HSDRRS Project Updates

CEMVN/NGO Quarterly Meeting

22 January 2010

US Army Corps of Engineers
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HSDRRS Mitigation

Impacts in IERs

IER	Parish		Non-wet BLH (Acres)	Non-wet BLH AAHUs	Marsh (Acres)	Marsh AAHUs	Swamp (Acres)	Swamp AAHUs	Wetland BLH Acres	Wetland BLH AAHUs	Water Bottoms Acres
1	St. Charles	Protected Side					137.50	73.97			
		Flood Side					143.57	110.97	11.33	8.09	
1 Supp	St. Charles	Protected Side									
		Flood Side									
2	Jefferson/St. Charles	Protected Side									75.00
		Flood Side			17.00	9.00					
2 Supp	Jefferson/St. Charles	Protected Side									
		Flood Side			16.50	11.45	2.00	1.55			
3	Jefferson	Protected Side									26.40
		Flood Side									
3 Supp	Jefferson	Protected Side									277
		Flood Side									
4	Orleans	Protected Side									
		Flood Side									
5	Jefferson/Orleans	Protected Side									3.29
		Flood Side									
6	Orleans	Protected Side									6.90
		Flood Side			4.00						
6 Supp	Orleans	Protected Side									
		Flood Side									
7	Orleans	Protected Side			100.40	36.80			151.70	79.30	106.00
		Flood Side			70.00	37.20			30.00	11.90	
8	St. Bernard	Protected Side									0.30
		Flood Side									
9	St. Bernard	Protected Side									
		Flood Side	10.00	4.65	1.90	1.20			1.16	0.66	
10	St. Bernard	Protected Side			106.55	57.31			38.32	16.44	95.00
		Flood Side			323.04	209.94			35.31	15.22	
11 Borgne	Orleans/St. Bernard	Protected Side									
		Flood Side			122.00	24.33			15.00	2.59	
11 Pontch	Orleans	Protected Side									7.00
		Flood Side									
12	Jefferson/Plaquemines	Protected Side							251.70	177.30	
		Flood Side					74.90	38.50	2.30	1.90	
13	Plaquemines	Protected Side							13.00	7.80	
		Flood Side					39.00	28.27	19.00	10.59	
14	Jefferson	Protected Side							45.00	30.00	
		Flood Side					29.75	17.02	45.50	37.17	
14 Supp	Jefferson	Protected Side									
		Flood Side					42.00	24.00			
15	Jefferson	Protected Side							23.50	6.00	
		Flood Side							3.60	1.35	
16	Jefferson	Protected Side									
		Flood Side			137.80	66.30			78.60	36.20	
16 Supp	Jefferson	Protected Side									
		Flood Side									
17	Jefferson	Protected Side							5.50	2.69	
		Flood Side					19.00	17.09			
Borrow 18	St. Bernard/Orleans/ Jefferson/ Plaquemines	Protected Side	276.90	89.29							
		Flood Side									
Borrow 22	Jefferson/ Plaquemines	Protected Side	86.93	28.90							
		Flood Side									
Borrow 25	Jefferson/Orleans/ Plaquemines	Protected Side	854.70	243.10							
		Flood Side									
Borrow 28	St. Bernard/ Jefferson/ Plaquemines	Protected Side	19.10	11.60							
		Flood Side									
TOTAL		Protected Side	1237.63	372.89	206.95	94.11	137.50	73.97	528.72	319.53	596.89
		Flood Side	10.00	4.65	692.24	359.42	350.22	237.40	241.80	125.67	
			1,247.63	377.54	899.19	453.53	487.72	311.37	770.52	445.20	596.89

Blue = actual (after construction)
Green = IER Complete. Final
Yellow = IER or IERS in process.
Pink = Impacts in 404c or refuge will be mitigated for in these areas
Updated: 21 Jan 10

Totals	Acres	AAHUs
Protected	2,111	861
Flood	1,891	727
	4,002	1,588

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Current Working Impacts

IER	Parish		Non-wet BLH (Acres)	Non-wet BLH AAHUs	Marsh (Acres)	Marsh AAHUs	Swamp (Acres)	Swamp AAHUs	Wetland BLH Acres	Wetland BLH AAHUs	Water Bottoms Acres
1	St. Charles	Protected Side					73.23	39.53			
		Flood Side					38.48	29.73	0.00	0.00	
1 Supp	St. Charles	Protected Side									
		Flood Side									
2	Jefferson/St. Charles	Protected Side									75.00
		Flood Side			17.00	9.00					
2 Supp	Jefferson/St. Charles	Protected Side									
		Flood Side			16.50	11.45	2.00	1.55			
3	Jefferson	Protected Side									26.40
		Flood Side									
3 Supp	Jefferson	Protected Side									277
		Flood Side									
4	Orleans	Protected Side									
		Flood Side									
5	Jefferson/Orleans	Protected Side									3.29
		Flood Side									
6	Orleans	Protected Side									6.90
		Flood Side			4.00						
6 Supp	Orleans	Protected Side									
		Flood Side									
7	Orleans	Protected Side			100.40	36.80			152.00	79.30	0.00
		Flood Side			70.00	37.20			30.00	11.90	
8	St. Bernard	Protected Side									0.30
		Flood Side									
9	St. Bernard	Protected Side									
		Flood Side	10.00	4.65	1.90	1.20			1.16	0.66	
10	St. Bernard	Protected Side			106.55	57.31			38.32	16.44	50.00
		Flood Side			323.04	209.94			35.31	15.22	
11 Borgne	Orleans/St. Bernard	Protected Side									
		Flood Side			122.00	24.33			15.00	2.59	
11 Pontch	Orleans	Protected Side									
		Flood Side									
12	Jefferson/Plaquemines	Protected Side							251.70	177.30	
		Flood Side					74.90	38.50	2.30	1.90	
13	Plaquemines	Protected Side							13.00	7.80	
		Flood Side					39.00	28.27	19.00	10.59	
14	Jefferson	Protected Side							45.00	30.00	
		Flood Side					29.75	17.02	45.50	37.17	
14 Supp	Jefferson	Protected Side									
		Flood Side					42.00	24.00			
15	Jefferson	Protected Side							23.50	6.00	
		Flood Side							3.60	1.35	
16	Jefferson	Protected Side									
		Flood Side			137.80	66.30			78.60	36.20	
16 Supp	Jefferson	Protected Side									
		Flood Side									
17	Jefferson	Protected Side							5.50	2.69	
		Flood Side					19.00	17.09			
Borrow 18	St. Bernard/Orleans/ Jefferson/ Plaquemines	Protected Side	255.90	79.41							
		Flood Side									
Borrow 22	Jefferson/ Plaquemines	Protected Side									
		Flood Side									
Borrow 25	Jefferson/Orleans/ Plaquemines	Protected Side									
		Flood Side									
Borrow 28	St. Bernard/ Jefferson/ Plaquemines	Protected Side									
		Flood Side									
WBV	Jefferson	Protected Side							716.00	361.32	
		Flood Side							684.00	395.23	
TOTAL		Protected Side	255.90	79.41	206.95	94.11	73.23	39.53	529.02	319.53	438.89
		Flood Side	10.00	4.65	692.24	359.42	245.13	156.16	230.47	117.58	
			265.90	84.06	899.19	453.53	318.36	195.69	759.49	437.11	438.89

Blue = actual (after construction)
Green = IER Complete. Final numbers.
Yellow = IER or IERS in process. Preliminary
Pink = Impacts in 404c or refuge will be mitigated for in these areas
Updated: 21 Jan 10

Totals

With WBV past mit

	Acres	AAHUs
Protected	1,781	894
Flood	2,301	2,098
	4,082	**2,992**

Without WBV past mit

	Acres	AAHUs
Protected	1,065	533
Flood	1,617	638
	2,682	**1,170**

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Current Working Impacts HSDRRS & original WBV construction

Habitat Type	Acres	AAHUs
BLH non-wet	265	84
Marsh	899	454
Swamp	318	196
BLH wet	2159	1194

Mitigation Basins

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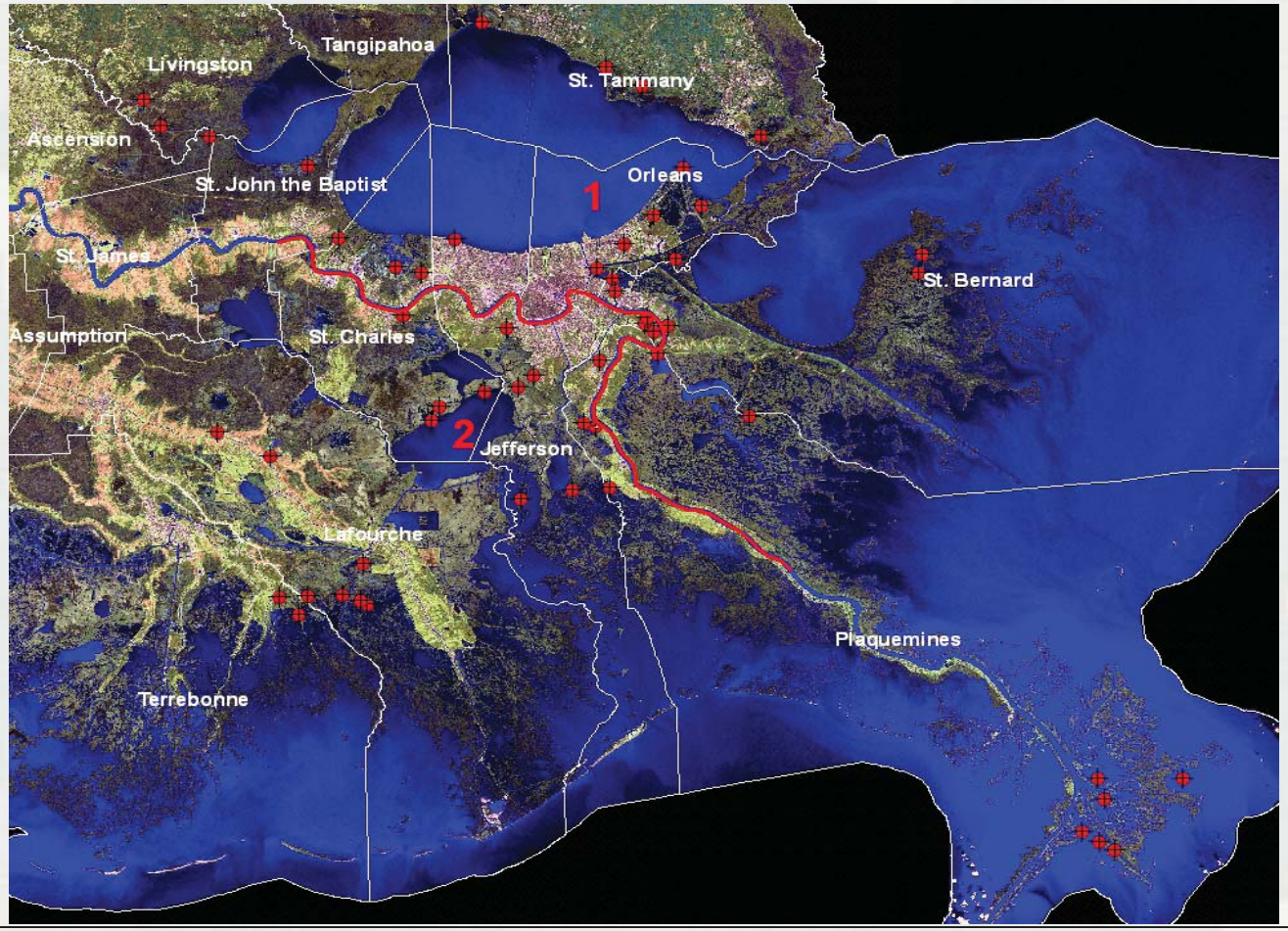
Totals by Hydrologic Basin

Basin			Non-wet BLH (Acres)	Non-wet BLH AAHUs	Marsh (Acres)	Marsh AAHUs	Swamp (Acres)	Swamp AAHUs	Wetland BLH (Acres)	Wetland BLH AAHUs	Water Bottoms (Acres)
1	**East Bank** (IERs 1-11+ Borrow)	Protected Side	226.00	68.79	206.95	94.11	73.23	39.53	190.32	95.74	
		Flood Side	10.00	4.65	554.44	293.12	40.48	31.28	81.47	30.37	438.89
		Total	**236.00**	**73.44**	**761.39**	**387.23**	**113.71**	**70.81**	**271.79**	**126.11**	**438.89**
2	**West Bank** (IERs 12-17 + Borrow)	Protected Side	29.90	10.62	0.00	0.00	0.00	0.00	338.70	223.79	0.00
		Flood Side	0.00	0.00	137.80	66.30	204.65	124.88	149.00	87.21	
		Total	**29.90**	10.62	**137.80**	66.30	**204.65**	124.88	**487.70**	311.00	**0.00**
1 & 2	**Overall Totals**		**265.90**	84.06	**899.19**	453.53	**318.36**	195.69	**759.49**	437.11	**438.89**
	W/ WBV old								**2159.49**	1193.66	

AEP Criteria

- **Success Probability –**
  - Risk/uncertainty to success- (increased exposure to environmental conditions, RE, lack of proven technology)
  - Sustainability (eg. Self sustaining hydrology)
  - Time to construct – to get to construction (simple over complex) and to construct the project itself
  - Complexity- difficulty of management/operation, local sponsor
- **In Basin** (figure 1)**, In Kind** (by habitat type as well as by protected or floodside)
  - Proximity to impacts
  - Synergy with other restoration and flood control actions
- **Site Qualities –**
  - Adjacent to a refuge or other public lands
  - Potential for expansion
- **Mitigation Type –** (prioritized as per EPA/Corps regs)
  - Restoration
  - Enhancement
  - Establishment- New construction
  - Preservation
- **Cost –**
  - Fully funded including O&M
  - Constructability
  - Cost per acre/Habitat Unit

Potential Mitigation Sites



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Current Mitigation Projects

- **Task Force Guardian:** Mitigation for New Orleans East and Walker Road borrow pit impacts, 57.5 acres of BLH wet - Bayou Sauvage Mitigation Project
- **Task Force Unwatering:** Mitigation for impacts incurred for repairing the Braithwaite/Scarsdale breaches, 21.3 acres of marsh - Big Mar Mitigation Project
- **LPV:** Mitigation from impacts incurred during the construction of the LPV HPS, 1,300 acres of marsh- Manchac Wildlife Management Area Shoreline Protection Modification

Questions?

