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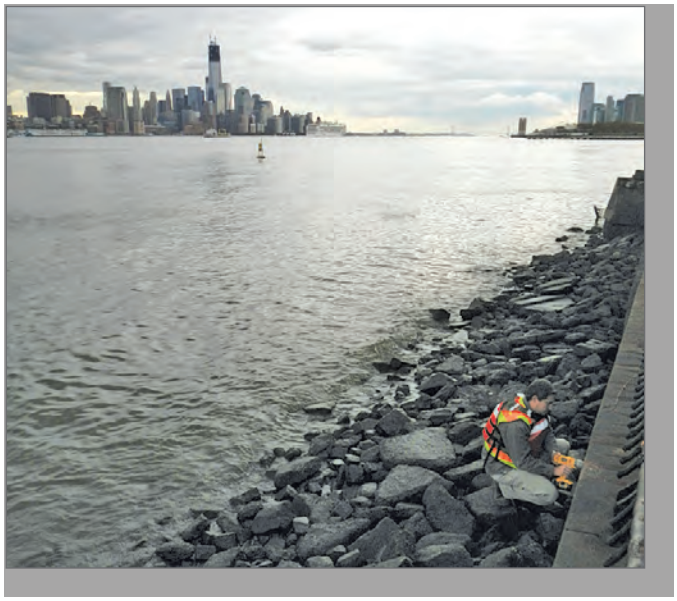
Monitoring Storm Tide and Flooding from Hurricane Sandy along the Atlantic Coast of the United States, October 2012



Open-File Report 2013–1043

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Cover photographs.

Top left: USGS technician recovering a storm-tide water-level sensor along the Hudson River in Hoboken, New Jersey (photo by Kerry A. Caslow, USGS).

Bottom left: USGS scientist surveying storm-tide debris line near the Verrazano-Narrows Bridge in Kings County, New York (photo by Christopher J. Henry, USGS).

Top right: House in Mantoloking, New Jersey, damaged by Hurricane Sandy (photo by Christopher A. Smith, USGS).

Middle right: Boat in New Jersey damaged by Hurricane Sandy (photo by Christopher J. Henry, USGS).

Bottom right: USGS technician measuring a high-water mark in Suffolk County, New York (photo by Martyn J. Smith, USGS).

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By Brian E. McCallum, Shaun M. Wicklein, Robert G. Reiser, Ronald Busciolano, Jonathan Morrison, Richard J. Verdi, Jaime A. Painter, Eric R. Frantz, and Anthony J. Gotvald

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U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
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Introduction

The U.S. Geological Survey (USGS) deployed a temporary monitoring network of water-level and barometric pressure sensors at 224 locations along the Atlantic coast from Virginia to Maine to continuously record the timing, areal extent, and magnitude of hurricane storm tide and coastal flooding generated by Hurricane Sandy (fig. 1). These records were greatly supplemented by an extensive post-flood high-water mark (HWM) flagging and surveying campaign from November to December 2012 involving more than 950 HWMs. Both efforts were undertaken as part of a coordinated federal emergency response as outlined by the Stafford Act under a directed mission assignment by the Federal Emergency Management Agency (FEMA).

Hurricane Sandy Storm-Tide Monitoring

Hurricane Sandy approached the coast of New Jersey near Atlantic City on October 29, 2012, as a Category 1 hurricane on the Saffir-Simpson Hurricane Wind Scale (National Weather Service, 1974). The large size of the storm created a wind field along to the coast that posed significant storm tide impacts. Storm tide, as defined by the National Oceanic and Atmospheric Administration (NOAA; National Oceanic and Atmospheric Administration, 2008), is the water-level rise generated by a combination of storm surge and astronomical tide during a coastal storm.

Given the historic magnitude of the storm and the expected scale of the resulting econonic damages and human hardship, and likely need for timely flood information on which to base both recovery operations and rebuilding efforts, FEMA mission assigned the USGS to deploy storm-tide monitoring instruments to characterize the height, extent, and timing of storm tides better than could be accomplished by existing USGS or NOAA observational fixed-place networks. In response, a total of 162 water-level and wave-height sensors were deployed at 147 locations during October 26–29 prior to landfall. This represented the second largest deployment of storm-tide sensors, behind only Hurricane Irene which made landfall in the same vicinity in August 2011. To supplement the records provided by these instruments, FEMA also mission-assigned the USGS to conduct an extensive HWM campaign. The resulting database of 950 HWMs following Sandy was the single largest HWM recovery effort in recent USGS history. During and after the storm, data from both efforts were collected and relayed immediately for display on the Storm-Tide Mapper, which allowed FEMA and other emergency management officials to examine the data and best direct federal response activities. Data collected from this event also permitted the evaluation of the performance of storm-tide models for maximum and incremental water level and flood extent, and the site-specific effects of storm tide on natural and anthropogenic features of the environment.

The locations of water-level and wave-height data collection were selected to augment existing tide-gage networks and to ensure adequate monitoring in areas forecasted to have significant storm tide. After Hurricane Sandy made landfall in New Jersey, sustained winds increased as an effect of an additional storm approaching from the west. The combination of storms, timed with the full-moon high-tide on October 29, exacerbated storm-tide flooding along the New Jersey, New York, and Connecticut coastlines, and caused significant backwater to occur far inland along the Delaware and Hudson Rivers. Storm effects along the Hudson River were measured as far inland as Albany, New York.

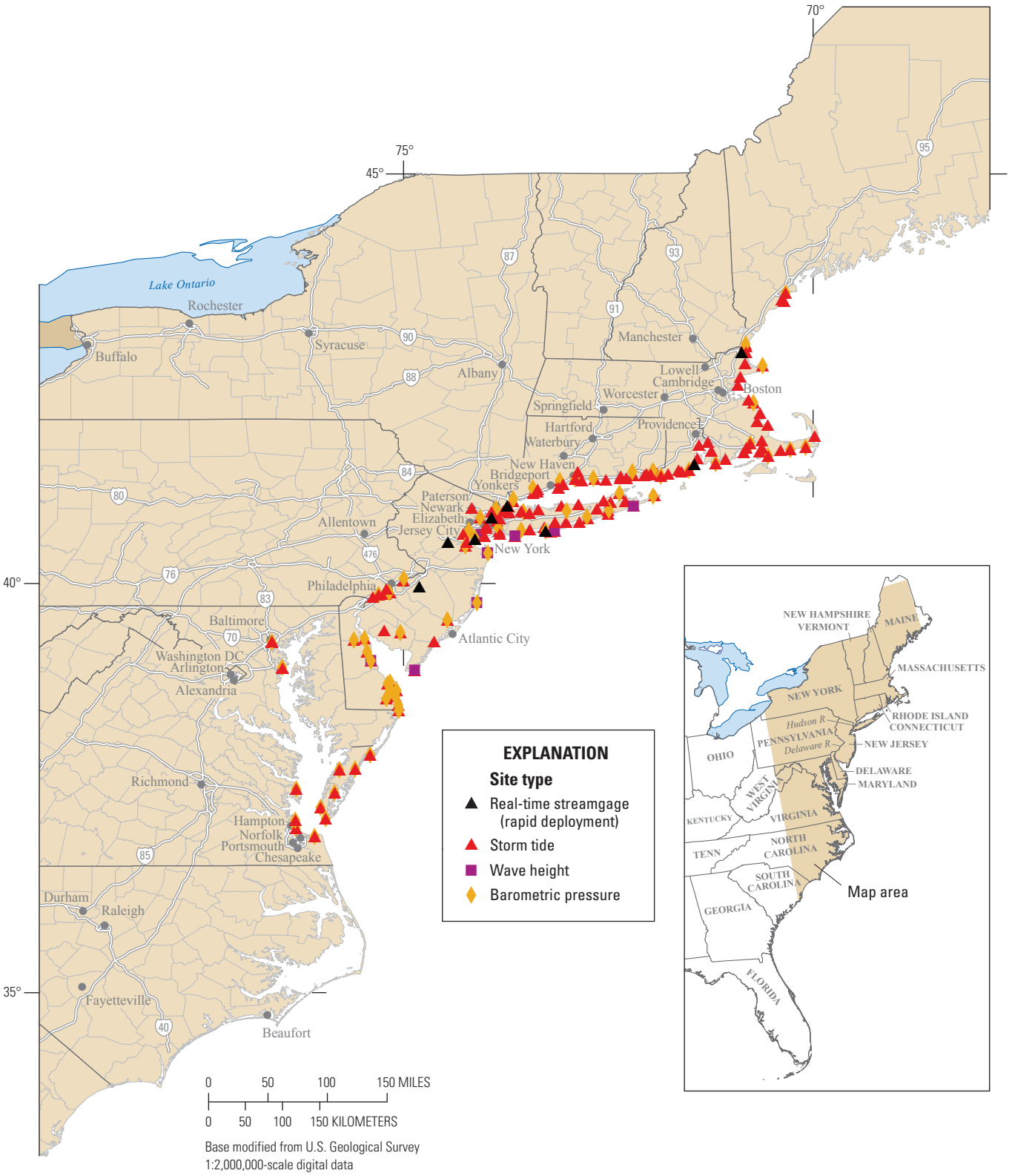

Figure 1. Locations of storm-tide sensors deployed for Hurricane Sandy, October 2012.

A total of 224 temporarily deployed sensors were used for Hurricane Sandy, 162 water-level and wave-height sensors were deployed at 147 locations (fig. 1). An additional 62 sensors were deployed at additional locations that recorded barometric pressure at 30-second intervals, expressed in pounds per square inch (table 1).

Of the 162 water-level sensors, 145 sensors were programmed to record water pressure at 30-second intervals, and 9 sensors recorded wave-height measured every 2 seconds, both expressed as water level in feet above the North American Vertical Datum of 1988 (NAVD 88) following surveys completed during sensor recovery. A typical sensor installation is shown in figure 2. An example of water-level elevation and barometric pressure data collected is shown in figure 3. An additional eight locations were rapid-deployment gages (RDG) instrumented with real-time telemetered sensors that recorded water-level elevations and meteorological data every 15 minutes during the hurricane and transmitted hourly to USGS Webpages (table 1; fig. 4).

At the 147 locations, 8 sensors (7 water-level and 1 wave-height) were co-located as redundant sensors for quality-control purposes, and an additional 7 wave-height sensors were co-located with storm-tide water-level sensors (162 water-level sensors total). Of the 162 sensors, 7 water-level sensors were lost or the structure they were attached to was damaged during the storm, and 5 sensors (4 storm-tide and 1 wave-height) did not record storm tide either due to a lack of water-level rise or because the sensor was installed too high above the water. Two RDGs were destroyed by the flood.

Data were collected and processed following protocols established by McGee and others (2006) and expanded upon by McCallum and others (2012), which included correcting water pressure for changes in barometric pressure and salinity. Quality-control checks were made by (1) deploying redundant sensors at a subset of sites, (2) comparing water levels computed from temporary sensors to water levels recorded at nearby USGS streamgaging and NOAA and USGS tidal stations, and (3) comparing elevations to independent high-water marks where possible. In the aftermath of the storm, 653 independent HWM locations were surveyed relative to NAVD 88 from Virginia to Massachusetts, with particular emphasis in New Jersey and New York where the impacts of the storm were the most pronounced. Multiple HWMs were flagged at some locations. Any HWM was considered an independent location if separated by more than 1,000 feet distance from other HWMs. An additional 297 HWMs were flagged throughout Connecticut, Rhode Island, and Massachusetts but not surveyed due to a lack of funding.

Table 1. Number of sites equipped to monitor Hurricane Sandy storm tide, by State.

State	Type and number of sensors deployed			
	Storm tide	Wave height	Real-time rapid deployment gages	Barometric pressure
Virginia	10	0	0	10
Maryland	4	0	0	2
Delaware	12	1	0	12
Pennsylvania	6	0	0	3
New Jersey	10	4	2	7
New York	39	4	4	11
Connecticut	27	0	0	7
Rhode Island	10	0	1	3
Massachusetts	22	0	1	5
New Hampshire	2	0	0	1
Maine	3	0	0	1
Total	145	9	8	62

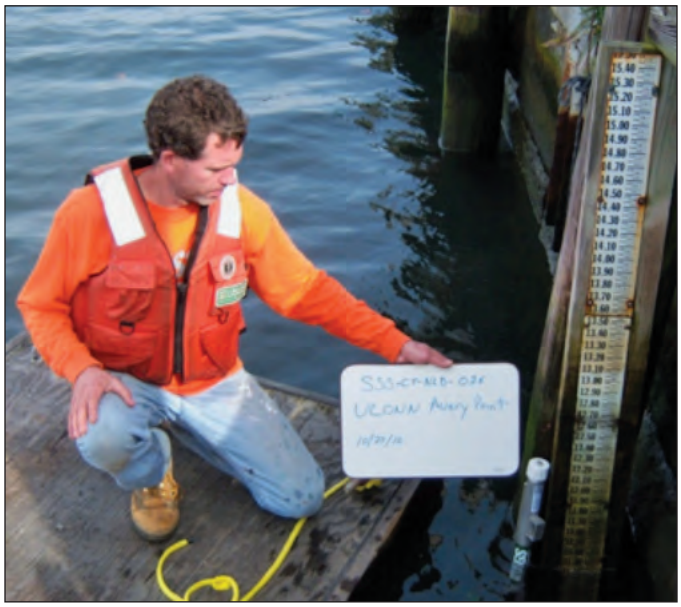

Figure 2. A USGS scientist obtaining water-surface elevation data relative to a known reference elevation and deploying a storm-tide sensor at SSS-CT-NLD-025 Poquonock River at Avery Point, Connecticut, October 27, 2012 (photo by Jonathan Morrison, USGS).

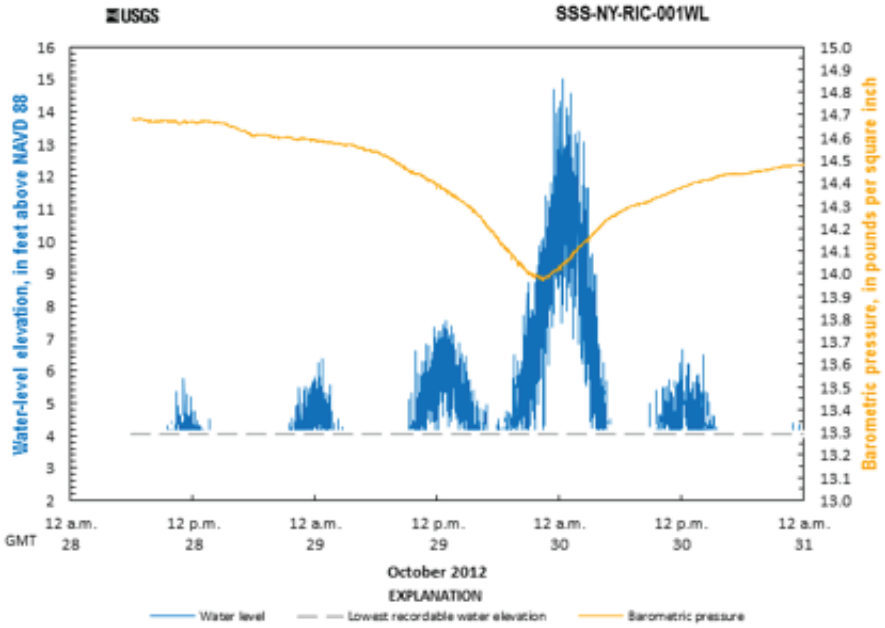

Figure 3. Example of a hydrograph displaying storm-tide elevation and barometric pressure data recorded at SSS-NY-RIC-001WL Lower New York Bay at South Beach at Staten Island, New York during Hurricane Sandy.

Figure 4. A USGS rapid-deployment gage installed to collect real-time water-level and meteorological data at 404810735538063 Harlem River at Randall's Island at Manhattan, New York (photo by Christopher J. Henry, USGS).

Elevation Surveys

The water-level data collected by the sensors were initially referenced to points on permanent objects near the water-level sensors in order to establish a temporary datum. After the storm, survey-grade Global Navigation Satellite Systems (GNSS) equipment (fig. 5) was used to determine the elevation above NAVD 88 of the reference points and HWMs, per Rydland and Densmore (2012), and the water-level data were adjusted accordingly to yield elevations relative to NAVD 88. Some of the water-level sensors for this study were placed in the same locations used during the USGS storm-tide data collection for Hurricane Irene (McCallum and others, 2012), so the water-level sensors were referenced to existing reference points using differential-level surveys or graduated steel tapes. GNSS equipment relies on GEOID models to determine elevations above NAVD 88. The GEOID09 model was used for consistency within the deployment area, and all elevations in this report were derived using the GEOID09 model.

National Geodetic Survey (NGS) benchmarks throughout the study area were surveyed for vertical control. Table 2 lists the GNSS-derived elevations using the GEOID09 model for all NGS benchmarks surveyed during this study and the published NGS elevations from the datasheets, which can be can be accessed at *http://www.ngs.noaa.gov/cgi-bin/datasheet.prl*. (Tables 2–6 are in the back of the report.)

Figure 5. A global positioning system used to survey storm-tide elevation at HWM-NJ-HUD-108 at Liberty State Park in Jersey City, New Jersey, after Hurricane Sandy (photo by Crystal Hammer, USGS).

Data Presentation

The data from the Hurricane Sandy storm-tide network constitute an extensive collection of continuous water-level records documenting a single, landfall hurricane. The data can be used to evaluate the performance of storm-tide models for maximum and incremental water level and flood extent, and for site-specific effects of storm tide on natural and anthropogenic features of the environment. The data are available in tab-delineated, ASCII format by site for each sensor by using a USGS interactive storm-tide mapper at *http://water.usgs.gov/floods/events/2012/sandy/sandymapper.html*.

Digital photographs for selected locations are available on the interactive mapper. Data for each sensor include location, date, time, water level, and barometric pressure, with the data-processing date provided in the file header. Data for each HWM include location, description and quality of the mark, and elevation.

A list of the 162 water-level and wave-height sensor locations and the peak storm tide recorded at each is presented in table 3. Locations were categorized as storm tide, riverine, or wave height as a result of data-collection intervals and proximity to the ocean. Riverine sites can be influenced by upstream runoff from inland flooding. These temporary sensors were deployed to augment long-term monitoring networks operated by the USGS (table 4) and NOAA (table 5). All HWM data collected by the USGS immediately after Hurricane Sandy are listed in table 6. The reference points and HWMs were surveyed to a vertical accuracy of 0.26 foot at the 95-percent confidence level and within 10 feet horizontally, except for Union, Middlesex, and Monmouth Counties in New Jersey. The vertical accuracy in these counties is 0.47 foot at the 95-percent confidence level. The elevations derived from the GEOID09 model in these three counties are 0.2 to 0.4 foot lower than the published NGS elevations, resulting in a lower accuracy (table 2). The accuracy is computed based on the National Standard for Space Data Accuracy method documented in Federal Geographic Data Committee (1998).

