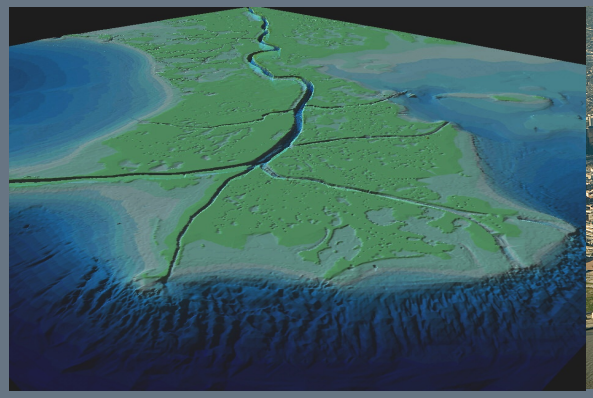
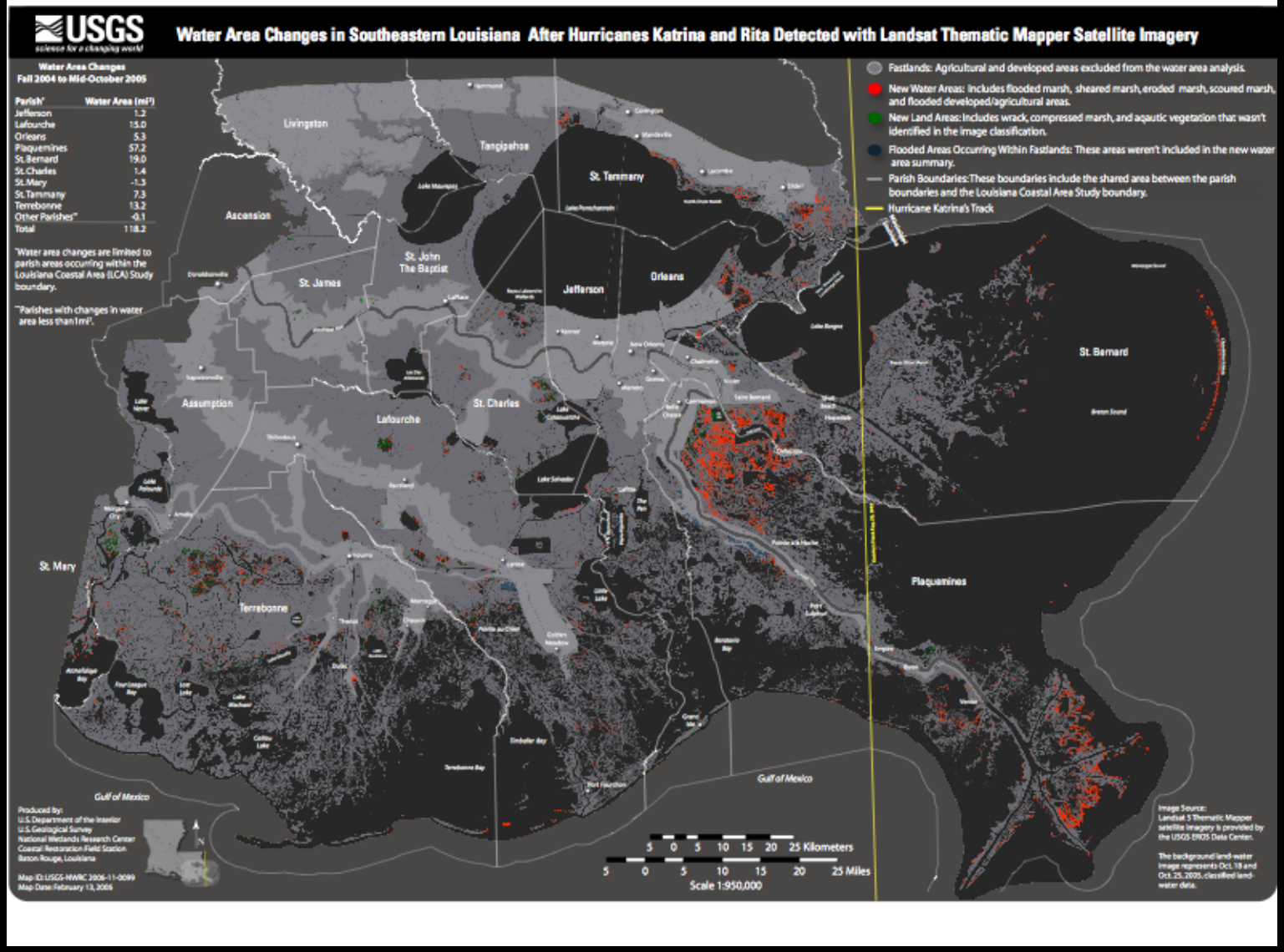


Facing Hurricanes: What Have We Learned?: A Hint of Room 4 "Changing the Game"

Douglas J. Meffert, D. Env., MBA
Deputy Director for Policy, Tulane/Xavier Center for Bioenvironmental Research
Associate Professor, Payson Center for International Development

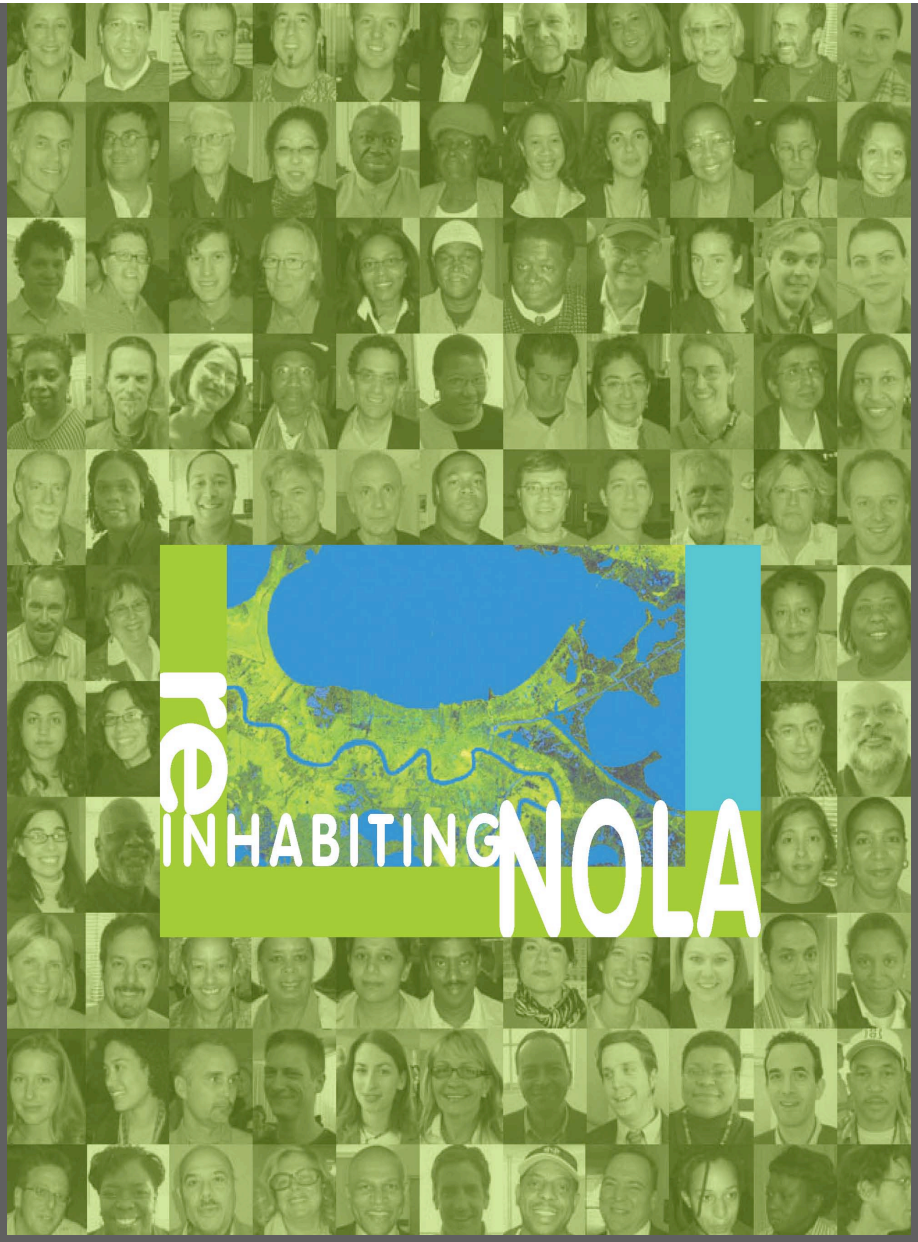
Hurricane Science and Education Symposium
25 October 2010
New Orleans, LA