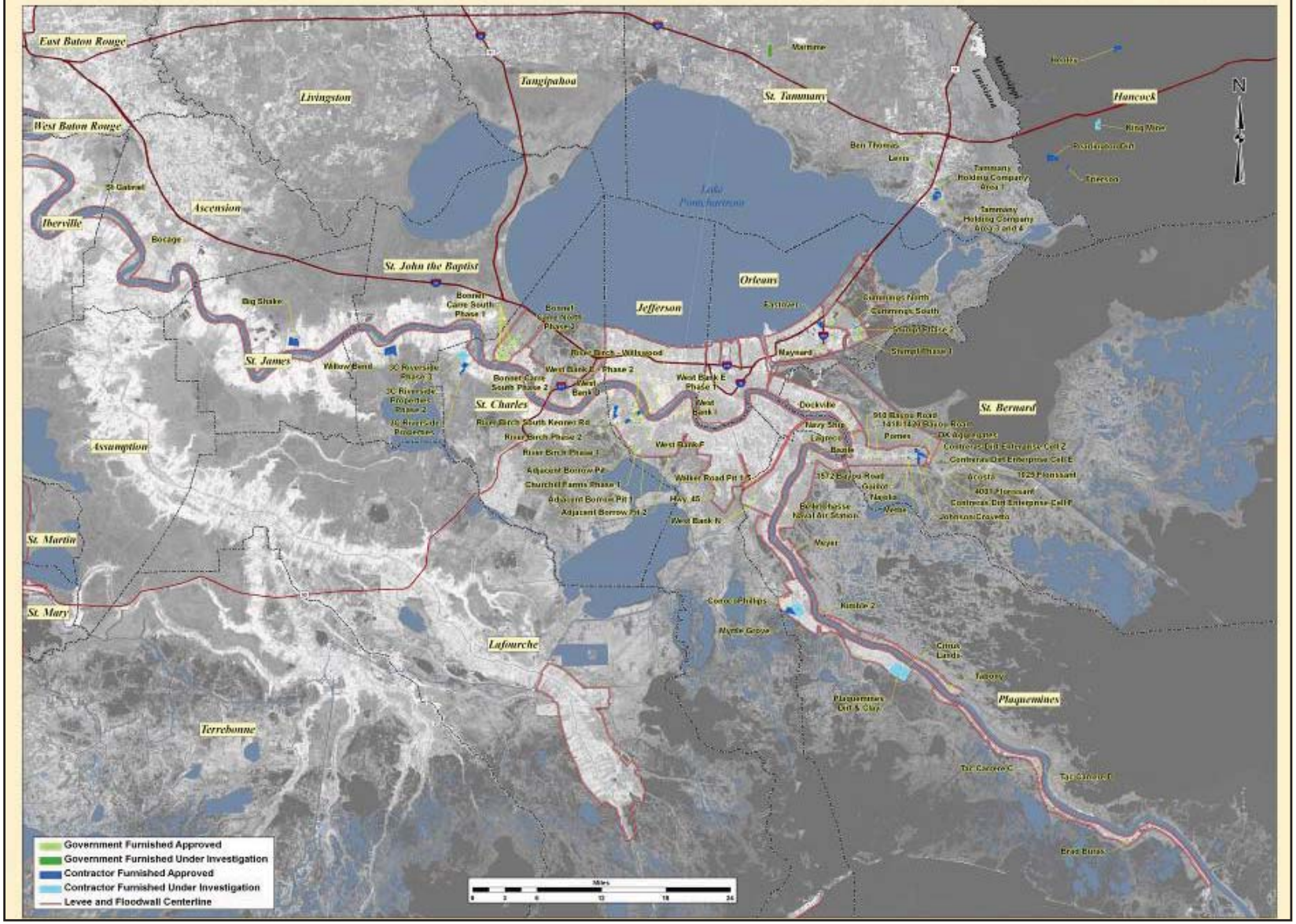
HSDRRS Borrow

HSDRRS Borrow

- Current Need
  - Remaining borrow requirement for HSDRRS contracts to be awarded is ~53 mcy
- Current Borrow Estimates
  - Identified: ~444 mcy
    - Approved: ~136 mcy (36 mcy GF, 100 mcy CF)
  - Suitable pending IER approval: ~44 mcy
  - Unsuitable: ~253 mcy
  - Under investigation: 11 mcy

GF: Government-furnished borrow material / CF: Contractor-furnished borrow material

Greater New Orleans Hurricane and Storm Damage Risk Reduction System Borrow Areas



Borrow IERs

- Approved IERs
  - 4 GF (IER 18, 22, 25, 28); 25 sites
  - 5 CF (IER 19, 23, 26, 29, 30); 26 sites
- Pending IERs
  - IER 32: CF borrow
    - Seven proposed sites
    - Decision Record for COL Lee's recommendation on proposed action January 2010
  - IER 31: CF borrow
    - Approximately seven proposed sites
    - Expected Public Review Period June 2010
  - IER 24: Stockpile areas
    - Three proposed stockpile areas to be used for Bonnet Carré material (Jefferson and St. Charles Parish projects)
    - Expected Public Review Period February 2010

The Borrow Team will continue to evaluate potential GF and CF borrow areas in addition to these IERs.

IER 24: Stockpile Areas

- Three proposed sites near the Bonnet Carré Spillway

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IER 32: Contractor-Furnished Borrow Material #6

- **Seven proposed sites in the metropolitan New Orleans area**

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IER 31: Contractor-Furnished Borrow Material #7

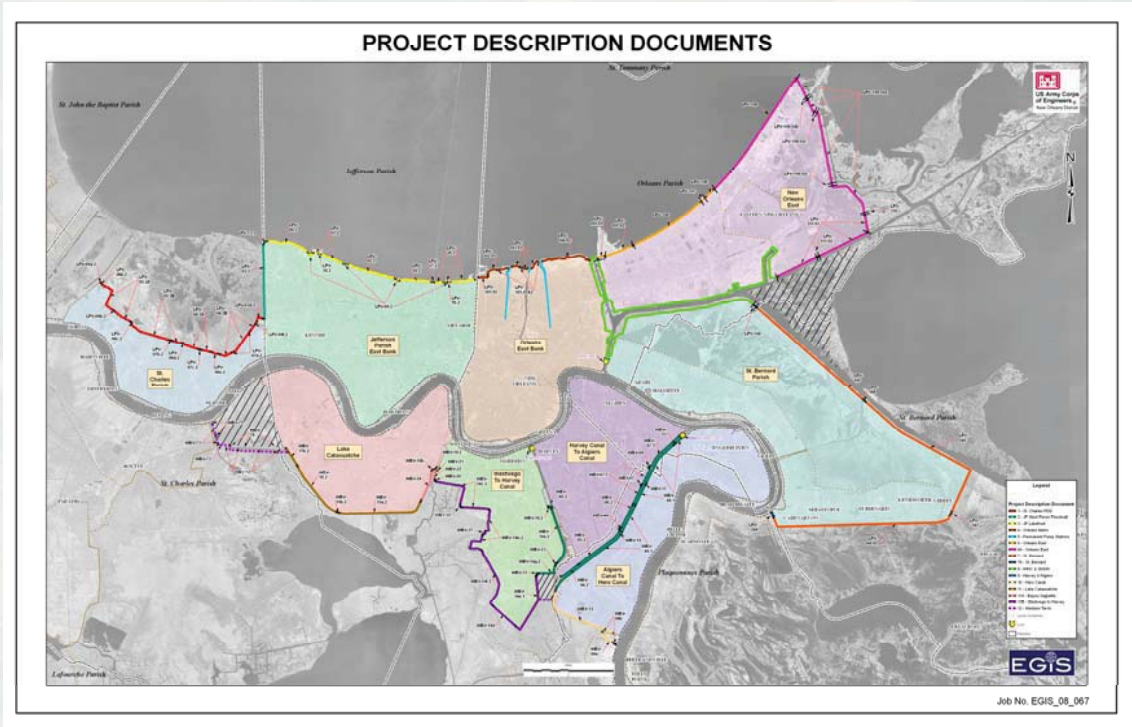
- Approximately seven sites in the metropolitan New Orleans Area
- Sites will be finalized before IER public release in June 2010

Questions?

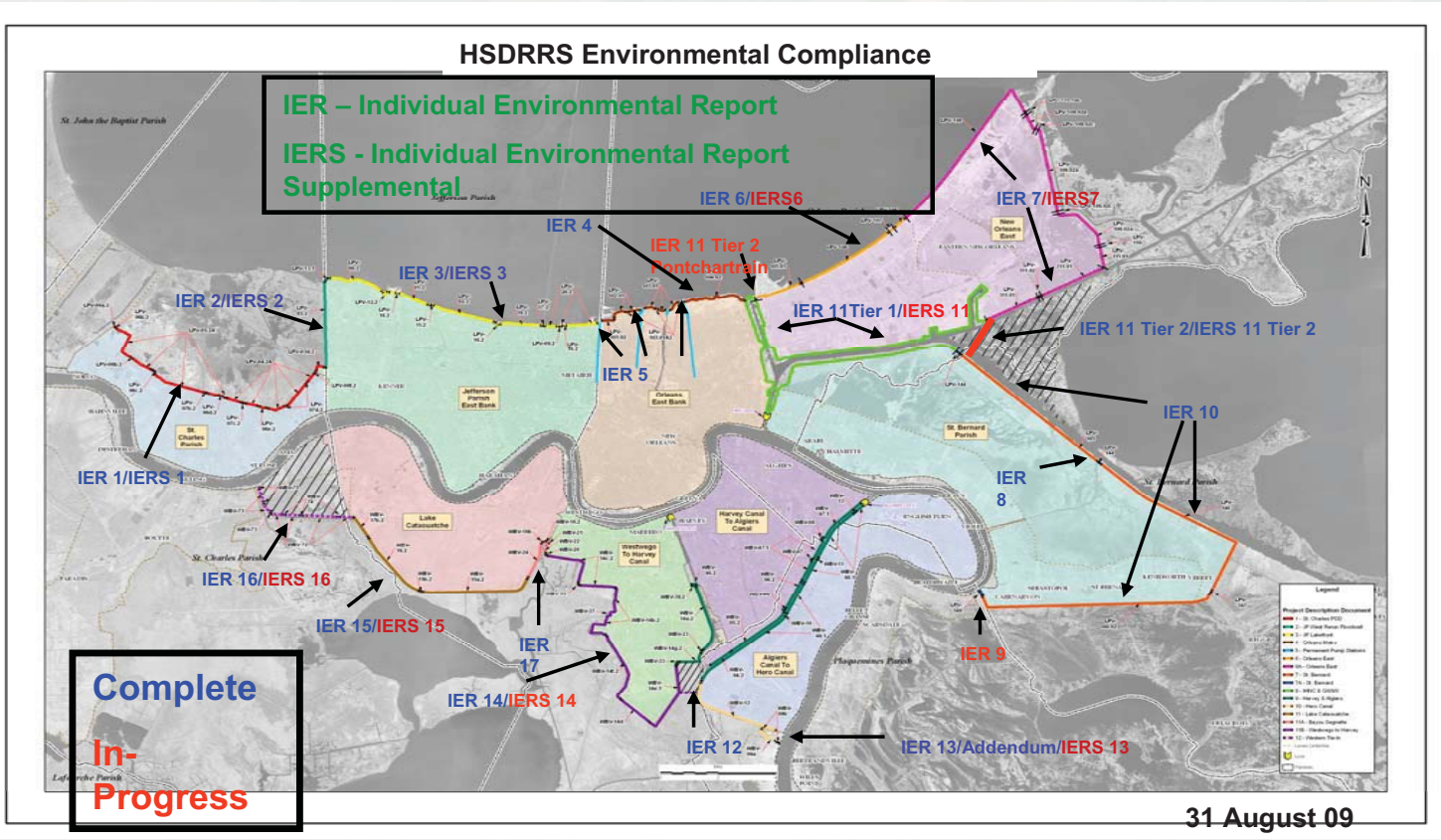
HSDRRS CED

HSDRRS Comprehensive Environmental Document

Purpose of the CED: Discuss Cumulative benefits and impacts of the Hurricane and Storm Damage Risk Reduction System, Mitigation, Data Gaps



