



**US Army Corps of Engineers**  
**Team New Orleans**



# **St. Tammany Parish Risk Reduction**

**Troy Constance**  
**Jun. 16 2009**  
**Northshore Harbor Center**

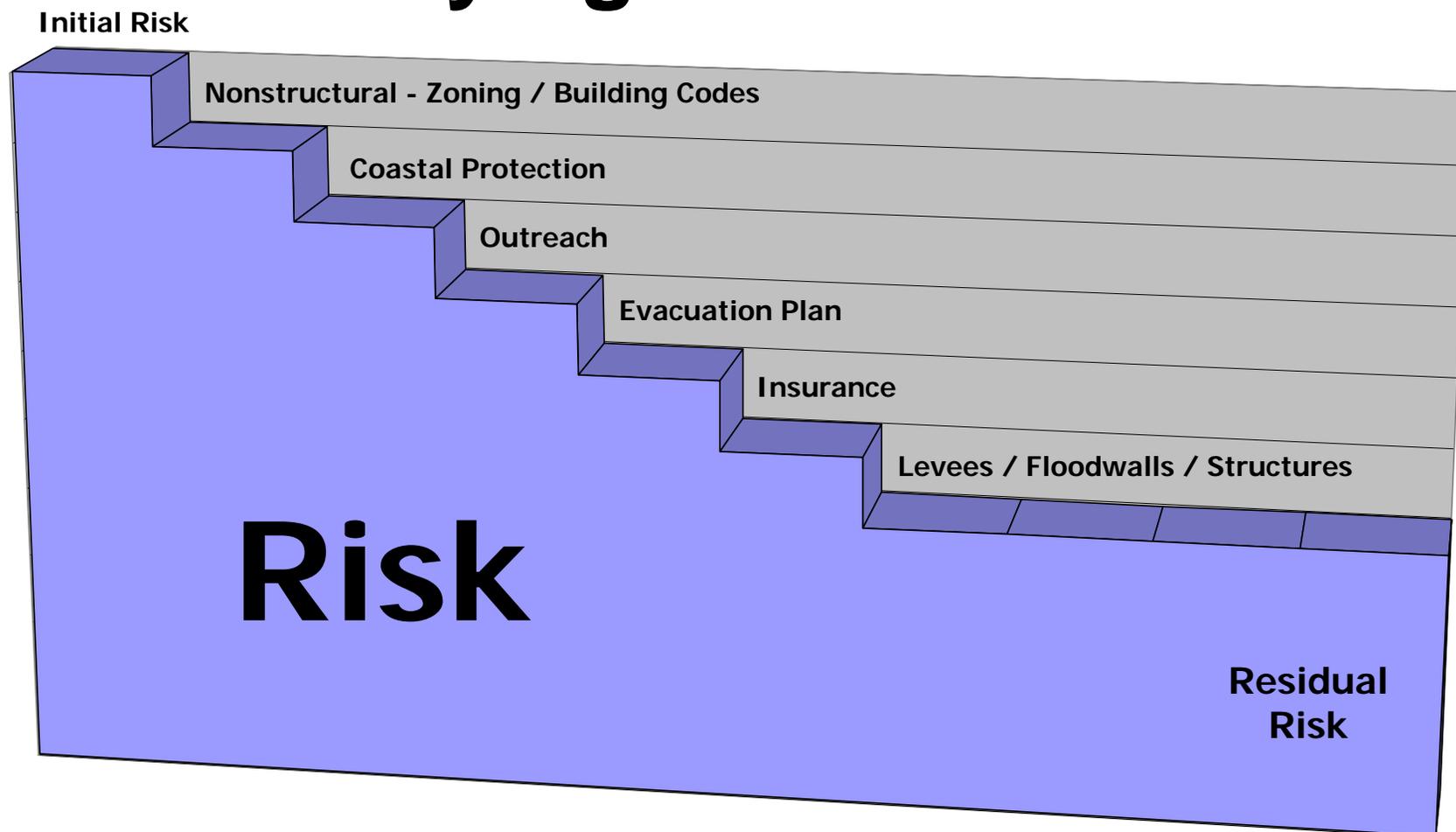


# Agenda

- I. Greater New Orleans Hurricane and Storm Damage Risk Reduction System**
- II. Hydraulic and Hydrology impacts of the Hurricane and Storm Damage Risk Reduction System**
- III. Southeast Louisiana Urban Drainage Flood Control Project**
- IV. Louisiana Coastal Protection and Restoration**
- V. Discussion**

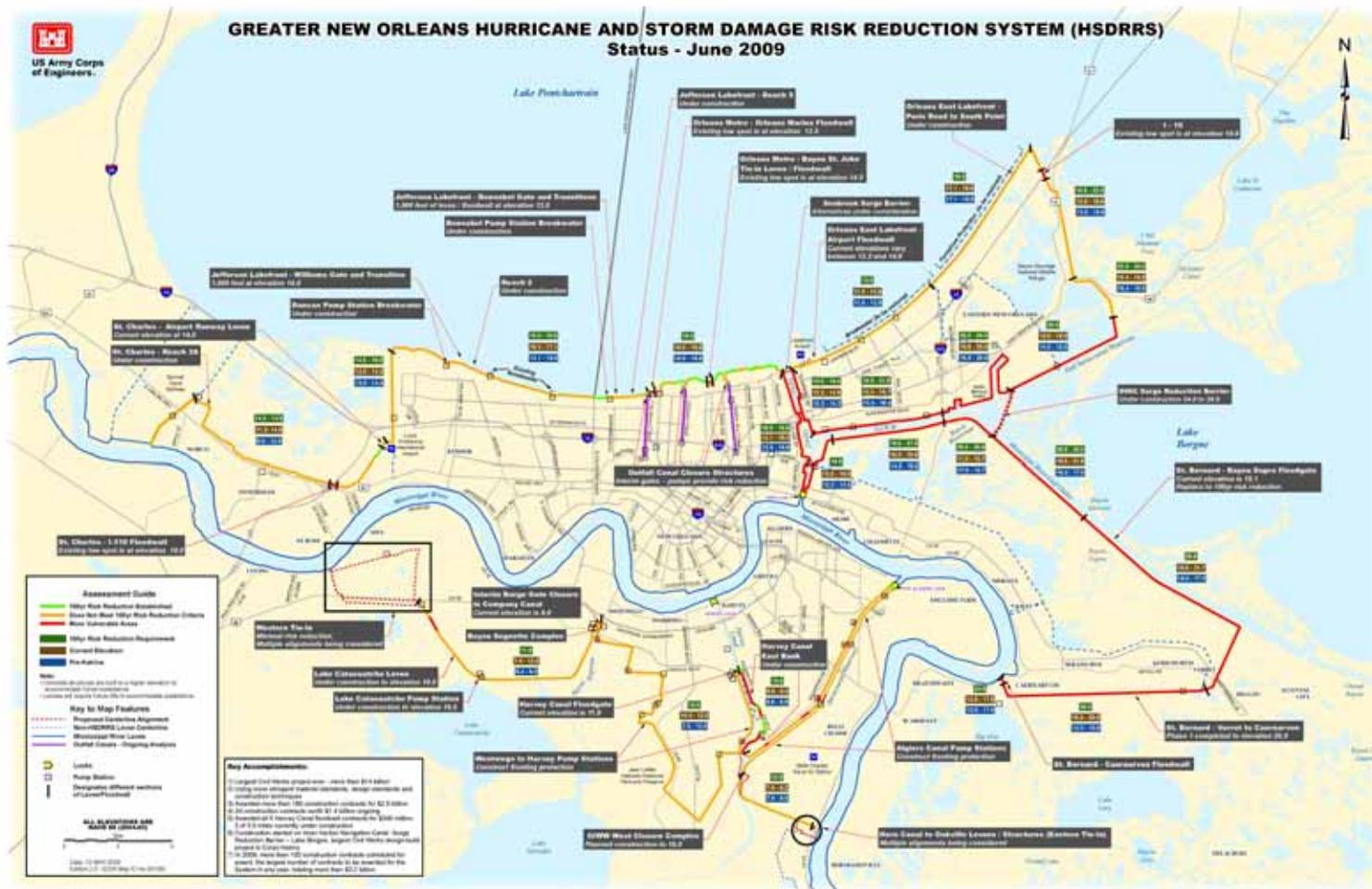


# Buying Down Risk





# Hurricane and Storm Damage Risk Reduction System





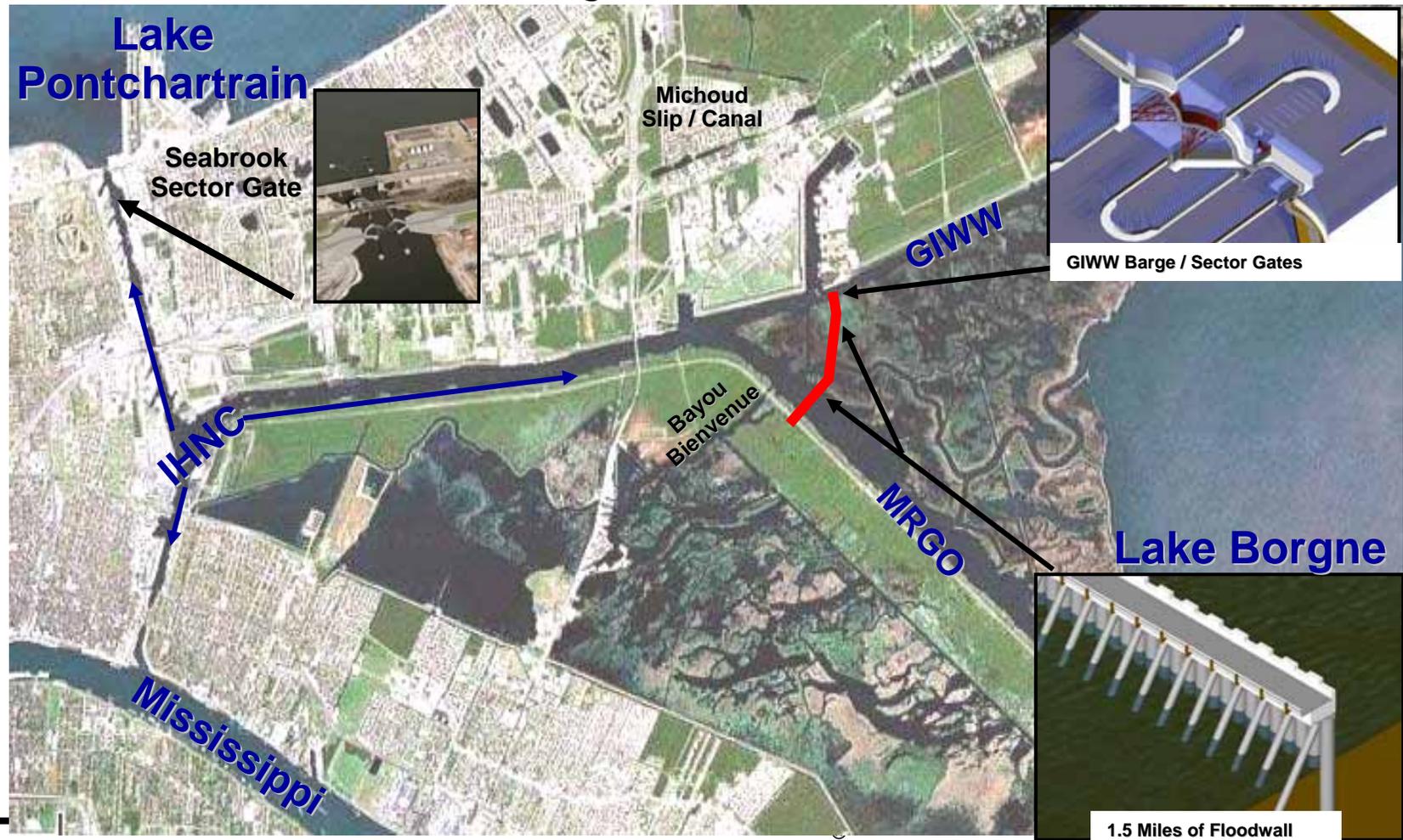
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# Inner Harbor Navigation Canal Surge Barrier



# Inner Harbor Navigation Canal Surge Barrier Project Area





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# Hydraulic and Hydrology Impacts of the Hurricane and Storm Damage Risk Reduction System



## Advanced Circulation Grid

- For coastal Louisiana modeling, the ADCIRC grid contains tens of millions of pieces of information

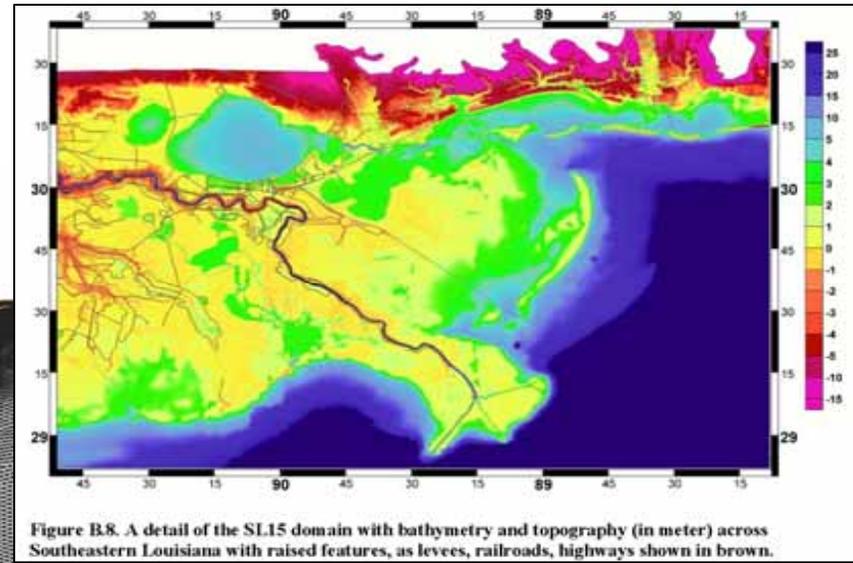
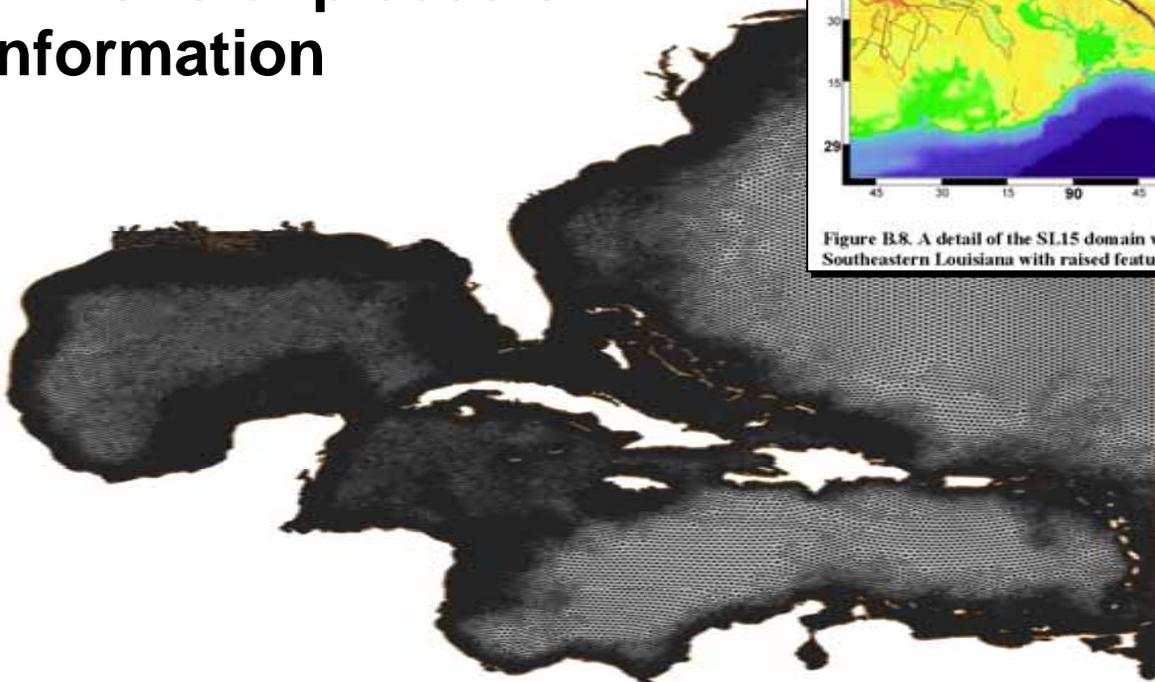


