

A satellite-style image of the Gulf of Mexico and surrounding landmasses, including parts of North and Central America. The image shows green land, blue water, and white clouds. The text is overlaid on this image.

**2005**

**RIC 2006**

**Session: T2GH**

**Emergency Preparedness**

# **Hurricane Season**

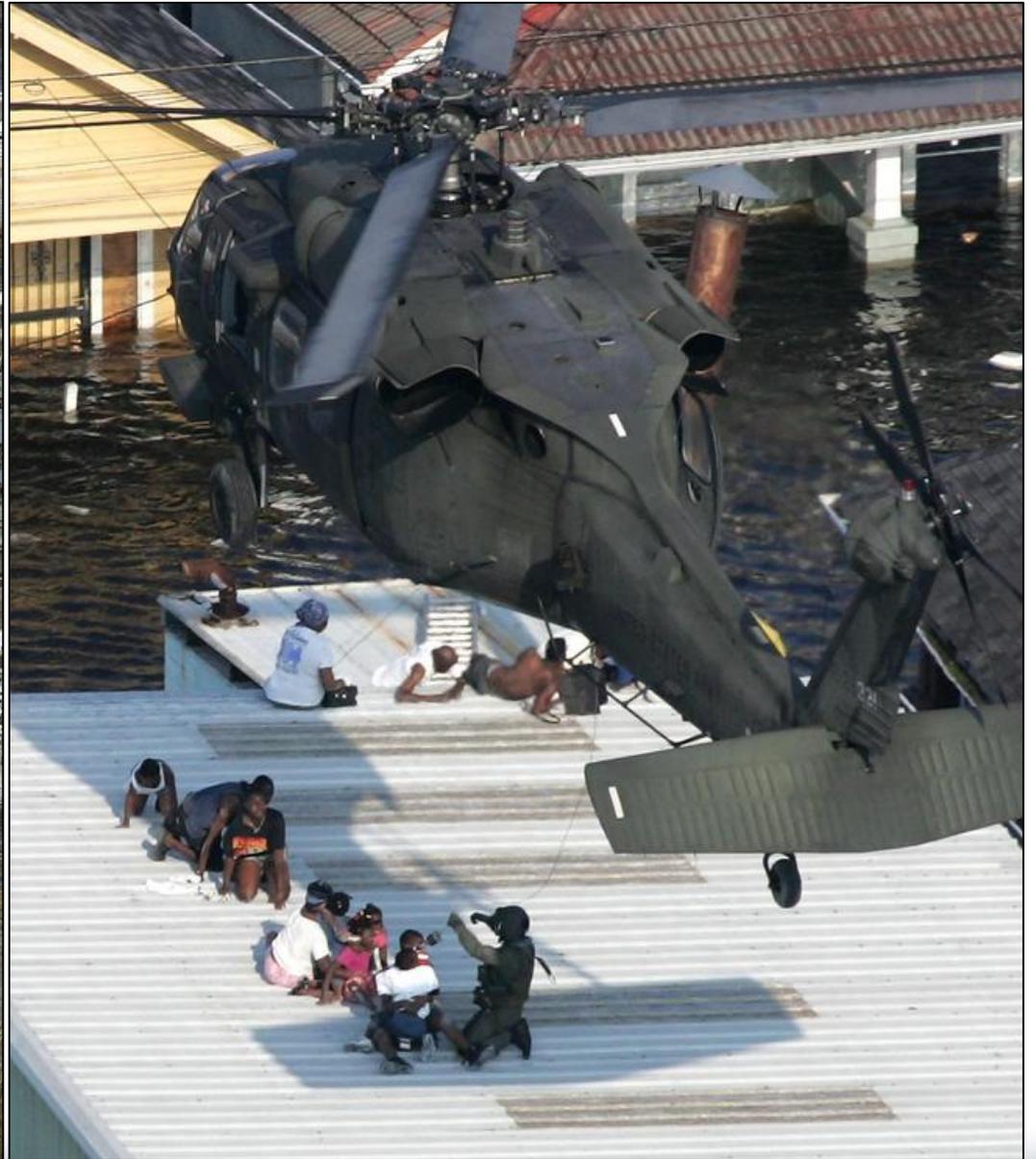
**Neal Fudge**

**Preparedness Chief**

**Governor's Office Of Homeland Security & Emergency Preparedness**

# Hurricane Katrina

Louisiana



A banner at the top of the slide features a blue background with a satellite image of a hurricane on the right and a red boat on the left. The text "Hurricane Katrina" is written in a large, white, sans-serif font, with "Louisiana" in a smaller, white, sans-serif font below it.

# Hurricane Katrina

## Louisiana

## Katrina Timeline

Thursday, August 25 - [LOHSEP Crisis Action Team monitors storm status](#)

4 PM CDT

- ✓ Katrina is upgraded to Hurricane

5:30 PM CDT

- ✓ Katrina makes landfall in Florida as a CAT 1 hurricane

Friday, August 26 - [State EOC activity increases & Parish conference calls begin](#)

12 AM CDT

- ✓ Maximum sustained winds has decreased to 70 mph, Katrina is again a tropical storm

4 AM CDT

- ✓ Katrina's eye is offshore of southwestern Florida over the Gulf of Mexico, 50 miles northeast of Key West
- ✓ Maximum sustained winds are 75 mph, Katrina now a CAT 1 hurricane
- ✓ Governor Blanco declares a State of Emergency for Louisiana
- ✓ Storm projections have shifted dramatically the west to include parts of Louisiana

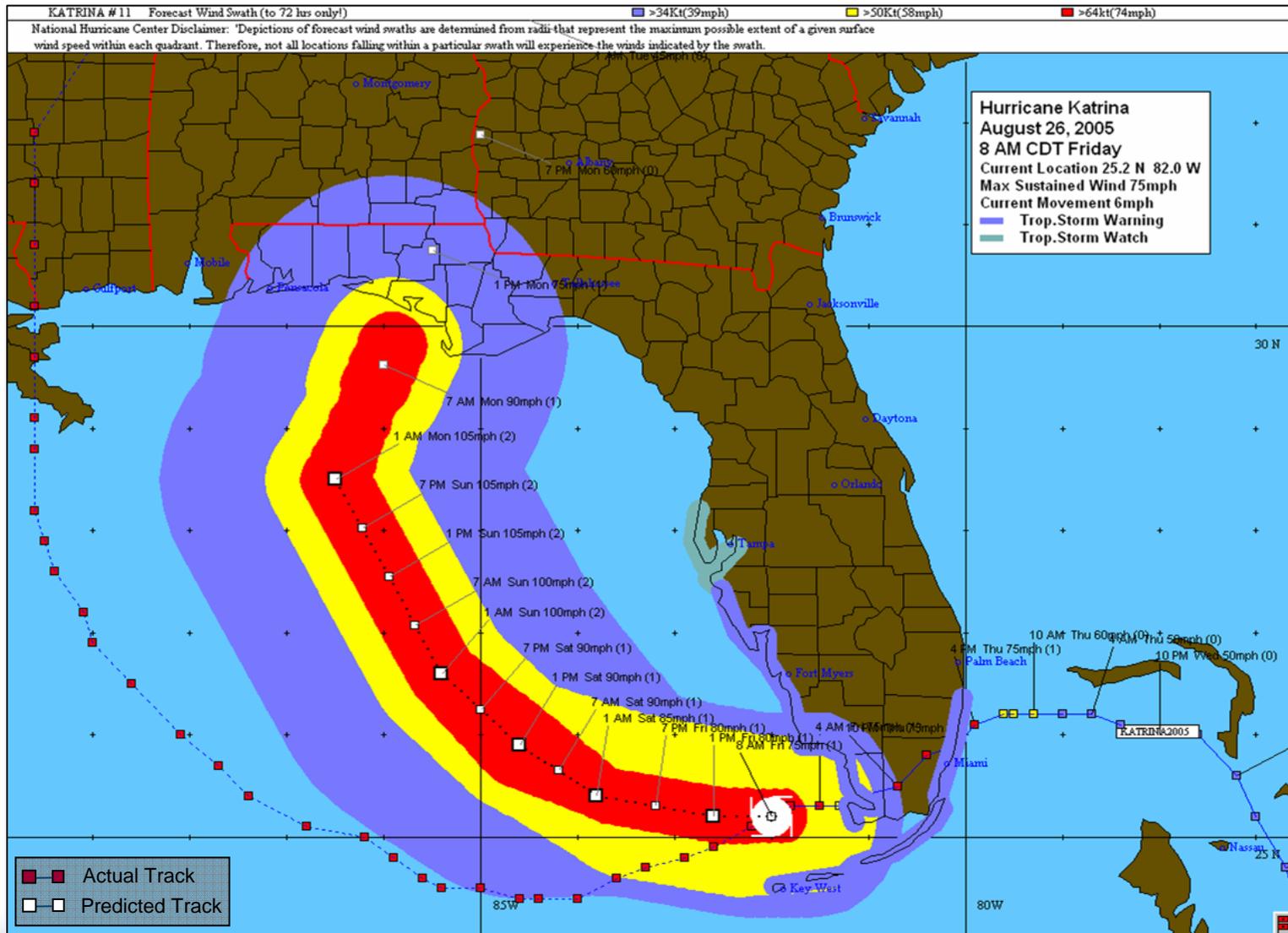
10 PM CDT

- ✓ National Hurricane Center forecasts Katrina will strike the town of Buras, east of New Orleans (prediction off by only 18 miles)

# Hurricane Katrina

## Louisiana

### Katrina Timeline





# Hurricane Katrina

Louisiana

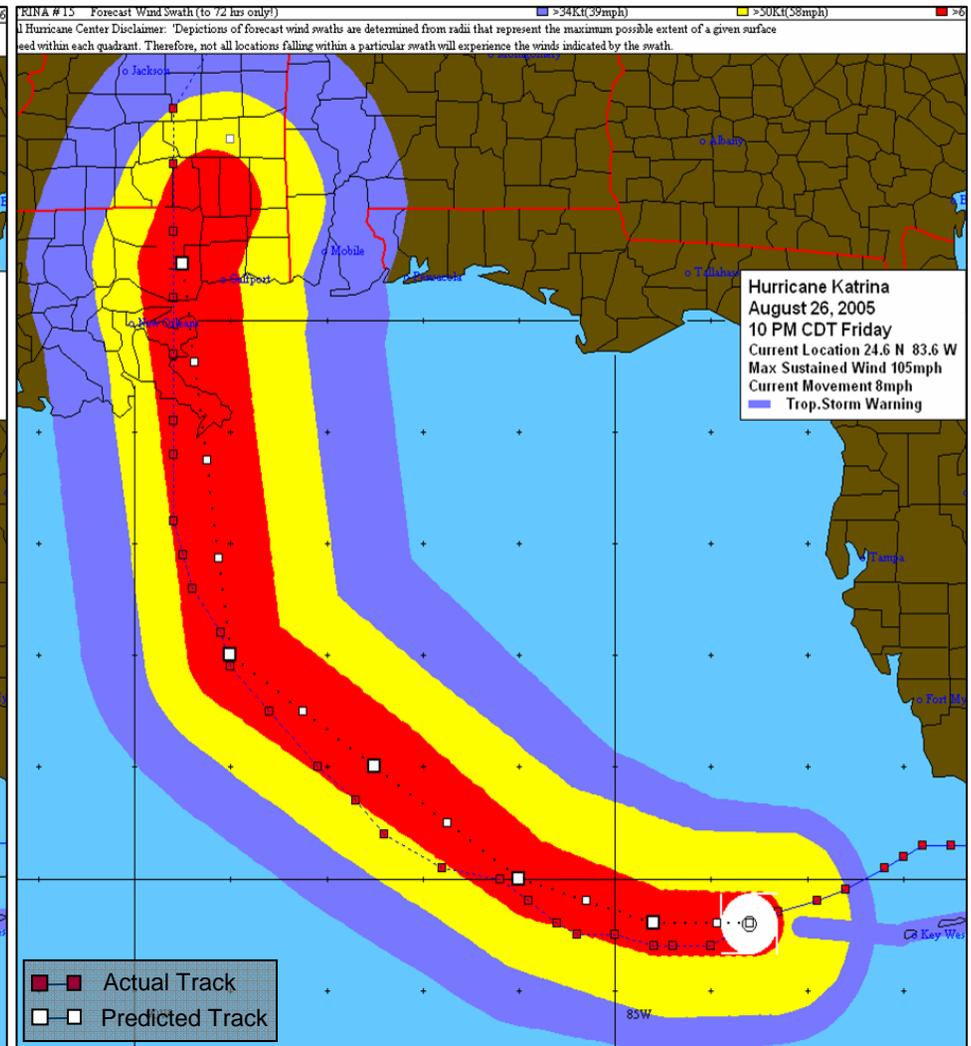
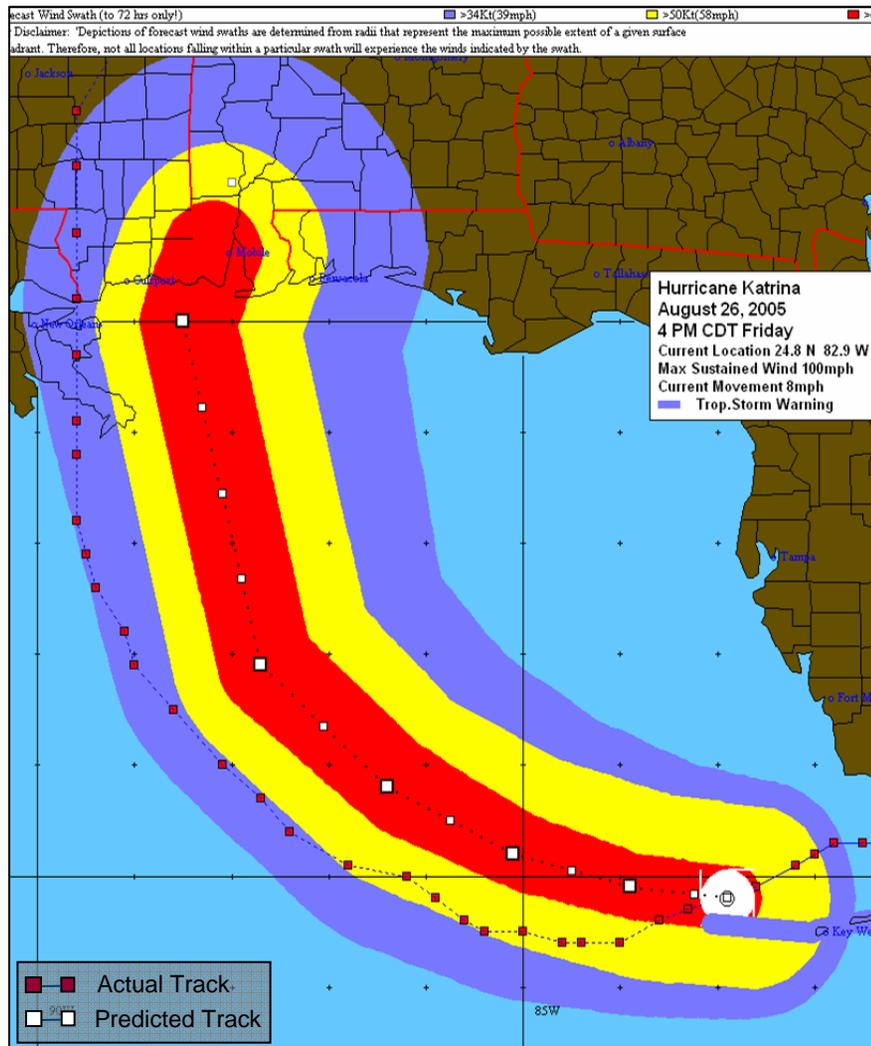
On August 26<sup>th</sup>  
Hurricane Katrina  
took a dramatic shift  
toward Louisiana



