

# Reflections on Disaster Response GIS Since the Columbia Shuttle Disaster in East Texas: 20 Years after the Event



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and

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## **Introduction**

- **Discuss role of the local GIS Community response to the Columbia Shuttle Disaster**
- **Point out important GIS Disaster Response Strategies emerging from the incident**
- **Examples of Landscape Commemoration**
- **Current Activities in building the GIS Disaster Response Community 20 years post event**

## **Status of GIS at SFASU prior to the Columbia Shuttle Event**

- **Early 1990s - Emerging GIS programs**
- **Mid 1990s – Functioning GIS labs**
- **East Texas Digital Database Concept**
- **Early 2000s - FEMA Initiative for County Level Hazard Mitigation Plans**
- **Nacogdoches Hazard Mitigation Plan Signed into Effect 31 January 2003**

# Columbia Shuttle Path 1 February 2003



Scribd accessed 1 April 2019



*Columbia Space Shuttle Mission STS - 107*

## **The Event: The Columbia Shuttle Disaster**

- **1 February 2003 –Structural failure upon re-entry**
- **7 Astronauts lost – subsequent loss of 2 first responders**
- **Hundreds involved in the Initial Response**
- **Thousands involved in the Recovery mission**
- **Among largest organized land searches in history**
- **International interest in the event – from time of occurrence to present**



**Brown**

**Clark**

**Anderson**

**Ramon**

**Husband**

**Chawla**

**McCool**



**Debris found two miles west of the old burned out store along CR 2815**



# Unified Command!







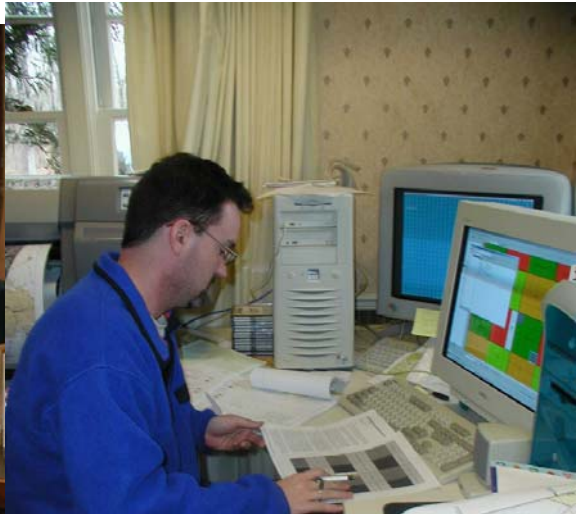
Established map protocol ahead of time:

▼ Deployed GPS Teams into the field

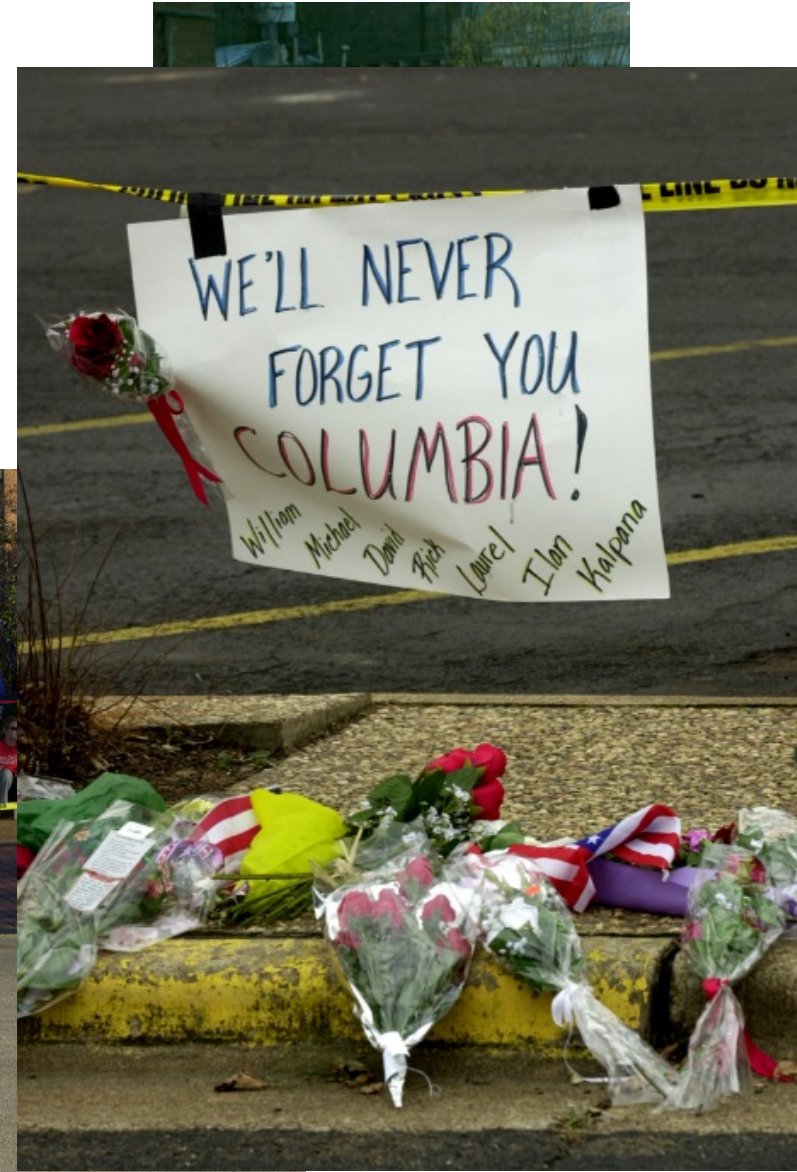
▪ Professionals

▪ Students

▪ Alumni

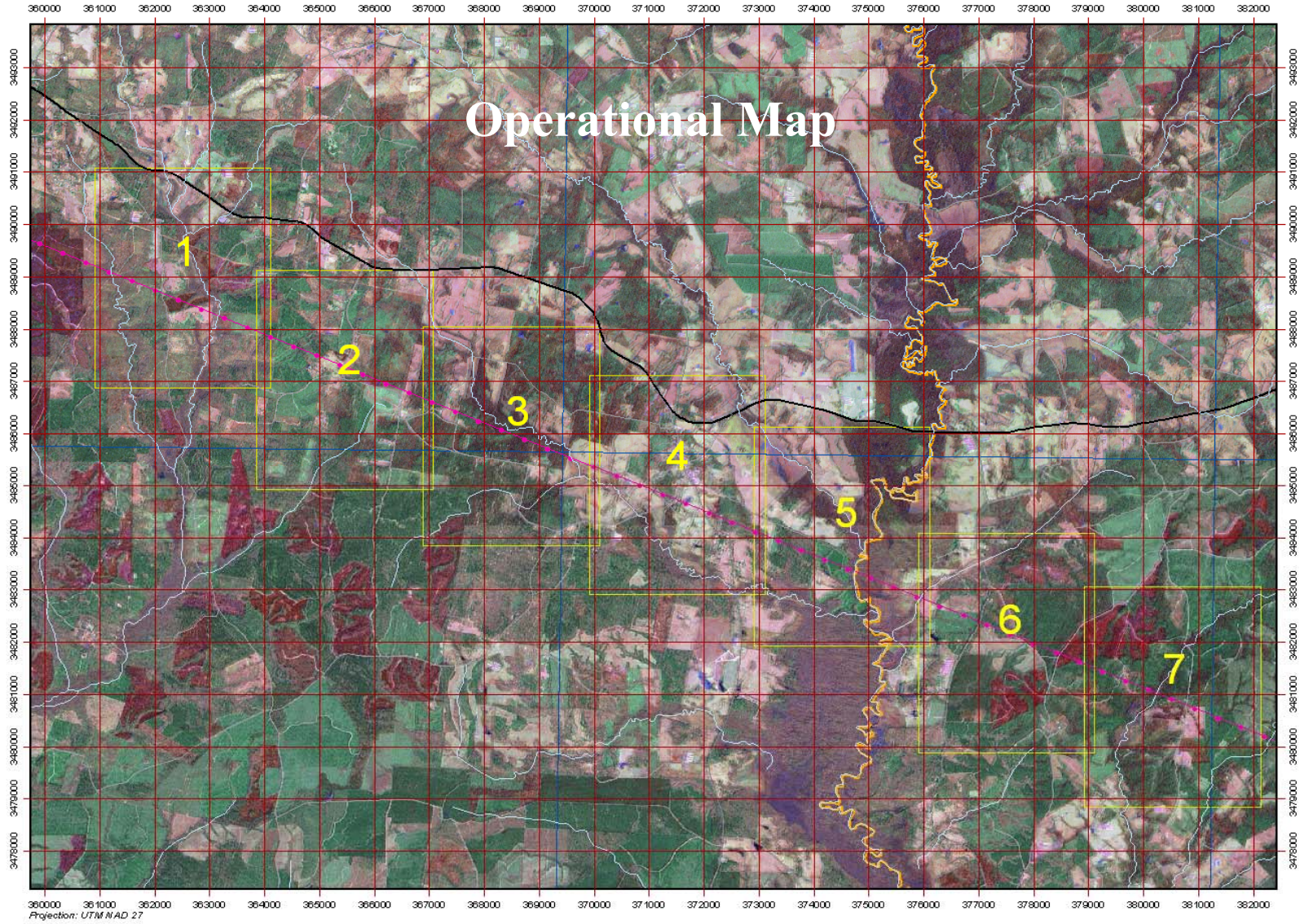


1 February 2003  
City of  
Nacogdoches









# Planning Maps

Searched by DATE

- 02/03/2003
- 02/04/2003
- 02/05/2003
- 02/06/2003
- 02/07/2003
- 02/08/2003
- 02/09/2003
- 02/10/2003
- 02/11/2003
- 02/12/2003

