

Greater New Orleans Hurricane and Storm Damage Risk Reduction

Facts and Figures

(As of December 1, 2008)



**US Army Corps
of Engineers**

Hurricane Katrina - August 29, 2005

- One of America's largest natural disasters
- 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 - 80 percent of New Orleans was flooded
- Approximately 1,500 lives were lost

Hurricane Rita - September 24, 2005

- Category 4 strength less than 12 hours before landfall
- 175 mph sustained winds in Gulf of Mexico
- 120 mph sustained winds at landfall
- Category 3 strength at landfall

The Hurricane and Storm Damage Risk Reduction System in the greater New Orleans area will be completed in 2011. Right now the area has the best flood protection in its history.

"Every day the Corps of Engineers is working, we are reducing risk to the people of greater New Orleans."

- Karen Durham-Aguilera
Director, Task Force Hope

Overview

Following Hurricanes Katrina and Rita, the U.S. Army Corps of Engineers completed the repair and restoration of 220 miles of floodwalls and levees from September 2005 to June 1, 2006.

Significant hurricane risk reduction measures include:

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

Temporary pumps 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.

Independent External Peer Review

- Leveraging vast pool of science and engineering expertise
- Attaining most scientifically sound solutions
- Enhancing quality of work and planning of future programs

Mississippi River Gulf Outlet (MRGO)

- The MRGO has been de-authorized for navigation. Construction of the closure structure will begin soon.
- The MRGO will be closed with a rock structure across the channel just south of Bayou La Loutre near Hopedale, La.
- The planned structure will consist of 433,500 tons of stone and will completely block the MRGO. It is designed to be 12 feet wide at the top and 450 feet wide at the bottom.

Emergency Response

Immediately after Hurricanes Katrina and Rita:

The Corps repaired or replaced 220 miles or 1.16 million feet of levees and floodwalls from September 2005 – June 2006 for 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
- Unwatered the City of New Orleans; more than 250 billion gallons removed

FEMA Support Mission

(Hurricanes Katrina and Rita)

Water - 2,178 trucks

Power Assessed - 928

Generators Installed - 288

Roofing - 81,318

Structures - 310

Debris - 28.1 million cubic yards

Funding

The Hurricane and Storm Damage Risk Reduction System (HSDRRS) is fully funded at **\$14.3 B**.

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

Federal share: \$12.8 B

Non-Federal Cost Share (to be repaid over 30 years) \$1.5 B

Total: \$14.3 B

Construction Contracts

<i>Contracts</i>	<i>Number</i>	<i>Estimated Value</i>
Total	344	\$7.300 B
Completed	138	\$764 M
In Construction	40	\$1.445 B

Inner Harbor Navigation Canal Surge Reduction Barrier:

- In early April 2008, a contract was awarded for the IHNC surge reduction project, the largest design-build civil works project in the history of the Corps. This project is the linchpin of the HSDRRS – essential to providing 100-year level of protection to the area.

- The contract was awarded to Shaw Environmental & Infrastructure, Inc., a Louisiana company, for over \$695 M. The project is scheduled for completion in 2011.

- The contract includes a provision for Advance Measures to reduce storm surge by August 2009.

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 accomplished the basic work (closures and substantial pump capacity) in 8 months – before the start of the 2006 Hurricane Season.

The total maximum pumping capacity today at the three outfall canal pumps is about 16,000 cubic feet per second, the average flow of the Potomac River.

17th Street Canal - 9,200 cfs total pumping capacity
Orleans Ave. Canal - 2,200 cfs total pumping capacity
London Ave. Canal - 5,200 cfs total pumping capacity

Supervisory Control and Data Acquisition (SCADA) equipment installed at the outfall canals last year gives the Corps a computerized control system to operate the pumps and gates while monitoring water levels in the canal. The SCADA equipment performed successfully during Hurricanes Gustav and Ike in September 2008.

Pump Stations

There are 73 pump stations (Federal and Non-Federal) in the four-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 four-parish area:

- 21 completed
- 6 in construction
- 3 in design.