# Hurricane Katrina

## Louisiana

### Katrina Timeline



A banner at the top of the slide features a blue background with a satellite image of a hurricane on the right and a red life preserver on the left. The text "Hurricane Katrina" is written in a large, white, sans-serif font, with "Louisiana" in a smaller, white, sans-serif font below it.

# Hurricane Katrina

## Louisiana

## Katrina Timeline

**Saturday, August 27** - State EOC is fully staffed at Level 1, FEMA ERT-A & ERT-N arrive in Baton Rouge/National Guard mobilized/Emergency Declaration request forwarded to President & initial needs for Federal assistance communicated to FEMA

**4 AM CDT**

- ✓ Katrina reaches CAT 3 intensity

**6:30 AM CDT**

- ✓ Recommended Louisiana Emergency Evacuation Plan be implemented

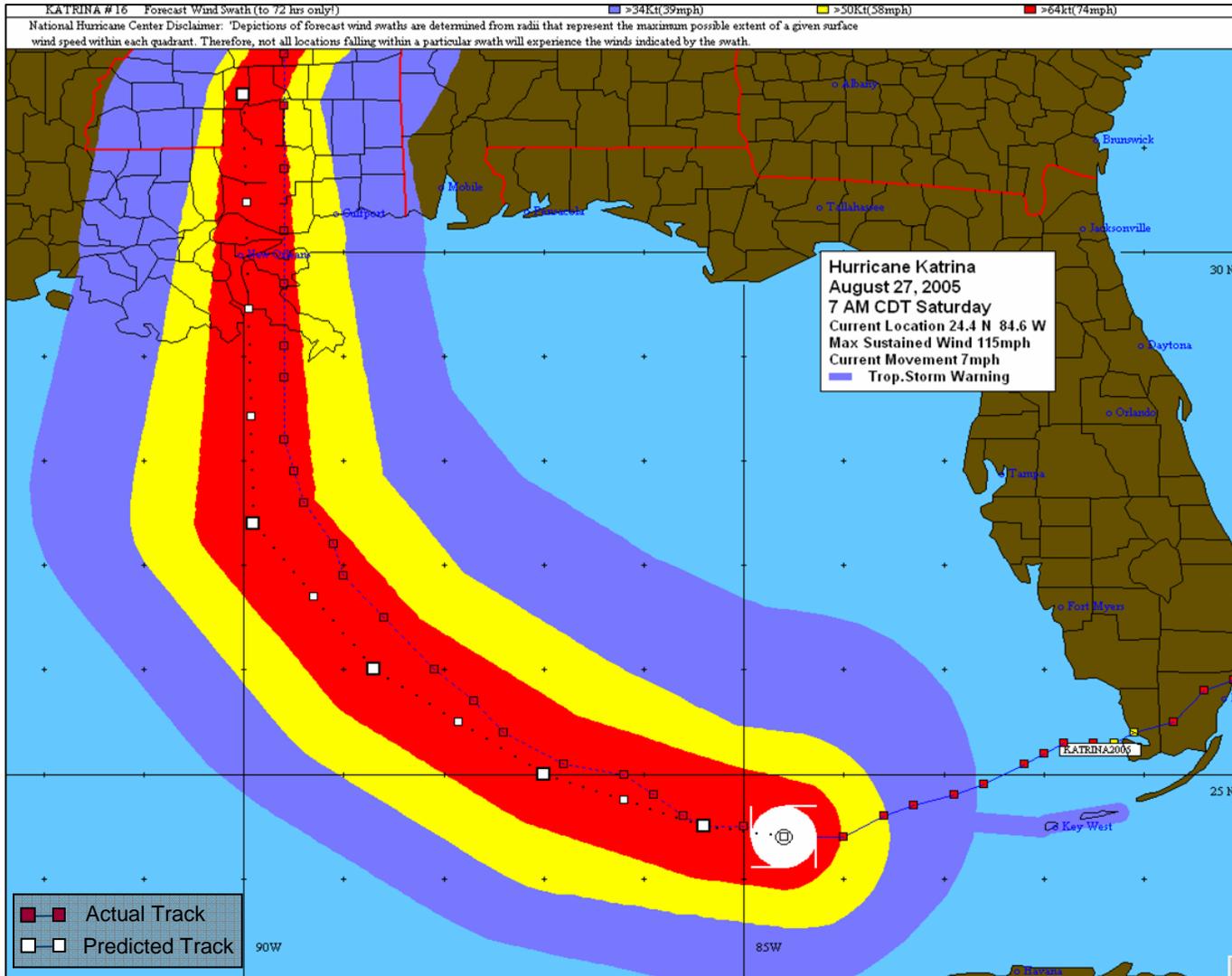
**9 AM CDT**

- ✓ Governor Blanco requests a Emergency Declaration for Louisiana from President Bush
- ✓ St. Charles calls for a mandatory evacuation of its residents
- ✓ St. Tammany announces State of Emergency, then later that day calls for an evacuation & establishes 2 shelters
- ✓ Plaquemines Parish declares a mandatory evacuation - Officials picking up special-needs residents at mid-day Saturday
- ✓ Jefferson declares a voluntarily evacuation for most of the Parish but a mandatory evacuation for the coastal areas of Grand isle, Crown Point, Lafitte & Barataria
- ✓ St. Bernard has recommended all residents evacuate

# Hurricane Katrina

## Louisiana

### Katrina Timeline



## Katrina Timeline

Saturday, August 27

Conference calls are ongoing through out the course of the day to assess the needs and dangers at the parish level.

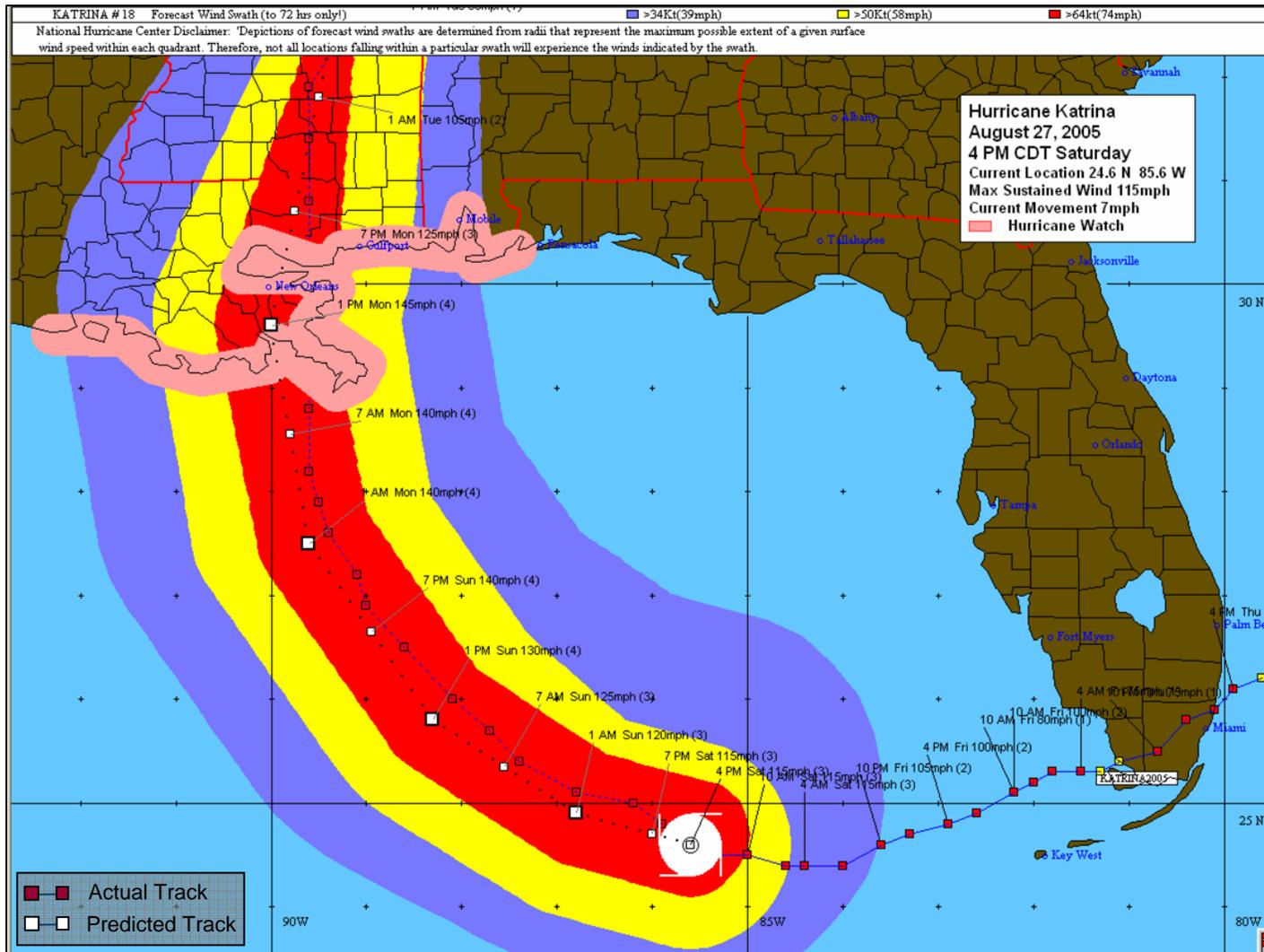
### 4 PM CDT

- ✓ Governor & Mayor Nagin host a mid-afternoon press conference
  - Nagin calls for a voluntary evacuation of the city - stresses the need for those in low-lying areas to evacuate
  - The City will open the Superdome as a special needs shelter
  - President declares a Federal State of Emergency

# Hurricane Katrina

## Louisiana

### Katrina Timeline



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# Hurricane Katrina

## Louisiana

## Katrina Timeline

**Sunday, August 28** - Request for Expedited Major Disaster Declaration Initiated

Conference calls are ongoing through out the course of the day to assess the needs and dangers at the parish level.