Current IER Status



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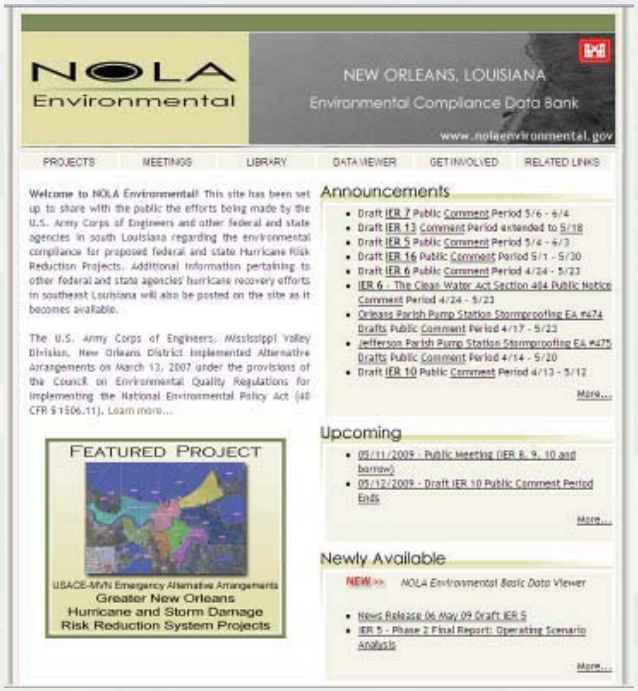
Current IER Status

- 16 Individual Environmental Reports (IERs) have been completed to describe the impacts of building the system
- 9 (7) IERs have been completed to describe impacts of excavating clay (borrow) and utilizing borrow stockpile sites
- Additional IERs are under development that describe proposed system features, additional borrow areas and mitigation sites
- Supplemental IERs are required as project designs are finalized
  - IER 1(1) Supplemental has been completed
  - IER 2 Supplemental has been completed
  - IER 3 Supplemental has been completed
  - IER 11.a Tier 2 Supplemental has been completed
  - IER 14.a Supplemental has been completed

Resources

www.nolaenvironmental.gov



http://www.mvn.usace.army.mil

Impacts Analyzed in IERs

- Air Quality
- Water Quality
- Terrestrial Habitat
- Aquatic Habitat
- Fish and Wildlife
- Wetlands
- Threatened and Endangered Species
- Recreational Resources
- Aesthetic (Visual) Resources
- Cultural Resources
- Prime and Unique Farmland
- Displacement of Population and Housing
- Impacts to Employment, Business and Industry Activity
- Availability of Public Facilities and Services
- Effects on Transportation
- Disruption of Desirable Community and Regional Growth
- Impacts to Tax Revenues and Property Values
- Changes in Community Cohesion
- Environmental Justice
- Hazardous, Toxic and Radioactive Waste

Acknowledged Data Gaps

- Transportation Impacts
  - Interim Transportation Report –Jan 2010 (Sept 2009)
- Mitigation Impacts
  - Mitigation IERs
- Air Emissions
  - Coordinating with Environmental Protection Agency, Louisiana Department of Environmental Quality, and Regional Planning Commission
- System Cumulative Impacts

CED Ongoing Activities

- CED Contract Awarded April 2008
- CED Contract Duration Extended to April 2010
- CED Contractor tasks underway
  - ► Compiling administrative record for all IERs
    - Indexing and archiving
  - ► Write up of impacts for the following sections
    - Complete (except for supplementals) (Air Quality, T&E species, Essential Fish Habitat, Fisheries, HTRW, Noise, Non-Wetlands/Uplands, Recreation, Soils, Water Resources, Wetlands, Wildlife)
    - Underway (Aesthetics, Environmental Justice, Cultural Resources, Public Involvement, Socioeconomics)

CED Ongoing Activities (cont.)

- Scoping Meeting September 2, 2009
- Areas of Concern and Recommendations for CED
  - Economic impact on surrounding communities
  - Environmental Justice, timing of activity in specific areas vs. others
  - Public Safety during construction and legacy issues with borrow pits
  - Environmental Justice-populations at most risk
  - Insurance coverage in region and relation to National Flood Insurance Program
  - Hazardous, toxic and radioactive contaminated sediment issues in canals
  - How arrived at 1 percent chance of flooding above levee heights
  - Safety Factor in resiliency
  - Percent of risk within 30-year or 25- year mortgage terms
  - Describe how homeowners could exceed 1 percent risk reduction
  - Impact of global warming >50 years

Scoping Meeting

Scoping Meeting

- Areas of Concern and Recommendations for CED Cont.
  - Interval testing of floodwall operations
  - Induced development-conservation easements
  - Multiple lines of defense
  - Impact of coastal erosion on 1 percent risk
  - Stormwater and drainage and again infrastructure
  - Incomplete data to be included in IER 12
  - Detail of final mitigation plan
  - Federal highway impacts-truck traffic quantification on local streets and human and environmental/street repairs
  - Improvements-how fit into neighborhood, planning vision via neighborhood associations
  - Local government compensation re:mitigation impacts
  - Public Involvement in CED and public review periods
  - Timeline to follow progress

CED Plan Ahead

- CED contractor will continue to compile administrative record
- USACE in-house staff will coordinate administrative record for supplementals
- CED contractor will continue to compile impacts section
- USACE in-house staff will continue to develop mitigation plans with state and federal resource agencies

CED Completion

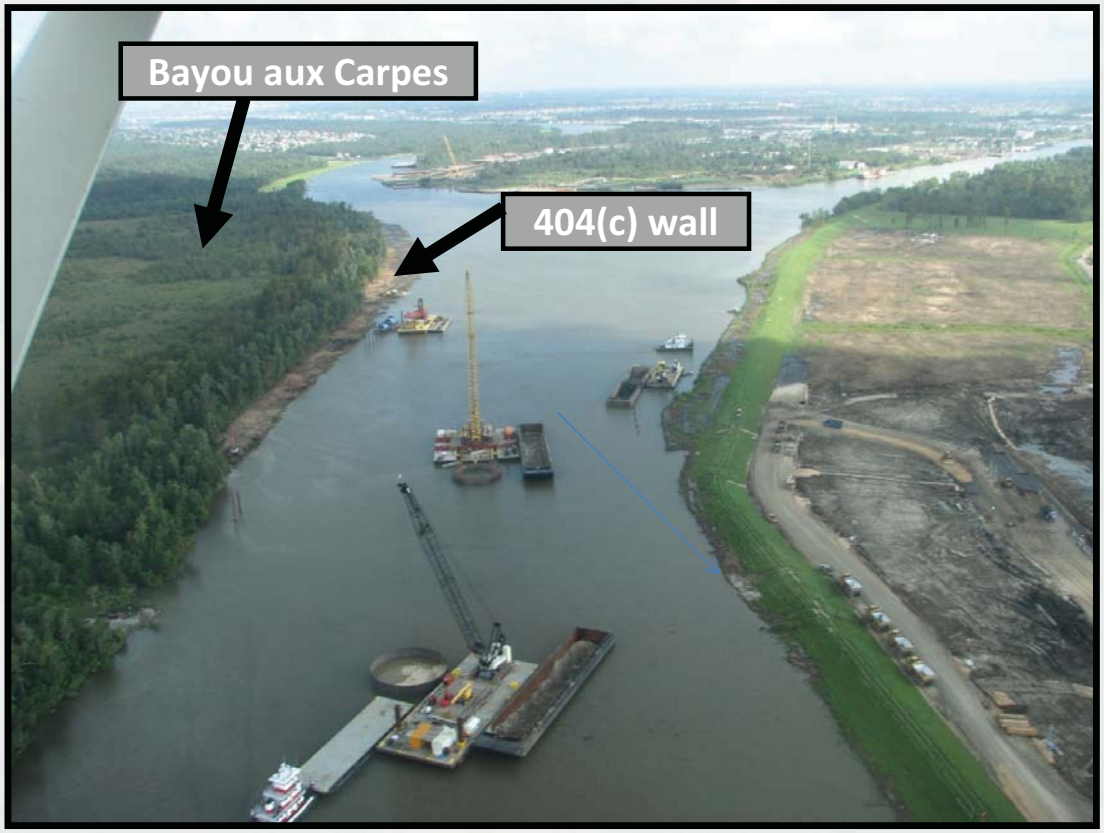
- Tied to completion of IERs
- Initial 17 projects for flood protection construction were projected to be completed by December 2008.
- One of the initial 17 is still pending.
- Additional construction IERs have been identified (IER 33/IER 34 Co-located MRL Levee).
- Numerous supplementals are planned or are underway.

Questions?

Violation at the Bayou Aux Carpes 404c Area

Bayou aux Carpes
Jefferson Parish, Louisiana

West Closure Complex



Contractor self-reported impact beyond 10-foot buffer zone

Mitigation measures

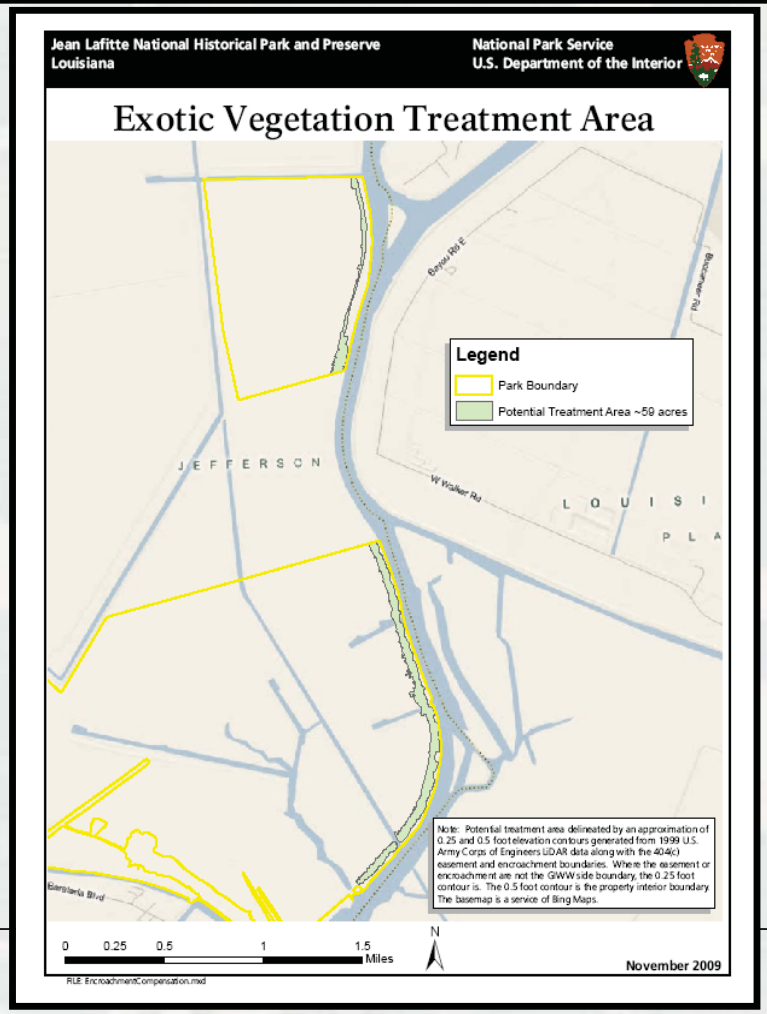
- ❑ Revised work plan
- ❑ Erected “Do Not Cross” orange fence
- ❑ Employee *and* subcontractor training mandatory
- ❑ Chinese Tallow (invasive plant species) eradication
- ❑ Replanting effort in collaboration with the National Park Service and U.S. Fish and Wildlife Service

Orange Fence erected

No entrance beyond *Orange Fence*

Hardhat sticker training recognition

Chinese Tallow eradication



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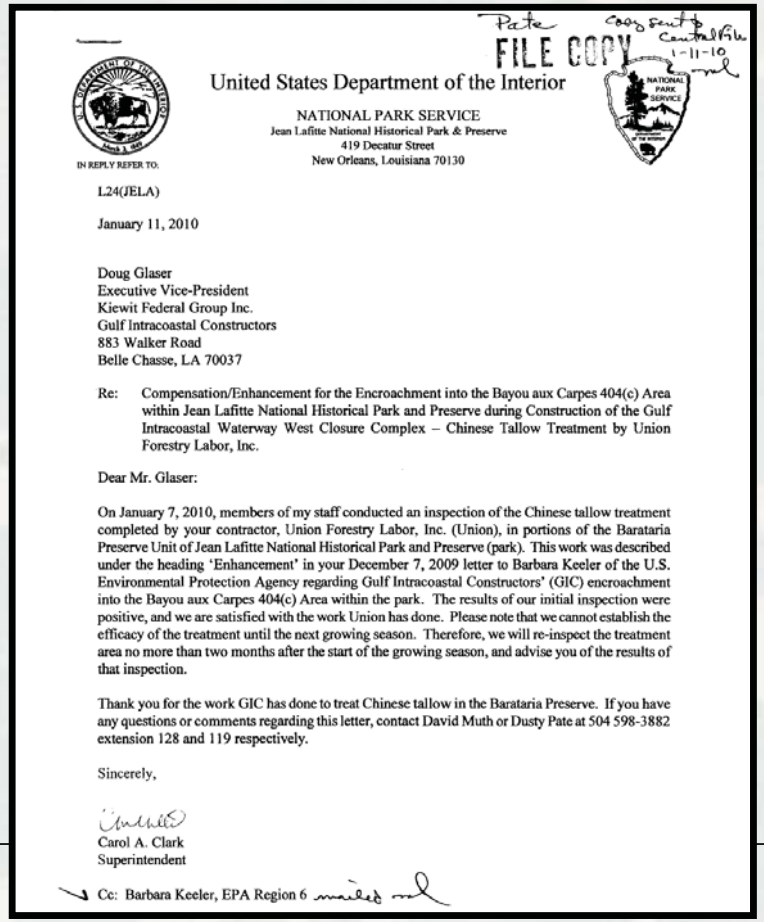
National Park Service concurrence of Chinese Tallow eradication effort



Date FILE COPY Copy sent to Central File 1-11-10

United States Department of the Interior

NATIONAL PARK SERVICE
Jean Lafitte National Historical Park & Preserve
419 Decatur Street
New Orleans, Louisiana 70130

IN REPLY REFER TO:

L24(JELA)

January 11, 2010

Doug Glaser
Executive Vice-President
Kiewit Federal Group Inc.
Gulf Intracoastal Constructors
883 Walker Road
Belle Chasse, LA 70037

Re: Compensation/Enhancement for the Encroachment into the Bayou aux Carpes 404(c) Area within Jean Lafitte National Historical Park and Preserve during Construction of the Gulf Intracoastal Waterway West Closure Complex – Chinese Tallow Treatment by Union Forestry Labor, Inc.