217 square miles (562 km^2) of wetland to water conversion

$1.1 billion acute loss to commercial fisheries

$150 million near-term loss to oyster harvests



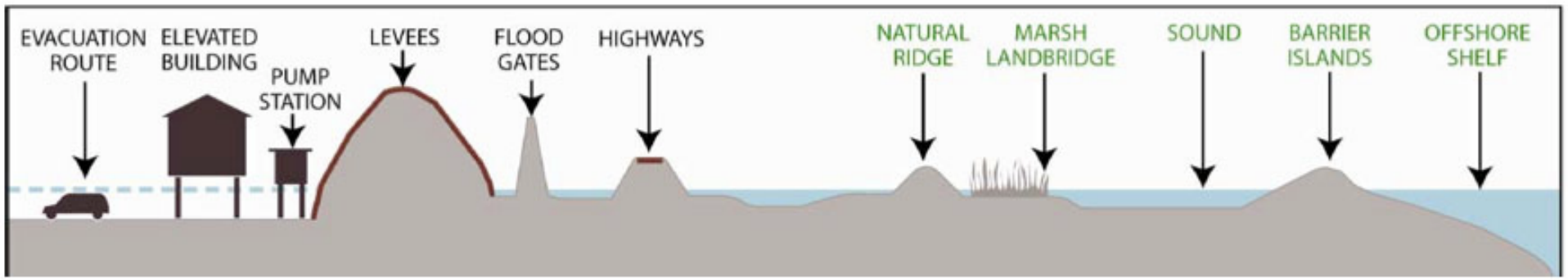
What residents care about:

1. Natural Systems
2. Buildings &Infrastructure
3. Public Health
4. Social & Political

For report and other info:
dmeffert@tulane.edu

A Tulane Community Workshop Held in New Orleans, November 2005

Cross-Section of Urban, Rural, and Natural Land Forms



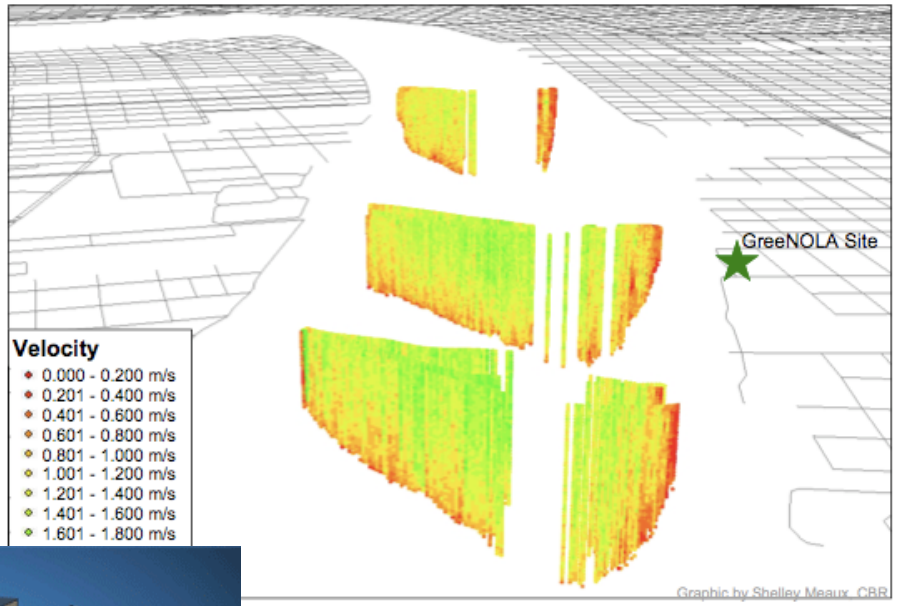
Multiple Lines of Defense Concept (Courtesy of the Lake Pontchartrain Basin Foundation)

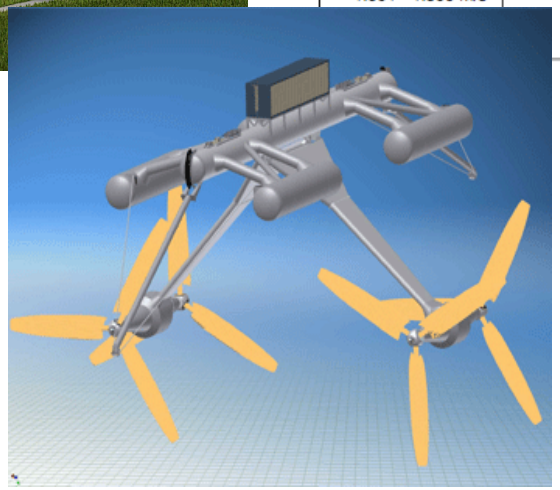
Holy Cross/Lower 9th
Sustainable Restoration Planning

Community Planning Workshops:

