

# NOAA Remote Sensing and GIS Support

- NOAA's Ocean Service and Marine and Aviation Operations collects aerial photography of affected coastal areas
  - Acquired more than 8,300 high resolution aerial photographs of critical impacted areas along the Gulf Coast
  - All photographs posted on NOAA's public web site, averaged 4.5 million downloads a day.
- GIS Support for National Hurricane Center's Storm Surge Modeling
  - NOAA's Ocean Service staff was onsite at the National Hurricane Center assisting in operational storm surge forecasts and maps up to 24 hours before Katrina made landfall.
  - FEMA relied on these products to determine extent and severity of storm surge flooding.

# NOAA Remote Sensing and GIS Support

- Support for Search and Recovery operations
  - Staff from NOAA's Ocean Service produced digital imagery for search and rescue, salvage operations, waterways management, and pollution response.
  - OR&R assisted the USCG in coordinating remote sensing and aerial photography. Support for the USGS Disaster Response Web site
- NOAA provided GIS products for the USGS Disaster Response Website
  - Products included; cumulative rainfall for the impact area, most recent pre-Katrina imagery and digital elevation data
  - Data will be essential for understanding the effects and changes that have occurred due to Katrina.



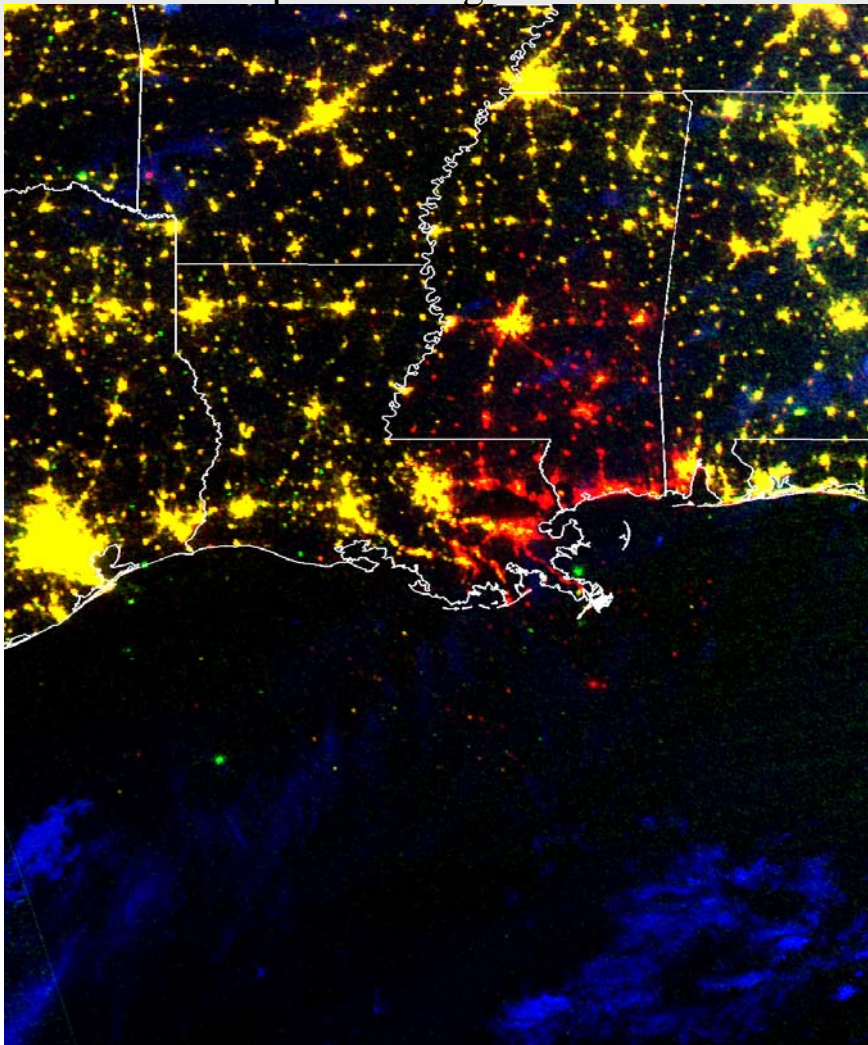
**Looking for Evidence of  
Potential Movement of Toxins &  
Pathogens**

**NOAA/NASA MODIS Coastwatch Imagery – TUESDAY 13 September**



## DMSP Optical Linescan System

August 31, 2005 after landfall. Red shows power outage areas.



