

NOAA Hydrographic Services Review Panel (HSRP): Emergency Management Considerations

Chris Moore | FEMA Region 2 Response Division



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Federal Hurricane Readiness Support

National Hurricane Program Initiatives

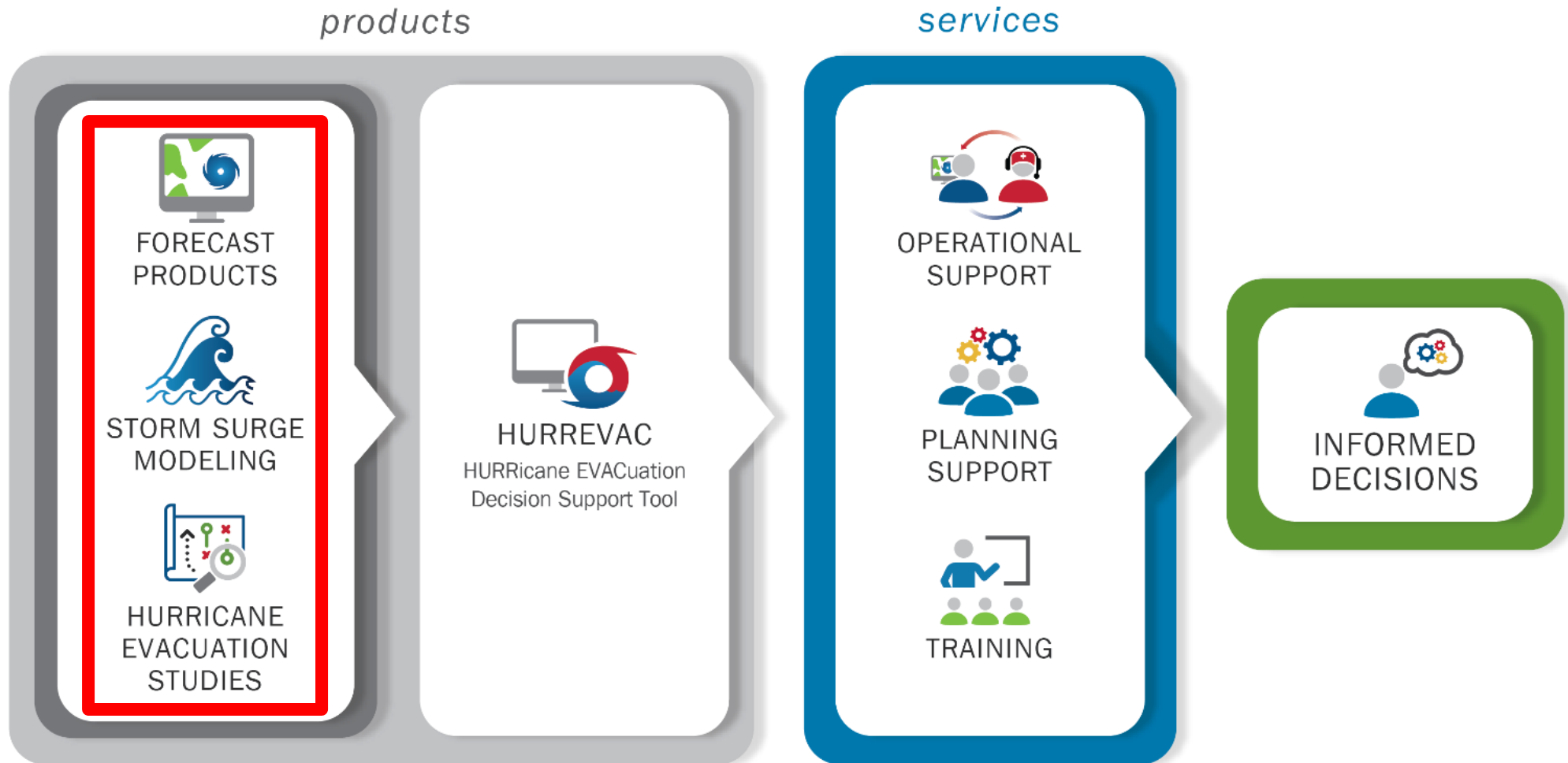
National Hurricane Program Partners



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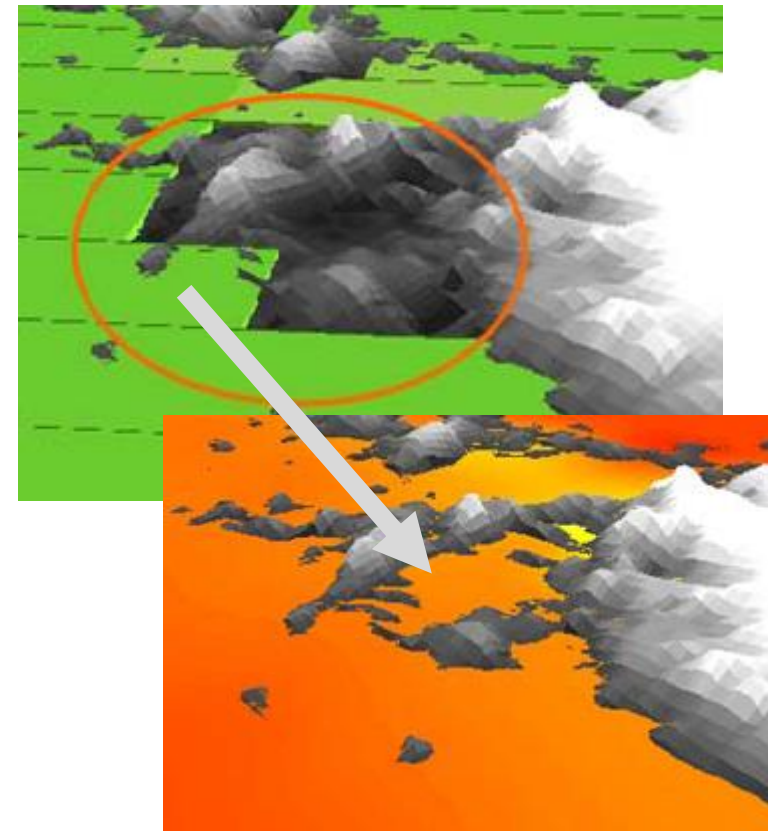
