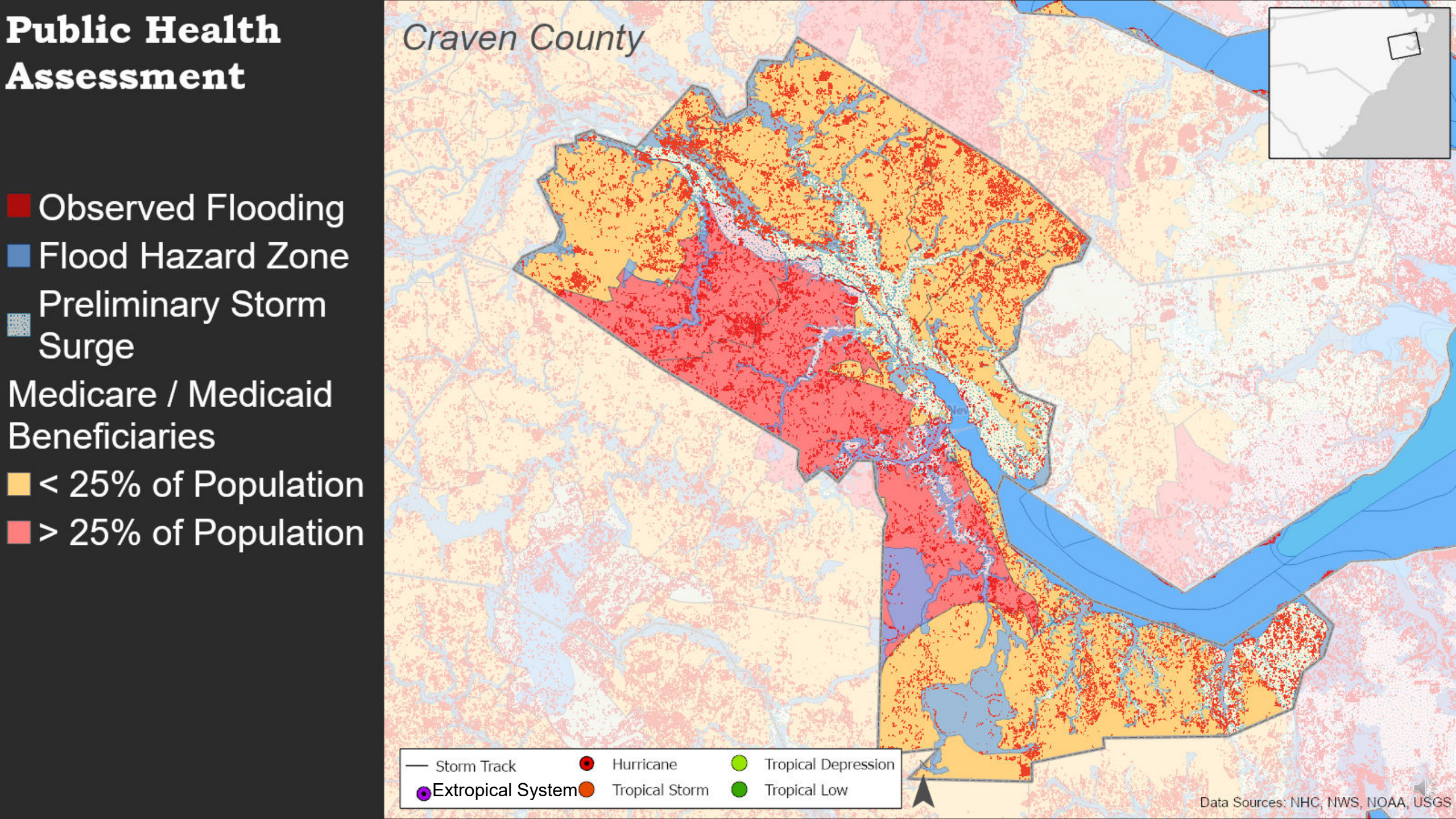
- Low to Moderate
- High



Public Health Assessment

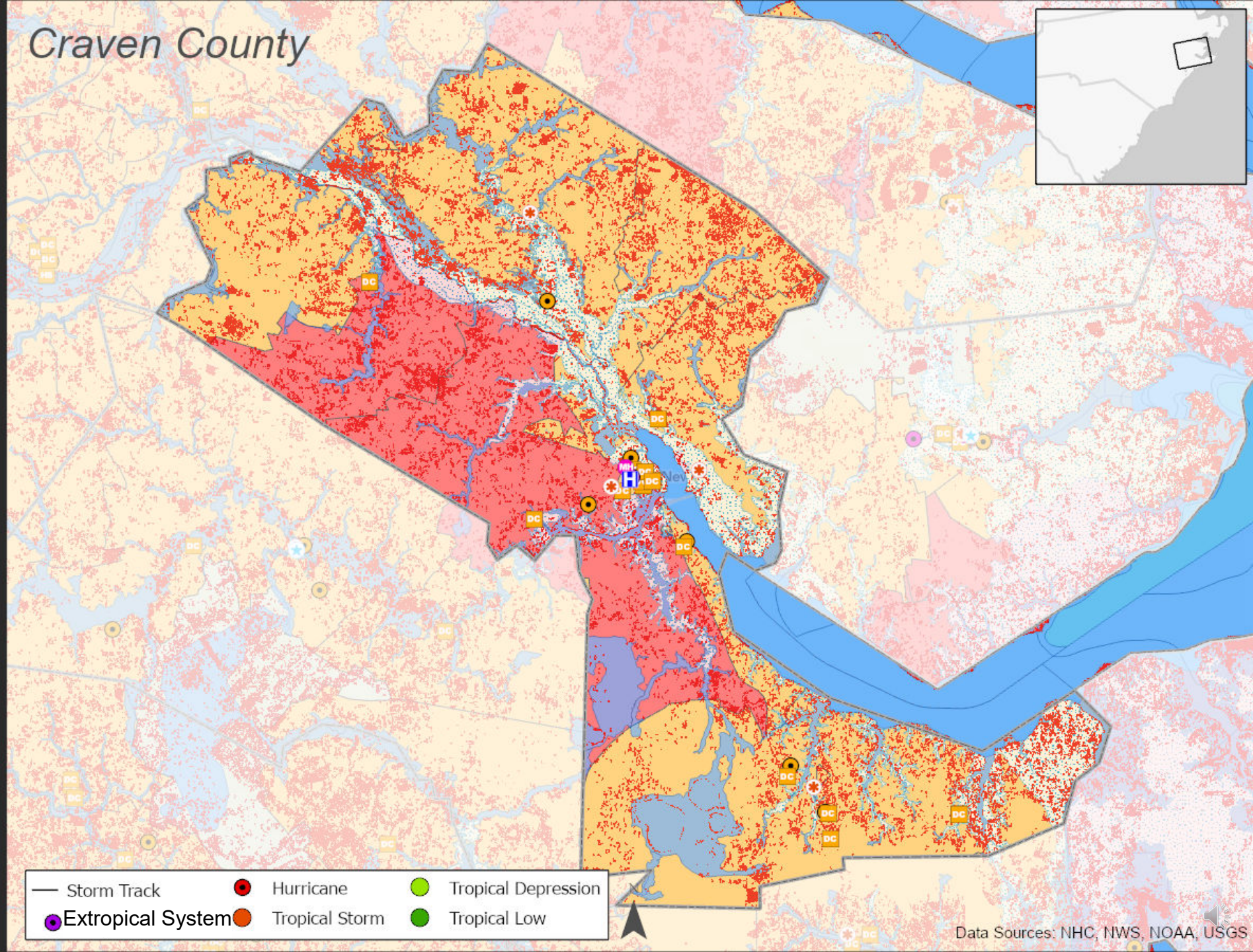


Public Health Assessment



Public Health Assessment

- Hospital
- Federally Qualified Health Center
- Surgical Center
- Dialysis Center
- Pharmacy
- Nursing Facility