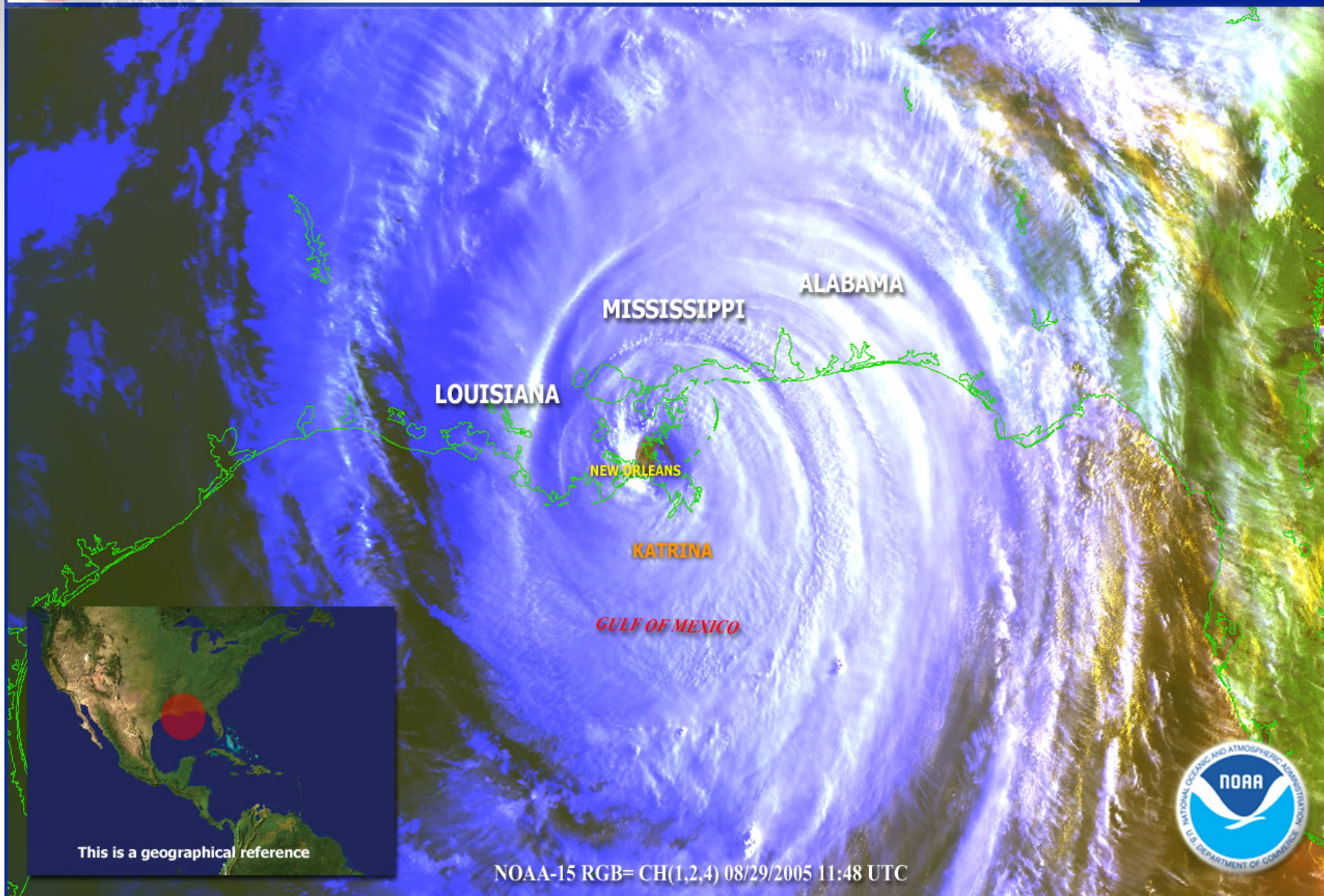
September 12, 2005 after landfall. Most power restored. Small area still Out, shown in red.





Hurricane KATRINA has hit land and is moving north at 15mph. It has max sustained winds of 150mph and gust of 184mph.