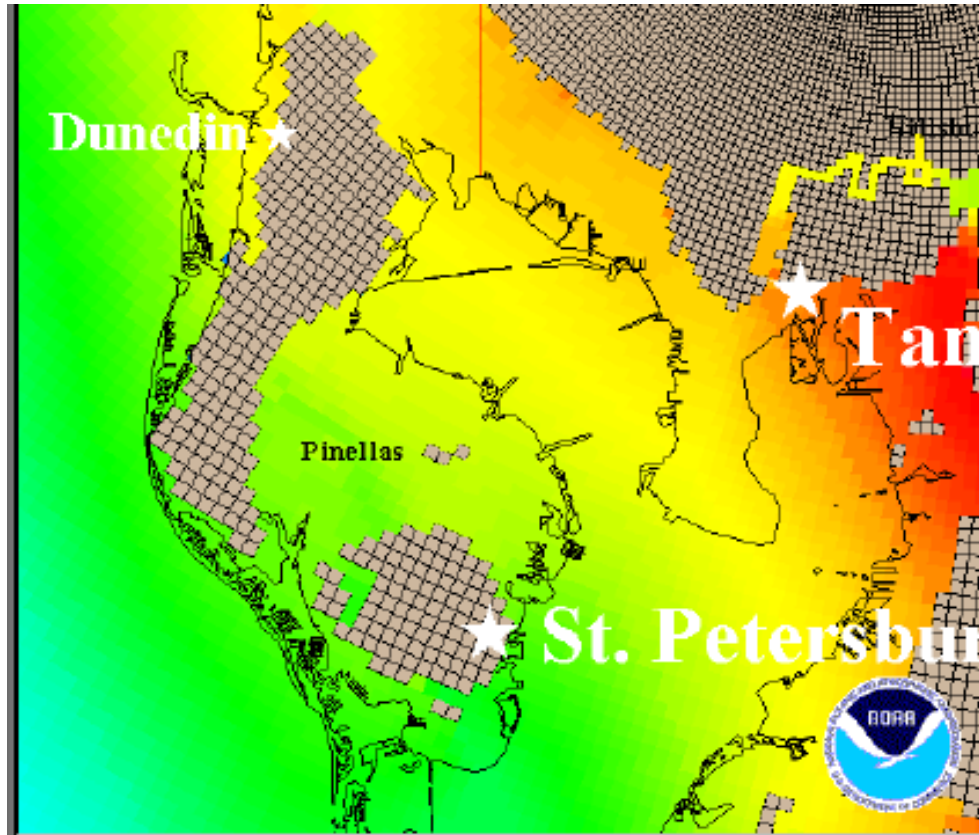
- Hurricane Preparedness Training
- Response and Evacuation Planning Technical Assistance
- Operational Technical Assistance and Decision Support

National Hurricane Program Products and Services



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National Hurricane Center Storm Surge Modeling



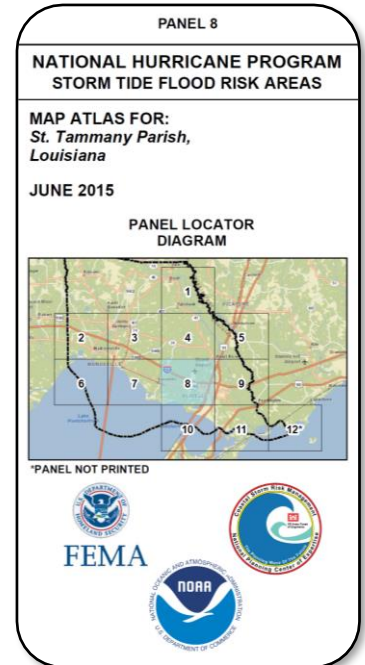
SLOSH Output by category, overlaid on a Digital Elevation Model