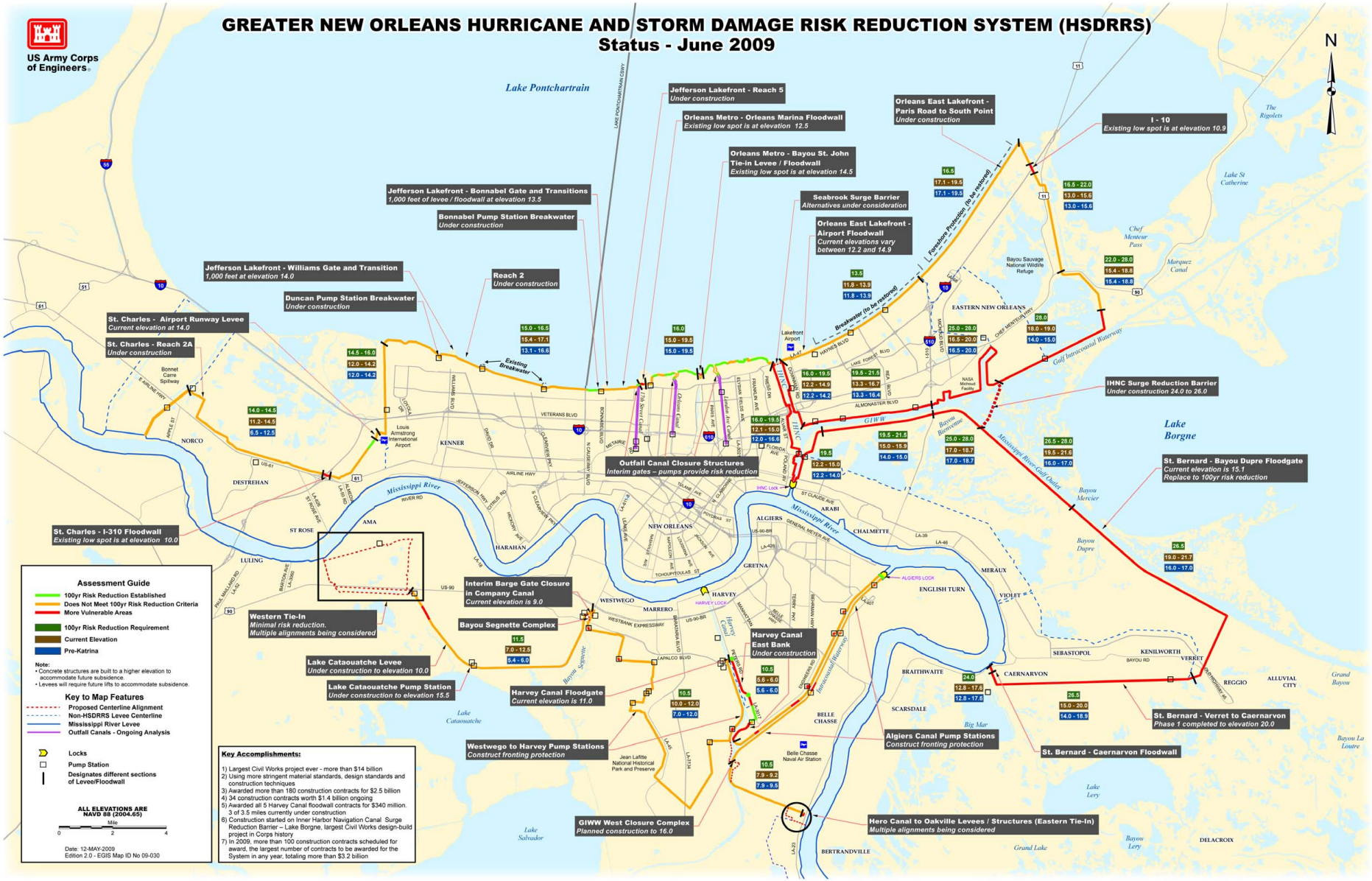
- February 20-21, 2006
- April 28-29, 2006
- June - August, 2006
- October 2006- January 2007