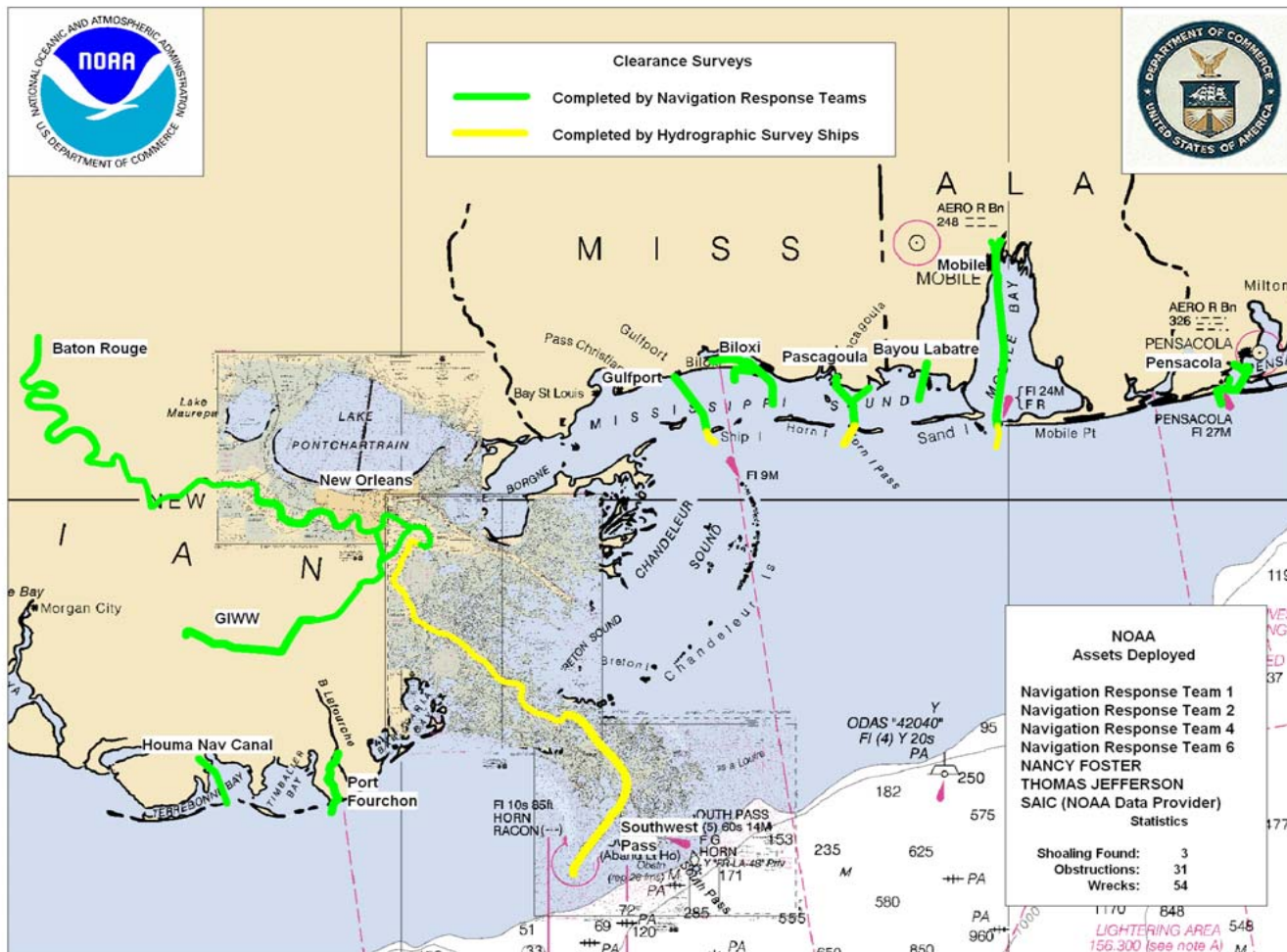
Credit: NOAA





# NOAA Hurricane Katrina Response: Emergency Hydrographic Surveys In Support of Reopening Ports and Waterways

Office of Coast Survey and Office of Marine and Aviation Operations



NOAA's Office of Coast Survey and Office of Marine and Aviation Operations led federal surveying efforts to make ports and shipping channels along the Gulf coast and channels on the Mississippi River once again navigable and safe for ship traffic. Working around the clock, Navigation Response Teams, NOAA vessels (THOMAS JEFFERSON and NANCY FOSTER) and contractors surveyed waterways for underwater hazards to vessels. Waterways must be surveyed and cleared before oil tankers, cargo ships, and other vessels can safely transit the area. Hurricanes can play havoc with the sea bottom, rendering the depths and obstructions displayed on nautical charts obsolete. NOAA survey results were critical for the Coast Guard to make decisions to re-open ports safely for maritime commerce and relief efforts.



NEW ORLEANS, LA



NRT MEMBERS REVIEW SURVEY DATA;  
PORT ALLEN, LA



THOMAS JEFFERSON



NRT 4; NEW ORLEANS, LA



EMPIRE, LA



BAYOU LA BATRE, LA



PLAQUEMINES PARISH, LA



NRT6; PORT ALLEN, LA

# Background

- Remotely sensed data is acquired to support NOAA's homeland security and emergency response requirements (ESF #5, #10, and #13 of the National Response Plan).
- NOAA maintains the capability to provide tools, technology, and expertise in a timely and efficient manner.
- The remotely sensed data collected is disseminated to federal, state, and local government agencies as well as the general public to facilitate support efforts.



# NOAA & H O M E L A N D S E C U R I T Y

detection preparedness prevention protection response recovery

## Damage Assessment Imagery

**JPEGs of storm impacted areas available for download**

Hurricane Katrina NOAA Images - Microsoft Internet Explorer provided by National Geodetic Survey

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Home

Address <http://ngs.woc.noaa.gov/katrina/> Go Links

Search AutoLink Options

### NOAA National Oceanic and Atmospheric Administration's National Geodetic Survey

## Hurricane Katrina Images

The imagery posted on this site is of the Gulf coast of Louisiana, Mississippi and Alabama after Hurricane Katrina made landfall.

This imagery was acquired by the [NOAA Remote Sensing Division](#) to support NOAA national security and emergency response requirements. In addition, it will be used for ongoing research efforts for testing and developing standards for airborne digital imagery.

Please note that these images are uncorrected and not rotated. The approximate ground sample distance (GSD) for each pixel is 37 cm (1.2 feet). The images have 60% forward overlap, and sidelap unknown. Image file size is between 2 MB and 3 MB.

#### Index Maps:

Click on the image on the left to locate and view individual images.



Click here for [additional information](#), including batch downloads and Exterior Orientation files.

In an effort to acquire imagery in a timely manner after the landfall of the Hurricane Katrina, clouds may be present in the imagery.

NOTE: The date of the photography can be derived from the first 3 characters of the image name. Image names beginning with 243 were acquired Aug 30, 2005, those beginning with 244 were acquired Aug 31, and so on.

#### Other Emergency Response Imagery:

[Click here](#)

#### Contact:

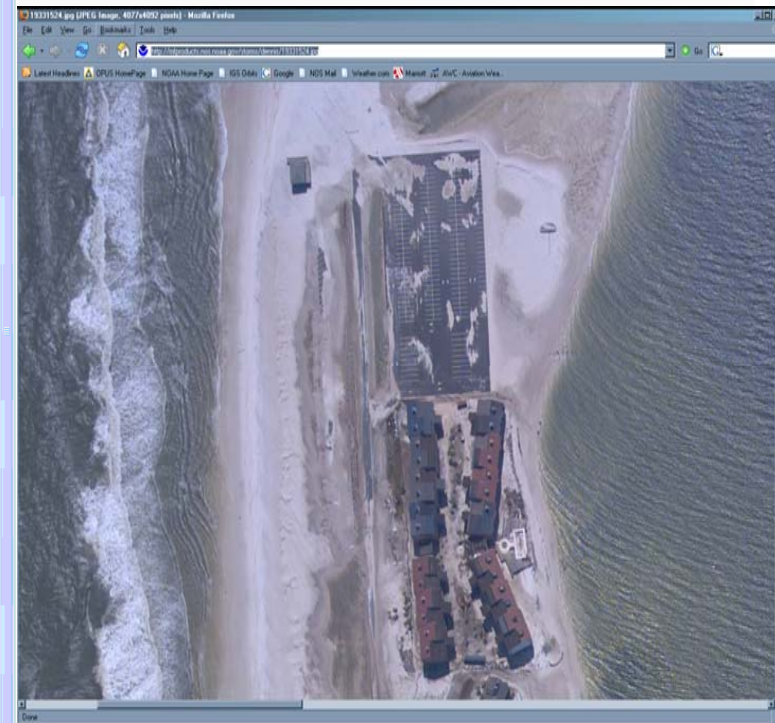
Email: [Mike Aslaksen](#) Chief, Remote Sensing Division