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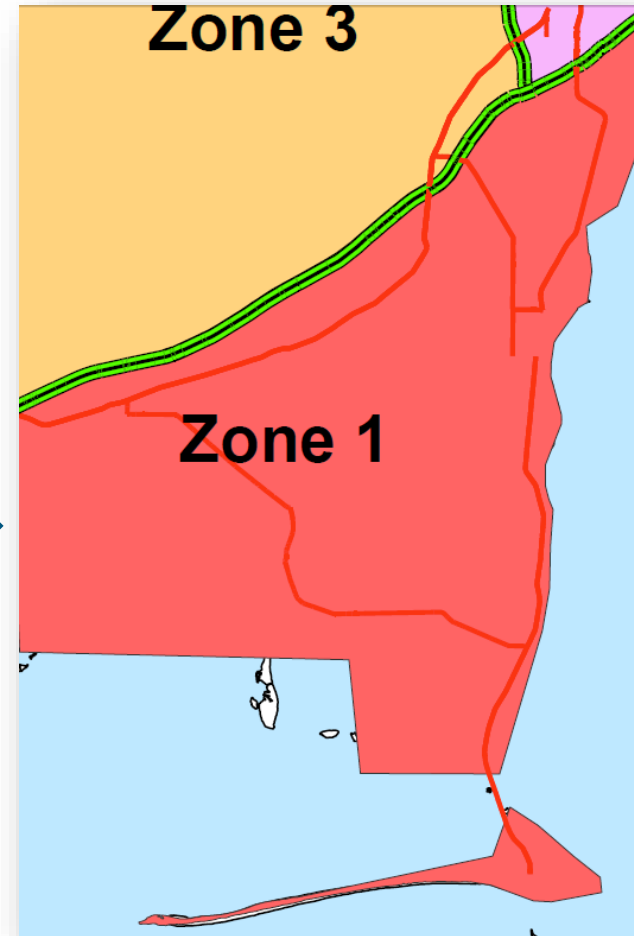
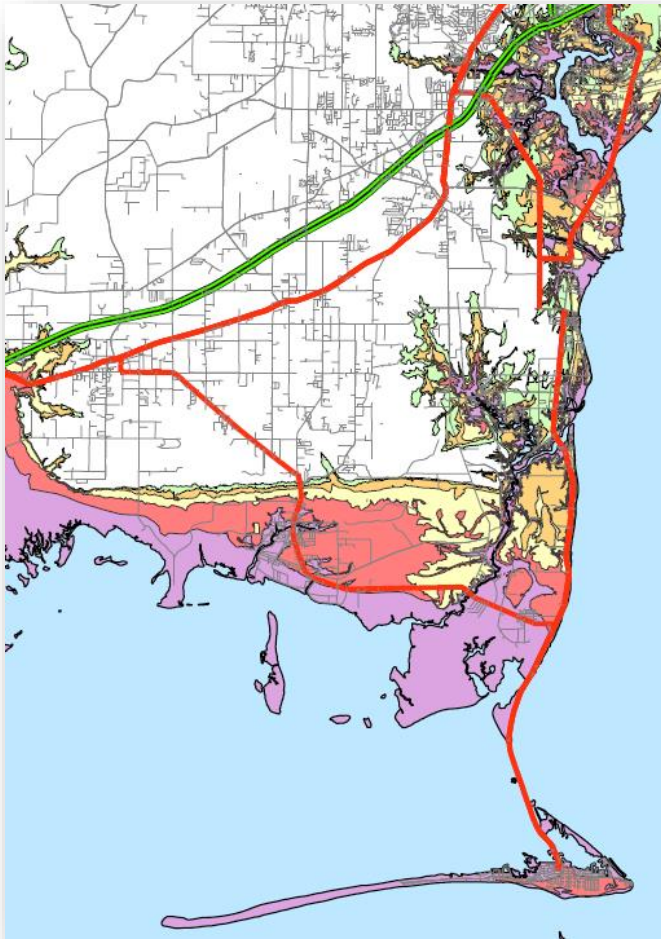
Steady-State Risk Maps

- Storm surge risk maps provide a composite “worst-case” scenario for storm surge vulnerability for every normally dry location on the map.



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Surge Vulnerability Maps as Basis for Evacuation Zones



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Evacuation Zones Based on Direction of Approach

- Areas with high population density may consider a storm's direction of approach in evacuation planning.
- Depending on bathymetry and topography, a storm's direction can significantly change the storm surge risk profile.

