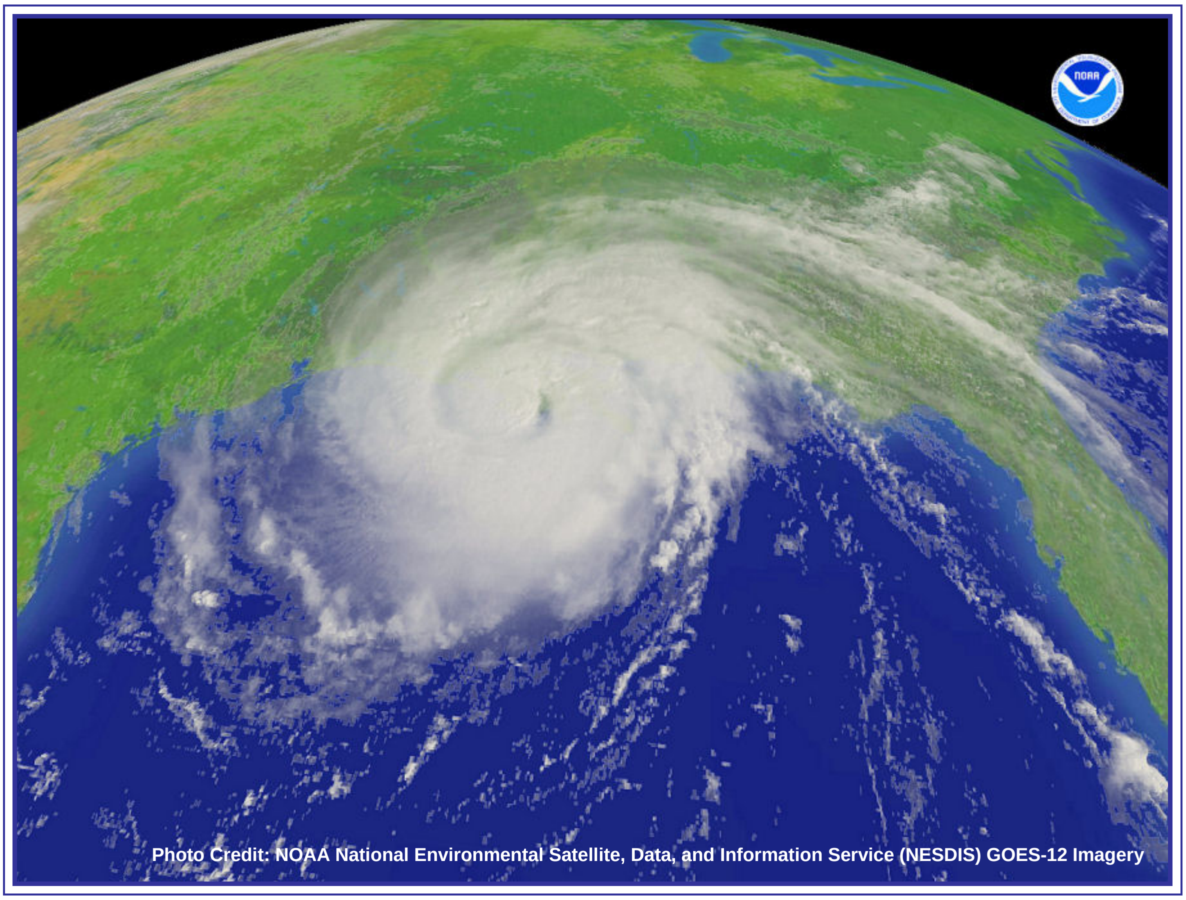
WATER LEVEL & METEOROLOGICAL DATA REPORT

Hurricane GUSTAV



September 25, 2008

noaa National Oceanic and Atmospheric Administration

U.S. DEPARTMENT OF COMMERCE
National Ocean Service
Center for Operational Oceanographic Products and Services

SUMMARY

The NOAA Center for Operational Oceanographic Products and Services (CO-OPS) maintains a network of oceanographic and meteorological stations along the United States coastline to monitor water levels, winds (speed, direction and gusts), barometric pressure, and air/water temperature. Utilizing these observations and tidal predictions, CO-OPS produces technical storm reports and a real-time Storm QuickLook synopsis product for tropical cyclones impacting the United States.