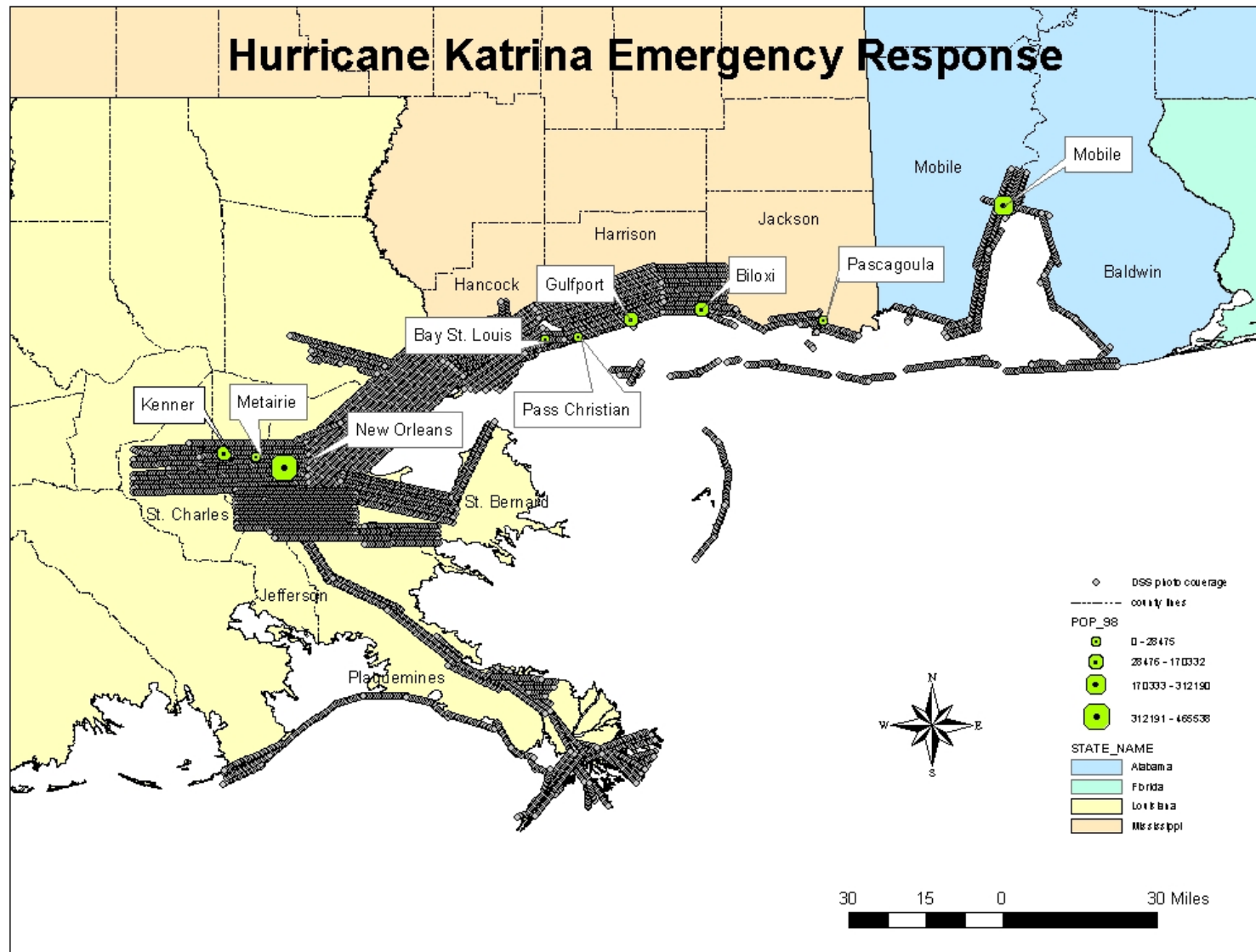
National Oceanic and Atmospheric Administration

[NOAA News Story](#)