Sustainable Built and Natural Systems
Models for Efficient/Renewable Energy

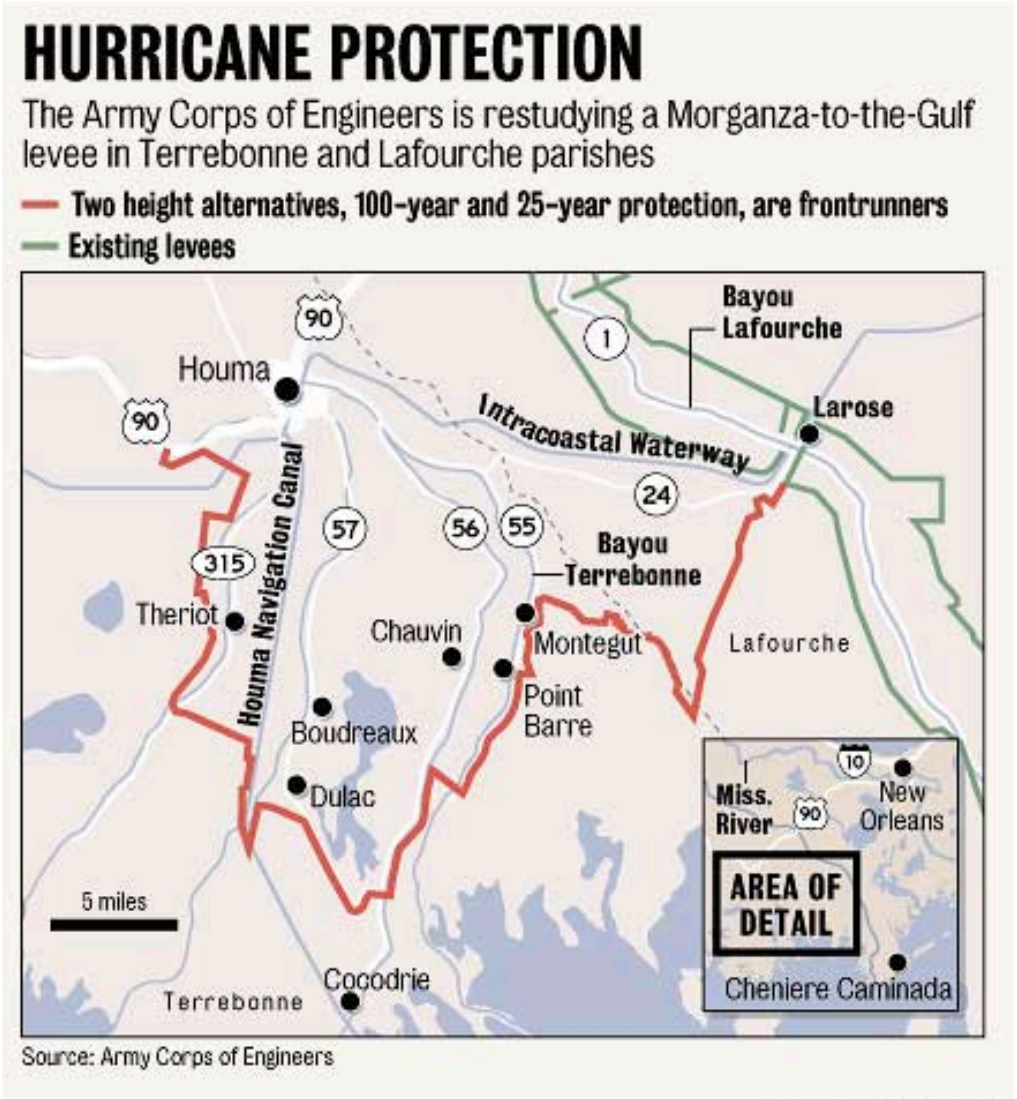




CENTER FOR BIOENVIRONMENTAL RESEARCH
at Tulane and Xavier Universities

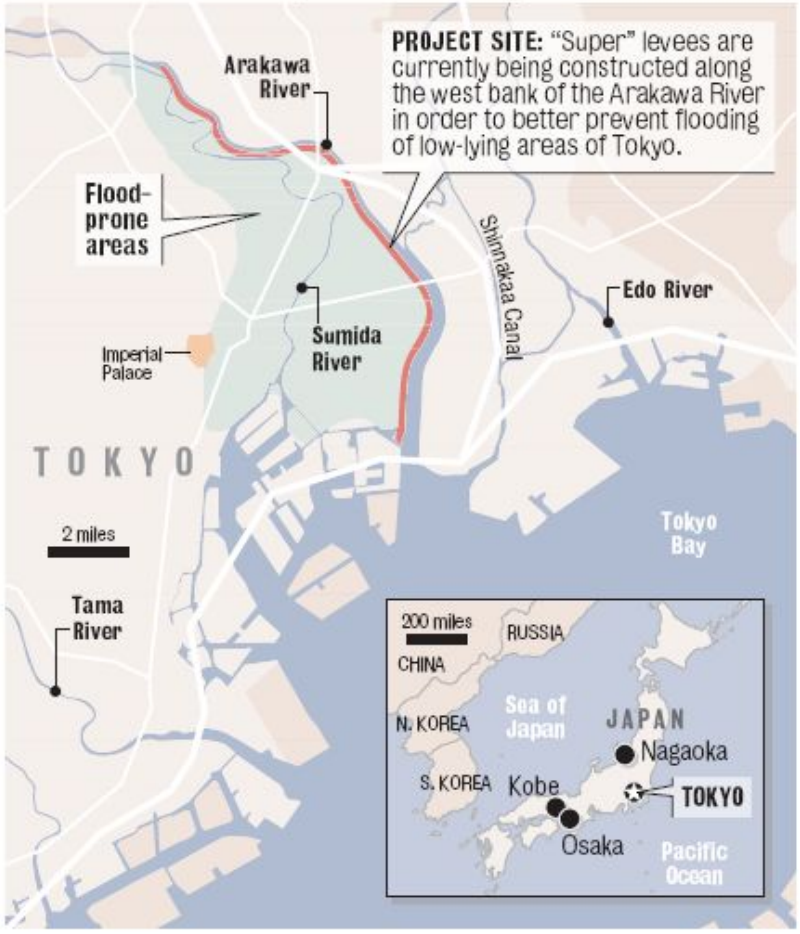

US Army Corps of Engineers
GREATER NEW ORLEANS HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM (HSDRRS)
Status - June 2009
N
Lake Pontchartrain
Jefferson Lakefront - Reach 5
Under construction
Orleans Metro - Orleans Marina Floodwall
Existing low spot is at elevation 12.5
Orleans East Lakefront - Paris Road to South Point
Under construction
I - 10
Existing low spot is at elevation 10.9
Orleans Metro - Bayou St. John Tie-in Levee / Floodwall
Existing low spot is at elevation 14.5
Jefferson Lakefront - Bonnabel Gate and Transitions
1,000 feet of levee / floodwall at elevation 13.5
Seabrook Surge Barrier
Alternatives under consideration
Bonnabel Pump Station Breakwater
Under construction
Orleans East Lakefront - Airport Floodwall
Current elevations vary between 12.2 and 14.9
Jefferson Lakefront - Williams Gate and Transition
1,000 feet at elevation 14.0
Reach 2
Under construction
Duncan Pump Station Breakwater
Under construction
St. Charles - Airport Runway Levee
Current elevation at 14.0
St. Charles - Reach 2A
Under construction
Outfall Canal Closure Structures
Interim gates – pumps provide risk reduction
IHNC Surge Reduction Barrier
Under construction 24.0 to 26.0
St. Bernard - Bayou Dupre Floodgate
Current elevation is 15.1
Replace to 100yr risk reduction
St. Charles - I-310 Floodwall
Existing low spot is at elevation 10.0
Interim Barge Gate Closure in Company Canal
Current elevation is 9.0
Western Tie-In
Minimal risk reduction.
Multiple alignments being considered
Bayou Segnette Complex
Harvey Canal East Bank
Under construction
Lake Cataouatche Levee
Under construction to elevation 10.0
Lake Cataouatche Pump Station
Under construction to elevation 15.5
Harvey Canal Floodgate
Current elevation is 11.0
Westwego to Harvey Pump Stations
Construct fronting protection
Algiers Canal Pump Stations
Construct fronting protection
St. Bernard - Caernarvon Floodwall
St. Bernard - Verret to Caernarvon
Phase 1 completed to elevation 20.0
GIWW West Closure Complex
Planned construction to 16.0
Hero Canal to Oakville Levees / Structures (Eastern Tie-In)
Multiple alignments being considered
Assessment Guide
100yr Risk Reduction Established
Does Not Meet 100yr Risk Reduction Criteria
More Vulnerable Areas
100yr Risk Reduction Requirement
Current Elevation
Pre-Katrina
Note:
• Concrete structures are built to a higher elevation to accommodate future subsidence.
• Levees will require future lifts to accommodate subsidence.
Key to Map Features
Proposed Centerline Alignment
Non-HSDRRS Levee Centerline
Mississippi River Levee
Outfall Canals - Ongoing Analysis
Locks
Pump Station
Designates different sections of Levee/Floodwall
ALL ELEVATIONS ARE NAVD 88 (2004.65)
Mile
0 2 4
Date: 12-MAY-2009
Edition 2.0 - EGIS Map ID No 09-030
Key Accomplishments:
1) Largest Civil Works project ever - more than $14 billion
2) Using more stringent material standards, design standards and construction techniques
3) Awarded more than 180 construction contracts for $2.5 billion
4) 34 construction contracts worth $1.4 billion ongoing
5) Awarded all 5 Harvey Canal floodwall contracts for $340 million. 3 of 3.5 miles currently under construction
6) Construction started on Inner Harbor Navigation Canal Surge Reduction Barrier – Lake Borgne, largest Civil Works design-build project in Corps history
7) In 2009, more than 100 construction contracts scheduled for award, the largest number of contracts to be awarded for the System in any year, totaling more than $3.2 billion
Lake Borgne
Mississippi River
Gulf Intracoastal Waterway
GIWW
IHNC
Bayou Segnette
Lake Cataouatche
Lake Salvador
Lake Pontchartrain
Lake Lery
Grand Lake
Big Mar
Bayou La Loutre
Bayou Dupre
Bayou Mercier
Bayou Bienvenue
Grand Bayou
The Rigolets
Lake St Catherine
Chef Menteur Pass
Marquez Canal
Bayou Sauvage National Wildlife Refuge
Jean Lafitte National Historical Park and Preserve
Belle Chasse Naval Air Station
NASA Michoud Facility
Lakefront Airport
Louis Armstrong International Airport
Bonnet Carre Spillway
NEW ORLEANS
EASTERN NEW ORLEANS
KENNER
METAIRIE
ALGIERS
ARABI
CHALMETTE
MERAUX
VIOLET
ENGLISH TURN
GRETNA
HARVEY
MARRERO
WESTWEGO
HARAHAN
ST ROSE
AMA
LULING
DESTREHAN
NORCO
BRAITHWAITE
CAERNARVON
SEBASTOPOL
KENILWORTH
VERRET
REGGIO
ALLUVIAL CITY
SCARSDALE
BELLE CHASSE
BERTRANDVILLE
DELACROIX

Proposed Morganza to Gulf Regional Levee



TAMING TOKYO'S RIVERS

The Arakawa River used to follow the course of what's now called the Sumida River before a new channel was dug by the Japanese government in the early 1900s to ease flooding. "Super" levees are now planned for about 75 miles of Tokyo riverfront with about 10 percent of the work complete or under way.



