



US Army Corps
of Engineers

New Orleans Hurricane and Storm Damage Risk Reduction System 2008 Facts and Figures

(As of August 28, 2008)

1. Overview

The U.S. Army Corps of Engineers completed the repair and restoration of 220 miles of floodwalls and levees by June 1, 2006.

The New Orleans area now has the best flood protection in its history. Every day the Corps of Engineers is working, we are reducing risk.

Significant hurricane protection measures include:

- Floodwalls reinforced at numerous locations
- I-walls replaced by stronger T-walls at breach sites
- Floodwalls armored and transition points strengthened between flood walls and levees
- Interior pump station have been repaired and improved
- Temporary pumps and flood gates at the three outfall canals have been completed.

Pumps in place at the three outfall canals have a total pumping capacity of about 16,000 cubic feet per second.

The Corps is committed to providing 100-year level flood protection to the New Orleans area in 2011.

2. Hurricane Katrina

- More than 1,500 lives were lost
- Category 5 strength less than 12 hours before landfall
- 127 mph winds at Louisiana landfall
- Maximum surge of 28 to 30 feet along Mississippi coast;
- 75 to 80 percent of New Orleans was flooded

3. Emergency Response

Under Task Force Guardian:

Repaired or replaced 220 miles of levees and floodwalls from September 2005 – June 2006, the start of Hurricane Season. The repaired system included:

- 2.3 miles of new floodwalls
- 22.7 miles of new levees
- 195.3 miles of scour repair
- 3 interim gated closure structures
- 4 closure structure repairs

Updated 8/28/08, 1700

220 miles = 1.16 million feet

Unwatered the City of New Orleans; more than 250 billion gallons removed.

Repaired, rebuilt and strengthened 256 miles of levees and floodwalls.

4. FEMA Support Mission

<i>Mission</i>	<i>Mississippi</i>	<i>Louisiana**</i>	<i>Complete</i>
Ice	1,300 trucks	1,533 trucks	100%
Water	939 trucks	2,178 trucks	100%
Power Assessed	470	928	100%
Generators Installed	160	288	100%
Roofing	49,892	81,318	100%
Structures	726	310	100%
Debris*	20.4 million cy	28.1 million cy	100%
		**Includes Rita and Katrina missions	

* *Would fill the Superdome nearly eight times.*

5. Funding

At present, the federal portion of the Hurricane and Storm Damage Risk Reduction System (HSDRRS) is fully funded at \$12.8 billion.

2nd and 3rd Supplementals: \$2.2 billion
4th Supplemental: \$3.6 billion
5th Supplemental: \$1.3 billion
6th Supplemental: \$5.7 billion

Total to date: \$12.8 billion

- 2nd and 3rd supplementals: Unwatering and emergency repairs;
- 3rd supplemental: Accelerate repair and completion to design heights;
- 4th supplemental: Replace floodwalls, install permanent pumps and gated closures at the three outfall canals; improvements to IHNC and 100-year flood protection; storm proof pump stations; armor critical features.
- 5th supplemental: Provide \$1.3 billion for West Bank and Lake Pontchartrain hurricane protection system to complete authorized projects.

6th supplemental: Provides \$5.7 billion for additional work on the Lake Pontchartrain and West Bank projects; SELA; permanent pumps and closure structures on the outfall canal, stormproofing interior pumping stations; armoring critical elements; improving protection at the IHNC; and replacing or modifying certain non-Federal levees in Plaquemines Parish.

The State of Louisiana will be expected to pay approximately \$1.8 billion as the non-federal sponsor, for a total programmatic cost of \$14.6 billion.

6. Construction Contracts*

Roll-Up	#	Estimated Value
Total	350	\$7.3 B
Completed	128	\$723 M
In Construction	45	\$1460 M
3-Month Look-Ahead		
Award	13	\$371 M
Advertise	9	\$360 M

*Includes contracts awarded and completed under TFG.