**12:40 AM CDT**

- ✓ Katrina reaches CAT 4

**7 AM CDT**

- ✓ Katrina becomes a CAT 5

**9:30 AM CDT**

- ✓ The Mayor & Governor hold a press conference during which they announced a mandatory evacuation "We're facing the storm most of us have feared,"
- ✓ Katrina set to make landfall overnight

**10 AM CDT**

- ✓ National Weather Service issues bulletin predicting "devastating" damage
- ✓ Mandatory evacuation is ordered for New Orleans City by Mayor Nagin

# Hurricane Katrina

Louisiana



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# Hurricane Katrina

## Louisiana

## Katrina Timeline

Sunday, August 28

Noon CDT

- ✓ Louisiana Superdome opened as a "refuge of last resort"

1 PM CDT

- ✓ Katrina strengthens to a strong CAT 5 with 175 mph sustained winds, with gusts to 216 mph
- ✓ President declares a State of Emergency in Alabama & Mississippi & a Major Disaster in Florida under the authority of the Stafford Act
- ✓ Governor Blanco makes arrangements with the Governor of New Mexico for National Guard reinforcements

# Hurricane Katrina

## Louisiana

URGENT - WEATHER MESSAGE  
NATIONAL WEATHER SERVICE NEW ORLEANS LA  
1011 AM CDT SUN AUG 28 2005

...DEVASTATING DAMAGE EXPECTED...

.HURRICANE KATRINA...A MOST POWERFUL HURRICANE WITH UNPRECEDENTED STRENGTH...RIVALING THE INTENSITY OF HURRICANE CAMILLE OF 1969.

MOST OF THE AREA WILL BE UNINHABITABLE FOR WEEKS...PERHAPS LONGER. AT LEAST ONE HALF OF WELL CONSTRUCTED HOMES WILL HAVE ROOF AND WALL FAILURE. ALL GABLED ROOFS WILL FAIL...LEAVING THOSE HOMES SEVERELY DAMAGED OR DESTROYED.

THE MAJORITY OF INDUSTRIAL BUILDINGS WILL BECOME NON FUNCTIONAL. PARTIAL TO COMPLETE WALL AND ROOF FAILURE IS EXPECTED. ALL WOOD FRAMED LOW RISING APARTMENT BUILDINGS WILL BE DESTROYED. CONCRETE BLOCK LOW RISE APARTMENTS WILL SUSTAIN MAJOR DAMAGE...INCLUDING SOME WALL AND ROOF FAILURE.

HIGH RISE OFFICE AND APARTMENT BUILDINGS WILL SWAY DANGEROUSLY...A FEW TO THE POINT OF TOTAL COLLAPSE. ALL WINDOWS WILL BLOW OUT.

AIRBORNE DEBRIS WILL BE WIDESPREAD...AND MAY INCLUDE HEAVY ITEMS SUCH AS HOUSEHOLD APPLIANCES AND EVEN LIGHT VEHICLES. SPORT UTILITY VEHICLES AND LIGHT TRUCKS WILL BE MOVED. THE BLOWN DEBRIS WILL CREATE ADDITIONAL DESTRUCTION. PERSONS...PETS...AND LIVESTOCK EXPOSED TO THE WINDS WILL FACE CERTAIN DEATH IF STRUCK.

POWER OUTAGES WILL LAST FOR WEEKS...AS MOST POWER POLES WILL BE DOWN AND TRANSFORMERS DESTROYED. WATER SHORTAGES WILL MAKE HUMAN SUFFERING INCREDIBLE BY MODERN STANDARDS.

THE VAST MAJORITY OF NATIVE TREES WILL BE SNAPPED OR UPROOTED. ONLY THE HEARTIEST WILL REMAIN STANDING...BUT BE TOTALLY DEFOLIATED. FEW CROPS WILL REMAIN. LIVESTOCK LEFT EXPOSED TO THE WINDS WILL BE KILLED.

AN INLAND HURRICANE WIND WARNING IS ISSUED WHEN SUSTAINED WINDS NEAR HURRICANE FORCE...OR FREQUENT GUSTS AT OR ABOVE HURRICANE FORCE...ARE CERTAIN WITHIN THE NEXT 12 TO 24 HOURS.

ONCE TROPICAL STORM AND HURRICANE FORCE WINDS ONSET...DO NOT VENTURE OUTSIDE!

August 28 2005  
10:11 AM CDT

NOAA Bulletin  
Predicting  
"Devastating"  
Damage

# Hurricane Katrina

## Louisiana



LA Homeland Security & Emergency Preparedness Emergency Operations

# Hurricane Katrina

## Louisiana



**Unified Command - COL Jeff Smith & FEMA ERT-N Team Leader William Lokey**

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# Hurricane Katrina

## Louisiana

## Katrina Timeline

### Louisiana Landfall

Monday, August 29

6:10 AM CDT

- ✓ Katrina makes landfall near Buras, Louisiana, with 145 mph winds

7:30 AM CDT

8 AM CDT

- ✓ New Orleans: Rising water on both sides of the Industrial Canal

9 AM CDT

- ✓ New Orleans: 6-8 feet of water in the Lower 9th Ward

11 AM CDT

- ✓ 10 feet of water in St. Bernard

2 PM CDT

- ✓ New Orleans officials confirm 17th Street Canal breach

3 PM CDT

- ✓ President declares a Major Disaster for Louisiana

# Hurricane Katrina

Louisiana





# Hurricane Katrina

## Louisiana

## Katrina Timeline

### **Monday, August 29**

- ✓ Louisiana pounded with more than 11 hours of hurricane-force winds
- ✓ By evening, Coast Guard, LA Fish & Wildlife & National Guard rescues already underway in tropical storm conditions
- ✓ Unconfirmed reports of levee overtopping & possible breaches

### **Tuesday, August 30**

- ✓ Levees in New Orleans, weakened by Katrina fail, flooding over 80% of the City
- ✓ Water pumps overcome, failing
- ✓ Over the following 4 days: Over 80,000 people evacuated from the greater New Orleans area, to multiple states
- ✓ An estimated 62,000 people rescued from homes & rooftops

# Hurricane Katrina

Louisiana

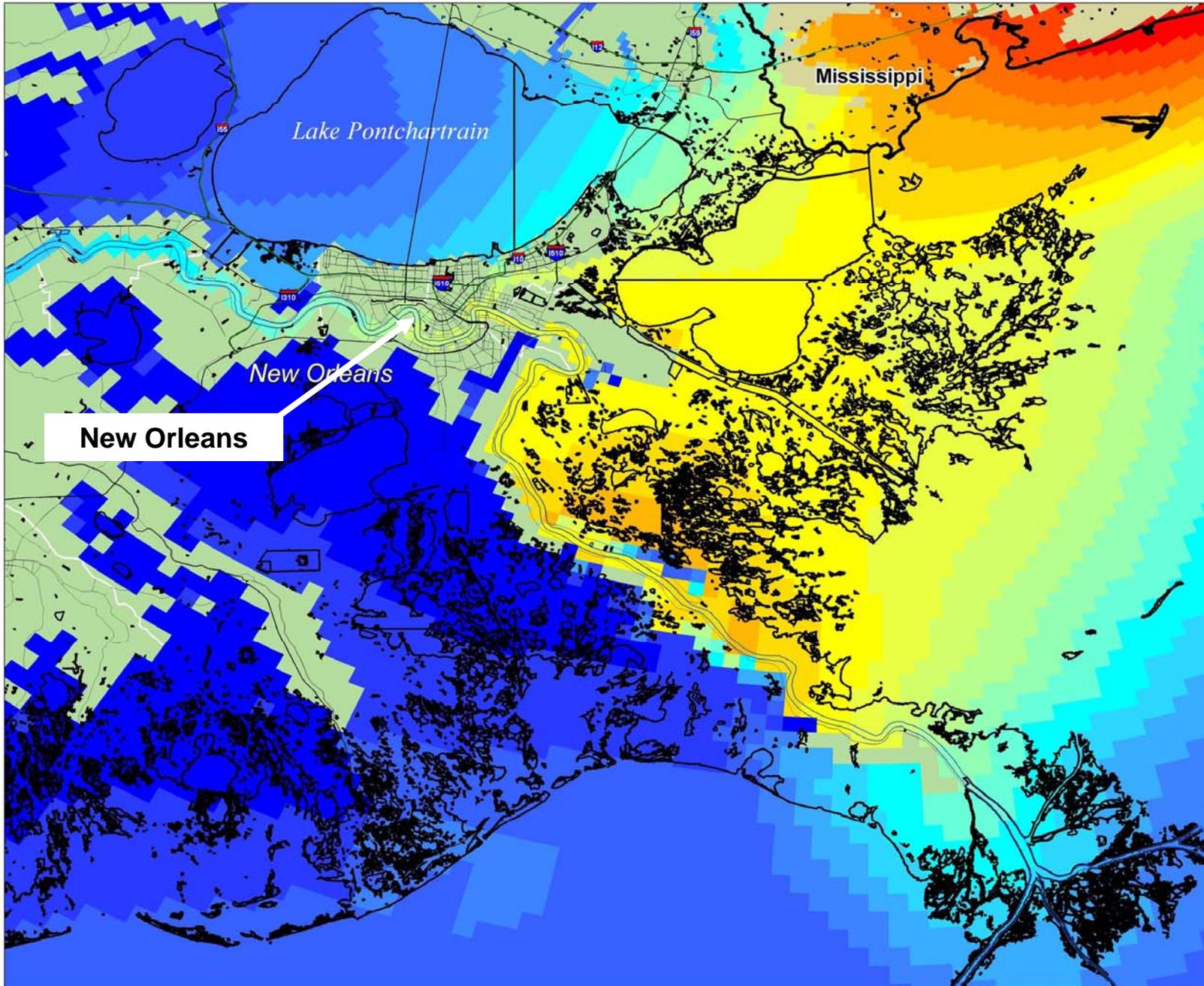


# Hurricane Katrina

Louisiana



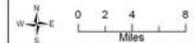
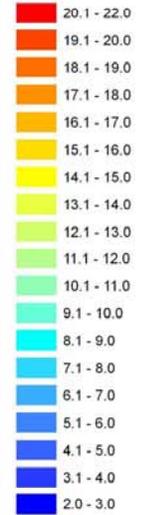
# Katrina Coastal Storm Surge Model - New Orleans