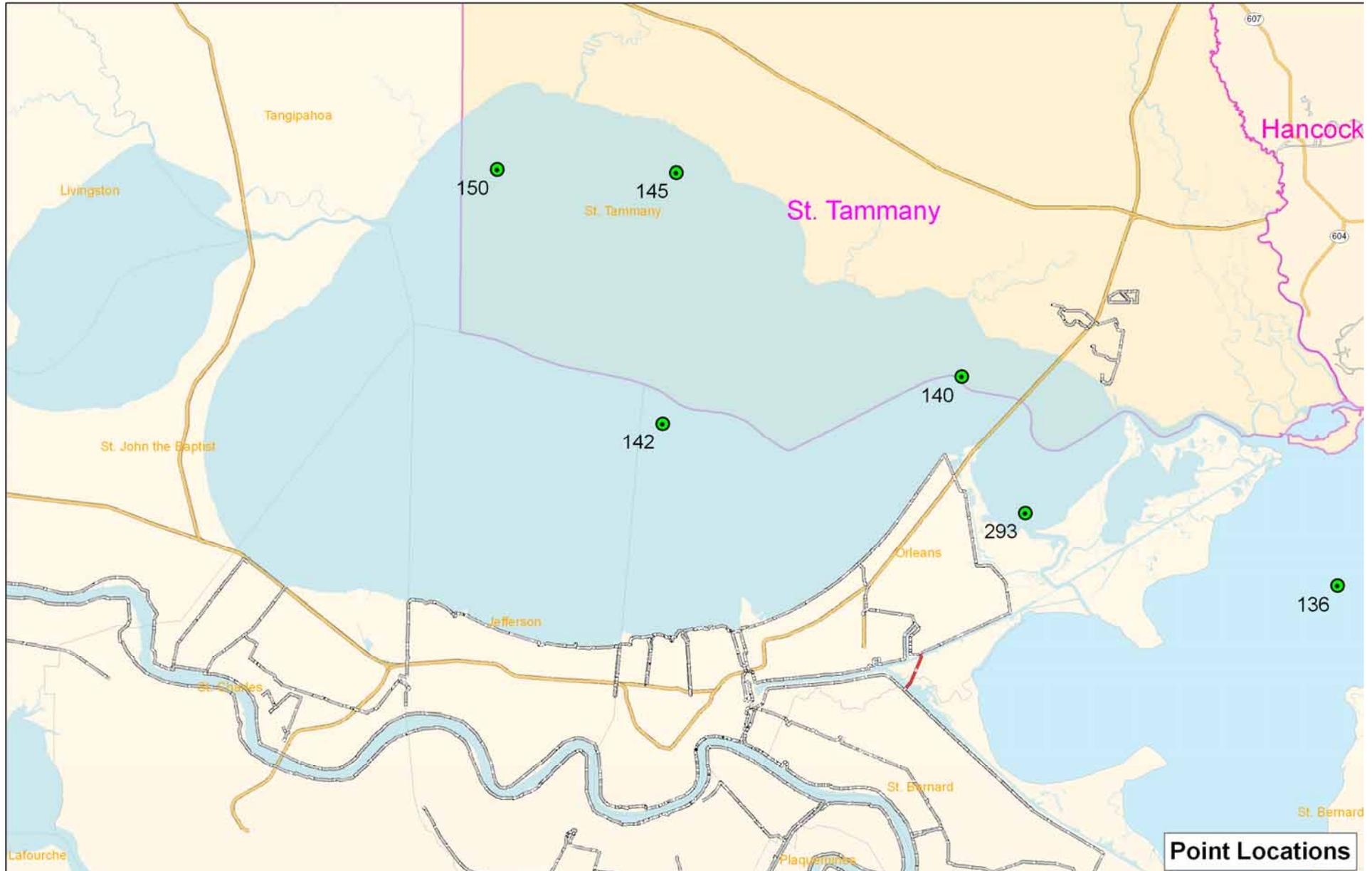
Figure B.8. A detail of the SL15 domain with bathymetry and topography (in meter) across Southeastern Louisiana with raised features, as levees, railroads, highways shown in brown.

- New features are added routinely





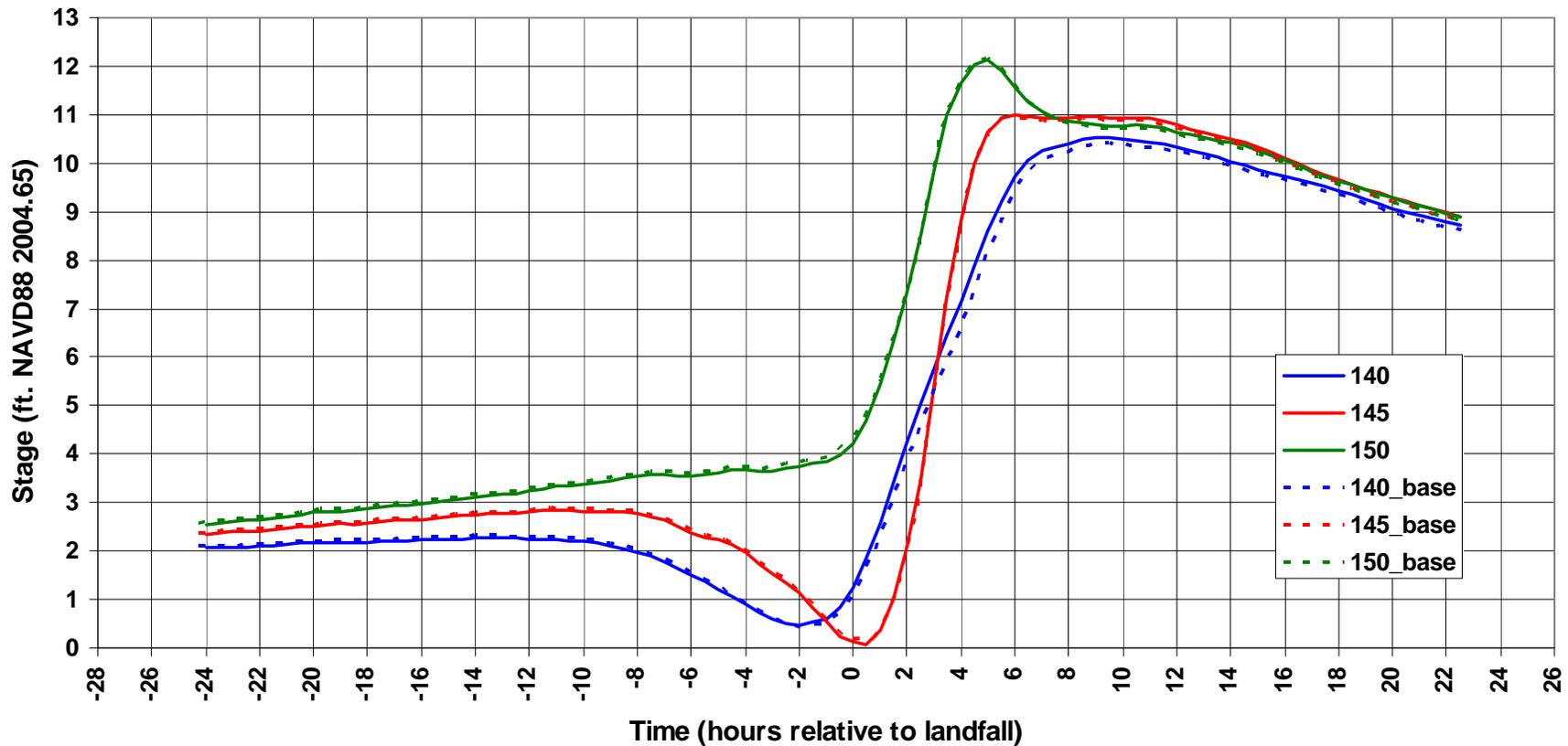
# 500 Year Event Surface Water Elevations Time Series





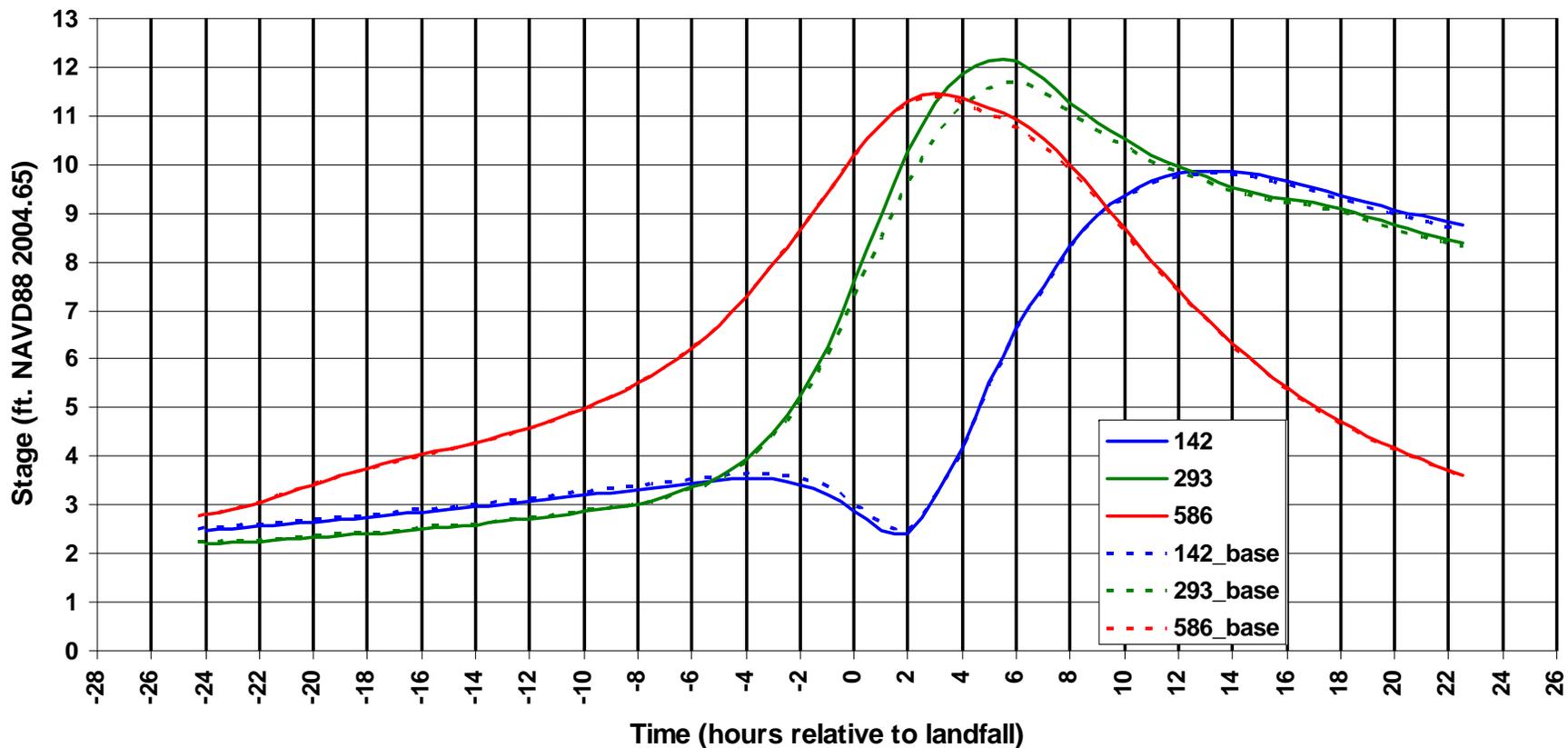
# Time Series of Surface Water Elevations (Storm 18 aprx.500-year event) 2007 vs 2010 Condition

Storm 18 (500 Yr)





# Time Series of Surface Water Elevations (Storm 18 aprx.500-year event) 2007 vs 2010 Condition Storm 18 (500 Yr)





# Technical Review Organization

## TECHNICAL REVIEW COORDINATOR – Ryan Clark

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John Richardson  
ASCE Blue Hill Hydraulics

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Consultant

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ASCE MEMBERS  
With Informal Representation from NRC \*

Billy Edge  
ASCE/NRC TAMU

Bob Dean  
ASCE/NRC UF

TR Independent Technical Review

ASCE American Society of Civil Engineers

NRC National Research Council

EPR External Peer Review

\* NRC Formal Review will occur over the next several months as part of review for IPET Volume 8, Hazard Definition Process



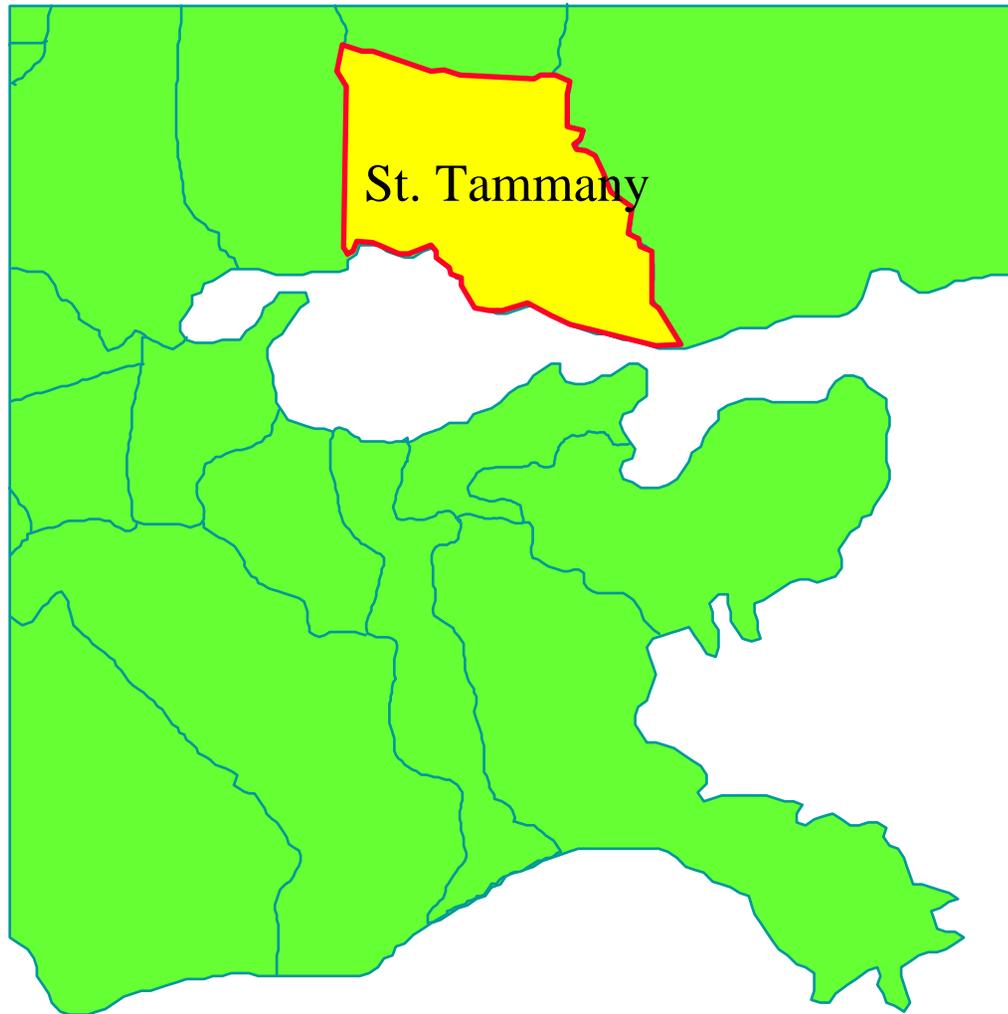
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# Southeast Louisiana Urban Drainage Flood Control Project (SELA)



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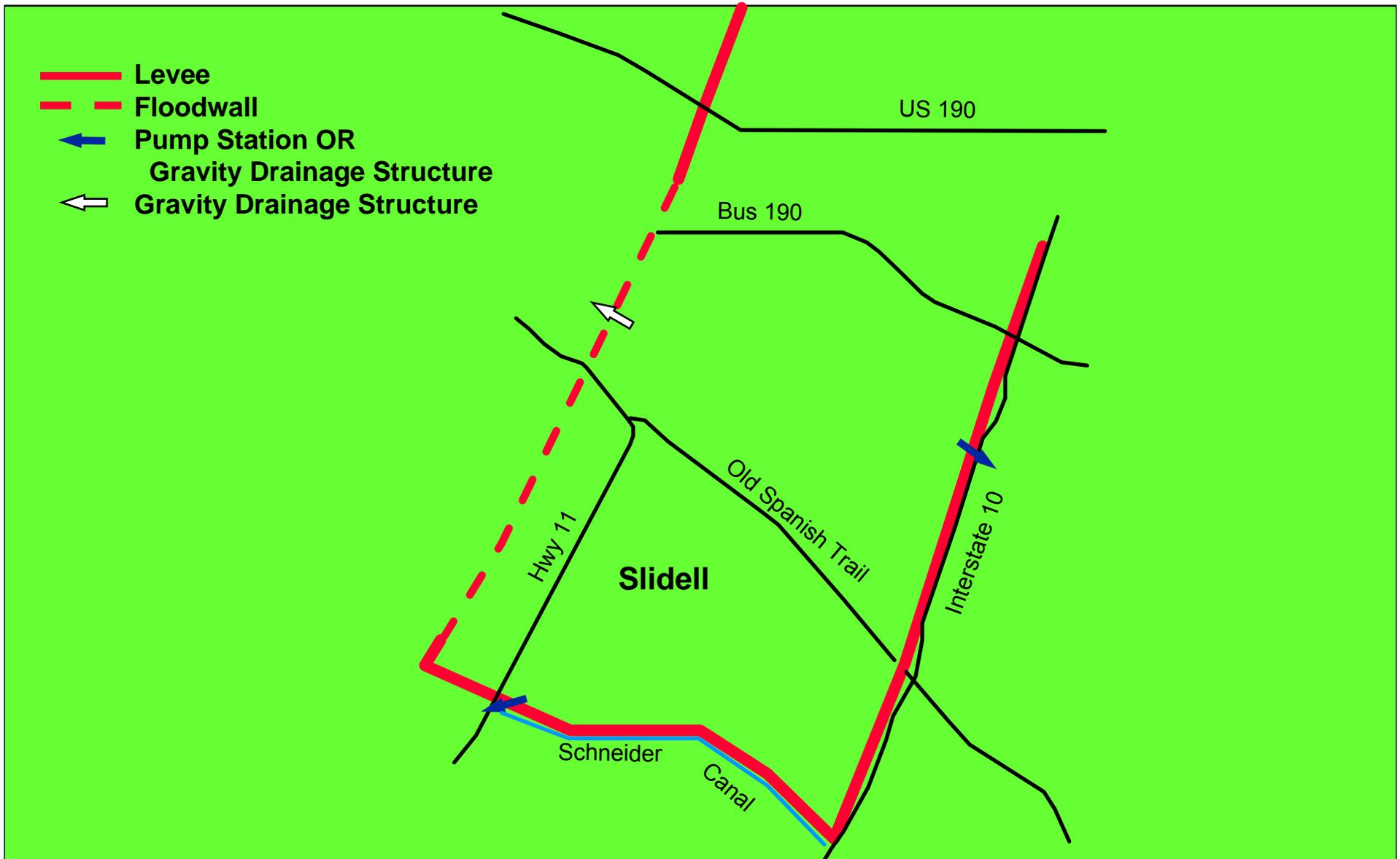
**The  
St. Tammany Parish  
Portion of the  
Southeast Louisiana  
Urban Drainage  
Flood Control  
Project**