Last Modified: September 9, 2005 8:26 AM





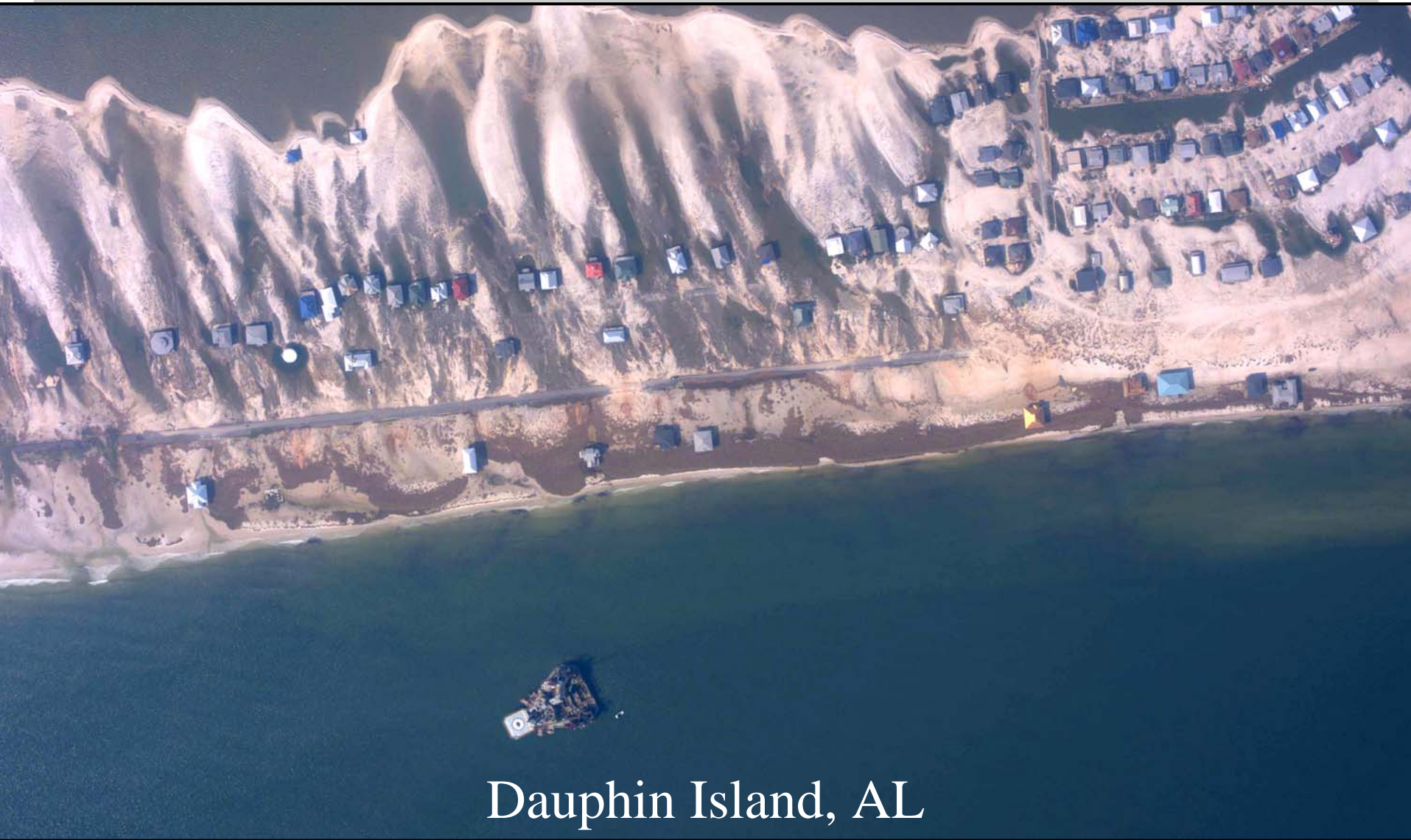


**9 Days**

**19 Flights**

**8327 images**

**40 Terabytes  
downloaded**



Dauphin Island, AL



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## Grand Isle, LA





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## Pass Christian, MS





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## Gulfport, MS