Source: Arakawa-Karyu River Office – Ministry of Land, Infrastructure and Transport, staff research

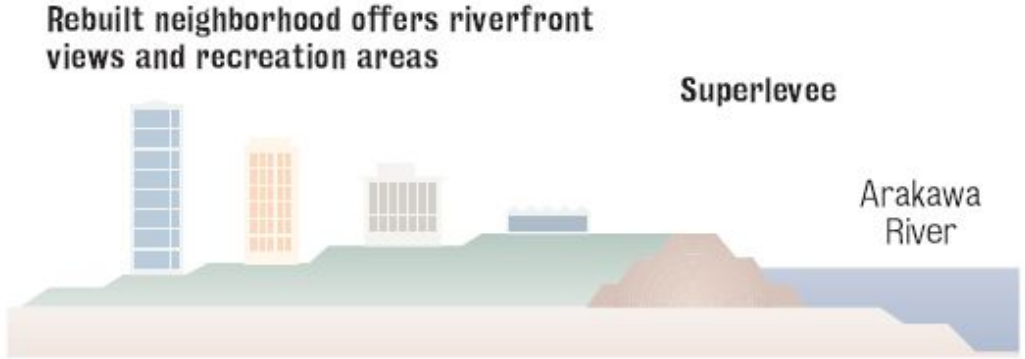
STAFF GRAPHIC BY EMMETT MAYER III

TRADITIONAL EARTHEN LEVEE

Designed to prevent rising river water from heavy rains or storm surge from flooding parts of the city. Earthen levees can sometimes fail due to overtopping or seepage.

SUPERLEVEE

Roughly the same height as an earthen levee, but much wider, it slopes gradually back into the neighborhood. The Japanese government believes superlevees offer superior lateral strength that is more resistant to overtopping failure, seepage or earthquake damage.