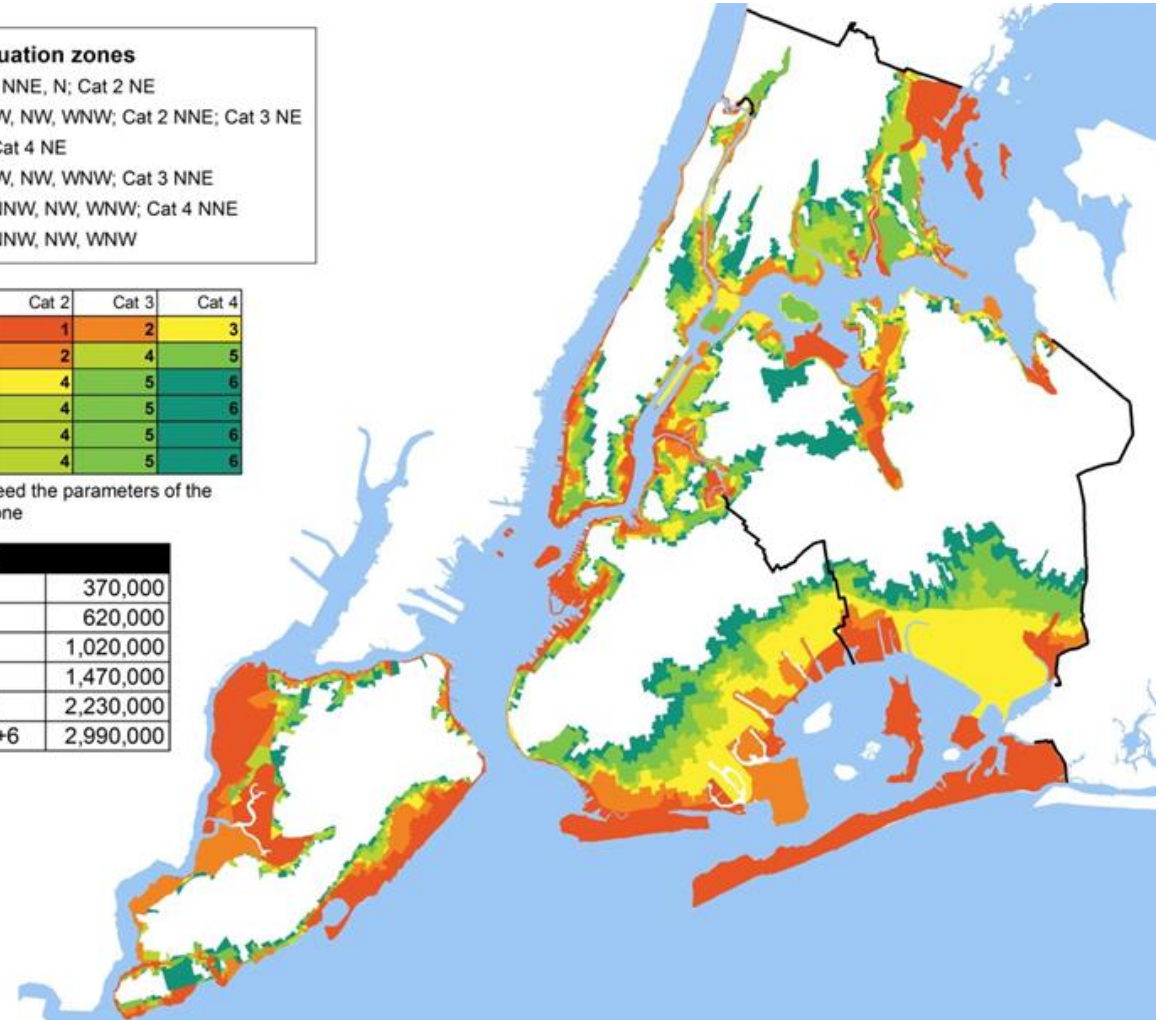
Hurricane evacuation zones

| | |
|---|---|
| 1 | - Cat 1 NE, NNE, N; Cat 2 NE |
| 2 | - Cat 1 NNW, NW, WNW; Cat 2 NNE; Cat 3 NE |
| 3 | - Cat 2 N; Cat 4 NE |
| 4 | - Cat 2 NNW, NW, WNW; Cat 3 NNE |
| 5 | - Cat 3 N, NNW, NW, WNW; Cat 4 NNE |
| 6 | - Cat 4 N, NNW, NW, WNW |

| | Cat 1 | Cat 2 | Cat 3 | Cat 4 |
|-----|-------|-------|-------|-------|
| NE | 1 | 1 | 2 | 3 |
| NNE | 1 | 2 | 4 | 5 |
| N | 1 | 4 | 5 | 6 |
| NNW | 2 | 4 | 5 | 6 |
| NW | 2 | 4 | 5 | 6 |
| WNW | 2 | 4 | 5 | 6 |

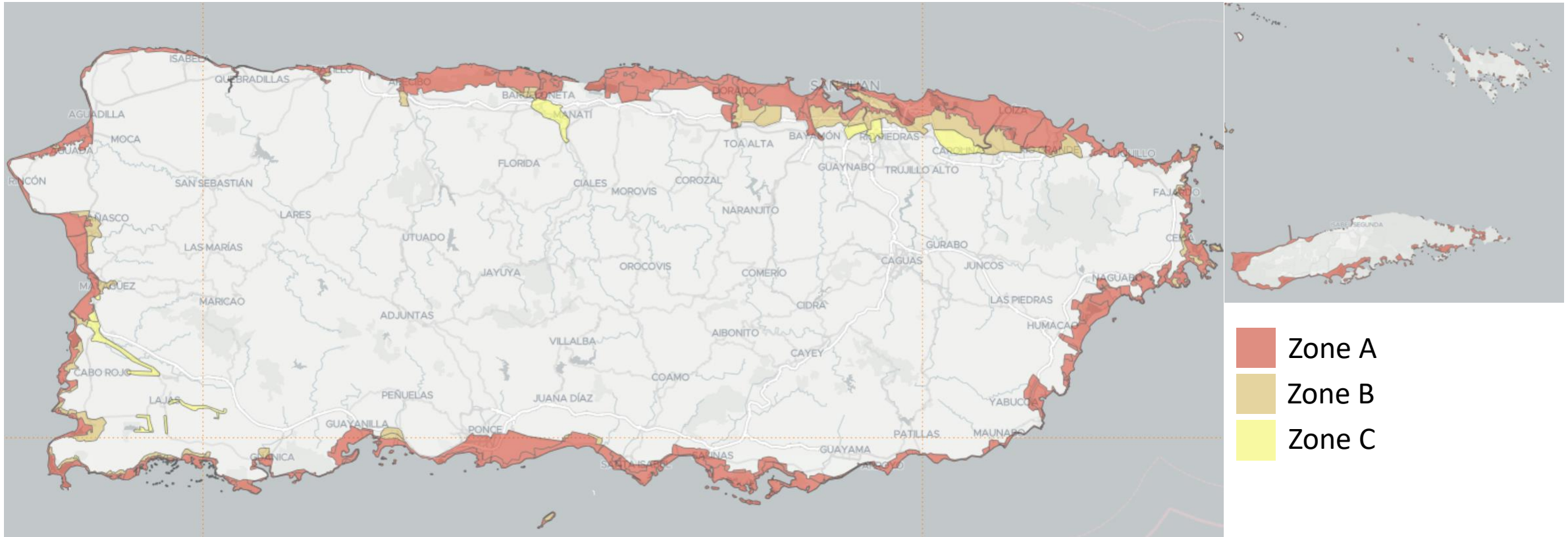
* For storms that exceed the parameters of the model, go up one zone

| 2010 Population | |
|------------------|-----------|
| Zone 1 | 370,000 |
| Zone 1+2 | 620,000 |
| Zone 1+2+3 | 1,020,000 |
| Zone 1+2+3+4 | 1,470,000 |
| Zone 1+2+3+4+5 | 2,230,000 |
| Zone 1+2+3+4+5+6 | 2,990,000 |