Dear Mr. Glaser:

On January 7, 2010, members of my staff conducted an inspection of the Chinese tallow treatment completed by your contractor, Union Forestry Labor, Inc. (Union), in portions of the Barataria Preserve Unit of Jean Lafitte National Historical Park and Preserve (park). This work was described under the heading 'Enhancement' in your December 7, 2009 letter to Barbara Keeler of the U.S. Environmental Protection Agency regarding Gulf Intracoastal Constructors' (GIC) encroachment into the Bayou aux Carpes 404(c) Area within the park. The results of our initial inspection were positive, and we are satisfied with the work Union has done. Please note that we cannot establish the efficacy of the treatment until the next growing season. Therefore, we will re-inspect the treatment area no more than two months after the start of the growing season, and advise you of the results of that inspection.

Thank you for the work GIC has done to treat Chinese tallow in the Barataria Preserve. If you have any questions or comments regarding this letter, contact David Muth or Dusty Pate at 504 598-3882 extension 128 and 119 respectively.

Sincerely,

Carol A. Clark
Superintendent

Cc: Barbara Keeler, EPA Region 6 mailed

Requirements for working in 404c area

- ❑ Job Hazard Analysis
- ❑ Approved Work Plan
- ❑ Appropriate PPE
- ❑ Employee Training mandatory
- ❑ Subcontractor training mandatory
- ❑ Orange “404c” Hard Hat Sticker



Jurisdictional Waters 101 Training Module Bayou Aux Carpes

Gulf Intracoastal Constructors (Kiewit Corporation and Traylor Bros., Inc.)
New Orleans, Louisiana

Whitenton Group, Inc.
ENVIRONMENTAL CONSULTANTS

Replanting effort

- 65 trees were planted in the most ecologically feasible and responsible areas west of the 90 foot boundary.
- Bottomland hardwood species known to occur in the Preserve: Nuttall Oak and Green Ash.
- Trees were planted on 10-foot centers (approximately) and in a random, natural pattern.
- All planting locations were recorded and georeferenced (using Timble GeoXT) by species and number.

Replanting effort

Replanting effort

Questions?

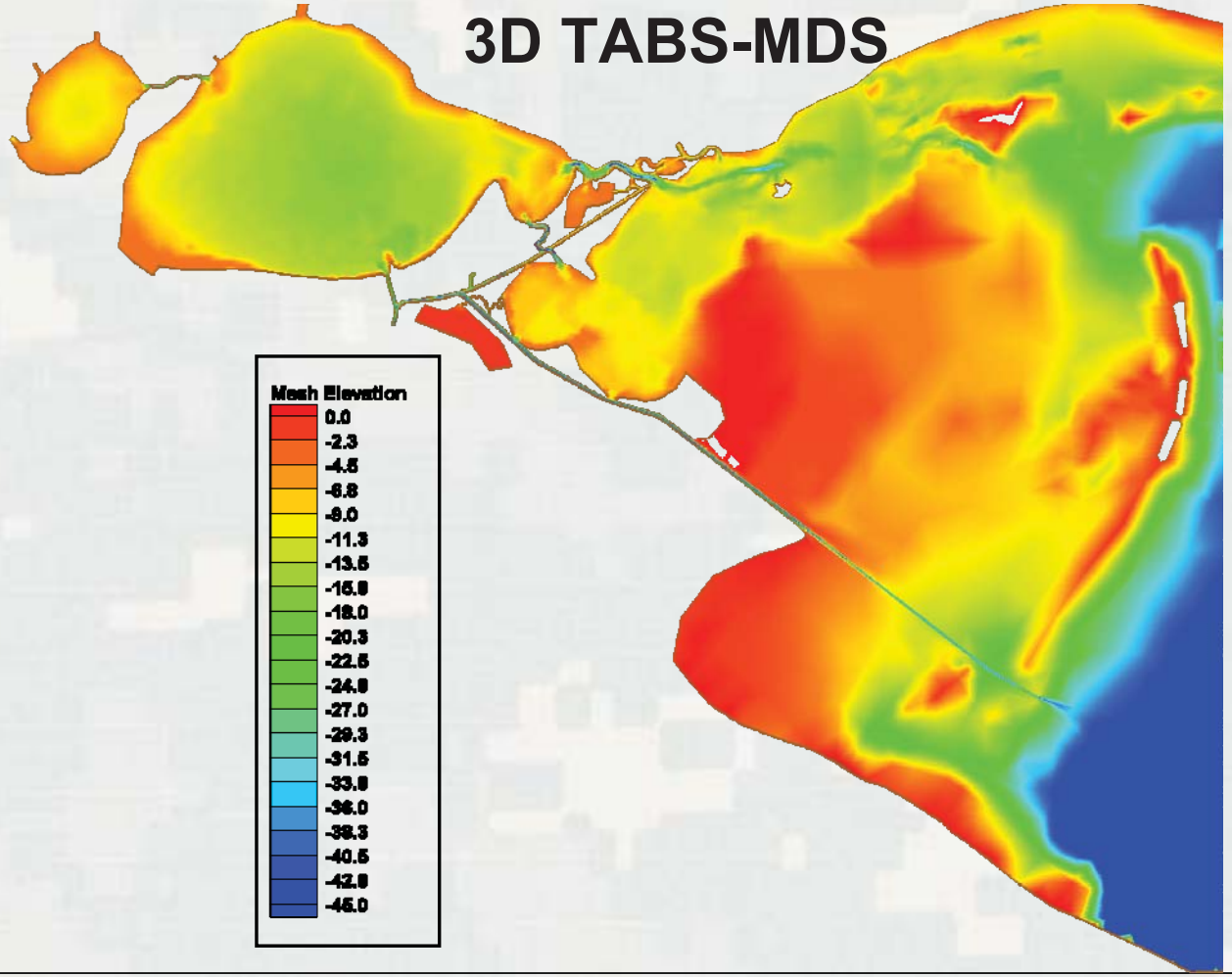
Examples of Secondary & Indirect Impacts to Wetlands

IER 11

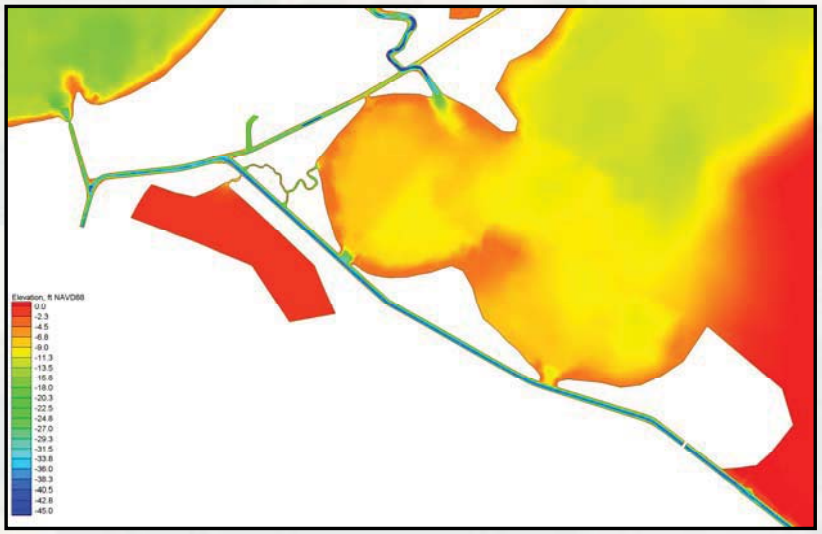
Indirect Impacts of the MRGO Closures at Bayou la Loutre and Bayou Bienvenue

Hydrodynamic and Salinity Model

3D TABS-MDS

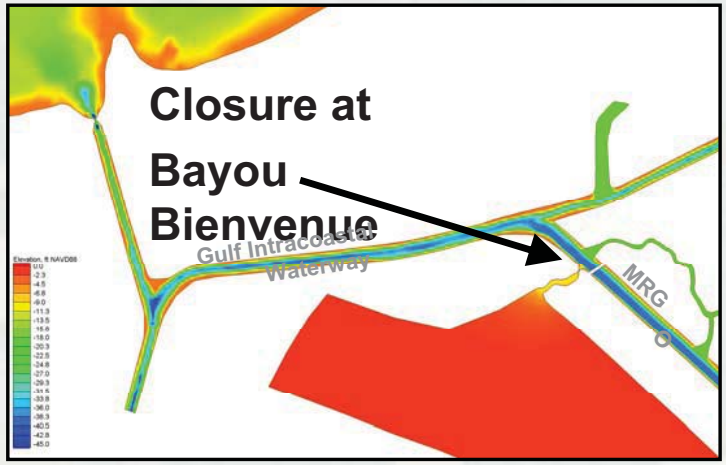


MRGO Closures at La Loutre and Bayou Bienvenue

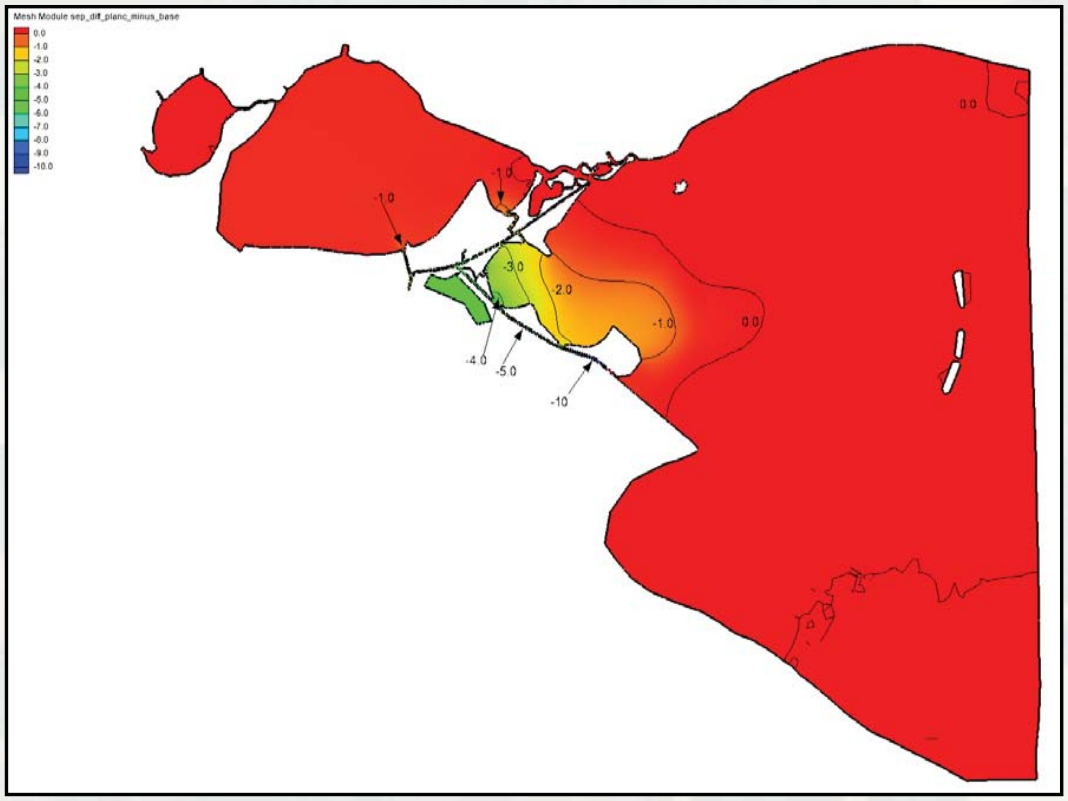


By adding the MRGO closure just south of Bayou Bienvenue (Scenario #2), the flow that would normally enter the GIWW through the MRGO now enters GIWW through the direct connection with Lake Borgne.