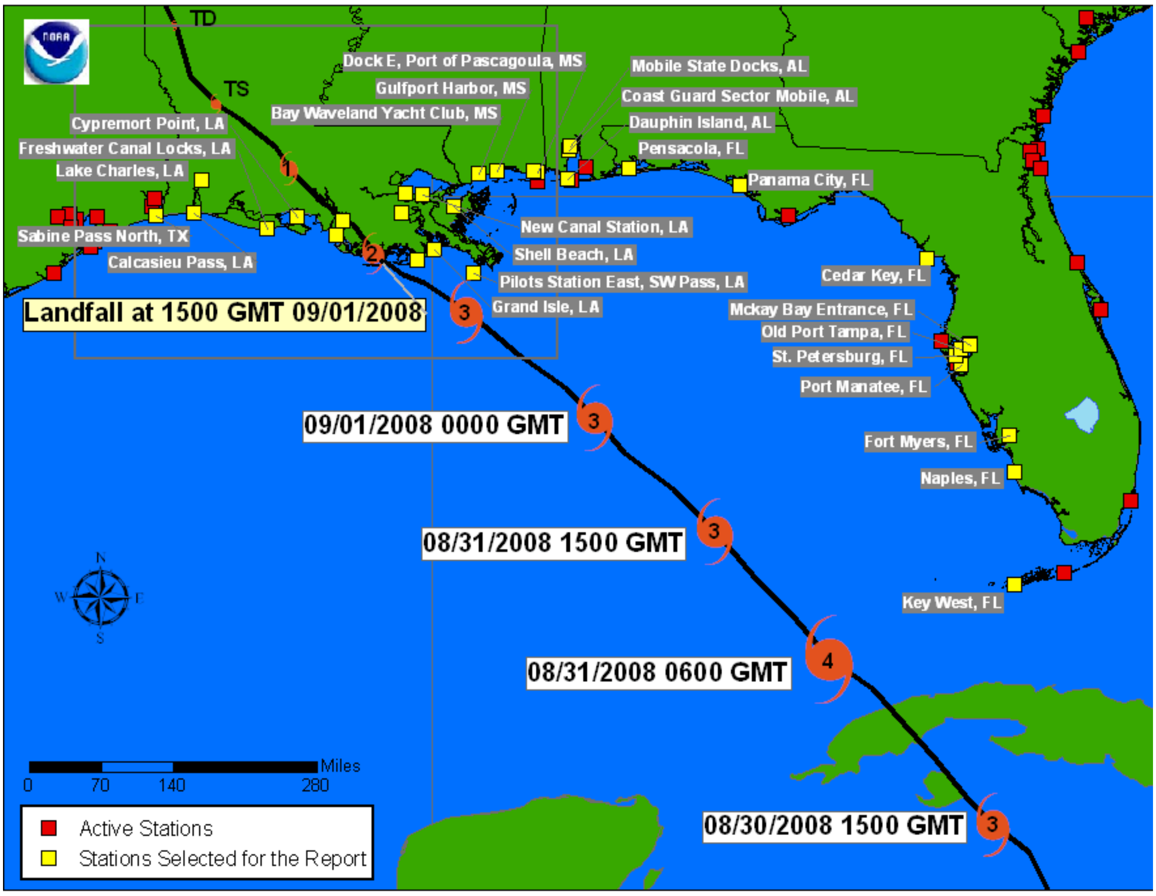
During Hurricane Gustav, stations from the Florida Keys and along the Gulf Coast to Texas recorded elevated water levels, high winds, and generally decreasing, although variable, barometric pressure. Station location information is contained in Figure 1, and Appendix 1. Observed water level elevations are referenced to the standard chart datum Mean Lower Low Water (MLLW), based on the National Tidal Datum Epoch 1983-2001 (see Appendix 2). This report summarizes the highest observed water levels, referred to as the Storm Tide, which is the maximum water level elevation measured by a water level station during storm events.

After striking Cuba, then a Category 4, Hurricane Gustav passed well southwest of Florida Keys during August 30-31, 2008. The hurricane decreased in strength as it moved northwestward across the Gulf of Mexico and made landfall on September 1, 2008 at 1500 GMT near Cocodrie, Louisiana. At landfall, Gustav was a Category 2 storm on the Saffir-Simpson Scale (see Appendix 1) with maximum sustained winds of 95 knots (110 mph). At 09:18 GMT on September 1, 2008, a maximum wind gust of 99 knots (114 mph) was recorded at Pilots Station East, SW Pass, Louisiana (Table 2). After landfall, Gustav moved northwestward over Louisiana before slowing down along the Louisiana-Texas border.

Water levels were slightly elevated along the Florida Keys as Hurricane Gustav passed offshore to the west. As Gustav approached the Gulf Coast, water levels rose from the west coast of Florida to eastern Louisiana, while they began to fall from western Louisiana to Texas. At landfall, the Bay Waveland Yacht Club, MS station recorded the highest storm tide of 3.331 m (10.93 ft) above MLLW, which was 3.014 m (9.89 ft) above the predicted tide (Fig. 18). Shell Beach, LA also showed a high storm tide, measuring 3.205 m (10.52 ft) above MLLW, which was 2.974 m (9.76 ft) above the predicted tide (Fig. 19). Water levels to the east of landfall from eastern Louisiana to Florida were elevated between 0.6 to 1.5 m above predicted. Water levels to the west of landfall from western Louisiana to Texas first receded (i.e. 1.243 m (4.08 ft) below predictions at Freshwater Canal Locks, LA - Fig. 29) just before the time of landfall, then raised above predicted values after the storm was well inland.

More information and data can be found at the CO-OPS website, www.tidesandcurrents.noaa.gov.

Figures 1 & 2. NOAA and Partnership stations relative to the Hurricane GUSTAV storm track (track information courtesy of the NOAA National Hurricane Center).



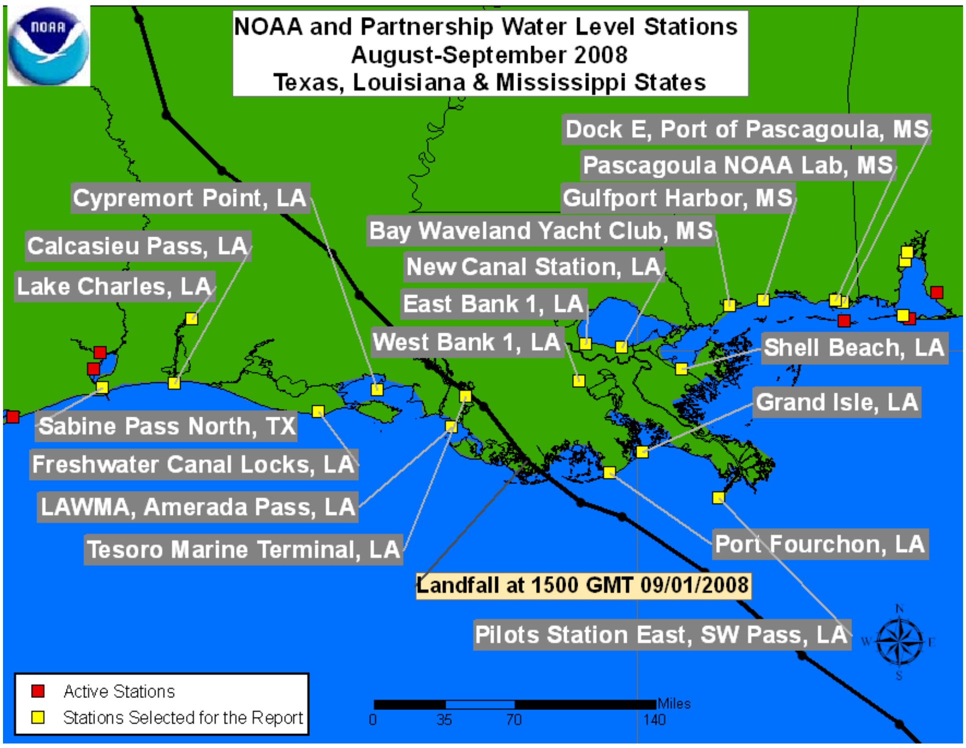


Table 1: **Maximum water levels** for Hurricane GUSTAV, August-September 2008.