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Hurricane Evacuation Zones

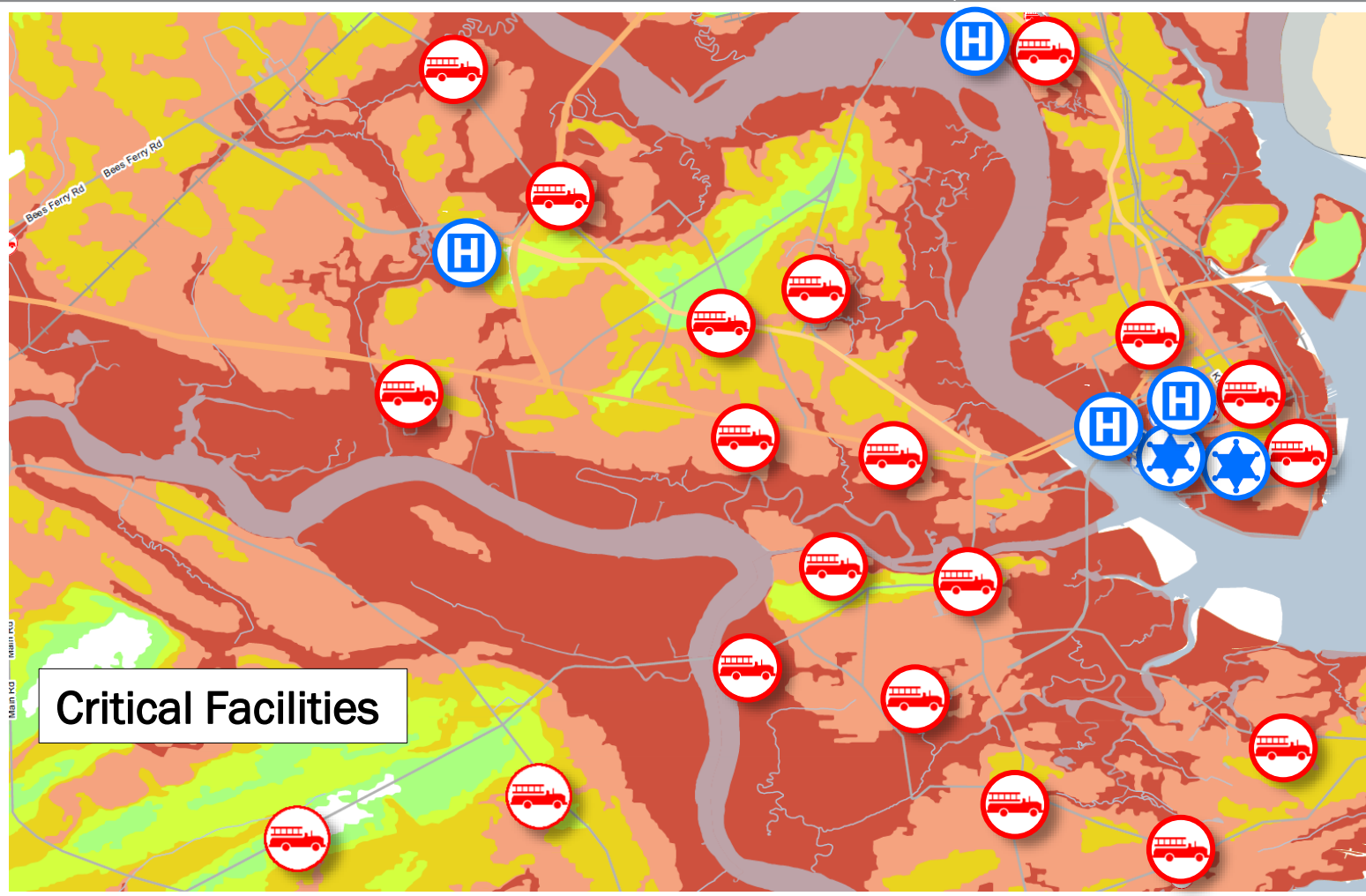
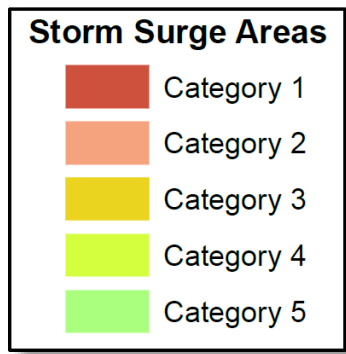


Hurricane Evacuation Zones were designated primarily for evacuation from coastal storm surge, but also account for areas highly vulnerable to rainfall flooding. More detailed evacuation zone maps are available at: <https://hvx.hurrevac.com/hvx/>



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Critical Infrastructure Vulnerability