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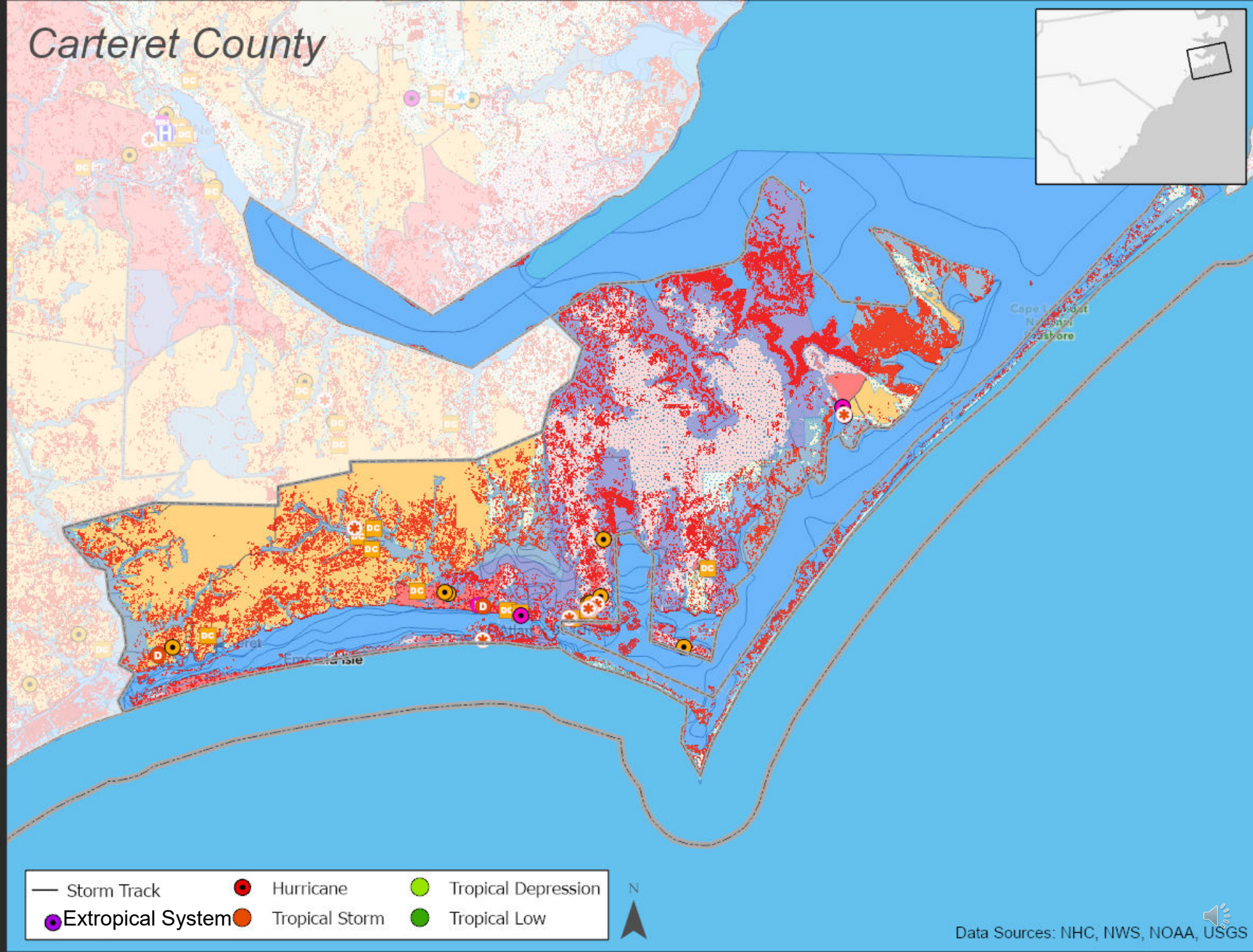