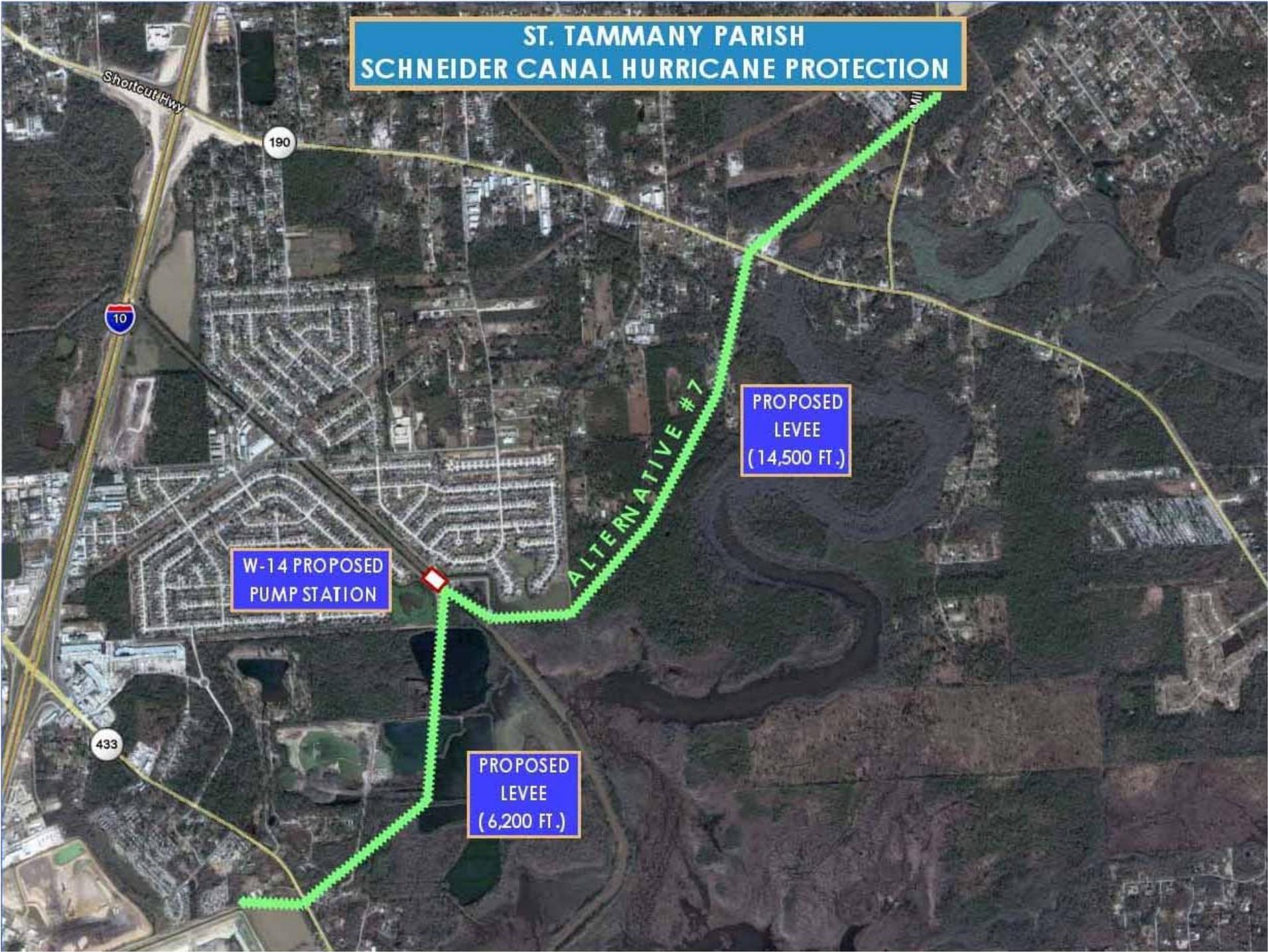
## Study Reports

- Schneider Canal, Slidell, Louisiana Hurricane Protection Reconnaissance Report (May 1990)
- The Tangipahoa, Tchefuncte and Tickfaw Rivers Reconnaissance Report (June 1991)
- St. Tammany Parish, Louisiana Reconnaissance Report (July 1996)
- Jefferson and Orleans Parishes, Louisiana Urban Flood Control and Water Quality Management Reconnaissance Report (July 1992)

# St. Tammany Schneider Canal Hurricane Protection



# ST. TAMMANY PARISH SCHNEIDER CANAL HURRICANE PROTECTION



Shortcut Hwy

190

10

W-14 PROPOSED  
PUMP STATION

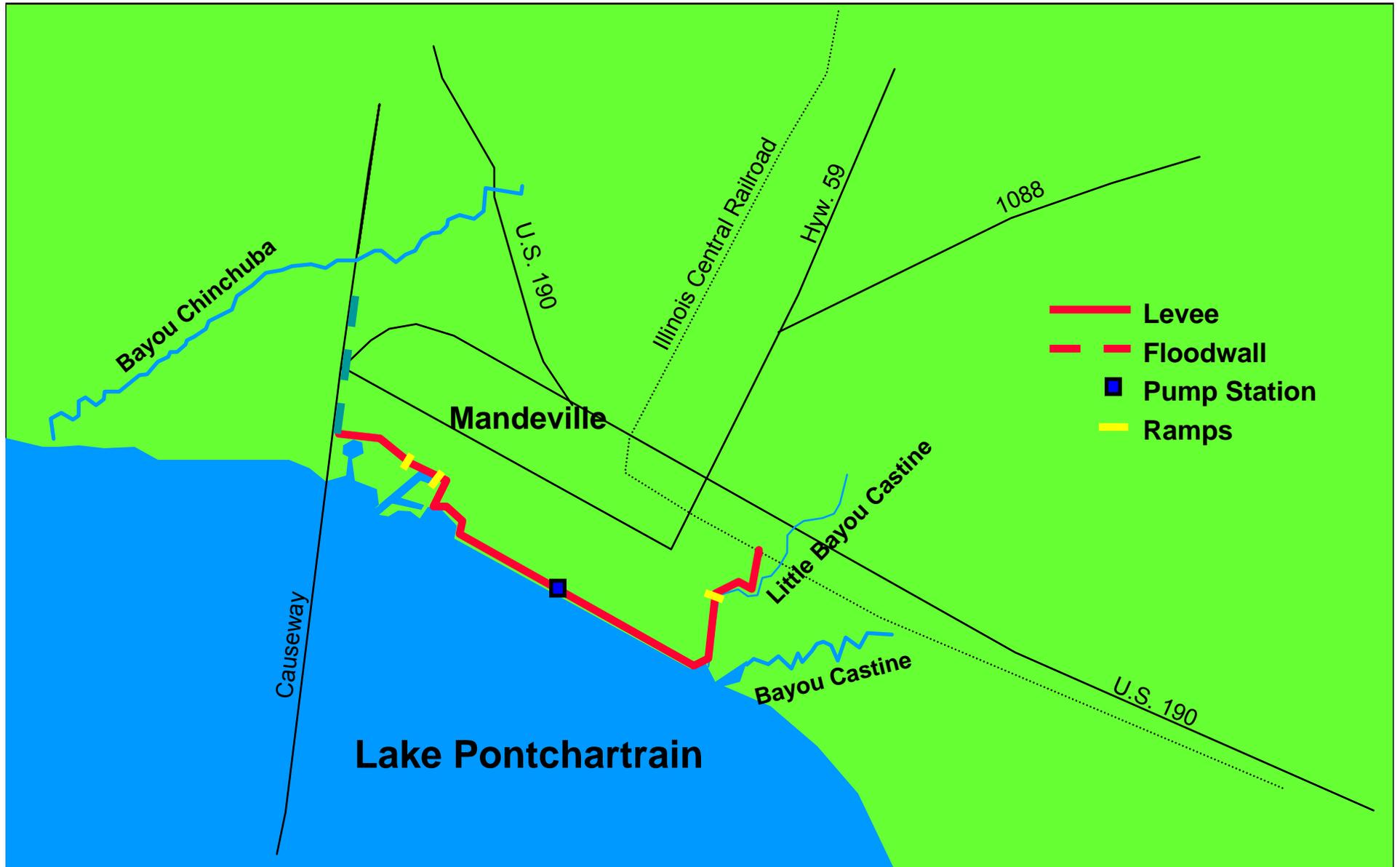
ALTERNATIVE #7

PROPOSED  
LEVEL  
(14,500 FT.)

433

PROPOSED  
LEVEL  
(6,200 FT.)

# St. Tammany Mandeville Hurricane Protection





# **St. Tammany—Slidell W-14 Canal**

## **Project scope includes**

- **channel improvements**
- **bridge replacements**
- **detention ponds**
- **pump station**

**Draft Environmental Assessment is currently available  
for public review and download at  
[www.nolaenvironmental.gov](http://www.nolaenvironmental.gov)**

**Section 533(d) final report scheduled for approval  
December 2009**





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# Louisiana Coastal Protection and Restoration (LACPR) Draft Final Technical Report to Congress



# Congressional Direction

- Conduct a comprehensive hurricane protection analysis and design
- Present a full range of flood control, coastal restoration, and hurricane protection measures
- Exclusive of normal policy considerations



# Congressional Direction

- Consider providing protection for a storm surge equivalent to a Category 5 hurricane
- May submit reports on component areas of the larger protection program for authorization
- Conducted in coordination with the State



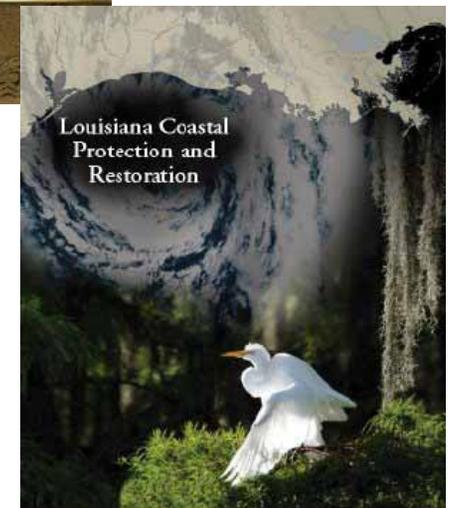
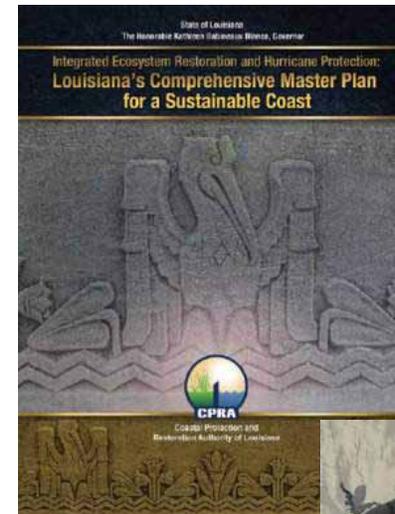
# Corps/State Collaboration

- We jointly developed objectives for LACPR consistent with the State Master Plan
- Worked with the state team to develop needs, opportunities, and alternatives.
- Continued collaboration in the evaluations



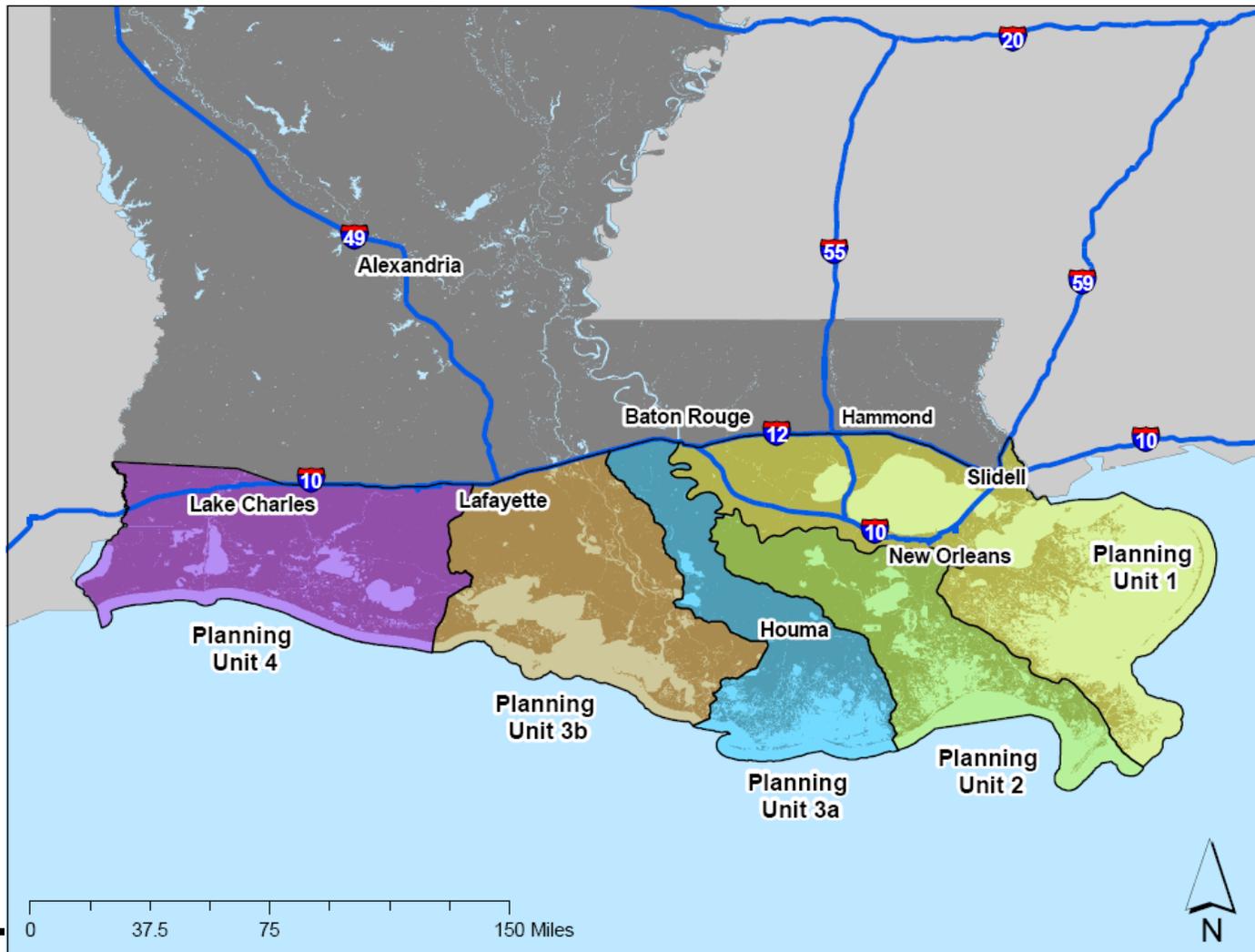
# Alternatives Development

- State Master Plan provides the overarching vision of LA coastal protection and restoration
- Multiple lines of defense strategy
- Coastal restoration was foundation of all alternatives
- Added on various structural, nonstructural, or combined structural/nonstructural components





# Planning Units





# Multi Criteria Decision Analysis

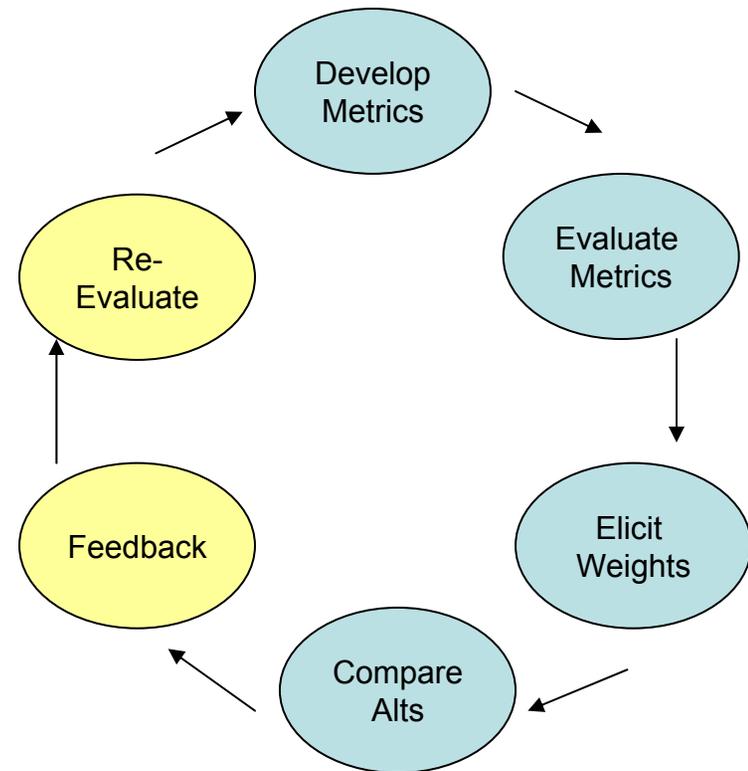
- Allows stakeholders to express preferences and values
- Analyze and compare dissimilar outputs
- Provides multiple alternatives and does not provide a single answer



# Multi Criteria Decision Analysis

## Stakeholder Feedback Loop

- Iterative process
- Post Technical Report: current with PU evaluation and plan selection
- Completes loop with stakeholders





# Initial Stakeholder Feedback

Metrics (in order of importance)	Planning Unit					Total*
	1	2	3a	3b	4	
Population impacted (people/year)	21	15	17	8	10	71
Direct wetland impacts (acres)	8	4	3	4	6	25
Indirect environmental impact (unit-less scale, -8 to +8)	8	2	5	2	4	21
Residual damages (\$ million/year)	3	2	2	3	4	14
Construction time (years)	1	1	3	4	1	10
Employment impacts (jobs disrupted/year)	2	2	0	2	1	7
Life-cycle cost (\$ million/year)	1	1	0	1	1	4
Historic properties protected (# of properties)	1	0	0	0	0	1
Historic districts protected (# of districts)	0	0	0	1	0	1
Archeological sites protected (# of sites)	0	0	0	0	0	0
<b>Total Number of Survey Respondents</b>	<b>45</b>	<b>27</b>	<b>30</b>	<b>25</b>	<b>27</b>	<b>154</b>

\*Indicates the number of respondents who ranked a particular metric as being most important.



