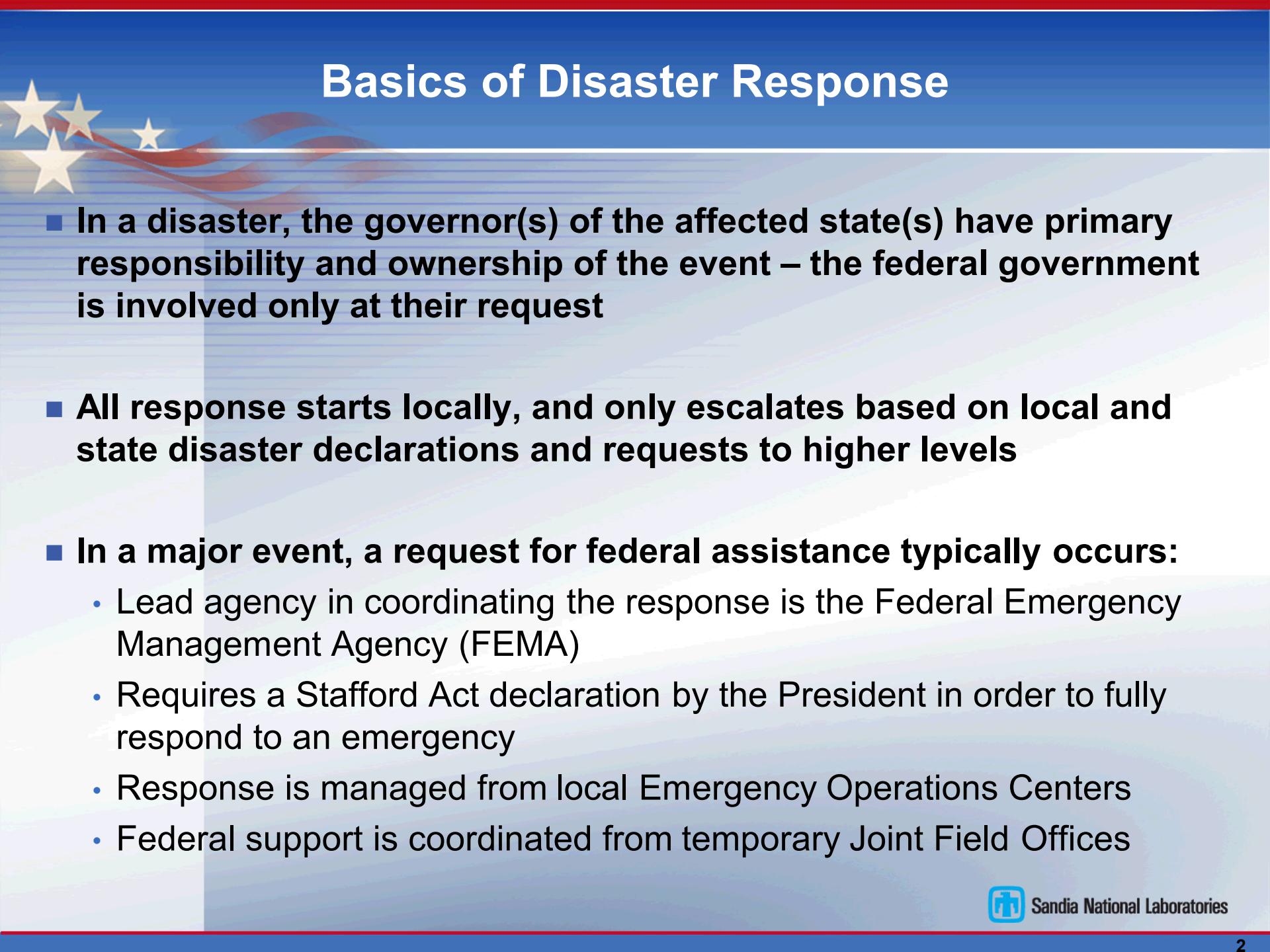


Introduction to Disaster Recovery and Analysis

Daniel J Pless
Sandia National Laboratories



Basics of Disaster Response

- In a disaster, the governor(s) of the affected state(s) have primary responsibility and ownership of the event – the federal government is involved only at their request
- All response starts locally, and only escalates based on local and state disaster declarations and requests to higher levels
- In a major event, a request for federal assistance typically occurs:
 - Lead agency in coordinating the response is the Federal Emergency Management Agency (FEMA)
 - Requires a Stafford Act declaration by the President in order to fully respond to an emergency
 - Response is managed from local Emergency Operations Centers
 - Federal support is coordinated from temporary Joint Field Offices



National Response Framework

- The NRF presents the key response principles, identifies the participants and their roles, and describes structures that guide the Nation's response operations
- Provides overall guidance to emergency management: including planning, coordination between different levels of government, and operations
- Assigns responsibility to Federal Agencies for different aspects of emergency management through a list of Emergency Support Functions (ESFs)



National Response Framework

January 2008



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Emergency Support Functions

ESF	Title	Agency / Agencies
1	Transportation	DOT