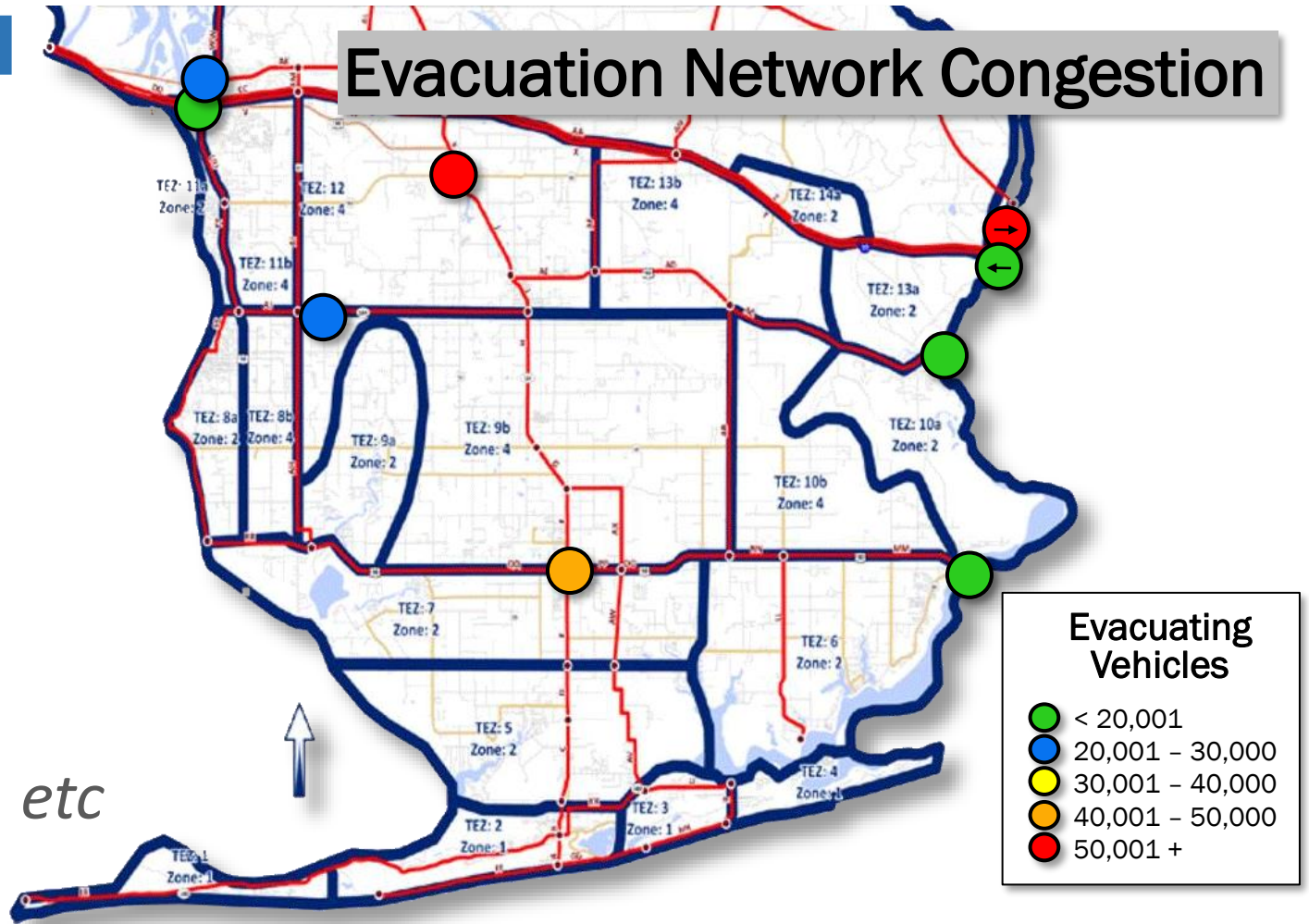
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Evacuation Transportation Analysis

TRANSPORTATION MODELING

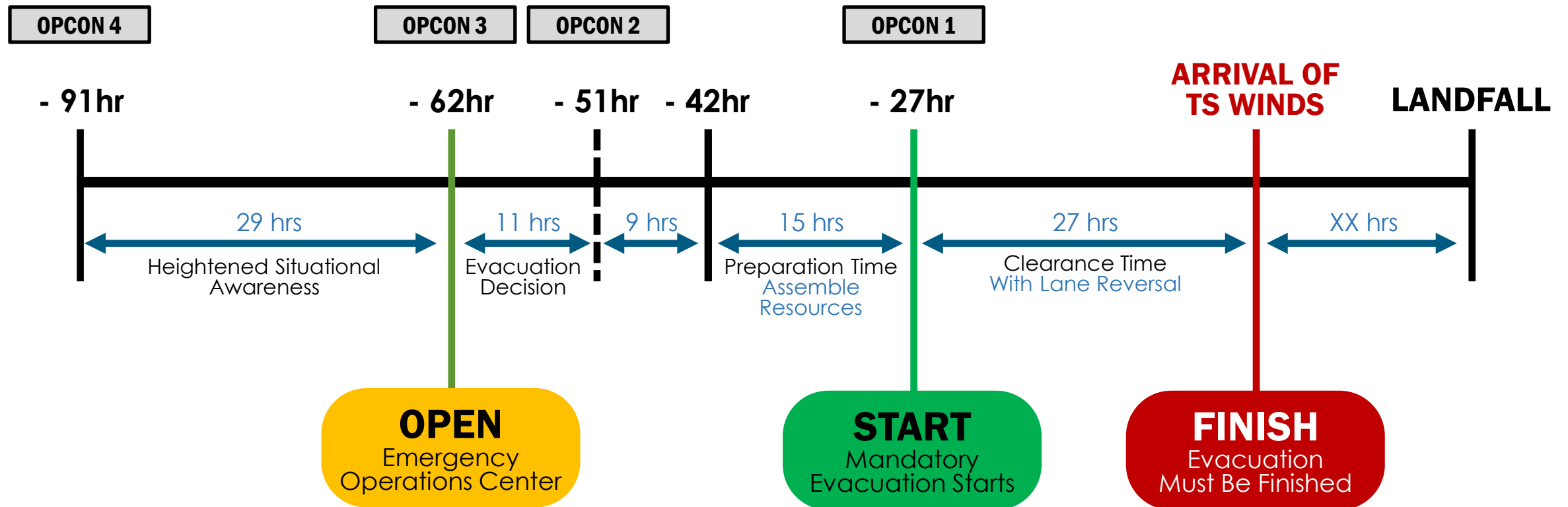
- **Traffic Management**
 - Bottle Necks
 - Evacuating Vehicles
- **Clearance Times**
 - Response Rate
 - Seasonal Population
 - Evacuation Scenarios
one-way, multi-state, etc

