US ARMY CORPS OF ENGINEERS
SANDY RESPONSE AND RECOVERY PROGRAM

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U.S. Army Corps of Engineers

8 March 2017

“The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation.”
OUTLINE

Sandy

Surge and other Sandy-Related Impacts

Response Actions

Recovery Program

Opportunities for Coastal Resilience Integration
Sandy originated in the Caribbean on 22 October 2012

Sandy severely impacted Jamaica, Cuba, Haiti, Dominican Republic, and Cuba, and resulted in one death in Puerto Rico

Sandy reached the continental US Atlantic coastline on 29 October

In the USA, effects extended from Florida to Maine, and west to the Great Lakes

States of New Jersey, New York, and Connecticut greatly impacted; NY-NJ Harbor devastated by catastrophic surge
Trained Team of Emergency Operations Professionals
Sustained Interagency Coordination
Conducted Multiple Emergency Response Exercises
Lowered pool elevations behind Corps dams
Closed hurricane barriers along New England Coast
Moved Corps vessels to safe havens
Issued 218,000 Sandbags in NJ & PA
Secured Corps Construction Projects and Facilities
Executed pre-storm inspections of USACE Projects
Engaged with legislators and governors
Synchronized operations with USACE
Activated and Deployed Emergency Responders
Positioned 3 Mobile Command Post Vehicles
Staged 374 power generators at forward sites
SURGE AND OTHER SANDY-RELATED IMPACTS

Human Costs
- 159 lives lost
- 500,000 mandatory evacuations
- 20,000 temporary shelter
- Extensive community dislocations
- $65B in damages

Economic
- 650,000 houses damaged/destroyed

Infrastructure Damage/Loss
- Telecommunications
- Mass transit
- Fuel
- Power
**Temporary Power Mission**
- Provided local and state officials with temporary emergency power needs at critical facilities to reinstitute local command and control and post-event recovery.
- At peak operations, USACE elements had over 500 generators in their controlled inventory and supplied 55MW of power to facilities - enough power for 50,000 homes.
- 742 power mission taskings were received, 682 assessments were conducted, and 334 generators were installed.

**Unwatering Mission**
- Unwater strategic infrastructure immediately after the event to restore subway, commuter rail, and automotive lines.
- Tunnels were unwatered in New York & New Jersey in 11 days
- Removed 474.5 million gallons

**Pump Mission**
- Removed 400 tons of trash/debris
- Pumped 10 million gallons
- Enabled Prime Power to conduct assessments

**Response Debris Mission**
- Clearance of emergency routes in coordination with power companies.

**Nation Water Mission**
- Provided 512 truckloads of water (9.2 million liters)

**Neighborhood**
- Used Local Government Liaisons to provide information to Division EOC and advise local government officials on further support missions
RESPONSE: PUBLIC LAW 113-2
DISASTER RELIEF APPROPRIATIONS ACT 2013

Total Appropriation $47.9B
HUD  $15.20B
DOT  $12.42B
DHS  $11.47B

14%  Construction of flood risk reduction projects
76%  Beach repair and restoration
  Repair of navigation channels and structures
9%   Investigations and studies
1%   Sandy Recovery Program $5.1B
0%   USACE

Construction of flood risk reduction projects
Beach repair and restoration
Repair of navigation channels and structures
Investigations and studies
Sandy Recovery Program $5.1B

127 STAT. 4
PUBLIC LAW 113–2—JAN. 29, 2013

Public Law 113–2
113th Congress
An Act
Making supplemental appropriations for the fiscal year ending September 30, 2013, to improve and streamline disaster assistance for Hurricane Sandy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending September 30, 2013:

Table:

<table>
<thead>
<tr>
<th>Appropriation</th>
<th>Amount</th>
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<tbody>
<tr>
<td>HUD</td>
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For an additional amount for “Commodity Assistance Program” for the emergency food assistance program as authorized by section 204(a)(1) of the Food and Nutrition Act of 2008 (7 U.S.C. 2005(a)(1)) and section 204(a)(1) of the Emergency Food Assistance Act of 1977 (7 U.S.C. 7505(a)(1)), $86,000,000: Provided, That notwithstanding any other provisions of the Emergency Food Assistance Act of 1977, additional foods and funds for administrative expenses from resources specifically appropriated, transferred, or reprogrammed to restore to States resources used to assist families and individuals displaced by Hurricane Sandy among the States without regard to sections 204 and 214 of such Act (7 U.S.C. 7505, 7515): Provided further, That such amount is designated by the Congress as being for an emergency requirement pursuant to section 251(b)(2)(A)(i) of the Balanced Budget and Emergency Deficit Control Act of 1985.
HURRICANE SANDY RECOVERY PROGRAM