2	Communications	NCS, FEMA
3	Public Works and Engineering	USACE, DoD, FEMA
4	Firefighting	USDA
5	Emergency Management	FEMA
6	Mass Care, Emergency Assistance, Housing and Human Services	FEMA, HHS
7	Logistics Management and Resource Support	FEMA, GSA,
8	Public Health and Medical Services	HHS
9	Search and rescue	FEMA, USCG, DoD
10	Oil and Hazardous Materials Response	USCG, EPA
11	Agriculture and Natural Resources	USDA, DOI
12	Energy	DOE
13	Public Safety and Security	DoJ
14	Long-Term Community Recovery	FEMA
15	External Affairs	FEMA



National Incident Management System

- Companion document to the NRF, provides the template for the management of incidents, whereas the NRF is focused on policy
- It provides a set of preparedness concepts and principles for all hazards
- The elements of NIMS are:
 - Preparedness
 - Communication and Information Management
 - Resource Management
 - Command and Management
 - Ongoing Management and Maintenance



NATIONAL INCIDENT MANAGEMENT SYSTEM

December 2008



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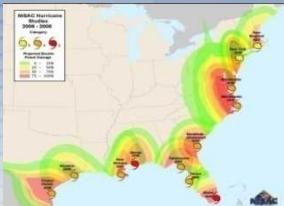
National Infrastructure Simulation and Analysis Center

- Patriot Act identified NISAC as the center for Critical Infrastructure Interdependency Modeling, Simulation, and Analysis.
- Provide a common, comprehensive view of U.S. infrastructure and its response to disruptions.
- Operationally-tested DHS rapid-response capability.
 - 24/7 crisis action analysis
 - Jointly executed by Sandia and Los Alamos National Laboratories