Source: Volusia County Sheriff’s Office

Hurricane Michael

Evaluate Regional Impacts

Coastal Storm Surge

- 9-12ft Storm Surge
- 1-8ft Storm Surge

Evaluate Regional Impacts

Coastal Storm Surge

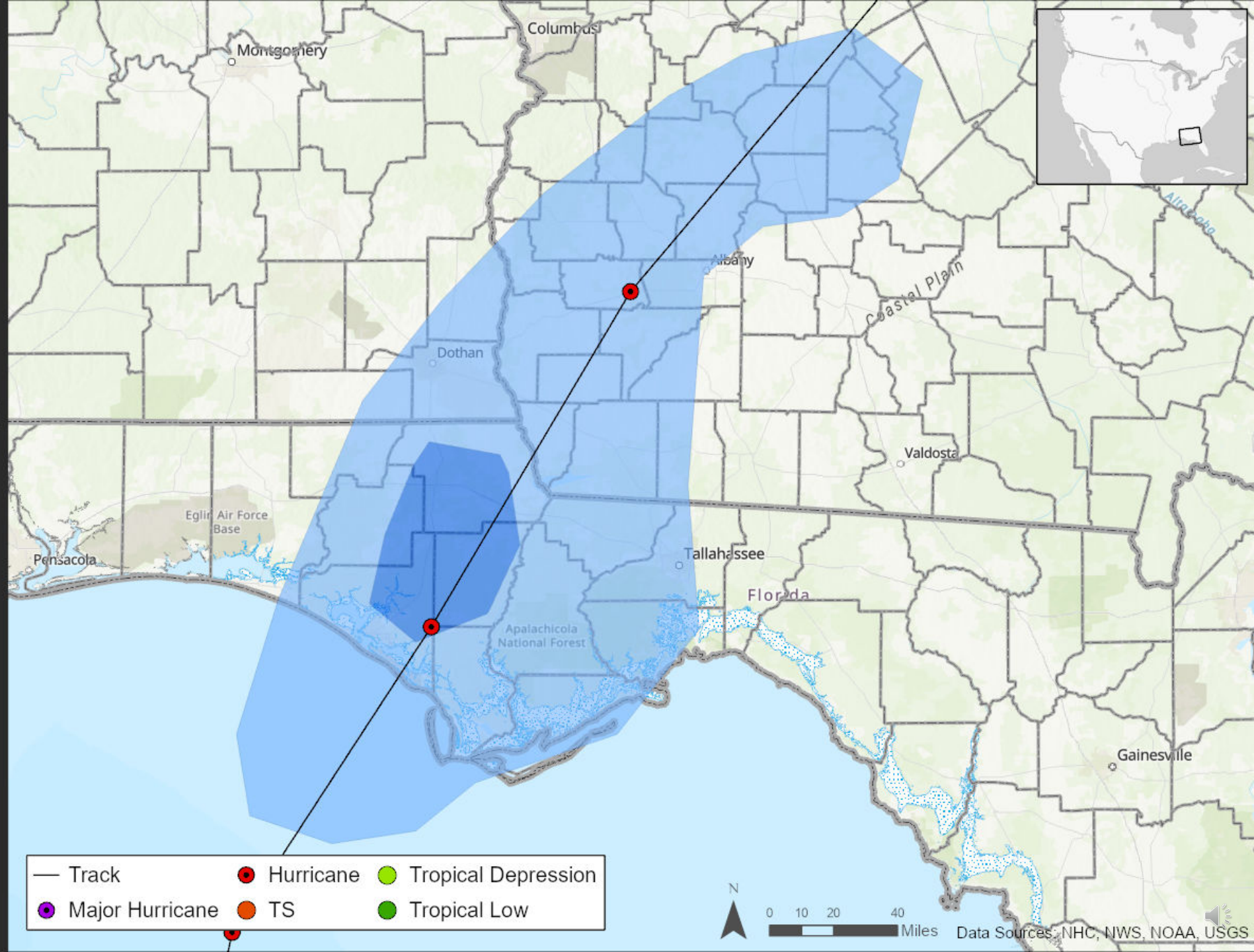
9-12ft Storm Surge

1-8ft Storm Surge

Observed Precipitation

5-6in

7in+



Evaluate Regional Impacts

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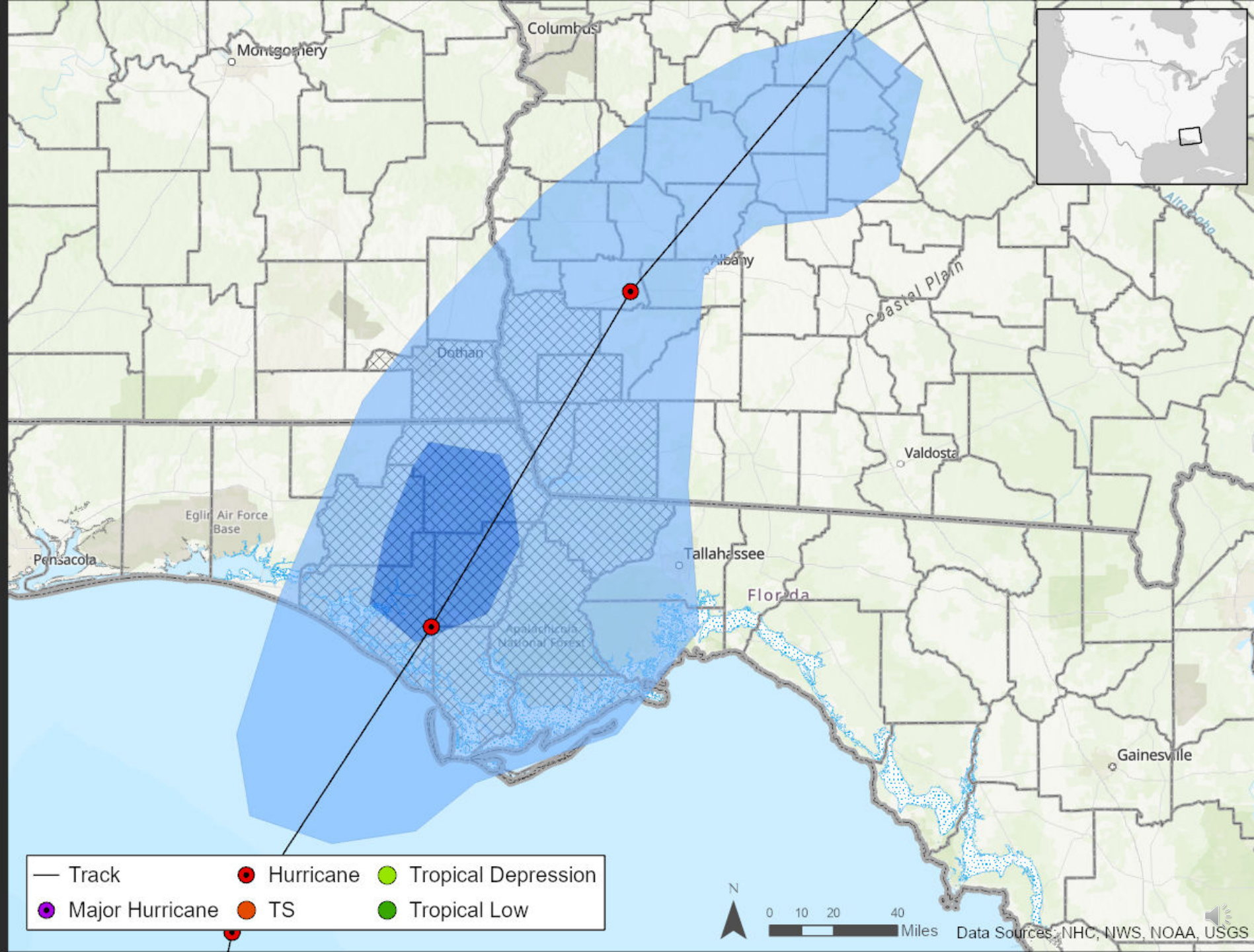
5-6in