**Updated total contract cost estimate (excludes engineering and design, supervision, administration, real estate, and contingency and escalation costs)

	Actual (19 Aug 08)	Scheduled (thru 31 Aug 08)
Total Funds Available	\$7,084 M	
Total Funds Obligated	\$3,235 M	\$3,223 M
Total Funds Committed	\$1,187 M	\$983 M
Total Funds Committed & Obligated (Cost to Complete)	\$4,422 M	\$4,206 M
Expenditures	\$1,951 M*	\$2,357 M

* Dollars in millions

*Does not include 6th Supplemental

In early April 2008, a contract was awarded for the Inner Harbor Navigation Canal surge reduction project, the largest design-build civil works project in the history of the Corps. The contract was awarded to Shaw Environmental & Infrastructure, Inc. for over \$695 million. Construction will begin upon completion of the NEPA requirements (c. early Fall 2008).

The magnitude of the construction work on the system is monumental. The Corps has 45 ongoing construction contracts worth almost \$1.2B. We will award another 23 contracts in the next six months, worth more than \$600M.

7. Outfall Canals

Construction and installation of the interim closure structures and pump stations at the three outfall canals would normally take 3 to 5 years to design, manufacture and install. The Corps got the basic work (closures and substantial pump capacity) done in 8 months – before the start of the 2006 Hurricane Season.

The maximum pumping capacity today at the three outfall canal pumps is about 16,000 cfs, the average flow of the Potomac River.

New Supervisory Control and Data Acquisition (SCADA) equipment installed at the outfall canals gives the Corps a computerized monitoring system that measures water levels remotely.

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8. Pump Stations

There are 73 pump stations (federal and non-federal) in the 4-parish area.

Orleans Parish: 24 stations
Jefferson Parish: 25 stations
St. Bernard Parish: 8 stations
Plaquemines Parish: 16 stations

Pump Station Repairs:

Of 30 projects over a 4-parish area:

- 18 completed
- 8 in construction
- 4 in design.

Jefferson Parish (\$1 M):

- 8 repair projects, all completed

Orleans Parish (\$35 M):

- 12 repair projects: 5 complete, 6 in construction, 1 in design; repairs will be completed in 2009; current pumping capacity 92%.

St. Bernard Parish (\$21 M est):

- 5 repair projects; 3 complete, 2 (1 design-build) projects currently underway; all repairs will be completed in 2009

Plaquemines Parish (\$10 M est):

- 5 repair projects; 1 complete, 1 in construction, all other contracts will be awarded this year; all repairs will be completed in 2009.

9. Storm-Proofing of Pump Stations

Of 26 projects over a 3-parish area:

- 3 complete
- 0 in construction
- 4 in design phase (1 to be awarded this fall)
- 19 prepping for design phase
- Jefferson Parish (\$71.1 M est): 11 projects
 - 1 completed,
 - 4 in design phase (1 to be awarded summer 08)
 - 6 prepping for design phase
- Orleans Parish (\$100+ M est): 13 projects
 - 2 in design phase
 - 11 prepping for design phase

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- Plaquemines Parish (\$3.2M) 2 projects
 - 2 completed

10. Levees and Floodwalls

There are 325 miles of levees/floodwalls in the HSDRRS.

Lake Pontchartrain & Vicinity:	120 miles
N.O. to Venice:	87 miles
West Bank & Vicinity:	66 miles
Larose to Golden Meadow:	45 miles
Grand Isle:	7 miles

11. Additional Risk Management Improvements

- Developed new Emergency Operations Procedures Manual.
- Created Risk and Reliability maps and the first risk modeling for the entire HSDRRS.
- Created Risk and Reliability maps with parish pumping factored in.

12. 100-Year Flood Protection Plan has been approved.

- On June 30, 2008, Congress passed the 6th Emergency Supplemental, which included \$5.7 billion to fully fund the federal share of 100-year protection.
- Once completed, the HSDRRS will be stronger and more resilient than any HSDRRS construction for greater New Orleans at any time in the city's history.

13. Environmental Compliance

The Corps applied "alternative measures" to the National Environmental Policy Act (NEPA) to complete emergency repairs to the system more quickly than the traditional process. Nevertheless, all projects will meet full NEPA compliance.

14. Outreach & Public Meetings

The Corps has hosted 70 public meetings (as of July 2008) around the HSDRRS in five parishes to allow the public the opportunity to provide input on development of the HSDRRS.