## Legend

### Storm Surge Model

Feet

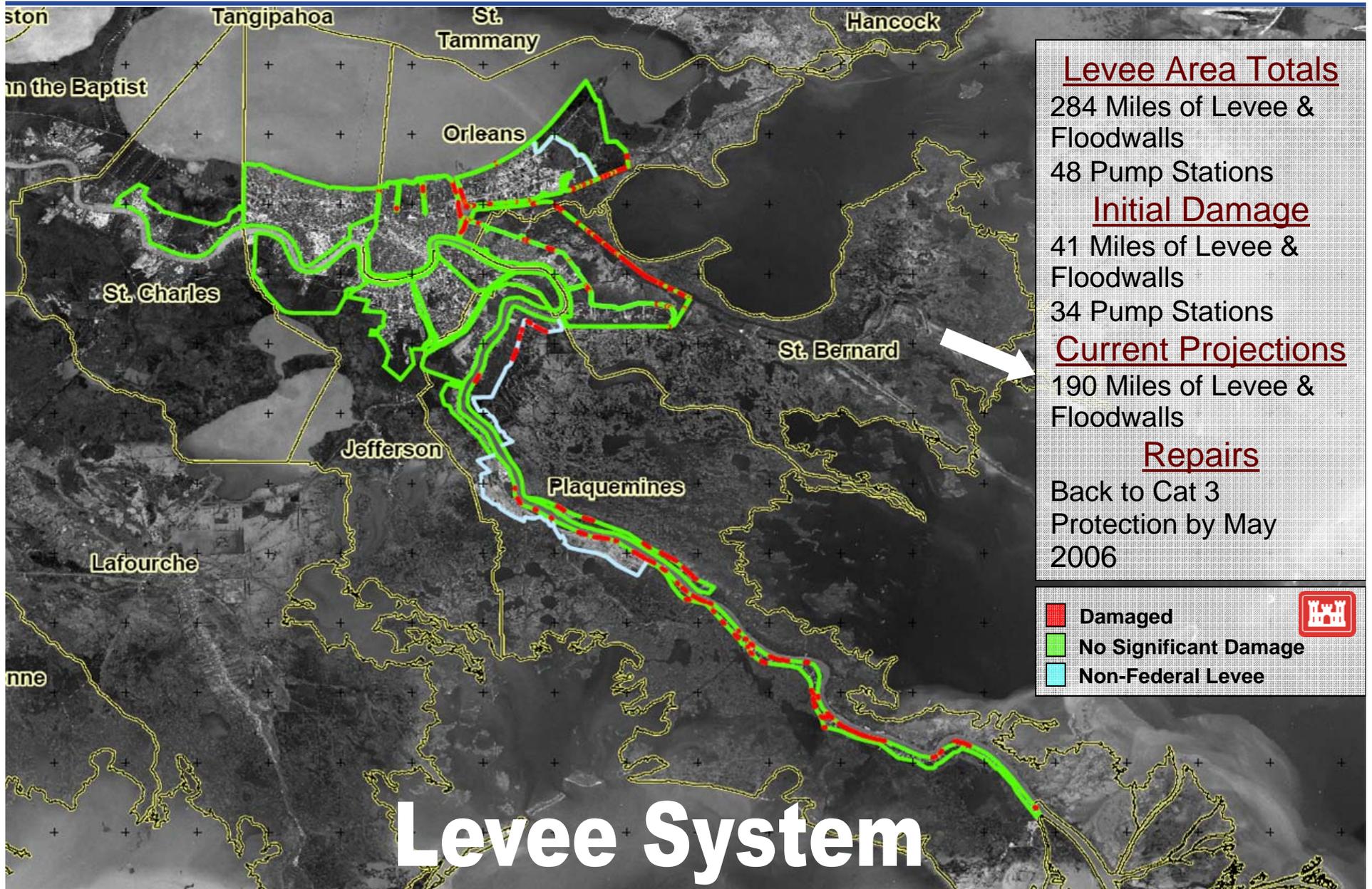


## Location Map



# Hurricane Katrina

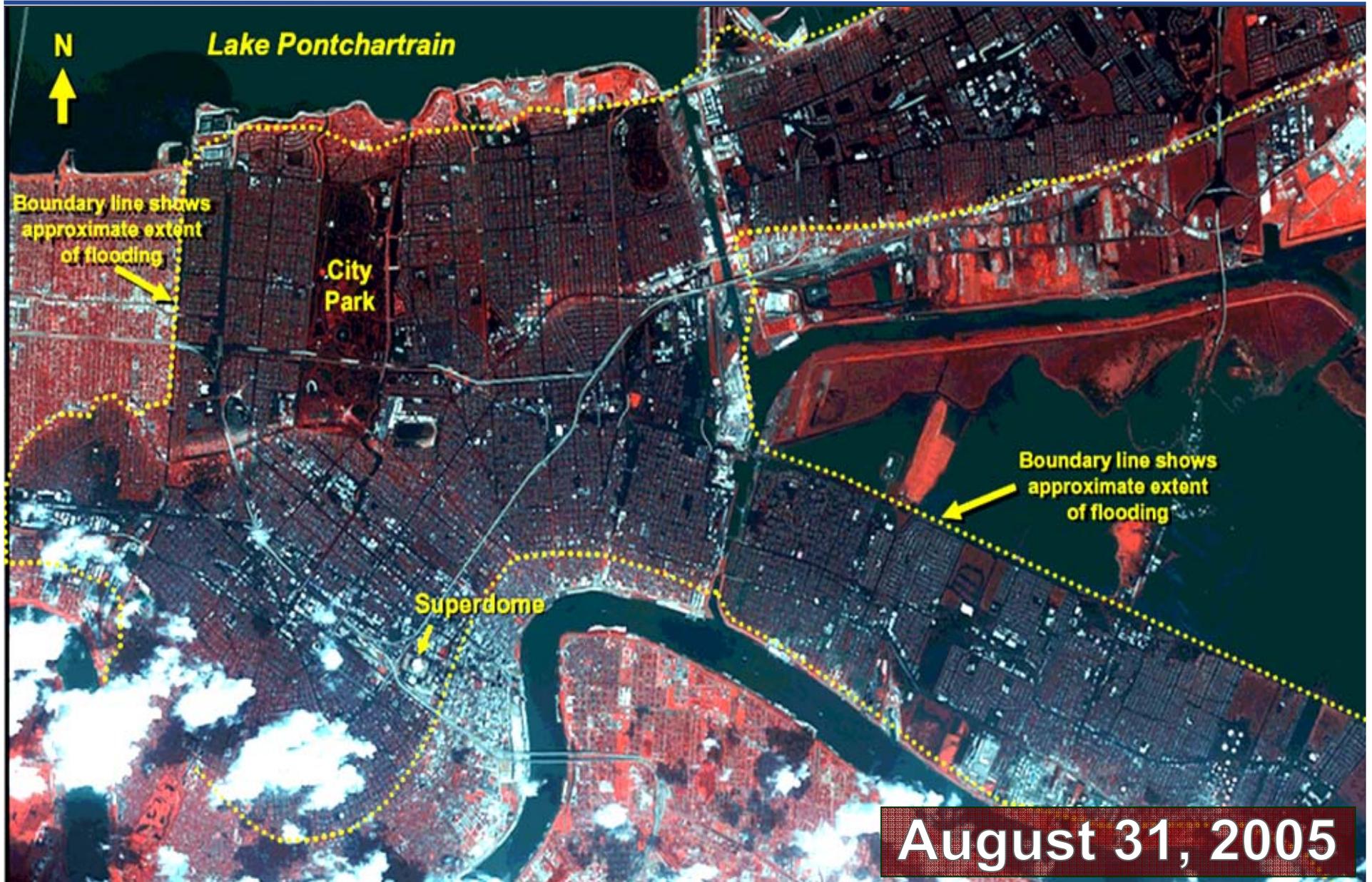
## Louisiana



# Levee System

# Hurricane Katrina

Louisiana

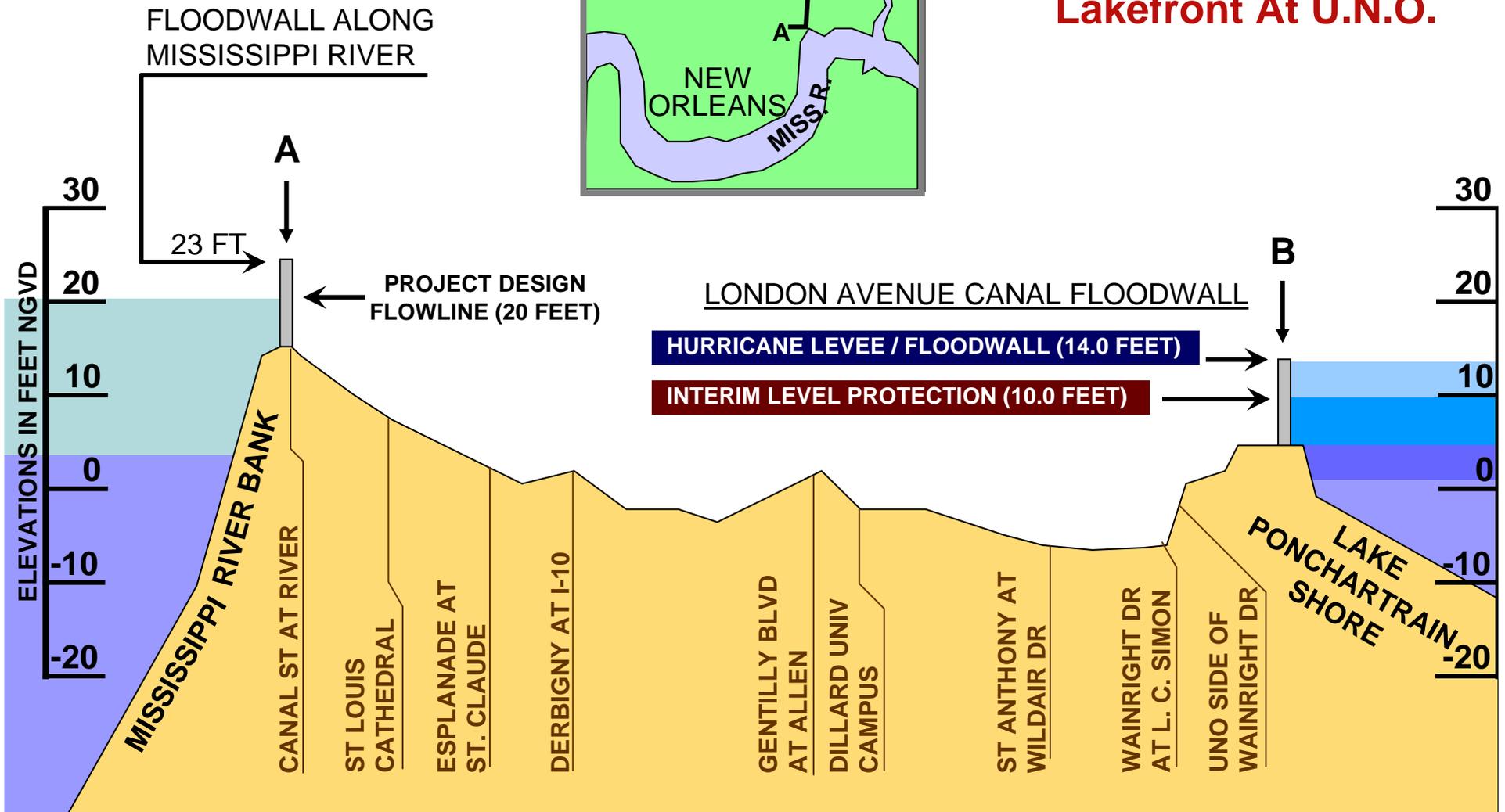


# Hurricane Katrina

## Louisiana

### City Of New Orleans Ground Elevations

### From Canal St. At Mississippi River To The Lakefront At U.N.O.



# Hurricane Katrina

Louisiana



# Hurricane Katrina

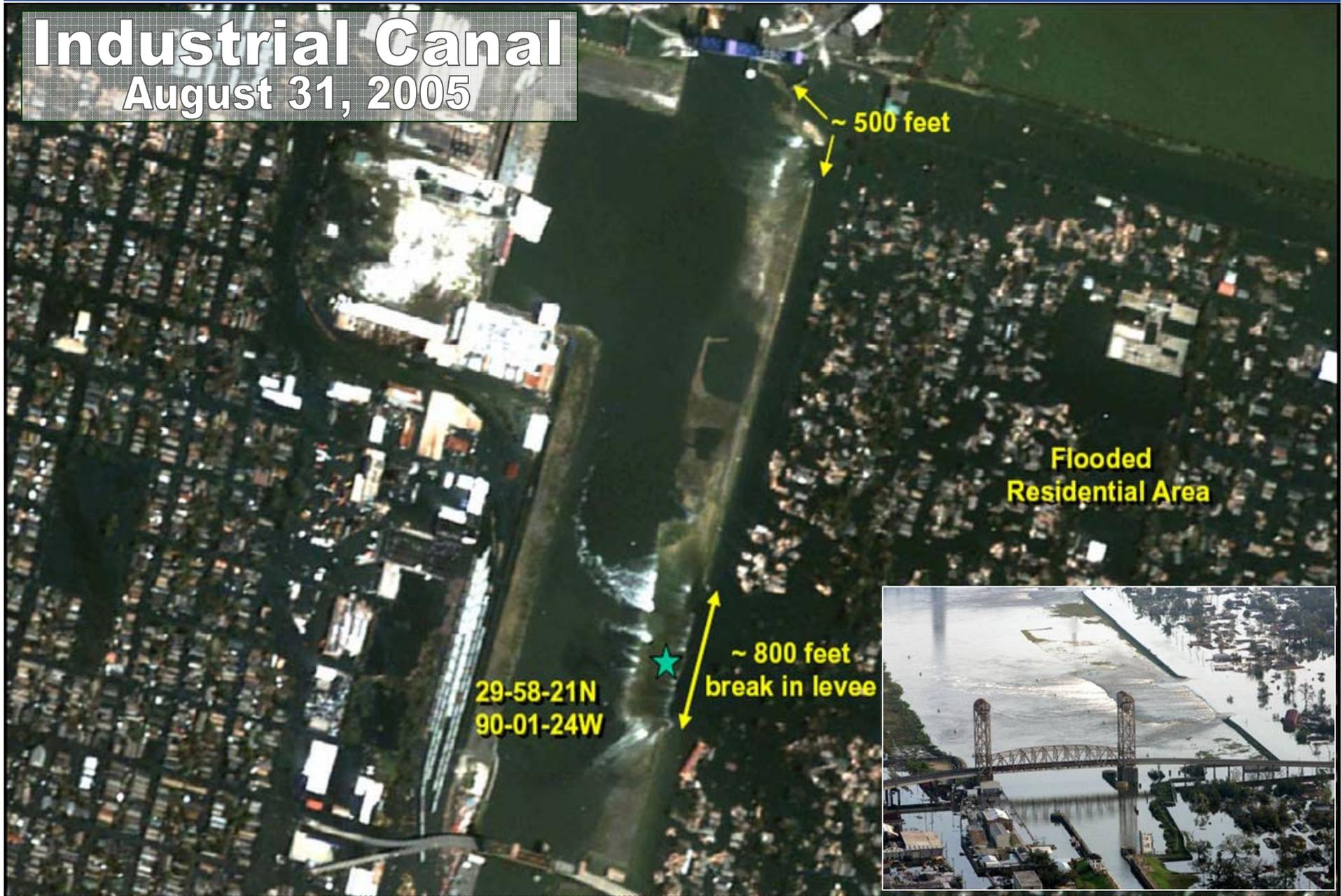
Louisiana



# Hurricane Katrina

Louisiana

**Industrial Canal**  
August 31, 2005



~ 500 feet

Flooded Residential Area

29-58-21N  
90-01-24W

~ 800 feet  
break in levee



# Hurricane Katrina

Louisiana



**9<sup>th</sup> Ward, New Orleans**

# Hurricane Katrina

Louisiana



**17<sup>th</sup> Street Canal**

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# Hurricane Katrina

## Louisiana

## U.S. Disasters

### FEMA Comparative Cost-Share Per Capita

Disaster	FEMA Cost	State Population	Cost Per Capita
Hurricane Katrina (LA) (2005)	\$43 billion	4.5 million	\$9,500
World Trade Center (2001)	\$7.4 billion	18.976 million	\$390
Northridge Earthquake (1994)	\$7.0 billion	29.760 million	\$235
Hurricane Andrew (1992)	\$1.8 billion	12.938 million	\$139
Hurricane Iniki (1992)	\$259.7 million	1.108 million	\$234
Loma Prieta Earthquake (1989)	\$867 million	23.668 million	\$ 37