7in+

Extreme Wind Warnings



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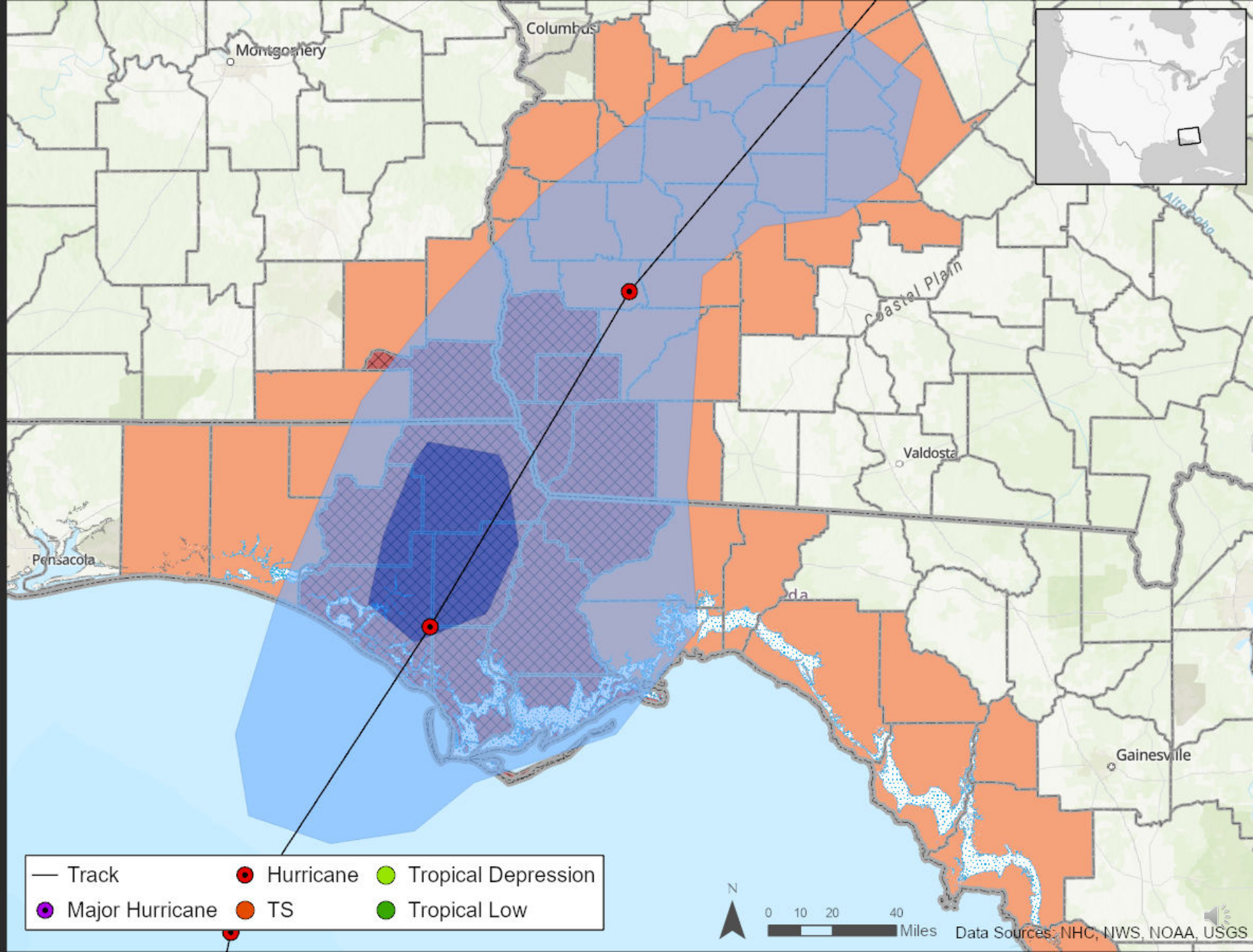