Jefferson Parish (\$1 M):

- 8 repair projects, all completed

Orleans Parish (\$38 M):

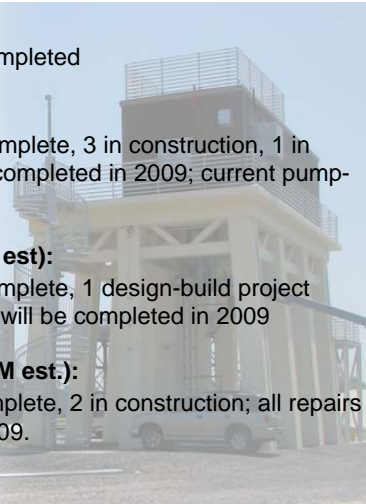
- 12 repair projects: 8 complete, 3 in construction, 1 in design; repairs will be completed in 2009; current pumping capacity 92%.

St. Bernard Parish (\$22 M est):

- 5 repairs projects; 4 complete, 1 design-build project currently underway; all will be completed in 2009

Plaquemines Parish (\$14 M est.):

- 5 repair projects; 1 complete, 2 in construction; all repairs will be completed in 2009.



Storm-Proofing of Pump Stations

Of 26 projects over a two-parish area:

- 3 completed
- 1 in construction
- 6 in design phase
- 16 prepping for design phase

Jefferson Parish (\$136 M): 11 projects

- 1 completed
- 1 in construction
- 4 in design phase
- 5 prepping for design phase

Orleans Parish (\$204 M): 15 projects

- 2 completed
- 2 in design phase
- 11 prepping for design phase

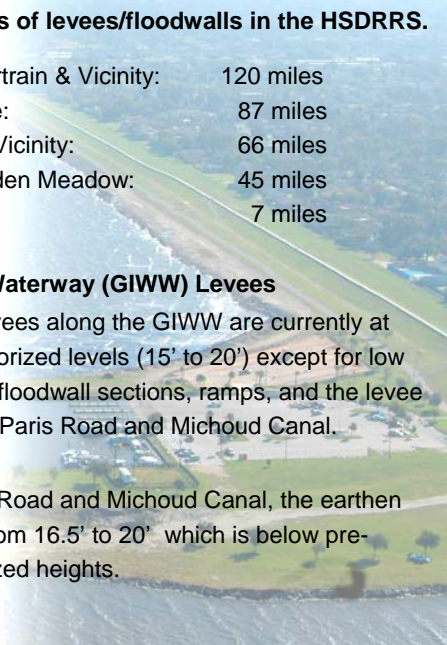
Levees and Floodwalls

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

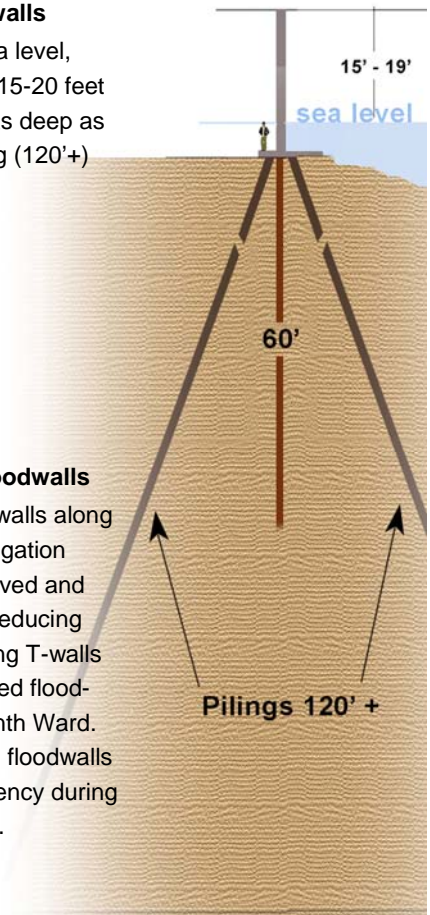
Gulf Intracoastal Waterway (GIWW) Levees

- The earthen levees along the GIWW are currently at previously authorized levels (15' to 20') except for low spots at gates, floodwall sections, ramps, and the levee reach between Paris Road and Michoud Canal.
- Between Paris Road and Michoud Canal, the earthen levees range from 16.5' to 20' which is below pre-Katrina authorized heights.