Hurricane Planning & Response

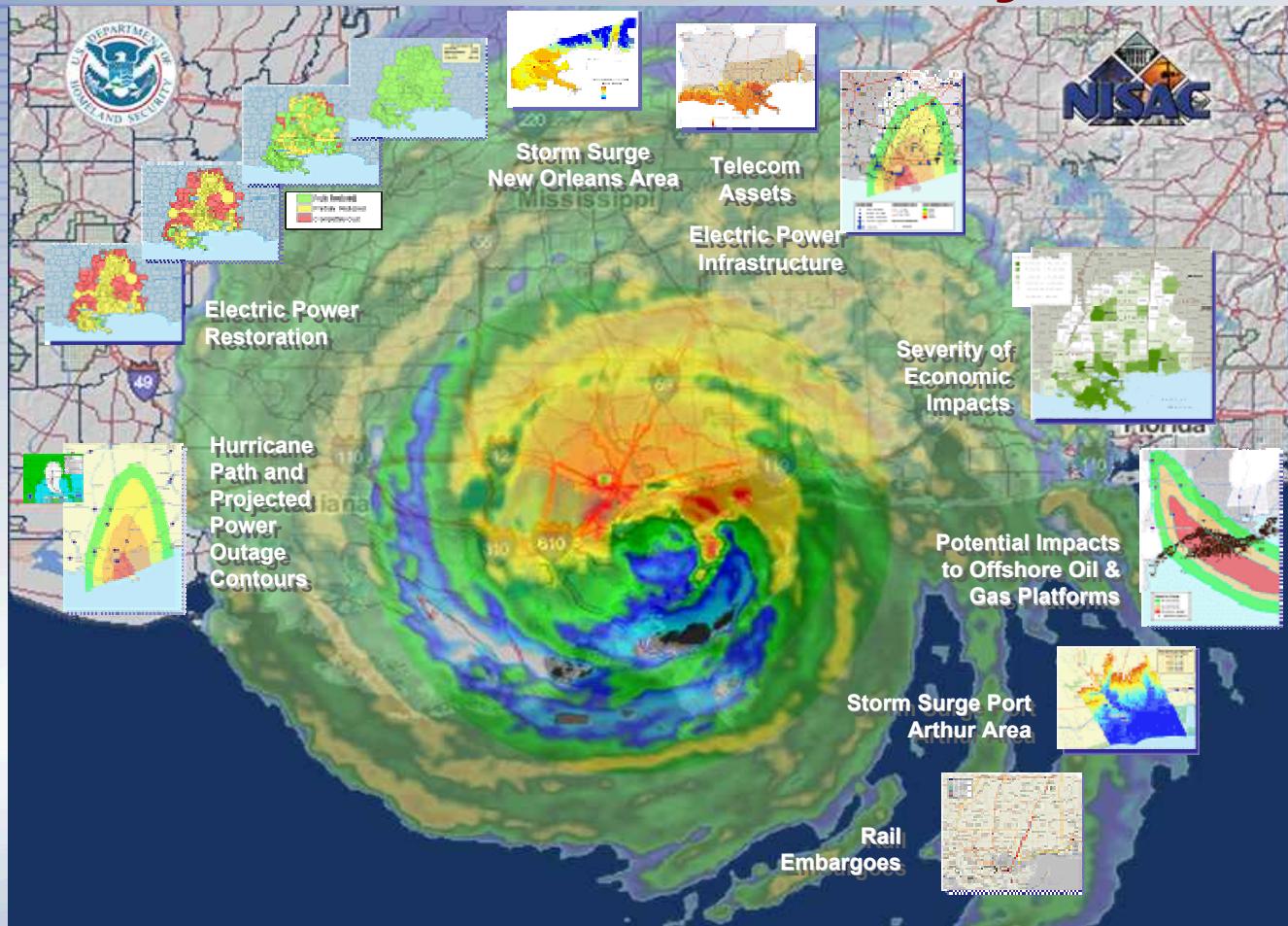
■ Planning Scenarios