Acknowledgments

This report was prepared in cooperation with the Federal Emergency Management Agency. The data in this report are the result of the long hours and extraordinary effort by numerous USGS staff from 15 different States. The authors particularly acknowledge the leadership and dedication of USGS employees in the Wisconsin Water Science Center who assisted with the Storm-Tide Mapper updates to deliver these valuable data to numerous stakeholders in a very timely and accurate manner.

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Tables 2–6

Table 2. Differences between Global Navigation Satellite System (GNSS) surveyed elevations and National Geodetic Survey (NGS) elevations used to check vertical accuracies in New Jersey and New York following Hurricane Sandy, October 2012.

[NGS PID, National Geodetic Survey Point Identifier; elevations referenced to the North American Verical Datum of 1988; GEOID09 is a model]

NGS PID	State	County	GNSS elevation (GEOID09), in feet	NGS datasheet elevation, in feet	Difference from NGS datasheet (GEOID09), in feet
AI8458	New Jersey	Bergen	4.72	4.90	−0.18
JU4087	New Jersey	Burlington	46.95	47.00	−0.05
JU4087	New Jersey	Burlington	46.95	47.00	−0.05
JU4087	New Jersey	Burlington	46.97	47.00	−0.03
AB6713	New Jersey	Cape May	10.07	10.21	−0.14
AB6713	New Jersey	Cape May	10.17	10.21	−0.04
AJ8715	New Jersey	Cape May	32.97	32.97	0.00
AM6984	New Jersey	Cape May	7.23	7.29	−0.06
HU1197	New Jersey	Cape May	7.03	6.98	0.05
KV0282	New Jersey	Hudson	36.52	36.61	−0.09
KV0334	New Jersey	Hudson	26.79	26.92	−0.13
KV0457	New Jersey	Hudson	8.55	8.72	−0.17
KV0457	New Jersey	Hudson	8.54	8.72	−0.18
AG9916	New Jersey	Middlesex	82.44	82.65	−0.21
KV0015	New Jersey	Middlesex	113.80	114.05	−0.25
KV0015	New Jersey	Middlesex	113.79	114.05	−0.26
KV0931	New Jersey	Middlesex	13.84	14.14	−0.30
DG9900	New Jersey	Monmouth	5.58	5.74	−0.16
DG9900	New Jersey	Monmouth	5.59	5.74	−0.15
DG9900	New Jersey	Monmouth	5.57	5.74	−0.17
DG9900	New Jersey	Monmouth	5.55	5.74	−0.19
DM6974	New Jersey	Monmouth	11.13	11.43	−0.30
DM6974	New Jersey	Monmouth	11.19	11.43	−0.24
DM6981	New Jersey	Monmouth	16.06	16.38	−0.32
DM6981	New Jersey	Monmouth	16.17	16.38	−0.21
KV0735	New Jersey	Monmouth	8.58	8.82	−0.24
KV0735	New Jersey	Monmouth	8.54	8.82	−0.28
KV0765	New Jersey	Monmouth	21.15	21.57	−0.42
KV3515	New Jersey	Monmouth	11.59	11.79	−0.20
KV3515	New Jersey	Monmouth	11.60	11.79	−0.19
KV3515	New Jersey	Monmouth	11.65	11.79	−0.14
DM6002	New Jersey	Ocean	5.58	5.64	−0.06
JU0067	New Jersey	Ocean	17.88	17.86	0.02

Table 2. Differences between Global Navigation Satellite System (GNSS) surveyed elevations and National Geodetic Survey (NGS) elevations used to check vertical accuracies in New Jersey and New York following Hurricane Sandy, October 2012.—Continued

[NGS PID, National Geodetic Survey Point Identifier; elevations referenced to the North American Verical Datum of 1988; GEOID09 is a model]

NGS PID	State	County	GNSS elevation (GEOID09), in feet	NGS datasheet elevation, in feet	Difference from NGS datasheet (GEOID09), in feet
JU0136	New Jersey	Ocean	16.52	16.55	−0.03
KV0838	New Jersey	Ocean	36.47	36.55	−0.08
AA5229	New Jersey	Union	14.07	14.34	−0.27
KV0061	New Jersey	Union	30.08	30.28	−0.20
AB6708	New Jersey	Atlantic	64.26	64.28	−0.02
JU0269	New Jersey	Atlantic	38.16	38.43	−0.27
JU2456	New Jersey	Atlantic	8.76	8.90	−0.14
KU1162	New York	Bronx	21.03	21.19	−0.16
KU1162	New York	Bronx	21.07	21.19	−0.12
KU1162	New York	Bronx	21.03	21.19	−0.16
MZ0734	New York	Greene	574.97	574.86	0.11
MZ3054	New York	Greene	25.17	25.20	−0.03
KV0584	New York	New York	11.21	11.26	−0.05
KV0584	New York	New York	11.23	11.26	−0.03
KU0978	New York	Queens	11.16	10.84	0.32
KU0978	New York	Queens	11.06	10.84	0.22
KU1199	New York	Queens	22.63	22.85	−0.22
KU1199	New York	Queens	22.75	22.85	−0.10
KU1199	New York	Queens	22.59	22.85	−0.26
KU1199	New York	Queens	22.69	22.85	−0.16
KU1199	New York	Queens	22.67	22.85	−0.18
KU1199	New York	Queens	22.72	22.85	−0.13
KU1199	New York	Queens	22.71	22.85	−0.14
KU1199	New York	Queens	22.50	22.85	−0.35
KU1199	New York	Queens	22.77	22.85	−0.08
KU1199	New York	Queens	22.86	22.85	0.01
KU1199	New York	Queens	22.61	22.85	−0.24
KU1199	New York	Queens	22.73	22.85	−0.12
KU1199	New York	Queens	22.91	22.85	0.06
KU1199	New York	Queens	22.96	22.85	0.11
KU1218	New York	Queens	14.70	14.89	−0.19
KU1218	New York	Queens	14.75	14.89	−0.14
KU1218	New York	Queens	14.76	14.89	−0.13

Table 2. Differences between Global Navigation Satellite System (GNSS) surveyed elevations and National Geodetic Survey (NGS) elevations used to check vertical accuracies in New Jersey and New York following Hurricane Sandy, October 2012.—Continued

[NGS PID, National Geodetic Survey Point Identifier; elevations referenced to the North American Verical Datum of 1988; GEOID09 is a model]

NGS PID	State	County	GNSS elevation (GEOID09), in feet	NGS datasheet elevation, in feet	Difference from NGS datasheet (GEOID09), in feet
KU1218	New York	Queens	14.82	14.89	−0.07
KU1218	New York	Queens	14.77	14.89	−0.12
KU1218	New York	Queens	14.79	14.89	−0.10
KU1218	New York	Queens	14.78	14.89	−0.11
KU1218	New York	Queens	14.83	14.89	−0.06
KU1218	New York	Queens	14.79	14.89	−0.10
KU1218	New York	Queens	14.96	14.89	0.07
KU1218	New York	Queens	14.92	14.89	0.03
KU1218	New York	Queens	14.89	14.89	−0.00
KU1218	New York	Queens	14.91	14.89	0.02
KU1218	New York	Queens	14.90	14.89	0.01
KU1218	New York	Queens	15.01	14.89	0.12
LY2033	New York	Ulster	353.20	353.21	−0.01
LY2033	New York	Ulster	353.18	353.21	−0.03
NA0463	New York	Ulster	302.13	302.17	−0.04
KU0953	New York	Westchester	7.96	8.14	−0.18
KU0953	New York	Westchester	8.02	8.14	−0.12
KU1740	New York	Westchester	7.24	7.60	−0.36
MZ1289	New York	Albany	38.23	38.28	−0.05
MZ1289	New York	Albany	38.16	38.28	−0.12
KU0028	New York	Suffolk	39.48	39.39	0.09
KU0194	New York	Suffolk	3.72	3.79	−0.07
KU0743	New York	Suffolk	93.14	93.05	0.09
KU0743	New York	Suffolk	93.14	93.05	0.09
KU0743	New York	Suffolk	93.17	93.05	0.12
KU0743	New York	Suffolk	93.13	93.05	0.08
KU0743	New York	Suffolk	92.86	93.05	−0.19
KU0743	New York	Suffolk	93.17	93.05	0.12
KU0743	New York	Suffolk	92.95	93.05	−0.10
KU0743	New York	Suffolk	93.08	93.05	0.03
KU0743	New York	Suffolk	92.98	93.05	−0.07

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-CT-FFD-001WL	Connecticut	Fairfield	40.99910	–73.65944	water level	storm tide	10.27	10/30/2012 01:55:30
SSS-CT-FFD-003WL	Connecticut	Fairfield	41.09979	–73.41568	water level	storm tide	9.92	10/30/2012 02:20:30
SSS-CT-FFD-005WL	Connecticut	Fairfield	41.14762	–73.36481	water level	storm tide	10.31	10/30/2012 02:09:00
SSS-CT-FFD-006WL	Connecticut	Fairfield	41.12310	–73.36998	water level	storm tide	10.15	10/30/2012 02:22:30
SSS-CT-FFD-009WL	Connecticut	Fairfield	41.25325	–73.08843	water level	storm tide	9.65	10/30/2012 02:08:30
SSS-CT-FFD-010WL	Connecticut	Fairfield	41.16316	–73.10901	water level	storm tide	none	peak not recorded
SSS-CT-FFD-012WL	Connecticut	Fairfield	41.16316	–73.10901	water level	storm tide	none	peak not recorded
SSS-CT-MSX-018WL	Connecticut	Middlesex	41.26919	–72.52936	water level	storm tide	7.63	10/30/2012 01:26:30
SSS-CT-MSX-019WL	Connecticut	Middlesex	41.28111	–72.35222	water level	storm tide	7.73	10/30/2012 00:48:30
SSS-CT-MSX-020WL	Connecticut	Middlesex	41.28111	–72.35222	water level	storm tide	7.86	10/30/2012 01:24:50
SSS-CT-NHV-013WL	Connecticut	New Haven	41.27221	–72.90479	water level	storm tide	9.50	10/30/2012 01:29:00
SSS-CT-NHV-014WL	Connecticut	New Haven	41.36733	–72.87494	water level	storm tide	7.20	10/30/2012 03:43:30
SSS-CT-NHV-015WL	Connecticut	New Haven	41.27178	–72.66361	water level	storm tide	8.56	10/30/2012 01:09:20
SSS-CT-NHV-018WL	Connecticut	New Haven	41.26040	–72.82064	water level	storm tide	8.77	10/30/2012 01:41:00
SSS-CT-NHV-019WL	Connecticut	New Haven	41.27221	–72.90479	water level	storm tide	9.23	10/30/2012 01:29:00
SSS-CT-NHV-020WL	Connecticut	New Haven	41.21129	–73.04948	water level	storm tide	9.84	10/30/2012 01:41:00
SSS-CT-NLD-015WL	Connecticut	New London	41.32525	–71.98460	water level	storm tide	6.35	10/30/2012 00:28:30
SSS-CT-NLD-016WL	Connecticut	New London	41.32525	–71.98460	water level	storm tide	6.42	10/29/2012 22:46:40
SSS-CT-NLD-018WL	Connecticut	New London	41.32147	–72.19540	water level	storm tide	11.72	10/29/2012 23:56:00
SSS-CT-NLD-019WL	Connecticut	New London	41.28428	–72.27758	water level	storm tide	8.26	10/30/2012 00:35:50
SSS-CT-NLD-022WL	Connecticut	New London	41.31250	–72.34608	water level	storm tide	7.01	10/30/2012 01:34:00
SSS-CT-NLD-023WL	Connecticut	New London	41.28428	–72.27758	water level	storm tide	8.41	10/30/2012 00:09:30

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-CT-NLD-025WL	Connecticut	New London	41.31675	–72.06092	water level	storm tide	6.55	10/30/2012 00:36:00
SSS-CT-NLD-026WL	Connecticut	New London	41.33497	–72.03550	water level	storm tide	5.98	10/30/2012 00:57:30
SSS-CT-NLD-027WL	Connecticut	New London	41.38081	–71.96792	water level	storm tide	6.16	10/29/2012 23:13:30
SSS-CT-NLD-029WL	Connecticut	New London	41.34667	–71.96767	water level	storm tide	5.96	10/29/2012 23:00:00
SSS-CT-NLD-030WL	Connecticut	New London	41.34433	–71.90947	water level	storm tide	5.83	10/30/2012 00:00:00
SSS-DE-KEN-002WL	Delaware	Kent	39.05853	–75.39781	water level	none	none	no surge recorded
SSS-DE-KEN-002WV	Delaware	Kent	39.05853	–75.39781	wave height	none	none	no surge recorded
SSS-DE-KEN-051WL	Delaware	Kent	39.32583	–75.47497	water level	storm tide	5.63	10/30/2012 05:03:00
SSS-DE-KEN-053WL	Delaware	Kent	39.16053	–75.44600	water level	storm tide	5.38	10/30/2012 04:23:30
SSS-DE-NEW-001WL	Delaware	New Castle	39.30928	–75.60947	water level	storm tide	7.09	10/30/2012 08:21:30
SSS-DE-SUS-008WL	Delaware	Sussex	38.79022	–75.16364	water level	storm tide	8.20	10/29/2012 14:06:00
SSS-DE-SUS-010WL	Delaware	Sussex	38.69453	–75.08419	water level	storm tide	4.84	10/30/2012 03:19:30
SSS-DE-SUS-014WL	Delaware	Sussex	38.51367	–75.06253	water level	storm tide	5.54	10/30/2012 04:51:30
SSS-DE-SUS-015WL	Delaware	Sussex	38.45489	–75.05814	water level	storm tide	4.85	10/30/2012 03:35:30
SSS-DE-SUS-030WL	Delaware	Sussex	38.70269	–75.16183	water level	storm tide	3.86	10/30/2012 03:14:30
SSS-DE-SUS-032WL	Delaware	Sussex	38.62542	–75.09992	water level	storm tide	7.18	10/29/2012 15:13:30
SSS-DE-SUS-033WL	Delaware	Sussex	38.59164	–75.21197	water level	storm tide	6.17	10/29/2012 14:55:00
SSS-DE-SUS-057WL	Delaware	Sussex	38.76871	–75.19700	water level	storm tide	5.47	10/29/2012 15:27:30
SSS-ME-CUM-002WL	Maine	Cumberland	43.54472	–70.33389	water level	storm tide	6.35	10/29/2012 15:57:30
SSS-ME-YOR-001WL	Maine	York	43.44667	–70.35611	water level	none	none	lost
SSS-ME-YOR-002WL	Maine	York	43.46222	–70.38194	water level	storm tide	5.34	10/30/2012 03:34:00
SSS-MD-ANN-001WL	Maryland	Anne Arundel	38.97683	–76.48506	water level	storm tide	3.61	10/30/2012 10:51:30

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-MD-ANN-003WL	Maryland	Anne Arundel	38.96861	–76.47631	water level	storm tide	3.41	10/30/2012 10:46:00
SSS-MD-BAL-001WL	Maryland	Baltimore	39.28369	–76.60608	water level	storm tide	3.75	10/30/2012 10:43:30
SSS-MD-BAL-003WL	Maryland	Baltimore	39.28636	–76.60581	water level	none	none	no surge recorded
424858070522116	Massachusetts	Essex	42.81612	–70.87255	real-time RDG	storm tide	6.68	10/29/2012 16:15:00
SSS-MA-BAR-023WL	Massachusetts	Barnstable	41.65638	–70.62355	water level	storm tide	5.29	10/29/2012 23:08:30
SSS-MA-BAR-024WL	Massachusetts	Barnstable	41.60618	–70.65186	water level	storm tide	5.44	10/29/2012 22:56:00
SSS-MA-BAR-025WL	Massachusetts	Barnstable	41.55283	–70.54864	water level	storm tide	3.59	10/29/2012 22:00:00
SSS-MA-BAR-026WL	Massachusetts	Barnstable	41.62131	–70.39557	water level	storm tide	3.57	10/29/2012 17:05:30
SSS-MA-BAR-027WL	Massachusetts	Barnstable	41.66752	–70.08976	water level	storm tide	3.45	10/29/2012 17:00:00
SSS-MA-BAR-028WL	Massachusetts	Barnstable	41.63949	–70.27664	water level	storm tide	3.95	10/29/2012 17:33:00
SSS-MA-BAR-031WL	Massachusetts	Barnstable	41.80028	–69.98068	water level	storm tide	7.06	10/29/2012 16:53:30
SSS-MA-BRI-016WL	Massachusetts	Bristol	41.51626	–71.07168	water level	storm tide	5.56	10/29/2012 23:42:30
SSS-MA-BRI-017WL	Massachusetts	Bristol	41.59597	–70.84321	water level	storm tide	5.95	10/29/2012 22:46:30
SSS-MA-ESS-037WL	Massachusetts	Essex	42.42096	–70.91832	water level	storm tide	7.73	10/29/2012 15:40:00
SSS-MA-ESS-038WL	Massachusetts	Essex	42.51951	–70.88681	water level	storm tide	6.91	10/29/2012 15:22:30
SSS-MA-ESS-039WL	Massachusetts	Essex	42.65899	–70.61502	water level	storm tide	6.83	10/29/2012 16:06:00
SSS-MA-ESS-040WL	Massachusetts	Essex	42.68369	–70.82777	water level	storm tide	7.12	10/29/2012 16:11:00
SSS-MA-ESS-041WL	Massachusetts	Essex	42.81693	–70.82020	water level	storm tide	7.35	10/29/2012 16:16:30
SSS-MA-NOR-036WL	Massachusetts	Norfolk	42.23905	–70.78930	water level	storm tide	6.89	10/29/2012 15:53:30
SSS-MA-PLY-018WL	Massachusetts	Plymouth	41.65608	–70.81283	water level	storm tide	6.90	10/29/2012 23:46:30
SSS-MA-PLY-019WL	Massachusetts	Plymouth	41.71257	–70.76535	water level	storm tide	5.56	10/29/2012 23:26:30
SSS-MA-PLY-021WL	Massachusetts	Plymouth	41.74369	–70.62779	water level	storm tide	4.91	10/29/2012 23:52:30