# Hurricane Katrina

## Louisiana

### Costliest Atlantic Hurricanes, 1851-2004

Cost Refers To Total Estimated Property Damage

Rank	Hurricane	Year	Cost
1	Katrina	2005	\$100 billion (est. 2005/USD)
2	Andrew	1992	\$43.672 billion (2004 USD)
3	Fifi	1974	\$20 billion (2005 USD)
4	Charley	2004	\$15 billion (2004 USD)
5	Ivan	2004	\$14.2 billion (2004 USD)

Source: NOAA



# Hurricane Katrina

## Louisiana

## Local Response

Emergency responders from around the state and the country flocked to stricken South Louisiana to aid in the rescue and recovery



# Hurricane Katrina

## Louisiana

### Local Response



# Hurricane Katrina

Louisiana

## Total Grants Processed From 1991 Until Katrina

Individual Assistance

\$ 306,313,000

Public Assistance

\$ 352,410,500

Hazard Mitigation

\$ 78,401,500 (HMGP)

\$ 22,000,000 (FMA)

SBA Loans

\$ 247,401,500

Total \$1,006,626,500



\* As of July 1, 2005

# Hurricane Katrina

Louisiana



# Hurricane Katrina

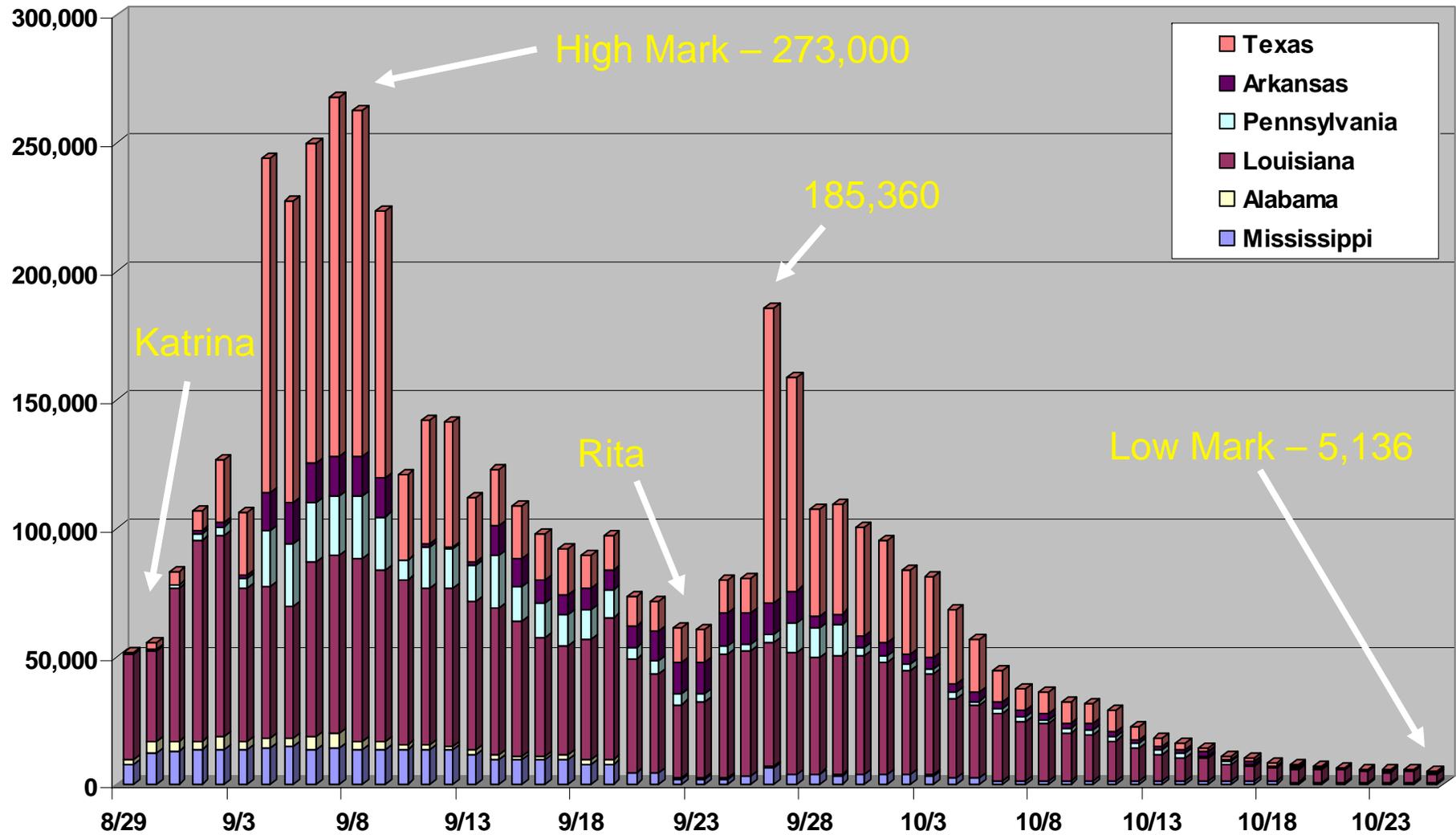
## Louisiana



# Hurricane Katrina

## Louisiana

### Total Consolidated Shelter Population



# Hurricane Katrina

## Louisiana

### Katrina - Wildlife & Fisheries



LDWF coordinated small boat rescue effort totals through peak recovery dates (As of Sep 13th)

- 400 boats (LDWF & LA State agencies) & 400 staff (LDWF)
- 392 out-of-state personnel & 274 boats
- Over 21,000 lives saved by small boat search & rescue

# Hurricane Katrina

Louisiana



# Hurricane Katrina

## Louisiana

### KATRINA Overview National Guard Search & Rescue

NATIONAL GUARD AVIATION ROLLUP FOR LOUISIANA - KATRINA							
DATE	FLIGHT HOURS	SORTIES FLOWN	CLASS I (TONS)	CARGO (TONS)	1ST CONTACT RESCUE	2ND CONTACT RESCUE	1ST + 2ND CONTACT TOTAL
29-Aug-05	195	780	4	28	2296	1970	4266
30-Aug-05	128	512	66	99	366	303	669
31-Aug-05	137	548	170	89	2304	1991	4295
01-Sep-05	219	876	248	248	2915	3529	6444
02-Sep-05	309	1236	112	167	3439	4753	8192
03-Sep-05	255	1020	105	144	4734	4258	8992
04-Sep-05	338	1352	84	147	2810	2823	5633
05-Sep-05	254	1016	140	104	3134	3519	6653
06-Sep-05	276	1104	339	195	2685	3097	5782
07-Sep-05	294	1176	166	181	4028	4263	8291
08-Sep-05	207	828	7	72	13	13	26
09-Sep-05	73	292	3	14	61	128	189
10-Sep-05	45	180	0	1	26	59	85
11-Sep-05	56	224	0	3	36	74	110
12-Sep-05	97	388	1	25	27	60	87
13-Sep-05	62	248	1	19	23	45	68
14-Sep-05	59	236	0	65	17	35	52
15-Sep-05	62	248	0	0	16	36	52
<b>TOTAL</b>	<b>3066</b>	<b>12264</b>	<b>1446</b>	<b>1601</b>	<b>28894</b>	<b>30956</b>	<b>59,886</b>
DEFINITION		# OF MISSIONS FLOWN BY A CREW	WATER/MEALS	CLASS III/VII/VIII/IX	AIRCREW WAS THE FIRST RESPONDER TO RESCUE CITIZENS OR EVACUATE MEDICAL PATIENTS	AIRCREW TRANSPORTED CITIZENS TO AN EVACUATION POINT AFTER INITIAL RESCUE	

# Hurricane Katrina

Louisiana



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# Hurricane Katrina

## Louisiana

## KATRINA Overview Coast Guard

This was the largest search & rescue operation in United States history

In the southeast region of Louisiana USCG S&R

- ✓ 7,723 rescued by air resources
- ✓ 11,584 rescued by surface resources

19,307 Total USCG S&R

- ✓ 9,403 patients evacuated from hospitals
- ✓ Katrina created a 90,000 square-mile area of destruction in Mississippi & Louisiana, an area larger than the size of Great Britain
- ✓ At the height of rescue operations there were at least 43 Coast Guard helicopters, 8 fixed-wing aircraft, 14 Auxiliary craft, 27 cutters & hundreds of small boats assisting in rescue & recovery operations
- ✓ Approximately 1/3 of the Coast Guard's entire air fleet was deployed to the region to support rescue operations in the immediate aftermath of the storm

# Hurricane Katrina

Louisiana

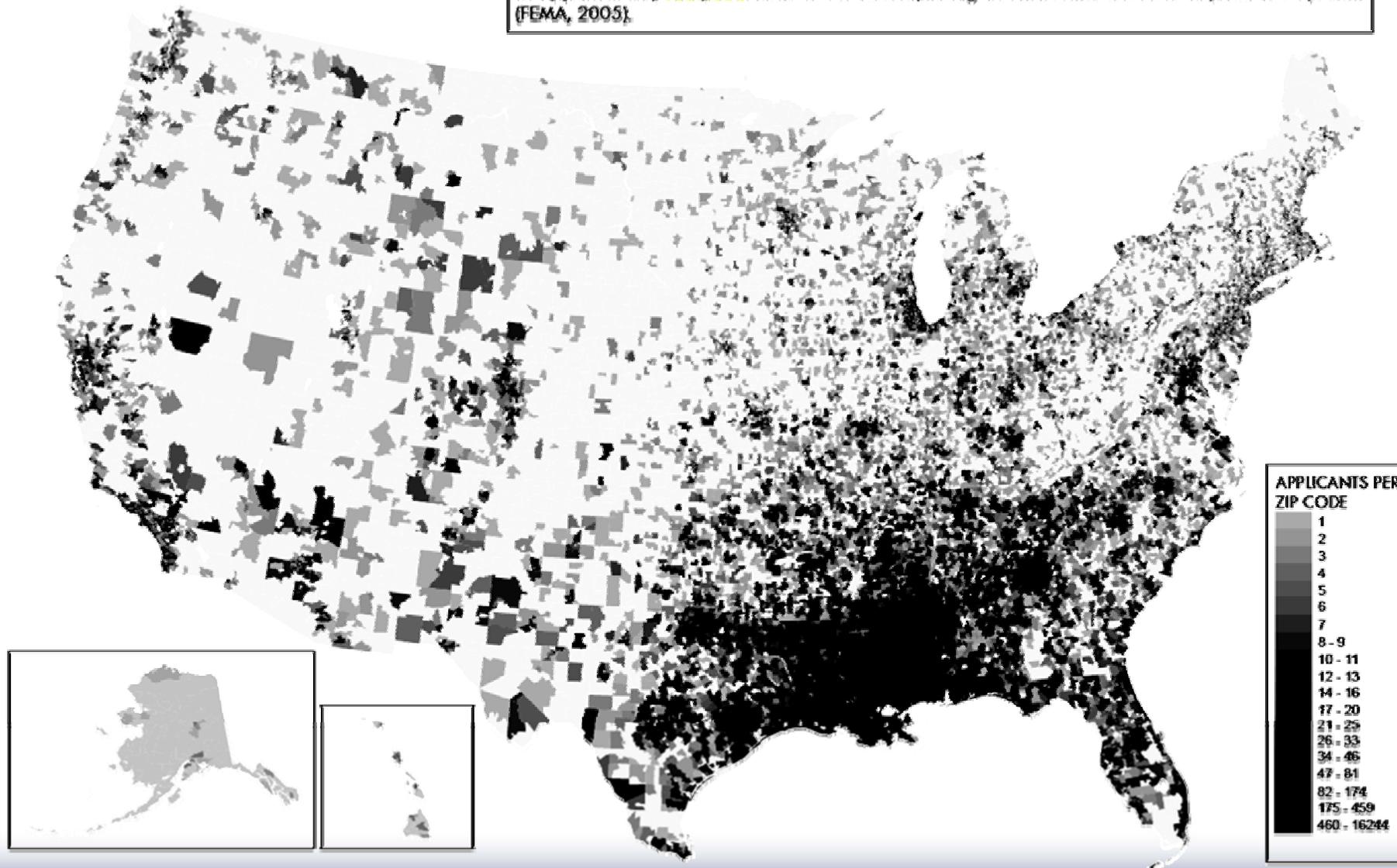


# Hurricane Katrina

## Louisiana

### LOUISIANA DIASPORA

The number of people displaced by Hurricane Katrina is staggering. Using information collected by the Federal Emergency Management Agency, the map below depicts the evacuated location (by ZIP code) of approximately 800,000 Louisiana citizens requesting federal assistance as of September 20, 2005 (FEMA, 2005).