Station Name	Station ID	Date & Time (GMT)	Storm Tide (Meters above MLLW)	Predicted WL (Meters)	Difference (Meters)	Storm Tide (Feet above MLLW)	Predicted WL (Feet)	Difference (Feet)	Storm Tide (Meters above NAVD88)	Storm Tide (Feet above NAVD88)
Bay Waveland Yacht Club, MS	8747437	09/01/08 16:12	3.331	0.317	3.014	10.93	1.04	9.89	3.231	10.60
Shell Beach, LA	8761305	09/01/08 17:24	3.205	0.231	2.974	10.52	0.76	9.76	n/a	n/a
Dock E, Port of Pascagoula, MS	8741041	09/01/08 14:54	2.009	0.275	1.734	6.59	0.90	5.69	n/a	n/a
Pascagoula NOAA Lab, MS	8741533	09/01/08 15:00	1.962	0.257	1.705	6.44	0.84	5.59	n/a	n/a
Cedar Key, FL	8727520	09/01/08 07:12	1.949	1.177	0.772	6.39	3.86	2.53	1.262	4.14
Port Fourchon, LA[1]	8762075	09/01/08 16:54	1.704	0.338	1.366	5.59	1.11	4.48	n/a	n/a
Coast Guard Sector Mobile, AL	8736897	09/01/08 19:12	1.694	0.297	1.397	5.56	0.97	4.58	n/a	n/a
Grand Isle, LA	8761724	09/01/08 16:18	1.638	0.267	1.371	5.37	0.88	4.50	1.838	6.03
Naples, FL	8725110	08/31/08 17:36	1.571	1.038	0.533	5.15	3.41	1.75	0.875	2.87
Pilots Station East, SW Pass, LA	8760922	09/01/08 11:36	1.553	0.229	1.324	5.10	0.75	4.34	n/a	n/a
New Canal Station, LA	8761927	09/02/08 05:18	1.500	0.074	1.426	4.92	0.24	4.68	2.769	9.08
Mobile State Docks, AL	8737048	09/01/08 19:12	1.482	0.360	1.122	4.86	1.18	3.68	1.900	6.23
LAWMA, Amerada Pass, LA	8764227	09/01/08 23:06	1.455	0.397	1.058	4.77	1.30	3.47	1.257	4.12
Gulfport Harbor, MS[1]	8745557	09/02/08 05:30	1.360	0.435	0.925	4.46	1.43	3.03	n/a	n/a
Old Port Tampa, FL	8726607	09/01/08 07:24	1.303	0.695	0.608	4.27	2.28	1.99	n/a	n/a
Pensacola, FL	8729840	09/01/08 14:36	1.257	0.245	1.012	4.12	0.80	3.32	1.159	3.80
St. Petersburg, FL	8726520	09/01/08 06:54	1.254	0.623	0.631	4.11	2.04	2.07	n/a	n/a
Dauphin Island, AL	8735180	09/01/08 15:06	1.226	0.256	0.970	4.02	0.84	3.18	1.156	3.79
Freshwater Canal Locks, LA	8766072	09/03/08 07:06	1.223	0.401	0.822	4.01	1.32	2.70	n/a	n/a
East Bank 1, Norco, B. LaBranche, LA[1]	8762372	09/02/08 15:48	1.194	0.085	1.109	3.92	0.28	3.64	n/a	n/a
Panama City, FL	8729108	09/01/08 14:48	1.078	0.308	0.770	3.54	1.01	2.53	0.908	2.98
Mckay Bay Entrance, FL	8726667	08/29/08 17:24	1.056	0.989	0.067	3.46	3.24	0.22	n/a	n/a
Calcasieu Pass, LA	8768094	09/03/08 09:00	1.023	0.570	0.453	3.36	1.87	1.49	n/a	n/a
Cypremort Point, LA[1]	8765251	09/02/08 08:36	0.968	0.218	0.750	3.18	0.72	2.46	n/a	n/a
Port Manatee, FL	8726384	08/31/08 22:18	0.957	0.380	0.577	3.14	1.25	1.89	0.482	1.58
Key West, FL	8724580	08/31/08 15:12	0.906	0.664	0.242	2.97	2.18	0.79	0.368	1.21
Fort Myers, FL	8725520	08/31/08 23:12	0.872	0.399	0.473	2.86	1.31	1.55	0.554	1.82
Lake Charles, LA	8767816	09/03/08 14:12	0.861	0.280	0.581	2.82	0.92	1.91	1.010	3.31
Sabine Pass North, TX	8770570	09/03/08 09:06	0.842	0.445	0.397	2.76	1.46	1.30	n/a	n/a
Tesoro Marine Terminal, LA[2]	8764044	09/02/08 01:12	0.660	0.143	0.517	2.17	0.47	1.70	n/a	n/a
West Bank 1, Bayou Gauche, LA	8762482	09/03/08 20:30	0.610	0.055	0.555	2.00	0.18	1.82	n/a	n/a

[1] Sensor reached its physical limit on measurements and did not record a maximum elevation

[2] Sensor reached its physical limit on measurements and did not record a minimum elevation

Table 2: **Maximum wind speed, wind gusts and minimum barometric pressure** recorded by NOS stations during Hurricane GUSTAV