# How We Built on MCDA Process

- Developed additional rankings focused on criteria related to:
  - Stakeholder Input
  - Environmental Impact
  - Cost Efficiency
  - Effectiveness in reducing Risk
  - Life cycle costs
  - “Category 5” per Congressional Direction
- Compared MCDA and additional rankings in a “Consumer Reports” style format
- Demonstrated the level of consistency between MCDA and traditional evaluations



# Sample Table for Planning Unit 1

Plan #	Planning Unit 1 Alternatives	Stakeholder (Multi-Criteria Decision Analysis)	Minimizing Environmental Impacts		Investment Decision (Efficiency)			Minimizing Remaining Risk (Effectiveness)			"Category 5" Design Level			Year 2025 Present Value Life Cycle Costs 2010-2075 (\$ Millions)
			Cumulative Ranking Score MCDA Trend Analysis	Direct Wetland Impact	Indirect Impacts	Cost Efficiency	Total System Costs	Frequency Risk Reduction	Annualized Residual Damages	Frequency Risk Reduction	Average % Risk Reduction	Cost Efficiency	Total System Costs	
	(Units)	(Unit-less Scale)	(Acres)	(Unit-less Scale)	Ratio: Risk Reduction / Present Value Life Cycle Costs (PV LCC)	Annualized Life Cycle Costs + EA Residual Damages (\$Millions)	Cost Efficiency Ratio: Event Freq Risk Reduction X Probability of Occurrence (2010-2075) / PV LCC	Average Annual Remaining Risk (\$ Millions)	Event Freq Risk Reduction X Probability (2010-2075) (\$Millions)	2075: 100-yr to 2,000-yr Frequency Events (Avg % of No Action Damages)	Ratio: Risk Reduction / Present Value Life Cycle Costs	Annualized Life Cycle Costs + EA Residual Damages (\$Millions)	Cost Efficiency Ratio: Total Event Frequency Risk Reduction / PV LCC	
2	Coastal (R2)	●	●	●	○	●	●	○	○	○	N/A	N/A	N/A	●
3	NS-100	●	●	●	●	●	○	○	○	○	N/A	N/A	N/A	●
4	NS-400	●	●	●	○	○	○	●	○	○	●	●	○	○
5	NS-1000	●	●	●	○	○	○	●	○	○	○	○	○	○
6	HL-a-100-2	○	○	○	○	○	○	○	○	○	N/A	N/A	N/A	○
7	HL-a-100-3	○	○	○	○	○	○	○	○	○	N/A	N/A	N/A	○
8	HL-b-400-2	○	○	○	○	○	○	○	○	○	○	○	○	○
9	HL-b-400-3	○	○	○	○	○	○	○	○	○	○	○	○	○
10	LP-a-100-1	○	○	○	○	●	●	○	○	○	○	●	●	○
11	LP-a-100-2	○	○	○	○	○	○	○	○	○	○	○	○	○
12	LP-a-100-3	○	○	○	○	○	○	○	○	○	○	○	○	○
13	LP-b-400-1	○	○	○	○	○	○	○	○	○	○	○	○	○
14	LP-b-400-3	○	○	○	○	○	○	○	○	○	○	○	○	○
15	LP-b-1000-1	○	○	○	○	○	○	○	○	○	○	○	○	○
16	LP-b-1000-2	○	○	○	○	○	○	○	○	○	○	○	○	○
17	C-HL-a-100-2	○	○	○	○	○	○	○	○	○	N/A	N/A	N/A	○
18	C-HL-a-100-3	○	○	○	○	○	○	○	○	○	N/A	N/A	N/A	○
19	C-HL-b-400-2	○	○	○	○	○	○	○	○	○	○	○	○	○
20	C-HL-b-400-3	○	○	○	○	○	○	○	○	○	○	○	○	○
21	C-LP-a-100-1	○	○	○	○	●	●	○	○	○	●	●	○	○
22	C-LP-a-100-2	○	○	○	○	○	○	○	○	○	○	○	○	○
23	C-LP-a-100-3	○	○	○	○	○	○	○	○	○	○	○	○	○
24	C-LP-b-400-1	○	○	○	○	○	○	○	○	○	○	○	○	○
25	C-LP-b-400-3	○	○	○	○	○	○	○	○	○	○	○	○	○
26	C-LP-b-1000-1	○	○	○	○	○	○	○	○	○	○	○	○	○
27	C-LP-b-1000-2	○	○	○	○	○	○	○	○	○	○	○	○	○

Scoring based on normalized values determined within each evaluation criteria as shown:	●	●	●	○	○	○
	1.0 Best	.9 - .99	.8 - .89	.6 - .79	.4 - .59	0 - .39 Worst



## From Tables to Rankings

- Tradeoffs aren't immediately apparent through MCDA alone
- All the criteria considered have relative importance
- Rankings were produced by combining groups of the criteria considered including MCDA
- Comparison of the combined criteria rankings demonstrated that a suite of best performing alternatives could be identified



# Sensitivity Analysis of Multiple Rankings

Plan Rank	Stakeholder MCDA Trend Analysis	NVR - 1	NVR - 2	NVR - 3	NVR - 4	NVR - 5	NVR - 6	NVR - 7	NVR - 8
1	NS-1000	NS-100	NS-100	NS-400	NS-400	C-LP-a-100-1	NS-100	C-LP-a-100-1	NS-400
2	NS-100	NS-400	NS-400	NS-100	NS-100	NS-100	NS-400	NS-400	NS-100
3	NS-400	NS-1000	Coastal	NS-1000	NS-1000	NS-400	C-LP-a-100-1	NS-100	NS-1000
4	C-HL-a-100-3	C-LP-a-100-1	NS-1000	Coastal	Coastal	NS-1000	Coastal	LP-a-100-1	C-LP-a-100-1
5	Coastal	Coastal	C-HL-a-100-3	C-LP-a-100-1	C-LP-a-100-1	LP-a-100-1	LP-a-100-1	NS-1000	LP-a-100-1
6	HL-a-100-3	LP-a-100-1	HL-a-100-3	LP-a-100-1	LP-a-100-1	C-LP-b-400-1	NS-1000	Coastal	Coastal
7	C-HL-a-100-2	C-HL-a-100-3	C-LP-a-100-1	C-HL-a-100-3	C-HL-a-100-3	Coastal	C-HL-a-100-3	C-LP-b-400-1	C-HL-a-100-3
8	HL-a-100-2	C-LP-b-400-1	LP-a-100-1	HL-a-100-3	HL-a-100-3	C-LP-b-1000-1	HL-a-100-3	C-LP-a-100-3	C-LP-a-100-3
9	C-LP-a-100-1	C-HL-b-400-3	C-HL-a-100-2	C-HL-a-100-2	C-HL-a-100-2	C-LP-a-100-3	C-LP-a-100-3	C-LP-a-100-2	HL-a-100-3
10	C-HL-b-400-2	HL-a-100-3	HL-a-100-2	HL-a-100-2	HL-a-100-2	C-LP-a-100-2	C-HL-a-100-2	C-HL-a-100-3	C-LP-a-100-2
11	LP-a-100-1	C-HL-b-400-2	C-HL-b-400-3	C-HL-b-400-3	C-HL-b-400-3	LP-b-400-1	C-LP-a-100-2	LP-a-100-3	C-LP-b-400-1
12	HL-b-400-2	C-LP-a-100-3	C-HL-b-400-2	C-LP-b-400-1	C-HL-b-400-2	C-HL-b-400-3	HL-a-100-2	LP-a-100-2	C-HL-a-100-2
13	C-HL-b-400-3	C-HL-a-100-2	HL-b-400-3	C-LP-a-100-3	C-LP-a-100-3	LP-a-100-3	C-LP-b-400-1	C-LP-b-1000-1	HL-a-100-2
14	C-LP-a-100-2	C-LP-a-100-2	C-LP-a-100-3	C-LP-a-100-2	C-LP-a-100-2	LP-a-100-2	LP-a-100-3	LP-b-400-1	LP-a-100-3
15	C-LP-a-100-3	C-LP-b-1000-1	HL-b-400-2	C-HL-b-400-2	C-LP-b-400-1	C-HL-b-400-2	LP-a-100-2	HL-a-100-3	LP-a-100-2
16	HL-b-400-3	HL-b-400-3	C-LP-a-100-2	HL-b-400-3	HL-b-400-3	C-HL-a-100-3	LP-b-400-1	C-HL-a-100-2	C-HL-b-400-3
17	LP-a-100-2	HL-b-400-2	LP-a-100-3	LP-a-100-3	HL-b-400-2	HL-b-400-3	C-HL-b-400-3	C-HL-b-400-3	C-HL-b-400-2
18	LP-a-100-3	LP-b-400-1	C-LP-b-400-1	LP-a-100-2	LP-a-100-3	C-LP-b-400-3	C-LP-b-1000-1	HL-a-100-2	LP-b-400-1
19	C-LP-b-400-1	HL-a-100-2	LP-a-100-2	HL-b-400-2	LP-a-100-2	HL-b-400-2	C-HL-b-400-2	C-HL-b-400-2	C-LP-b-1000-1
20	LP-b-400-1	LP-a-100-3	LP-b-400-1	LP-b-400-1	LP-b-400-1	LP-b-1000-1	HL-b-400-3	HL-b-400-3	HL-b-400-2
21	C-LP-b-1000-1	LP-a-100-2	C-LP-b-1000-1	C-LP-b-1000-1	C-LP-b-1000-1	HL-a-100-3	HL-b-400-2	LP-b-1000-1	HL-b-400-3
22	C-LP-b-400-3	LP-b-1000-1	LP-b-1000-1	LP-b-1000-1	LP-b-1000-1	C-HL-a-100-2	LP-b-1000-1	HL-b-400-2	LP-b-1000-1
23	LP-b-1000-1	C-LP-b-400-3	C-LP-b-400-3	C-LP-b-400-3	C-LP-b-400-3	HL-a-100-2	C-LP-b-400-3	C-LP-b-400-3	C-LP-b-400-3
24	C-LP-b-1000-2	LP-b-400-3							
25	LP-b-400-3	C-LP-b-1000-2							
26	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2	LP-b-1000-2

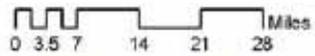
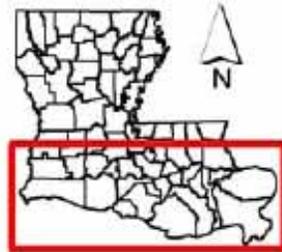


## Final Array of Alternatives in Planning Units 1 and 2

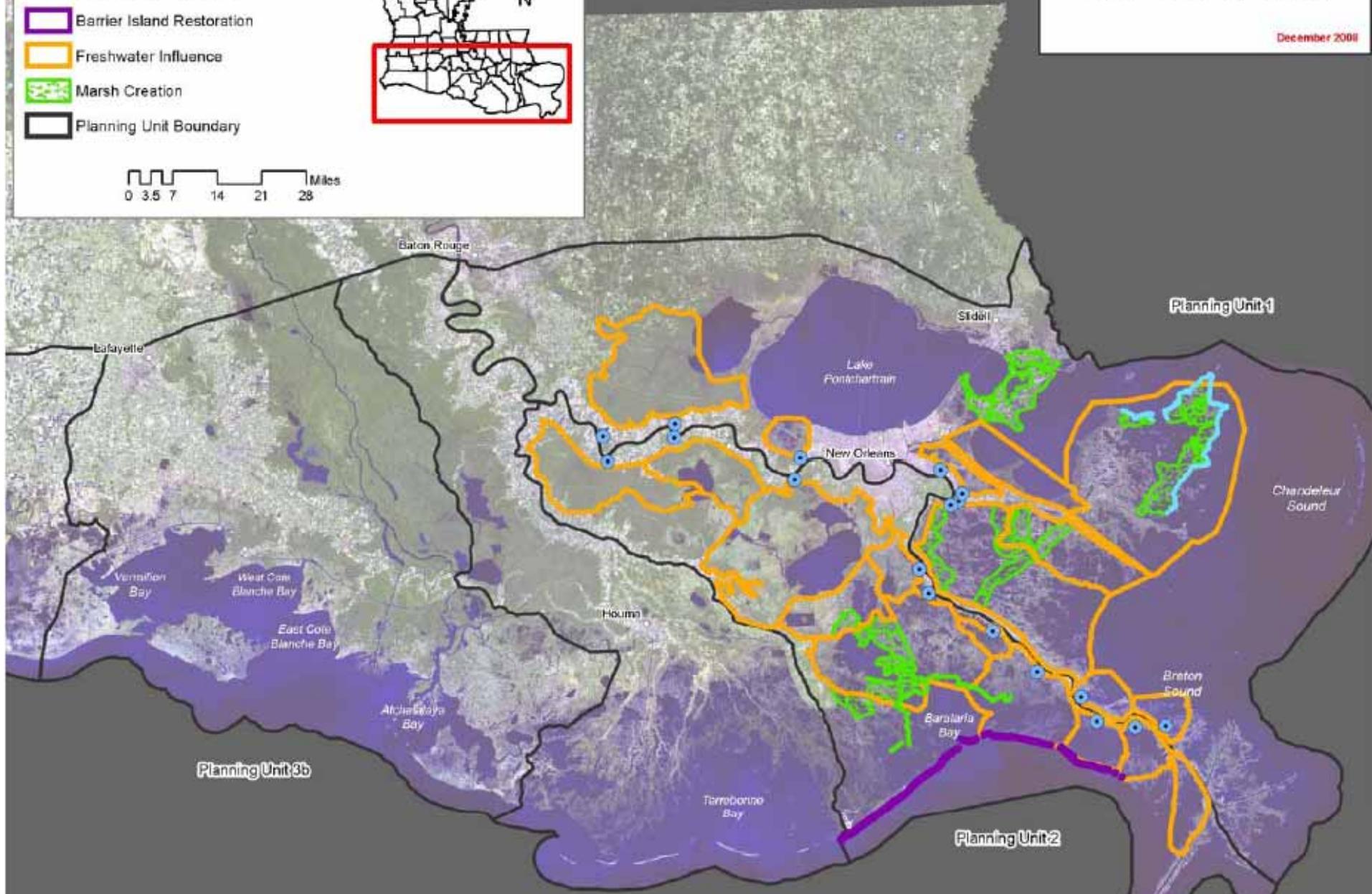
- Alternatives include coastal restoration
- Planning Unit 1 options:
  - Coastal only
  - Nonstructural (3 levels)
  - Lake Pontchartrain barrier-weir (with or without nonstructural)

# Legend

- Diversion
- Shoreline Stabilization
- Barrier Island Restoration
- Freshwater Influence
- Marsh Creation
- Planning Unit Boundary