Evacuation Network Congestion



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Example Pre-Incident Hurricane Response Timeline



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All-Hazards Operational Coordination

Marine Transportation System Restoration and Recovery

Concept of Support

| Phase 1 | | | Phase 2 | | | Phase 3 | | |
|-------------------------|-----------------|-----------------|--------------------------|-------------------------|----------------------|-------------------------------------|-------------------------------|-------------------|
| Pre-Incident Operations | | | Post-Incident Operations | | | Recovery and Restoration Operations | | |
| 1a | 1b | 1c | 2a | 2b | 2c | 3a | 3b | 3c |
| Monitor Threat | Elevated Threat | Credible Threat | Immediate Response | Community Stabilization | Sustained Operations | JFO Program Delivery | Long-Term Recovery Operations | Regional Closeout |



Examples

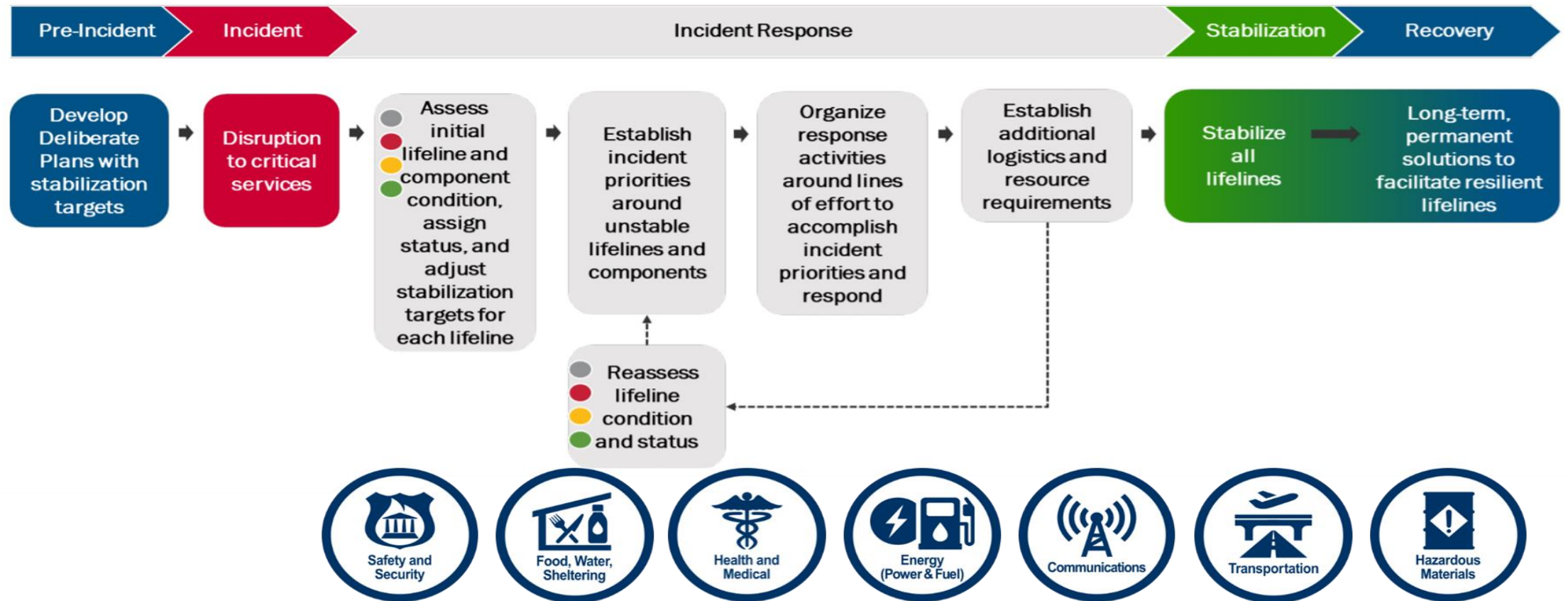
Hurricane
Anticipated Pandemic
Anticipated Terrorism

Earthquake
Flash Flood
Tornado
Hazardous Material Release
Unanticipated Terrorism