Classify County Risk

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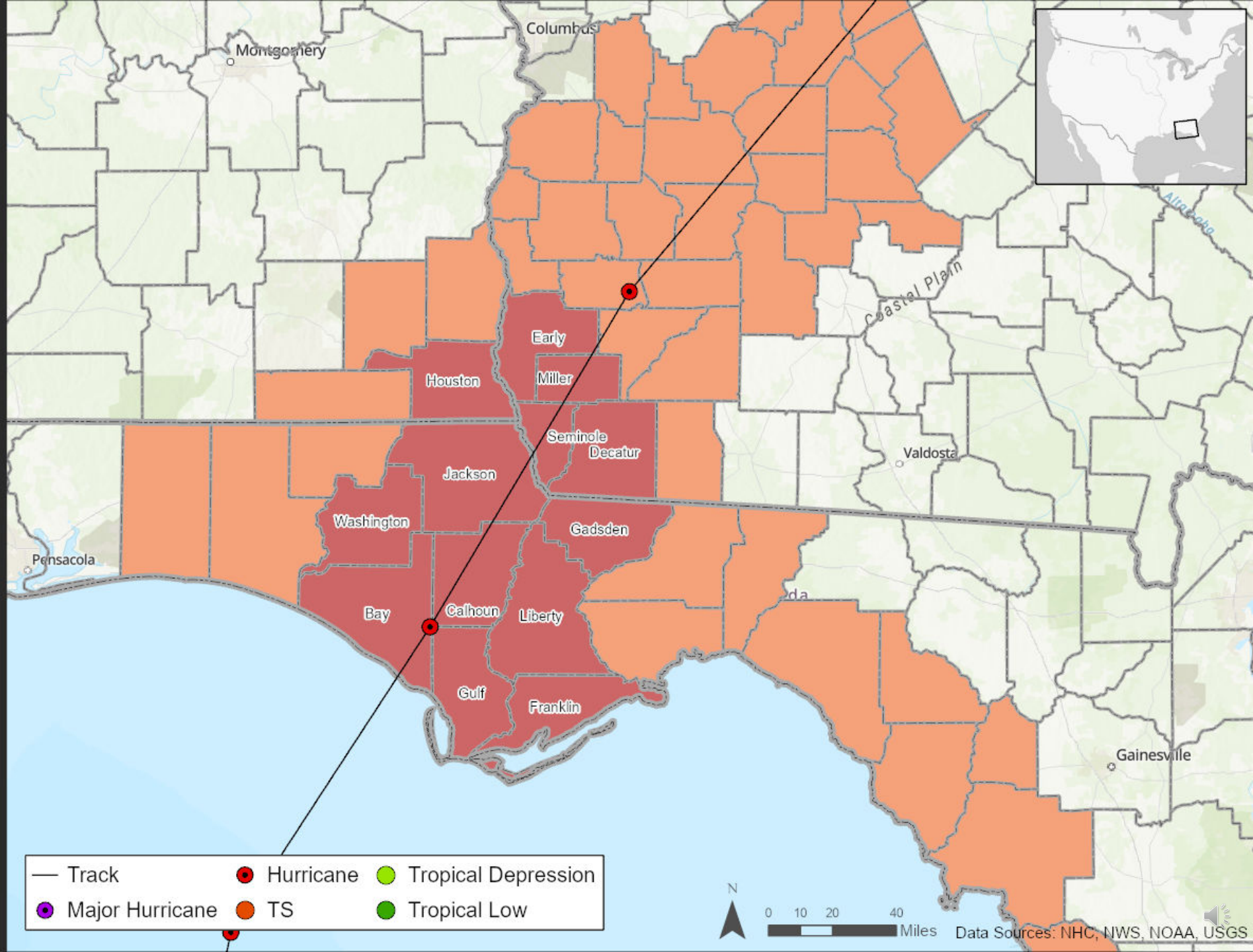
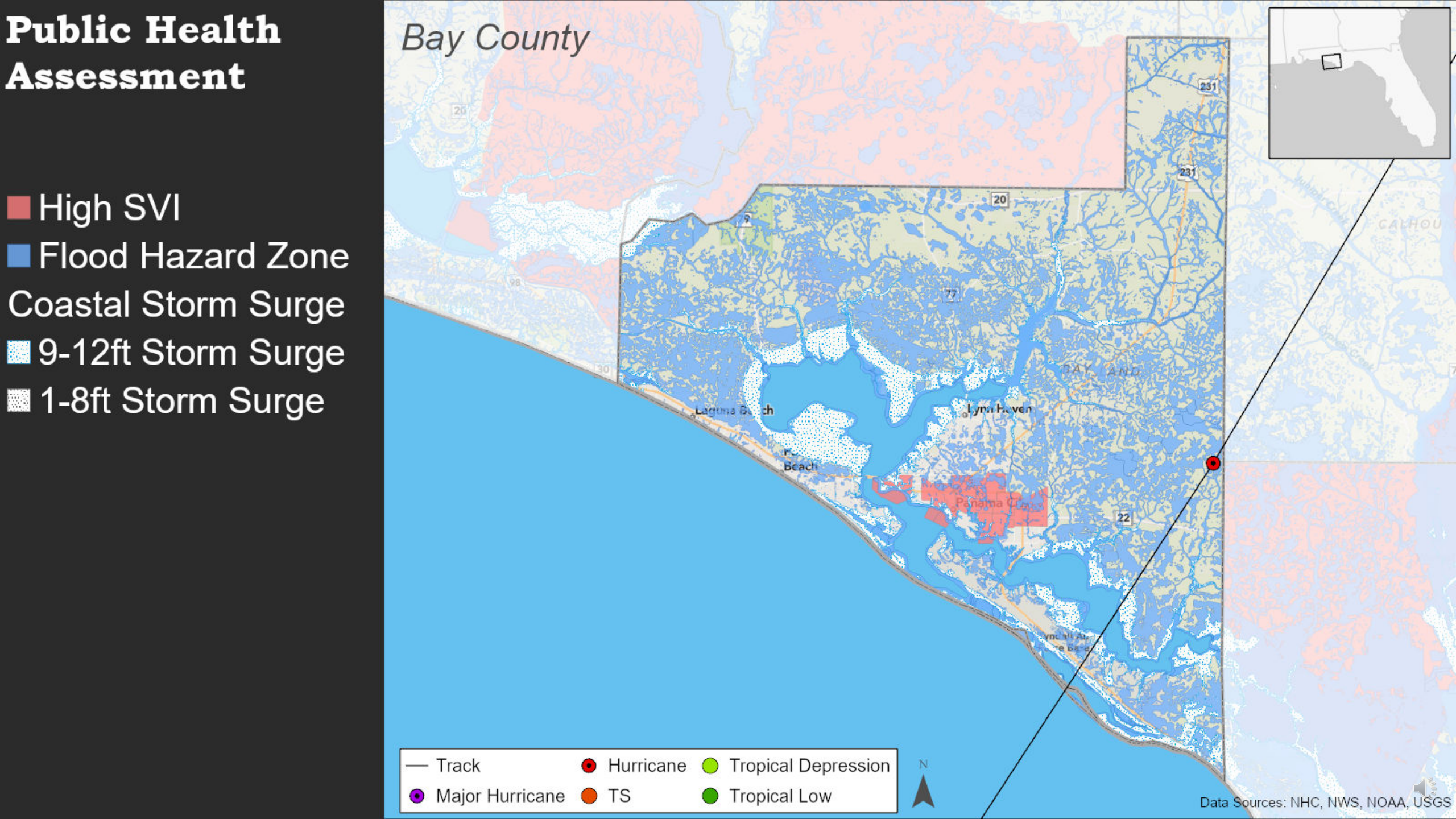
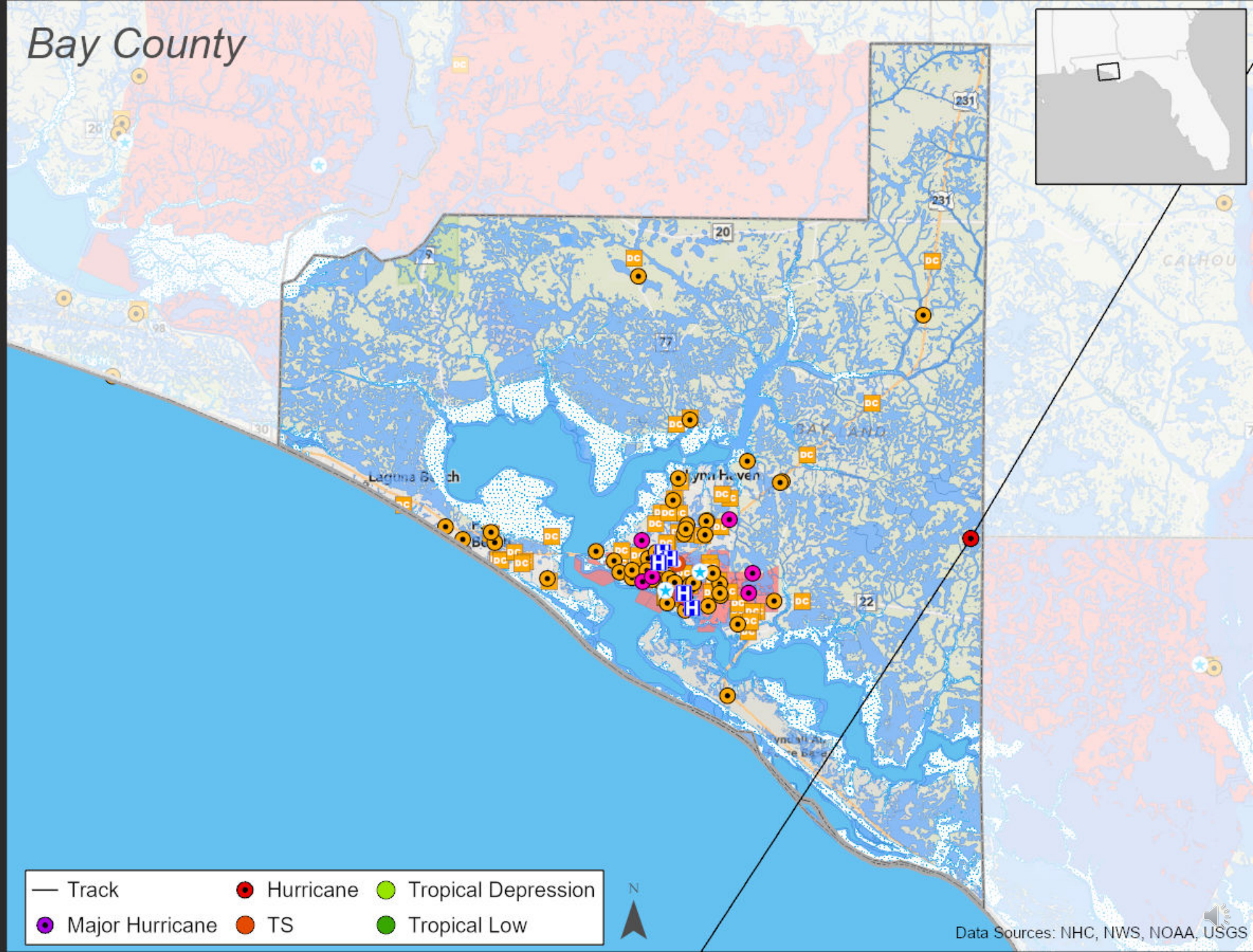