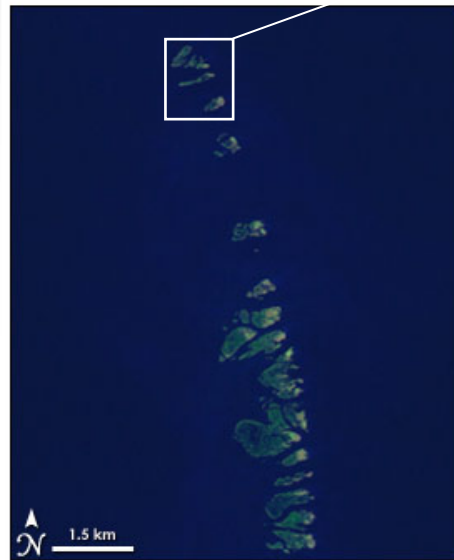




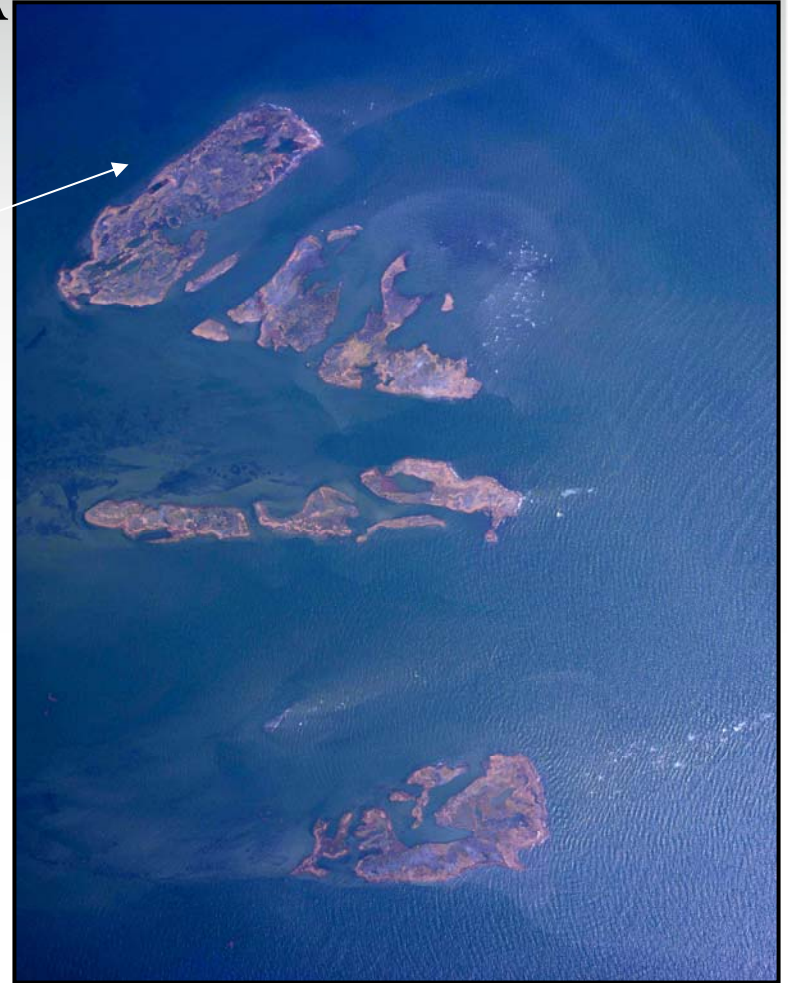
## Chandeleur Islands, LA



October 15, 2004



September 16, 2005



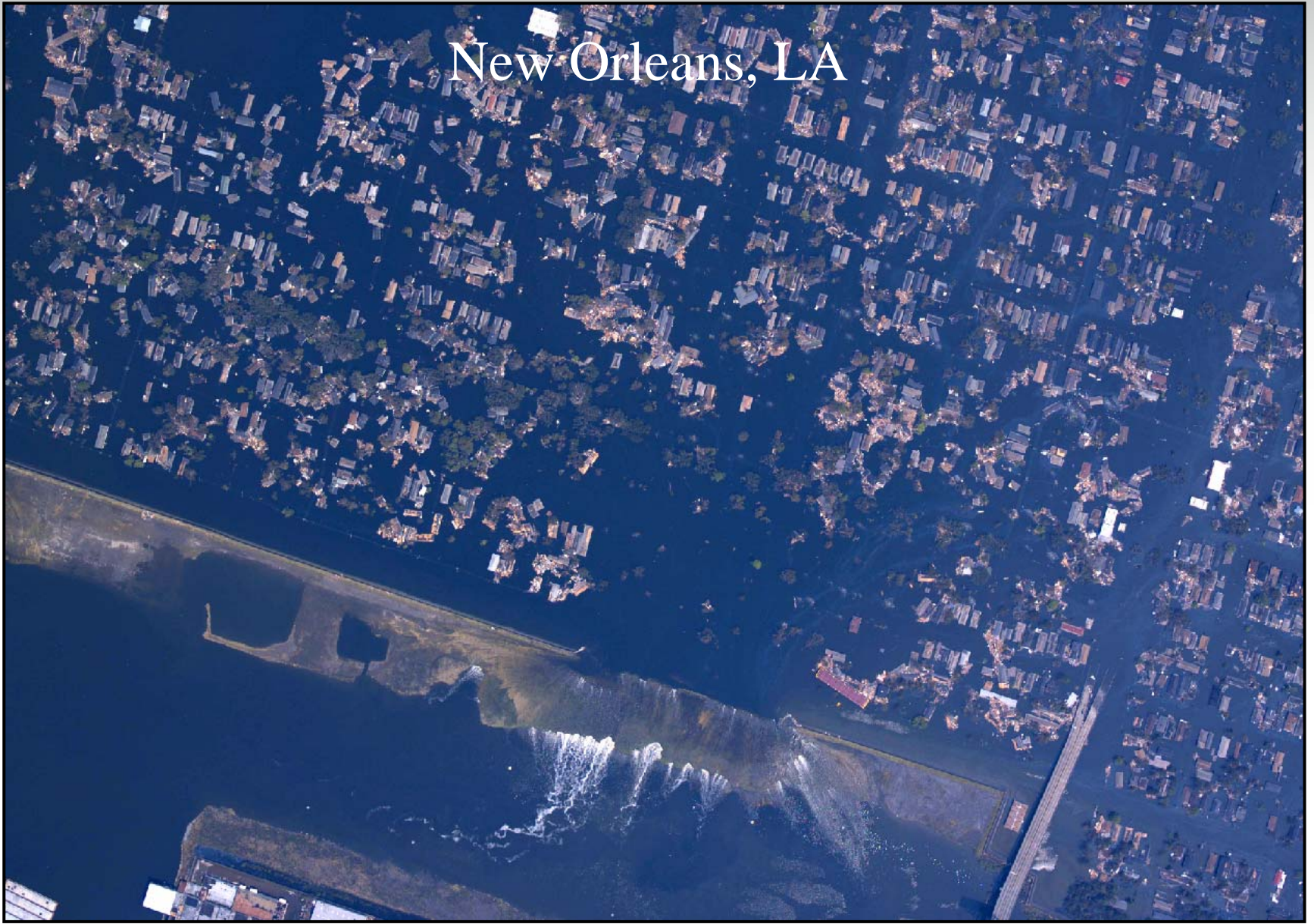


NOAA

& H O M E L A N D S E C U R I T Y

d e t e c t i o n   p r e p a r e d n e s s   p r e v e n t i o n   p r o t e c t i o n   r e s p o n s e   r e c o v e r y