All simulations were run for 15 months
October 2005 – December 2006

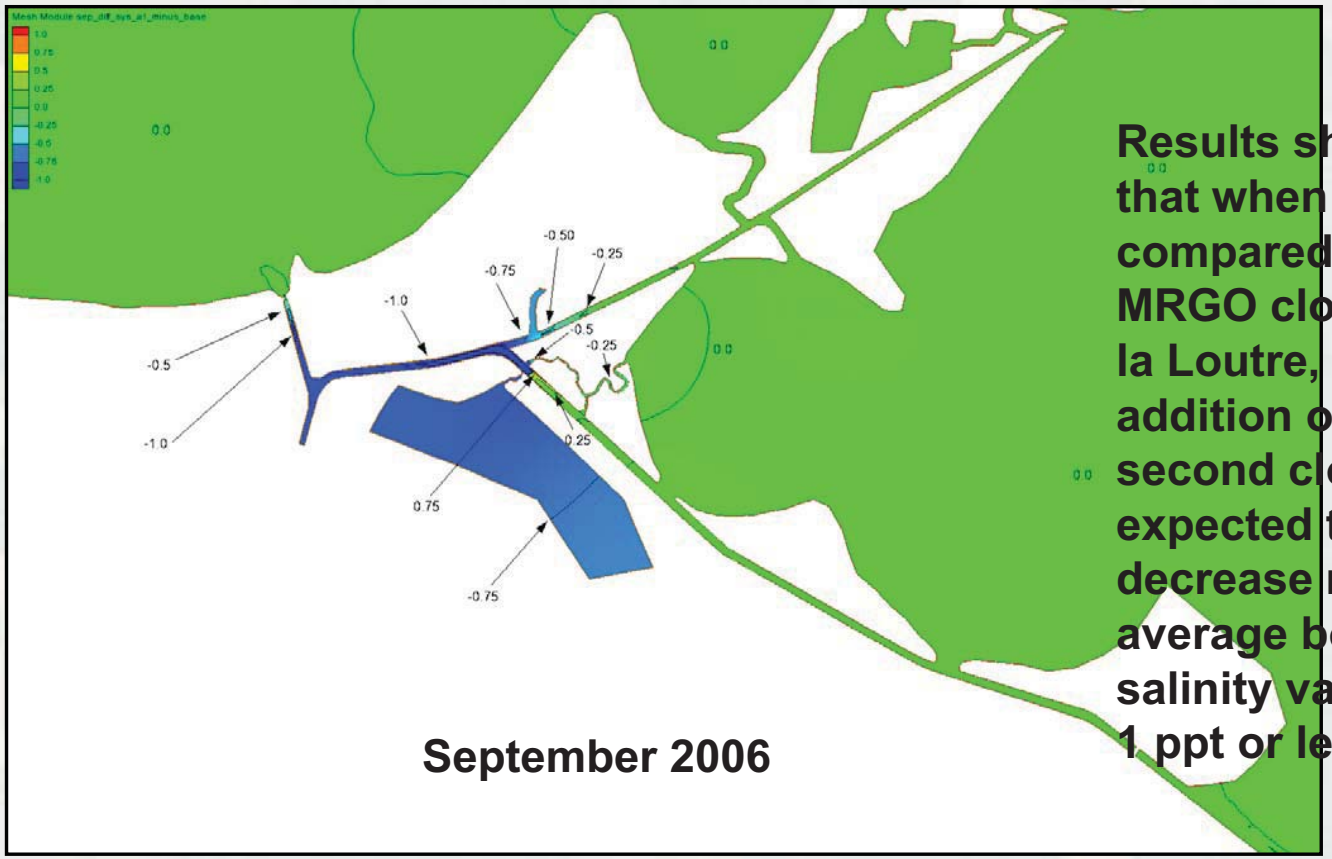


Salinity Results for MRGO Closure at La Loutre



Results show that when compared to the existing conditions (no closures), the MRGO closure at la Loutre is expected to have significant effects on monthly average bottom salinity values.

Salinity Results for the Addition of a Second MRGO Closure at Bayou Bienvenue

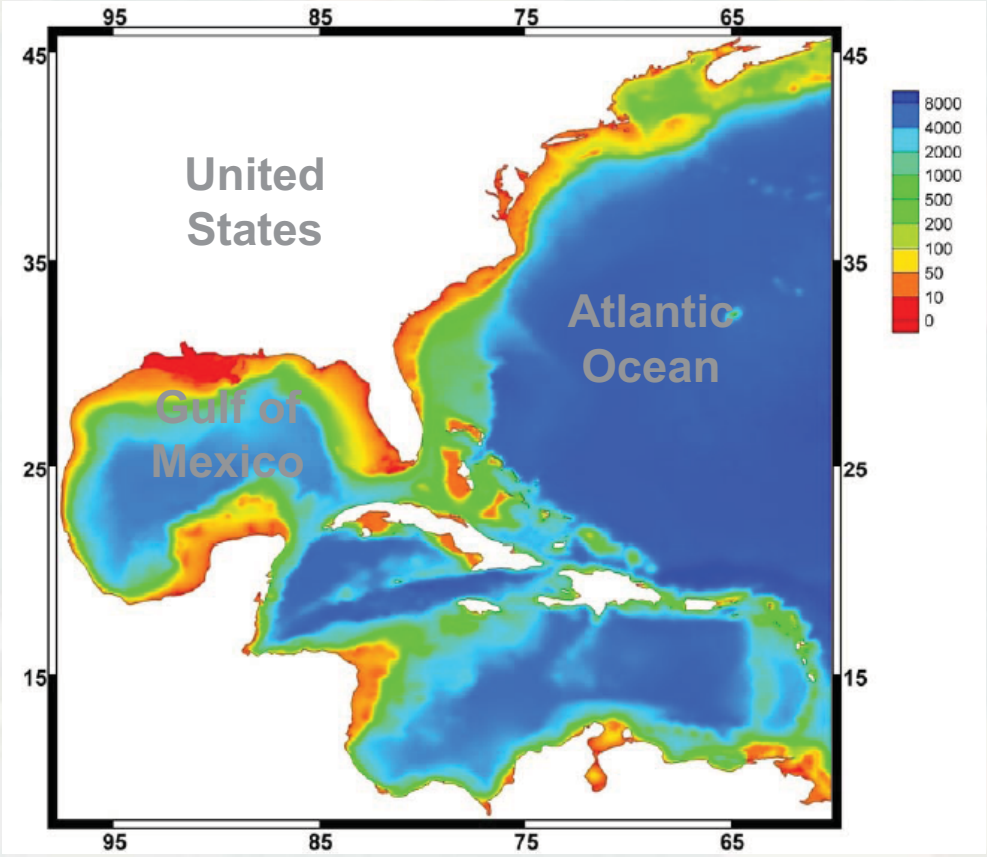


September 2006

Results show that when compared to the MRGO closure at la Loutre, the addition of a second closure is expected to decrease monthly average bottom salinity values by 1 ppt or less.

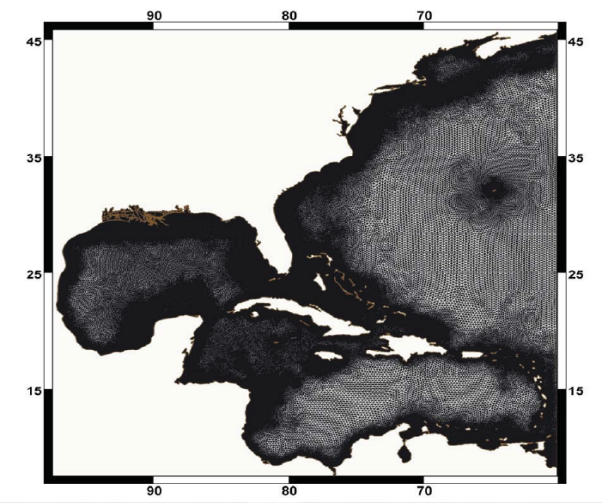
ADCIRC Hydrodynamic Model
ADvanced CIRCulation

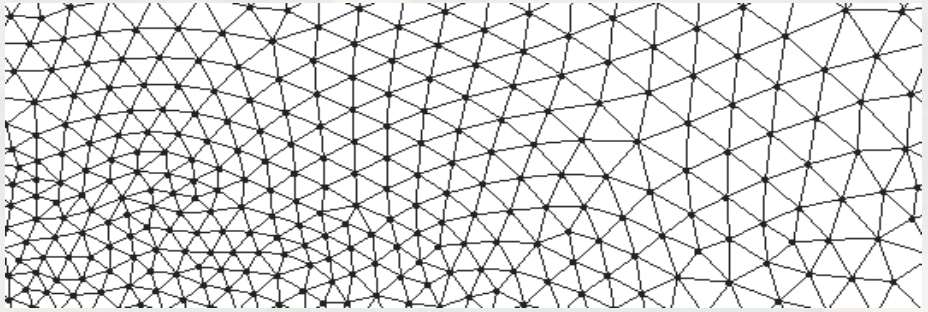
- Finite element hydrodynamic model which solves continuity and momentum equations
- Considers wind, pressure, tides, riverine flow.
- Parallelization: 256 processors used simultaneously on US Dept. of Defense supercomputers for each simulation



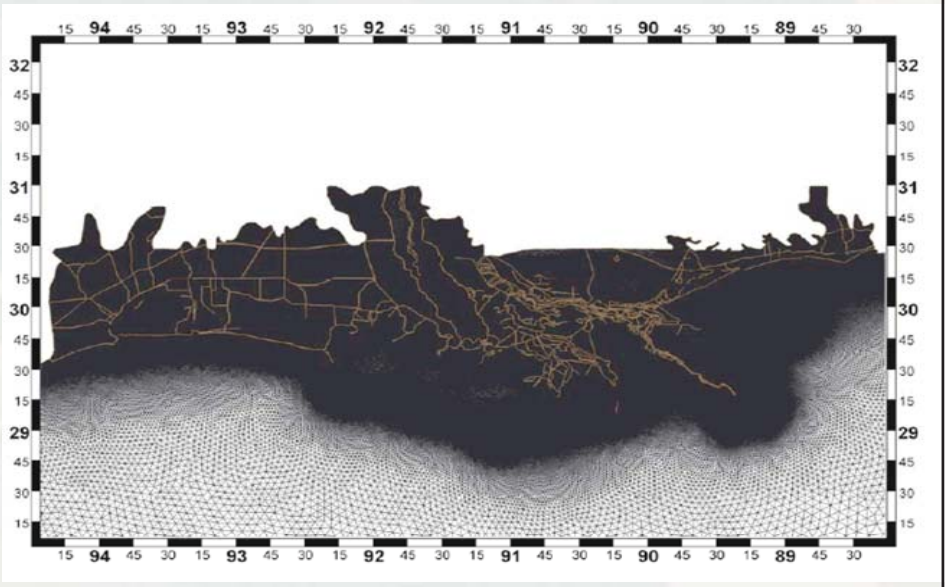
ADCIRC SL15 with bathymetry (in meters) for the total domain

Detail of ADCIRC grid in Southern Louisiana

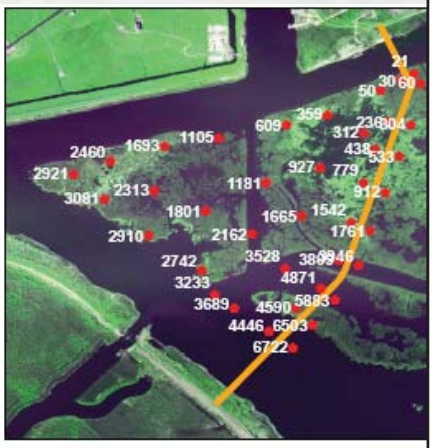




Raised features, levees, railroads, highways shown in brown.



Hydrographs saved at 52 representative locations



IHNC Hydroperiod Modelling
Hydrograph Output Points
Figure 33

Landsat Thematic Mapper Satellite Image 2005,
UTM Zone 15 NAD83, LOSCO (2007).
Using bands 5-7-3 as an RGB composite.

Tidal phase, amplitude, and inundation duration

EAST of the barrier

Of 25 points analyzed:

- **14 points showed no change in duration of flooding, but showed as much as +/- 2.4 inches change in amount of water on marsh**
- **2 points wetted for 1-2 hours longer per day and <2.4 additional inches of water**
- **3 points wetted for 1-2 less per day and <2.4 additional inches of water**
- **1 point continuous flooding and < 3 additional inches of water (wetted for 15 more hours per day)**

WEST of the barrier

Of the 27 points analyzed:

- **11 points showed no change in duration of flooding, but showed as much as +/- 2.4 inches change in amount of water on marsh**
- **1 point wetted for 1-2 hours longer per day and <2.4 additional inches of water**
- **7 points wetted for 1-2 less per day and <2.4 additional inches of water**
- **2 points showed continuous flooding and < 3 additional inches of water (wetted for 10 more hours per day)**

Golden Triangle Marsh Inundation

Area of marsh inundation during a typical tidal cycle is not expected to change significantly after the MRGO closures.