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-MA-PLY-032WL	Massachusetts	Plymouth	41.92901	–70.55507	water level	storm tide	8.05	10/29/2012 15:31:00
SSS-MA-PLY-033WL	Massachusetts	Plymouth	41.98024	–70.68291	water level	storm tide	8.31	10/29/2012 15:35:00
SSS-MA-PLY-034WL	Massachusetts	Plymouth	42.08254	–70.64636	water level	storm tide	7.30	10/29/2012 15:51:00
SSS-MA-PLY-035WL	Massachusetts	Plymouth	42.20139	–70.72573	water level	storm tide	7.86	10/29/2012 15:34:00
SSS-NH-ROC-004WL	New Hampshire	Rockingham	42.89820	–70.81700	water level	storm tide	7.19	10/29/2012 19:49:00
SSS-NH-ROC-005WL	New Hampshire	Rockingham	42.92180	–70.82330	water level	storm tide	6.04	10/29/2012 20:26:00
395740074482628	New Jersey	Burlington	39.96137	–74.80724	real-time RDG	storm tide	7.14	10/30/2012 12:15:00
403030074273017	New Jersey	Middlesex	40.50843	–74.45838	real-time RDG	storm tide	13.88	10/30/2012 02:15:00
SSS-NJ-ATL-005WL	New Jersey	Atlantic	39.55333	–74.46278	water level	storm tide	7.92	10/30/2012 02:06:30
SSS-NJ-CPM-010WL	New Jersey	Cape May	39.28833	–74.62750	water level	storm tide	6.97	10/30/2012 00:42:00
SSS-NJ-CPM-035WL	New Jersey	Cape May	38.93639	–74.86556	water level	storm tide	12.89	10/29/2012 13:28:30
SSS-NJ-CPM-035WV	New Jersey	Cape May	38.93639	–74.86556	wave height	wave height	12.55	10/29/2012 14:05:52
SSS-NJ-CUM-020WL	New Jersey	Cumberland	39.39528	–75.04083	water level	storm tide	6.31	10/30/2012 06:08:00
SSS-NJ-CUM-025WL	New Jersey	Cumberland	39.42917	–75.23694	water level	storm tide	6.44	10/30/2012 06:59:00
SSS-NJ-HUD-002WL	New Jersey	Hudson	40.79982	–74.06606	water level	storm tide	8.80	10/30/2012 03:09:00
SSS-NJ-MID-001WL	New Jersey	Middlesex	40.45911	–74.24687	water level	storm tide	11.71	10/29/2012 23:02:30
SSS-NJ-MON-002WV	New Jersey	Monmouth	40.37222	–73.97304	wave height	wave height	17.05	10/29/2012 23:30:16
SSS-NJ-MON-003WV	New Jersey	Monmouth	40.37222	–73.97304	wave height	wave height	19.50	10/30/2012 00:40:56
SSS-NJ-OCE-001WV	New Jersey	Ocean	39.76361	–74.10417	wave height	wave height	8.96	10/30/2012 00:44:02
SSS-NJ-PAS-001WL	New Jersey	Passaic	40.92647	74.16631	water level	riverine	none	no surge recorded
SSS-NJ-UNI-001WL	New Jersey	Union	40.64775	–74.20512	water level	storm tide	12.20	10/30/2012 01:37:30
SSS-NJ-UNI-002WL	New Jersey	Union	40.59952	–74.27177	water level	storm tide	12.60	10/30/2012 02:21:00

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
403236074073983	New York	Richmond	40.54340	–74.12773	real-time RDG	storm tide	none	peak not recorded
403836073154775	New York	Suffolk	40.64333	–73.26306	real-time RDG	storm tide	5.16	10/30/2012 01:45:00
404810735538063	New York	New York	40.80059	–73.92647	real-time RDG	storm tide	none	peak not recorded
405658073433147	New York	Westchester	40.94881	–73.73262	real-time RDG	storm tide	10.16	10/30/2012 02:00:00
SSS-NY-KIN-001WL	New York	Kings	40.58000	–74.01161	water level	storm tide	13.32	10/30/2012 00:23:30
SSS-NY-KIN-002WL	New York	Kings	40.70458	–73.98832	water level	storm tide	none	peak not recorded
SSS-NY-KIN-003WL	New York	Kings	40.67688	–73.98984	water level	storm tide	11.08	10/30/2012 01:04:30
SSS-NY-NAS-001WL	New York	Nassau	40.87791	–73.53057	water level	storm tide	10.12	10/30/2012 01:49:00
SSS-NY-NAS-004WL	New York	Nassau	40.58275	–73.64068	water level	storm tide	17.48	10/30/2012 00:00:00
SSS-NY-NAS-004WV	New York	Nassau	40.58275	–73.64068	wave height	wave height	16.54	10/29/2012 23:51:46
SSS-NY-NAS-005WL	New York	Nassau	40.65238	–73.45850	water level	storm tide	7.98	10/30/2012 01:24:00
SSS-NY-NAS-006WL	New York	Nassau	40.88750	–73.56361	water level	storm tide	10.22	10/30/2012 01:51:30
SSS-NY-NAS-007WL	New York	Nassau	40.85722	–73.46333	water level	storm tide	9.98	10/30/2012 02:13:00
SSS-NY-NAS-008WL	New York	Nassau	40.86622	–73.71019	water level	storm tide	10.29	10/30/2012 02:03:00
SSS-NY-NEW-001WL	New York	New York	40.87757	–73.92633	water level	storm tide	9.50	10/30/2012 02:07:30
SSS-NY-QUE-001WL	New York	Queens	40.76229	–73.85828	water level	storm tide	10.35	10/30/2012 02:06:30
SSS-NY-QUE-002WL	New York	Queens	40.64533	–73.83638	water level	storm tide	11.16	10/30/2012 01:23:00
SSS-NY-QUE-004WL	New York	Queens	40.79651	–73.82879	water level	storm tide	10.57	10/30/2012 02:06:00
SSS-NY-QUE-005WL	New York	Queens	40.60615	–73.82265	water level	storm tide	10.38	10/30/2012 01:18:30
SSS-NY-RIC-001WL	New York	Richmond	40.59388	–74.05985	water level	storm tide	15.02	10/30/2012 00:23:30
SSS-NY-RIC-001WV	New York	Richmond	40.59388	–74.05985	wave height	wave height	15.06	10/30/2012 00:59:38
SSS-NY-RIC-003WL	New York	Richmond	40.50188	–74.23034	water level	storm tide	16.00	10/30/2012 00:38:30

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-NY-RIC-004WL	New York	Richmond	40.54345	–74.12768	water level	storm tide	13.22	10/30/2012 00:52:30
SSS-NY-SUF-001WL	New York	Suffolk	41.01259	–72.55828	water level	storm tide	7.86	10/30/2012 01:47:30
SSS-NY-SUF-002WL	New York	Suffolk	40.96438	–72.86320	water level	storm tide	8.48	10/30/2012 01:50:00
SSS-NY-SUF-003WL	New York	Suffolk	40.94617	–73.07227	water level	storm tide	8.81	10/30/2012 02:02:00
SSS-NY-SUF-004WL	New York	Suffolk	40.78712	–72.75025	water level	storm tide	6.83	10/30/2012 01:31:30
SSS-NY-SUF-005WL	New York	Suffolk	40.91608	–72.63774	water level	storm tide	7.86	10/29/2012 20:33:00
SSS-NY-SUF-006WL	New York	Suffolk	40.84887	–72.50285	water level	storm tide	7.32	10/30/2012 01:25:30
SSS-NY-SUF-008WL	New York	Suffolk	40.89331	–72.50300	water level	storm tide	6.53	10/30/2012 01:59:30
SSS-NY-SUF-009WL	New York	Suffolk	41.00197	–72.29030	water level	storm tide	6.33	10/30/2012 01:50:30
SSS-NY-SUF-011WL	New York	Suffolk	40.90048	–73.35304	water level	storm tide	9.48	10/30/2012 02:18:30
SSS-NY-SUF-014WL	New York	Suffolk	40.99070	–72.47074	water level	storm tide	7.44	10/30/2012 01:13:00
SSS-NY-SUF-015WL	New York	Suffolk	41.10104	–72.36144	water level	storm tide	6.40	10/30/2012 01:28:00
SSS-NY-SUF-017WL	New York	Suffolk	40.64316	–73.15750	water level	storm tide	13.41	10/30/2012 00:12:30
SSS-NY-SUF-017WV	New York	Suffolk	40.64316	–73.15750	wave height	wave height	15.93	10/29/2012 23:16:42
SSS-NY-SUF-018WL	New York	Suffolk	40.63473	–73.20216	water level	storm tide	4.09	10/30/2012 00:26:00
SSS-NY-SUF-019WL	New York	Suffolk	40.65932	–73.26486	water level	storm tide	5.57	10/30/2012 01:23:30
SSS-NY-SUF-021WL	New York	Suffolk	40.74918	–73.01338	water level	storm tide	6.73	10/30/2012 03:18:00
SSS-NY-SUF-022WL	New York	Suffolk	40.68523	–73.27990	water level	storm tide	6.79	10/30/2012 01:36:30
SSS-NY-SUF-023WL	New York	Suffolk	40.94428	–72.18910	water level	none	none	lost
SSS-NY-SUF-023WV	New York	Suffolk	40.94428	–72.18910	wave height	wave height	13.39	10/29/2012 23:19:44
SSS-NY-SUF-024WL	New York	Suffolk	41.07319	–71.93438	water level	storm tide	6.08	10/29/2012 23:13:00
SSS-NY-SUF-026WL	New York	Suffolk	40.74687	–72.85550	water level	storm tide	5.68	10/30/2012 01:20:30

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-NY-SUF-027WL	New York	Suffolk	40.74760	–73.15039	water level	storm tide	6.06	10/30/2012 03:57:30
SSS-NY-WES-001WL	New York	Westchester	40.94276	–73.71983	water level	storm tide	10.92	10/30/2012 02:19:30
SSS-NY-WES-003WL	New York	Westchester	40.89039	–73.78172	water level	storm tide	10.44	10/30/2012 01:59:30
SSS-PA-DEL-003WL	Pennsylvania	Delaware	39.83280	–75.37609	water level	storm tide	7.01	10/30/2012 07:02:00
SSS-PA-DEL-005WL	Pennsylvania	Delaware	39.85918	–75.30225	water level	storm tide	7.11	10/30/2012 07:29:00
SSS-PA-DEL-006WL	Pennsylvania	Delaware	39.86531	–75.22887	water level	storm tide	7.18	10/30/2012 07:41:00
SSS-PA-PHI-013WL	Pennsylvania	Philadelphia	40.03425	–75.00025	water level	none	none	no surge recorded
SSS-PA-PHI-014WL	Pennsylvania	Philadelphia	39.93389	–75.20825	water level	storm tide	7.44	10/30/2012 07:29:30
SSS-PA-PHI-016WL	Pennsylvania	Philadelphia	39.88758	–75.16422	water level	storm tide	7.52	10/30/2012 07:52:30
412656071265946	Rhode Island	Washington	41.44911	–71.44985	real-time RDG	storm tide	6.02	10/30/2012 00:15:00
SSS-RI-BRI-013WL	Rhode Island	Bristol	41.72614	–71.28590	water level	storm tide	6.27	10/29/2012 23:12:00
SSS-RI-KEN-011WL	Rhode Island	Kent	41.68673	–71.39166	water level	storm tide	6.64	10/29/2012 23:03:30
SSS-RI-NEW-014WL	Rhode Island	Newport	41.61965	–71.24000	water level	storm tide	6.42	10/29/2012 22:56:00
SSS-RI-NEW-015WL	Rhode Island	Newport	41.46496	–71.19241	water level	storm tide	6.36	10/29/2012 22:45:00
SSS-RI-WAS-001WL	Rhode Island	Washington	41.31029	–71.85914	water level	storm tide	5.86	10/29/2012 23:52:30
SSS-RI-WAS-003WL	Rhode Island	Washington	41.36451	–71.60520	water level	storm tide	8.43	10/30/2012 00:27:00
SSS-RI-WAS-005WL	Rhode Island	Washington	41.33482	–71.76663	water level	storm tide	6.39	10/30/2012 00:31:30
SSS-RI-WAS-007WL	Rhode Island	Washington	41.38102	–71.64473	water level	storm tide	3.97	10/30/2012 02:01:00
SSS-RI-WAS-008WL	Rhode Island	Washington	41.37726	–71.51472	water level	storm tide	6.59	10/29/2012 23:59:30
SSS-RI-WAS-012WL	Rhode Island	Washington	41.52809	–71.41637	water level	storm tide	6.35	10/29/2012 22:23:00
SSS-VA-ACC-001WL	Virginia	Accomack	37.90318	–75.40668	water level	storm tide	5.00	10/29/2012 12:51:00
SSS-VA-ACC-002WL	Virginia	Accomack	37.73291	–75.58983	water level	storm tide	5.98	10/29/2012 11:41:00

Table 3. Hurricane Sandy peak storm-tide data for 165 U.S. Geological Survey temporarily deployed sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time; RDG, rapid-deployment gage]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
SSS-VA-ACC-003WL	Virginia	Accomack	37.72195	–75.78580	water level	storm tide	5.38	10/29/2012 16:48:00
SSS-VA-HAM-002WL	Virginia	Hampton	37.01528	–76.31722	water level	storm tide	5.30	10/29/2012 13:13:00
SSS-VA-MAT-001WL	Virginia	Mathews	37.49278	–76.31000	water level	storm tide	3.54	10/29/2012 14:16:00
SSS-VA-NOR-001WL	Virginia	Northampton	37.44528	–75.84186	water level	storm tide	5.46	10/29/2012 13:05:00
SSS-VA-NOR-003WL	Virginia	Northampton	37.26492	–76.01628	water level	storm tide	5.02	10/29/2012 13:36:00
SSS-VA-NOR-004WL	Virginia	Northampton	37.12811	–75.94944	water level	storm tide	5.71	10/29/2012 12:12:00
SSS-VA-VAB-001WL	Virginia	Virginia Beach	36.90683	–76.08825	water level	storm tide	5.49	10/29/2012 12:56:00
SSS-VA-YOR-003WL	Virginia	Poquoson	37.11061	–76.31944	water level	storm tide	5.08	10/29/2012 12:48:00

Table 4. Hurricane Sandy peak storm-tide data recorded at U.S. Geological Survey permanent monitoring sites, by State.

[NAVD 88, North American Vertical Datum of 1988; NGVD 29, National Geodetic Vertical Datum of 1929; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Gage altitude datum	Peak storm-tide date and time (GMT)
			Decimal degrees						
01194750	Connecticut	Middlesex	41.351389	–72.385556	real-time streamgage	storm tide	8.00	NGVD 29	10/30/2012 01:45:00
01208873	Connecticut	Fairfield	41.179819	–73.219002	real-time streamgage	storm tide	10.49	NGVD 29	10/29/2012 22:40:00
01100500	Massachusetts	Essex	42.704833	–71.153139	real-time streamgage	storm tide	12.21	NAVD 88	10/29/2012 22:15:00
01100693	Massachusetts	Essex	42.772778	–71.083056	real-time streamgage	storm tide	7.58	NAVD 88	10/29/2012 17:30:00
01103050	Massachusetts	Middlesex	42.395652	–71.075052	real-time streamgage	storm tide	7.44	NAVD 88	10/29/2012 15:45:00
01104715	Massachusetts	Suffolk	42.368889	–71.061667	real-time tidegage	storm tide	7.29	NAVD 88	10/29/2012 15:45:00
011055566	Massachusetts	Norfolk	42.270932	–71.068384	real-time streamgage	storm tide	7.59	NAVD 88	10/29/2012 16:15:00
01105583	Massachusetts	Norfolk	42.220933	–70.978103	real-time streamgage	storm tide	7.64	NAVD 88	10/29/2012 19:15:00
01105585	Massachusetts	Norfolk	42.247877	–70.997270	real-time streamgage	storm tide	9.50	NGVD 29	10/30/2012 01:00:00
01105730	Massachusetts	Plymouth	42.100657	–70.822542	real-time streamgage	storm tide	5.38	NGVD 29	10/29/2012 21:45:00
01105870	Massachusetts	Plymouth	41.990936	–70.733649	real-time streamgage	storm tide	7.79	NAVD 88	10/29/2012 16:00:00
01105876	Massachusetts	Plymouth	41.941770	–70.622534	real-time streamgage	storm tide	7.15	NAVD 88	10/29/2012 16:00:00
011058837	Massachusetts	Barnstable	41.592332	–70.507806	real-time streamgage	storm tide	3.36	NAVD 88	10/29/2012 22:30:00
01108410	Massachusetts	Bristol	41.899823	–71.089490	real-time streamgage	storm tide	6.52	NAVD 88	10/30/2012 01:15:00
01378501	New Jersey	Bergen	40.948056	–74.026667	tidal crest-stage gage	storm tide	8.52	NAVD 88	10/30/2012
01378626	New Jersey	Hudson	40.799444	–74.066389	tidal crest-stage gage	storm tide	8.6	NAVD 88	10/30/2012
01390000	New Jersey	Bergen	40.864444	–74.110278	tidal crest-stage gage	storm tide	12.29	NAVD 88	10/30/2012
01392650	New Jersey	Essex	40.713167	–74.123056	real-time tidegage	storm tide	12.1	NAVD 88	10/30/2012
01393510	New Jersey	Union	40.646944	–74.205278	tidal crest-stage gage	storm tide	12.21	NAVD 88	10/30/2012
01396035	New Jersey	Union	40.599167	–74.270833	tidal crest-stage gage	storm tide	11.9	NAVD 88	10/30/2012
01404171	New Jersey	Middlesex	40.508333	–74.456944	tidal crest-stage gage	storm tide	13.9	NAVD 88	10/30/2012
01406050	New Jersey	Middlesex	40.415	–74.348889	real-time streamgage	storm tide	12.03	NAVD 88	10/30/2012 03:15:00