DATE	SQ_MILES
	0
02/03/2003	21.1
02/04/2003	9.6
02/05/2003	7.5
02/06/2003	4.9
02/07/2003	5.1
02/08/2003	3.2
02/09/2003	2.1
02/10/2003	1.8
02/11/2003	1.6
	0
TOTAL WORKED	56.9
	0
TOTAL AREA	93.6
	0

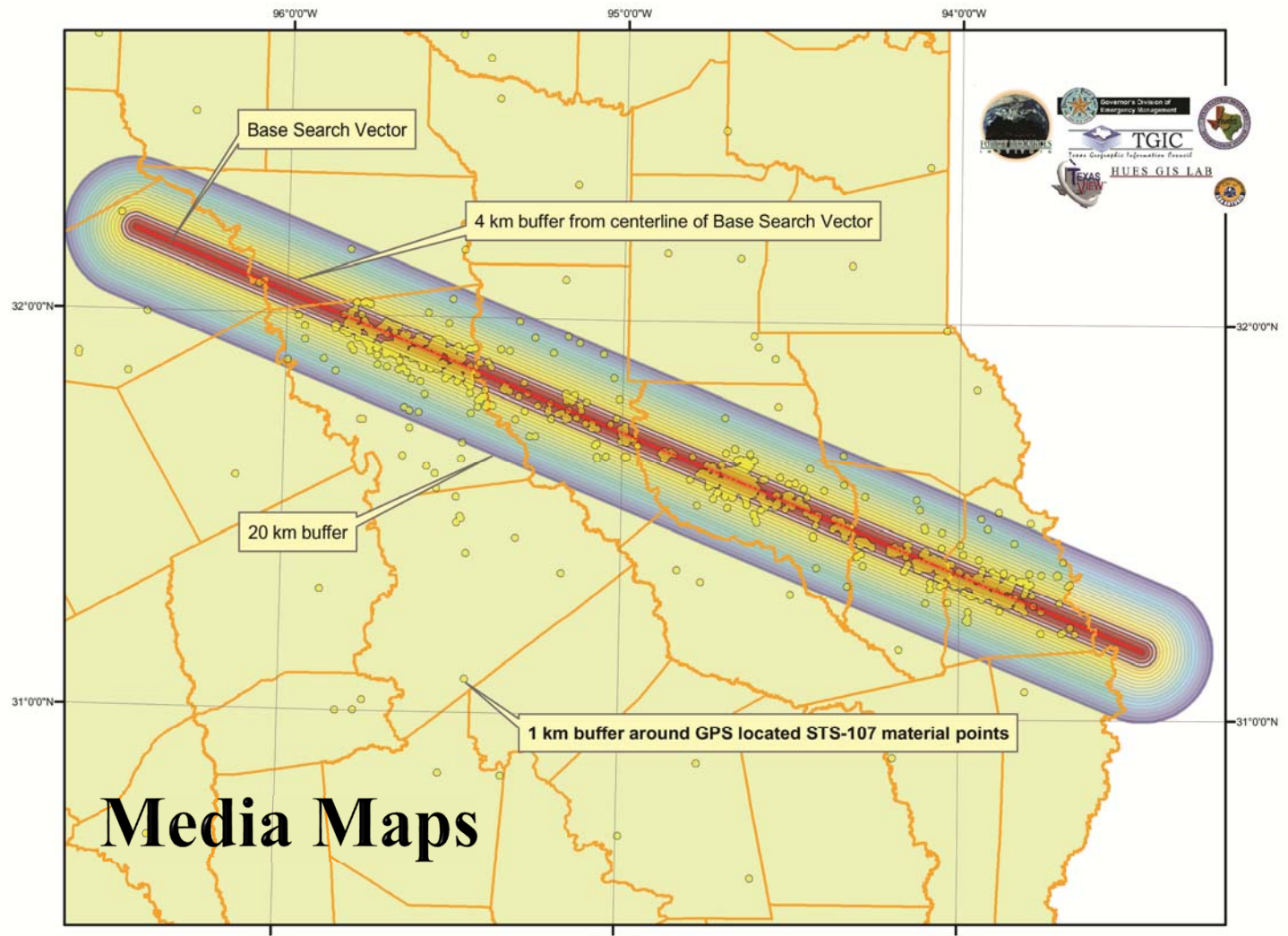
City of Nacogdoches  
 HUES GIS LAB  
 Geographic Program  
 Stephen F. Austin State University  
 Nacogdoches, Texas  
 Dr. Darrel E. McDonald, Coordinator



COLUMBIA SHUTTLE RECOVERY  
 San Augustine County  
 February 2003







**Media Maps**

Analysis as of 02-11-03 0500 CST.  
J.M. Williams

# San Augustine Chamber of Commerce Building

## Forward Mapping Operations



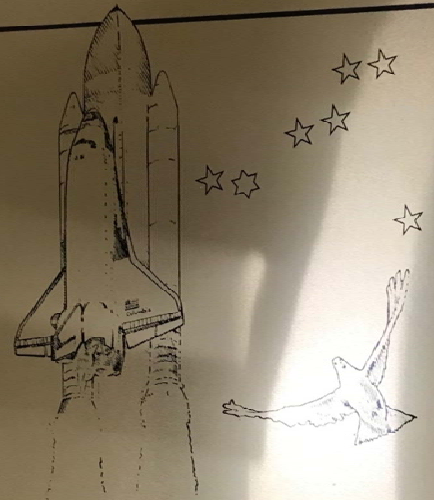




Pitster Garrison Civic Center  
Disaster Field Operations (DFO) Command Center  
February 2003 - May 2003



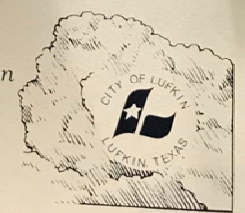
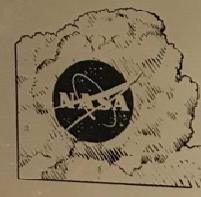
*In Honor*  
of the first  
responders from  
multiple federal,  
state and local  
agencies that  
established the  
Command Center  
in the city of  
**Lufkin,**  
**Texas**  
February 1 - 9, 2003



**Pitser Garrison Civic Center**

*In memory of the Crew of the United States Space Shuttle Columbia*

- Rick D. Husband*
- William C. McCool*
- David M. Brown*
- Kalpana Chawla*
- Michael P. Anderson*
- Laurel B. Clark*
- Ilan Ramon*