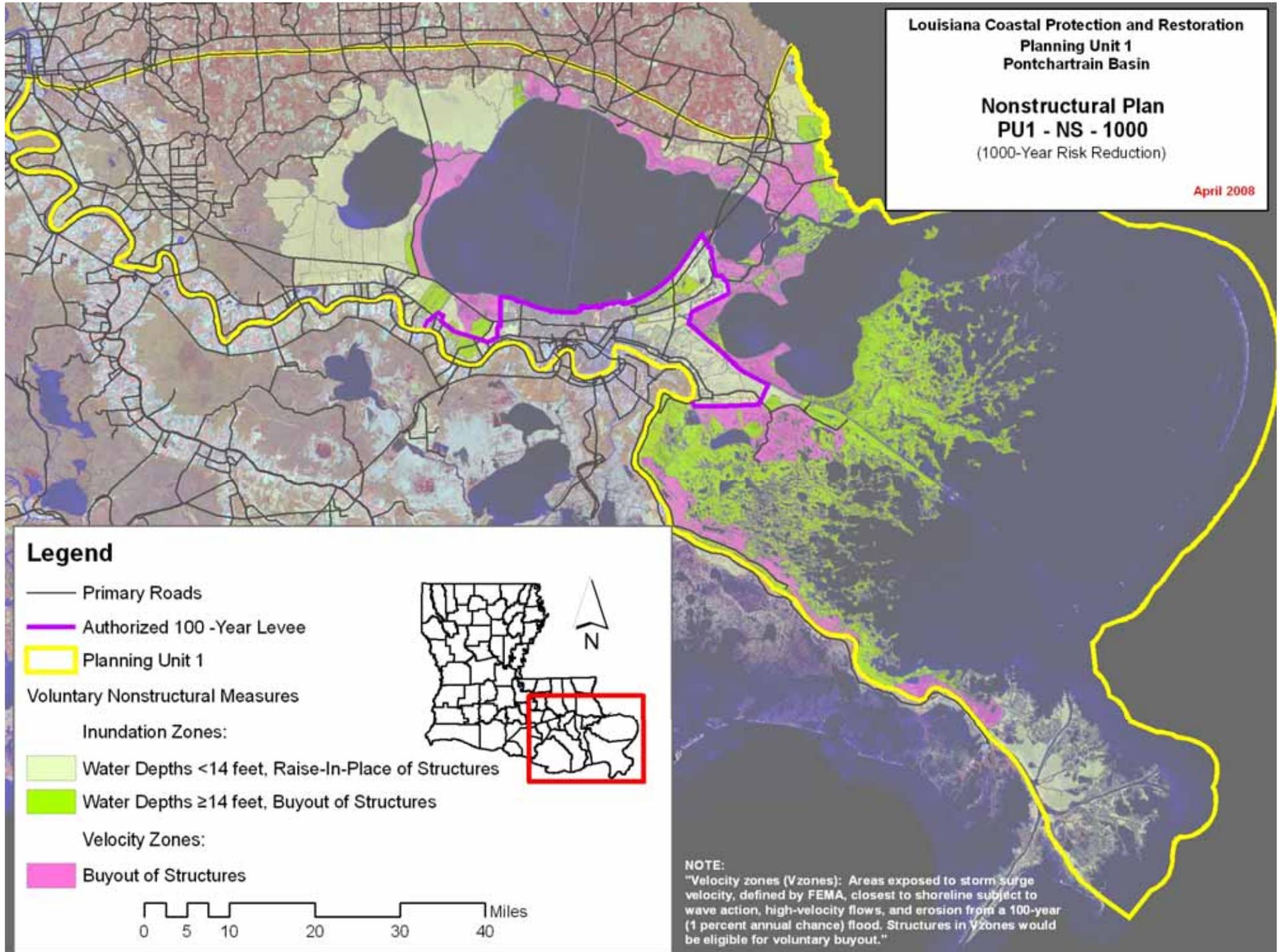
Louisiana Coastal Protection and Restoration  
**Coastal Restoration Plans  
Planning Units 1 and 2**  
(Included in all Coastwide Plans)  
December 2008



Louisiana Coastal Protection and Restoration  
Planning Unit 1  
Pontchartrain Basin

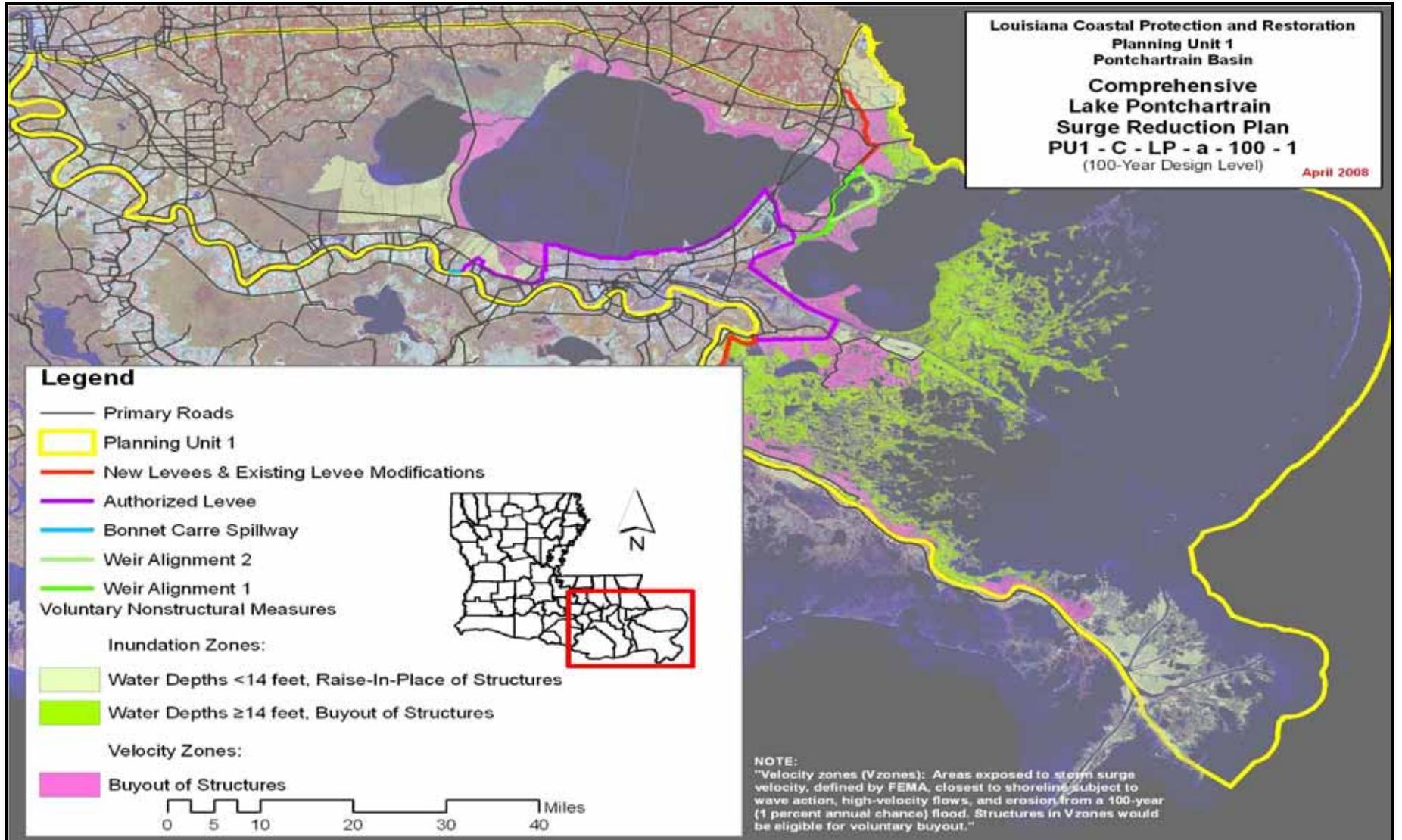
Nonstructural Plan  
PU1 - NS - 1000  
(1000-Year Risk Reduction)

April 2008





# US Army Corps of Engineers Team New Orleans



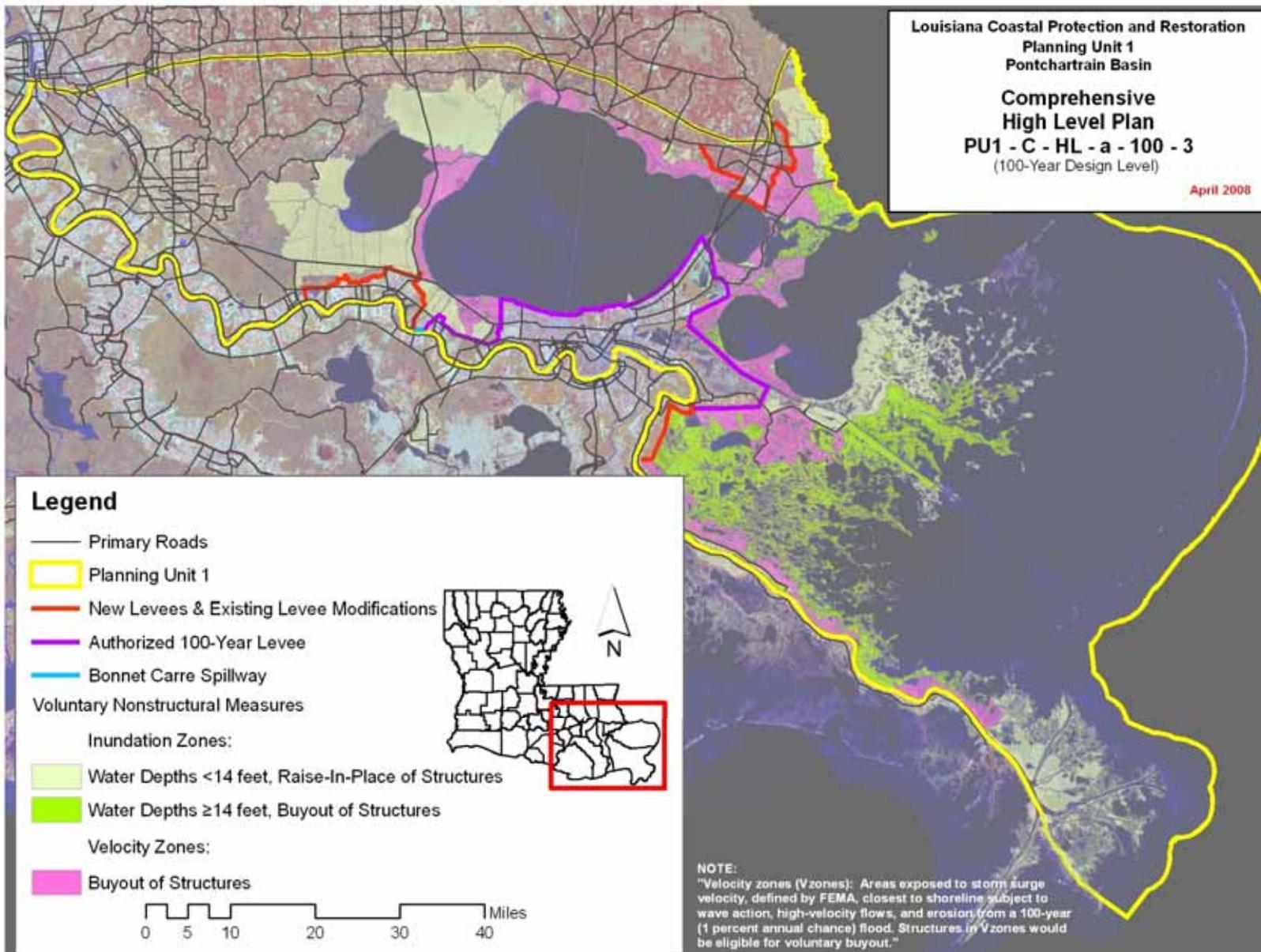


U.S. ARMY

# US Army Corps of Engineers Team New Orleans



®





# Post Report Submission Path Forward

- **Follow VTC Fact Sheet Process to Define the Work**
- **State/Corps Develops Priorities and Options**
- **State/Corps coordinate with Federal Agencies, Local Entities, NGOs, and the Public**
- **HQ establishes Program Guidance Memorandum**
- **Execute the Work for Appropriate Action**

## **Examples:**

- **Modification of on-going projects**
- **Post Authorization Change Reports**
- **Amendments to Existing FCSA**
- **New authorizations**



# Options for Implementation PU1

- Current final array contains:
  - 1 – basin wide restoration alternative
  - 1 – major structural alternative
  - 3 – independent nonstructural alternatives
  - 1 – comprehensive (structural / nonstructural) alternative
- Options:
  - 1 – execute through a comprehensive basin plan
  - 2 – focus on only structural features
  - 3 – focus on coastal features
  - 4 – focus on non-structural actions
  - 5 – develop hazard mitigation efforts



# PU1: Option 1 Comprehensive Basin Plan Implementation

Use PAC of Lake Pontchartrain and Vicinity authority

- Integrate coastal features, structural features, and nonstructural features
- Identify optimal risk reduction alternative
- Complete engineering analysis
- Complete NEPA
- Select the recommended plan



# PU1: Option 2 Structural Only Features Implementation

Use PAC of Lake Pontchartrain and Vicinity authority

- Focus on the existing project (high level plan)
- Identify optimal risk reduction alternative
- Complete engineering analysis
- Complete NEPA
- Select the recommended plan



# Risk Informed Decision Framework

- MCDA can be an effective means to inform trade-offs
- MCDA communicates the risks and consequences of key decisions
- MCDA allows Stakeholders to self-assign risk through tradeoffs

***"The corps can't and won't tell us how safe our cities need to be, how sustainable our coast should be, what values we should enhance and protect. They can't do that because it's not their job. It's our job."***

- Mark Davis

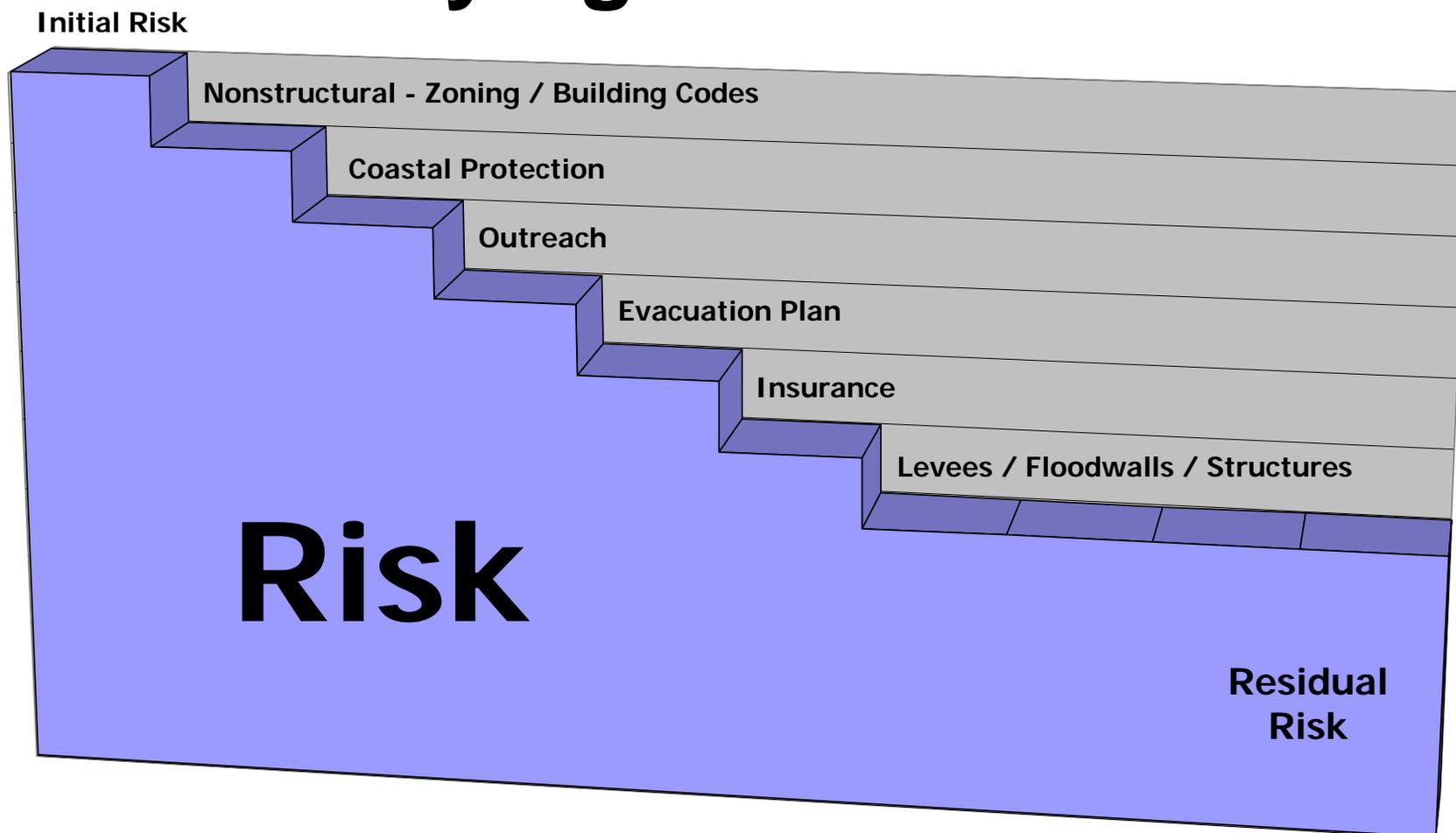


# LACPR Technical Report Status

Milestone	Date
✓ Draft Final Technical Report submitted to MVD/HQ	19 Dec 08
✓ Agency Technical Review completed	25 Feb 09
✓ HQ policy review and issue resolution initiated	26 Feb 09
✓ NAS external peer review initiated	3 March 2009
✓ Resolution of HQ Comments	April/May 09
✓ Senior Leader Panel Briefing	21 May 09
✓ Printed copies of Final Technical Report available	7 Jun 09
<b>Public, State, &amp; Agency review of Final Technical Review</b>	<b>9 Jun – 24 Jul 09</b>
Final NAS report (tentative)	8 Jul 09
Complete comment documentation and print supplement	4 Aug 09
Final Technical Report transmitted to Chief of Engineers	6 Aug 09
Transmittal of Final Technical Review to ASA-CW	31 Aug 09



# Buying Down Risk





US Army Corps of Engineers  
Team New Orleans



**Copies of the LaCPR report are  
available at**

**[lacpr.usace.army.mil](http://lacpr.usace.army.mil)**

**Comments will be posted at  
[www.nolaenvironmental.gov](http://www.nolaenvironmental.gov)**



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# Discussion



# Barrier Plan Chronology

1. **INTERIM STUDY IN 1962** - The original project plan, termed the “Barrier Plan,” included floodgates (surge barriers) in the passes to Lake Pontchartrain to prevent “Standard Project Hurricane” (SPH) - driven surges from entering the lake accompanied by levees and floodwalls in other locations designed to withstand SPH surges.
2. **BARRIER PLAN AUTHORIZED IN 1965** - To provide protection from a storm with the SPH wind speed and central pressure parameters established in the report of the Chief of Engineers. Project would be cost-shared 70% federal and 30% local.
3. **ENGINEERING DESIGN PHASE** - At the time of authorization, the District estimated that the project would be completed by the mid-to-late-1970s.
4. **HURRICANE BETSY IN 1965** - The District requested and received permission from the Corps’ Lower Mississippi Division (the Division) and Corps Headquarters to increase structure heights by 1-2 feet across the project network.
5. **NATIONAL ENVIRONMENTAL POLICY ACT ENACTED IN 1969**. Council on Environmental Quality implementation guidance developed in 1972



# Barrier Plan Chronology

6. **OPPOSITION TO THE BARRIER PLAN** - Potential adverse environmental effects were the most widely-cited concern of organized opponents to the Barrier Plan.