Table 4. Hurricane Sandy peak storm-tide data recorded at U.S. Geological Survey permanent monitoring sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; NGVD 29, National Geodetic Vertical Datum of 1929; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Gage altitude datum	Peak storm-tide date and time (GMT)
			Decimal degrees						
01406700	New Jersey	Middlesex	40.508333	–74.291667	tidal crest-stage gage	storm tide	13.4	NAVD 88	10/30/2012
01406710	New Jersey	Middlesex	40.492222	–74.281389	real-time tidegage	storm tide	13.4	NAVD 88	10/30/2012
01407030	New Jersey	Monmouth	40.435556	–74.207222	tidal crest-stage gage	storm tide	13.56	NAVD 88	10/30/2012
01407081	New Jersey	Monmouth	40.449167	–74.1475	real-time tidegage	storm tide	13.8	NAVD 88	10/30/2012 00:54:00
01407535	New Jersey	Monmouth	40.362222	–74.081944	tidal crest-stage gage	storm tide	11.7	NAVD 88	10/30/2012
01407590	New Jersey	Monmouth	40.32	–74.003056	tidal crest-stage gage	storm tide	10.00	NAVD 88	10/30/2012
01407600	New Jersey	Monmouth	40.365556	–73.974722	real-time tidegage	storm tide	13.0	NAVD 88	10/30/2012 00:54:00
01407705	New Jersey	Monmouth	40.198611	–74.07	real-time streamgage	storm tide	12.70	NGVD 29	10/30/2012 01:00:00
01407770	New Jersey	Monmouth	40.181111	–74.030278	real-time tidegage	storm tide	10.9	NAVD 88	10/29/2012 23:18:00
01408043	New Jersey	Ocean	40.070833	–74.059444	real-time tidegage	storm tide	5.61	NAVD 88	10/30/2012 03:48:00
01408050	New Jersey	Ocean	40.101667	–74.0375	real-time tide gage	storm tide	9.5	NAVD 88	10/30/2012 00:36:00
01408155	New Jersey	Ocean	40.066111	–74.133611	tidal crest-stage gage	storm tide	7.37	NAVD 88	10/30/2012
01408168	New Jersey	Ocean	40.04	–74.052222	real-time tidegage	storm tide	6.91	NAVD 88	10/30/2012 06:18:00
01408200	New Jersey	Ocean	39.948889	–74.113889	tidal crest-stage gage	storm tide	8.6	NAVD 88	10/30/2012
01408700	New Jersey	Ocean	39.950278	–74.198889	tidal crest-stage gage	storm tide	6.59	NAVD 88	10/30/2012
01408750	New Jersey	Ocean	39.938333	–74.082222	real-time tidegage	storm tide	6.6	NAVD 88	10/30/2012
01409110	New Jersey	Ocean	39.791111	–74.181944	real-time tidegage	storm tide	7.3	NAVD 88	10/30/2012 04:24:00
01409125	New Jersey	Ocean	39.761111	–74.108056	real-time tidegage	storm tide	5.21	NAVD 88	10/30/2012 00:24:00
01409135	New Jersey	Ocean	39.723611	–74.134722	tidal crest-stage gage	storm tide	5.01	NAVD 88	10/30/2012
01409145	New Jersey	Ocean	39.670278	–74.215	tidal crest-stage gage	storm tide	7.4	NAVD 88	10/30/2012
01409146	New Jersey	Ocean	39.653889	–74.185833	real-time tidegage	storm tide	6.5	NAVD 88	10/30/2012 03:00:00
01409285	New Jersey	Ocean	39.552778	–74.251667	tidal crest-stage gage	storm tide	7.47	NAVD 88	10/30/2012

Table 4. Hurricane Sandy peak storm-tide data recorded at U.S. Geological Survey permanent monitoring sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; NGVD 29, National Geodetic Vertical Datum of 1929; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Gage altitude datum	Peak storm-tide date and time (GMT)
			Decimal degrees						
01409335	New Jersey	Ocean	39.508889	–74.324722	real-time tidegage	storm tide	8.3	NAVD 88	10/29/2012 23:48:00
01410000	New Jersey	Burlington	39.663333	–74.523611	real-time streamgage	storm tide	9.63	NGVD 29	10/31/2012 01:45:00
01410100	New Jersey	Atlantic	39.553056	–74.462778	tidal crest-stage gage	storm tide	8.1	NAVD 88	10/30/2012
01410150	New Jersey	Burlington	39.623056	–74.441389	real-time streamgage	storm tide	10.04	NGVD 29	10/30/2012 03:15:00
01410500	New Jersey	Atlantic	39.430278	–74.520556	real-time streamgage	storm tide	9.10	NGVD 29	10/30/2012 02:00:00
01410510	New Jersey	Atlantic	39.423056	–74.5	real-time tidegage	storm tide	7.53	NAVD 88	10/30/2012 01:06:00
01410560	New Jersey	Atlantic	39.353333	–74.456667	real-time tidegage	storm tide	7.6	NAVD 88	10/30/2012 01:42:00
01410570	New Jersey	Atlantic	39.365556	–74.445556	tidal crest-stage gage	storm tide	7.68	NAVD 88	10/30/2012
01410600	New Jersey	Atlantic	39.3775	–74.423333	real-time tidegage	storm tide	7.81	NAVD 88	10/30/2012 00:54:00
01411175	New Jersey	Atlantic	39.448333	–74.726944	tidal crest-stage gage	storm tide	8.0	NAVD 88	10/30/2012
01411300	New Jersey	Cape May	39.306944	–74.820556	real-time streamgage	storm tide	7.82	NGVD 29	10/30/2012 03:15:00
01411315	New Jersey	Cape May	39.288056	–74.627778	tidal crest-stage gage	storm tide	6.97	NAVD 88	10/30/2012
01411320	New Jersey	Cape May	39.284167	–74.577778	real-time tidegage	storm tide	7.25	NAVD 88	10/30/2012 00:00:00
01411325	New Jersey	Atlantic	39.381667	–74.518889	tidal crest-stage gage	storm tide	7.9	NAVD 88	10/30/2012
01411335	New Jersey	Cape May	39.200833	–74.655278	tidal crest-stage gage	storm tide	7.4	NAVD 88	10/30/2012
01411350	New Jersey	Cape May	39.1575	–74.697778	real-time tidegage	storm tide	7.56	NAVD 88	10/30/2012 00:18:00
01411355	New Jersey	Cape May	39.110833	–74.733889	real-time tidegage	storm tide	7.15	NAVD 88	10/29/2012 23:24:00
01411360	New Jersey	Cape May	39.056667	–74.764167	real-time tidegage	storm tide	6.73	NAVD 88	10/30/2012 01:36:00
01411370	New Jersey	Cape May	39.028333	–74.801389	tidal crest-stage gage	storm tide	7.30	NAVD 88	10/30/2012
01411382	New Jersey	Cape May	38.990278	–74.836389	tidal crest-stage gage	storm tide	6.15	NAVD 88	10/30/2012
01411390	New Jersey	Cape May	38.948611	–74.890556	real-time tidegage	storm tide	5.90	NAVD 88	10/29/2012 12:42:00
01411435	New Jersey	Cape May	39.161667	–74.831944	real-time tidegage	storm tide	6.01	NAVD 88	10/30/2012 04:48:00

Table 4. Hurricane Sandy peak storm-tide data recorded at U.S. Geological Survey permanent monitoring sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; NGVD 29, National Geodetic Vertical Datum of 1929; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Gage altitude datum	Peak storm-tide date and time (GMT)
			Decimal degrees						
01411900	New Jersey	Cumberland	39.395278	–75.040556	tidal crest-stage gage	storm tide	6.39	NAVD 88	10/30/2012
01412150	New Jersey	Cumberland	39.231667	–75.033056	real-time tidegage	storm tide	7.04	NAVD 88	10/30/2012 02:30:00
01413015	New Jersey	Cumberland	39.429167	–75.236667	tidal crest-stage gage	storm tide	6.53	NAVD 88	10/30/2012
01413038	New Jersey	Cumberland	39.383611	–75.350278	real-time tidegage	storm tide	5.91	NAVD 88	10/30/2012 05:00:00
01463500	New Jersey	Mercer	40.22166	–74.77805	real-time streamgage	storm tide	10.72	NAVD 88	10/30/2012 19:45:00
01464040	New Jersey	Mercer	40.189167	–74.755833	tidal crest-stage gage	storm tide	8.78	NAVD 88	10/30/2012
01464598	New Jersey	Burlington	40.078056	–74.874167	tidal crest-stage gage	storm tide	8.20	NAVD 88	10/30/2012
01476550	New Jersey	Gloucester	39.831111	–75.3325	tidal crest-stage gage	storm tide	7.75	NAVD 88	10/30/2012
01482650	New Jersey	Salem	39.576944	–75.643611	tidal crest-stage gage	storm tide	5.48	NAVD 88	10/30/2012
01483050	New Jersey	Salem	39.508333	–75.460556	tidal crest-stage gage	storm tide	5.88	NAVD 88	10/30/2012
01302050	New York	Queens	40.755833	–73.745833	real-time streamgage	storm tide	9.69	NAVD 88	10/30/2012 02:15:00
01302250	New York	Nassau	40.866222	–73.710194	real-time tidegage	storm tide	11.39	NGVD 29	10/30/2012 02:00:00
01302600	New York	Nassau	40.888556	–73.638	real-time tidegage	storm tide	9.87	NAVD 88	10/30/2012 02:30:00
01302845	New York	Nassau	40.905111	–73.593194	real-time tidegage	storm tide	11.14	NGVD 29	10/30/2012 02:18:00
01303500	New York	Nassau	40.857222	–73.463333	real-time streamgage	storm tide	none	none	damaged
01304057	New York	Suffolk	40.962861	–73.143167	real-time tidegage	storm tide	10.36	NGVD 29	10/30/2012 02:06:00
01304200	New York	Suffolk	41.136639	–72.30675	real-time tidegage	storm tide	6.43	NAVD 88	10/30/2012 01:24:00
01304500	New York	Suffolk	40.913611	–72.686667	real-time streamgage	storm tide	6.76	NAVD 88	10/30/2012 02:45:00
01304562	New York	Suffolk	40.917778	–72.638667	real-time tidegage	storm tide	7.65	NAVD 88	10/29/2012 20:18:00
01309225	New York	Suffolk	40.669267	–73.355677	real-time tidegage	storm tide	6.54	NAVD 88	10/30/2012 02:00:00
01310521	New York	Nassau	40.627603	–73.575406	real-time tidegage	storm tide	8.98	NAVD 88	10/30/2012 01:12:00
01310740	New York	Nassau	40.593437	–73.583740	real-time tidegage	storm tide	8.97	NAVD 88	10/30/2012 01:06:00

Table 4. Hurricane Sandy peak storm-tide data recorded at U.S. Geological Survey permanent monitoring sites, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; NGVD 29, National Geodetic Vertical Datum of 1929; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Gage altitude datum	Peak storm-tide date and time (GMT)
			Decimal degrees						
01311143	New York	Nassau	40.608833	–73.656111	real-time tidegage	storm tide	9.77	NAVD 88	10/30/2012 01:12:00
01311145	New York	Nassau	40.593160	–73.737354	real-time tidegage	storm tide	9.70	NAVD 88	10/30/2012 00:42:00
01311500	New York	Nassau	40.663611	–73.704444	real-time streamgage	storm tide	9.33	NGVD 29	10/29/2012 23:00:00
01311850	New York	Nassau	40.617327	–73.757910	real-time tidegage	storm tide	10.55	NAVD 88	10/30/2012 01:36:00
01311875	New York	Kings	40.573716	–73.885136	real-time tidegage	storm tide	10.65	NAVD 88	10/30/2012 01:06:00
01359139	New York	Albany	42.646111	–73.7475	real-time tidegage	storm tide	10.57	NAVD 88	10/30/2012 09:45:00
01372058	New York	Dutchess	41.650927	–73.944582	real-time tidegage	storm tide	8.66	NAVD 88	10/30/2012 04:15:00
01376534	New York	Richmond	40.573722	–74.141306	real-time streamgage	storm tide	11.82	NAVD 88	10/30/2012 01:45:00
01376558	New York	Richmond	40.525417	–74.209389	real-time streamgage	storm tide	12.76	NAVD 88	10/30/2012 01:00:00
01118500	Rhode Island	Washington	41.383711	–71.833125	real-time streamgage	storm tide	5.86	NAVD 88	10/29/2012 23:30:00

Table 5. Hurricane Sandy peak storm-tide data recorded at National Oceanic and Atmospheric Administration permanent monitoring sites, by State (NOAA, 2012).

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Site type	Type of data recorded	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide date and time (GMT)
			Decimal degrees					
8461490	Connecticut	New London	41.36000	–72.09000	real-time tide gage	storm tide	6.16	10/30/2012 0:12
8467150	Connecticut	Fairfield	41.17333	–73.18167	real-time tide gage	storm tide	9.30	10/30/2012 2:06
8551910	Delaware	New Castle	39.55833	–75.57333	real-time tide gage	storm tide	6.13	10/30/2012 5:42
8557380	Delaware	Sussex	38.78167	–75.12000	real-time tide gage	storm tide	6.08	10/29/2012 13:00
8570283	Maryland	Worcester	38.32833	–75.09167	real-time tide gage	storm tide	4.42	10/29/2012 13:42
8571421	Maryland	Dorchester	38.22000	–76.03833	real-time tide gage	storm tide	3.05	10/30/2012 18:36
8571892	Maryland	Dorchester	38.57333	–76.06833	real-time tide gage	storm tide	3.44	10/29/2012 21:30
8574680	Maryland	Baltimore	39.26667	–76.57833	real-time tide gage	storm tide	3.83	10/30/2012 10:36
8575512	Maryland	Anne Arundel	38.98333	–76.48000	real-time tide gage	storm tide	3.11	10/30/2012 12:54
8577330	Maryland	Calvert	38.31667	–76.45167	real-time tide gage	storm tide	none	damaged
8443970	Massachusetts	Suffolk	42.35333	–71.05333	real-time tide gage	storm tide	7.42	10/29/2012 15:48
8447435	Massachusetts	Barnstable	41.68833	–69.95000	real-time tide gage	storm tide	5.87	10/29/2012 16:00
8447930	Massachusetts	Barnstable	41.52333	–70.67167	real-time tide gage	storm tide	4.44	10/29/2012 22:18
8423898	New Hampshire	Rockingham	43.07167	–70.71167	real-time tide gage	storm tide	6.41	10/29/2012 15:36
8531680	New Jersey	Monmouth	40.46667	–74.00833	real-time tide gage	storm tide	none	damaged
8534720	New Jersey	Atlantic	39.35500	–74.41833	real-time tide gage	storm tide	6.28	10/30/2012 0:24
8536110	New Jersey	Cape May	38.96833	–74.96000	real-time tide gage	storm tide	5.90	10/29/2012 13:42
8510560	New York	Suffolk	41.04833	–71.96000	real-time tide gage	storm tide	5.55	10/30/2012 0:12
8518750	New York	New York	40.70000	–74.01333	real-time tide gage	storm tide	11.28	10/30/2012 1:24
8545240	Pennsylvania	Philadelphia	39.93333	–75.14167	real-time tide gage	storm tide	7.52	10/30/2012 8:00
8452660	Rhode Island	Newport	41.50500	–71.32667	real-time tide gage	storm tide	6.13	10/29/2012 23:00
8454000	Rhode Island	Providence	41.80667	–71.40000	real-time tide gage	storm tide	6.89	10/29/2012 23:30
8632200	Virginia	Northampton	37.16500	–75.98833	real-time tide gage	storm tide	4.92	10/29/2012 12:48
8635750	Virginia	Northumber-land	37.99500	–76.46333	real-time tide gage	storm tide	2.92	10/28/2012 18:06
8638610	Virginia	Norfolk	36.94667	–76.33000	real-time tide gage	storm tide	5.17	10/29/2012 13:18