Flood Control and Coastal Emergencies

North Atlantic Division  25 projects completed
South Atlantic Division  8 projects complete

1. Misquamicut Beach, Westerly, RI
2. Prospect Beach, West Haven, CT
3. Woodmont Beach, Milford, CT PL84-99
4. Fire Island Inlet to Montauk Point (WOSI)
5. Fire Island Inlet to Montauk Point, West Hampton, NY
6. Fire Island Inlet and Shores Westerly to Jones Inlet (Gligo)
7. East Rockaway Inlet to Rockaway Inlet & Jamaica Bay, NY (1A)
7b. East Rockaway Inlet to Rockaway Inlet & Jamaica Bay, NY (1B)
8. Atlantic Coast of NYC, Rockaway Inlet (Coney Island)
9. Oakwood Beach
10a. Raritan Bay and Sandy Hook Bay, NJ (Keansburg) (hard features)
10b. Raritan Bay and Sandy Hook Bay, NJ (Keansburg) (soft features)
11a. Sandyhook at Barneget Inlet (Seabright to Manasquan)
11b. Sandyhook at Barneget Inlet (Belmar to Manasquan)
11c. Sandyhook at Barneget Inlet (Long Branch)
11d. Sandyhook at Barneget Inlet (Ashbury Park to Avon, NJ)
12. Barneget Inlet to Little Egg Harbor
13. Brigantine Island, NJ
14. Absecon Island, NJ
15. Great Egg Harbor/Peck Beach, NJ
16. Townsend Inlet to Cape May, NJ
17. Cape May to Lower Township, NJ
18. Roosevelt Inlet to Lewes, NJ
19. Rehoboth to Dewey, DE
20. Fenwick Island, DE
21. Delaware Coast Protection, DE
22. Bethany/South Bethany
23. Atlantic Coast MD (Rehab Project)
24. Virginia Beach, VA (Hurricane Protection)
25. Sandbridge Beach Nourishment, VA

Start Date: 1 FEB 2013
Completed Date: 13 OCT 2015

Program Amount: $958 M

Harvey Cedars Beach area of Barneget Inlet to Little Egg Harbor (LBI) Project, NJ, before (above) and after beach replenishment.
USACE SANDY RECOVERY PROGRAM
FLOOD CONTROL AND COASTAL EMERGENCIES

Rockaway FCCE Construction
USACE SANDY RECOVERY PROGRAM
OPERATIONS AND MAINTENANCE

North Atlantic Division
- 86 projects / 78 complete
- Substantial completion
  September 2015

South Atlantic Division
- 21 projects / 21 complete
- Fiscal Completion and Closeout

Great Lakes & Ohio River Div.
- 40 projects / 39 complete
- Substantial completion
  December 2016

Program Amount: $780 M
HURRICANE SANDY PROGRAM STATUS

Authorized But Unconstructed/Construction Program

TOTAL PROGRAM AMOUNT: $2,756 Million

Work under this category includes constructing flood and storm damage risk reduction projects at sites where either an authorized-but-not-yet-constructed Corps project or a partially-constructed Corps project exists.

Oakwood Beach construction included a 50-foot-wide berm designed to reduce storm damages to infrastructure.