7. **ENVIRONMENTAL IMPACT STATEMENT CHALLENGED IN 1975** - Environmental Defense Fund challenged the adequacy of the project environmental impact statement (EIS). The court found that the project EIS did not meet NEPA requirements.

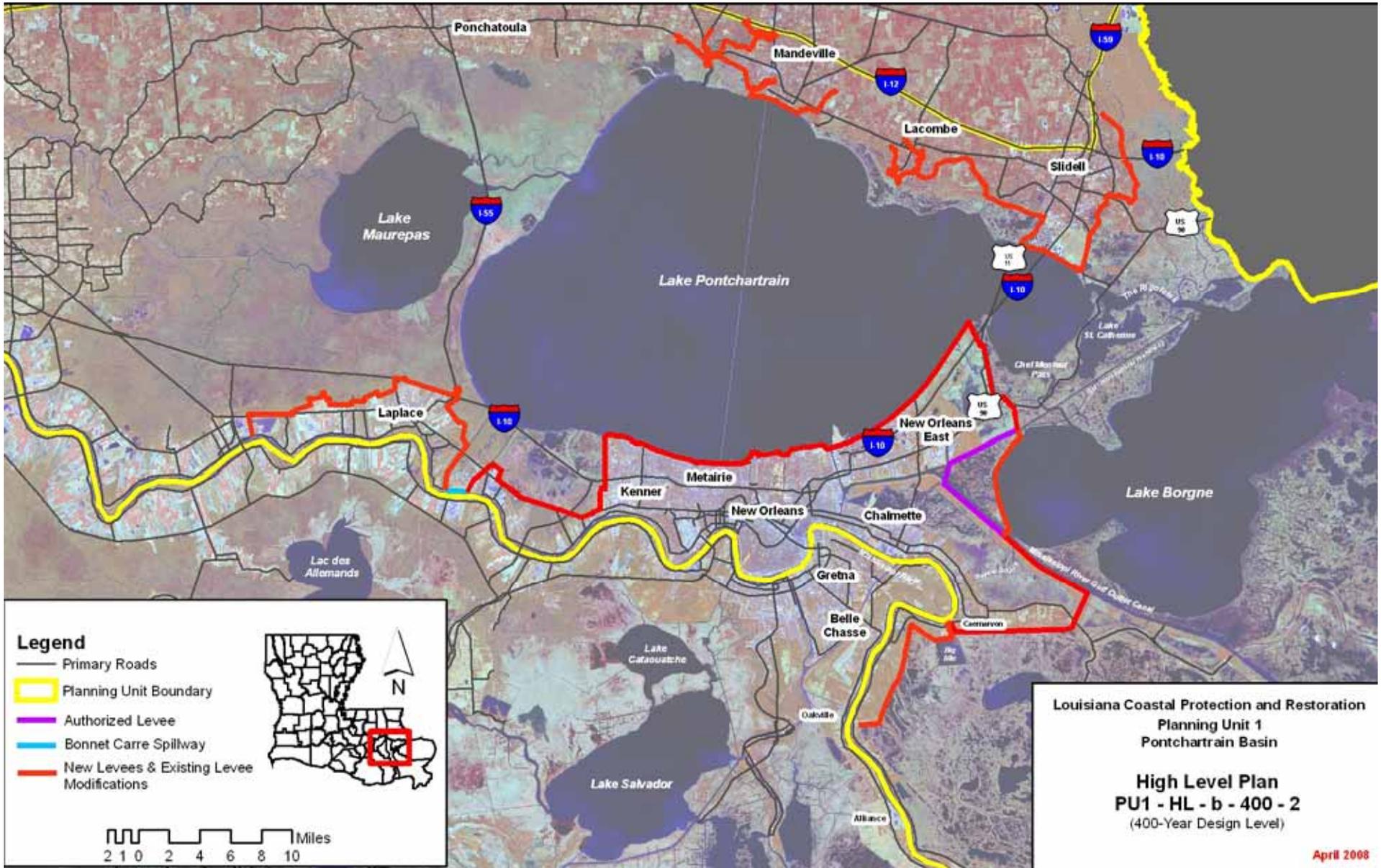
8. **FEDERAL COURT INJUNCTION IN 1977** - Court issued injunction on further construction of the Barrier Plan until the analytical deficiencies were resolved.

9. **INJUNCTION LIFTED FOR ALL NON-BARRIER ELEMENTS IN 1978** - Court lifts the injunction for all non-barrier elements (levees and floodwalls). Injunction effectively placed on hold project work on certain lakefront levees and the outfall canals, since the design and construction of those features would be affected by the final resolution of the proposed barriers.

10. **HIGH LEVEL PLAN APPROVED IN 1985** – The Corps initiated an engineering and environmental reevaluation of both the Barrier Plan and the alternative “High Level Plan,” which involved higher lakefront levees (southshore levees) in lieu of barrier complexes. The Director of Civil Works approved replacing the barriers with increased levee heights along the lakefront.

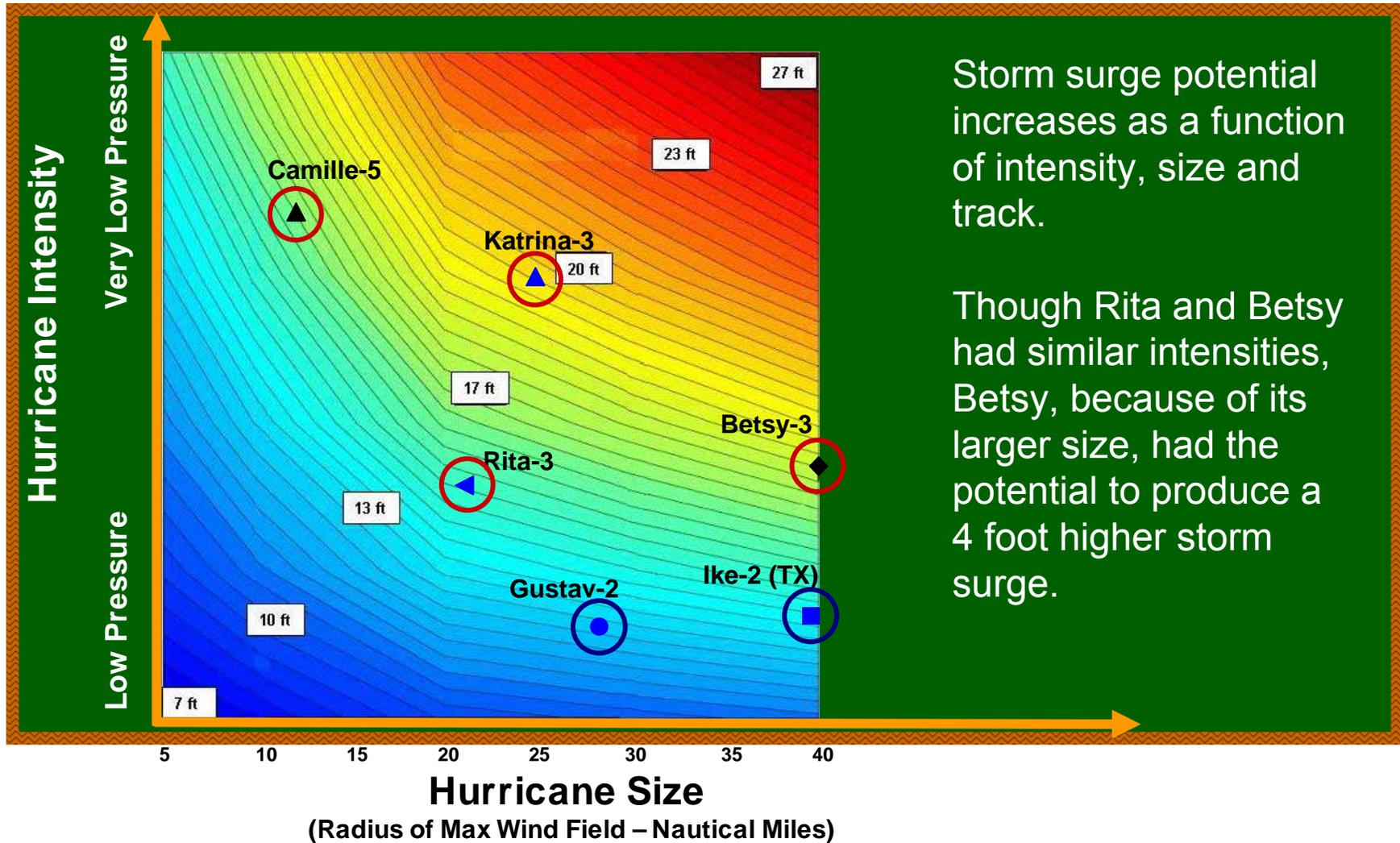


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# Hurricane Size Matters



Storm surge potential increases as a function of intensity, size and track.

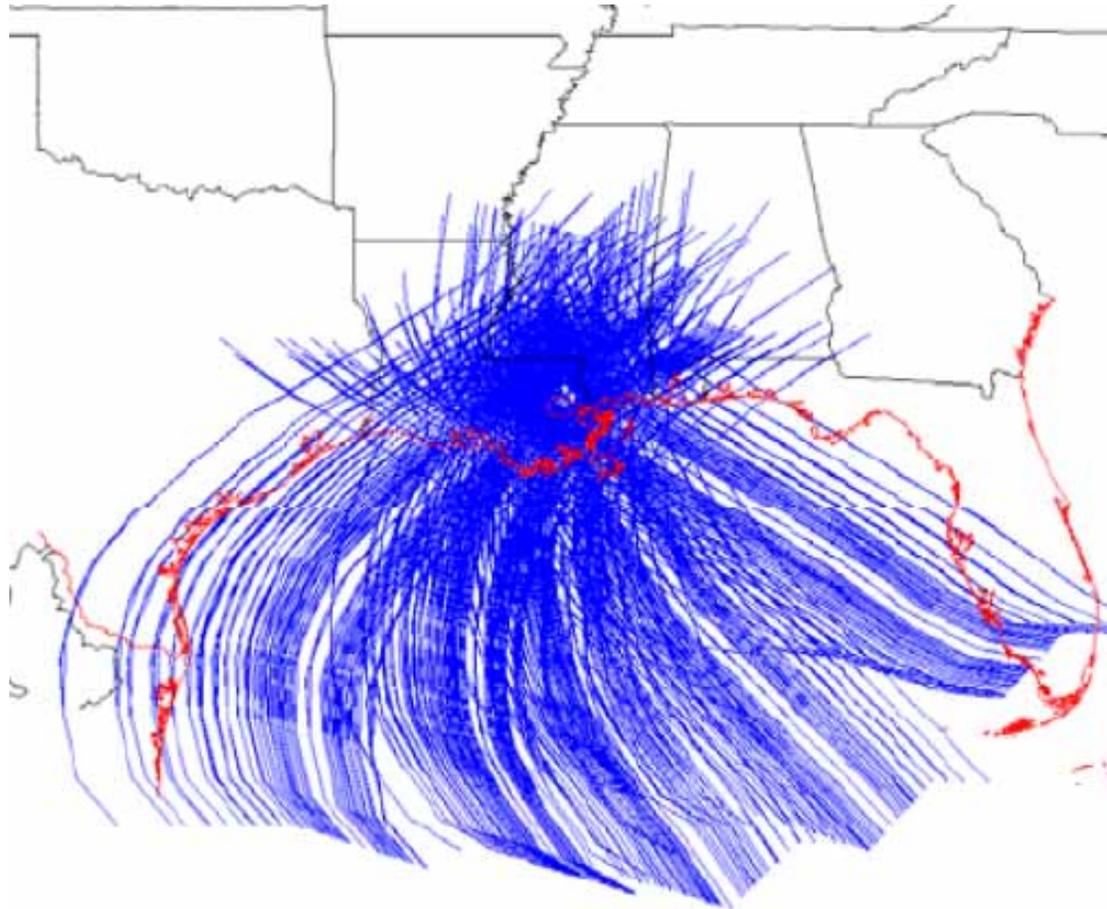
Though Rita and Betsy had similar intensities, Betsy, because of its larger size, had the potential to produce a 4 foot higher storm surge.



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# Comprehensive Assessment of Risk



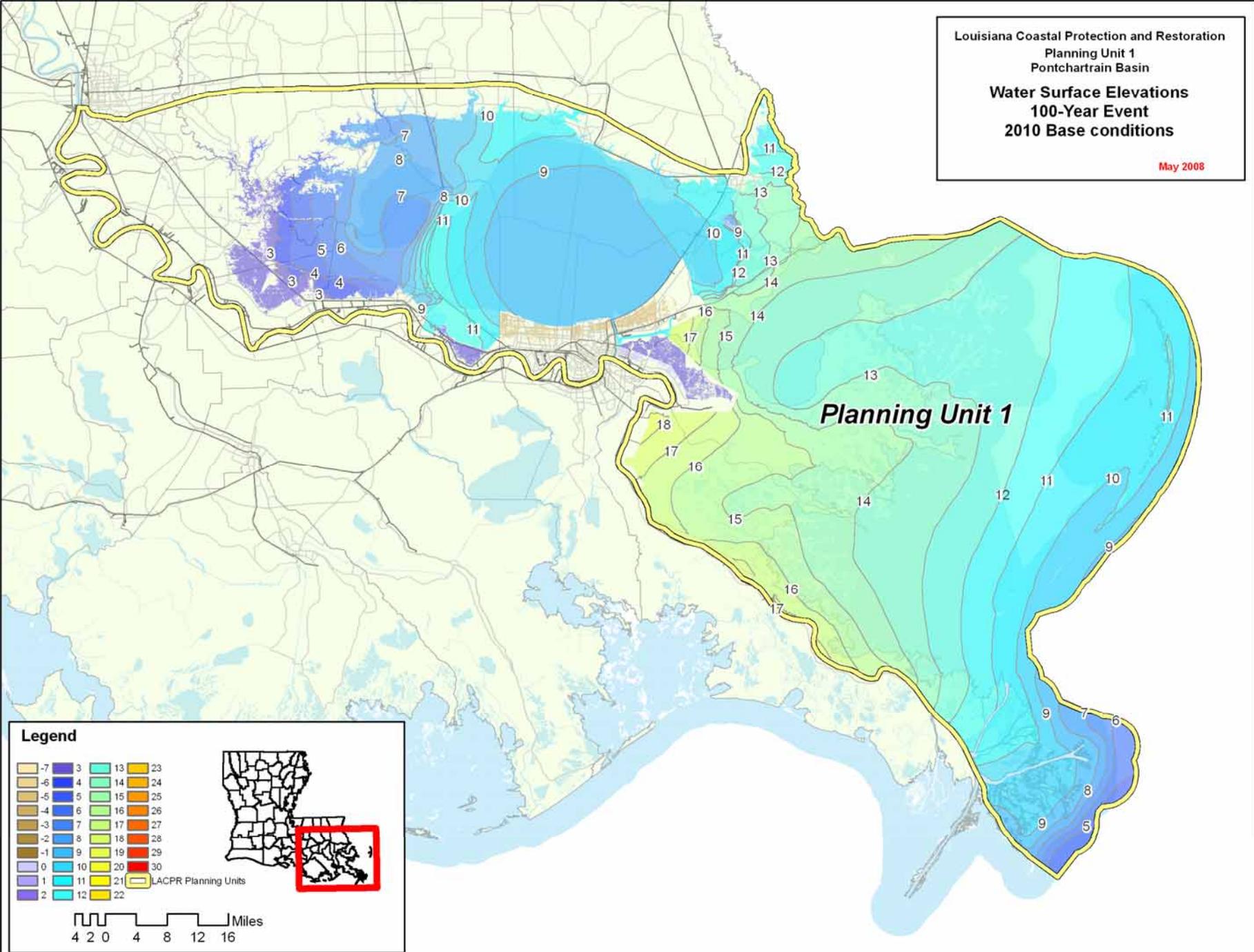
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# Hydrodynamic Analyses

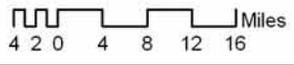
- Magnitude of the effort unprecedented
- DOD priority on supercomputers
- Basis of LACPR/MsCIP—beyond HSDRRS
- Risk-based analysis
  - 5 frequency events (10-yr, 100-yr, 400-yr, 1,000-yr, 2,000-yr)
  - 3 design levels (100-yr, 400-yr and 1,000-yr)
  - 3 confidence levels (10%, 50%, 90%)

Louisiana Coastal Protection and Restoration  
 Planning Unit 1  
 Pontchartrain Basin  
**Water Surface Elevations  
 100-Year Event  
 2010 Base conditions**  
 May 2008