Station Name	Station ID	Date & Time	**Max Wind Speed**		Date & Time	**Max Wind Gusts**		Date & Time	**Atmospheric Pressure**
		GMT	**m/sec**	knots	GMT	**m/sec**	knots	GMT	**Min (mbar)**
Vaca Key, FL	8723970	08/29/08 23:18	**12.0**	23.3	08/31/08 00:54	**18.4**	35.8	08/31/08 00:30	**1006.0**
Key West, FL	8724580	08/31/08 05:30	**8.9**	17.3	08/31/08 09:06	**15.4**	29.9	08/31/08 07:24	**1004.1**
Naples, FL	8725110	08/31/08 16:36	**9.2**	17.9	08/31/08 19:12	**13.8**	26.8	08/31/08 08:18	**1006.8**
Fort Myers, FL	8725520	08/30/08 17:24	**8.7**	16.9	08/31/08 17:12	**13.7**	26.6	08/31/08 08:18	**1009.1**
Port Manatee, FL	8726384	08/29/08 00:54	**10.6**	20.6	08/31/08 16:00	**16.4**	31.9	n/a	n/a
C-CUT, FL	8726413	08/31/08 15:54	**17.6**	34.2	08/31/08 18:00	**20.9**	40.6	08/31/08 20:24	**1007.5**
St. Petersburg, FL	8726520	08/31/08 13:54	**9.2**	18.0	08/31/08 17:42	**15.2**	29.5	08/31/08 20:42	**1008.0**
Old Port Tampa, FL	8726607	08/31/08 14:24	**10.2**	19.8	08/31/08 17:54	**14.9**	29.0	n/a	n/a
Mckay Bay Entrance, FL	8726667	08/31/08 14:30	**13.6**	26.4	08/31/08 17:24	**16.9**	32.9	n/a	n/a
Berth 223, FL	8726669	08/30/08 19:24	**10.0**	19.4	08/30/08 19:24	**13.6**	26.4	n/a	n/a
Seabulk, FL	8726673	08/31/08 17:18	**8.8**	17.1	08/31/08 17:30	**13.2**	25.6	n/a	n/a
TPA Cruise Terminal 2, FL	8726694	08/31/08 17:30	**10.0**	19.5	08/31/08 14:06	**14.0**	27.1	n/a	n/a
Panama City, FL	8729108	08/31/08 18:36	**9.7**	18.9	09/01/08 05:48	**14.9**	29.0	09/01/08 06:54	**1007.8**
Pensacola, FL	8729840	08/31/08 13:12	**5.1**	9.9	08/31/08 22:48	**6.9**	13.4	09/01/08 08:18	**1005.5**
Dauphin Island, AL	8735180	09/01/09 09:24	**21.7**	42.2	09/01/08 09:12	**28.1**	54.6	09/01/08 10:12	**1002.8**
Coast Guard Sector Mobile, AL	8736897	09/0108 18:06	**14.4**	28.0	08/31/08 21:42	**21.3**	38.9	09/01/08 08:54	**1004.9**
Bay Waveland Yacht Club, MS	8747437	09/01/08 14:42	**24.4**	47.4	09/01/08 14:36	**30.0**	58.3	09/01/08 13:12	**997.7**
Pilots Station East, SW Pass, LA	8760922	09/01/08 09:18	**40.5**	78.7	09/01/08 09:18	**51.2**	99.5	09/01/08 10:00	**976.1**
Shell Beach, LA	8761305	09/01/08 13:30	**26.9**	52.3	09/01/08 10:48	**35.1**	68.2	09/01/08 13:12	**990.1**
Grand Isle, LA	8761724	09/01/08 10:48	**29.5**	57.3	09/01/08 10:24	**43.0**	83.6	09/01/08 12:06	**976.7**
New Canal Station, LA	8761927	09/01/08 12:30	**26.9**	52.3	09/01/08 13:18	**35.2**	68.4	09/01/08 13:24	**989.8**
East Bank 1, Norco, B. LaBranche, LA	8762372	09/01/08 19:06	**26.6**	51.7	09/01/08 17:30	**33.4**	64.9	09/01/08 16:48	**988.8**
West Bank 1, Bayou Gauche, LA	8762482	09/01/08 16:42	**23.6**	45.9	09/01/08 17:48	**34.1**	66.3	09/01/08 16:06	**980.8**
LAWMA, Amerada Pass, LA	8764227	09/01/08 18:30	**27.3**	53.1	09/01/08 17:06	**36.4**	70.8	09/01/08 17:00	**965.2**
Calcasieu Pass, LA	8768094	09/01/08 04:30	**15.7**	30.5	09/01/08 20:48	**19.9**	38.7	09/01/08 22:24	**994.3**
Sabine Pass North, TX	8770570	09/01/08 21:24	**16.5**	32.1	09/01/08 21:24	**20.8**	40.4	09/02/08 01:24	**998.6**