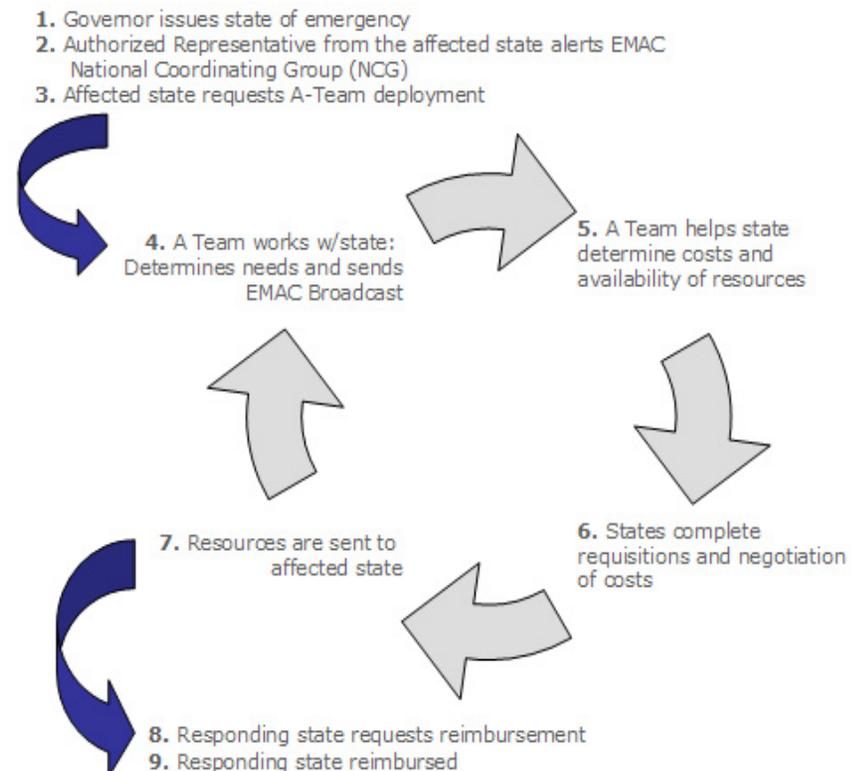
# Hurricane Katrina

## Louisiana

## Emergency Management Assistance Compact (EMAC)

The Emergency Management Assistance Compact, is a congressionally ratified organization that provides form & structure to interstate mutual aid.

Through EMAC, a disaster impacted state can request & receive assistance from other member states quickly & efficiently, resolving two key issues upfront: liability & reimbursement.



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# Hurricane Katrina

Louisiana

## Emergency Management Assistance Compact (EMAC)

NG Missions	547
Civilian Missions	449
<b>Missions To Date</b>	<b>996</b>
EMAC Personnel Total	38,158
Civilian Dollars	\$129,855,484
National Guard Dollars	\$308,235,927
<b>Total Katrina Dollars</b>	<b>\$438,091,411</b>

# Hurricane Katrina

## Louisiana

### Emergency Management Compact Civilian Personnel

42 States Responded.....Total: 8,118

Alabama	147	Kentucky	352	Oklahoma	38
Arizona	115	Maine	112	Oregon	60
Arkansas	200	Maryland	177	Pennsylvania	114
California	339	Massachusetts	10	Rhode Island	21
Colorado	136	Michigan	170	S. Carolina	98
Connecticut	5	Minnesota	422	S. Dakota	5
Delaware	9	Missouri	33	Tennessee	37
Florida	31	N. Carolina	57	Texas	478
Georgia	454	Nevada	44	Utah	20
Idaho	4	New Jersey	638	Vermont	3
Illinois	1691	New Mexico	144	Virginia	144
Indiana	126	New York	1403	W. Virginia	15
Iowa	33	North Dakota	17	Washington	25
Kansas	16	Ohio	175	Washington D.C.	

# Hurricane Katrina

## Louisiana

### Out-Of-State Military Personnel

51 States Or Territories Responded.....Total: 27,533

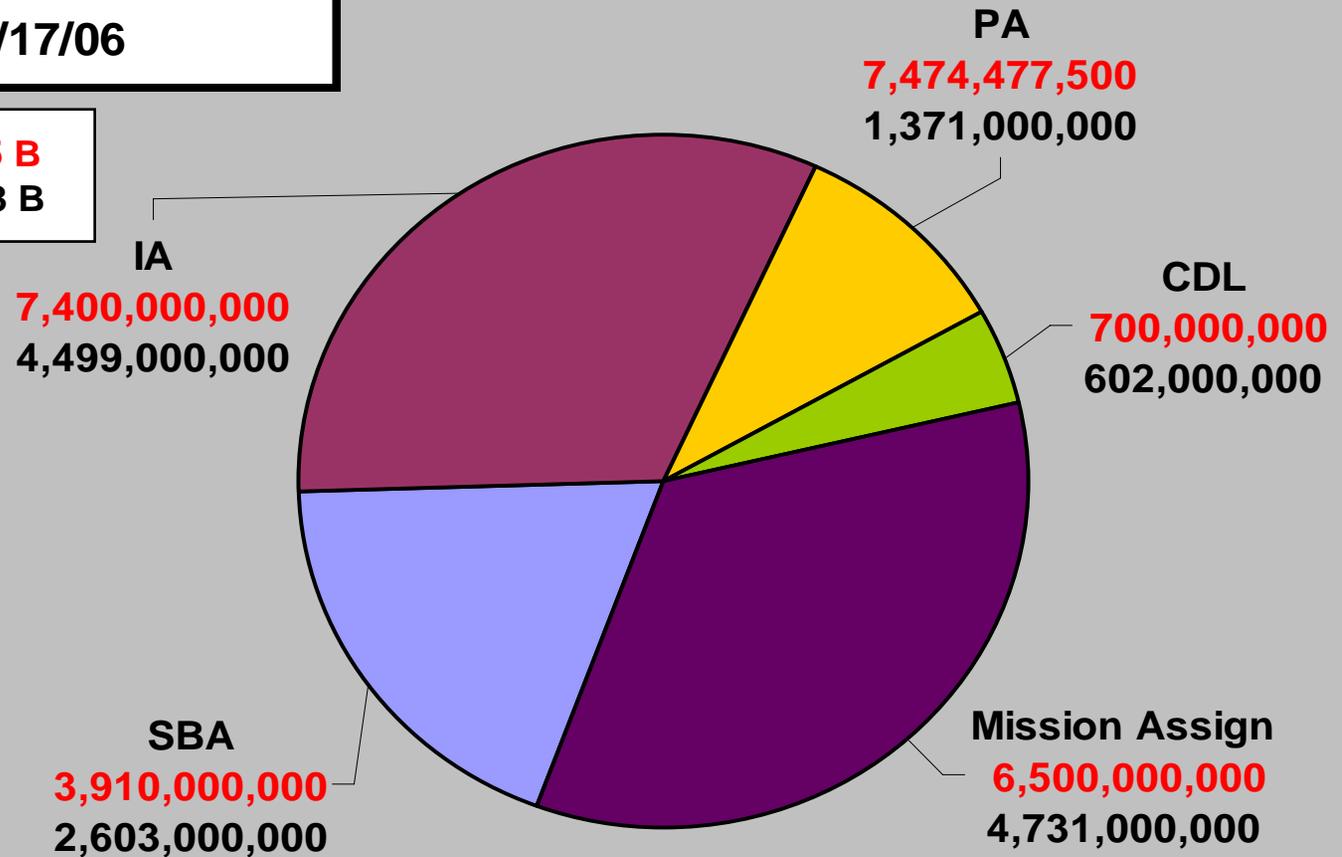
Alaska	6	Maryland	279	Oregon	1919
Alabama	769	Massachusetts	700	Pennsylvania	2432
Arizona	387	Michigan	334	Puerto Rico	17
Arkansas	767	Minnesota	9	Rhode Island	175
California	2522	Mississippi	4	S. Carolina	668
Colorado	887	Missouri	2153	S. Dakota	270
Connecticut	295	Montana	20	Tennessee.	519
Delaware	48	N. Carolina	1014	Texas	2538
Florida	37	Nebraska	291	US Virgin Islands	150
Georgia	296	Nevada	282	Utah	443
Idaho	1	New Hampshire	579	Vermont	102
Illinois	1168	New Jersey	194	Virginia	536
Indiana	787	New Mexico	91	W. Virginia	574
Iowa	1	New York	36	Washington	396
Kansas	454	NGB	2	Washington D.C.	503
Kentucky	590	Ohio	394	Wisconsin	550
Maine	173	Oklahoma	171	Wyoming	10

# Hurricane Katrina

## Louisiana

**LA Money Approved 1603/1607**  
**As of: 2/17/06**

**Total Projected: \$ 32.5 B**  
**Total Approved: \$ 13.8 B**



# Projected Hazard Mitigation Funds

\$ 2,000,000,000 +

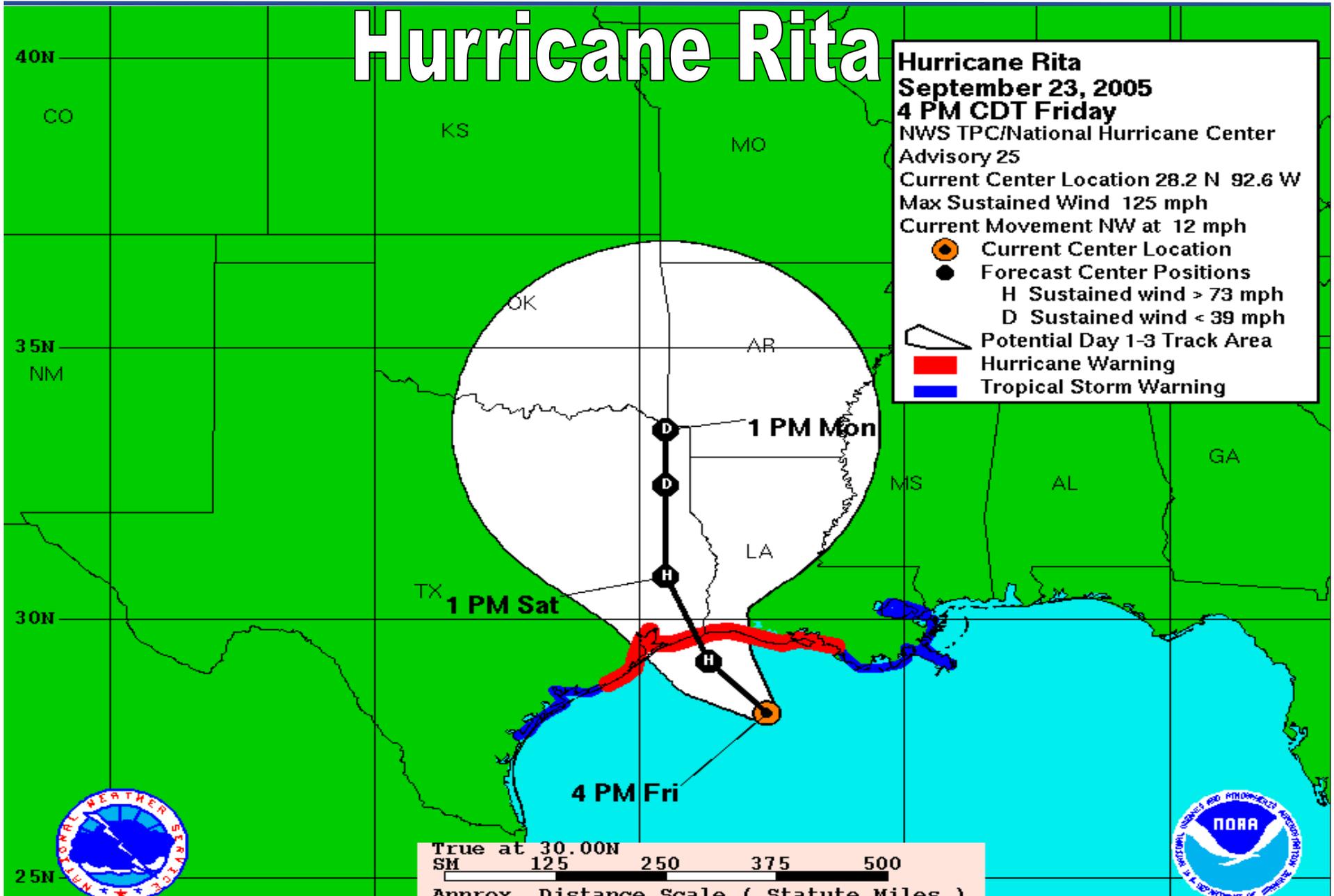
# Hurricane Katrina

Louisiana

# Hurricane Rita

**Hurricane Rita**  
**September 23, 2005**  
**4 PM CDT Friday**  
NWS TPC/National Hurricane Center  
Advisory 25  
Current Center Location 28.2 N 92.6 W  
Max Sustained Wind 125 mph  
Current Movement NW at 12 mph