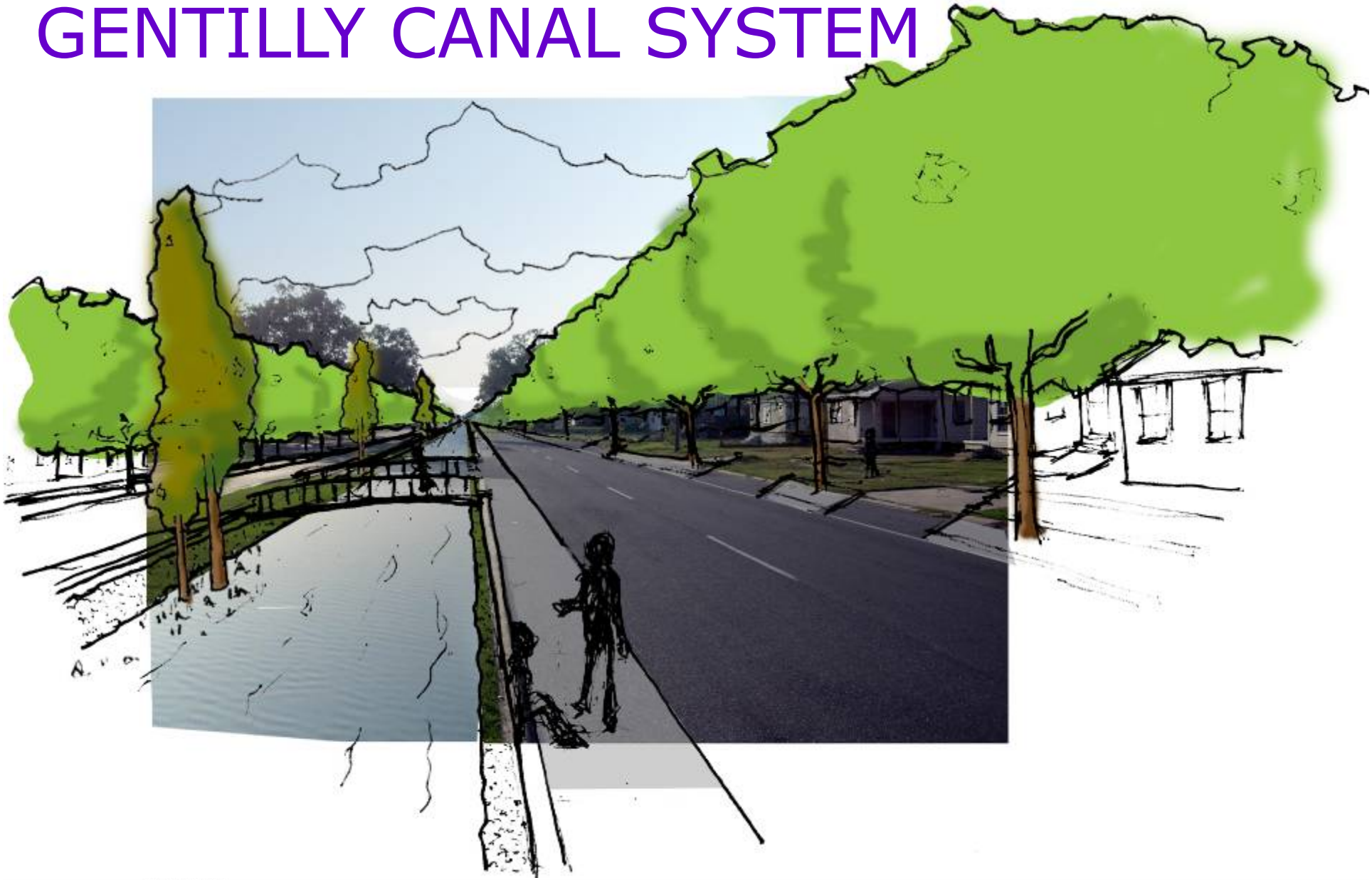



30
大型車は通行

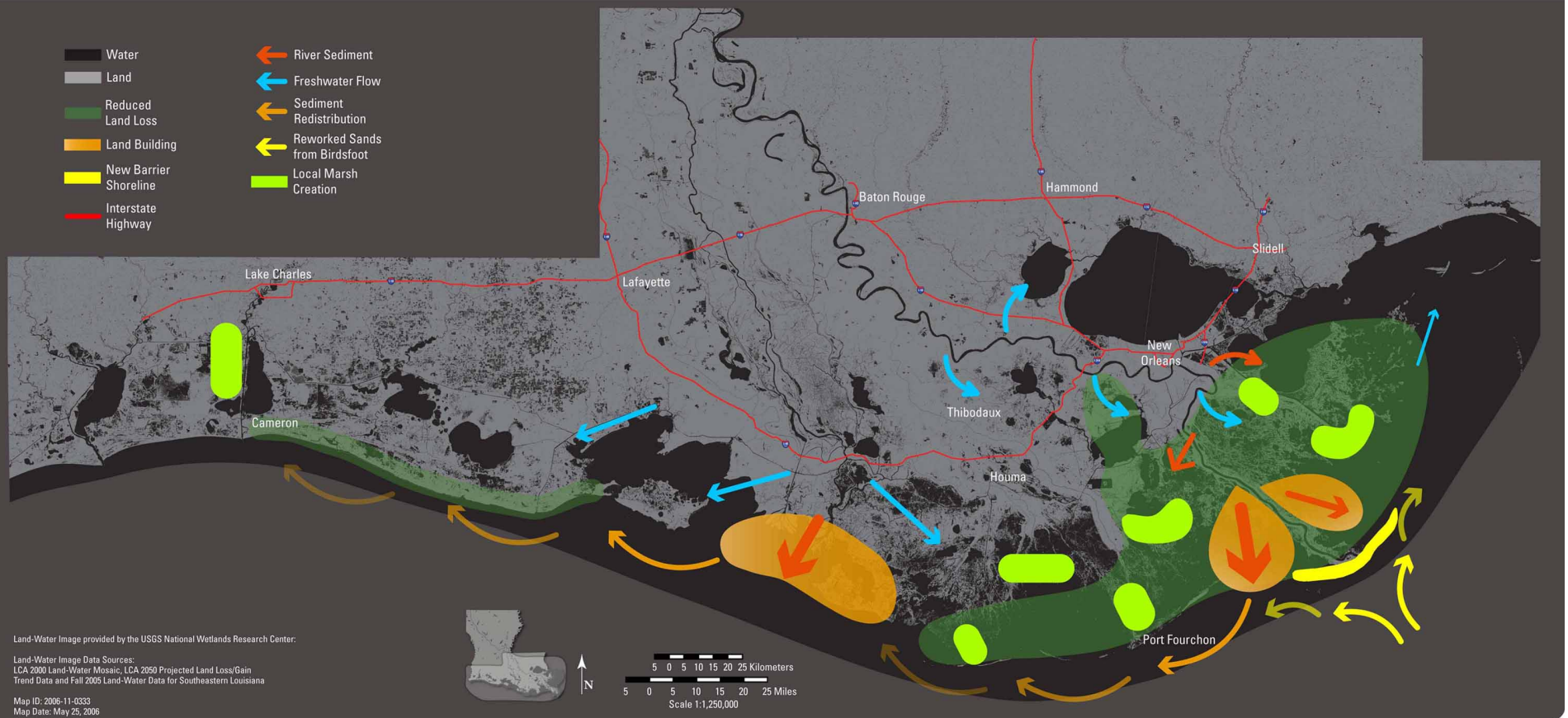

きけんですので
ゴルフの練習・ラジコン遊びは
やらないでください。
利用者へお願い
ゴミは持ち帰りましょう。

LONDON AVENUE CANAL

GENTILLY CANAL SYSTEM



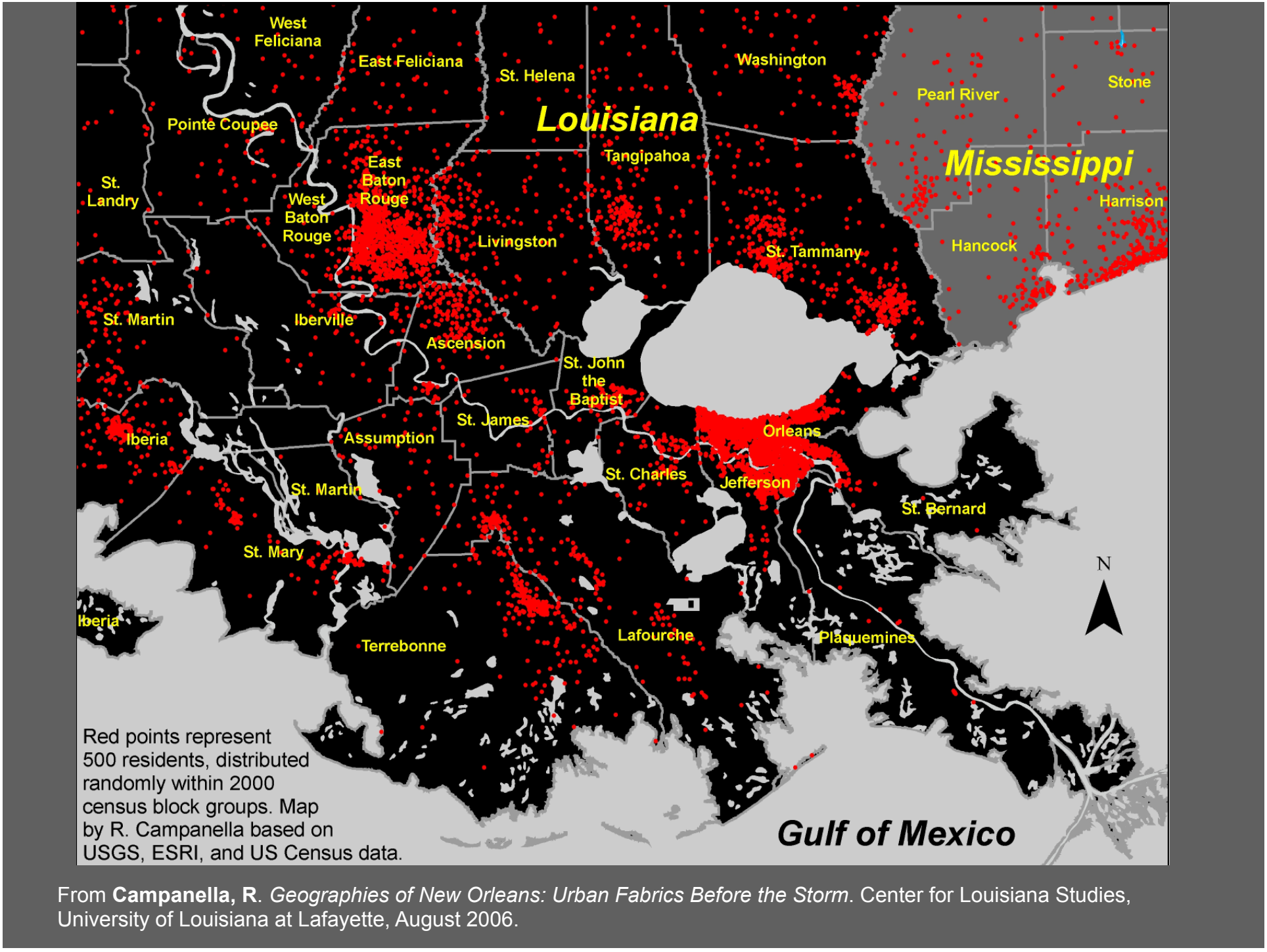
Achieving Sustainability and Addressing Local Restoration Needs