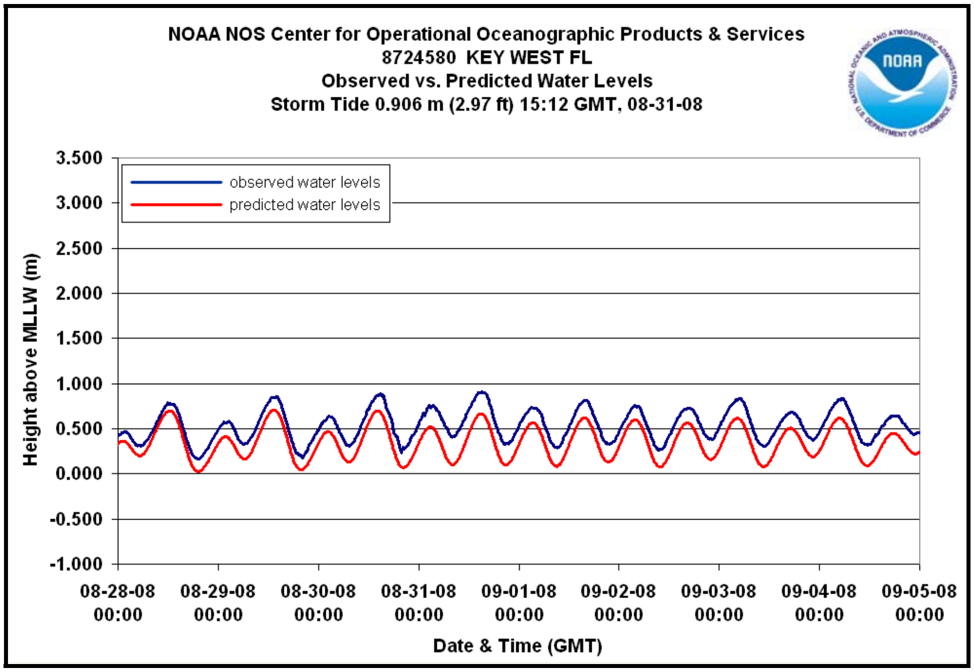


Figure 3. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Key West, FL before, during, and after Hurricane Gustav.

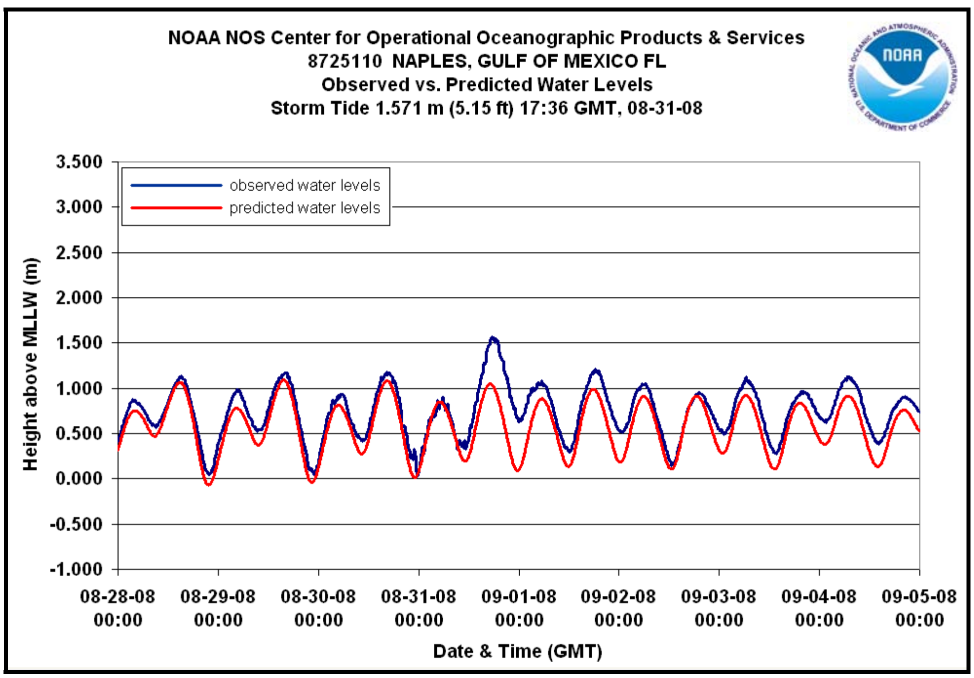


Figure 4. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Naples, FL before, during, and after Hurricane Gustav.

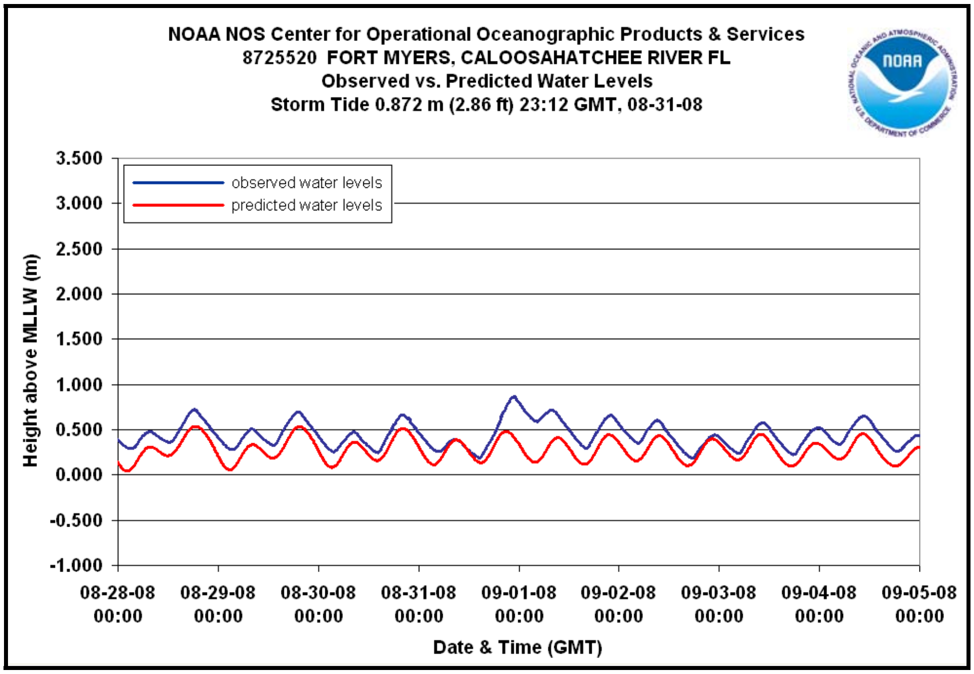


Figure 5. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Fort Myers, FL before, during, and after Hurricane Gustav.