# New Orleans, LA



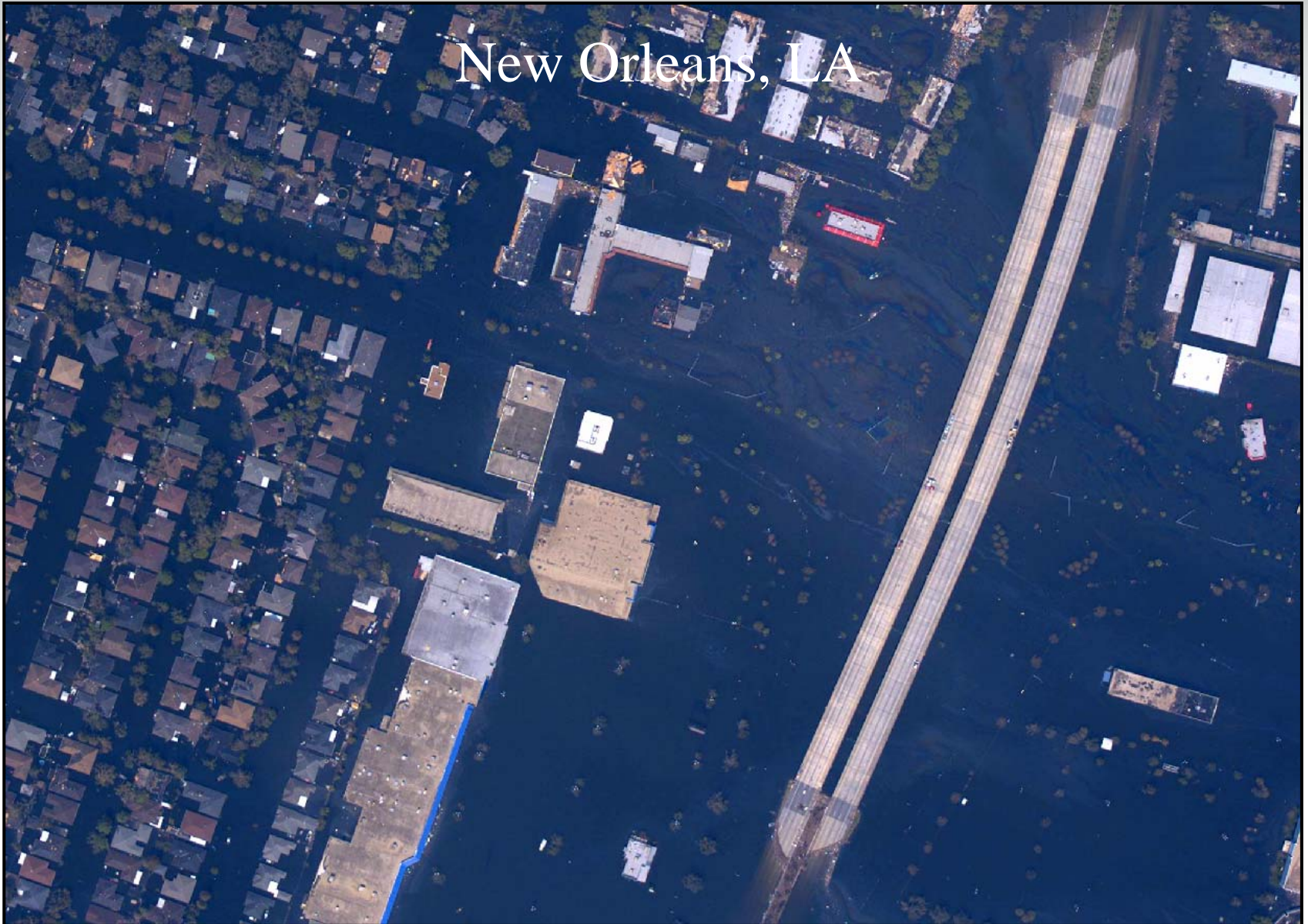


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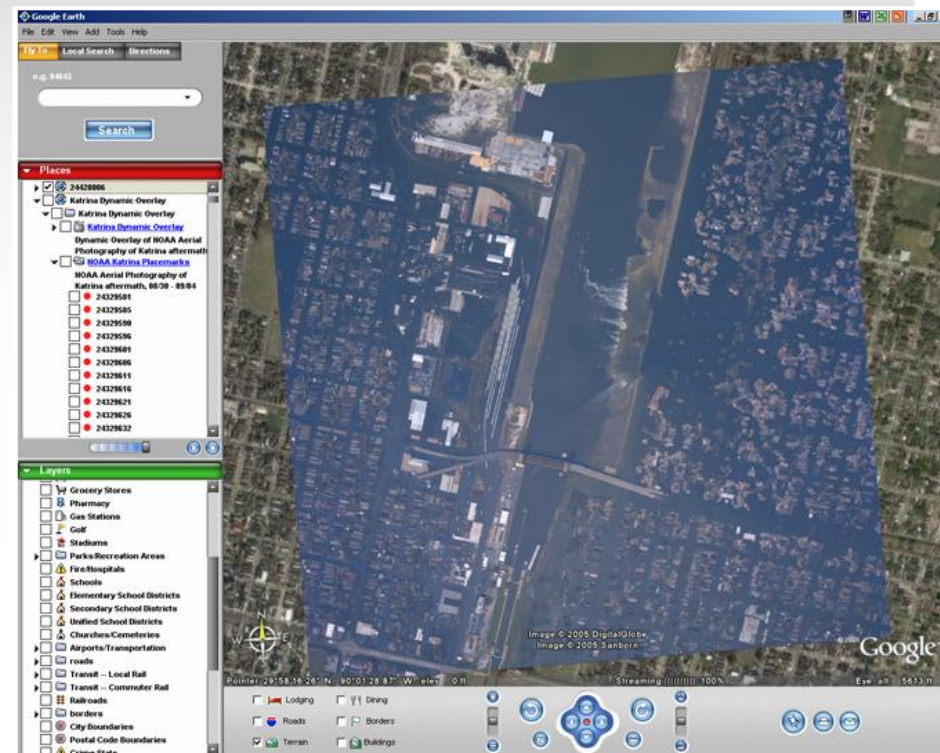
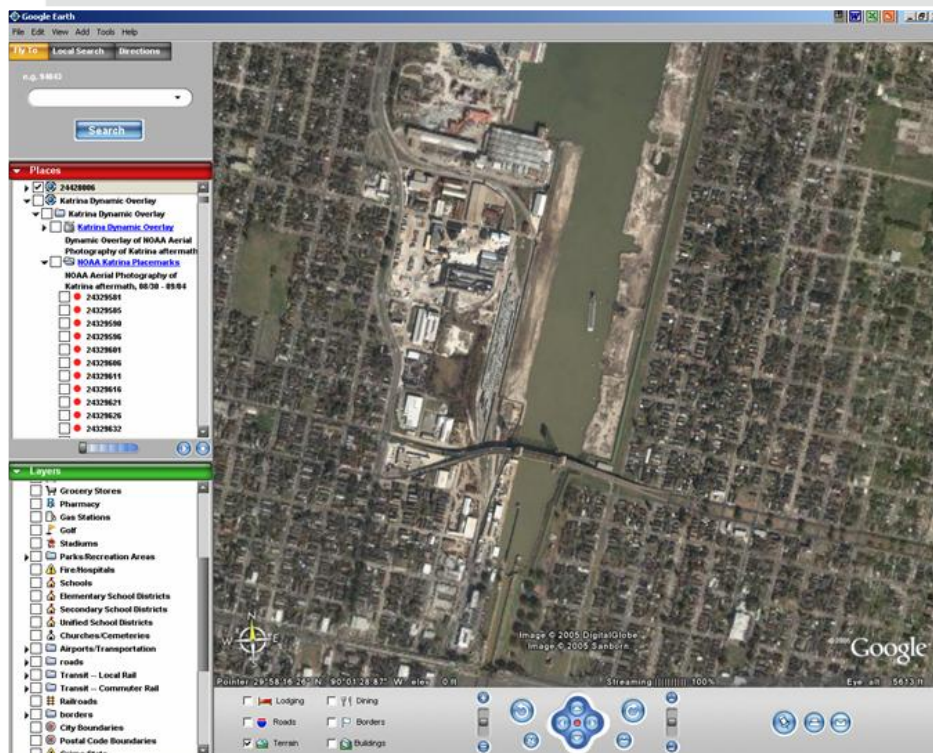
& H O M E L A N D S E C U R I T Y