- Current Center Location
- Forecast Center Positions
  - H Sustained wind > 73 mph
  - D Sustained wind < 39 mph
- ▭ Potential Day 1-3 Track Area
- Hurricane Warning
- Tropical Storm Warning

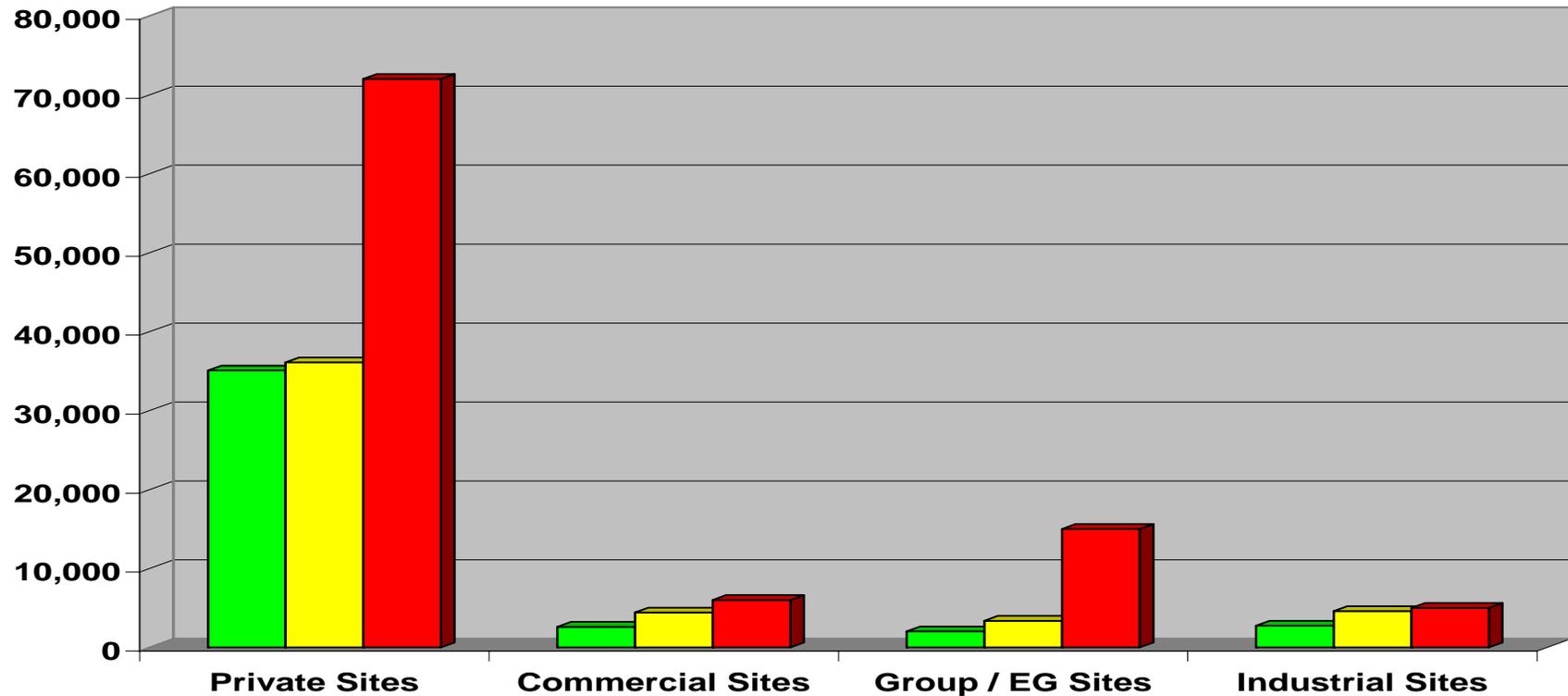


# Hurricane Katrina

## Louisiana

### Louisiana Transitional Housing Status (Estimated Requirement of 98,000 Units)

Updated Through  
February 18, 2006 1800

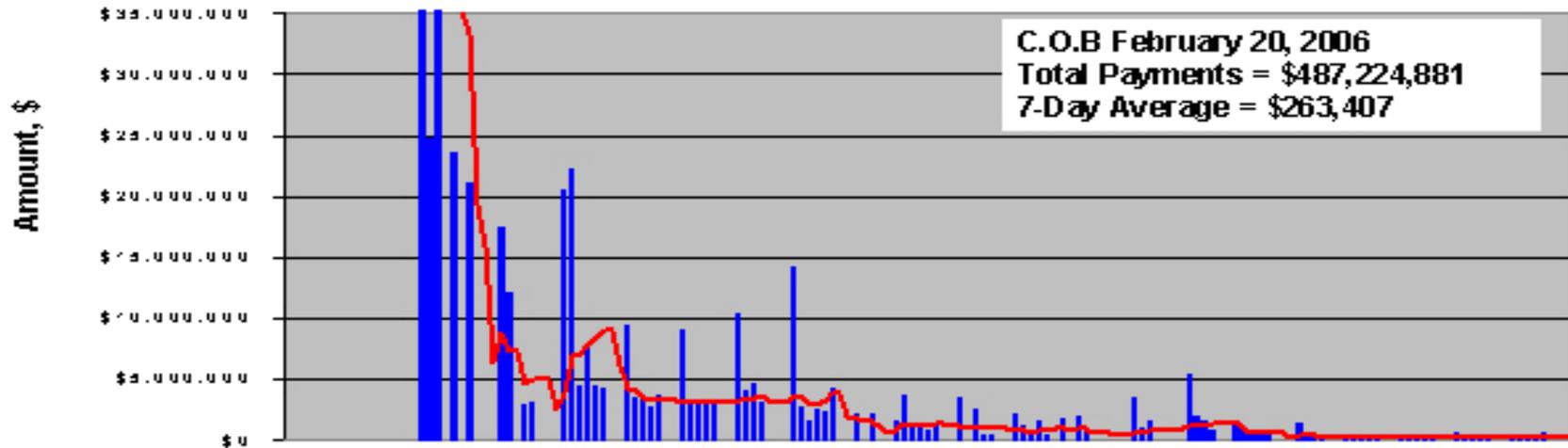


■ Occupied	TT	34,146	1,570	2,029	2,675	40,420
	MH	927	1,041	0	72	2,040
	Total	35,073	2,611	2,029	2,747	42,460
■ RFO	TT	35,175	2,425	3,371	4,517	45,488
	MH	927	1,993	0	72	2,992
	Total	36,102	4,418	3,371	4,589	48,480
■ Est. Requirement		72,000	6,000	15,000	5,000	98,000

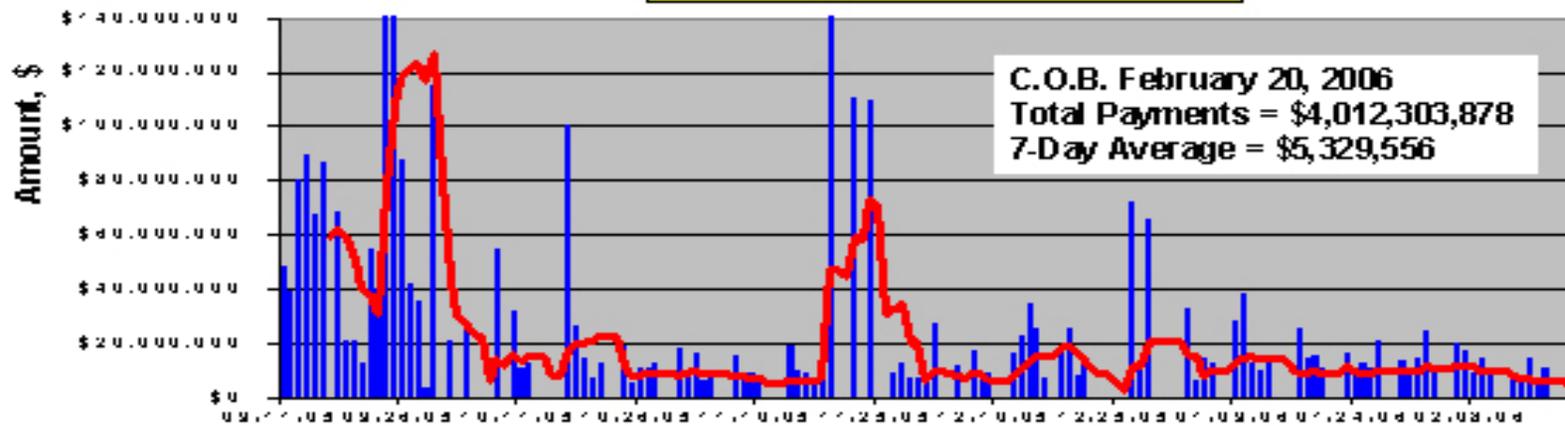
# Hurricane Katrina

## Louisiana

Rita IA Payments (HA+ONA)



Katrina IA Payments (HA+ONA)



# Hurricane Katrina

## Louisiana

### Estimated Housing Units Damaged / Destroyed MAJOR / SEVERE ONLY

#### **KATRINA**

Major Damage	126,900
Severe Damage	237,200

#### **RITA**

Major Damage	12,700
Severe Damage	3,750

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<b>TOTAL</b>	<b>380,600</b>
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Source: Real Property Damage Estimates from FEMA December 15, 2005 Data Extract

Note: FEMA Housing inspections are not complete; these numbers are estimates subject to future revision