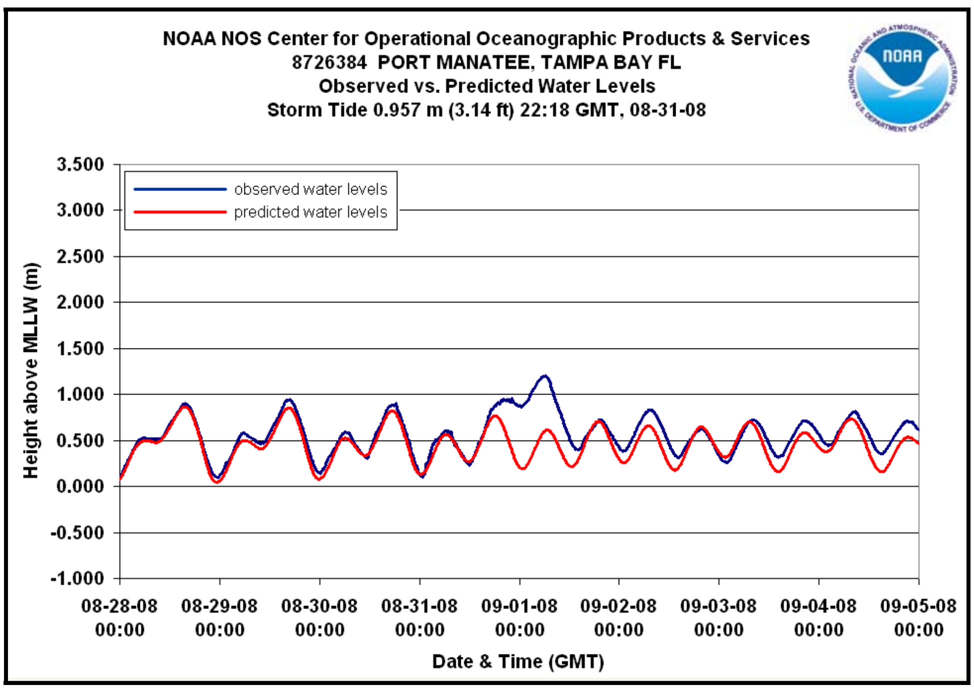


Figure 6. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Port Manatee, FL before, during, and after Hurricane Gustav.

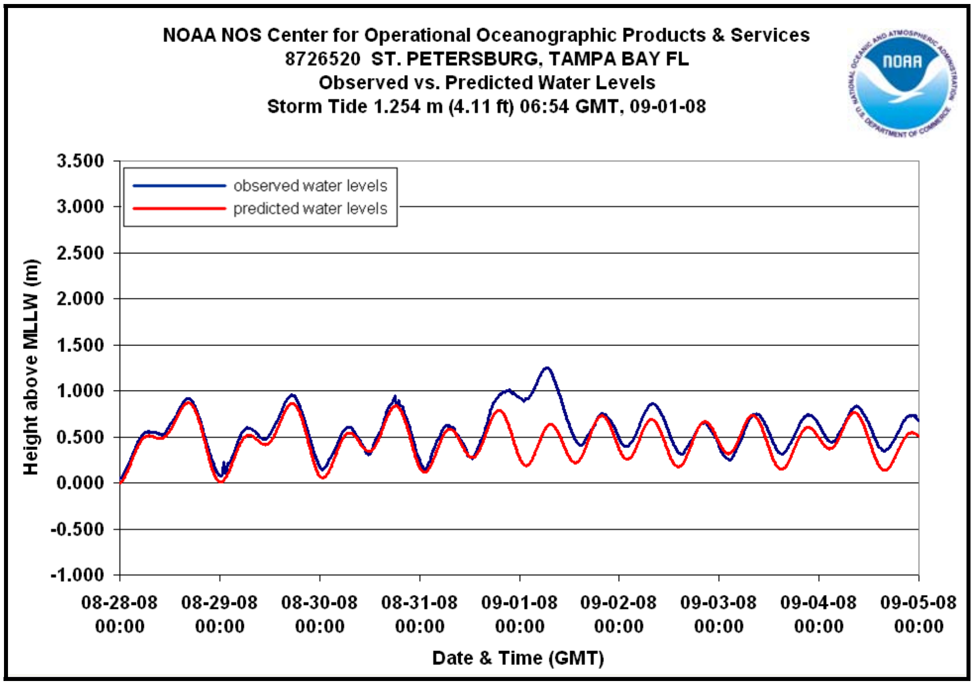


Figure 7. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at St. Petersburg, FL before, during, and after Hurricane Gustav.

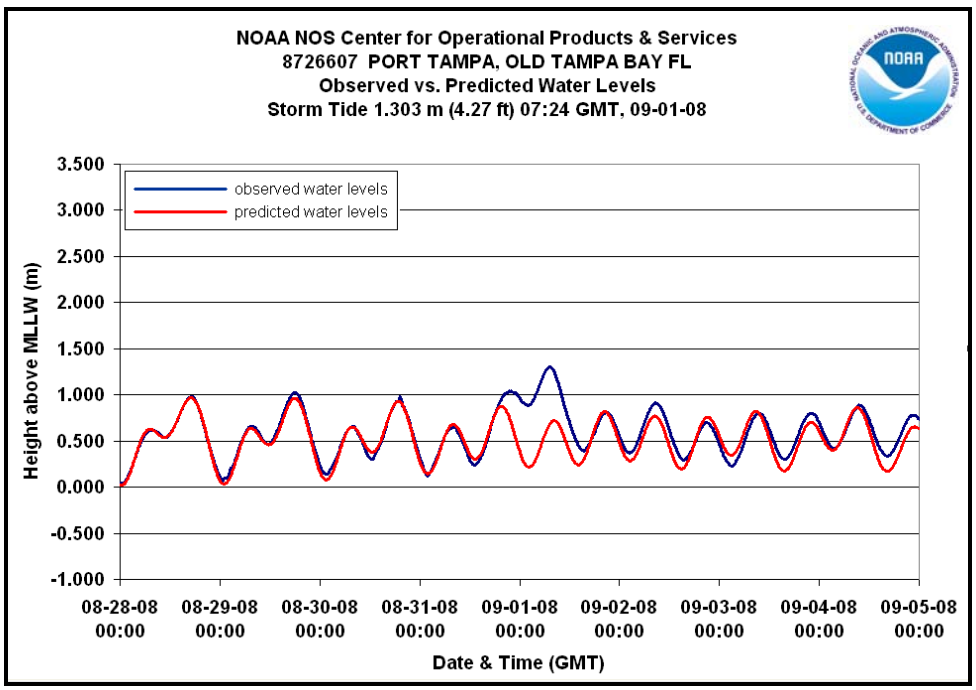


Figure 8. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Old Port Tampa, FL before, during, and after Hurricane Gustav.