detection preparedness prevention protection response recovery

New Orleans, LA



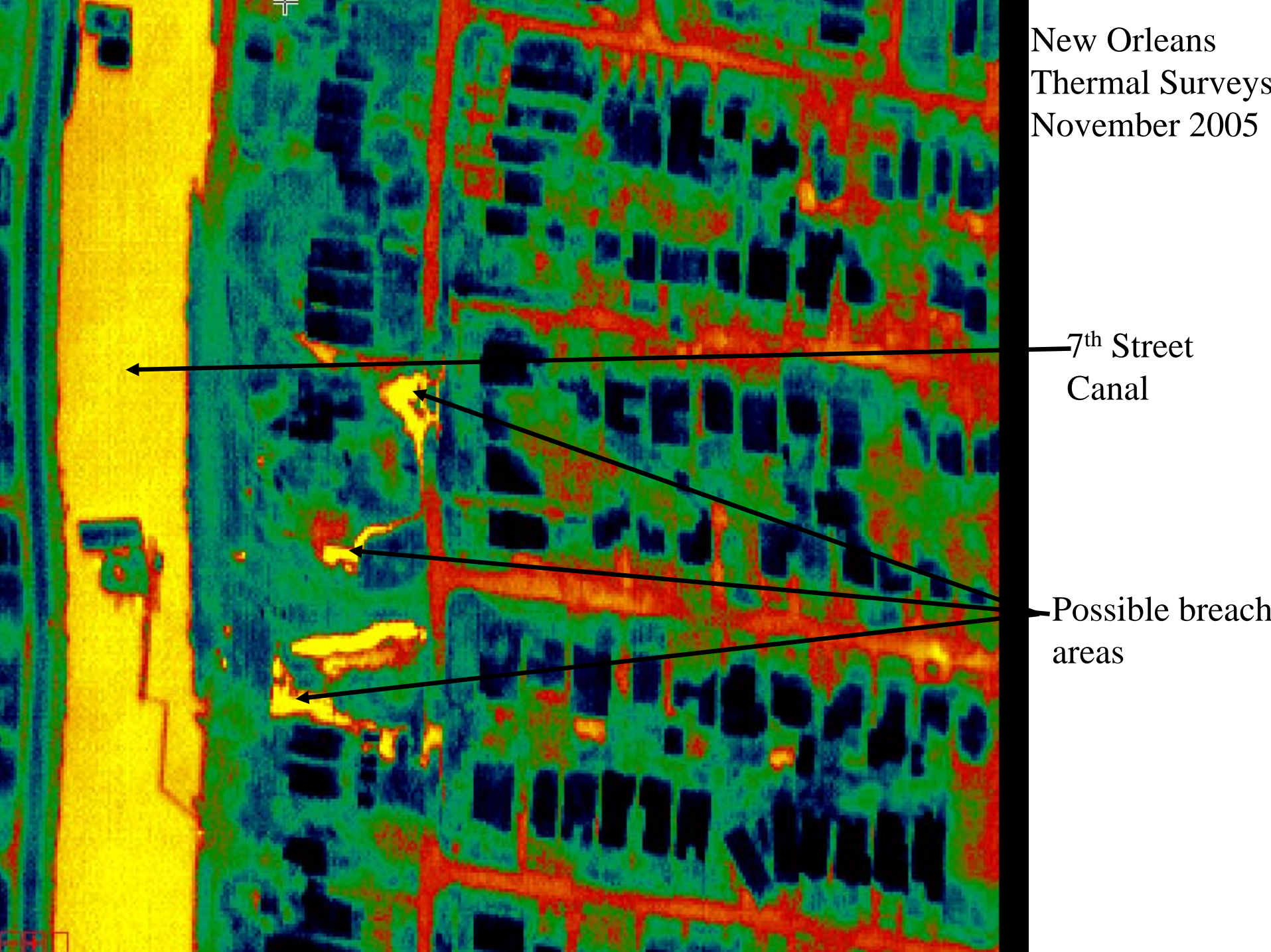




**Google Earth incorporates NOAA imagery.**



New Orleans  
Thermal Surveys  
November 2005





# Lessons Learned and Future Directions

- **Operations this year were an overall success:**
  - Data was made available to the public within 24 hrs of collection.
  - The imagery was deemed valuable for internal and external needs.
    - Internal: NRT's  
HAZMAT  
Coastal Zone Management  
Hurricane Research
    - External: DHS  
USACE  
DOD  
State and Local Emergency Managers  
General Public
  - NGS was able to utilize both NOAA and non NOAA platforms which assisted in allowing for the ability to respond and flexibility to limit the impact on other commitments to aircraft.



# Lessons Learned and Future Directions

- **Improvements to Operations and Data Delivery:**

- Improving concept of operation to include several platforms (both NOAA and non NOAA), staging and logistic plans, and staffing plans.
- Development of a flight plan database, in consultation with the users, from Texas to Maine, which will include the outer coast and integral infrastructure.
- Identify sources and prioritize pre-imagery
- Develop or identify both a government only and public website for delivery
- Develop better communication between the field and office on collection priorities – internally and externally.
- Implement DSS improvement roadmap to increase efficiency and better serve customer requirements.
  - Phase I (June 2006)
    - Real time GPS/IMU processing
    - World Files to accompany individual images
    - Ground based satellite internet connectivity
    - Automate imagery ingestion to web delivery
    - Enhanced backdrops for web delivery, North up rendering
  - Phase II (June 2007)
    - Near Real time image processing to orthomosaics
    - Format delivery – MrSID, JPEG2000