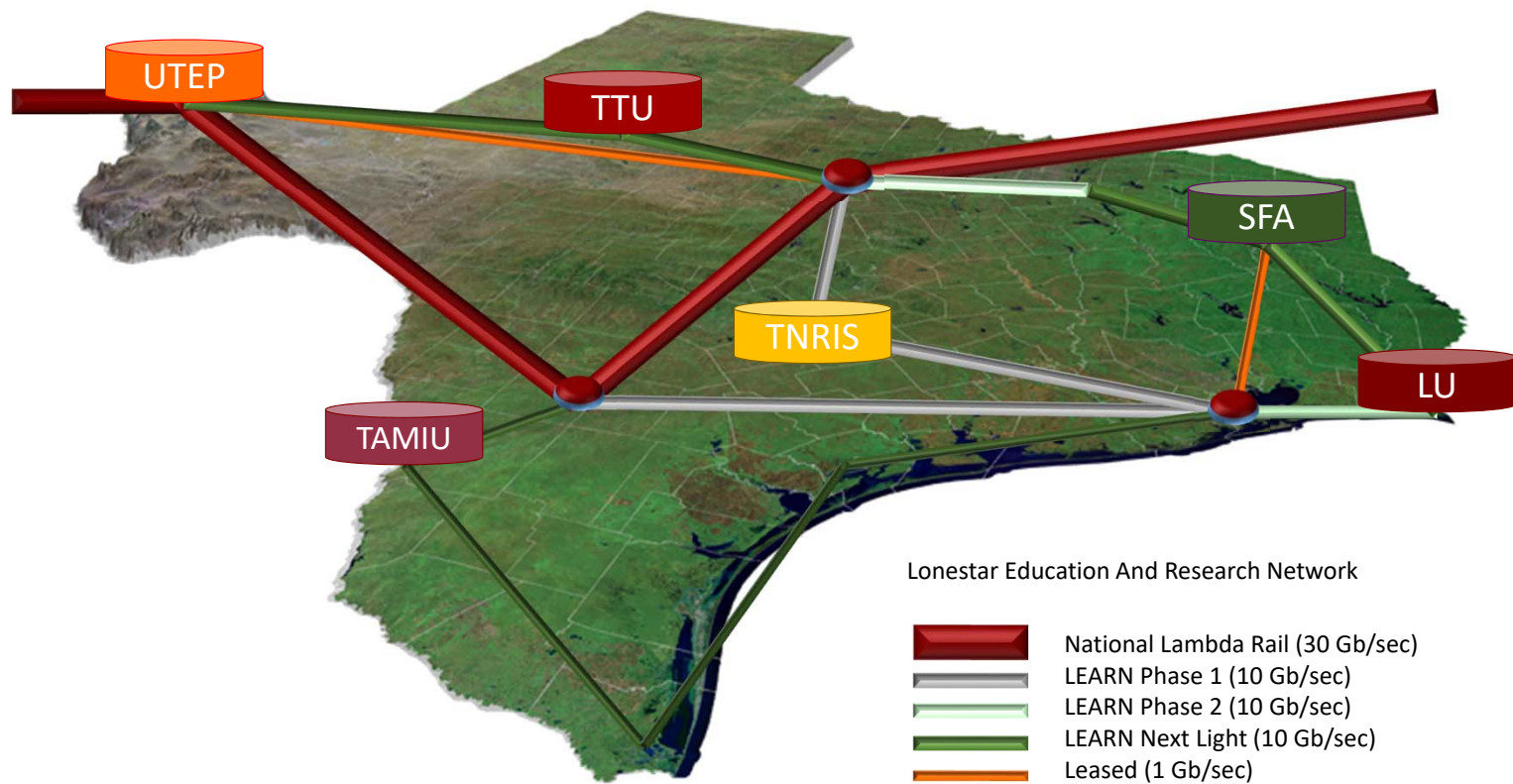
FEBRUARY 1, 2003



## Columbia Regional Geospatial Service System Established by Congress in 2005



# Connected by High-speed Networks



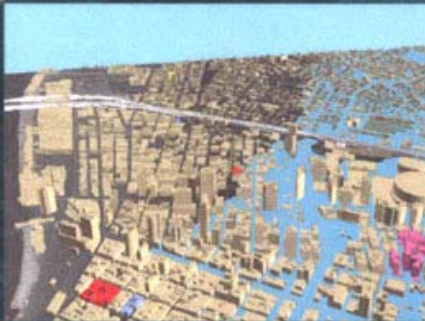
# **Regional GIS Support**

- **Geospatial Data Replication**
- **Education and Training Programs**
- **Consulting Services (Councils of Governments)**
- **EOC Support**
- **Economic Modeling (CEDAR, ETFI)**
- **Mapping Support for Ground Water Conservation Districts**
- **Web-based Map Services**
- **Web-base Map Applications**