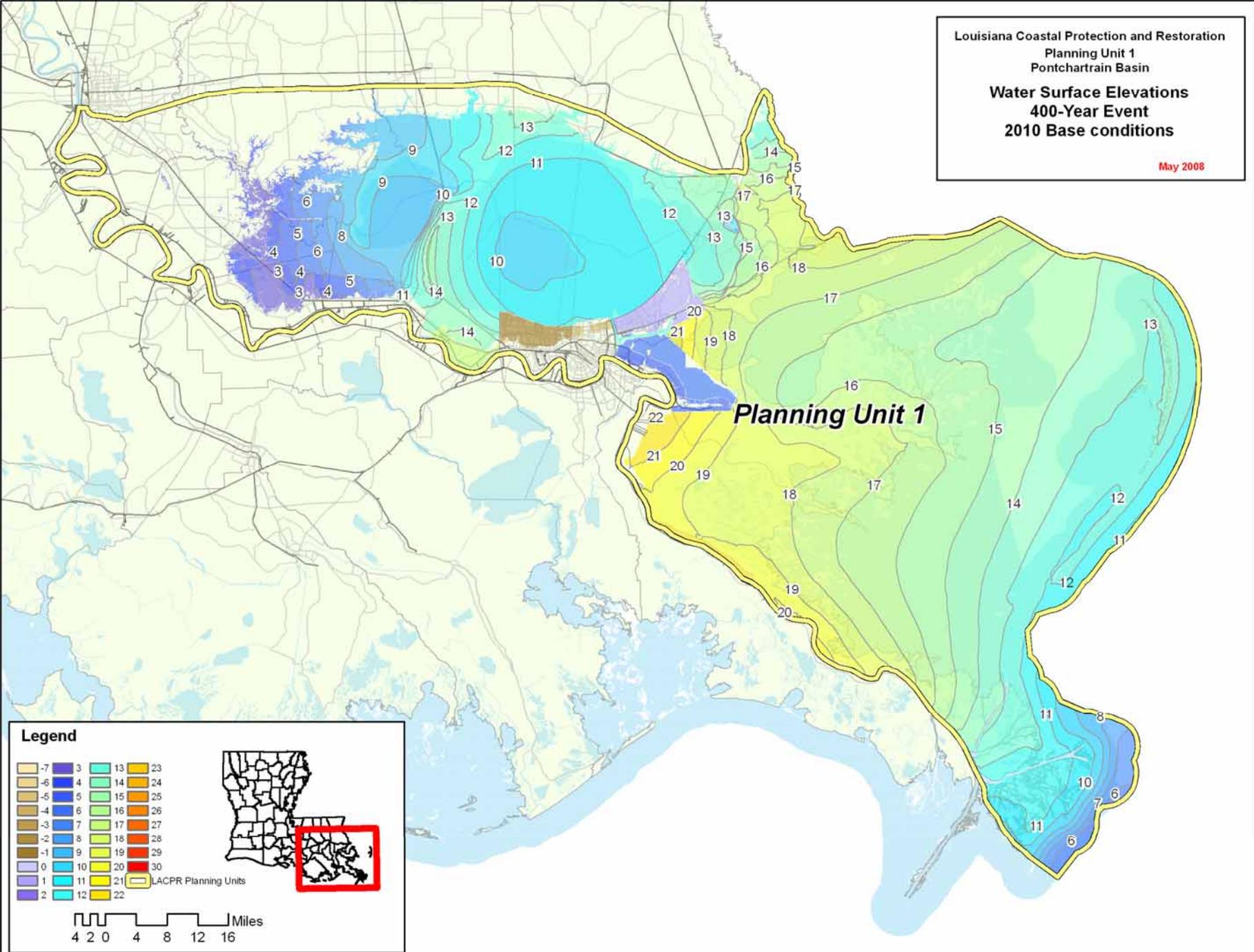


**Legend**

-7	3	13	23
-6	4	14	24
-5	5	15	25
-4	6	16	26
-3	7	17	27
-2	8	18	28
-1	9	19	29
0	10	20	30
1	11	21	
2	12	22	



Louisiana Coastal Protection and Restoration  
 Planning Unit 1  
 Pontchartrain Basin  
**Water Surface Elevations  
 400-Year Event  
 2010 Base conditions**  
 May 2008



**Legend**

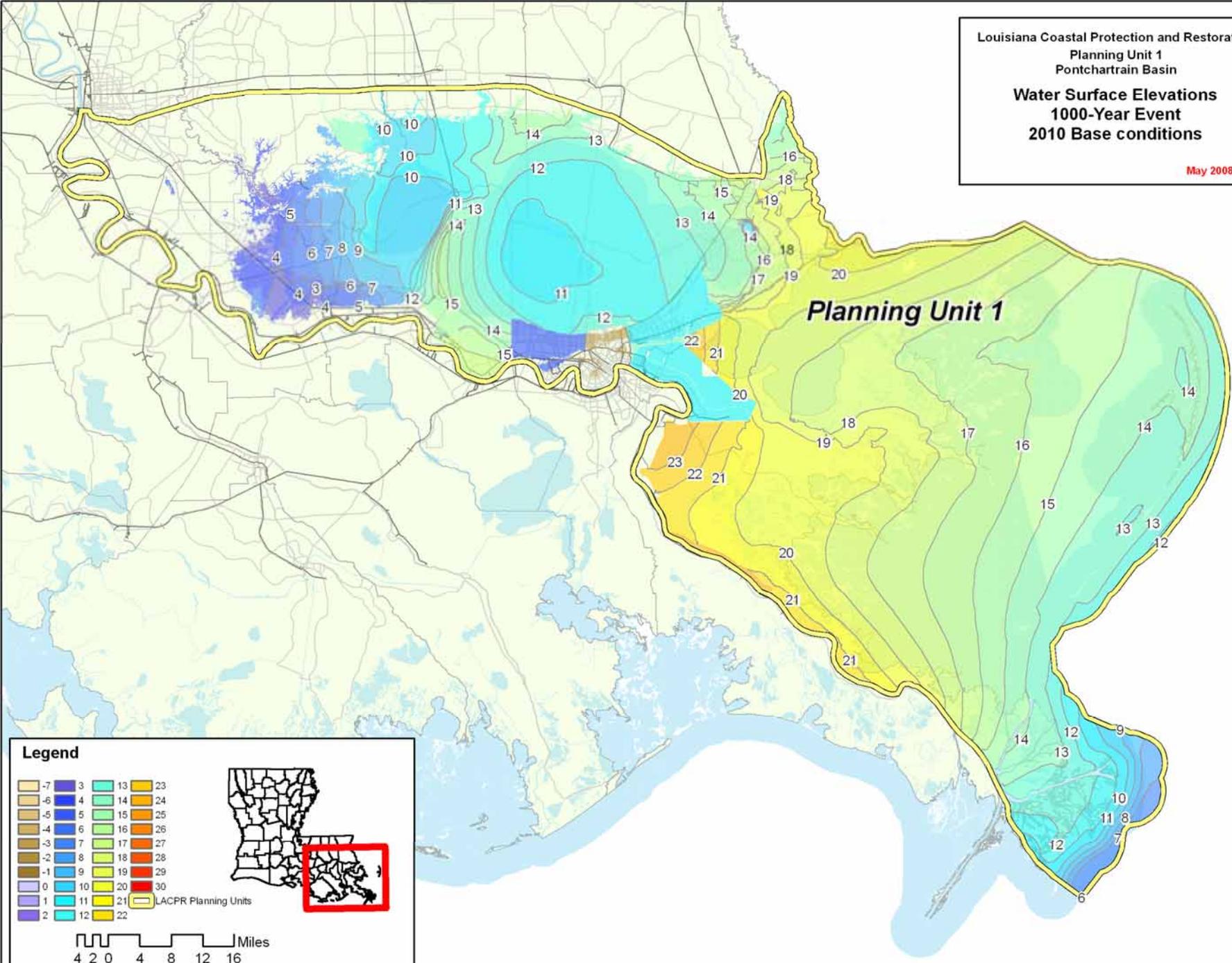
-7	3	13	23
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-3	7	17	27
-2	8	18	28
-1	9	19	29
0	10	20	30
1	11	21	
2	12	22	

LACPR Planning Units

Miles  
 4 2 0 4 8 12 16

Louisiana Coastal Protection and Restoration  
 Planning Unit 1  
 Pontchartrain Basin  
**Water Surface Elevations  
 1000-Year Event  
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**Planning Unit 1**



**Legend**

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0	10	20	30
1	11	21	LACPR Planning Units
2	12	22	

Miles  
 4 2 0 4 8 12 16



# Economic Evaluation

- GIS-based
- 72,000 census blocks
- 2 million structures
- Inventory of residential, non-residential, agriculture, vehicle, transportation, emergency costs
- 111 alternatives evaluated in detail
- 4 future scenarios
  - 2 development & land use projections
  - 2 relative sea level rise projections



# Environmental Analysis

- Multi-agency team
- Formulated coastal plans targeting long-term sustainability of the coastal landscape
- Evaluated 100 years of performance for 5 coastal plans
- Assessed potential direct/indirect impacts of structural plans



## Flood Damages

- In May 1995, 6-hour rainfall amounts averaging 12 inches caused extensive flooding in Orleans, Jefferson, and St. Tammany Parishes.
- Since 1978, the three parishes have sustained damages of over \$1 billion in rainfall flooding events.



# Congressional Authorizations

- Fiscal Year 1996 Energy and Water Development Appropriations Act  
(Authorized work from three Corps of Engineers Reconnaissance Reports)
- Water Resources Development Act of 1996  
(Added work from fourth COE Recon Report)



# Terms of the Authorizations

- authorized all economically justified work described in previously completed New Orleans District reports
- established that the project would be cost-shared at a rate of 75% Federal and 25% non-Federal (min 5% cash contribution)
- directed that any work performed by the non-Federal interests subsequent to the reports and determined to be a compatible and integral part of the projects shall be creditable



# Study Reports

- Schneider Canal, Slidell, Louisiana Hurricane Protection Reconnaissance Report (May 1990)
- The Tangipahoa, Tchefuncte and Tickfaw Rivers Reconnaissance Report (June 1991)
- Jefferson and Orleans Parishes, Louisiana Urban Flood Control and Water Quality Management Reconnaissance Report (July 1992)
- St. Tammany Parish, Louisiana Reconnaissance Report (July 1996)



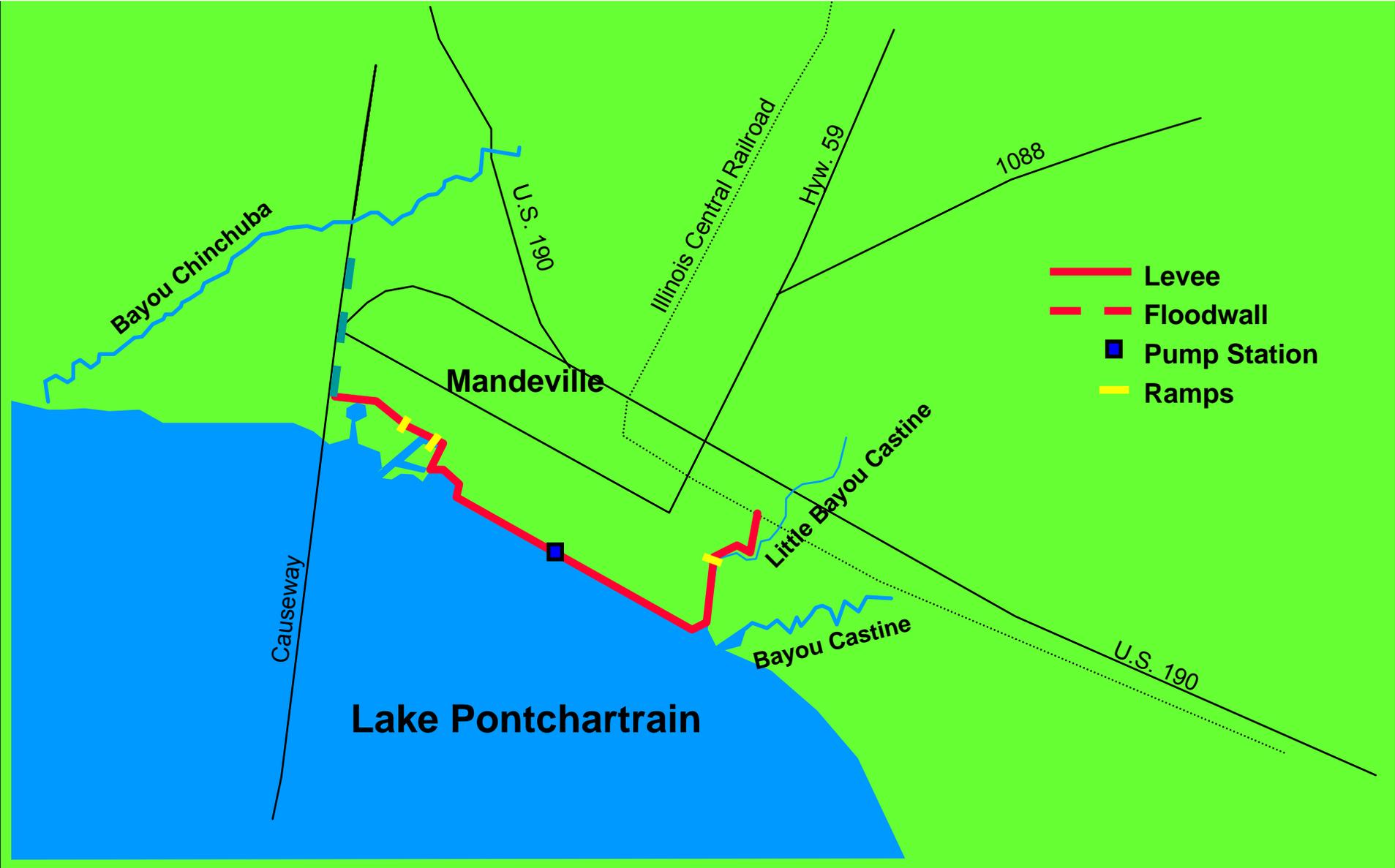
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**Team New Orleans**



# **St. Tammany Parish Work Authorized in Tangipahoa, Tchefuncte, and Tickfaw Rivers Reconnaissance Report**

- **Mandeville Hurricane Protection**
  - No support for this plan
  - Corps not currently pursuing implementation
- **Mile Branch Channel Improvements**
  - Corps unable to develop plan supported by City of Covington