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-CT-FFD-111	Connecticut	Fairfield	40.999180	–73.658720	10.33	10/30/2012	No
HWM-CT-FFD-112	Connecticut	Fairfield	40.999020	–73.659380	10.38	10/30/2012	No
HWM-CT-FFD-411	Connecticut	Fairfield	41.099750	–73.415880	10.14	10/30/2012	No
HWM-CT-FFD-412	Connecticut	Fairfield	41.099270	–73.415570	10.24	10/30/2012	No
HWM-CT-FFD-511	Connecticut	Fairfield	41.122840	–73.369900	10.14	10/30/2012	No
HWM-CT-FFD-512	Connecticut	Fairfield	41.123400	–73.370420	10.10	10/30/2012	Yes
HWM-CT-FFD-513	Connecticut	Fairfield	41.147003	–73.364967	10.22	10/30/2012	Yes
HWM-CT-FFD-514	Connecticut	Fairfield	41.146989	–73.364978	10.32	10/30/2012	Yes
HWM-CT-FFD-515	Connecticut	Fairfield	41.147272	–73.364119	10.15	10/30/2012	Yes
HWM-CT-FFD-811	Connecticut	Fairfield	41.16330	–73.11092	8.63	10/30/2012	Yes
HWM-CT-FFD-812	Connecticut	Fairfield	41.16260	–73.11095	8.33	10/30/2012	Yes
HWM-CT-FFD-813	Connecticut	Fairfield	41.16306	–73.11698	8.75	10/30/2012	No
HWM-CT-FFD-814	Connecticut	Fairfield	41.253720	–73.088751	9.55	10/30/2012	No
HWM-CT-FFD-815	Connecticut	Fairfield	41.253452	–73.088672	9.59	10/30/2012	No
HWM-CT-FFD-816	Connecticut	Fairfield	41.016645	–73.628319	9.84	10/30/2012	Yes
HWM-CT-FFD-817	Connecticut	Fairfield	41.021805	–73.615184	9.88	10/30/2012	Yes
HWM-CT-FFD-818	Connecticut	Fairfield	41.032779	–73.591960	10.04	10/30/2012	Yes
HWM-CT-MSX-111	Connecticut	Middlesex	41.269339	–72.529702	8.01	10/30/2012	No
HWM-CT-MSX-112	Connecticut	Middlesex	41.269140	–72.530950	7.11	10/30/2012	Yes
HWM-CT-MSX-113	Connecticut	Middlesex	41.276908	–72.524291	6.81	10/30/2012	No
HWM-CT-MSX-311	Connecticut	Middlesex	41.28256	–72.35161	7.04	10/30/2012	Yes
HWM-CT-MSX-322	Connecticut	Middlesex	41.284430	–72.351400	6.99	10/30/2012	Yes
HWM-CT-MSX-323	Connecticut	Middlesex	41.281850	–72.351530	7.07	10/30/2012	Yes
HWM-CT-MSX-324	Connecticut	Middlesex	41.272880	–72.357820	6.90	10/30/2012	Yes
HWM-CT-NHV-111	Connecticut	New Haven	41.210800	–73.050820	9.31	10/30/2012	Yes
HWM-CT-NHV-112	Connecticut	New Haven	41.210850	–73.050600	9.50	10/30/2012	Yes
HWM-CT-NHV-611	Connecticut	New Haven	41.262154	–72.822238	9.69	10/30/2012	Yes
HWM-CT-NHV-612	Connecticut	New Haven	41.260995	–72.821059	8.91	10/30/2012	Yes
HWM-CT-NHV-613	Connecticut	New Haven	41.267593	–72.819286	9.41	10/30/2012	No
HWM-CT-NHV-713	Connecticut	New Haven	41.268652	–72.669539	8.38	10/30/2012	Yes
HWM-CT-NLD-515	Connecticut	New London	41.325194	–71.985075	6.65	10/30/2012	No
HWM-CT-NLD-516	Connecticut	New London	41.380610	–71.967780	6.44	10/29/2012	Yes
HWM-CT-NLD-517	Connecticut	New London	41.316750	–72.061610	5.70	10/30/2012	No
HWM-CT-NLD-611	Connecticut	New London	41.344194	–71.908944	5.99	10/29/2012	Yes
HWM-CT-NLD-612	Connecticut	New London	41.346694	–71.967250	6.00	10/29/2012	Yes
HWM-MA-BAR-517	Massachusetts	Barnstable	41.800332	–69.980697	7.30	10/29/2012	Yes
HWM-MA-BAR-607	Massachusetts	Barnstable	41.598000	–70.643389	5.28	10/29/2012	Yes
HWM-MA-BAR-614	Massachusetts	Barnstable	41.622389	–70.393250	3.60	10/29/2012	No
HWM-MA-BAR-616	Massachusetts	Barnstable	41.643760	–70.252560	4.02	10/29/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-MA-BAR-619	Massachusetts	Barnstable	41.667550	–70.089810	2.95	10/29/2012	Yes
HWM-MA-BAR-623	Massachusetts	Barnstable	41.550480	–70.551360	4.62	10/29/2012	Yes
HWM-MA-BAR-711	Massachusetts	Barnstable	41.641954	–70.277469	4.08	10/29/2012	Yes
HWM-MA-BAR-712	Massachusetts	Barnstable	41.552440	–70.549030	5.12	10/29/2012	Yes
HWM-MA-BAR-713	Massachusetts	Barnstable	41.605575	–70.651550	6.31	10/29/2012	Yes
HWM-MA-BAR-714	Massachusetts	Barnstable	41.655650	–70.624490	5.97	10/29/2012	Yes
HWM-MA-BRI-203	Massachusetts	Bristol	41.516230	–71.071730	5.84	10/29/2012	No
HWM-MA-BRI-628	Massachusetts	Bristol	41.594260	–70.849330	7.00	10/29/2012	No
HWM-MA-DUK-248	Massachusetts	Dukes	41.461430	–70.561000	4.18	10/29/2012	Yes
HWM-MA-DUK-249	Massachusetts	Dukes	41.430150	–70.601550	3.82	10/29/2012	Yes
HWM-MA-DUK-250	Massachusetts	Dukes	41.414390	–70.560440	4.62	10/29/2012	Yes
HWM-MA-DUK-251	Massachusetts	Dukes	41.387100	–70.513970	3.75	10/29/2012	Yes
HWM-MA-DUK-252	Massachusetts	Dukes	41.352620	–70.499800	5.76	10/29/2012	Yes
HWM-MA-DUK-253	Massachusetts	Dukes	41.350490	–70.528840	7.04	10/29/2012	No
HWM-MA-DUK-254	Massachusetts	Dukes	41.376070	–70.670000	6.21	10/29/2012	Yes
HWM-MA-DUK-255	Massachusetts	Dukes	41.345530	–70.707090	6.95	10/29/2012	Yes
HWM-MA-DUK-256	Massachusetts	Dukes	41.457290	–70.601740	5.05	10/29/2012	Yes
HWM-MA-ESS-309	Massachusetts	Essex	42.822980	–70.826770	9.17	10/29/2012	Yes
HWM-MA-ESS-310	Massachusetts	Essex	42.822860	–70.826680	9.50	10/29/2012	Yes
HWM-MA-ESS-314	Massachusetts	Essex	42.810100	–70.861920	8.39	10/29/2012	Yes
HWM-MA-ESS-316	Massachusetts	Essex	42.816660	–70.819980	10.16	10/29/2012	Yes
HWM-MA-ESS-318	Massachusetts	Essex	42.763470	–70.847060	7.14	10/29/2012	Yes
HWM-MA-ESS-423	Massachusetts	Essex	42.433290	–70.934770	13.15	10/29/2012	Yes
HWM-MA-ESS-716	Massachusetts	Essex	42.421942	–70.917157	9.63	10/29/2012	Yes
HWM-MA-NAN-701	Massachusetts	Nantucket	41.270010	–70.200650	11.51	10/29/2012	Yes
HWM-MA-NAN-702	Massachusetts	Nantucket	41.286210	–70.191590	3.79	10/29/2012	Yes
HWM-MA-NAN-703	Massachusetts	Nantucket	41.289730	–70.092920	3.33	10/29/2012	Yes
HWM-MA-NAN-704	Massachusetts	Nantucket	41.290550	–70.044190	4.44	10/29/2012	Yes
HWM-MA-NAN-705	Massachusetts	Nantucket	41.336060	–70.001070	5.08	10/29/2012	Yes
HWM-MA-NAN-706	Massachusetts	Nantucket	41.301330	–69.975720	13.71	10/29/2012	Yes
HWM-MA-NAN-707	Massachusetts	Nantucket	41.261040	–69.963100	11.87	10/29/2012	Yes
HWM-MA-NAN-708	Massachusetts	Nantucket	41.242610	–69.994120	11.22	10/29/2012	Yes
HWM-MA-NAN-709	Massachusetts	Nantucket	41.245420	–70.077930	7.95	10/29/2012	Yes
HWM-MA-NAN-710	Massachusetts	Nantucket	41.253440	–70.157160	16.00	10/29/2012	Yes
HWM-MA-NOR-412	Massachusetts	Norfolk	42.238960	–70.788590	7.34	10/29/2012	Yes
HWM-MA-PLY-405	Massachusetts	Plymouth	41.974408	–70.677231	12.45	10/29/2012	Yes
HWM-MA-PLY-408	Massachusetts	Plymouth	42.085640	–70.650650	7.76	10/29/2012	Yes
HWM-MA-PLY-411	Massachusetts	Plymouth	42.203950	–70.724100	9.98	10/29/2012	Yes
HWM-MA-PLY-519	Massachusetts	Plymouth	41.712163	–70.766166	3.45	10/29/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-MA-PLY-624	Massachusetts	Plymouth	41.747560	–70.632260	5.02	10/29/2012	Yes
HWM-MA-PLY-625	Massachusetts	Plymouth	41.657650	–70.813800	5.94	10/29/2012	Yes
HWM-MA-PLY-715	Massachusetts	Plymouth	41.928470	–70.554874	7.72	10/29/2012	Yes
HWM-MA-PLY-718	Massachusetts	Plymouth	41.979517	–70.682244	10.65	10/29/2012	Yes
HWM-NJ-ATL-006	New Jersey	Atlantic	39.553333	–74.462778	8.18	10/30/2012	No
HWM-NJ-ATL-007	New Jersey	Atlantic	39.553333	–74.462778	8.11	10/30/2012	No
HWM-NJ-ATL-100	New Jersey	Atlantic	39.430574	–74.520151	7.62	10/29/2012	Yes
HWM-NJ-ATL-101	New Jersey	Atlantic	39.422667	–74.499918	7.39	10/29/2012	Yes
HWM-NJ-ATL-102	New Jersey	Atlantic	39.397283	–74.493027	7.53	10/29/2012	No
HWM-NJ-ATL-103	New Jersey	Atlantic	39.372197	–74.418974	7.69	10/29/2012	No
HWM-NJ-ATL-104	New Jersey	Atlantic	39.375541	–74.417630	7.15	10/29/2012	Yes
HWM-NJ-ATL-105	New Jersey	Atlantic	39.390747	–74.397936	7.64	10/29/2012	No
HWM-NJ-ATL-106	New Jersey	Atlantic	39.377728	–74.406839	7.79	10/29/2012	No
HWM-NJ-ATL-107	New Jersey	Atlantic	39.415066	–74.355190	8.00	10/29/2012	No
HWM-NJ-ATL-108	New Jersey	Atlantic	39.405355	–74.372788	7.75	10/29/2012	No
HWM-NJ-ATL-232	New Jersey	Atlantic	39.623130	–74.624340	7.38	10/29/2012	No
HWM-NJ-ATL-300	New Jersey	Atlantic	39.357160	–74.445450	7.31	10/29/2012	No
HWM-NJ-ATL-301	New Jersey	Atlantic	39.361947	–74.444327	7.22	10/30/2012	Yes
HWM-NJ-ATL-302	New Jersey	Atlantic	39.348720	–74.464810	7.71	10/29/2012	No
HWM-NJ-ATL-303	New Jersey	Atlantic	39.337501	–74.492111	6.90	10/30/2012	No
HWM-NJ-ATL-304	New Jersey	Atlantic	39.304950	–74.536940	8.28	10/29/2012	No
HWM-NJ-ATL-305	New Jersey	Atlantic	39.304810	–74.536760	8.43	10/29/2012	No
HWM-NJ-ATL-306	New Jersey	Atlantic	39.277970	–74.572360	8.47	10/29/2012	No
HWM-NJ-BER-413	New Jersey	Bergen	40.878872	–74.040775	8.22	10/30/2012	No
HWM-NJ-BER-414	New Jersey	Bergen	40.892842	–74.037419	8.22	10/30/2012	Yes
HWM-NJ-BER-415	New Jersey	Bergen	40.842819	–73.966186	9.44	10/30/2012	No
HWM-NJ-BER-416	New Jersey	Bergen	40.842344	–74.042028	7.43	10/30/2012	No
HWM-NJ-BER-417	New Jersey	Bergen	40.785528	–74.147158	11.82	10/30/2012	No
HWM-NJ-BER-423	New Jersey	Bergen	40.816142	–73.978506	9.46	10/30/2012	No
HWM-NJ-BUR-233	New Jersey	Burlington	39.641960	–74.649920	7.48	10/29/2012	No
HWM-NJ-CPM-001	New Jersey	Cape May	38.957200	–74.883020	5.72	10/29/2012	Yes
HWM-NJ-CPM-002	New Jersey	Cape May	38.958800	–74.854950	5.32	10/29/2012	Yes
HWM-NJ-CPM-003	New Jersey	Cape May	38.964130	–74.854380	5.88	10/29/2012	Yes
HWM-NJ-CPM-004	New Jersey	Cape May	39.077440	–74.802660	6.89	10/29/2012	No
HWM-NJ-CPM-005	New Jersey	Cape May	39.060050	–74.769220	6.73	10/29/2012	No
HWM-NJ-CPM-006	New Jersey	Cape May	39.058580	–74.756350	6.82	10/29/2012	No
HWM-NJ-CPM-007	New Jersey	Cape May	39.082390	–74.737680	7.77	10/29/2012	No
HWM-NJ-CPM-008	New Jersey	Cape May	39.096630	–74.724910	6.94	10/29/2012	No
HWM-NJ-CPM-234	New Jersey	Cape May	39.116780	–74.890870	6.72	10/29/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NJ-CPM-235	New Jersey	Cape May	39.036460	–74.936530	10.65	10/29/2012	Yes
HWM-NJ-CPM-236	New Jersey	Cape May	38.996340	–74.956510	9.11	10/29/2012	Yes
HWM-NJ-CPM-237	New Jersey	Cape May	38.968000	–74.964050	8.18	10/29/2012	Yes
HWM-NJ-ESS-102	New Jersey	Essex	40.713739	–74.130017	11.56	10/30/2012	Yes
HWM-NJ-HUD-001	New Jersey	Hudson	40.758800	–74.028860	9.38	10/30/2012	No
HWM-NJ-HUD-002	New Jersey	Hudson	40.758800	–74.028860	9.37	10/30/2012	No
HWM-NJ-HUD-003	New Jersey	Hudson	40.758800	–74.028860	9.38	10/30/2012	No
HWM-NJ-HUD-004	New Jersey	Hudson	40.758960	–74.029690	11.99	10/30/2012	No
HWM-NJ-HUD-005	New Jersey	Hudson	40.758960	–74.029690	11.99	10/30/2012	No
HWM-NJ-HUD-006	New Jersey	Hudson	40.758960	–74.029690	12.01	10/30/2012	No
HWM-NJ-HUD-007	New Jersey	Hudson	40.761850	–74.023440	10.34	10/30/2012	No
HWM-NJ-HUD-008	New Jersey	Hudson	40.761850	–74.023440	10.08	10/30/2012	Yes
HWM-NJ-HUD-009	New Jersey	Hudson	40.743830	–74.023900	10.72	10/30/2012	Yes
HWM-NJ-HUD-010	New Jersey	Hudson	40.741550	–74.026250	10.46	10/30/2012	No
HWM-NJ-HUD-103	New Jersey	Hudson	40.725964	–74.091331	10.95	10/30/2012	Yes
HWM-NJ-HUD-104	New Jersey	Hudson	40.645311	–74.130769	11.55	10/30/2012	Yes
HWM-NJ-HUD-107	New Jersey	Hudson	40.668522	–74.104028	12.67	10/30/2012	Yes
HWM-NJ-HUD-108	New Jersey	Hudson	40.692653	–74.056114	11.88	10/30/2012	Yes
HWM-NJ-HUD-109	New Jersey	Hudson	40.716494	–74.033564	10.44	10/30/2012	No
HWM-NJ-HUD-110	New Jersey	Hudson	40.735639	–74.028461	10.60	10/30/2012	No
HWM-NJ-HUD-420	New Jersey	Hudson	40.759944	–74.024778	10.34	10/30/2012	Yes
HWM-NJ-HUD-421	New Jersey	Hudson	40.782783	–74.004975	10.08	10/30/2012	Yes
HWM-NJ-HUD-422	New Jersey	Hudson	40.796131	–73.993186	9.79	10/30/2012	Yes
HWM-NJ-HUD-424	New Jersey	Hudson	40.801047	–74.064658	8.25	10/30/2012	Yes
HWM-NJ-HUD-425	New Jersey	Hudson	40.775139	–74.086719	8.72	10/30/2012	Yes
HWM-NJ-HUD-426	New Jersey	Hudson	40.760967	–74.088814	9.20	10/30/2012	Yes
HWM-NJ-MID-100	New Jersey	Middlesex	40.461606	–74.256949	12.94	10/29/2012	Yes
HWM-NJ-MID-101	New Jersey	Middlesex	40.457899	–74.244733	15.77	10/29/2012	Yes
HWM-NJ-MID-150	New Jersey	Middlesex	40.600506	–74.238103	12.18	10/29/2012	No
HWM-NJ-MID-203	New Jersey	Middlesex	40.500586	–74.299872	13.36	10/29/2012	Yes
HWM-NJ-MID-204	New Jersey	Middlesex	40.509939	–74.288275	12.86	10/29/2012	No
HWM-NJ-MID-205	New Jersey	Middlesex	40.509297	–74.261783	12.73	10/29/2012	No
HWM-NJ-MID-206	New Jersey	Middlesex	40.535858	–74.262197	12.48	10/29/2012	No
HWM-NJ-MID-210	New Jersey	Middlesex	40.571411	–74.217667	12.27	10/30/2012	No
HWM-NJ-MID-224	New Jersey	Middlesex	40.462200	–74.002680	11.06	10/30/2012	No
HWM-NJ-MID-225	New Jersey	Middlesex	40.416500	–74.362380	11.88	10/29/2012	No
HWM-NJ-MID-226	New Jersey	Middlesex	40.452000	–74.379290	12.83	10/29/2012	No
HWM-NJ-MID-402	New Jersey	Middlesex	40.476661	–74.353783	13.34	10/29/2012	No
HWM-NJ-MID-403	New Jersey	Middlesex	40.491594	–74.316881	12.74	10/29/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NJ-MID-404	New Jersey	Middlesex	40.501011	–74.276553	13.62	10/29/2012	No
HWM-NJ-MID-405	New Jersey	Middlesex	40.485272	–74.277331	13.28	10/29/2012	No
HWM-NJ-MID-406	New Jersey	Middlesex	40.461600	–74.256953	13.13	10/29/2012	Yes
HWM-NJ-MID-407	New Jersey	Middlesex	40.452683	–74.242050	13.59	10/29/2012	No
HWM-NJ-MID-408	New Jersey	Middlesex	40.444533	–74.231239	12.82	10/29/2012	No
HWM-NJ-MID-409	New Jersey	Middlesex	40.443922	–74.231144	13.00	10/29/2012	Yes
HWM-NJ-MON-100	New Jersey	Monmouth	40.316123	–73.980033	11.49	10/30/2012	Yes
HWM-NJ-MON-101	New Jersey	Monmouth	40.306867	–73.978439	18.98	10/30/2012	Yes
HWM-NJ-MON-102	New Jersey	Monmouth	40.275984	–73.984877	17.42	10/30/2012	Yes
HWM-NJ-MON-103	New Jersey	Monmouth	40.276211	–73.985726	14.63	10/30/2012	Yes
HWM-NJ-MON-104	New Jersey	Monmouth	40.257000	–73.991972	13.68	10/30/2012	Yes
HWM-NJ-MON-105	New Jersey	Monmouth	40.231993	–74.008746	10.32	10/30/2012	Yes
HWM-NJ-MON-106	New Jersey	Monmouth	40.227611	–73.999690	11.58	10/30/2012	Yes
HWM-NJ-MON-107	New Jersey	Monmouth	40.214689	–74.013093	10.51	10/30/2012	Yes
HWM-NJ-MON-108	New Jersey	Monmouth	40.207182	–74.012808	11.13	10/30/2012	Yes
HWM-NJ-MON-109	New Jersey	Monmouth	40.196067	–74.020323	11.87	10/30/2012	Yes
HWM-NJ-MON-110	New Jersey	Monmouth	40.188668	–74.059438	11.05	10/30/2012	Yes
HWM-NJ-MON-111	New Jersey	Monmouth	40.172185	–74.018682	11.96	10/30/2012	Yes
HWM-NJ-MON-112	New Jersey	Monmouth	40.143757	–74.029133	9.10	10/30/2012	Yes
HWM-NJ-MON-113	New Jersey	Monmouth	40.140938	–74.042059	9.05	10/30/2012	Yes
HWM-NJ-MON-114	New Jersey	Monmouth	40.137826	–74.109873	9.38	10/30/2012	Yes
HWM-NJ-MON-116	New Jersey	Monmouth	40.450971	–74.174209	12.49	10/30/2012	No
HWM-NJ-MON-117	New Jersey	Monmouth	40.448188	–74.142222	5.14	10/30/2012	No
HWM-NJ-MON-118	New Jersey	Monmouth	40.351754	–74.069873	11.22	10/30/2012	Yes
HWM-NJ-MON-119	New Jersey	Monmouth	40.377760	–74.011914	10.91	10/30/2012	No
HWM-NJ-MON-120	New Jersey	Monmouth	40.387966	–74.016724	15.08	10/30/2012	Yes
HWM-NJ-MON-121	New Jersey	Monmouth	40.311851	–74.005933	9.61	10/30/2012	No
HWM-NJ-MON-122	New Jersey	Monmouth	40.373442	–73.974661	10.59	10/30/2012	No
HWM-NJ-MON-123	New Jersey	Monmouth	40.397101	–73.976772	10.94	10/30/2012	No
HWM-NJ-MON-124	New Jersey	Monmouth	40.470936	–74.011128	11.57	10/30/2012	No
HWM-NJ-MON-200	New Jersey	Monmouth	40.353370	–74.085630	11.20	10/30/2012	Yes
HWM-NJ-MON-201	New Jersey	Monmouth	40.357130	–74.077920	11.34	10/30/2012	Yes
HWM-NJ-MON-202	New Jersey	Monmouth	40.404640	–73.994150	10.98	10/30/2012	No
HWM-NJ-MON-203	New Jersey	Monmouth	40.400200	–73.982920	10.90	10/30/2012	No
HWM-NJ-MON-204	New Jersey	Monmouth	40.400110	–73.983150	11.11	10/30/2012	No
HWM-NJ-MON-205	New Jersey	Monmouth	40.400270	–73.983020	10.98	10/30/2012	No
HWM-NJ-MON-206	New Jersey	Monmouth	40.400360	–73.983200	10.56	10/30/2012	No
HWM-NJ-MON-207	New Jersey	Monmouth	40.362600	–73.974240	9.96	10/30/2012	No
HWM-NJ-MON-208	New Jersey	Monmouth	40.362730	–73.974330	10.16	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NJ-MON-209	New Jersey	Monmouth	40.357530	–73.973660	10.14	10/30/2012	No
HWM-NJ-MON-210	New Jersey	Monmouth	40.416790	–74.039340	11.68	10/30/2012	Yes
HWM-NJ-MON-211	New Jersey	Monmouth	40.422590	–74.096710	9.63	10/30/2012	No
HWM-NJ-MON-212	New Jersey	Monmouth	40.422510	–74.059320	11.71	10/30/2012	No
HWM-NJ-MON-213	New Jersey	Monmouth	40.432390	–74.113100	11.66	10/30/2012	No
HWM-NJ-MON-214	New Jersey	Monmouth	40.442464	–74.136228	5.22	10/30/2012	No
HWM-NJ-MON-215	New Jersey	Monmouth	40.447297	–74.146589	5.12	10/30/2012	No
HWM-NJ-MON-216	New Jersey	Monmouth	40.442903	–74.159472	11.99	10/30/2012	No
HWM-NJ-MON-217	New Jersey	Monmouth	40.446467	–74.163189	13.03	10/30/2012	No
HWM-NJ-MON-218	New Jersey	Monmouth	40.445394	–74.209531	14.47	10/30/2012	No
HWM-NJ-MON-219	New Jersey	Monmouth	40.445417	–74.209389	14.50	10/30/2012	No
HWM-NJ-MON-220	New Jersey	Monmouth	40.447194	–74.223417	13.37	10/30/2012	No
HWM-NJ-MON-223	New Jersey	Monmouth	40.441720	–74.227450	12.97	10/30/2012	No
HWM-NJ-MON-314	New Jersey	Monmouth	40.340790	–73.975040	9.47	10/30/2012	No
HWM-NJ-MON-315	New Jersey	Monmouth	40.313620	–73.999520	9.59	10/30/2012	No
HWM-NJ-MON-316	New Jersey	Monmouth	40.334050	–74.029390	9.69	10/30/2012	No
HWM-NJ-MON-317	New Jersey	Monmouth	40.333790	–74.029390	9.74	10/30/2012	No
HWM-NJ-MON-357	New Jersey	Monmouth	40.123881	–74.042886	10.06	10/30/2012	No
HWM-NJ-MON-359	New Jersey	Monmouth	40.117922	–74.038225	9.44	10/30/2012	No
HWM-NJ-MON-361	New Jersey	Monmouth	40.111925	–74.048942	11.96	10/30/2012	No
HWM-NJ-MON-363	New Jersey	Monmouth	40.105747	–74.053700	9.28	10/30/2012	No
HWM-NJ-MON-365	New Jersey	Monmouth	40.099828	–74.051328	8.74	10/30/2012	No
HWM-NJ-OCE-228	New Jersey	Ocean	40.072790	–74.044340	6.83	10/30/2012	No
HWM-NJ-OCE-229	New Jersey	Ocean	40.068210	–74.056650	6.38	10/30/2012	No
HWM-NJ-OCE-302	New Jersey	Ocean	39.765667	–74.200861	4.42	10/30/2012	No
HWM-NJ-OCE-306	New Jersey	Ocean	39.791978	–74.182814	7.33	10/30/2012	No
HWM-NJ-OCE-309	New Jersey	Ocean	39.828322	–74.184544	5.83	10/30/2012	No
HWM-NJ-OCE-312	New Jersey	Ocean	39.835583	–74.194333	5.96	10/30/2012	Yes
HWM-NJ-OCE-314	New Jersey	Ocean	39.907622	–74.126872	5.26	10/30/2012	No
HWM-NJ-OCE-319	New Jersey	Ocean	39.707936	–74.136458	5.17	10/30/2012	No
HWM-NJ-OCE-321	New Jersey	Ocean	39.761131	–74.110119	5.31	10/30/2012	No
HWM-NJ-OCE-323	New Jersey	Ocean	39.929856	–74.140625	6.51	10/30/2012	No
HWM-NJ-OCE-325	New Jersey	Ocean	39.940303	–74.166767	6.69	10/30/2012	Yes
HWM-NJ-OCE-328	New Jersey	Ocean	39.913600	–74.084258	6.32	10/30/2012	No
HWM-NJ-OCE-330	New Jersey	Ocean	39.921250	–74.080150	6.22	10/30/2012	No
HWM-NJ-OCE-332	New Jersey	Ocean	39.988308	–74.070836	6.85	10/30/2012	No
HWM-NJ-OCE-334	New Jersey	Ocean	39.958847	–74.072847	8.74	10/30/2012	No
HWM-NJ-OCE-336	New Jersey	Ocean	40.036619	–74.051733	6.98	10/30/2012	No
HWM-NJ-OCE-338	New Jersey	Ocean	40.056600	–74.110200	7.00	10/30/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NJ-OCE-345	New Jersey	Ocean	40.018914	–74.145053	7.25	10/30/2012	Yes
HWM-NJ-OCE-347	New Jersey	Ocean	40.059575	–74.092192	7.11	10/30/2012	No
HWM-NJ-OCE-349	New Jersey	Ocean	40.069203	–74.058569	6.08	10/30/2012	Yes
HWM-NJ-OCE-352	New Jersey	Ocean	40.082714	–74.066747	6.43	10/30/2012	Yes
HWM-NJ-OCE-355	New Jersey	Ocean	40.095386	–74.086203	9.53	10/30/2012	No
HWM-NJ-OCE-371	New Jersey	Ocean	39.640269	–74.189358	5.52	10/30/2012	No
HWM-NJ-OCE-373	New Jersey	Ocean	39.607069	–74.206394	7.72	10/30/2012	No
HWM-NJ-OCE-375	New Jersey	Ocean	39.579567	–74.228283	7.44	10/30/2012	No
HWM-NJ-OCE-377	New Jersey	Ocean	39.542631	–74.255950	7.89	10/29/2012	No
HWM-NJ-OCE-379	New Jersey	Ocean	39.669894	–74.160164	5.62	10/30/2012	No
HWM-NJ-OCE-382	New Jersey	Ocean	39.669181	–74.222714	7.48	10/30/2012	No
HWM-NJ-OCE-384	New Jersey	Ocean	39.637886	–74.304697	4.85	10/29/2012	No
HWM-NJ-OCE-386	New Jersey	Ocean	39.599992	–74.340061	8.04	10/29/2012	No
HWM-NJ-OCE-388	New Jersey	Ocean	39.602153	–74.342489	8.06	10/29/2012	Yes
HWM-NJ-OCE-390	New Jersey	Ocean	39.579833	–74.332844	7.80	10/29/2012	No
HWM-NJ-OCE-392	New Jersey	Ocean	39.591936	–74.346200	7.89	10/29/2012	No
HWM-NJ-OCE-394	New Jersey	Ocean	39.551139	–74.374883	8.46	10/29/2012	No
HWM-NJ-SOM-212	New Jersey	Somerset	40.541364	–74.514308	13.83	10/29/2012	Yes
HWM-NJ-UNI-207	New Jersey	Union	40.642458	–74.198214	11.71	10/30/2012	No
HWM-NJ-UNI-208	New Jersey	Union	40.639286	–74.210378	11.93	10/30/2012	No
HWM-NJ-UNI-209	New Jersey	Union	40.600606	–74.209358	12.09	10/30/2012	No
HWM-NY-ALB-006	New York	Albany	42.473306	–73.790500	10.23	10/30/2012	Yes
HWM-NY-ALB-007	New York	Albany	42.473444	–73.790500	10.01	10/30/2012	Yes
HWM-NY-ALB-009	New York	Albany	42.746840	–73.689360	10.63	10/30/2012	Yes
HWM-NY-ALB-010	New York	Albany	42.747400	–73.689240	10.67	10/30/2012	Yes
HWM-NY-BRO-804	New York	Bronx	40.842800	–73.929000	9.68	10/30/2012	No
HWM-NY-BRO-805	New York	Bronx	40.823000	–73.932200	9.89	10/30/2012	No
HWM-NY-BRO-807	New York	Bronx	40.804700	–73.902300	10.61	10/30/2012	No
HWM-NY-BRO-808	New York	Bronx	40.807000	–73.870000	10.34	10/30/2012	Yes
HWM-NY-BRO-809	New York	Bronx	40.815400	–73.838600	10.68	10/30/2012	Yes
HWM-NY-BRO-810	New York	Bronx	40.809200	–73.803700	10.42	10/30/2012	Yes
HWM-NY-BRO-811	New York	Bronx	40.864700	–73.802000	10.22	10/30/2012	Yes
HWM-NY-COL-001	New York	Columbia	42.528667	–73.757333	9.96	10/30/2012	No
HWM-NY-COL-003	New York	Columbia	42.528694	–73.757864	10.09	10/30/2012	No
HWM-NY-COL-004	New York	Columbia	42.528917	–73.758639	9.87	10/30/2012	Yes
HWM-NY-DUT-001	New York	Dutchess	41.706670	–73.940130	9.02	10/30/2012	No
HWM-NY-DUT-002	New York	Dutchess	41.706990	–73.940000	8.96	10/30/2012	No
HWM-NY-DUT-003	New York	Dutchess	41.708740	–73.939260	9.10	10/30/2012	No
HWM-NY-DUT-004	New York	Dutchess	41.708650	–73.939200	9.07	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-DUT-005	New York	Dutchess	41.708530	–73.939470	9.03	10/30/2012	No
HWM-NY-DUT-006	New York	Dutchess	41.651650	–73.943530	9.10	10/30/2012	No
HWM-NY-DUT-007	New York	Dutchess	41.651720	–73.943630	9.06	10/30/2012	No
HWM-NY-GRE-001	New York	Greene	42.348167	–73.792389	9.64	10/30/2012	No
HWM-NY-GRE-002	New York	Greene	42.348139	–73.792472	9.65	10/30/2012	No
HWM-NY-GRE-003	New York	Greene	42.347861	–73.792556	9.23	10/30/2012	Yes
HWM-NY-GRE-004	New York	Greene	42.263050	–73.806390	9.53	10/30/2012	No
HWM-NY-GRE-005	New York	Greene	42.262870	–73.806640	9.51	10/30/2012	No
HWM-NY-GRE-006	New York	Greene	42.262460	–73.806280	9.53	10/30/2012	No
HWM-NY-GRE-007	New York	Greene	42.263332	–73.806400	9.51	10/30/2012	No
HWM-NY-GRE-008	New York	Greene	42.210360	–73.854090	8.49	10/30/2012	No
HWM-NY-GRE-009	New York	Greene	42.210340	–73.853790	9.63	10/30/2012	No