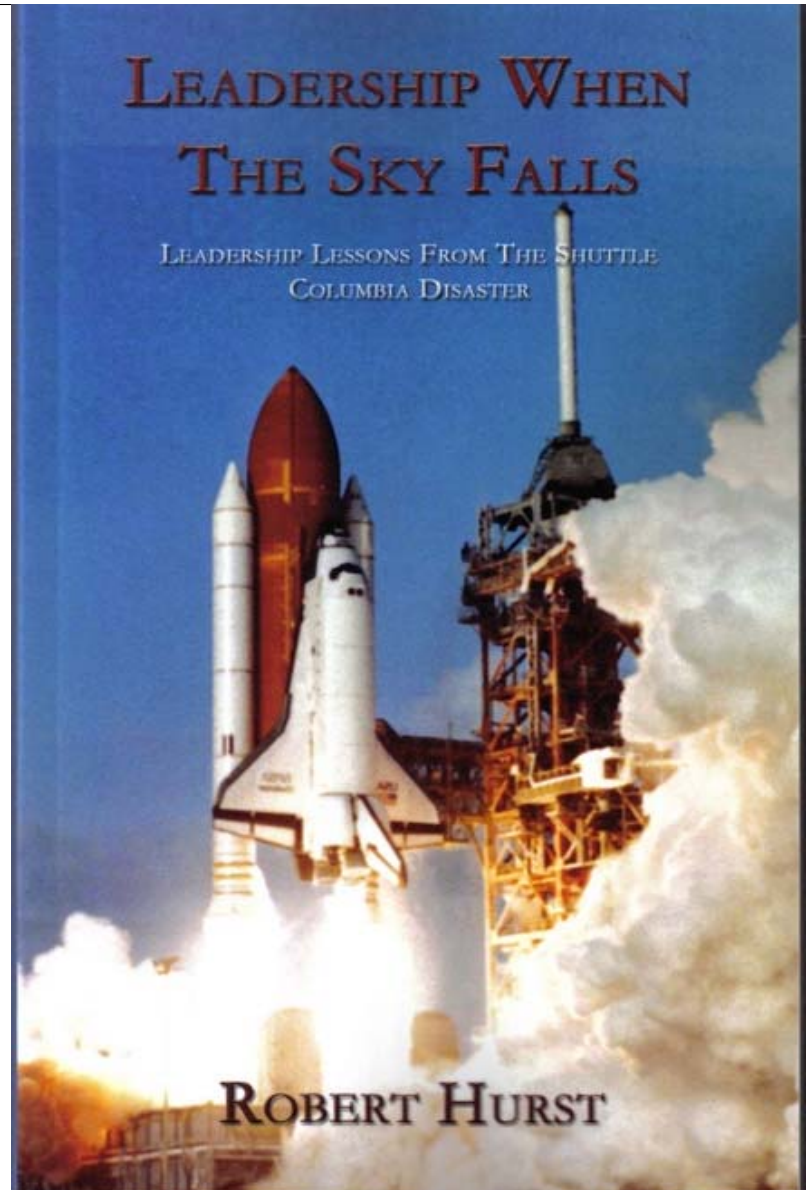


# SUCCESSFUL RESPONSE STARTS WITH A MAP



## Improving Geospatial Support for Disaster Management

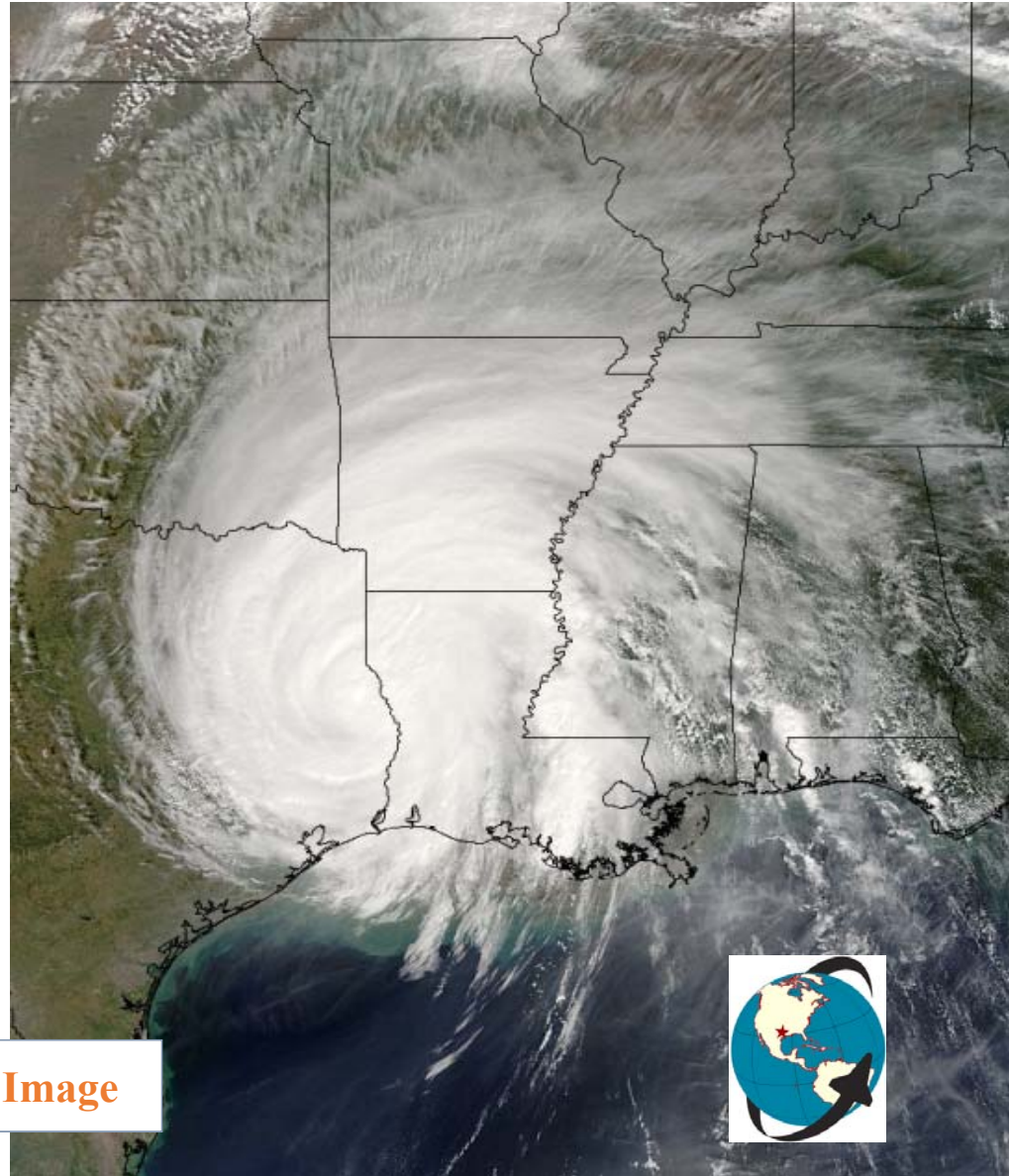
NATIONAL RESEARCH COUNCIL  
OF THE NATIONAL ACADEMIES



**HURRICANE  
RITA 2005**

Category 1  
(Gusts up to  
90+ mph)

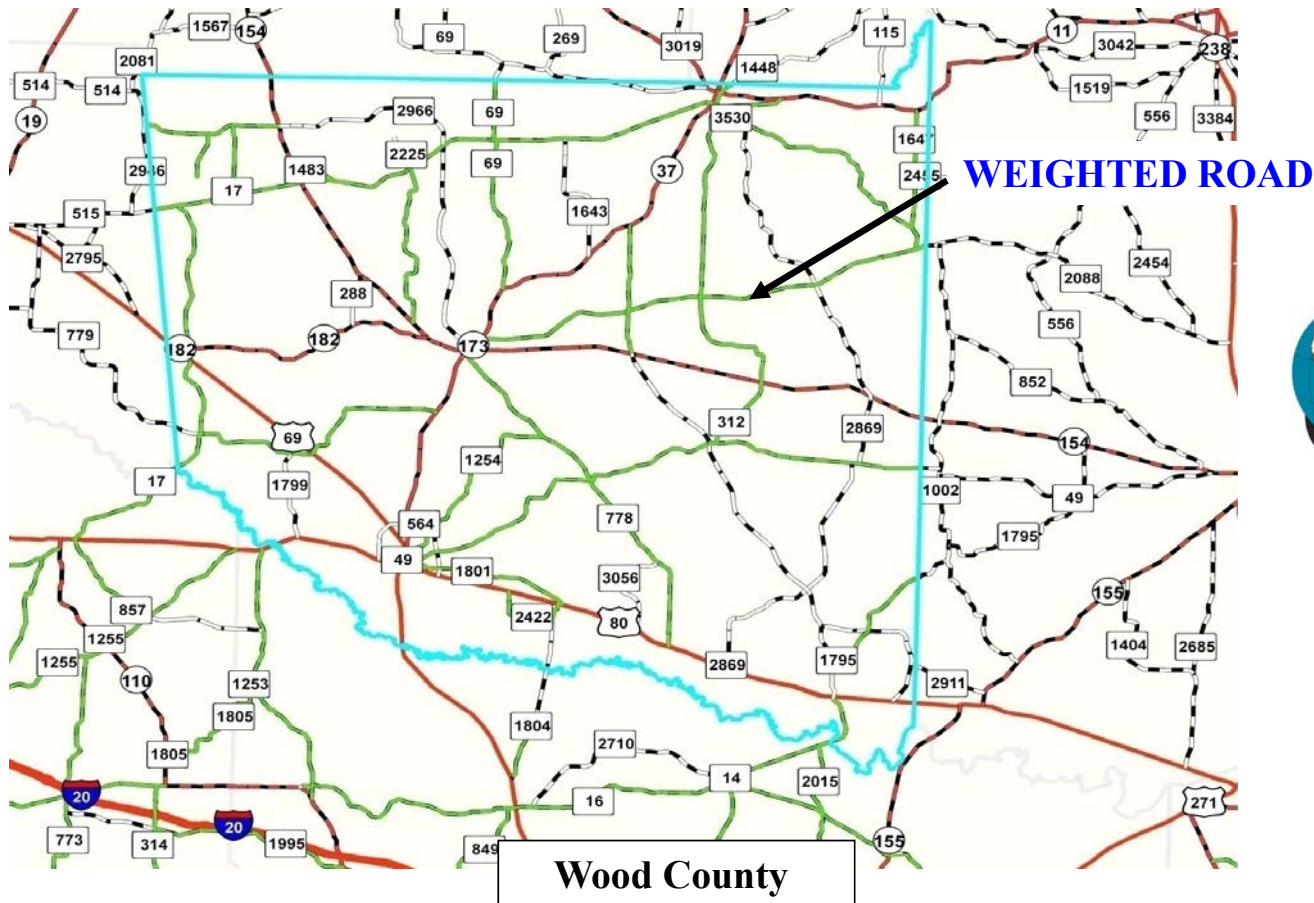
**Terra Modis Image**



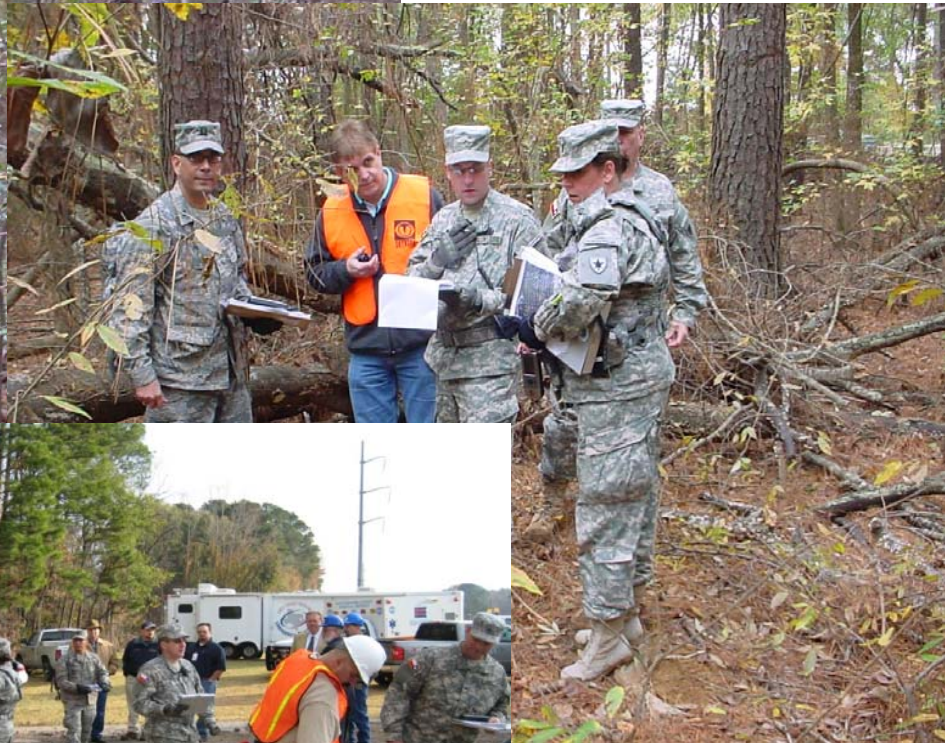
# Damage in Jefferson County, Texas – US Corps Imagery