The Corps has hosted 10 Neighborhood Focus Group meetings throughout the HSDRRS.

PROGRESS Past, Present, Future

PAST...

Outfall Canal Closures: 17th Street, London Ave., Orleans Ave.

- After Hurricane Katrina, all three outfall canals were fitted with pumps and gates before start of 2006 hurricane season.
- 5 years of work completed in 8 months to provide risk reduction before start of the next hurricane season.

Load Test Conducted

- London Ave. Canal load test concluded that safe water elevation could be raised from 4 feet to 5 feet, increasing the S&WB's capacity to pump rain water into the canal by 30%.

Pump Capacity

- Total pumping capacity at all three outfall canals is 16,000 cfs, sufficient to meet the pumping capacity of the S&WB's output.

Harvey Sector Gate

- Major surge protection structure on the West Bank
 - Built to pre Katrina authorized level of protection
 - Elevation of 8 feet

GIWW Levees Raised

- Earthen levees now at authorized levels include areas from IHNC to Paris Road, the earthen levees were raised to 15' (low spots still exist at gate, floodwalls and ramps), to east of Michoud Canal to CSX rail road gate, elevation ranges from 19' (earthen levee) to 20' (gate)
- Between Paris Road and Michoud Canal the earthen levees range from 16.5' to 20' and are below pre-Katrina authorized heights

Interim protection on IHNC

- Levees and floodwalls along Inner Harbor Navigation Canal were improved and strengthened by reducing stick-up and adding T-walls to replace breached floodwalls at Lower Ninth Ward

PRESENT...

Funding

HSDRRS Funding \$ thru 5 th Supplemental		
Federal Appropriations		7.055B
Non-Federal, 100-year		.221B
Non-federal SELA		.008B
Total		7.284B
6 th Supplemental		
Federal		5.761B
Non-federal (65/35 ratio)		1.527B
Total		7.288B
Federal share		7.055B
		5.761B
Total		12.816
Total amount (Federal and non-Federal)		7.284B
		7.288B
Total		14.572B

IHNC Surge Reduction Contract Awarded in April 2008

- Linchpin of the HSDRRS – essential to providing 100-year level of protection
- Largest design-build civil works project in Corps history
- \$695 Million contract
- IHNC surge reduction project will reduce surge risk for New Orleans East, Lower Ninth Ward, Metro New Orleans, and St. Bernard Parish
- Construction to start fall 2008
- IER 11 up for 30 day public review 20 AUG 08

West Bank --

Harvey Canal Floodwalls

- Starting below sea level, floodwalls will be 20-24 ft. high with pilings as deep as a 12-story building (120'+)
- 2.2 miles long
- \$188 million

West Bank & Vicinity Projects

- Currently there are 20 miles of levee under construction and 2.5 miles of floodwall under construction. All levees are being raised in lifts to previously authorized heights and will be raised again to 100-year elevations. All floodwalls are being built to 2057 elevations.
- 6 miles of floodwalls have been strengthened, transitions armored, and scour protection constructed.
- \$300 M in construction contracts has been awarded, with another \$200 M awarded for engineering and design work, environmental assessment, and construction inspection.

Updated 8/28/08, 1700

- While a great deal of work is on-going on the West Bank and Vicinity Projects, the areas of Belle Chasse, Gretna-Algiers, Harvey-Westwego, and Lake Cataouatche are still subject to a high level of risk.
- All polders have on-going, significant construction projects; however, there are still “gaps” in the system which place residents at risk for the 2008 hurricane season.

Plaquemines

- All work to restore levees to pre-Katrina authorized grades is complete, except for two sections of levee that have sub-soil stability deficiencies indicated by soil borings. Work to repair these sections continues.
- The Congressional authorization for 100-year protection was not extended to include the New Orleans to Venice project.