HWM-NY-GRE-010	New York	Greene	42.210270	–73.854360	9.46	10/30/2012	No
HWM-NY-GRE-011	New York	Greene	42.210430	–73.854380	9.58	10/30/2012	No
HWM-NY-GRE-012	New York	Greene	42.210460	–73.854300	9.61	10/30/2012	No
HWM-NY-KIN-001	New York	Kings	40.640762	–74.035637	11.32	10/30/2012	No
HWM-NY-KIN-002	New York	Kings	40.716365	–73.924915	10.91	10/30/2012	No
HWM-NY-KIN-003	New York	Kings	40.644537	–73.888147	11.03	10/30/2012	No
HWM-NY-KIN-504	New York	Kings	40.703960	–73.990490	11.31	10/30/2012	No
HWM-NY-KIN-510	New York	Kings	40.718870	–73.965240	11.24	10/30/2012	No
HWM-NY-KIN-511	New York	Kings	40.668790	–74.009560	11.24	10/30/2012	No
HWM-NY-KIN-604	New York	Kings	40.703999	–73.989436	10.98	10/30/2012	No
HWM-NY-KIN-605	New York	Kings	40.703999	–73.989436	10.9	10/30/12	Yes
HWM-NY-KIN-715	New York	Kings	40.579410	–74.011175	12.37	10/29/2012	No
HWM-NY-KIN-724	New York	Kings	40.665240	–74.012695	11.27	10/29/2012	No
HWM-NY-KIN-725	New York	Kings	40.675411	–73.990992	9.83	10/29/2012	No
HWM-NY-KIN-900	New York	Kings	40.667252	–74.000014	10.99	10/30/2012	Yes
HWM-NY-KIN-901	New York	Kings	40.661113	–74.005562	11.18	10/30/2012	No
HWM-NY-KIN-902	New York	Kings	40.655825	–74.016189	11.49	10/30/2012	No
HWM-NY-KIN-903	New York	Kings	40.610890	–74.036290	12.93	10/30/2012	Yes
HWM-NY-KIN-904	New York	Kings	40.595190	–74.000070	11.48	10/30/2012	No
HWM-NY-KIN-905	New York	Kings	40.580190	–73.997920	11.46	10/30/2012	Yes
HWM-NY-KIN-906	New York	Kings	40.589401	–73.926072	10.86	10/30/2012	No
HWM-NY-KIN-908	New York	Kings	40.607430	–73.896260	11.24	10/30/2012	No
HWM-NY-KIN-909	New York	Kings	40.659480	–73.863700	10.00	10/30/2012	No
HWM-NY-NAS-001	New York	Nassau	40.610833	–73.715	9.78	10/30/2012	Yes
HWM-NY-NAS-220	New York	Nassau	40.587052	–73.734675	12.72	10/30/2012	No
HWM-NY-NAS-221	New York	Nassau	40.586188	–73.710984	10.62	10/30/2012	No
HWM-NY-NAS-222	New York	Nassau	40.589579	–73.612328	10.23	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-NAS-223	New York	Nassau	40.592280	–73.577121	9.27	10/30/2012	No
HWM-NY-NAS-224	New York	Nassau	40.601130	–73.503740	8.02	10/30/2012	No
HWM-NY-NAS-225	New York	Nassau	40.589670	–73.554440	8.73	10/30/2012	No
HWM-NY-NAS-416	New York	Nassau	40.653800	–73.458800	7.92	10/29/2012	No
HWM-NY-NAS-501	New York	Nassau	40.877500	–73.530170	9.82	10/30/2012	No
HWM-NY-NAS-502	New York	Nassau	40.875934	–73.536587	10.14	10/30/2012	No
HWM-NY-NAS-512	New York	Nassau	40.795200	–73.753200	10.22	10/30/2012	Yes
HWM-NY-NAS-513	New York	Nassau	40.814180	–73.764140	10.80	10/30/2012	Yes
HWM-NY-NAS-514	New York	Nassau	40.833820	–73.755180	15.60	10/30/2012	Yes
HWM-NY-NAS-516	New York	Nassau	40.817640	–73.718720	9.74	10/30/2012	Yes
HWM-NY-NAS-517	New York	Nassau	40.821080	–73.704260	9.96	10/30/2012	No
HWM-NY-NAS-518	New York	Nassau	40.834970	–73.728700	10.84	10/30/2012	Yes
HWM-NY-NAS-519	New York	Nassau	40.827750	–73.656760	10.37	10/30/2012	Yes
HWM-NY-NAS-700	New York	Nassau	40.887500	–73.563611	10.2	10/30/12	No
HWM-NY-NAS-707	New York	Nassau	40.583975	–73.640810	10.67	10/30/2012	Yes
HWM-NY-NAS-708	New York	Nassau	40.590756	–73.643275	9.29	10/30/2012	No
HWM-NY-NAS-709	New York	Nassau	40.593280	–73.668890	8.73	10/30/2012	No
HWM-NY-NAS-710	New York	Nassau	40.585012	–73.668421	11.58	10/30/2012	No
HWM-NY-NAS-711	New York	Nassau	40.584373	–73.686437	9.68	10/30/2012	No
HWM-NY-NAS-712	New York	Nassau	40.591853	–73.680873	9.48	10/30/2012	No
HWM-NY-NAS-901	New York	Nassau	40.659050	–73.426800	7.53	10/29/2012	No
HWM-NY-NAS-902	New York	Nassau	40.662490	–73.446570	7.72	10/29/2012	No
HWM-NY-NAS-903	New York	Nassau	40.653870	–73.460980	7.96	10/30/2012	No
HWM-NY-NAS-904	New York	Nassau	40.664780	–73.471360	8.36	10/30/2012	No
HWM-NY-NAS-905	New York	Nassau	40.658280	–73.495560	5.04	10/30/2012	No
HWM-NY-NAS-906	New York	Nassau	40.658280	–73.504840	7.94	10/30/2012	Yes
HWM-NY-NAS-907	New York	Nassau	40.648790	–73.516240	8.54	10/29/2012	No
HWM-NY-NAS-908	New York	Nassau	40.660160	–73.529120	8.56	10/29/2012	No
HWM-NY-NAS-909	New York	Nassau	40.650540	–73.727460	8.84	10/30/2012	No
HWM-NY-NAS-910	New York	Nassau	40.625860	–73.748890	10.37	10/30/2012	No
HWM-NY-NAS-911	New York	Nassau	40.617100	–73.756650	10.22	10/30/2012	No
HWM-NY-NAS-912	New York	Nassau	40.605480	–73.731970	9.78	10/29/2012	No
HWM-NY-NAS-913	New York	Nassau	40.609130	–73.715280	9.99	10/29/2012	Yes
HWM-NY-NAS-914	New York	Nassau	40.620150	–73.706430	10.07	10/29/2012	No
HWM-NY-NAS-915	New York	Nassau	40.634590	–73.669640	9.59	10/29/2012	No
HWM-NY-NAS-916	New York	Nassau	40.641520	–73.659650	8.52	10/29/2012	No
HWM-NY-NAS-917	New York	Nassau	40.622231	–73.647320	9.44	10/29/2012	No
HWM-NY-NAS-918	New York	Nassau	40.630710	–73.631310	9.40	10/29/2012	No
HWM-NY-NAS-919	New York	Nassau	40.630210	–73.613090	9.27	10/29/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-NAS-920	New York	Nassau	40.640010	–73.595710	9.24	10/29/2012	No
HWM-NY-NAS-921	New York	Nassau	40.632290	–73.582860	9.03	10/29/2012	No
HWM-NY-NAS-922	New York	Nassau	40.647600	–73.553890	8.44	10/29/2012	No
HWM-NY-NAS-923	New York	Nassau	40.857222	–73.463333	9.71	10/30/2012	No
HWM-NY-NAS-924	New York	Nassau	40.867830	–73.472800	9.95	10/30/2012	Yes
HWM-NY-NAS-925	New York	Nassau	40.871990	–73.503560	10.15	10/30/2012	No
HWM-NY-NAS-926	New York	Nassau	40.888950	–73.509220	9.80	10/30/2012	Yes
HWM-NY-NAS-927	New York	Nassau	40.876150	–73.487670	9.45	10/29/2012	No
HWM-NY-NAS-928	New York	Nassau	40.873410	–73.516690	10.01	10/30/2012	No
HWM-NY-NAS-929	New York	Nassau	40.882390	–73.545980	9.60	10/30/2012	No
HWM-NY-NAS-930	New York	Nassau	40.905150	–73.543330	10.04	10/30/2012	Yes
HWM-NY-NAS-931	New York	Nassau	40.914130	–73.526020	9.80	10/30/2012	Yes
HWM-NY-NAS-932	New York	Nassau	40.903360	–73.512290	9.70	10/30/2012	No
HWM-NY-NAS-933	New York	Nassau	40.886250	–73.532460	10.00	10/30/2012	No
HWM-NY-NAS-934	New York	Nassau	40.910380	–73.539870	8.12	10/30/2012	No
HWM-NY-NAS-935	New York	Nassau	40.910840	–73.558110	11.06	10/30/2012	No
HWM-NY-NAS-936	New York	Nassau	40.908160	–73.581570	10.36	10/30/2012	No
HWM-NY-NAS-938	New York	Nassau	40.891520	–73.635660	9.98	10/30/2012	No
HWM-NY-NAS-939	New York	Nassau	40.899390	–73.627460	9.86	10/30/2012	No
HWM-NY-NAS-940	New York	Nassau	40.804710	–73.649630	10.18	10/30/2012	No
HWM-NY-NAS-941	New York	Nassau	40.823580	–73.646580	10.16	10/30/2012	No
HWM-NY-NAS-942	New York	Nassau	40.851120	–73.650460	10.87	10/30/2012	Yes
HWM-NY-NAS-954	New York	Nassau	40.610200	–73.430050	7.07	10/29/2012	No
HWM-NY-NAS-955	New York	Nassau	40.620210	–73.559730	8.67	10/29/2012	Yes
HWM-NY-NAS-964	New York	Nassau	40.896776	–73.605596	7.72	10/30/2012	No
HWM-NY-NEW-001	New York	New York	40.7776	–73.9425	10.43	10/30/2012	Yes
HWM-NY-NEW-002	New York	New York	40.828	–73.9542	9.54	10/30/2012	Yes
HWM-NY-NEW-003	New York	New York	40.7407	–74.0117	12.26	10/30/2012	Yes
HWM-NY-NEW-004	New York	New York	40.76312	–74.00047	10.35	10/30/2012	Yes
HWM-NY-NEW-005	New York	New York	40.74013	–73.97328	10.81	10/30/2012	Yes
HWM-NY-NEW-008	New York	New York	40.69035	–74.04692	11.29	10/30/2012	No
HWM-NY-NEW-009	New York	New York	40.68971	–74.04387	11.37	10/30/2012	Yes
HWM-NY-NEW-010	New York	New York	40.69912	–73.03992	11.11	10/30/2012	No
HWM-NY-NEW-011	New York	New York	40.69938	–74.03867	11.10	10/30/2012	Yes
HWM-NY-NEW-012	New York	New York	40.69086	–74.01246	10.99	10/30/2012	No
HWM-NY-NEW-013	New York	New York	40.68527	–74.02489	11.22	10/30/2012	No
HWM-NY-NEW-100	New York	New York	40.701100	–74.015600	11.55	10/30/2012	No
HWM-NY-NEW-101	New York	New York	40.701100	–74.015000	11.37	10/30/2012	No
HWM-NY-NEW-102	New York	New York	40.704400	–74.016900	10.02	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-NEW-103	New York	New York	40.704400	–74.016700	10.99	10/30/2012	No
HWM-NY-NEW-104	New York	New York	40.703100	–74.006900	11.29	10/30/2012	No
HWM-NY-NEW-105	New York	New York	40.705000	–74.006700	11.07	10/30/2012	No
HWM-NY-NEW-106	New York	New York	40.705000	–74.006700	11.15	10/30/2012	No
HWM-NY-NEW-107	New York	New York	40.705000	–74.006400	11.23	10/30/2012	No
HWM-NY-NEW-108	New York	New York	40.7078	–74.0039	11.07	10/30/2012	No
HWM-NY-NEW-109	New York	New York	40.7078	–74.0011	11.04	10/30/2012	No
HWM-NY-NEW-110	New York	New York	40.7078	–74.0022	11.12	10/30/2012	No
HWM-NY-NEW-111	New York	New York	40.7078	–74.0022	11.05	10/30/2012	No
HWM-NY-NEW-112	New York	New York	40.7097	–73.9953	11.15	10/30/2012	No
HWM-NY-NEW-113	New York	New York	40.710800	–73.978100	11.18	10/30/2012	Yes
HWM-NY-NEW-114	New York	New York	40.710800	–73.978100	10.86	10/30/2012	Yes
HWM-NY-NEW-115	New York	New York	40.710800	–73.978100	10.86	10/30/2012	No
HWM-NY-NEW-116	New York	New York	40.711100	–73.977200	10.87	10/30/2012	Yes
HWM-NY-NEW-117	New York	New York	40.711100	–73.977200	10.87	10/30/2012	Yes
HWM-NY-NEW-118	New York	New York	40.711100	–73.977200	10.96	10/30/2012	Yes
HWM-NY-NEW-119	New York	New York	40.711100	–73.977200	10.92	10/30/2012	Yes
HWM-NY-NEW-120	New York	New York	40.7164	–74.0161	10.88	10/30/2012	Yes
HWM-NY-NEW-121	New York	New York	40.7164	–74.0167	10.87	10/30/2012	Yes
HWM-NY-NEW-122	New York	New York	40.7181	–74.0147	11.33	10/30/2012	Yes
HWM-NY-NEW-123	New York	New York	40.7183	–74.015	11.05	10/30/2012	Yes
HWM-NY-NEW-124	New York	New York	40.7169	–74.0119	10.85	10/30/2012	No
HWM-NY-NEW-125	New York	New York	40.7169	–74.0125	10.56	10/30/2012	No
HWM-NY-NEW-126	New York	New York	40.7164	–74.0136	9.76	10/30/2012	No
HWM-NY-NEW-127	New York	New York	40.7131	–74.0139	9.67	10/30/2012	No
HWM-NY-NEW-128	New York	New York	40.720800	–74.011400	10.79	10/30/2012	No
HWM-NY-NEW-802	New York	New York	40.877000	–73.926000	9.53	10/30/2012	Yes
HWM-NY-NEW-803	New York	New York	40.868000	–73.911900	9.00	10/30/2012	No
HWM-NY-NEW-806	New York	New York	40.796600	–73.915500	11.13	10/30/2012	Yes
HWM-NY-NEW-981	New York	New York	40.800589	–73.926474	10.31	10/30/2012	No
HWM-NY-ORA-001	New York	Orange	41.502450	–74.005050	8.94	10/30/2012	No
HWM-NY-ORA-002	New York	Orange	41.504180	–74.004800	8.94	10/30/2012	No
HWM-NY-ORA-003	New York	Orange	41.504640	–74.005160	8.96	10/30/2012	No
HWM-NY-ORA-004	New York	Orange	41.383330	–73.955550	8.64	10/30/2012	No
HWM-NY-QUE-001	New York	Queens	40.715556	–73.920556	10.88	10/30/2012	No
HWM-NY-QUE-006	New York	Queens	40.74922	–73.840718	7.77	10/30/2012	Yes
HWM-NY-QUE-007	New York	Queens	40.59296	–73.79644	10.68	10/30/2012	Yes
HWM-NY-QUE-501	New York	Queens	40.779940	–73.749180	10.31	10/30/2012	No
HWM-NY-QUE-502	New York	Queens	40.779940	–73.749180	10.31	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-QUE-503	New York	Queens	40.792840	–73.849290	10.12	10/30/2012	Yes
HWM-NY-QUE-505	New York	Queens	40.741690	–73.959040	10.72	10/30/2012	No
HWM-NY-QUE-506	New York	Queens	40.772270	–73.936000	10.93	10/30/2012	No
HWM-NY-QUE-507	New York	Queens	40.661550	–73.844390	10.92	10/30/2012	No
HWM-NY-QUE-508	New York	Queens	40.652670	–73.842220	10.79	10/30/2012	No
HWM-NY-QUE-509	New York	Queens	40.786150	–73.915310	10.45	10/30/2012	Yes
HWM-NY-QUE-520	New York	Queens	40.796445	–73.828987	10.84	10/30/2012	Yes
HWM-NY-QUE-521	New York	Queens	40.793508	–73.780571	10.56	10/30/2012	Yes
HWM-NY-QUE-603	New York	Queens	40.759741	–73.848639	10.48	10/30/2012	Yes
HWM-NY-QUE-713	New York	Queens	40.616594	–73.825473	10.33	10/29/2012	Yes
HWM-NY-QUE-714	New York	Queens	40.605867	–73.822038	10.30	10/29/2012	No
HWM-NY-QUE-726	New York	Queens	40.567790	–73.882467	10.53	10/30/2012	Yes
HWM-NY-QUE-727	New York	Queens	40.565367	–73.883311	10.80	10/30/2012	Yes
HWM-NY-QUE-728	New York	Queens	40.561111	–73.914311	10.71	10/29/2012	No
HWM-NY-QUE-729	New York	Queens	40.555324	–73.925291	12.74	10/30/2012	No
HWM-NY-QUE-730	New York	Queens	40.576315	–73.859819	11.16	10/30/2012	No
HWM-NY-QUE-731	New York	Queens	40.582427	–73.834500	10.30	10/30/2012	No
HWM-NY-QUE-732	New York	Queens	40.595119	–73.741392	8.95	10/30/2012	No
HWM-NY-QUE-907	New York	Queens	40.567040	–73.882830	10.96	10/30/2012	No
HWM-NY-QUE-910	New York	Queens	40.63739	–73.74588	10.59	10/30/2012	No
HWM-NY-RIC-001	New York	Richmond	40.592439	–74.166304	12.25	10/30/2012	
HWM-NY-RIC-701	New York	Richmond	40.582220	–74.098510	12.45	10/30/2012	No
HWM-NY-RIC-702	New York	Richmond	40.502420	–74.253880	13.12	10/30/2012	Yes
HWM-NY-RIC-703	New York	Richmond	40.499650	–74.241200	13.21	10/29/2012	No
HWM-NY-RIC-704	New York	Richmond	40.502354	–74.231087	13.2	10/29/12	Yes
HWM-NY-RIC-705	New York	Richmond	40.515440	–74.194440	12.99	10/30/2012	Yes
HWM-NY-RIC-706	New York	Richmond	40.539349	–74.143728	9.75	10/30/2012	Yes
HWM-NY-RIC-716	New York	Richmond	40.511529	–74.210355	13.05	10/30/2012	No
HWM-NY-RIC-717	New York	Richmond	40.528442	–74.158873	16.92	10/30/2012	Yes
HWM-NY-RIC-718	New York	Richmond	40.555259	–74.116615	12.50	10/30/2012	No
HWM-NY-RIC-719	New York	Richmond	40.593864	–74.068290	12.74	10/30/2012	No
HWM-NY-RIC-720	New York	Richmond	40.615638	–74.063051	15.31	10/30/2012	Yes
HWM-NY-RIC-721	New York	Richmond	40.637715	–74.073863	11.71	10/30/2012	Yes
HWM-NY-RIC-722	New York	Richmond	40.646789	–74.089546	11.67	10/30/2012	Yes
HWM-NY-RIC-723	New York	Richmond	40.641166	–74.135947	11.47	10/30/2012	Yes
HWM-NY-RIC-982	New York	Richmond	40.545830	–74.123830	13.99	10/30/2012	Yes
HWM-NY-ROC-001	New York	Rockland	41.230120	–73.976850	10.27	10/30/2012	Yes
HWM-NY-ROC-002	New York	Rockland	41.230090	–73.976850	9.41	10/30/2012	No
HWM-NY-ROC-003	New York	Rockland	41.230060	–73.976780	8.56	10/30/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-ROC-004	New York	Rockland	41.229900	–73.976880	9.44	10/30/2012	No
HWM-NY-ROC-005	New York	Rockland	41.229890	–73.976970	11.12	10/30/2012	Yes
HWM-NY-ROC-006	New York	Rockland	41.043240	–73.896560	9.68	10/30/2012	No
HWM-NY-SUF-001	New York	Suffolk	41.060982	–72.367823	6.58	10/30/2012	Yes
HWM-NY-SUF-002	New York	Suffolk	41.073942	–72.318901	6.21	10/30/2012	No
HWM-NY-SUF-003	New York	Suffolk	40.9325	–72.615556	7.22	10/30/2012	Yes
HWM-NY-SUF-004	New York	Suffolk	40.747598	–73.150391	6.10	10/30/2012	No
HWM-NY-SUF-005	New York	Suffolk	40.965219	–72.771869	9.1	10/29/12	Yes
HWM-NY-SUF-006	New York	Suffolk	40.982486	–72.532892	6.7	10/29/12	Yes
HWM-NY-SUF-300	New York	Suffolk	41.101030	–72.361180	6.36	10/29/2012	Yes
HWM-NY-SUF-301	New York	Suffolk	41.100950	–72.361610	6.42	10/29/2012	No
HWM-NY-SUF-302	New York	Suffolk	41.132470	–72.258640	6.22	10/29/2012	No
HWM-NY-SUF-303	New York	Suffolk	41.143330	–72.312730	5.84	10/29/2012	Yes
HWM-NY-SUF-304	New York	Suffolk	41.143310	–72.312430	6.36	10/29/2012	Yes
HWM-NY-SUF-305	New York	Suffolk	41.130700	–72.328220	6.95	10/29/2012	No
HWM-NY-SUF-306	New York	Suffolk	41.131180	–72.328480	6.02	10/29/2012	No
HWM-NY-SUF-307	New York	Suffolk	40.989800	–72.470770	7.08	10/29/2012	No
HWM-NY-SUF-308	New York	Suffolk	40.915930	–72.637760	8.60	10/29/2012	Yes
HWM-NY-SUF-401	New York	Suffolk	40.747500	–72.854900	5.69	10/30/2012	No
HWM-NY-SUF-402	New York	Suffolk	40.750500	–73.013700	5.82	10/30/2012	No
HWM-NY-SUF-403	New York	Suffolk	40.685300	–73.279900	7.44	10/30/2012	Yes
HWM-NY-SUF-404	New York	Suffolk	40.658911	–73.264775	7.09	10/30/2012	Yes
HWM-NY-SUF-405	New York	Suffolk	40.691200	–73.277200	5.82	10/29/2012	No
HWM-NY-SUF-406	New York	Suffolk	40.705267	–73.252545	5.95	10/29/2012	No
HWM-NY-SUF-407	New York	Suffolk	40.711590	–73.244348	6.06	10/29/2012	No
HWM-NY-SUF-408	New York	Suffolk	40.915000	–72.661700	7.80	10/29/2012	No
HWM-NY-SUF-409	New York	Suffolk	40.904200	–72.619900	7.72	10/30/2012	No
HWM-NY-SUF-410	New York	Suffolk	40.850400	–72.503800	6.61	10/29/2012	No
HWM-NY-SUF-411	New York	Suffolk	40.844800	–72.572500	6.90	10/29/2012	No
HWM-NY-SUF-412	New York	Suffolk	40.818900	–72.624500	6.35	10/30/2012	No
HWM-NY-SUF-413	New York	Suffolk	40.787700	–72.749500	6.32	10/30/2012	No
HWM-NY-SUF-415	New York	Suffolk	40.774100	–72.816100	6.51	10/29/2012	No
HWM-NY-SUF-417	New York	Suffolk	40.663000	–73.413000	7.54	10/29/2012	No
HWM-NY-SUF-418	New York	Suffolk	40.632134	–73.216211	9.43	10/29/2012	No
HWM-NY-SUF-419	New York	Suffolk	40.644000	–73.157000	8.01	10/29/2012	No
HWM-NY-SUF-420	New York	Suffolk	40.634550	–73.203050	4.17	10/29/2012	No
HWM-NY-SUF-421	New York	Suffolk	40.879800	–72.449900	6.57	10/29/2012	No
HWM-NY-SUF-422	New York	Suffolk	40.869000	–72.392000	7.92	10/30/2012	No
HWM-NY-SUF-424	New York	Suffolk	41.006300	–72.035000	5.20	10/29/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-SUF-425	New York	Suffolk	41.072232	–71.934520	5.79	10/29/2012	Yes
HWM-NY-SUF-426	New York	Suffolk	41.050100	–71.956500	5.98	10/29/2012	No
HWM-NY-SUF-427	New York	Suffolk	41.003900	–72.186600	6.06	10/30/2012	No
HWM-NY-SUF-428	New York	Suffolk	41.001000	–72.291000	6.27	10/30/2012	No
HWM-NY-SUF-429	New York	Suffolk	41.013600	–72.303200	6.40	10/30/2012	No
HWM-NY-SUF-430	New York	Suffolk	41.037100	–72.319700	6.45	10/30/2012	No
HWM-NY-SUF-431	New York	Suffolk	40.992900	–72.315500	6.26	10/30/2012	No
HWM-NY-SUF-432	New York	Suffolk	40.993700	–72.362900	6.51	10/30/2012	No
HWM-NY-SUF-433	New York	Suffolk	40.959800	–72.398200	6.53	10/30/2012	No
HWM-NY-SUF-434	New York	Suffolk	40.917200	–72.439500	6.72	10/30/2012	No
HWM-NY-SUF-435	New York	Suffolk	40.897500	–72.469500	6.47	10/29/2012	No
HWM-NY-SUF-436	New York	Suffolk	40.893500	–72.503300	6.28	10/30/2012	No
HWM-NY-SUF-506	New York	Nassau	40.964515	–72.863200	8.30	10/30/2012	Yes
HWM-NY-SUF-507	New York	Nassau	40.964924	–72.863171	8.50	10/30/2012	No
HWM-NY-SUF-508	New York	Nassau	40.945740	–73.071980	8.82	10/30/2012	No
HWM-NY-SUF-509	New York	Nassau	40.945739	–73.071980	8.79	10/30/2012	No
HWM-NY-SUF-510	New York	Nassau	40.951152	–73.029481	8.64	10/30/2012	No
HWM-NY-SUF-511	New York	Suffolk	41.012204	–72.556397	7.75	10/30/2012	No
HWM-NY-SUF-512	New York	Suffolk	40.916171	–72.661192	8.07	10/30/2012	No
HWM-NY-SUF-513	New York	Suffolk	40.916171	–72.661192	8.18	10/30/2012	No
HWM-NY-SUF-514	New York	Suffolk	40.917462	–72.655353	7.85	10/30/2012	No
HWM-NY-SUF-516	New York	Suffolk	40.910104	–72.555428	7.36	10/30/2012	No
HWM-NY-SUF-517	New York	Suffolk	40.900303	–73.353029	9.46	10/30/2012	
HWM-NY-SUF-600	New York	Suffolk	40.74759826	–73.1503912	6.10	10/29/2012	No
HWM-NY-SUF-601	New York	Suffolk	40.922020	–73.443240	9.92	10/29/2012	Yes
HWM-NY-SUF-602	New York	Suffolk	40.907280	–73.483570	9.49	10/29/2012	Yes
HWM-NY-SUF-603	New York	Suffolk	40.897170	–73.434980	9.60	10/29/2012	Yes
HWM-NY-SUF-604	New York	Suffolk	40.905360	–73.402830	9.78	10/29/2012	No
HWM-NY-SUF-605	New York	Suffolk	40.892430	–73.374530	9.63	10/29/2012	No
HWM-NY-SUF-606	New York	Suffolk	40.925930	–73.357100	9.84	10/30/2012	No
HWM-NY-SUF-607	New York	Suffolk	40.954100	–73.398120	9.99	10/30/2012	No
HWM-NY-SUF-608	New York	Suffolk	40.923050	–73.296370	7.85	10/29/2012	No
HWM-NY-SUF-609	New York	Suffolk	40.896970	–73.223640	8.9	10/29/12	Yes
HWM-NY-SUF-610	New York	Suffolk	40.921730	–73.149670	9.22	10/29/2012	No
HWM-NY-SUF-611	New York	Suffolk	40.959010	–73.021410	8.57	10/29/2012	No
HWM-NY-SUF-612	New York	Suffolk	40.987310	–72.615710	7.29	10/29/2012	No
HWM-NY-SUF-613	New York	Suffolk	40.993690	–72.537570	8.79	10/29/2012	No
HWM-NY-SUF-614	New York	Suffolk	41.053460	–72.473090	7.68	10/29/2012	No
HWM-NY-SUF-615	New York	Suffolk	40.803590	–72.750110	6.45	10/30/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-SUF-616	New York	Suffolk	40.785090	–72.798880	6.48	10/30/2012	No
HWM-NY-SUF-617	New York	Suffolk	40.796360	–72.831150	6.73	10/29/2012	No
HWM-NY-SUF-618	New York	Suffolk	40.757870	–72.831100	6.20	10/29/2012	No
HWM-NY-SUF-619	New York	Suffolk	40.743950	–72.882020	4.75	10/29/2012	No
HWM-NY-SUF-620	New York	Suffolk	40.752820	–72.934380	5.62	10/29/2012	No
HWM-NY-SUF-621	New York	Suffolk	40.669420	–73.367860	6.75	10/29/2012	No
HWM-NY-SUF-622	New York	Suffolk	40.678280	–73.333000	6.55	10/29/2012	No
HWM-NY-SUF-623	New York	Suffolk	40.687810	–73.290530	6.17	10/29/2012	Yes
HWM-NY-SUF-626	New York	Suffolk	40.707540	–73.189150	5.71	10/29/2012	Yes
HWM-NY-SUF-627	New York	Suffolk	40.719950	–73.141180	5.54	10/29/2012	Yes
HWM-NY-SUF-628	New York	Suffolk	40.727700	–73.142000	5.80	10/29/2012	No
HWM-NY-SUF-629	New York	Suffolk	40.721880	–73.091450	5.43	10/29/2012	No
HWM-NY-SUF-630	New York	Suffolk	40.729980	–73.063800	5.51	10/29/2012	No
HWM-NY-SUF-631	New York	Suffolk	40.731580	–73.036500	5.57	10/29/2012	No
HWM-NY-SUF-632	New York	Suffolk	40.750410	–72.981370	5.41	10/29/2012	No
HWM-NY-SUF-633	New York	Suffolk	40.799190	–72.697540	5.86	10/29/2012	No
HWM-NY-SUF-634	New York	Suffolk	40.807310	–72.733610	6.48	10/29/2012	Yes
HWM-NY-SUF-635	New York	Suffolk	40.773220	–72.899100	5.23	10/29/2012	No
HWM-NY-SUF-636	New York	Suffolk	40.764510	–72.913860	5.40	10/29/2012	No
HWM-NY-SUF-637	New York	Suffolk	40.790220	–72.662120	6.42	10/29/2012	No
HWM-NY-SUF-638	New York	Suffolk	40.800310	–72.625650	3.47	10/29/2012	No
HWM-NY-SUF-639	New York	Suffolk	40.816900	–72.567600	6.44	10/29/2012	No
HWM-NY-SUF-943	New York	Suffolk	40.858460	–73.210360	8.64	10/29/2012	No
HWM-NY-SUF-944	New York	Suffolk	40.882600	–73.193420	8.92	10/29/2012	No
HWM-NY-SUF-945	New York	Suffolk	40.645520	–73.260590	5.65	10/29/2012	No
HWM-NY-SUF-946	New York	Suffolk	40.641720	–73.253130	5.40	10/29/2012	No
HWM-NY-SUF-948	New York	Suffolk	40.625050	–73.265180	6.40	10/29/2012	No
HWM-NY-SUF-949	New York	Suffolk	40.628190	–73.243330	5.61	10/29/2012	Yes
HWM-NY-SUF-950	New York	Suffolk	40.639770	–73.288160	7.75	10/29/2012	No
HWM-NY-SUF-952	New York	Suffolk	40.620020	–73.392520	8.89	10/29/2012	No
HWM-NY-SUF-953	New York	Suffolk	40.615150	–73.416820	7.51	10/29/2012	No
HWM-NY-SUF-956	New York	Suffolk	40.664810	–73.423320	7.48	10/29/2012	No
HWM-NY-SUF-957	New York	Suffolk	41.119560	–72.336260	6.50	10/29/2012	No
HWM-NY-SUF-958	New York	Suffolk	41.082020	–72.387380	6.42	10/29/2012	No
HWM-NY-SUF-959	New York	Suffolk	41.037090	–72.393470	6.55	10/29/2012	No
HWM-NY-SUF-960	New York	Suffolk	41.037560	–72.427660	6.91	10/29/2012	No
HWM-NY-SUF-961	New York	Suffolk	40.957950	–72.548580	6.78	10/29/2012	No
HWM-NY-SUF-962	New York	Suffolk	40.935160	–72.575690	7.78	10/29/2012	No
HWM-NY-SUF-965	New York	Suffolk	40.634165	–73.345257	5.22	10/29/2012	No