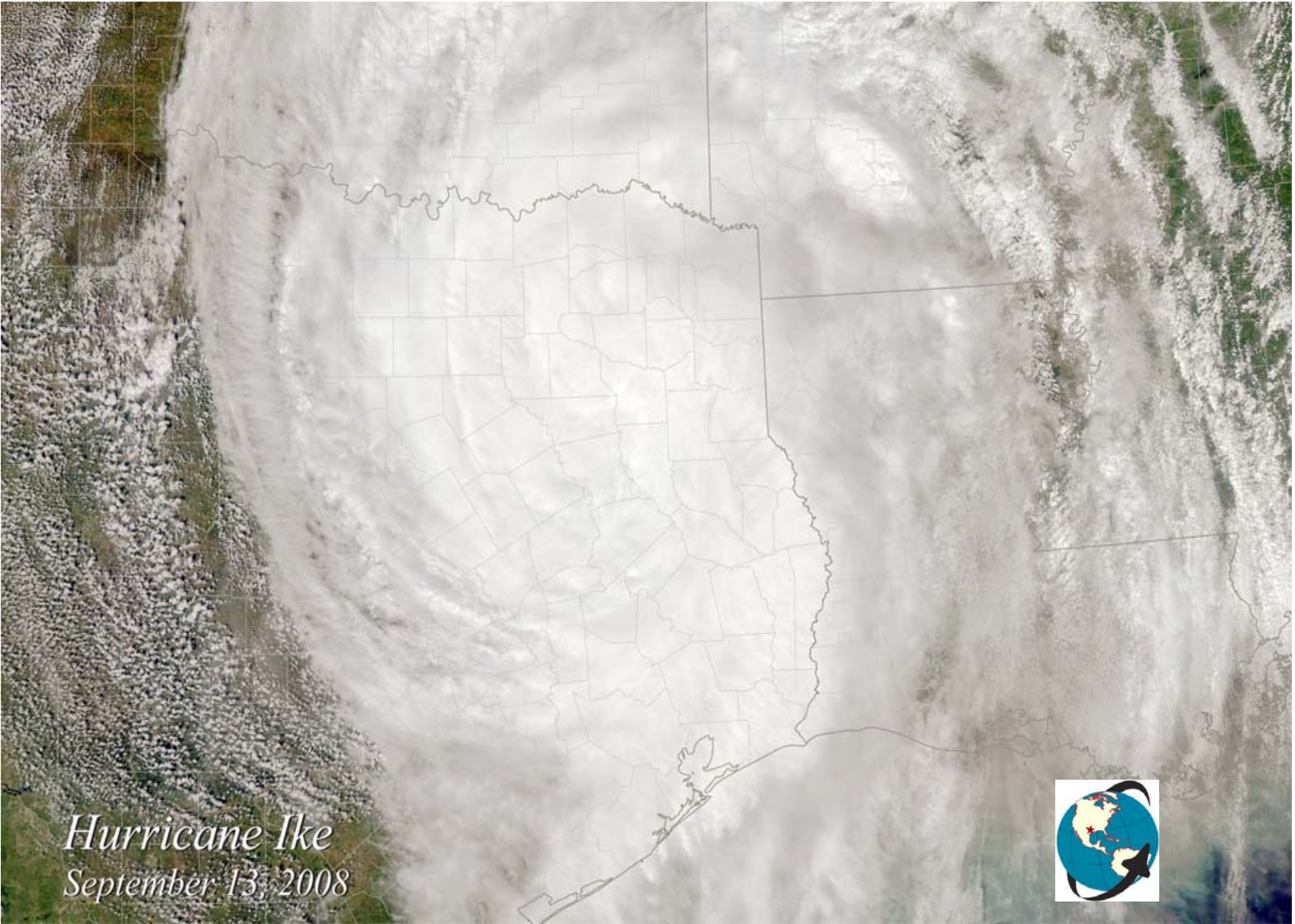


# Web-Based Timber Salvage Application Bridge Capacity Load-Weighted Roads



## Rescue and Recovery Drill With Local Agencies





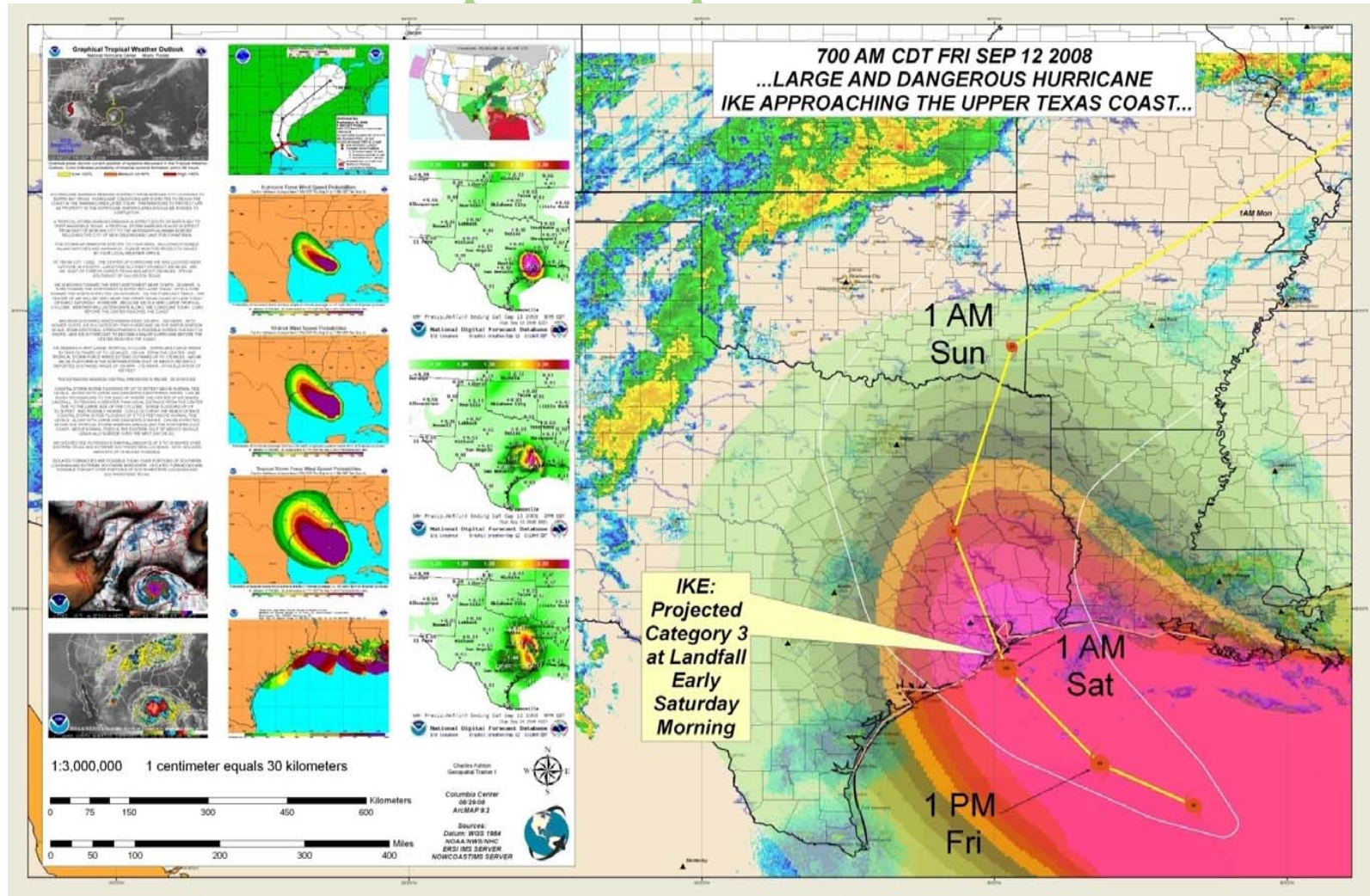
*Hurricane Ike*  
*September 13, 2008*



# Response to Hurricane IKE - 2008

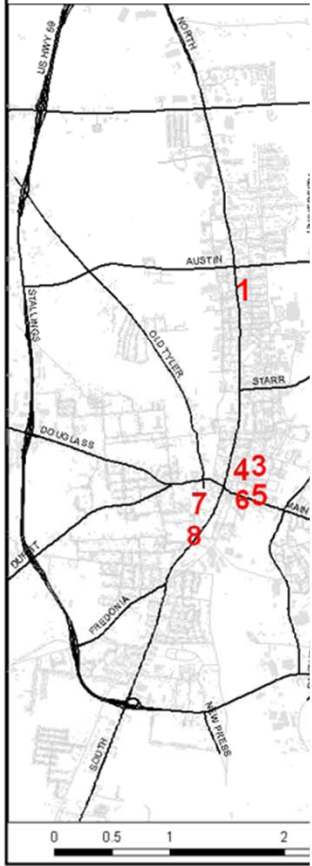
- **Geospatial support in EOCs for IKE event:**
  - **City of Nacogdoches/Stephen F. Austin State University**
    - **Dynamic Weather Mash-up Maps**
    - **Critical Infrastructure**
  - **Nacogdoches County**
    - **Information maps for evacuees**
    - **Road Closures**
    - **Gas Availability**
    - **Locator Maps for Evacuees**
  - **Galveston County**
    - **Requested Geospatial Support**
    - **Broad Array of Mapping Support for 10 days**