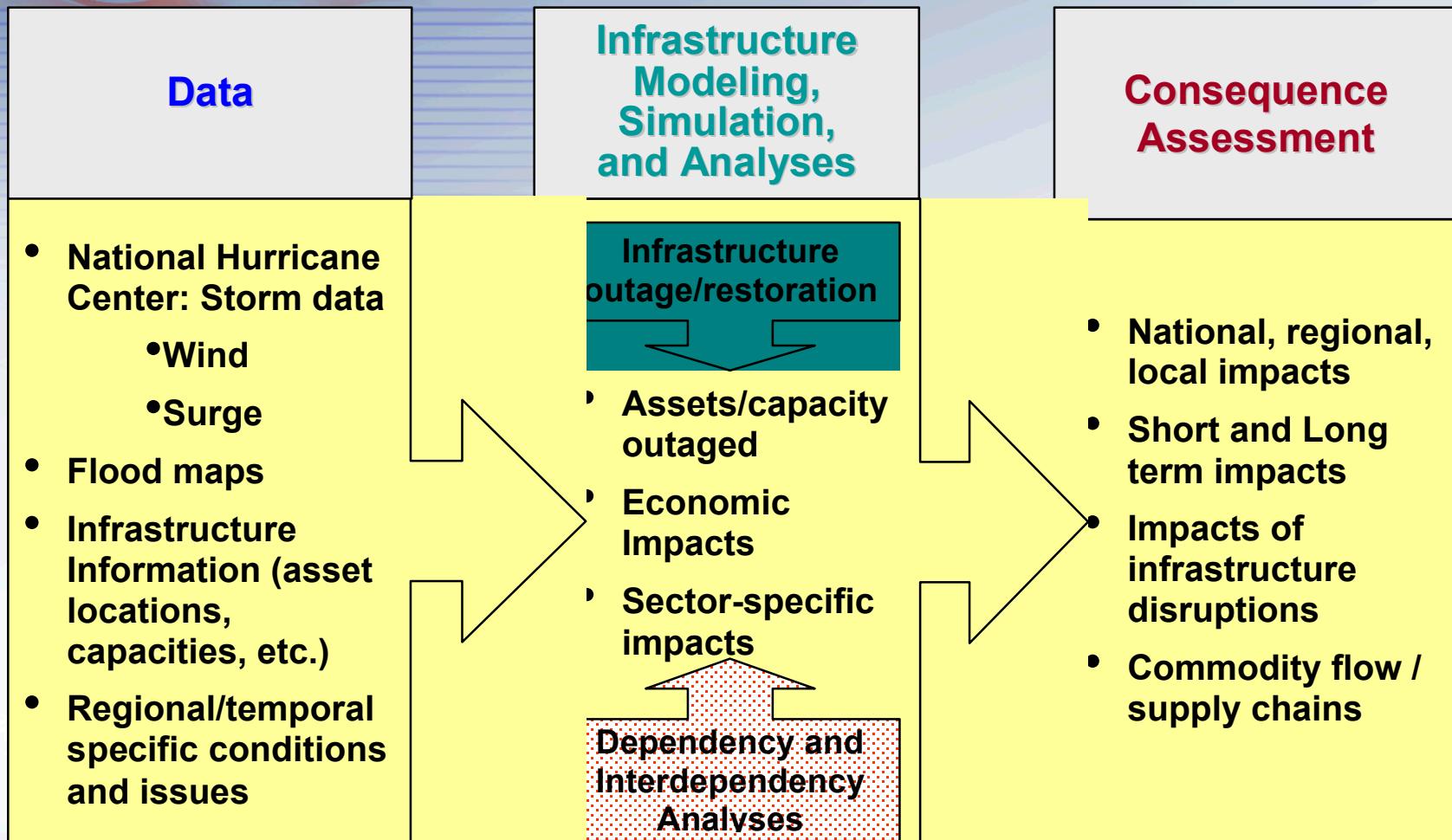
■ Pre-Landfall Infrastructure & Population Impacts