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-NY-ULS-001	New York	Ulster	42.071660	–73.938550	9.36	10/30/2012	No
HWM-NY-ULS-002	New York	Ulster	42.071200	–73.938130	9.35	10/30/2012	No
HWM-NY-ULS-003	New York	Ulster	42.071490	–73.937010	9.36	10/30/2012	No
HWM-NY-ULS-004	New York	Ulster	41.929000	–73.968440	9.25	10/30/2012	No
HWM-NY-ULS-005	New York	Ulster	41.928980	–73.968490	9.28	10/30/2012	No
HWM-NY-ULS-006	New York	Ulster	41.929040	–73.968520	9.24	10/30/2012	No
HWM-NY-ULS-007	New York	Ulster	41.928990	–73.968740	9.24	10/30/2012	No
HWM-NY-WES-001	New York	Westchester	41.156920	–73.869970	9.01	10/30/2012	No
HWM-NY-WES-002	New York	Westchester	41.155730	–73.870050	8.99	10/30/2012	No
HWM-NY-WES-003	New York	Westchester	40.998740	–73.884600	8.88	10/30/2012	No
HWM-NY-WES-004	New York	Westchester	40.937190	–73.903110	8.98	10/30/2012	No
HWM-NY-WES-005	New York	Westchester	40.937320	–73.903040	9.01	10/30/2012	No
HWM-NY-WES-006	New York	Westchester	40.937130	–73.902890	9.17	10/30/2012	No
HWM-NY-WES-800	New York	Westchester	40.943000	–73.720900	10.53	10/30/2012	No
HWM-NY-WES-801	New York	Westchester	40.890639	–73.782364	10.15	10/30/2012	No
HWM-NY-WES-812	New York	Westchester	40.908700	–73.768600	11.78	10/30/2012	Yes
HWM-NY-WES-813	New York	Westchester	40.931700	–73.744700	10.08	10/30/2012	Yes
HWM-NY-WES-814	New York	Westchester	40.955806	–73.692567	10.24	10/30/2012	No
HWM-NY-WES-815	New York	Westchester	40.978565	–73.665596	9.82	10/30/2012	No
HWM-NY-WES-980	New York	Westchester	40.947445	–73.732346	10.26	10/30/2012	No
HWM-PA-DEL-003	Pennsylvania	Delaware	39.832890	–75.376170	7.13	10/30/2012	Yes
HWM-PA-DEL-005	Pennsylvania	Delaware	39.860070	–75.301570	7.20	10/30/2012	Yes
HWM-PA-DEL-006	Pennsylvania	Delaware	39.865690	–75.228970	7.20	10/30/2012	Yes
HWM-PA-PHI-014	Pennsylvania	Philadelphia	39.933889	–75.208250	7.60	10/30/2012	Yes
HWM-PA-PHI-016	Pennsylvania	Philadelphia	39.888301	–75.164039	7.70	10/30/2012	No
HWM-RI-BRI-640	Rhode Island	Bristol	41.723860	–71.285990	6.24	10/29/2012	No
HWM-RI-KEN-646	Rhode Island	Kent	41.686110	–71.390000	6.53	10/29/2012	No
HWM-RI-NEW-208	Rhode Island	Newport	41.465340	–71.191660	8.40	10/29/2012	Yes
HWM-RI-NEW-212	Rhode Island	Newport	41.619730	–71.240120	10.42	10/29/2012	Yes
HWM-RI-WAS-224	Rhode Island	Washington	41.527780	–71.417060	8.41	10/29/2012	Yes
HWM-RI-WAS-232	Rhode Island	Washington	41.310070	–71.858790	5.84	10/29/2012	No
HWM-RI-WAS-236	Rhode Island	Washington	41.334860	–71.767070	6.64	10/29/2012	No
HWM-RI-WAS-241	Rhode Island	Washington	41.381320	–71.644840	4.14	10/30/2012	Yes
HWM-RI-WAS-244	Rhode Island	Washington	41.365320	–71.605350	3.88	10/30/2012	Yes
HWM-RI-WAS-257	Rhode Island	Washington	41.173790	–71.558660	8.43	10/30/2012	Yes
HWM-RI-WAS-258	Rhode Island	Washington	41.202040	–71.561900	16.24	10/30/2012	No
HWM-RI-WAS-259	Rhode Island	Washington	41.223670	–71.564960	6.57	10/30/2012	Yes
HWM-RI-WAS-260	Rhode Island	Washington	41.208130	–71.578330	10.39	10/30/2012	Yes
HWM-RI-WAS-261	Rhode Island	Washington	41.180780	–71.573790	5.40	10/30/2012	Yes