Harvey Canal Floodwalls

- Starting below sea level, floodwalls will be 15-20 feet high with pilings as deep as a 12-story building (120'+)
- 2.2 miles long
- \$340 M budgeted



IHNC Levees and Floodwalls

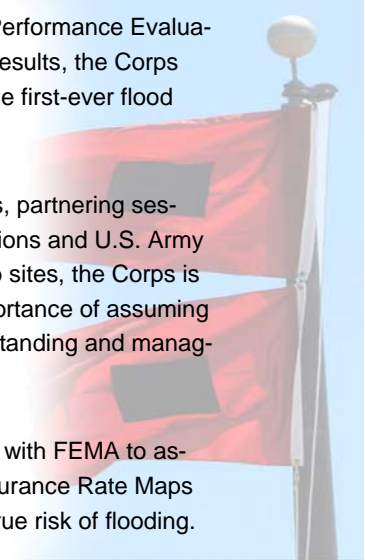
- Levees and floodwalls along Inner Harbor Navigation Canal were improved and strengthened by reducing stick-up and adding T-walls to replace breached floodwalls at Lower Ninth Ward. These levees and floodwalls proved their resiliency during Hurricane Gustav.

Environmental Compliance

Alternative Arrangements allow the Corps to expedite the environmental process required of all federally-funded projects while fully complying with the requirements of the National Environmental Protection Act.

Risk Management and Risk Communication

- Using the Interagency Performance Evaluation Task Force model results, the Corps released to the public the first-ever flood depth maps.
- Utilizing public meetings, partnering sessions, special presentations and U.S. Army Corps of Engineers web sites, the Corps is communicating the importance of assuming responsibility for understanding and managing flood risk.
- The Corps is partnering with FEMA to assure accurate Flood Insurance Rate Maps are available to depict true risk of flooding.



Other Major Projects

West Bank & Vicinity Projects

- Currently there are 24 miles of levees under construction and 2.1 miles of floodwalls under construction.
- 6 miles of floodwalls have been strengthened, transitions armored, and scour protection constructed.
- \$400 M in construction contracts has been awarded, with another \$200 M awarded for engineering and design work, environmental assessment and construction inspection.
- 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.

Plaquemines

- The Congressional authorization for 100-year level of protection was not extended to include the New Orleans to Venice project.
- 36 miles of West Bank non-Federal levees will be raised to 12 feet. This will incorporate the existing non-Federal levee into the Federal levee systems between the West Bank & Vicinity levee in the north and the New Orleans-to-Venice levee in the south. Construction completion is scheduled for April 2013 at an estimated cost of \$671 M.

East Bank

- Lake Pontchartrain Orleans Lakefront: Flood protection levels are improved, at or near 100-year level of protection in most locations.
- St. Charles: This area requires the most significant work but interim measures are underway.
- Last of nine contracts should be finished by late summer of 2009. Two contracts in Orleans Parish are scheduled for award during the next four months.

St. Bernard: Verret to Caernarvon

- Phase I construction to raise levees to previously authorized levels of protection is 50% complete.
- \$41.5 M is budgeted

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

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

Southeast Louisiana Project (SELA)

SELA includes interior drainage improvements in Orleans and Jefferson Parishes that support the parishes' master drainage plan and generally provide rainfall flood protection.

Nine Jefferson Parish SELA construction contracts awarded since Hurricane Katrina include canal enlargements, bridge replacements, and pump station improvements.

Two contracts will be completed this summer; two more are slated for completion by the end of the year.

Armoring

Armoring adds resiliency to a levee and can reduce erosion and scouring by protecting levee backslopes against wave overtopping. Since Katrina the Corps has undertaken a concerted effort to improve standard armoring methods and is working with academia to research the use of grass, geotextile materials, stone and paving materials.

More than \$600 M will be spent on armoring approximately 260 miles of levee in the HSDRRS. About 420 transition spots (where a floodwall meets a levee) will be armored.

Borrow (levee dirt)

- 75 million cubic yards are needed to build the 100-year level of protection for the HSDRRS.
- 60 million cubic yards have been identified as suitable for levee construction.
- Approximately 65 million cubic yards of borrow are under investigation.