# Hurricane Map Mashups

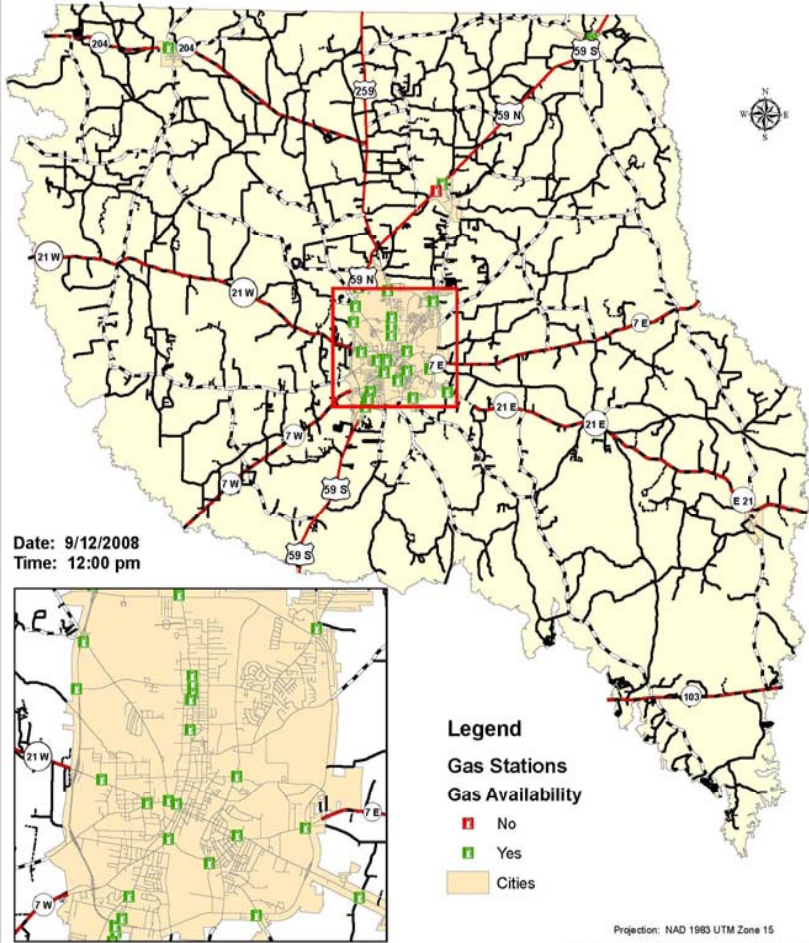




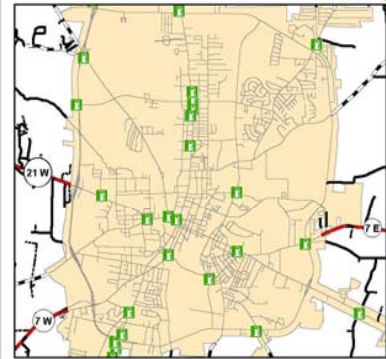
# Bed & Breakfasts



# Nacogdoches Gas Availability

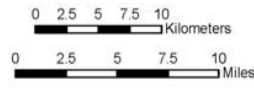


Date: 9/12/2008  
Time: 12:00 pm



**Legend**  
Gas Stations  
Gas Availability  
No  
Yes  
Cities

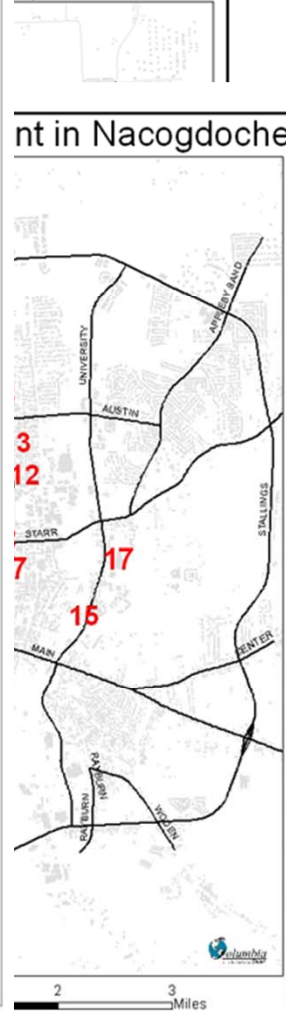
Columbia Regional Geospatial Service Center  
Arthur Temple College of Forestry and Agriculture  
Stephen F. Austin State University  
601 S. Pease  
Nacogdoches, TX 75965  
Voice: 936-668-6100  
Email: rainesjason@sfau.edu



Projection: NAD 1983 UTM Zone 15  
Data Source: Nacogdoches County Sheriff's Department  
Columbia Regional Geospatial Service Center