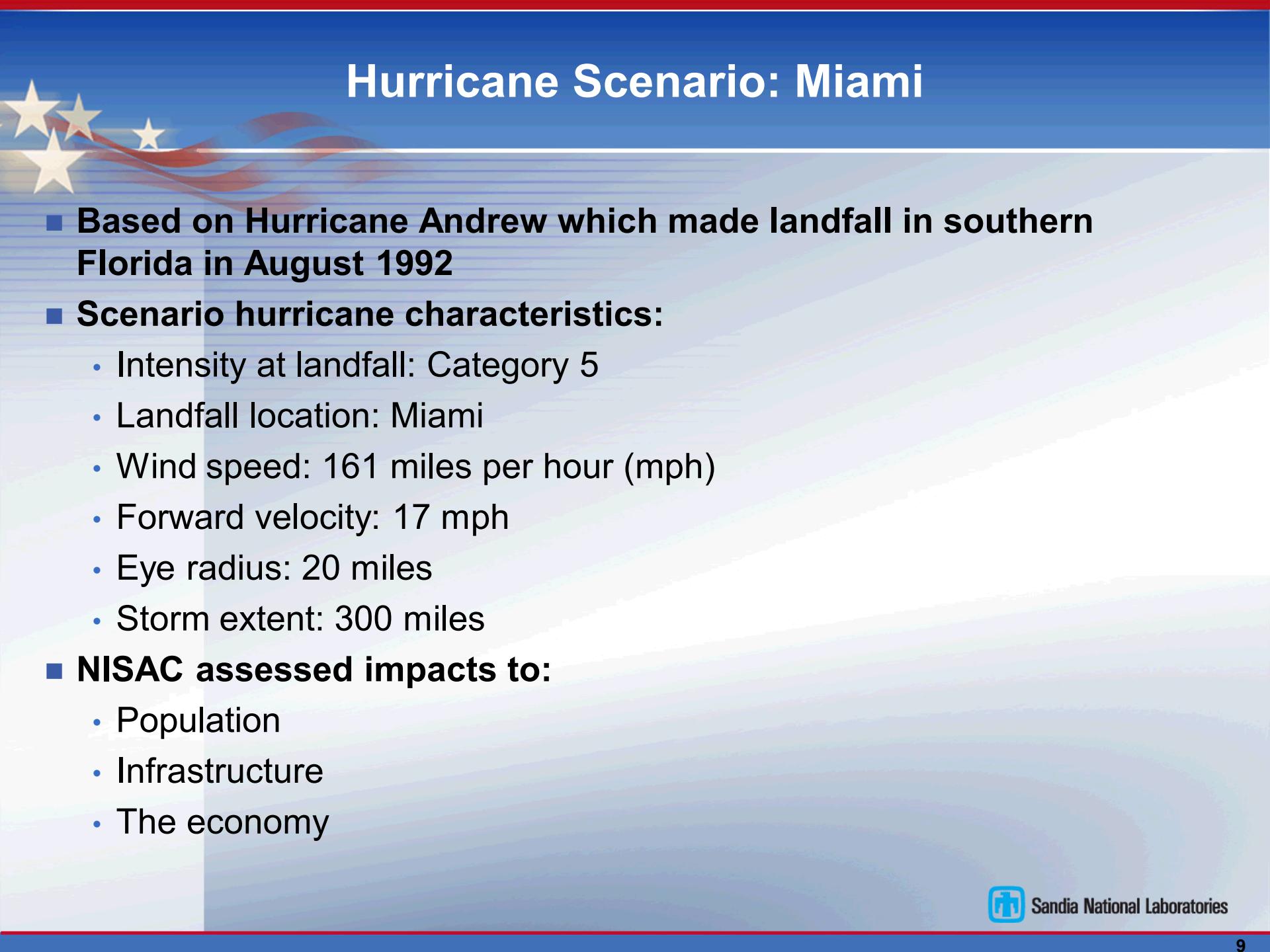


■ Post-Landfall Response & Recovery Issues



Hurricane Impact Analysis





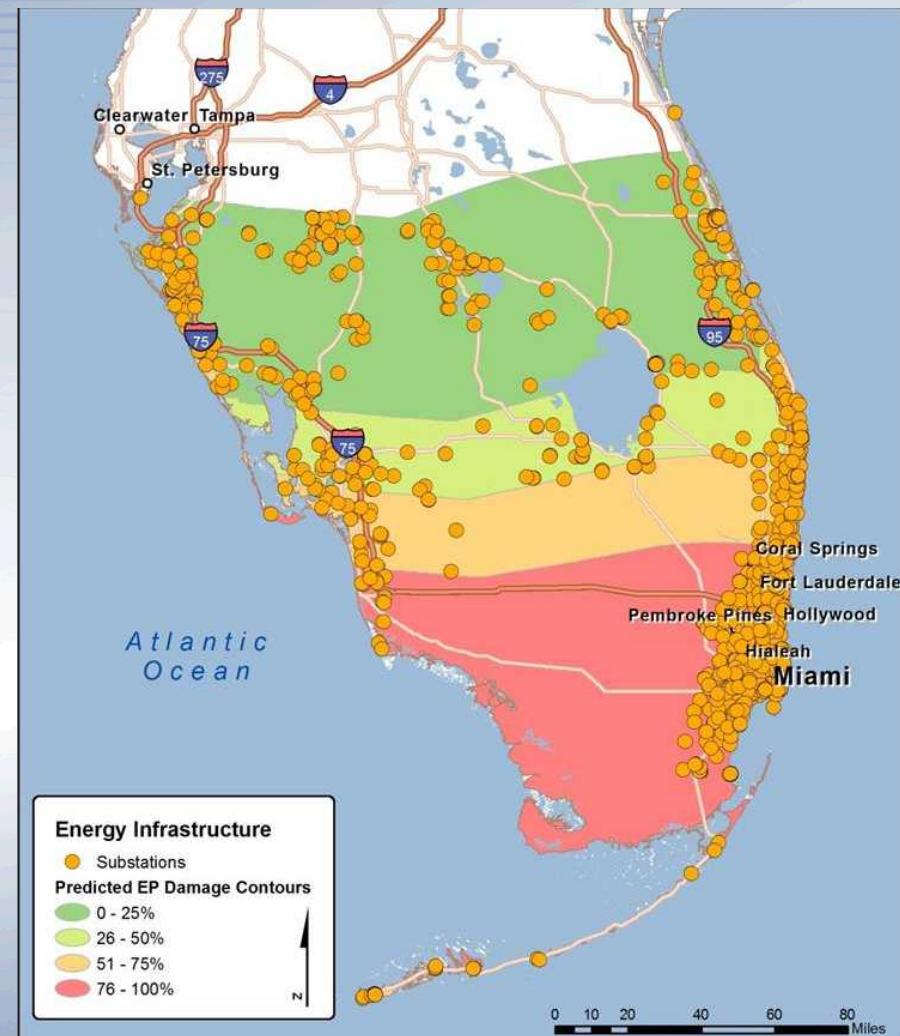
Hurricane Scenario: Miami

- Based on Hurricane Andrew which made landfall in southern Florida in August 1992
- Scenario hurricane characteristics:
 - Intensity at landfall: Category 5
 - Landfall location: Miami
 - Wind speed: 161 miles per hour (mph)
 - Forward velocity: 17 mph
 - Eye radius: 20 miles
 - Storm extent: 300 miles
- NISAC assessed impacts to:
 - Population
 - Infrastructure
 - The economy