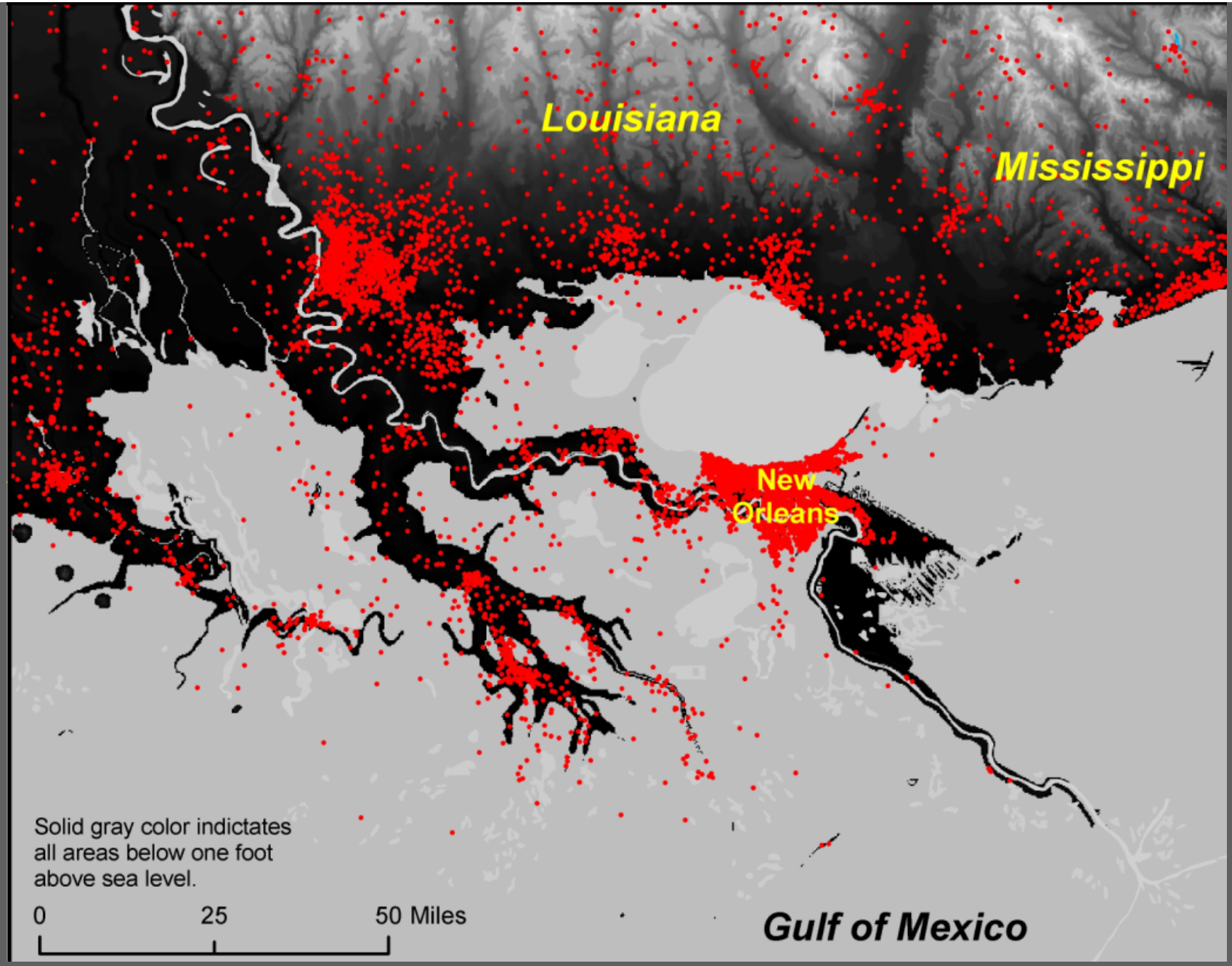
Land-Water Image provided by the USGS National Wetlands Research Center:

Land-Water Image Data Sources:
LCA 2000 Land-Water Mosaic, LCA 2050 Projected Land Loss/Gain
Trend Data and Fall 2005 Land-Water Data for Southeastern Louisiana

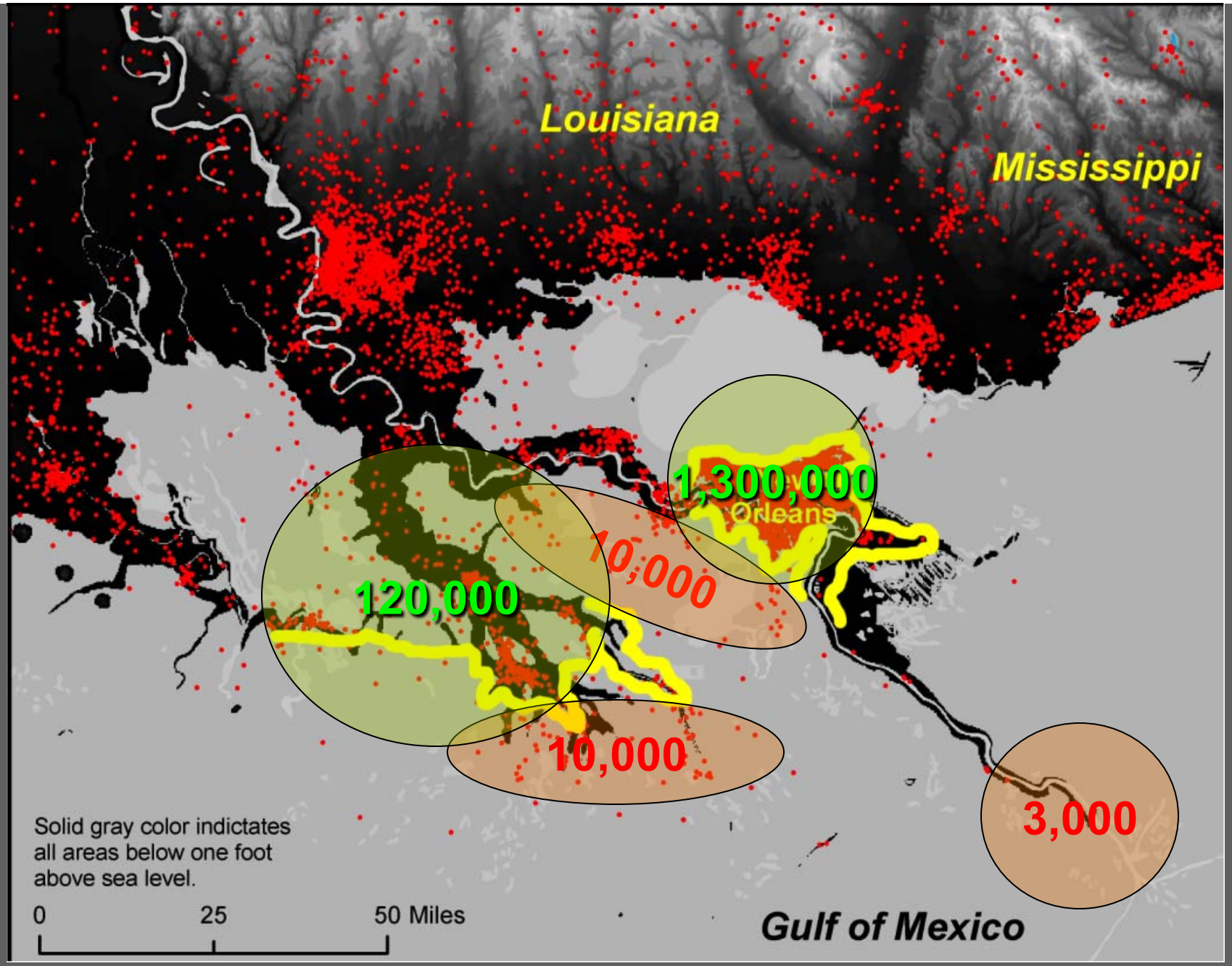
Map ID: 2006-11-0333
Map Date: May 25, 2006