Maximum and Minimum Inundated Areas						
	Protected Side (x 1000 acres)					
Depth (ft)	Existing Case		Base Case		Proposed Action	
	Min	Max	Min	Max	Min	Max
0.25	0.3	0.7	0.3	0.7	0.4	0.6
0.5	0.3	0.7	0.3	0.7	0.4	0.6
0.75	0.2	0.6	0.2	0.6	0.3	0.5
1	0.2	0.5	0.2	0.5	0.2	0.4
	Flood Side (x 1000 acres)					
Depth (ft)	Existing Case		Base Case		Proposed Action	
	Min	Max	Min	Max	Min	Max
0.25	5.7	9.3	5.8	9.2	5.9	9.4
0.5	5.6	9.2	5.7	9.1	5.8	9.2
0.75	5.0	8.7	5.1	8.5	5.2	8.5
1	4.4	8.0	4.5	7.8	4.7	7.8

Base case includes the MRGO closure at la Loutre

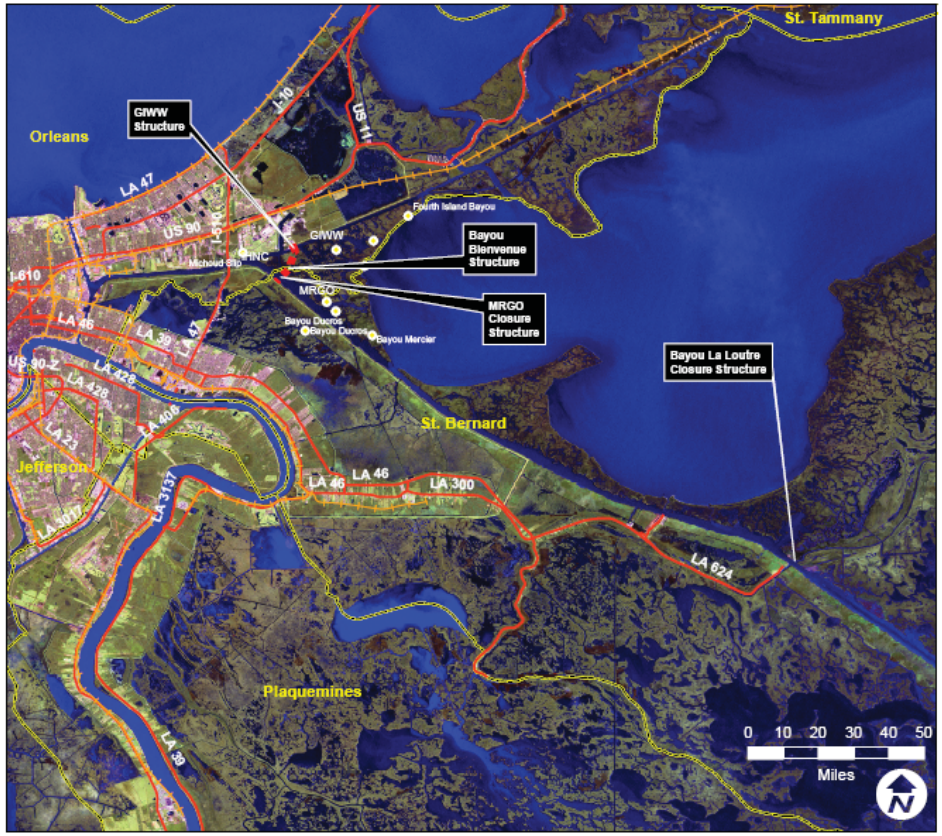
Proposed action includes the MRGO closure at Bayou Bienvenue

Indirect Wetland Impacts

- Points with decreased tidal amplitude could result in:
  - ► decreased sedimentation creating conditions conducive for subsidence.
  - ► greater occurrence of *Spartina patens*
  - ► less primary production
- 1.4m cy dredge material from barrier project beneficially used in 205 acre open water area in Golden Triangle

Backup slides

Hydroperiod Modeling (USACE 2008)



IHNC Hydroperiod Modelling
Base Map with Project Location
Including MRGO Closure
at Bayou La Loutre
Figure 2

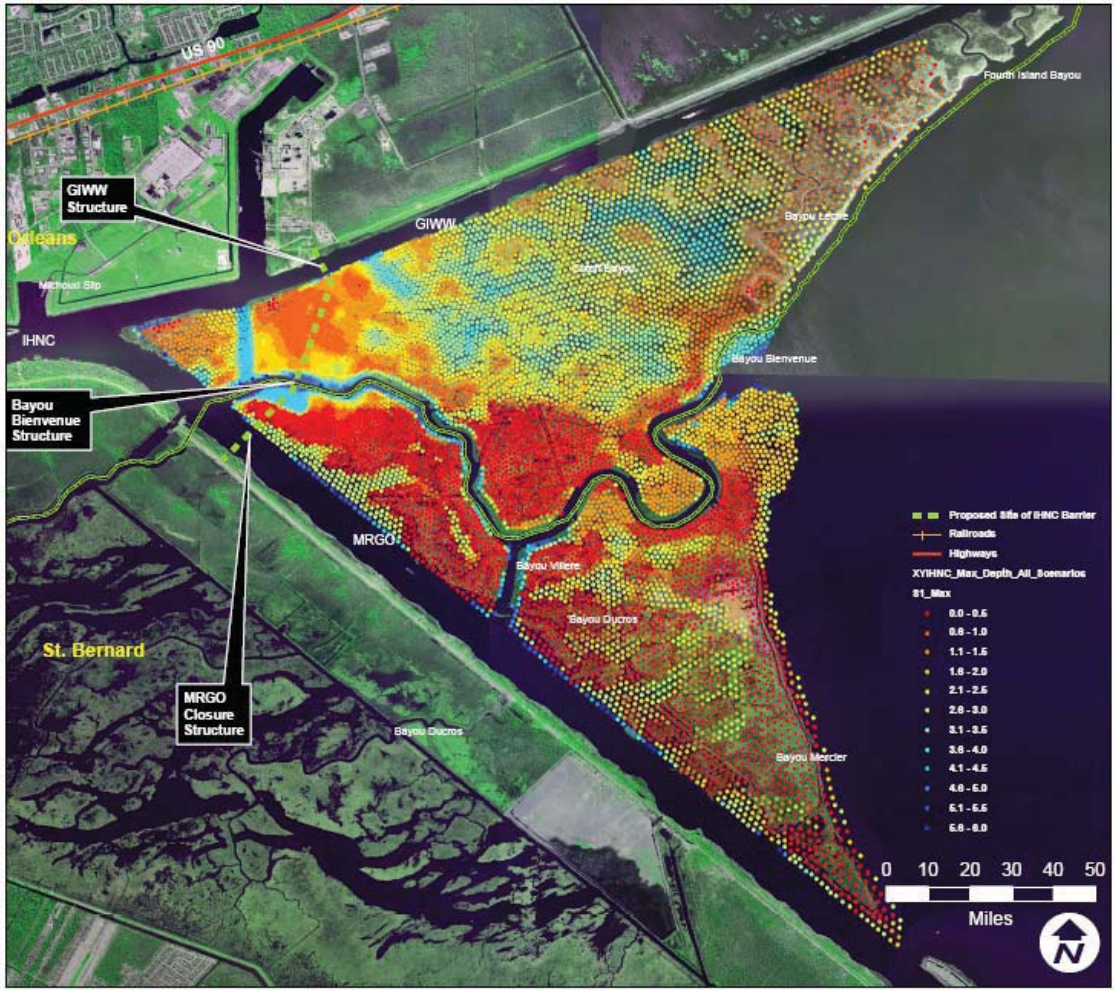
Railroads

Highways

Proposed Site of IHNC Barrier

Landsat Thematic Mapper Satellite Image 2005,
UTM Zone 15 NAD83, LOSCO (2007).
Using bands 5-7-3 as an RGB composite.

Maximum depth of inundation for existing conditions



Each "dot" represents a node in the ADCIRC mesh. There are over 13,000 nodes which cover the Golden Triangle marsh for this study.

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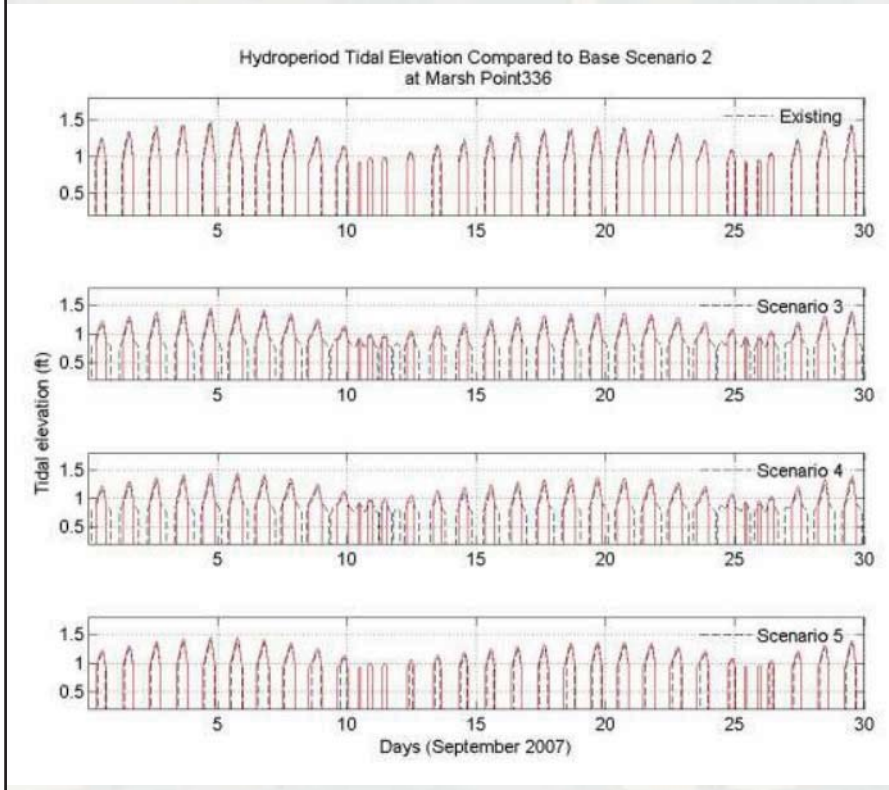
Sample Water Level Time Series EAST of the barrier



East of barrier

Location #336

At this location, the marsh remains wet for approx. 5 hours longer per day.

Phase shift for most locations is less than ½ hour.

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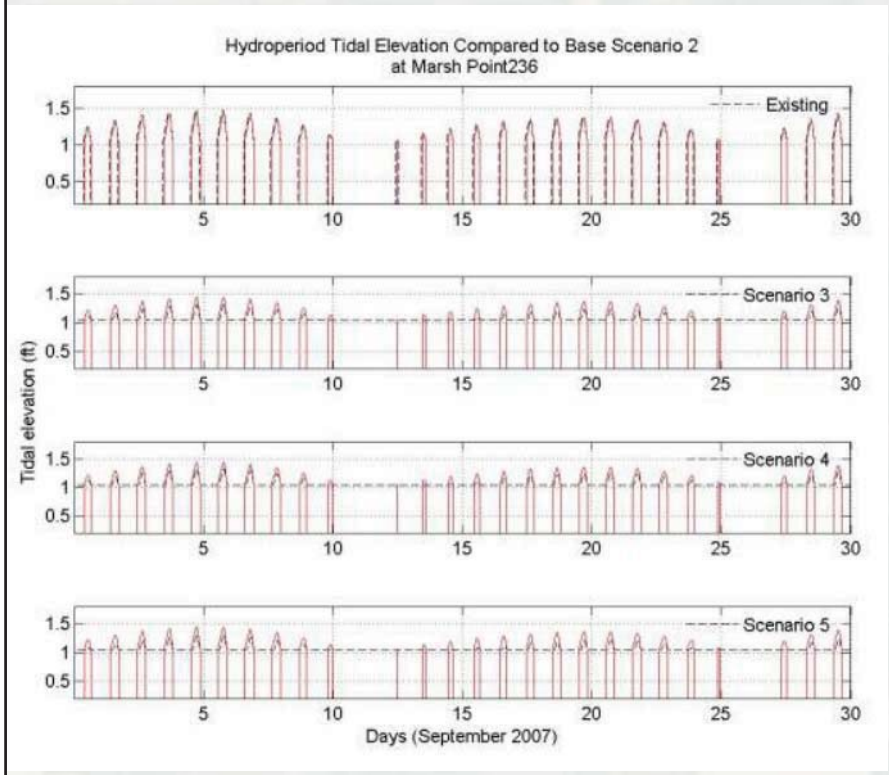
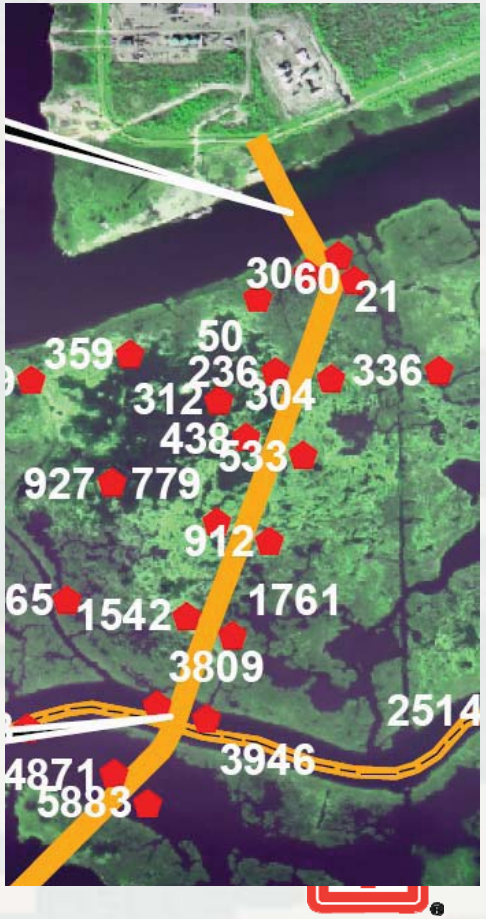
Sample Water Level Time Series
WEST of the barrier



West of barrier
Location #236

Instead of the marsh wetting & drying with the tidal cycle, this location is inundated with approx. 3" of water.