Table 6. Hurricane Sandy storm-tide high-water-mark data collected and surveyed by U.S. Geological Survey, by State.—Continued

[NAVD 88, North American Vertical Datum of 1988; GMT, Greenwich Mean Time]

Site identification	State	County	Latitude	Longitude	Peak storm-tide elevation, feet above NAVD 88	Peak storm-tide estimated date (GMT)	Wave affected
			Decimal degrees				
HWM-RI-WAS-262	Rhode Island	Washington	41.190140	–71.592220	5.18	10/30/2012	Yes
HWM-RI-WAS-263	Rhode Island	Washington	41.189030	–71.568640	6.39	10/30/2012	Yes
HWM-RI-WAS-653	Rhode Island	Washington	41.376520	–71.515390	6.53	10/30/2012	Yes
HWM-VA-ACC-001	Virginia	Accomack	37.935940	–75.349490	4.01	10/29/2012	No
HWM-VA-ACC-002	Virginia	Accomack	37.605750	–75.687390	5.84	10/29/2012	No
HWM-VA-ACC-051	Virginia	Accomack	37.926370	–75.663670	5.95	10/29/2012	No
HWM-VA-ACC-052	Virginia	Accomack	37.926370	–75.663670	5.93	10/29/2012	Yes
HWM-VA-ACC-053	Virginia	Accomack	37.926370	–75.663670	5.24	10/29/2012	Yes
HWM-VA-ACC-054	Virginia	Accomack	37.791260	–75.705820	6.19	10/29/2012	No
HWM-VA-ACC-055	Virginia	Accomack	37.721950	–75.785800	5.12	10/29/2012	No
HWM-VA-ACC-056	Virginia	Accomack	37.721950	–75.785800	5.08	10/29/2012	Yes
HWM-VA-ACC-057	Virginia	Accomack	37.666150	–75.831200	5.02	10/29/2012	Yes
HWM-VA-ACC-058	Virginia	Accomack	37.666150	–75.831200	4.79	10/29/2012	Yes
HWM-VA-GLO-001	Virginia	Gloucester	37.280222	–76.395111	4.54	10/29/2012	No
HWM-VA-GLO-002	Virginia	Gloucester	37.280222	–76.395111	4.57	10/29/2012	No
HWM-VA-MAT-001	Virginia	Mathews	37.449278	–76.281278	3.54	10/29/2012	No
HWM-VA-MAT-002	Virginia	Mathews	37.449278	–76.281278	3.52	10/29/2012	No
HWM-VA-MAT-003	Virginia	Mathews	37.318944	–76.274111	4.60	10/29/2012	No
HWM-VA-MAT-004	Virginia	Mathews	37.318944	–76.274111	4.68	10/29/2012	Yes
HWM-VA-NFK-004	Virginia	Norfolk	36.959250	–76.259028	7.56	10/29/2012	Yes
HWM-VA-NFK-005	Virginia	Norfolk	36.858806	–76.298639	4.88	10/29/2012	Yes
HWM-VA-NOR-001	Virginia	Northampton	37.287750	–75.955430	5.83	10/29/2012	Yes
HWM-VA-NOR-002	Virginia	Northampton	37.476250	–75.934670	4.26	10/29/2012	Yes
HWM-VA-NOR-051	Virginia	Northampton	37.556950	–75.839830	3.10	10/29/2012	Yes
HWM-VA-NOR-053	Virginia	Northampton	37.410660	–75.965390	4.39	10/29/2012	Yes
HWM-VA-VAB-001	Virginia	Virginia Beach	36.700430	–75.927077	7.94	10/29/2012	Yes
HWM-VA-VAB-002	Virginia	Virginia Beach	36.740267	–75.941967	8.70	10/29/2012	Yes
HWM-VA-VAB-003	Virginia	Virginia Beach	36.852083	–76.064417	5.71	10/29/2012	Yes
HWM-VA-YOR-001	Virginia	York	37.214278	–76.419861	5.02	10/29/2012	Yes

Glossary

EDT Eastern daylight time

EST Eastern standard time

FEMA Federal Emergency Management Agency

GMT Greenwich Mean Time

GNSS Global Navigation Satellite Systems

HWM High-water mark

NAVD 88 North American Vertical Datum of 1988

NGS National Geodetic Survey

NGVD 29 National Geodetic Vertical Datum of 1929

NOAA National Oceanic and Atmospheric Administration

RDG Rapid deployment gage

RTN Real-Time Network

storm surge Water level rise caused by a storm over and above the predicted astronomical tide

storm tide Water level rise due to the combination of storm surge and the astronomical tide

streamgage Instrumentation used to measure water level and corresponding streamflow

tide gage Instrumentation used to measure coastal water level

USGS U.S. Geological Survey

Conversion Factors and Datums

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch	2.54	centimeter (cm)
inch	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
mile, nautical (nmi)	1.852	kilometer (km)
yard (yd)	0.9144	meter (m)
	Pressure	
atmosphere, standard (atm)	101.3	kilopascal (kPa)
bar	100	kilopascal (kPa)
inch of mercury at 60 ºF (in Hg)	3.377	kilopascal (kPa)
pound-force per square inch (lbf/in^2)	6.895	kilopascal (kPa)
pound per square foot (lb/ft^2)	0.04788	kilopascal (kPa)
pound per square inch (lb/in^2)	6.895	kilopascal (kPa)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F = (1.8 \times °C) + 32$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$°C = (°F - 32) / 1.8$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88) unless otherwise noted.

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83) unless otherwise noted.

Elevation, as used in this report, refers to distance above the vertical datum.

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