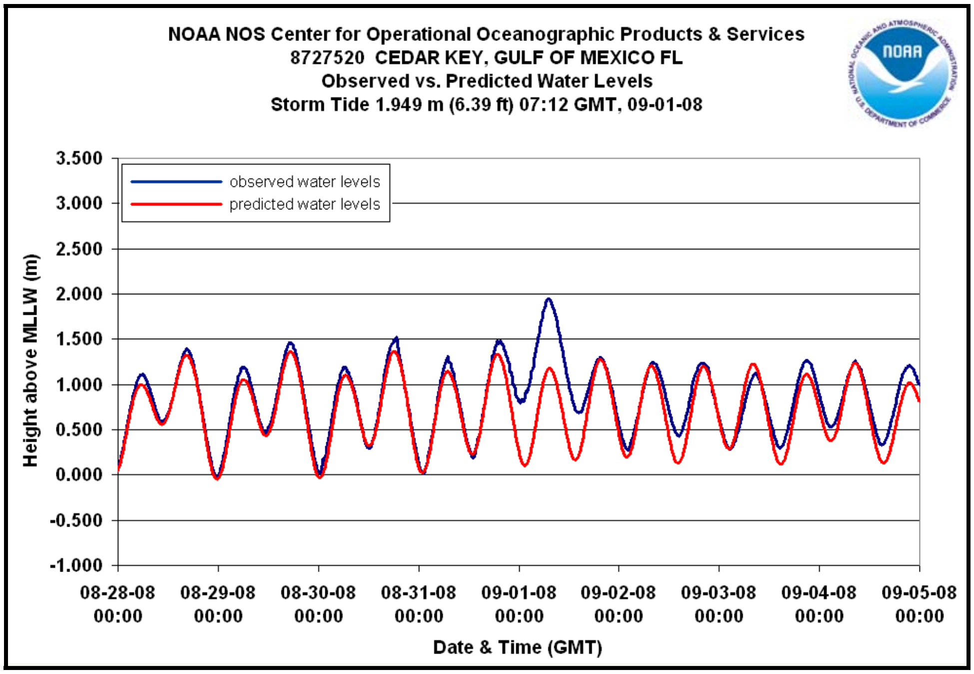


Figure 9. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Cedar Key, FL before, during, and after Hurricane Gustav.

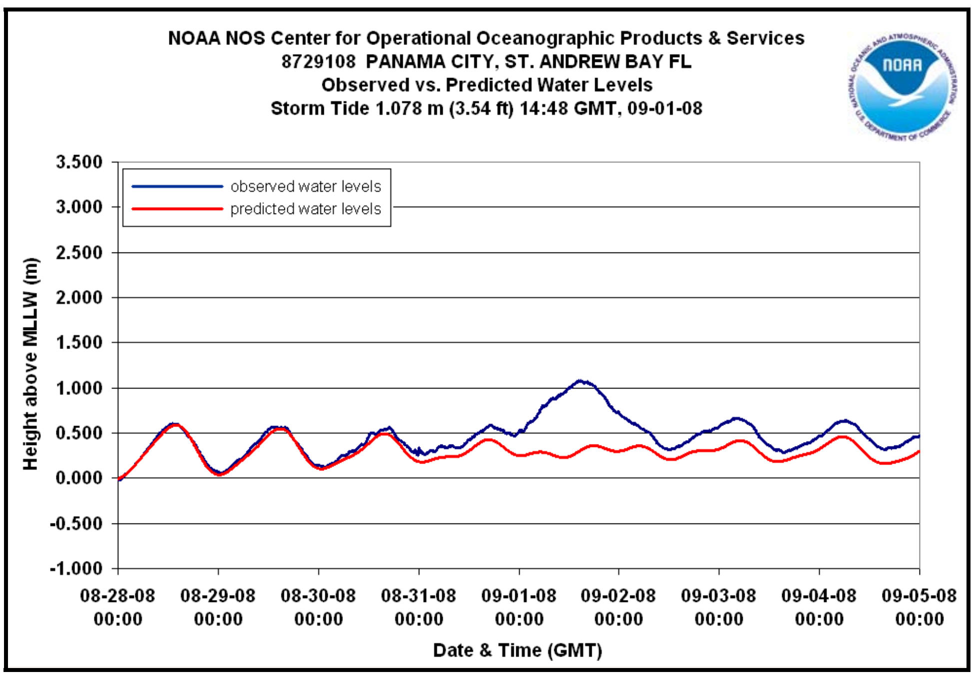


Figure 10. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Panama City, FL before, during, and after Hurricane Gustav.