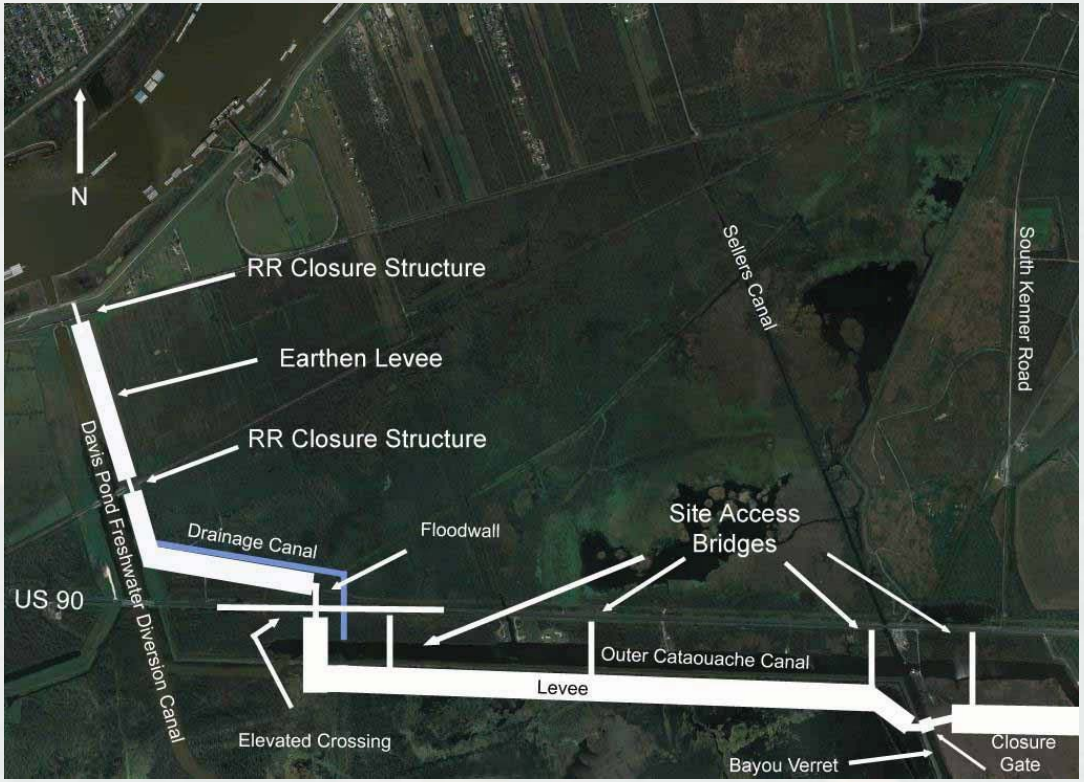
Questions?

IER 16

IER 16

- Discussion regarding secondary (indirect impacts)
- Wetlands Hydrology
  - Hydrologic and Hydraulic Analysis prepared and included in IER as Appendix
  - Water exchange impacts reduced through design modifications
- Induced Development
  - St. Charles Parish Development Projection Study results indicated development unlikely
  - Headquarters Policy on Mitigation for Induced Development future land development regulated and mitigated (Federal/State and Local)

IER 16 Western Tie In



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H &H Study Areas

Discuss 3 Areas
1) Area Above HWY 90
2) Area Below HWY 90 West End
3) Area Below HWY 90 East End

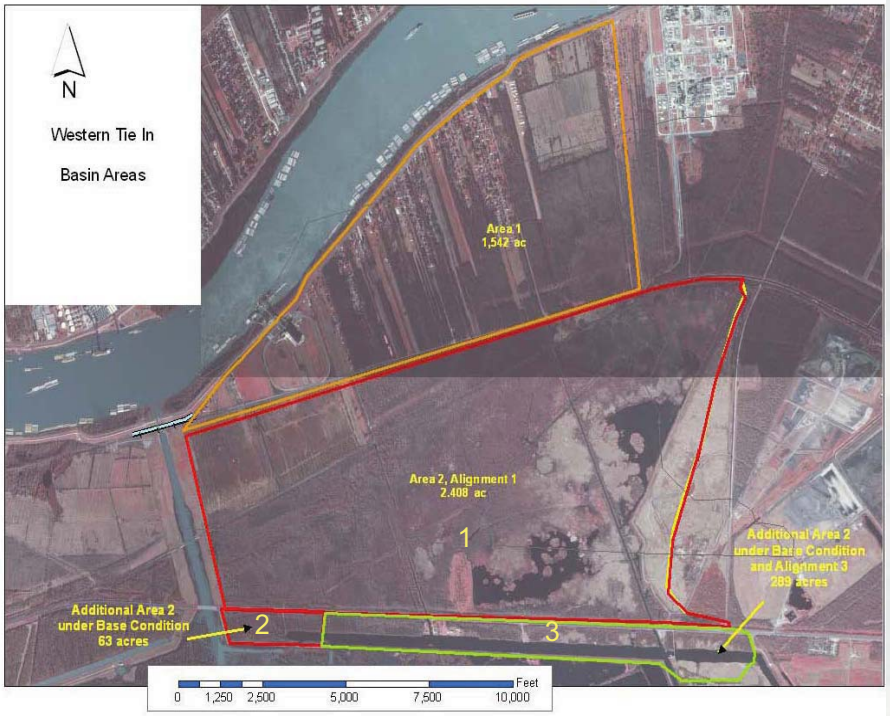

Figure 3. Areas – Western Tie In.

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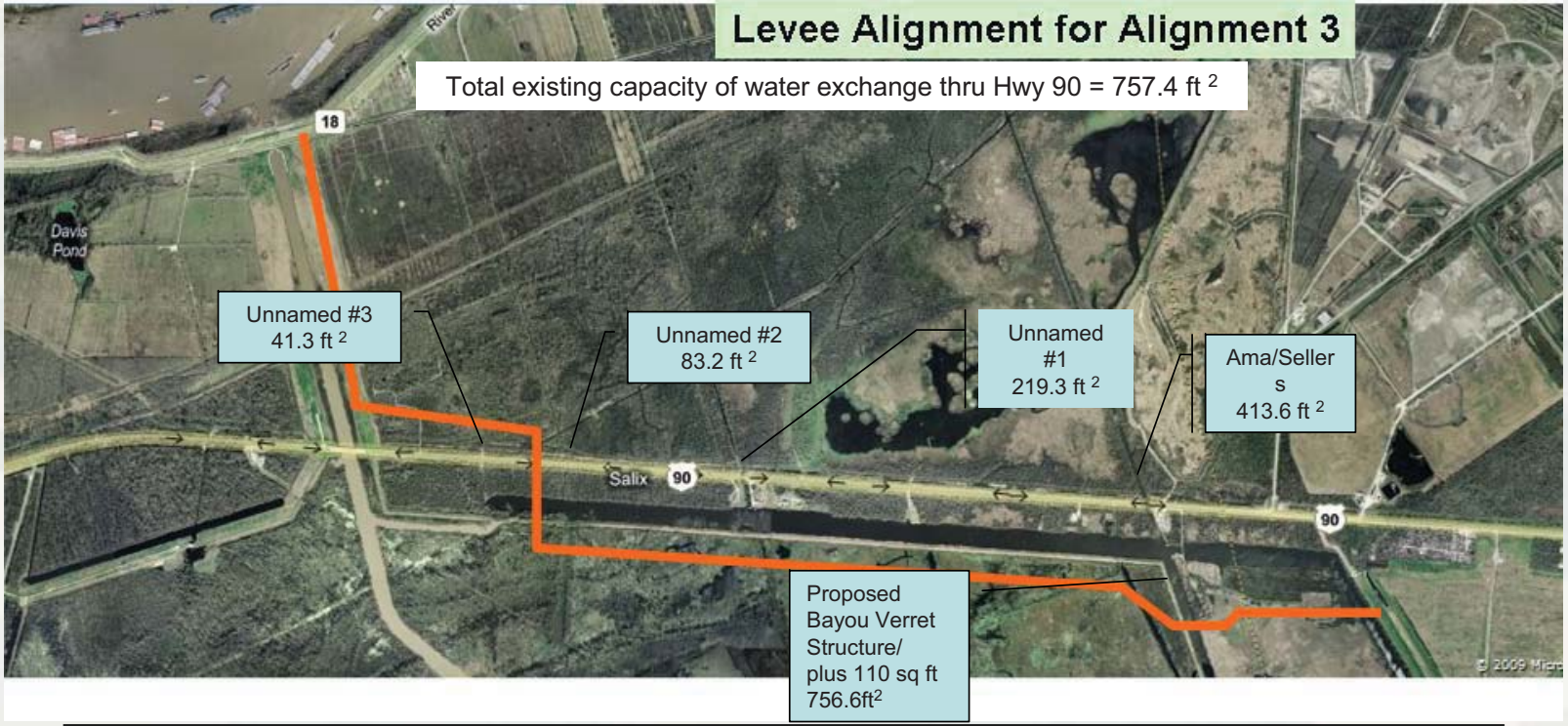
Area 1 - Area previously hydrologically modified by the construction of Hwy 90, and Davis Pond Guide levee. Closure Structure plus 110 sq ft (sluice gates) across Bayou Verret/Sellers Canal is sized equal to the existing combined cross section thru Hwy 90. This would maintain water exchange above Hwy 90 to avoid/minimize secondary (indirect) impacts to wetland Areas north of Hwy 90. (Calculated Cross section of area below 1.5 ft NAVD 88)



Area 2 - 63 Acres
Area previously hydrologically modified by the construction of the Davis Pond Guide Levee and Hwy 90
Water exchange interrupted to the east by construction of closure across Outer Cataoutache Canal
Existing Plan a gap will be constructed along southern boundary of area 2 to allow for water exchange minimizing indirect impacts
IER 16 Supplemental will propose to further degrade western and southern boundary (Davis Pond Guide Levee)

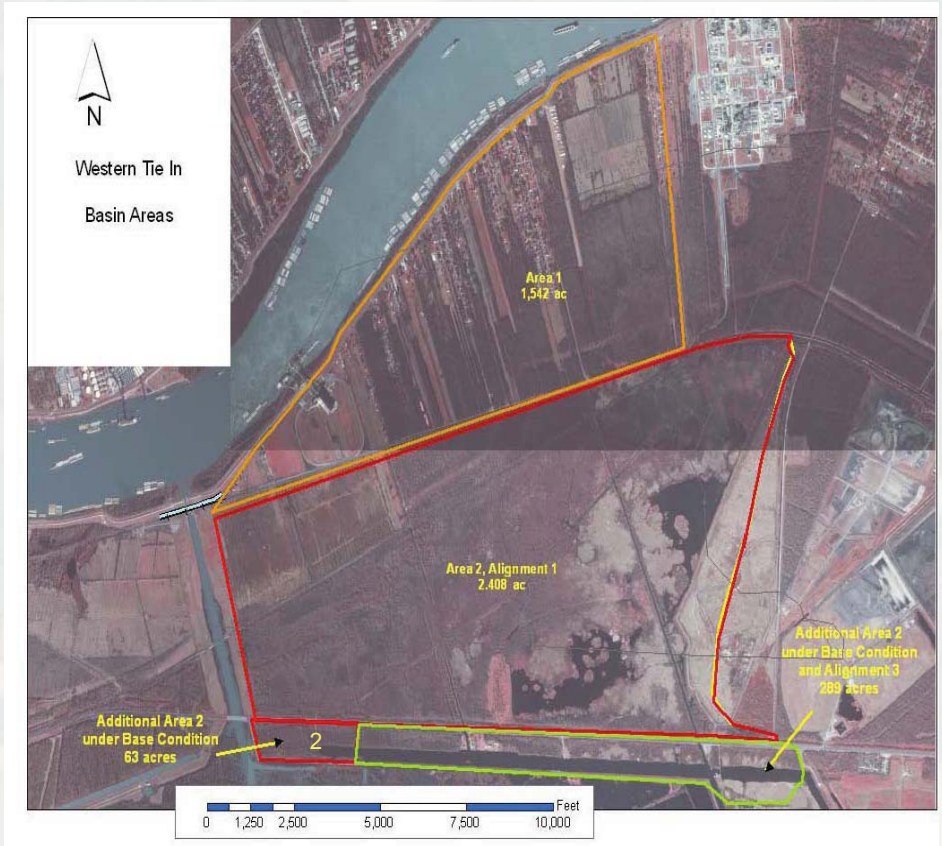


Figure 3. Areas – Western Tie In.