Energy Infrastructure

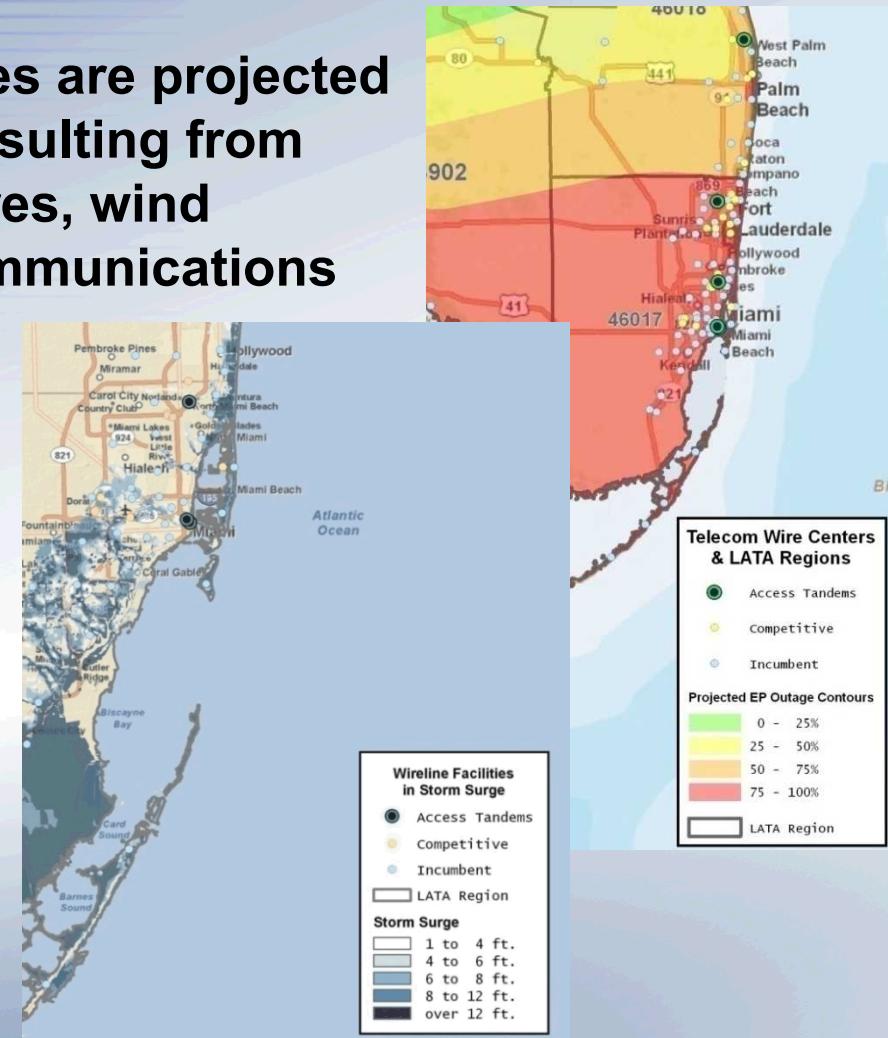
- Electrical outage modeling driven by wind damage estimates to distribution
- About 4.6 million people live in the area where electric power outage is expected to reach 100 percent
- Miami-Dade and Broward counties on the east side and Collier and Monroe counties on the west side of southern Florida, as well as the Florida Keys are expected to experience near-complete power outages



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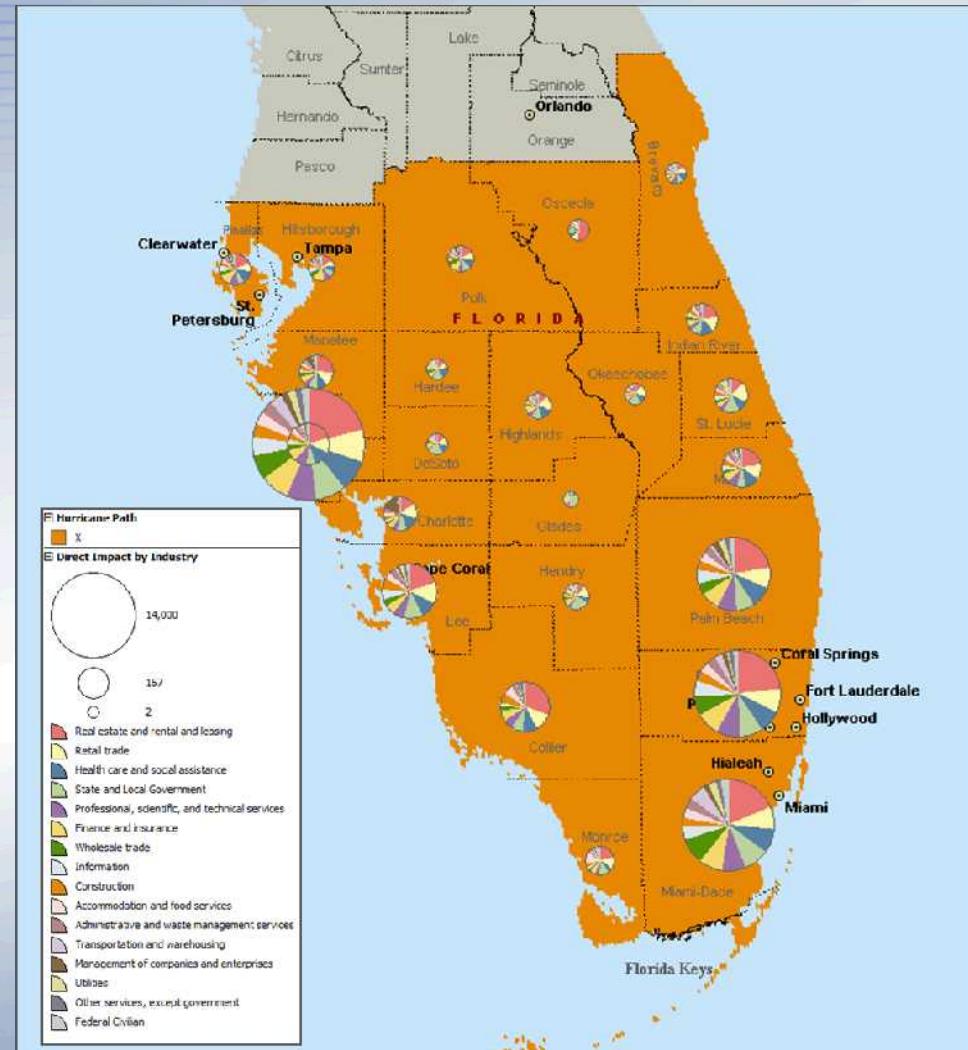
Impacts to Communications