# St. Tammany—Mandeville Hurricane Protection



# St. Tammany—Mile Branch Channel Improvements

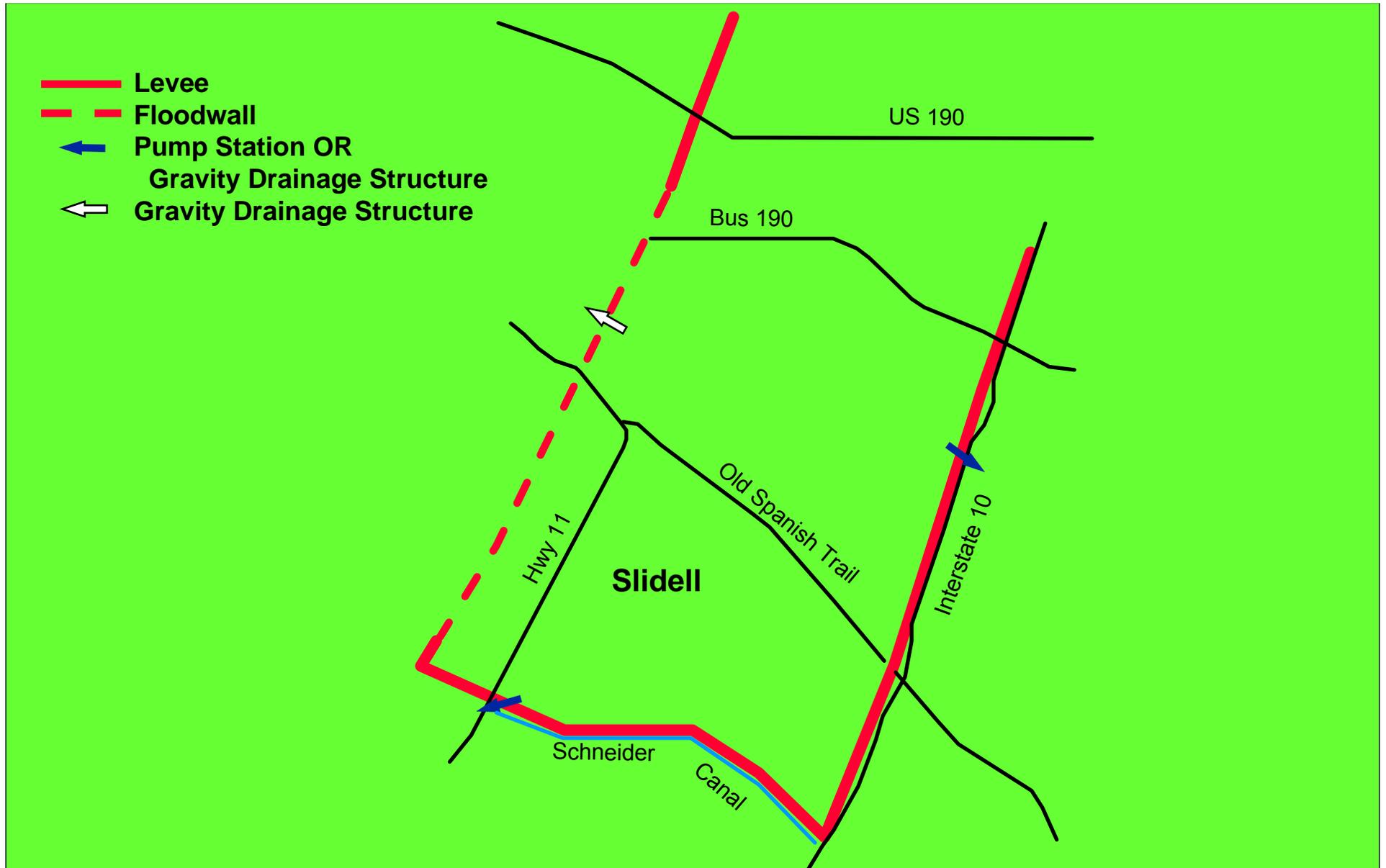




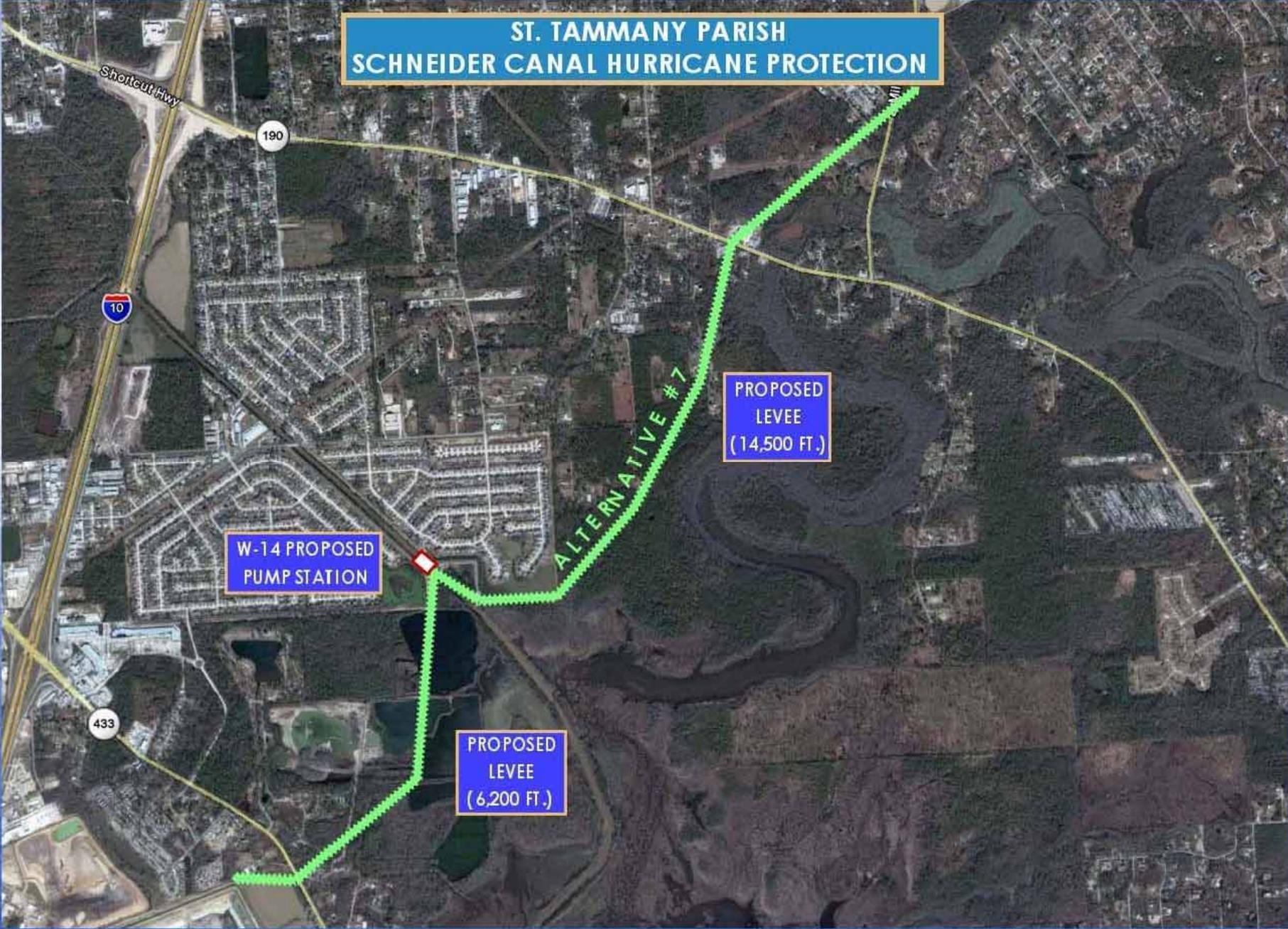
## **St. Tammany Parish Work Authorized in Schneider Canal, Slidell Reconnaissance Report**

- **Schneider Canal Hurricane Protection**
  - Working with St. Tammany Parish and City of Slidell to develop project management plan for Section 533(d) study
  - Parish has proposed a new alignment east of original study area
  - Project management plan in development

# St. Tammany—Schneider Canal Hurricane Protection



**ST. TAMMANY PARISH  
SCHNEIDER CANAL HURRICANE PROTECTION**

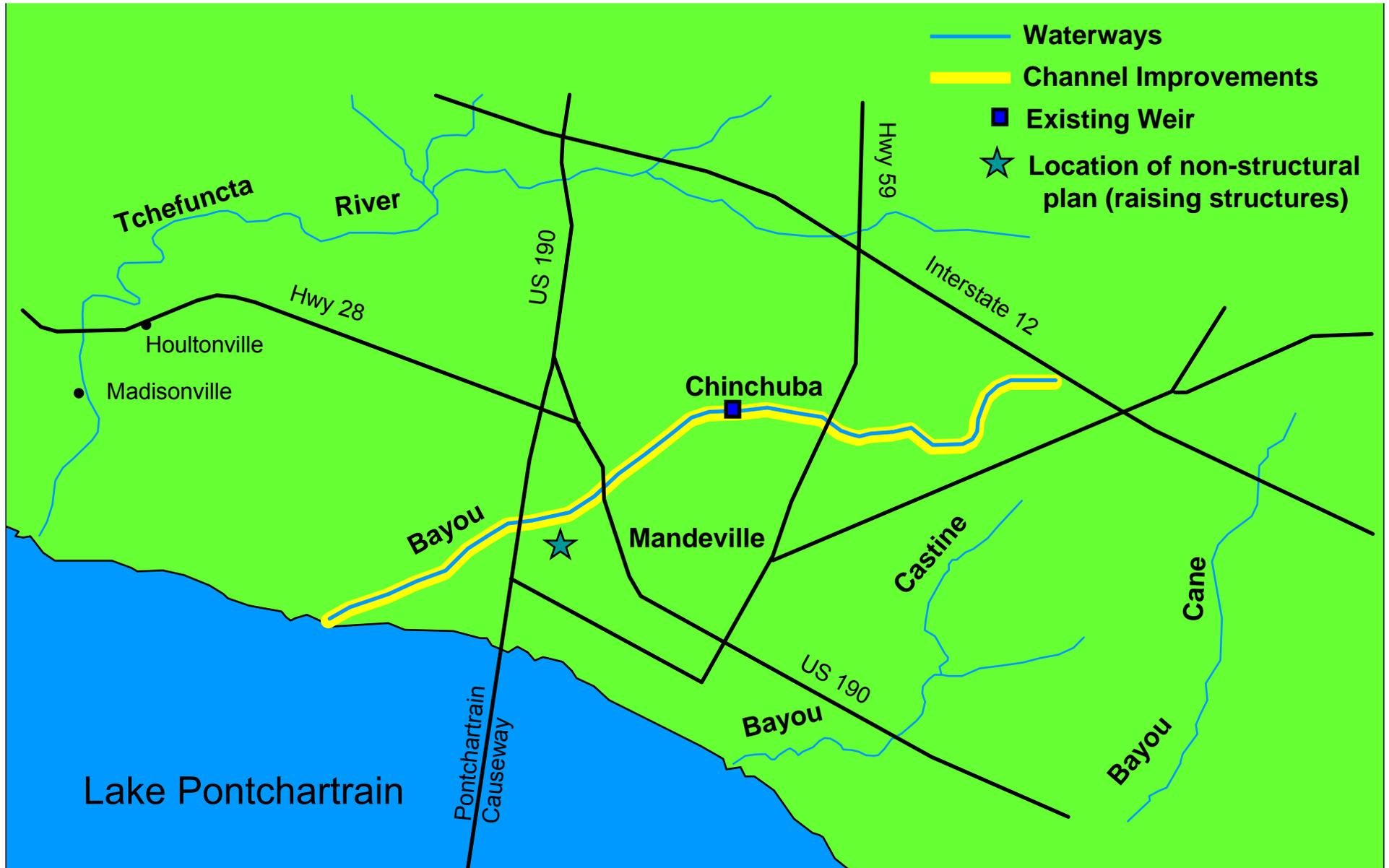




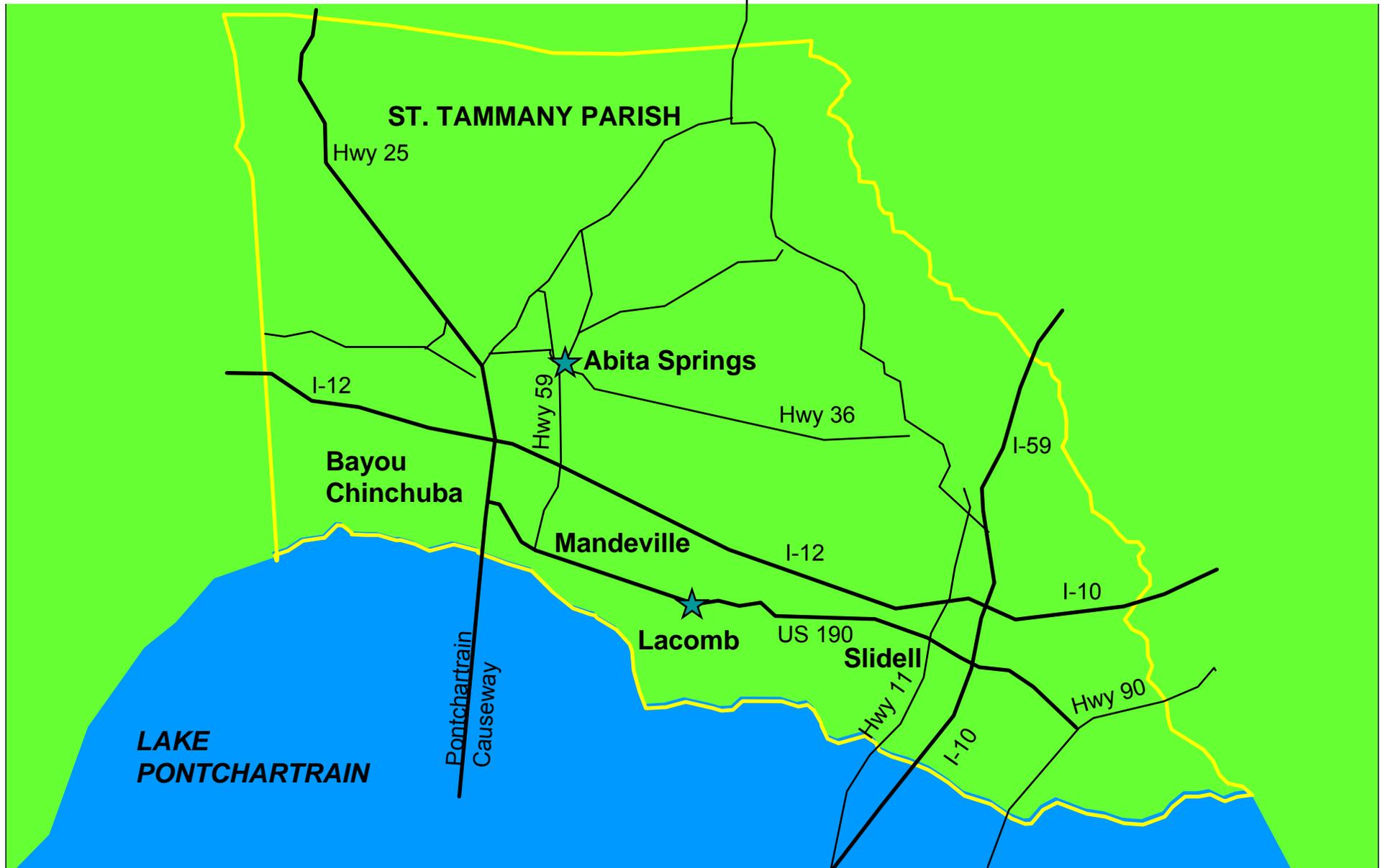
## **St. Tammany Parish Work Authorized in St. Tammany Parish, La. Reconnaissance Report**

- **Bayou Chinchuba**
  - Channel Improvement Plan or
  - Structure Raising
  - no implementable plan has been developed
  - **Abita Springs and Lacombe Structure Raising (raise homes & businesses)**
  - no non-federal sponsor
- **Slidell Area Plan**
  - W-13 Canal Basin Channel Improvements
  - W-14 Canal Basin Detention Ponds and Channel Improvements
  - W-15 Canal Basin Drainage Improvements

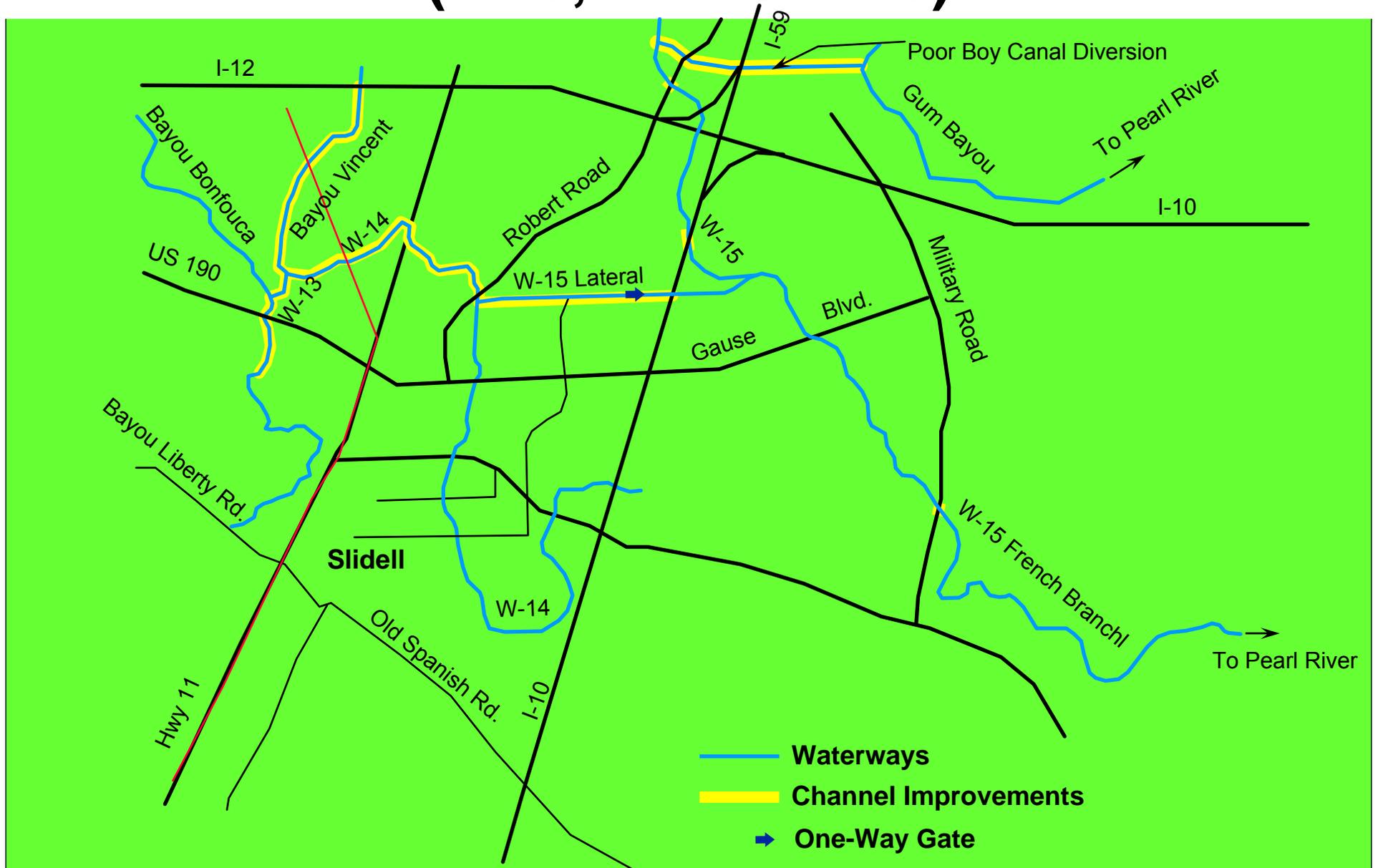
# St. Tammany—Bayou Chinchuba Channel Improvements or Structure Raising



# St. Tammany—Abita Springs and Lacombe Structure Raising



# St. Tammany - Slidell Area Plan (W13, W14 & W15)





## St. Tammany—Slidell W-14 Canal

Scope of original plan reduced at request of St. Tammany Parish

- channel improvements
- bridge replacements
- detention ponds
- pump station

Section 533(d) report in preparation,  
scheduled for submission in July 2009



PROPOSED W-14  
CANAL WIDENING  
(4.1 MILES)

PROPOSED POND  
AT ROBERT BLVD.

REPLACE BRIDGE  
AT INDEPENDENCE DR.

REPLACE BRIDGE  
AT FLORIDA AVE.

REPLACE BRIDGE  
AT COUSIN ST.

PROPOSED POND  
AT DANAY ST.

PROPOSED  
UPPER POND

PROPOSED  
BOTTOM POND

**ST. TAMMANY PARISH  
SLIDELL AREA W-14 CANAL PROJECT**

W-14 PROPOSED  
PUMP STATION