East Bank --

- Lake Pontchartrain Orleans Lakefront --- Flood protection levels are improved, at or near 100-year level of protection in most locations.
- St. Charles --- Requires most significant work but interim measures are underway

Southeast Louisiana Project (SELA)

- SELA includes interior drainage improvements in Orleans and Jefferson Parishes that support the parishes’ master drainage plans and generally provide rainfall flood protection.
- The Dwyer Road intake culvert project is the first major SELA project advanced in Orleans Parish since Hurricane Katrina.
 - Advertised in June 2008; planned completion in spring 2012
- The pump station to which the intake culvert will convey rainfall runoff is under construction and scheduled for completion in 2009.
- Nine SELA construction contracts have been awarded since Hurricane Katrina, all in Jefferson Parish.
 - Includes canal enlargements, bridge replacements, and pump station improvements.
 - Two contracts to be completed this summer; two more slated for completion by the end of the year.
- Last of the nine contracts should be finished by late summer of 2009.
- Two contracts in Orleans Parish are scheduled for award during the next four months.

East Jefferson/St. Charles Levees – armoring, transitions, raises

- Interim improvements include adding levee berms, hardening transition points, reducing I-wall stick-up heights, and raising levees
- Stronger and more resilient than pre-Katrina
- Work on-going to reach 100-year level protection

Updated 8/28/08, 1700

St. Bernard: Verret to Caernarvon

- \$41.5 million for Phase I to raise levees to previously authorized levels of protection
- Elevations: 15.5 to 20 feet
- 38% complete

Borrow (levee dirt)

- 100 million cubic yards needed to build the 100-year level of protection for the HSDRRS.
- 40 million cubic yards have been identified as suitable for levee construction; 60 million cubic yards still needed

FUTURE...

'Advance Measures' for IHNC Surge Barrier

- Scheduled for completion in 2011, the IHNC surge barrier construction will complete a certain level of protection by 2009, in advance of completion.
- 4 month public comment period over in September 2008.

IHNC Surge Barrier

- Construction to start in fall 2008 and be completed for hurricane season 2011.

Closure of MRGO

- On June 5, the ASACW forwarded the MRGO Deep-Draft De-Authorization Study to Congress. This action officially de-authorized the MRGO from the Gulf Intracoastal Waterway to the Gulf of Mexico in accordance with the Water Resources Development Act of 2007.
- The recommended plan is total closure of the MRGO with a rock structure across the channel just south of Bayou LaLoutre near Hopedale, Louisiana.
- The Corps will coordinate repairs to the IHNC lock prior to building the MRGO rock closure at Bayou LaLoutre.
- Because closing the IHNC Lock for repairs would impact shallow draft traffic, the Corps will dredge the channel at Baptiste Collette, to allow traffic to bypass the lock.
- All of the material dredged from Baptiste Collette will be used beneficially to build coastal wetlands.
- Once the Baptiste Collette dredging is complete, the IHNC lock de-watering and repair will begin.
- Once all lock repairs are complete, the construction of the MRGO closure can be completed. The Corps will work to closely coordinate all of these projects and look for opportunities to conduct work simultaneously to expedite completion.
- The Corps projects in the MRGO area are being closely coordinated; MRGO de-authorization and closure, IHNC repair, IHNC area hurricane protection, ecosystem restoration projects, LPV levee improvements.

Permanent Pump Stations

- The proposed siting of the permanent pumps is currently under consideration.

Updated 8/28/08, 1700

100-Year Protection for 2011 Hurricane Season

- The Corps is building a comprehensive “system” of levees, floodwalls, and other structures
- Ongoing levee raises, floodwall construction, fronting/foreshore protection
- 100-year risk reduction (i.e. protection against a storm surge magnitude that has a 1 in 100 chance of occurring in any given year.”
- We will build to a height sufficient to protect against a storm surge and waves associated with a 100-year event.

Louisiana Coastal Protection and Restoration (LACPR)

- Partnership with state of Louisiana --- analysis and design project looking at full range of hurricane protection measures, spanning comprehensively across all of coastal Louisiana, and integrating water resources objectives of hurricane protection, flood control, and coastal restoration.
- Peer review by National Academies of Science --- comments received 12 May 2008.
- Stakeholder input and values --- Corps uses risk-informed decision making process that relies on that input
- Additional stakeholder engagement will take place in July 2008.
- Plans will be presented in November 2008 and a plan will be ready for coordination in December 2008.