From **Campanella, R**. *Geographies of New Orleans: Urban Fabrics Before the Storm*. Center for Louisiana Studies, University of Louisiana at Lafayette, August 2006.

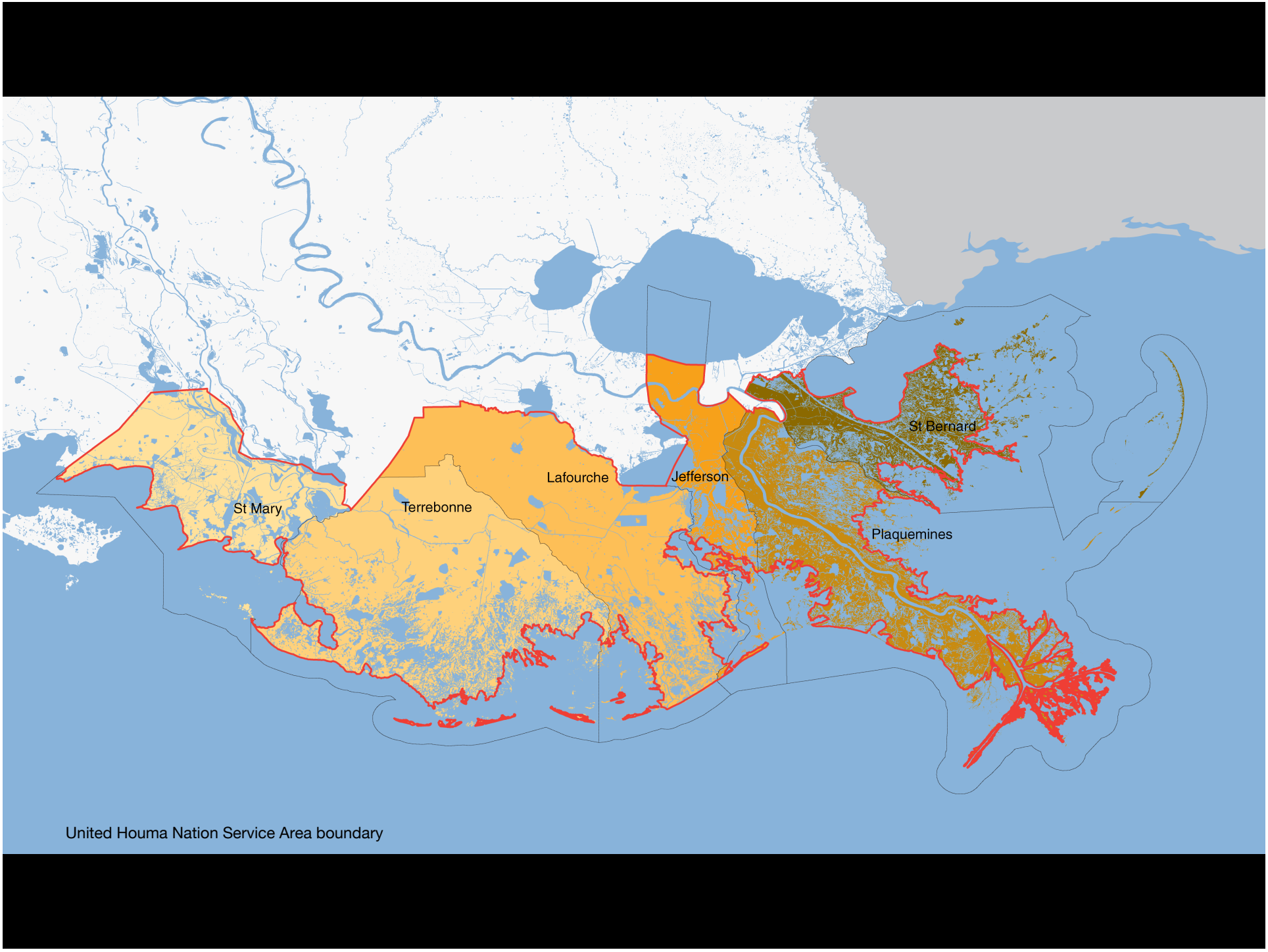


From **Campanella, R**. *Geographies of New Orleans: Urban Fabrics Before the Storm*. Center for Louisiana Studies, University of Louisiana at Lafayette, August 2006.


Louisiana
Mississippi
1,300,000
Orleans
10,000
120,000
10,000
3,000
Solid gray color indictates
all areas below one foot
above sea level.
0
25
50 Miles
Gulf of Mexico

United Houma Nation, Louisiana
Living With Water

Source: United Houma Nation


St Bernard
Lafourche
Jefferson
St Mary
Terrebonne
Plaquemines
United Houma Nation Service Area boundary

United Houma Nation, Louisiana
Relief Supplies following Hurricane Katrina

Source: United Houma Nation

United Houma Nation, Louisiana

Dulac Community Center following Hurricane Gustav

Source: Douglas Meffert

United Houma Nation, Louisiana
Three-part Plan for Climate Change Adaptation

1. Evacuation: How do you implement frequent evacuations in an economically-sustainable and psychologically-sound method?

2. Hazard Mitigation: What are structural standards for residential and other use now and in the future?

3. Stabilization: How and where can the UHN adapt and relocate in the future to sustain their culture? (e.g. public or community land trusts?)

Contact dmeffert@tulane.edu for report.

Concluding Remarks

- Delta systems have high dependency of urban inhabitants on ecosystems within and outside the urban region
- Delta systems depend on both natural systems and hard structures for adaptation and mitigation
- Adaptation/Mitigation priorities focus primarily on low-probability/high-impact and high-probability/moderate-impact

“Action speaks louder than words but not nearly as often.”

“Apparently there is nothing that cannot happen today.”

- Mark Twain

Image Source: Douglas Meffert