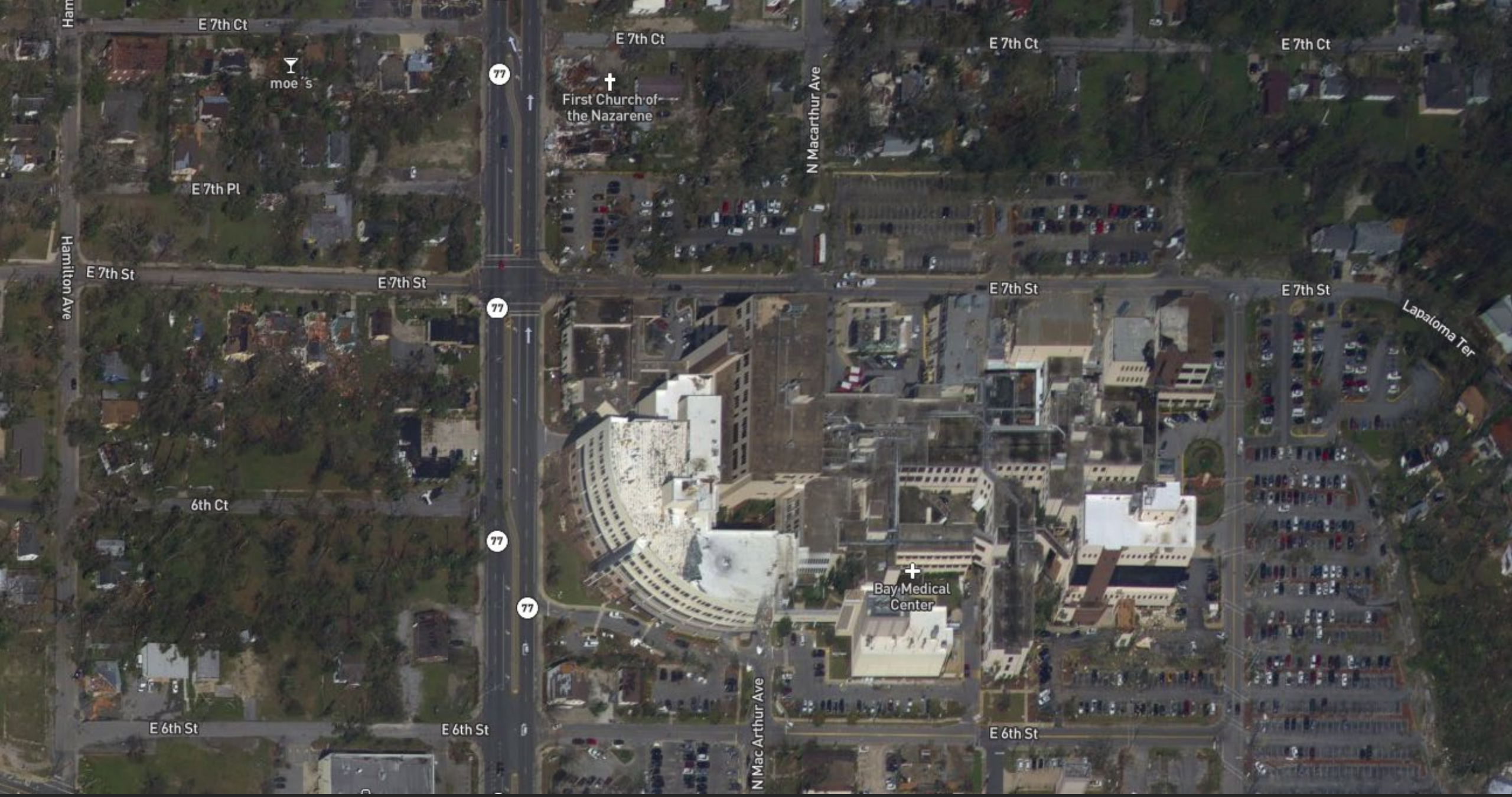
Public Health Assessment



Public Health Assessment

- Hospital
- Dialysis Center
- Nursing Facility
- FQHC
- Public School
- Daycare Center

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Lapaloma Ter
6th Ct
Bay Medical Center
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E 6th St
N Mac Arthur Ave
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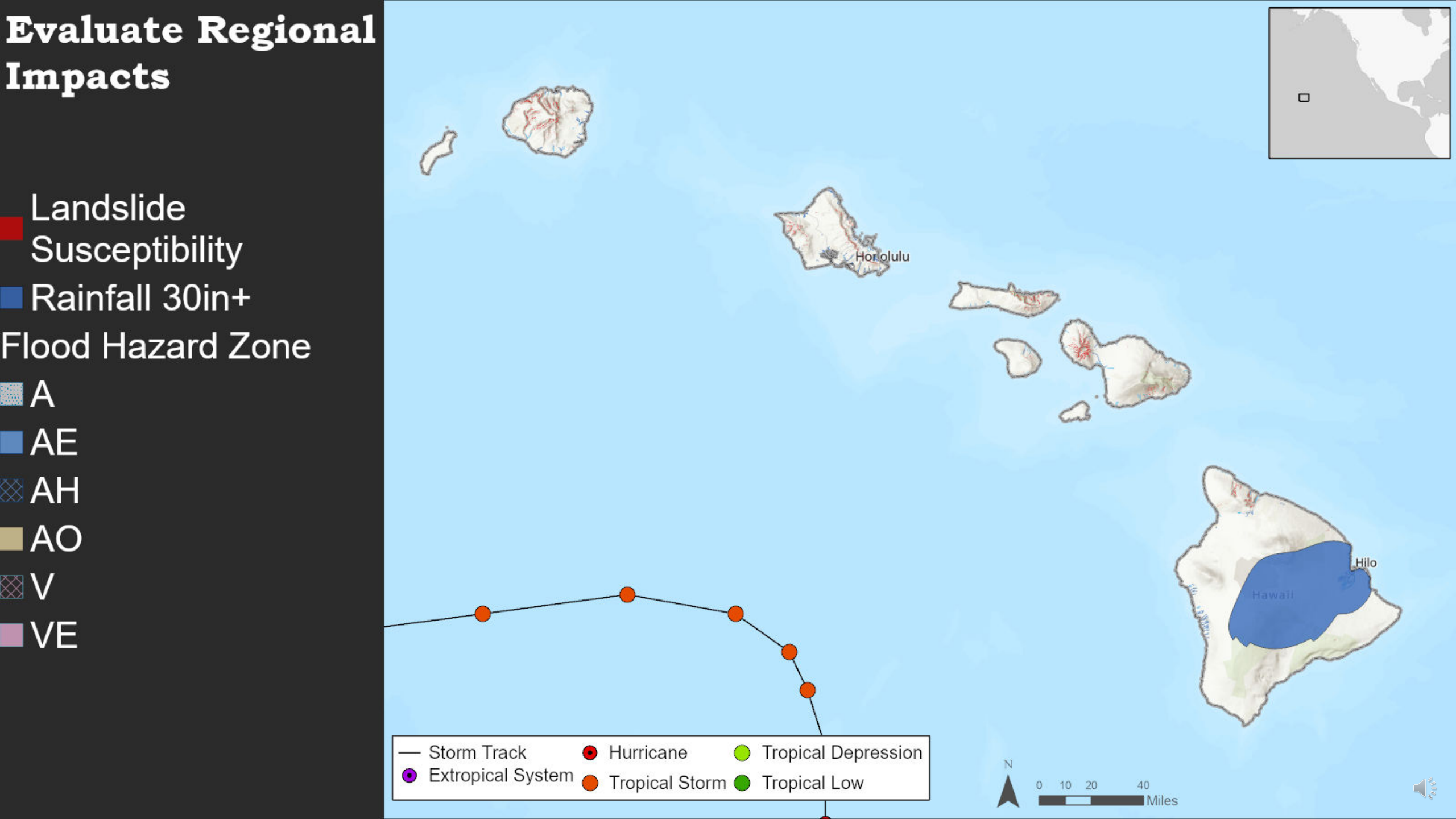
Source: NOAA