# Hurricane Katrina

## Louisiana

## Public Assistance

34,403,281 cubic yards debris removed

63.2 million cy est.; 54% complete\*

80,984 blue roofs installed

82,000 est.; 98% Complete

13,119,300 pounds of Household Hazardous Waste removed

20 million pounds est.; 63% complete

313,266 Whitegoods removed

500,000 est.; 63% complete

As of Feb. 21, 2006

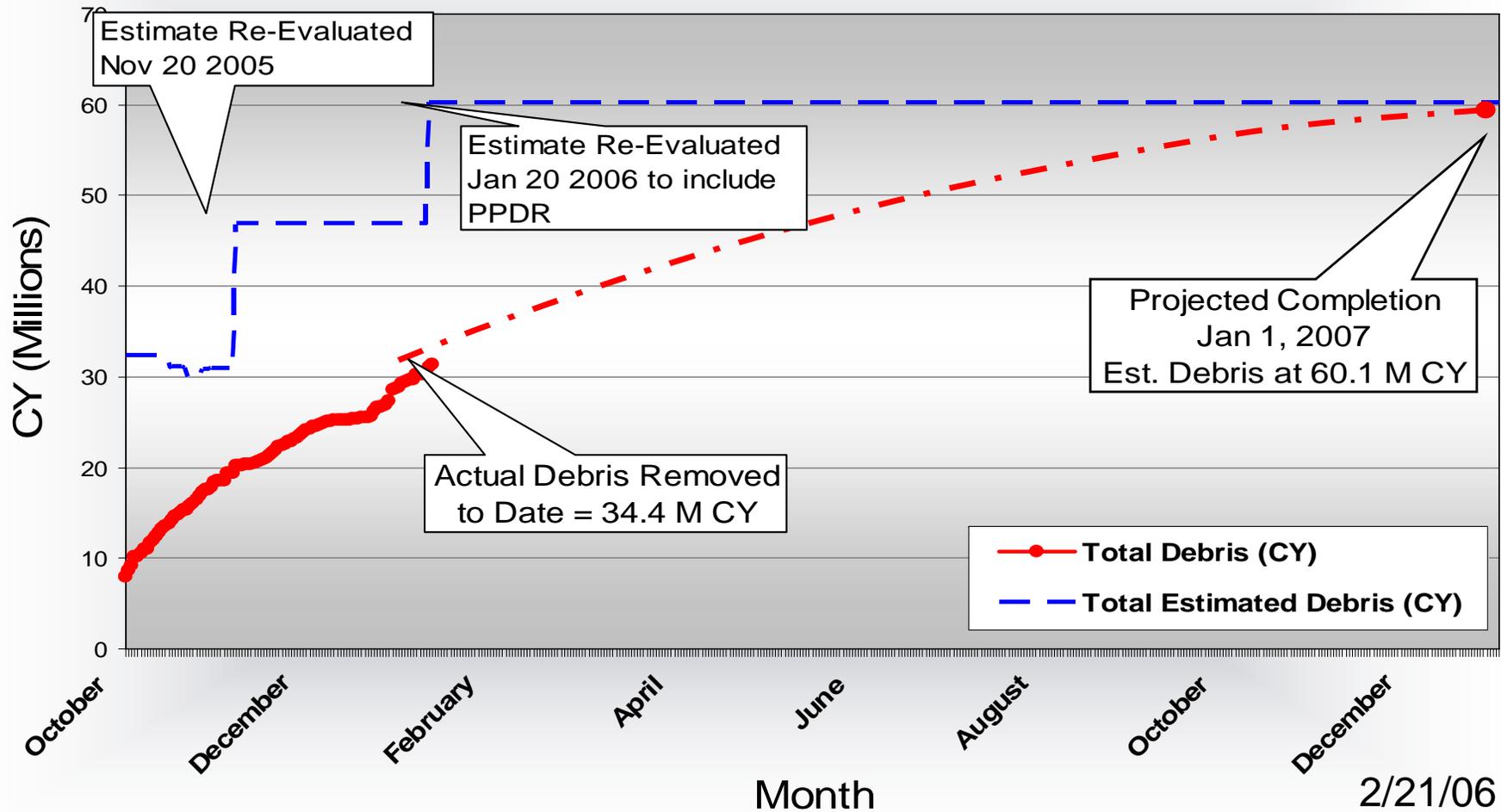
\*Excludes Demolition



# Hurricane Katrina

## Louisiana

### Total Debris Removed Vs. Estimated Debris (Curbside & PPDR)



# Hurricane Katrina

## Louisiana

### Infrastructure Funds Overview

As of February 22, 2006

	Parameter	Amount Expected	Amount To Date	Change	Percent Complete
<b>KATRINA</b>	Money Obligated	\$6,710,000,000	\$1,351,444,921	—	20.1%
	Project Worksheets	12,500	2,915	80	23.3%
<b>RITA</b>	Money Obligated	\$675,500,000	\$65,723,340	\$1,146,560	9.7%
	Project Worksheets	3,400	1332	51	39.2%

# Hurricane Katrina

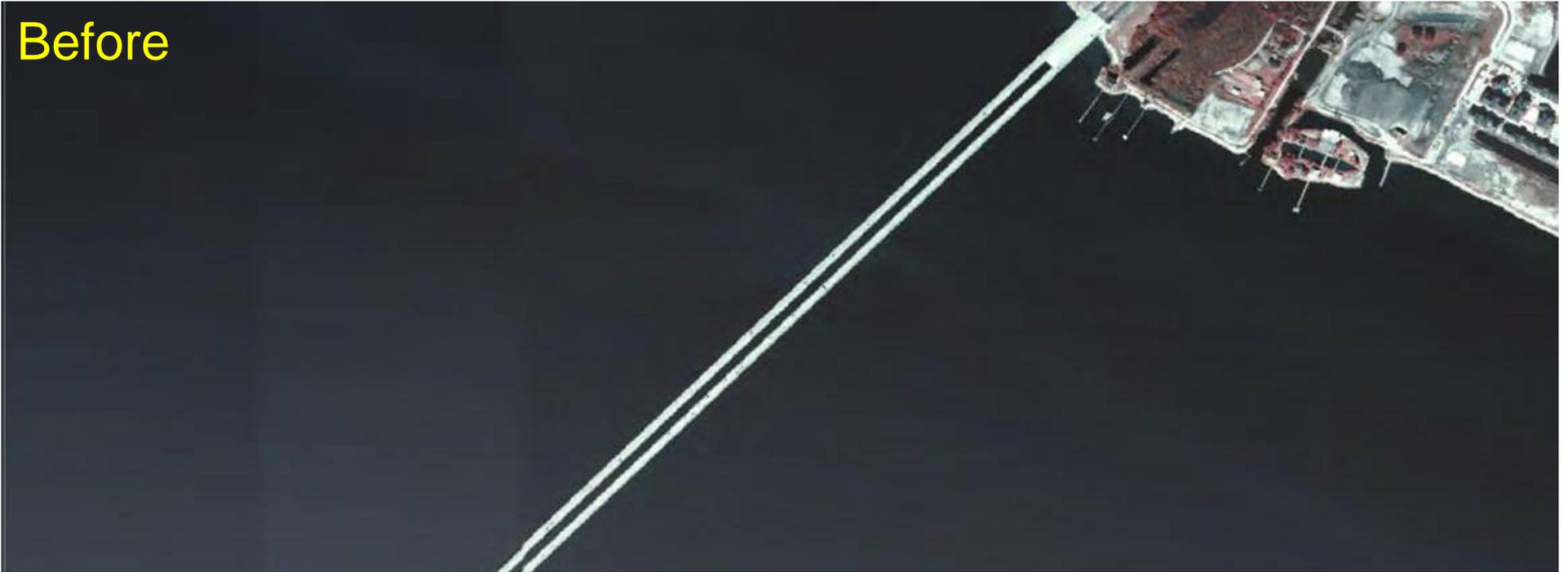
Louisiana



## Economic Impact

- ✓ Insurance Losses: Estimated at \$20.8 billion
- ✓ Destroyed Motor Vehicles
  - Estimated at 300,000 to 350,000
- ✓ Direct Tourism Dollars Lost: \$1 billion by Dec. 31
- ✓ LA Department of Revenue is reporting a loss of \$1 billion for 2005
- ✓ Businesses Damaged or Destroyed - nearly 71,000
  - 4 in 10 of the state's businesses were damaged or destroyed by the storms (SBA)
  - 90% of the affected businesses are small businesses
  - Represents about 30% of State's total economy

Before



## Economic Impact

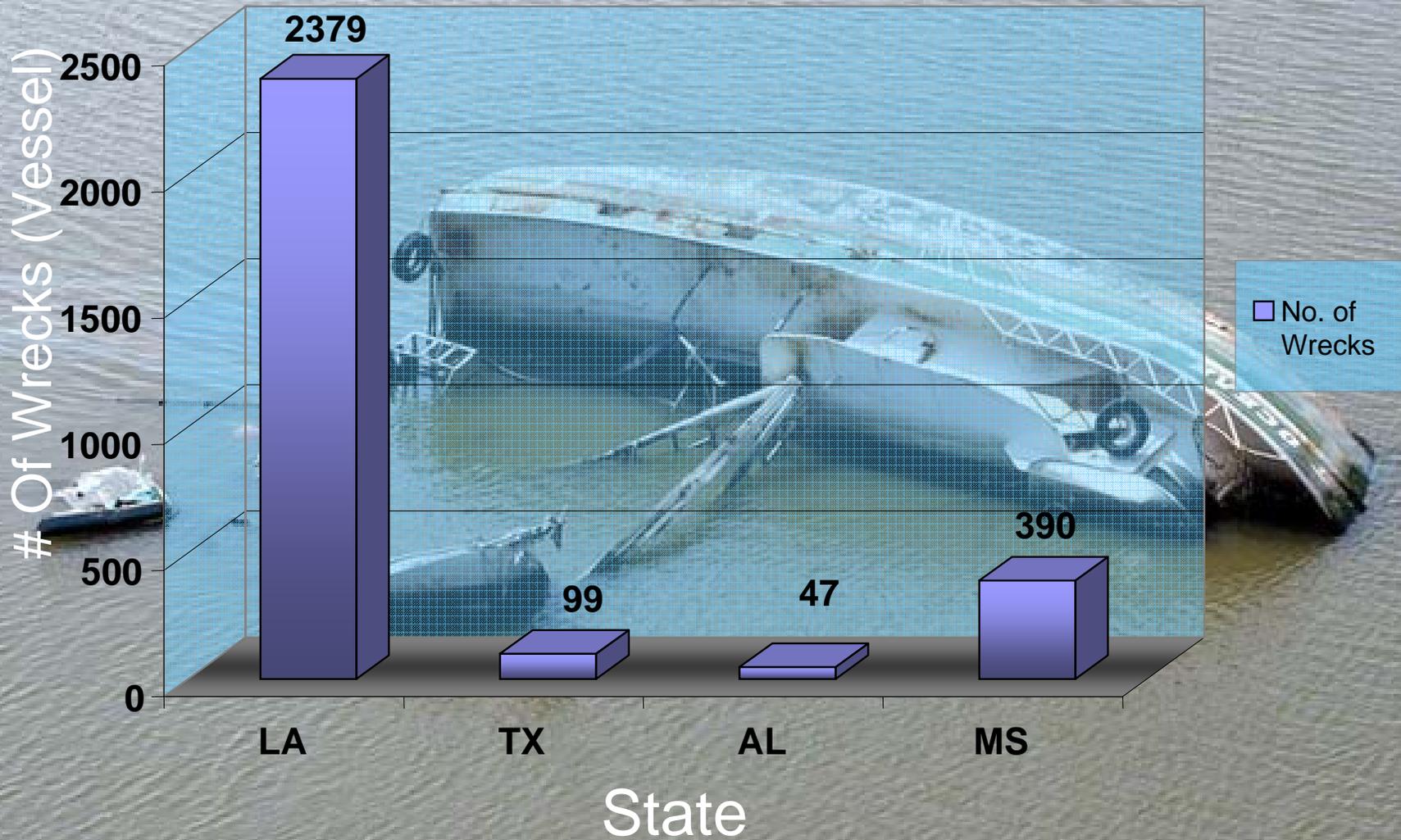
Expected Stafford Act Expenditures \$40 billion or \$8,300 per capita for every man, woman & child in Louisiana

- ✓ Roads & Bridge Infrastructure Damages - estimated at \$5.5 Billion (DOTD)
- ✓ The Office of Fisheries preliminary revenue loss estimates
  - Potential \$1.29 billion loss in retail fisheries revenue over the next year related to Hurricane Katrina damages
  - Amount increases to \$1.3 billion when 2-year retail oyster sales losses are added
  - Over \$400 million in estimated losses for the recreational fishing industry

# Hurricane Katrina

## Louisiana

### Number Of Wrecked Vessels By State



# Hurricane Katrina

## Louisiana

### Utilities

- ✓ Entergy - 1.1 Million Customers Affected
  - Estimated 123,000 customers in New Orleans area received substantial structural or flood damage
  - May not be able to take power for some time
- ✓ Cleco - 80,800 Customers Affected
  - St. Tammany & Washington Parishes
- ✓ BellSouth Telephone - 58.21% of lines out-of-service



# Hurricane Katrina

## Louisiana

### Oil & Gas

- ✓ Loss in oil production from Aug 26 - Nov 10
  - 82,735,894 barrels or just over 15% of Gulf annual production
- ✓ Natural Gas loss Aug 26 - Nov 10
  - 426.43 billion cubic feet or almost 12% of Gulf annual production



# Hurricane Katrina

## Louisiana

## Oil Spills

The total volume spilled throughout the impacted areas was 8 million gallons and more than one million gallons at Murphy...Exxon Valdez was 11 million gallons.



# Hurricane Katrina

Louisiana



# Aftermath

# Hurricane Katrina

Louisiana



**Slidell, St. Tammany Parish**

# Hurricane Katrina

Louisiana



**St. Bernard Parish**

# Hurricane Katrina

Louisiana



**Plaquemines Parish**

# Hurricane Katrina

Louisiana



**9<sup>th</sup> Ward, New Orleans**

# Hurricane Katrina

Louisiana



**Lake Shore (17<sup>th</sup> St Canal), New Orleans**

# Hurricane Katrina

Louisiana

## Coastal Erosion - Chandeleur Islands