Authorized But Unconstructed/Construction Program

TOTAL PROGRAM AMOUNT: $2,756 Million

Start Date: 1 Apr 2013
End Date: 24 Jun 2021

Before
After

Updated 14 Apr 15
USACE SANDY RECOVERY PROGRAM
AUTHORIZED BUT UNCONSTRUCTED PROJECTS

Rockaway – Jamaica Bay Reformulation
**HURRICANE SANDY PROGRAM STATUS ONGOING STUDIES**

**Ongoing Studies Program**

**TOTAL PROGRAM AMOUNT: $28 Million NAD 17 Studies**

**North Atlantic Coast Comprehensive Study $19 M**

1. Pawcatuck River, RI Flood Study
2. Pawcatuck River & Rhode Island Coastal Investigation
3. Lake Montauk Harbor, NJ
4. Hashamomuck Cove, NY
5. Asharoken
6. Bayville
7. **Südsee, Staten Island, NY**
8. Rahway River Basin, NJ
9. Shrewsbury, River, NJ
10. Highlands, NJ
11. Leonardo, NJ
12. Wreck Pond, NJ
13. Alternative Long Term Nourishment
14. Delaware River Comprehensive, NJ
15. Delaware River Dredged Material, NJ
16. Delaware River Dredged Material Utilization, DE
17. Hereford Inlet / Cape May Inlet, NJ

**Buried Seawall/Armored Levee**

- Reach A-4: 22,700 ft Buried Seawall/Armored Levee
- 26.5 ft NGVD29 crest height
- 17 ft crest width
- 50-60 feet toe to toe

**South Shore, Staten Island:** Sandy’s inundation swept homes from their foundations and left behind a swath of debris.

**Start Date:** 5 Aug 2013

**End Date:** April 2018

*Updated 14 Apr 15*
OPPORTUNITIES: COASTAL RESILIENCE INTEGRATION

Ongoing USACE Activities

* Vulnerability Assessments, Resilience and Climate Change Adaptation Planning
* Technical Assistance to States and installations; Public-Private Partnership initiatives
* Limited & General Reevaluation Reports
* Continuing Authorities Program and Operation & Maintenance activities
* Flood Control and Coastal Emergency projects
* National Hurricane Program
* Coastal Systems Portfolio Initiative

Regional Partnerships & Collaboration

Federal Emergency Management Agency (FEMA)

Housing and Urban Development (HUD)

Department of Interior (DOI)

Regional Ocean Councils (States)

Regional Planning Bodies (Federal, States, and Tribes)

Sandy Regional Infrastructure Resilience Coordination (SRIRC)

Implementation in other Coastal Regions

Coastal Texas Feasibility Study

South Atlantic Division Regional Sediment Management

Great Lakes Resilience Study

USACE-Sponsor Design and Construction

NAC FA New Feasibility Studies

Cost-Shared with Non-Federal Sponsor; Managed as a Regional Program building on NACCS Findings, Outcomes, and Products

NACCS Products: Geospatial Database; Numerical Modeling of Extreme Water Levels; Economic Depth-Damage Functions; Environmental and Cultural Resources Conditions Report; Conceptual Regional Sediment Budget; Vulnerability, Resilience, Natural and Nature-Based Features Assessment and Metric Development

9 North Atlantic Coast Focus Areas (NAC FA)

North Atlantic Coast Comprehensive Study

Strategic Integration of Coastal Investments

Ongoing Implementation
Sea Bright - Manasquan: Long Branch

Overview
Initial Construction
Reports
Renourishments
Cost Summary
Risk

Date Renourishment Initiated: 2008  Date Construction Initiated: 1997
Date Construction Complete: 1998
Estimated Fill Quantity (cy): 4,652,000
Actual Fill Quantity (cy): 4,300,000
Estimated Cost: data unavailable
Actual Cost: data unavailable
Notes:

Sea Bright - Manasquan: Long Branch

Overview
Initial Construction
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Renourishments
Cost Summary
Risk

Report Name                      Date(s)
Chief’s Report:                  Report dates unavailable
Feasibility:                    1989
PCA:                            1992

Sea Bright - Manasquan: Long Branch

Overview
Initial Construction
Reports
Renourishments
Cost Summary
Risk

Renourishment: 1 2008
Estimated Fill Quantity (cy) 881,000  Actual Fill Quantity (cy) 728,985
1st Renourishment @ Long Branch, completed Feb 2009

Data update underway, to be completed 3rd Q FY17.
"Hurricane Sandy brought to light the reality that coastal storms are intensifying and that sea-level and climate change will only heighten the vulnerability of coastal communities. Coastal storm risk management is a shared responsibility, and we believe there should be shared tools used by all decision makers to assess risk and identify solutions.

Brig. Gen. Kent D. Savre
Commanding General
U.S. Army Corps of Engineers
North Atlantic Division