- Wired telecommunication outages are projected to be primarily local in nature, resulting from emergency power systems failures, wind damage to pole-mounted telecommunications systems, or flooding of facilities
- Fifteen wireline wire centers that serve approximately 413,000 households are likely to be out of service due to flooding
- An additional 51 wire centers in the projected 75- to 100-percent electric power damage regions that serve approximately 1.3 million households



Economic Impacts

- Estimated direct economic impact is \$13.6 billion, total impact is \$34.5 billion: includes lost regional economic output and indirect effect
- Largest economic impacts concentrated in Miami-Dade, Palm Beach, and Broward counties
- All industry sectors within the damage zones are expected to be affected by electric power outages, surge, and structural damage



Preparation, Response, and Recovery Activities

Time Frame	Activity
Prior to Landfall	<p>Prior to arrival of the hurricane, evacuate assisted living facilities in surge areas and areas with a high probability of electric power outage</p> <p>Prior to the arrival of the hurricane, coordinate with regional Medicare/Medicaid offices and home healthcare providers to arrange for patients requiring medical services at home</p> <p>Set up temporary dialysis centers or similar facilities for patients requiring regular, outpatient medical services</p>
Immediate Aftermath	<p>Clear debris from major roads and provide access:</p> <ul style="list-style-type: none">- For potable water trucks to all areas that have a high probability (>50%) of being without electric power for more than four days- Between functional petroleum tank farms and high-consequence hospitals <p>Provide fuel for backup generators to:</p> <ul style="list-style-type: none">- Wastewater treatment facilities not in surge area and that serve “non-evacuated” regions- Hospitals that are expected to be without power for more than two days and are not located in surge or evacuation zones.- 911 centers and emergency service dispatch centers that are expected to be without power for more than two days and are not located in surge or evacuation zones- Large telecommunications wire centers expected to be without power for more than two days and are not located in surge or evacuation zones <p>Restore electric power to areas with large hospitals</p> <p>Truck in potable water to “non-evacuated” areas that have a high probability (>50%) of being without electric power for more than four days</p>
Second Stage	<p>Permit access to electric power repair crews to repair damaged substations, distribution power lines, and generating stations in electric power outage and evacuated areas</p> <p>Permit repair crews access to potable water treatment plants in evacuated areas</p> <p>Permit repair crews access to wastewater treatment plants in surge and evacuated areas</p> <p>May need to allow chlorine to be brought in to wastewater treatment plants in surge areas</p> <p>Permit repair crews to access large telecommunications wire centers in surge areas</p> <p>Permit repair crews to access 911 centers and dispatch centers in surge zones</p> <p>Permit repair crews to access hospitals in surge areas.</p>
Long-term	<p>Community-centric restoration of infrastructure:</p> <ul style="list-style-type: none">• Commodity supplies• Public service (fire, police, schools)