Area 3 - 289 Acres Open Water and Wetlands (164 Acres). Water exchange reduced in this area due to closure of Outer Cataouatche Canal. 35 percent of pre-construction cross section. IER identifies and discusses impacts. Including changes in flood-side surface water elevations. Operation of Bayou Verret Closure Structure should reduce impacts (e.g., structure remaining open except during storm events)

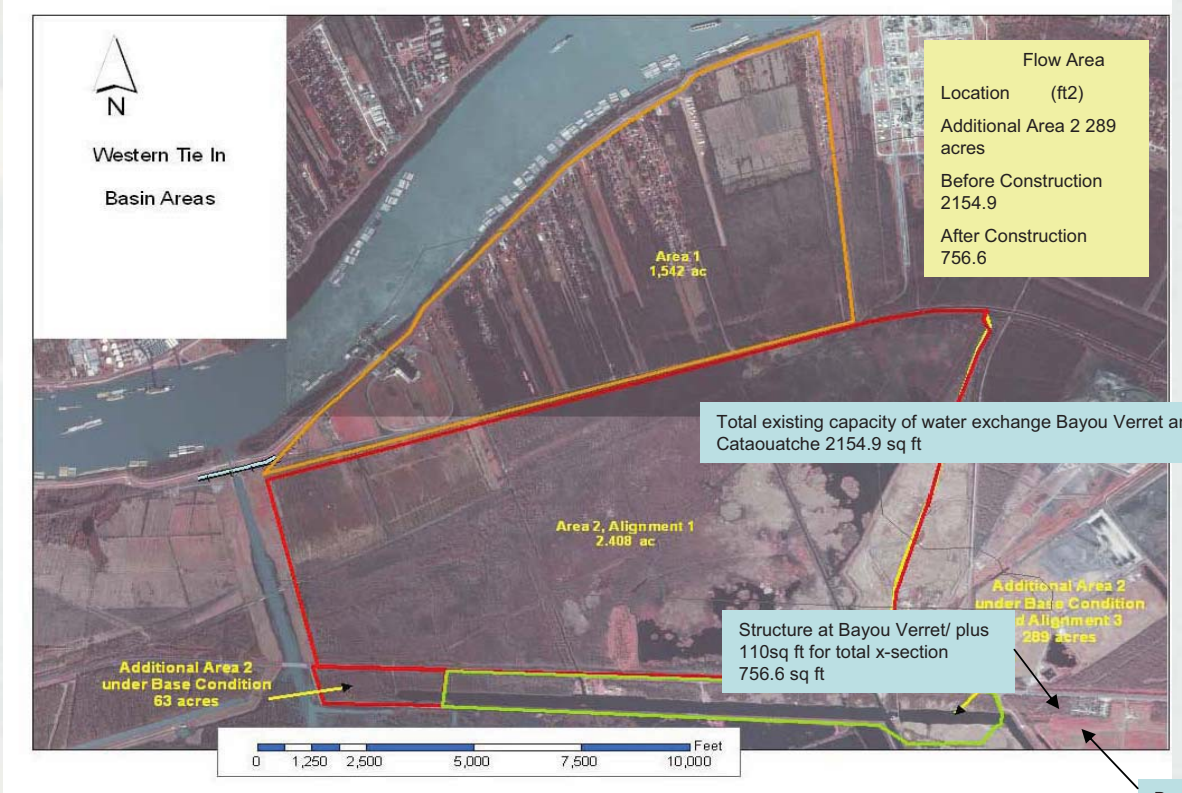


Figure 3. Areas – Western Tie In.

Water Surface Level Comparisons

10-Year Event – 2 Hour Duration

Condition	Comments	Runoff %	Length of Storm (days)	Rainfall Frequency (yrs)	Rainfall (Inches)	Rainfall Exceedence (inches)	Water Surface Elevation in Area 2 just upstream of Hwy 90, at Peak Inflow to System (NAVD88)	Water Surface Elevation in Area 2 @ upper end, just downstream of RR, at Peak Inflow to System (NAVD88)
Base	Existing	70	0.5	10	7.6	5.32	1.2	1.4
		70	1	10	9.1	6.37	1.2	1.4
		70	2	10	10.2	7.14	1.2	1.4
		70	4	10	11.1	7.77	1.2	1.4
		70	7	10	13.8	9.66	1.2	1.4
		70	0.5	50	10	7	1.3	1.6
		70	1	50	12	8.4	1.3	1.6
		70	2	50	13.8	9.66	1.3	1.6
		70	4	50	15.2	10.64	1.3	1.6
		70	7	50	18.5	12.95	1.3	1.6
		70	0.5	100	11.1	7.77	1.4	1.6
		70	1	100	13.2	9.24	1.4	1.6
		70	2	100	15.1	10.57	1.4	1.6
		70	4	100	17	11.9	1.4	1.6
		70	7	100	20.5	14.35	1.4	1.6

Condition	Comments	Runoff %	Length of Storm (days)	Rainfall Frequency (yrs)	Rainfall (Inches)	Rainfall Exceedence (inches)	Area 1 Area (ac)	Runoff to Area1 (ac-ft)	Area 2 Area (ac)	Runoff to Area 2 (ac-ft)	Area 1 to Area 2 Pump Capacity (af-day)	Area 1 to Area 2 Total Pump Capacity (ac-ft)	Inflow - Area 1 to Area 2 (ac-ft)	Outflow from Area 2 (ac-ft) (Assumes TW elev = 0.0)	Net Ponding in Area 2 (ac-ft)	Ponding Elevation in Area 2 (NAVD88)	Water Surface Elevation in Area 2 just upstream of Hwy 90 (NAVD88)	Water Surface Elevation in Area 2 @ upper end, just downstream of RR, at Peak Inflow to System (NAVD88)
Alignment 3	Existing Runoff Conditions	70	0.5	10	7.6	5.32	1,542	684	2,697	1,196	405	203	203	0	1,398	1.18	1.1	
		70	1	10	9.1	6.37	1,542	819	2,697	1,432	405	405	405	0	1,837	1.38	1.3	
		70	2	10	10.2	7.14	1,542	917	2,697	1,605	405	810	810	0	2,415	1.56	1.5	
		70	4	10	11.1	7.77	1,542	998	2,697	1,746	405	1,620	998	0	2,745	1.8	1.7	
		70	7	10	13.8	9.66	1,542	1,241	2,697	2,171	405	2,835	1,241	0	3,412	2.12	1.9	
		70	0.5	50	10	7	1,542	900	2,697	1,573	405	203	203	0	1,776	1.33	1.3	
		70	1	50	12	8.4	1,542	1,079	2,697	1,888	405	405	405	0	2,293	1.6	1.5	
		70	2	50	13.8	9.66	1,542	1,241	2,697	2,171	405	810	810	0	2,981	1.92	1.8	
		70	4	50	15.2	10.64	1,542	1,367	2,697	2,391	405	1,620	1,367	0	3,759	2.28	2.1	
		70	7	50	18.5	12.95	1,542	1,664	2,697	2,911	405	2,835	1,664	0	4,575	2.63	2.4	
		70	0.5	100	11.1	7.77	1,542	998	2,697	1,746	405	203	203	0	1,949	1.43	1.4	
		70	1	100	13.2	9.24	1,542	1,187	2,697	2,077	405	405	405	0	2,482	1.69	1.6	
		70	2	100	15.1	10.57	1,542	1,358	2,697	2,376	405	810	810	0	3,186	2	1.8	
		70	4	100	17	11.9	1,542	1,529	2,697	2,675	405	1,620	1,529	0	4,204	2.5	2.3	
		70	7	100	20.5	14.35	1,542	1,844	2,697	3,225	405	2,835	1,844	0	5,069	2.83	2.6	

Figure 14. Project Condition (Alignment 3) Water Surface Levels (NAVD88

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Water Surface Level Comparisons

100-Year Event – 7 Day Duration

Condition	Comments	Runoff %	Length of Storm (days)	Rainfall Frequency (yrs)	Rainfall (inches)	Rainfall Exceedence (inches)	Water Surface Elevation in Area 2 just upstream of Hwy 90, at Peak Inflow to System (NAVD88)	Water Surface Elevation in Area 2 @ upper end, just downstream of RR, at Peak Inflow to System (NAVD88)
Base	Existing	70	0.5	10	7.6	5.32	1.2	1.4
		70	1	10	9.1	6.37	1.2	1.4
		70	2	10	10.2	7.14	1.2	1.4
		70	4	10	11.1	7.77	1.2	1.4
		70	7	10	13.8	9.66	1.2	1.4
		70	0.5	50	10	7	1.3	1.6
		70	1	50	12	8.4	1.3	1.6
		70	2	50	13.8	9.66	1.3	1.6
		70	4	50	15.2	10.64	1.3	1.6
		70	7	50	18.5	12.95	1.3	1.6
		70	0.5	100	11.1	7.77	1.4	1.6
		70	1	100	13.2	9.24	1.4	1.6
		70	2	100	15.1	10.57	1.4	1.6
		70	4	100	17	11.9	1.4	1.6
		70	7	100	20.5	14.35	1.4	1.6

Condition	Comments	Runoff %	Length of Storm (days)	Rainfall Frequency (yrs)	Rainfall (inches)	Rainfall Exceedence (inches)	Area 1 Area (ac)	Runoff to Area1 (ac-ft)	Area 2 Area (ac)	Runoff to Area 2 (ac-ft)	Area 1 to Area 2 Pump Capacity (af-day)	Area 1 to Area 2 Total Pump Capacity (ac-ft)	Inflow - Area 1 to Area 2 (ac-ft)	Outflow from Area 2 (ac-ft) (Assumes TW elev = 0.0)	Net Ponding in Area 2 (ac-ft)	Ponding Elevation in Area 2 (NAVD88)	Water Surface Elevation in Area 2 just upstream of Hwy 90 (NAVD88)	Water Surface Elevation in Area 2 @ upper end, just downstream of RR, at Peak Inflow to System (NAVD88)
Alignment 3	Existing Runoff Conditions	70	0.5	10	7.6	5.32	1,542	684	2,697	1,196	405	203	203	0	1,398	1.18	1.1	
		70	1	10	9.1	6.37	1,542	819	2,697	1,432	405	405	405	0	1,837	1.38	1.3	
		70	2	10	10.2	7.14	1,542	917	2,697	1,605	405	810	810	0	2,415	1.56	1.5	
		70	4	10	11.1	7.77	1,542	998	2,697	1,746	405	1,620	998	0	2,745	1.8	1.7	
		70	7	10	13.8	9.66	1,542	1,241	2,697	2,171	405	2,835	1,241	0	3,412	2.12	1.9	
		70	0.5	50	10	7	1,542	900	2,697	1,573	405	203	203	0	1,776	1.33	1.3	
		70	1	50	12	8.4	1,542	1,079	2,697	1,888	405	405	405	0	2,293	1.6	1.5	
		70	2	50	13.8	9.66	1,542	1,241	2,697	2,171	405	810	810	0	2,981	1.92	1.8	
		70	4	50	15.2	10.64	1,542	1,367	2,697	2,391	405	1,620	1,367	0	3,759	2.28	2.1	
		70	7	50	18.5	12.95	1,542	1,664	2,697	2,911	405	2,835	1,664	0	4,575	2.63	2.4	
		70	0.5	100	11.1	7.77	1,542	998	2,697	1,746	405	203	203	0	1,949	1.43	1.4	
		70	1	100	13.2	9.24	1,542	1,187	2,697	2,077	405	405	405	0	2,482	1.69	1.6	
		70	2	100	15.1	10.57	1,542	1,358	2,697	2,376	405	810	810	0	3,186	2	1.8	
		70	4	100	17	11.9	1,542	1,529	2,697	2,675	405	1,620	1,529	0	4,204	2.5	2.3	
		70	7	100	20.5	14.35	1,542	1,844	2,697	3,225	405	2,835	1,844	0	5,069	2.83	2.6	

IER 16 Western Tie-in Induced development

- St. Charles Parish Development Project Study Prepared and included in IER as Appendix. Results of study indicated " development not likely in the near future (12 years).
  - cost associated to raise (fill) areas
  - existing available land nearby that is more economically feasible to develop
  - no excess demand in market

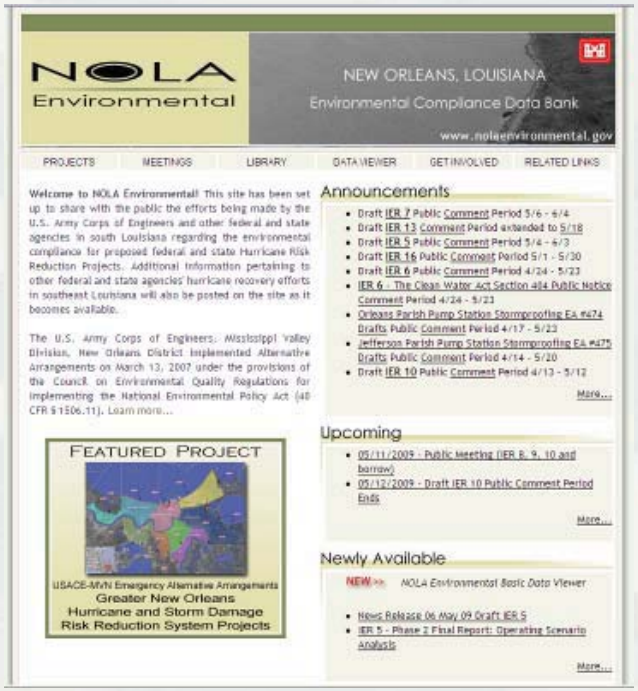
- USACE Headquarters Policy on Mitigation for Induced Development (appendix G)

- "USACE policy is that the CEMVN would mitigate, to the extent justified, the adverse direct environmental impacts of projects. However, the CEMVN would not mitigate for speculative indirect impacts related to future land development, which would be subject to compliance with local and state permit and zoning requirements. Federal, local, and state interests would be responsible for approving or denying permits to construct and defining the appropriate mitigation requirements for future land development activities, should they occur." (See appendix G for a copy of USACE Headquarters Policy on Mitigation for Induced Development).

Links to IER and appendices

www.nolaenvironmental.gov

http://www.mvn.usace.army.mil



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Questions?