Source: NYT / Associated Press

Hurricane Lane

Evaluate Regional Impacts

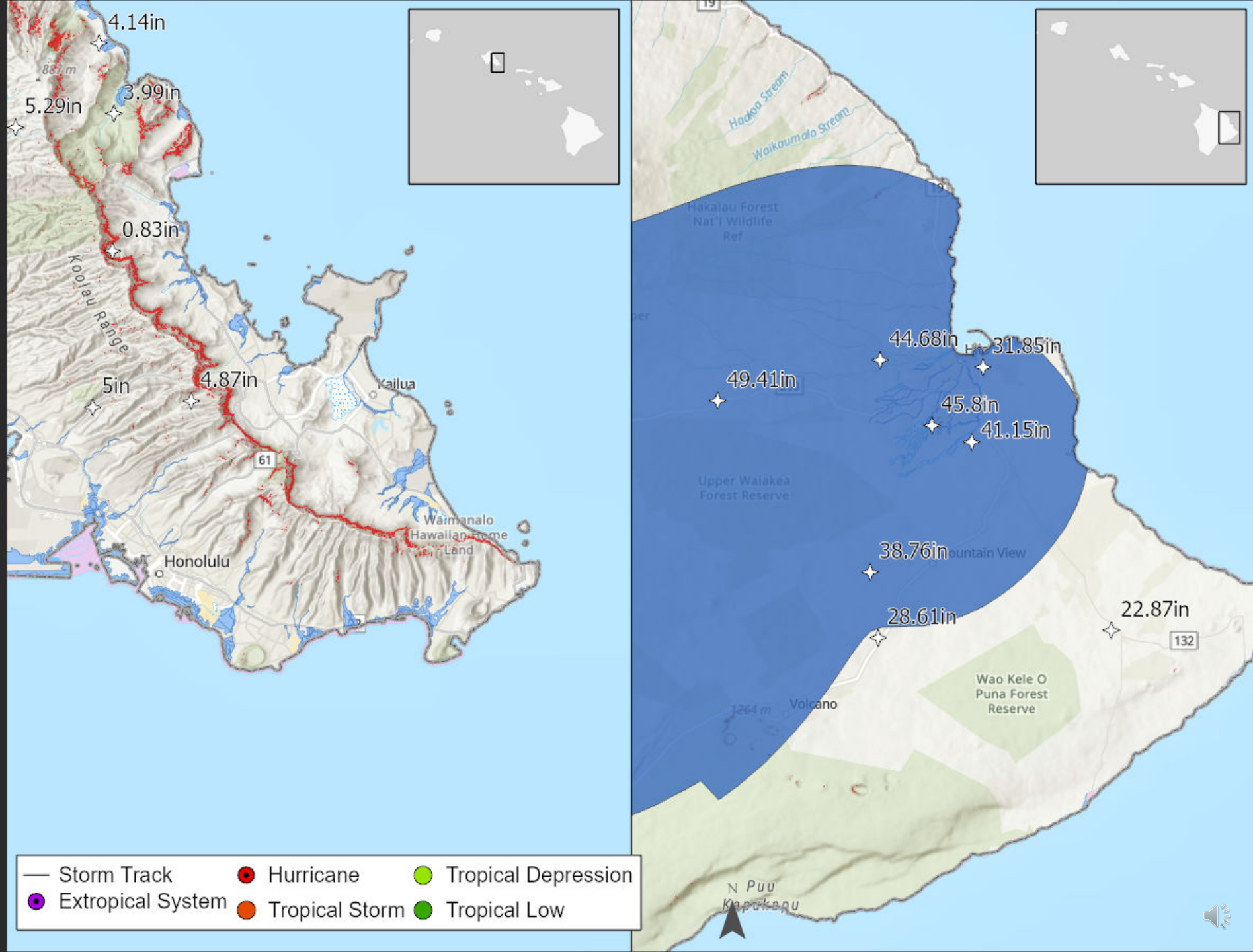


Evaluate Regional Impacts

- Rain Gauge
- Rainfall 30in+
- Landslide Susceptibility

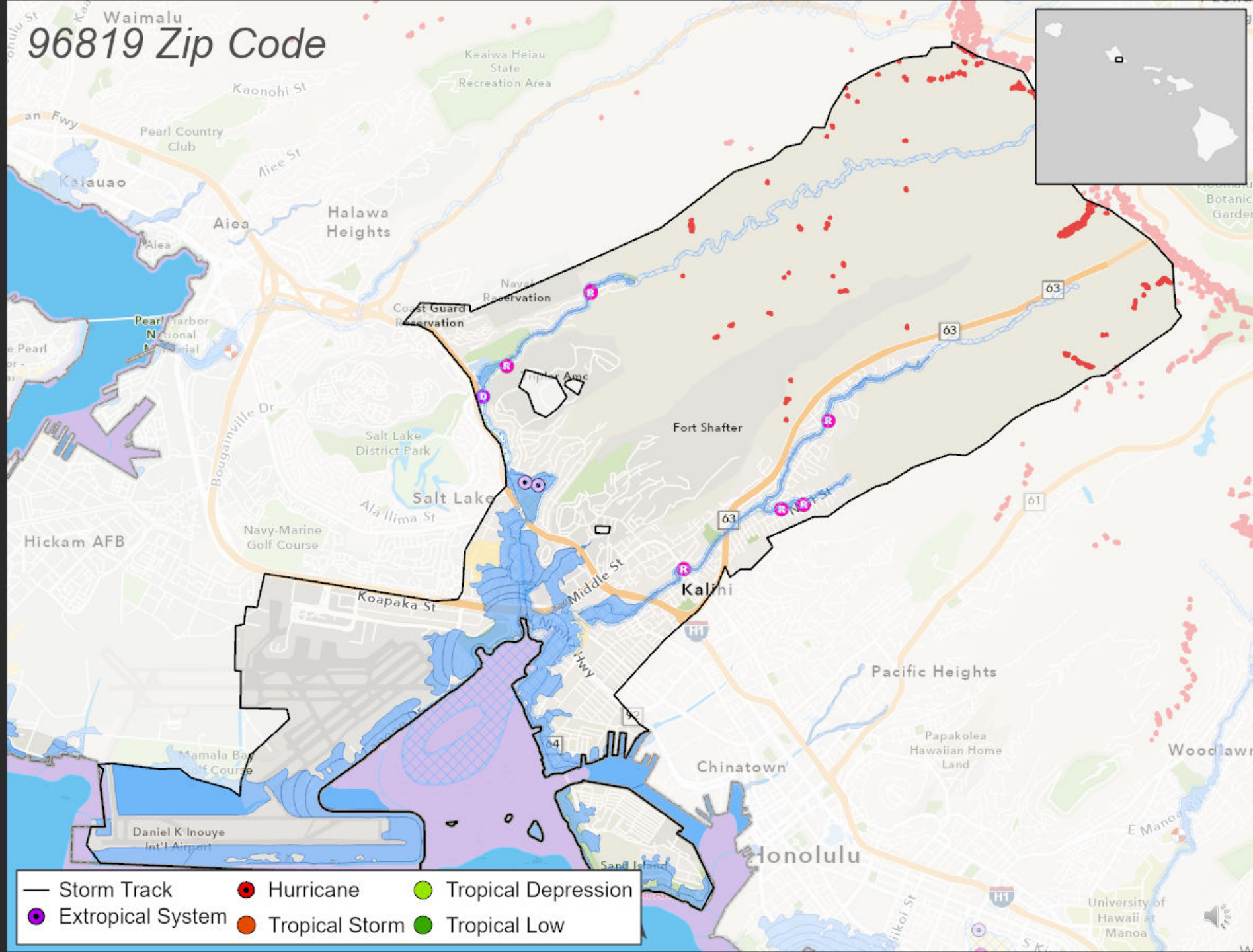
Flood Hazard Zone

- A
- AE
- AH
- AO
- V
- VE



Public Health Assessment

- Adult Residential Care
- Day Care Center
- Pharmacy
- Public School
- Senior Assisted Living
- Federally Qualified Health Center



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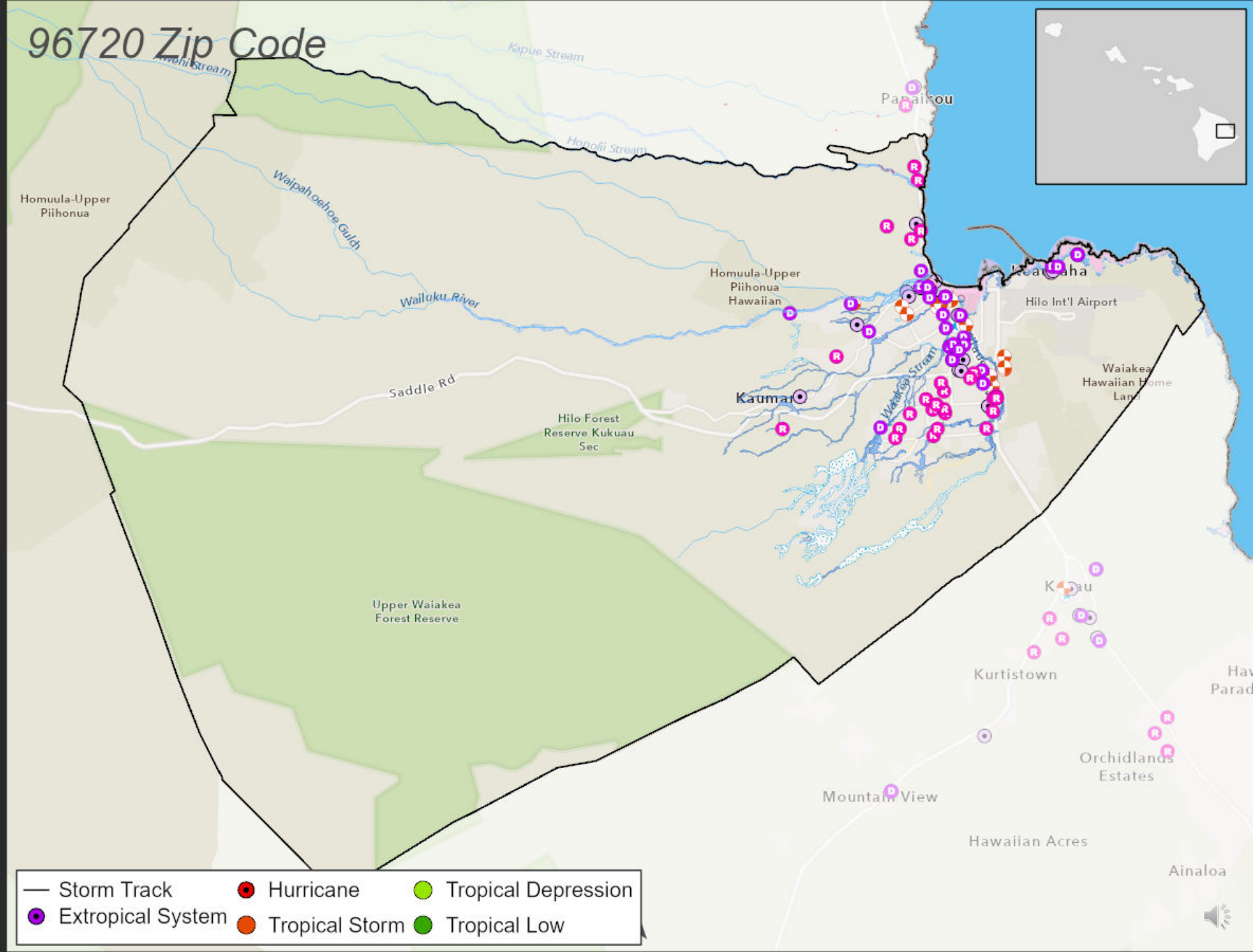


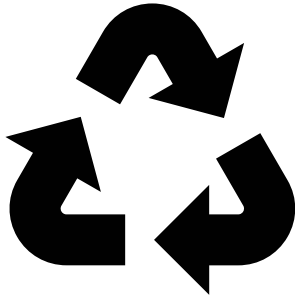
Key Findings

Understanding topography and storm characteristics are as important as knowing the location of critical infrastructure. The combination of all three factors can provide a basis for organizational decision-making, in some cases, in near-real time.

Key Findings

When applied prior to and during a forecasted event, geodesign is an effective model to evaluate the location and magnitude of impact to public health infrastructure.

Key Findings



Easily replicable. Using common scripting tools, this approach can be automated and integrated into existing organizational decision-making processes. All data sources in our analysis are publicly available (many with open APIs).

Conclusion

- Reliable hazard-specific vulnerability variables can provide actionable information to decision-makers for recovery (and response)
- Local insights of which variables make for better indicators is critical to provide better outcomes
- Recovery impacts still will take weeks to months to materialize, but prioritizing resources in areas with high vulnerability + high impact will provide a head start

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