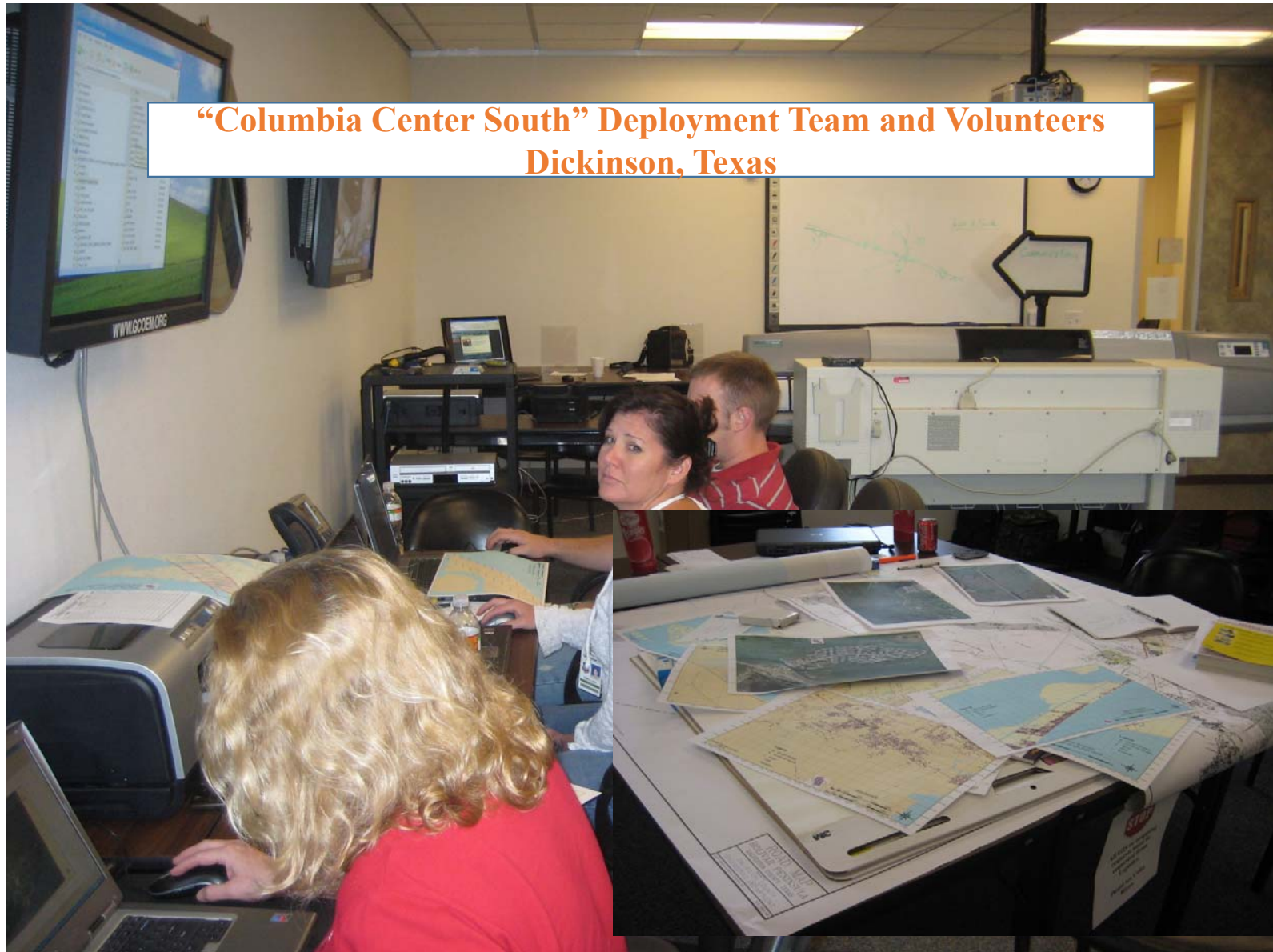
# Restaurants in Nacogdoches, Texas

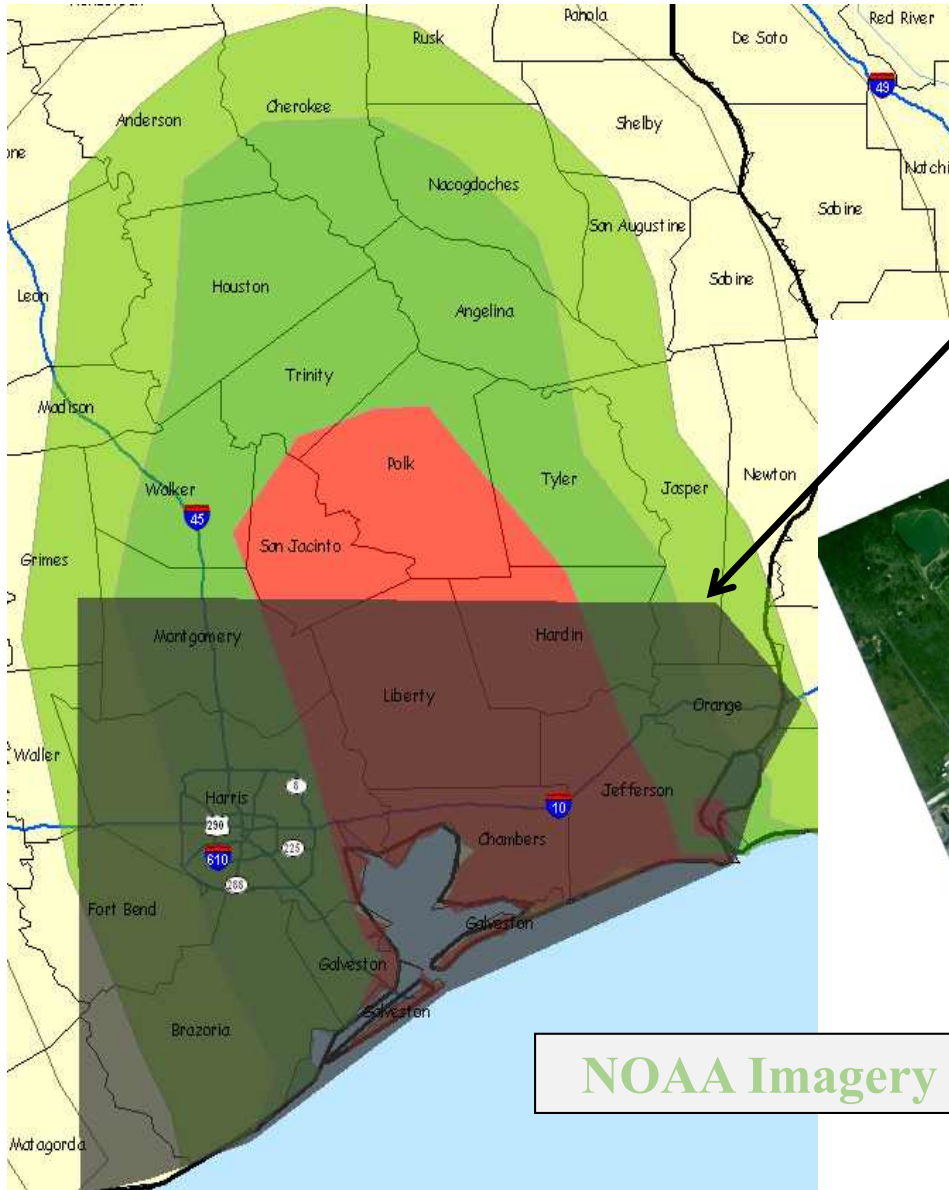


- 1** **Brunch**  
L'Espresso Coffee Shop  
1702 Park Road  
Nacogdoches, TX 75965  
936-668-6100
- 2** **Bowling**  
The Bowling Alley  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-3522
- 3** **Cinema**  
Cinema Theatre  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 4** **Golf**  
Stonewall Hill Golf Course  
1611 S. 21st  
Nacogdoches, TX 75965  
936-668-2162
- 5** **Hotel**  
Crestview Hotel  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 6** **Library**  
Nacogdoches Public Library  
1112 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 7** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 8** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 9** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 10** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 11** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 12** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 13** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 14** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 15** **Nightlife**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 16** **Put Put Golf**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 17** **Shopping**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 18** **Skating Rink**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162
- 19** **Theater**  
The Sports Club  
1001 N. Main Street  
Nacogdoches, TX 75965  
936-668-2162



**“Columbia Center South” Deployment Team and Volunteers  
Dickinson, Texas**





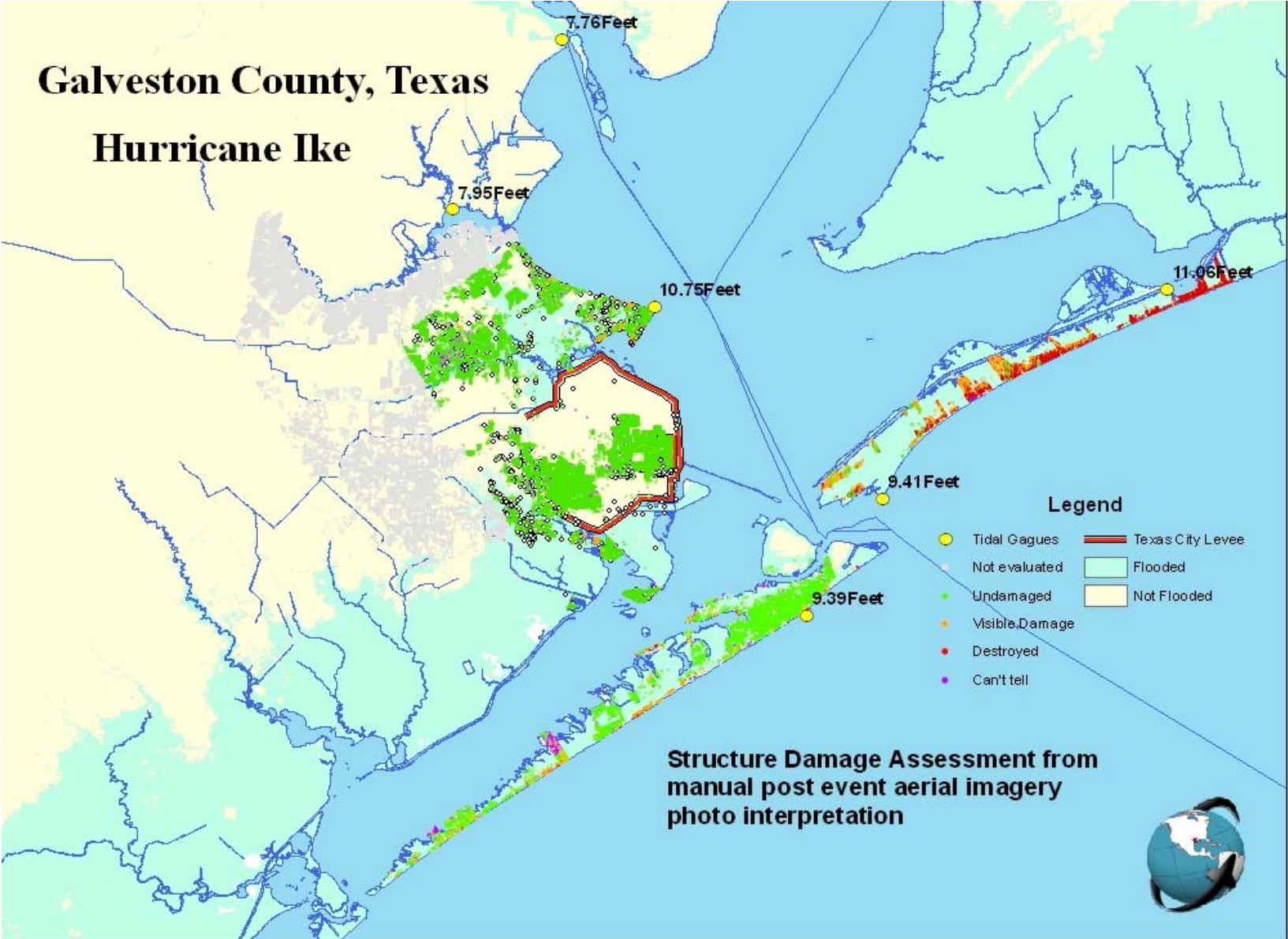
**USDA NRCS Area Request  
for .5 Meter or Better  
Imagery  
September 2008**