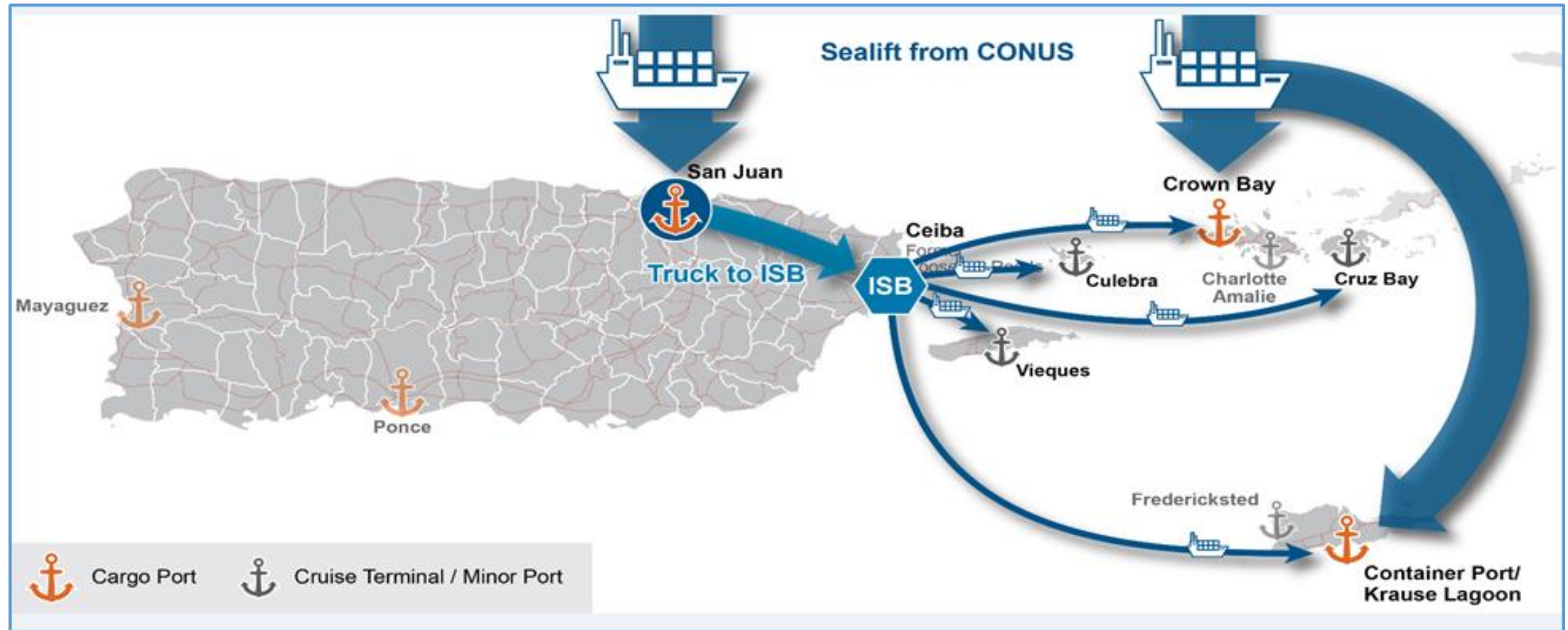
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Community Lifeline Stabilization



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Resource Support Bandwidth: Caribbean Maritime Transport



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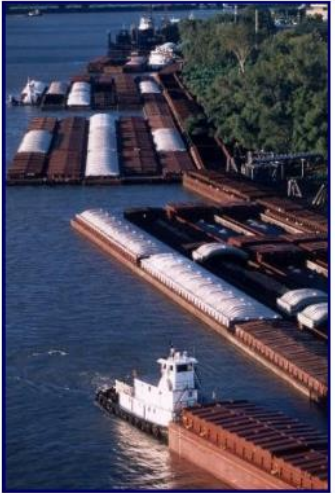
Coordination Structures

- Federal support to the Government of Puerto Rico may be coordinated by federal agencies under their own authorities, or through the coordination of Emergency Support Functions (ESFs), when activated.
- US Coast Guard (USCG) works directly with port stakeholders to facilitate recovery of the Marine Transportation System (MTS) through the Marine Transportation System Recovery Unit (MTSRU).
- USCG may operate emergency operations centers (EOCs) as the lead federal agency for the MTS.
- USCG may align with ESF-1 and other emergency management organizations at other coordination sites.
- During a presidentially declared disaster, FEMA may form a Unified Coordination Group (UCG) with the Puerto Rico Emergency Management Bureau (PREMB) and designate a Federal Coordinating Officer (FCO).
- The FCO ensures integration of federal emergency management functions, resource allocation, and coordination of federal activities in support of Commonwealth operations.



Marine Transportation System Recovery Unit (MTSRU) Partnerships

- When requested, under the direction of the Captain of the Port, FEMA can augment MTSRU operations by providing coordination and funding for additional federal interagency, procurement, and contract resource support.

| Federal | Maritime Industry | | State and Local Government |
|--|---|--|---|
| <ul style="list-style-type: none"> Department of Defense Department of Transportation U.S. Army Corps of Engineers U.S. Customs and Border Protection Transportation Security Administration Maritime Administration Federal Emergency Management Agency Environmental Protection Agency National Oceanographic and Atmospheric Administration U.S. Navy Supervisor of Salvage | <ul style="list-style-type: none"> Ocean carriers Coastwise carriers Ship assist tugs Tow boats and barge operators Cruise ship operators Container facilities Dry bulk facilities Oil/liquid bulk facilities Passenger terminals Ferry and water taxi operators Shippers/Freight Fwd Trade Organizations Marina operators | <ul style="list-style-type: none"> Rail Operators Trucking Companies Shipyards Fleeting Operations Marine Exchanges Organized Labor Stevedoring Vendors Ship Chandlery Mutual Aid/Co-Ops Salvage and marine construction firms Chamber of Commerce | <ul style="list-style-type: none"> Pilots Association Port Authority Emergency Management Marine Police and Fire Law Enforcement Fish & Wildlife Public Health Tribal Organizations |
|  | <p>From elegant cruise ships to hard working barges, the maritime industry is vital to our nation's economy and security. A MTSRU can help your port get back to business.</p> | |  |



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Thank you.



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Contact Information

Chris Moore

FEMA Region 2

Hurricane Program Manager

christopher.moore@fema.dhs.gov



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