**NOAA Imagery**

# Galveston County, Texas

## Hurricane Ike





Waterline after Ike

Waterline Before Ike

# Wide Area Damage Assessment WADA



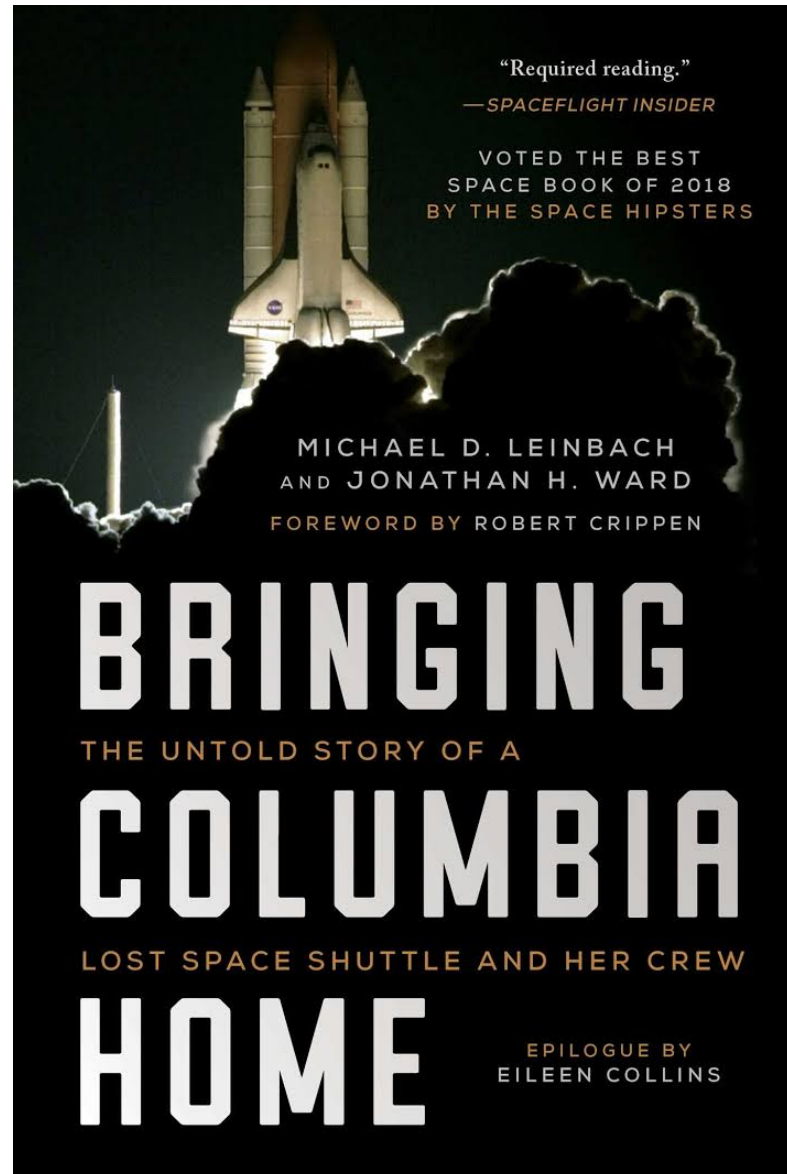








The most recent  
iteration of the events  
detailing the tragic  
Columbia Shuttle  
Disaster  
2018



"Required reading."

—SPACEFLIGHT INSIDER

VOTED THE BEST  
SPACE BOOK OF 2018  
BY THE SPACE HIPSTERS

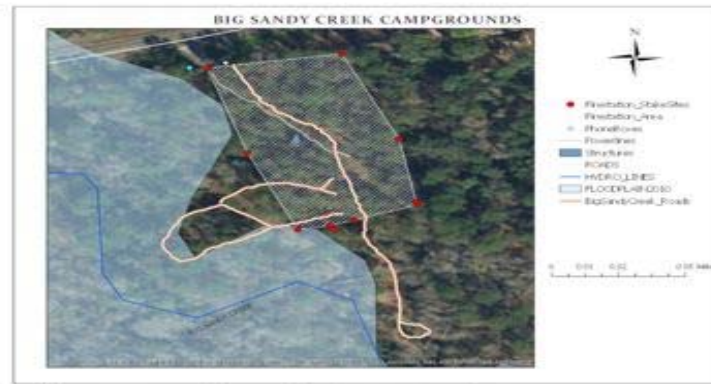
MICHAEL D. LEINBACH  
AND JONATHAN H. WARD  
FOREWORD BY ROBERT CRIPPEN

BRINGING  
THE UNTOLD STORY OF A  
COLUMBIA  
LOST SPACE SHUTTLE AND HER CREW  
HOME

EPILOGUE BY  
EILEEN COLLINS

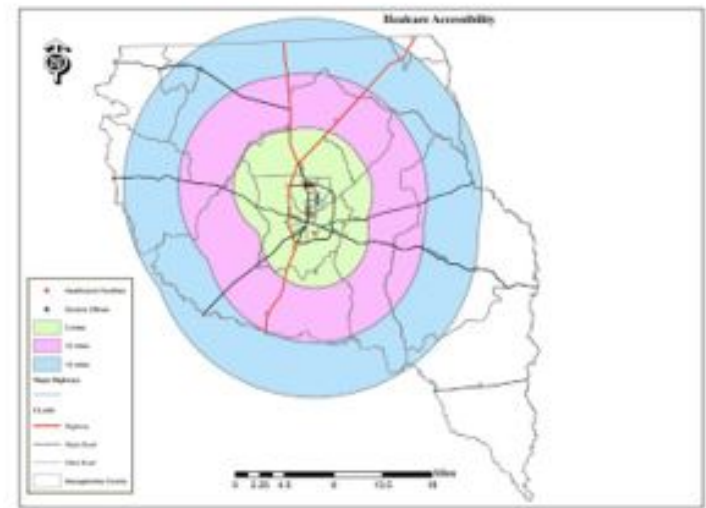
## **Post Columbia Center GIS Activities Building New GIS Community**

- **Columbia Regional Geospatial Service Center lost funding due to purpose violation**
- **Local Government Agencies not able to offer support**
- **Returned to Geography program**
- **Entered into new networking opportunities**

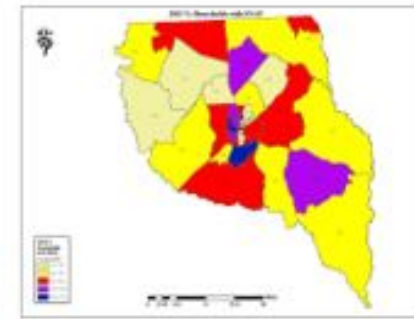




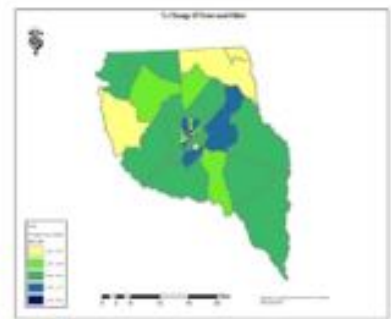
### Visualizing and Interpreting Selected Factors Influencing Wellness in Nacogdoches County Extracted from the American Community Survey (ACS) for 2015-2018



Accessibility to Health Care Nacogdoches County



2015 Percent Households with SNAP Insurance



% Change in Over 65 for 2015 - 2018

Darrel L. McDonald, PhD. Geography, Anthropology, Geography and Sociology Department SFASU  
Noel Estwick, PhD. Agribusiness, Department of Agriculture Prairie View A&M University

# DISASTER

Preparedness for  
Response to  
Innovation on  
Mitigation of  
Recovery



**March 5-7**

Fee required  
for attendance to  
Opening Reception  
5:00-6:00PM

## Cost

General Admission \$150  
College Student Admission \$25  
Reduced Admission \$75

## Location

Willie A. Temp  
Student Center  
155 L. W. Minor  
Prairie View, T



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OR VISIT US**

<https://bit.ly/3l3hi>



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# Broadening the Family of GIS Disaster Response

**Marcus T. Coleman,  
Jr. Director –  
Homeland Security  
Center for Faith-  
Based Neighborhood  
Partnerships  
(left)**

**Dr. Farrah G. Cambrice  
Sociology  
PVAMU  
(right)**



# Broadening the Family of GIS Disaster Response

**Shacara O.  
Lightbourne – Island  
Foodology  
(left)  
Bahamas**

**Dr. Noel Estwick  
PAMU  
(center)**

**Josephina Adderley-  
Curry  
(right)  
Bahamas**





## **Conclusions**

- **Over twenty years the GIS community has continued to grow, expand and to be a significant part of emergency response.**
- **And its role in the future is widening with innovative applications.**

# Forever Remembered tribute to the Challenger and Columbia Crews Kennedy Space Center

NASA 2015

**The future doesn't belong to the fainthearted – it belongs to the brave  
President Ronald Reagan**



**Years later NASA announced that some 40% of the Columbia Shuttle debris had been recovered and used to help determine the reasons for the tragic incident**



"I can talk about safety, but once I open those doors and folks enter into the room, it becomes a different conversation," said Michael Ciannilli, who oversees NASA's Columbia Research and Preservation Office. "When you come face to face with Columbia in the room, it becomes real. It becomes extremely real."