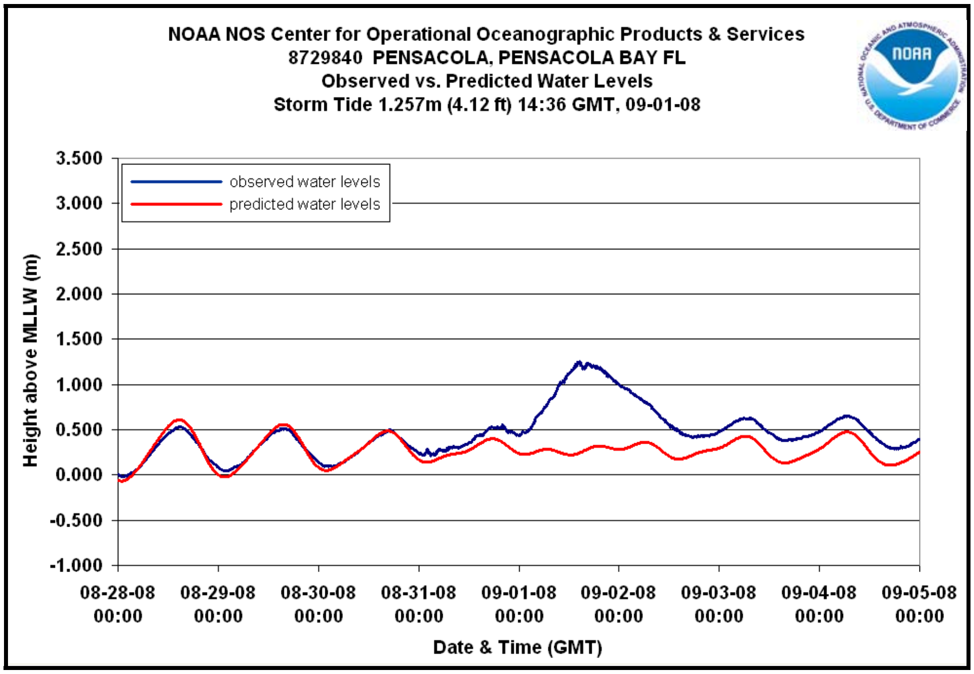


Figure 11. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Pensacola, FL before, during, and after Hurricane Gustav.

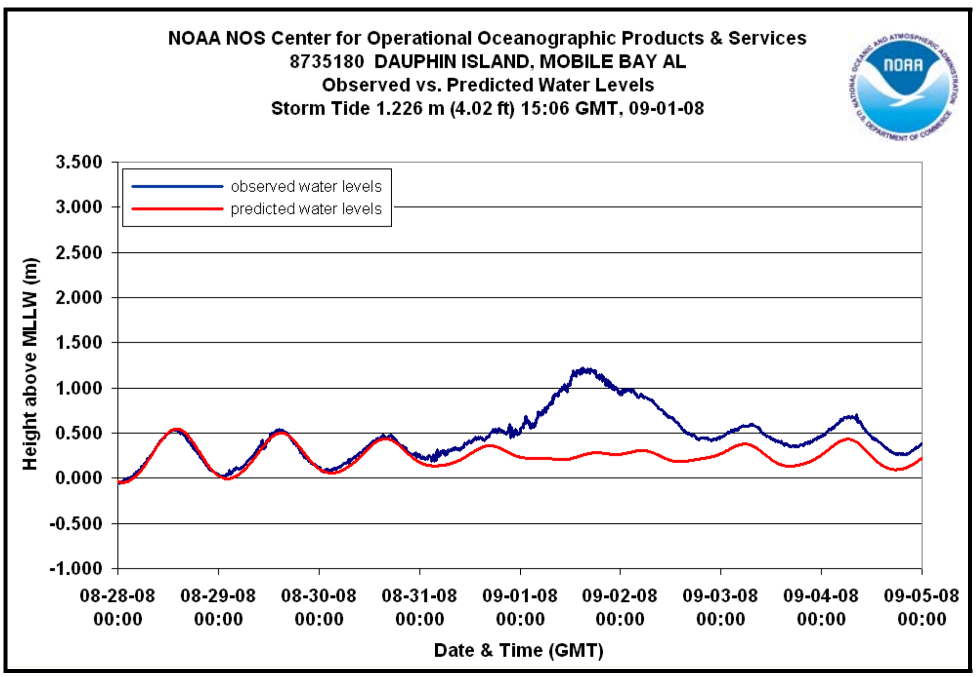


Figure 12. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Dauphin Island, AL before, during, and after Hurricane Gustav.

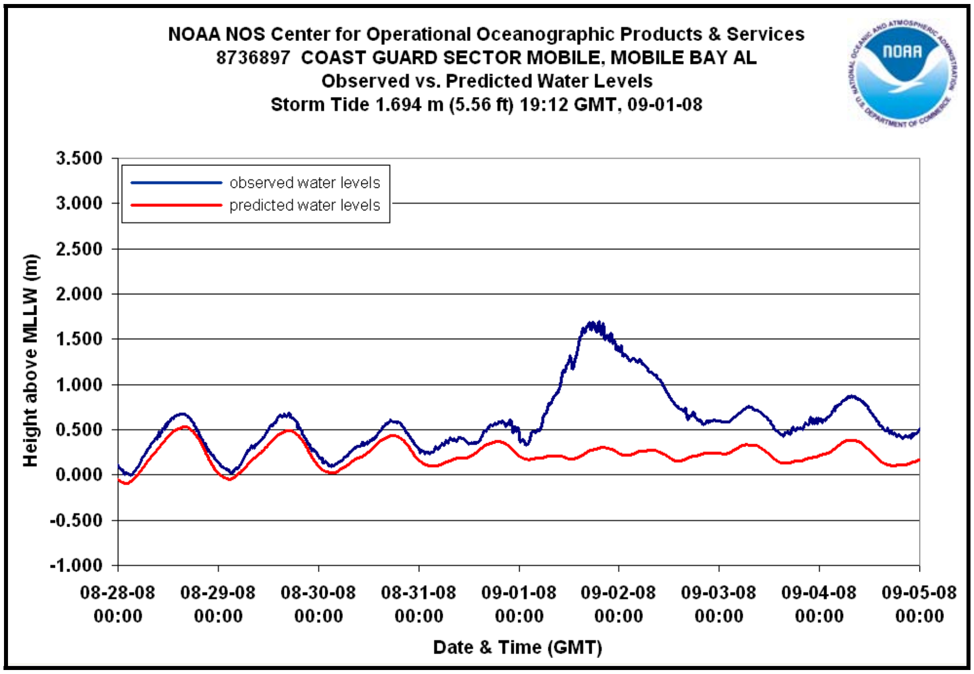


Figure 13. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Coast Guard Sector Mobile, AL before, during, and after Hurricane Gustav.

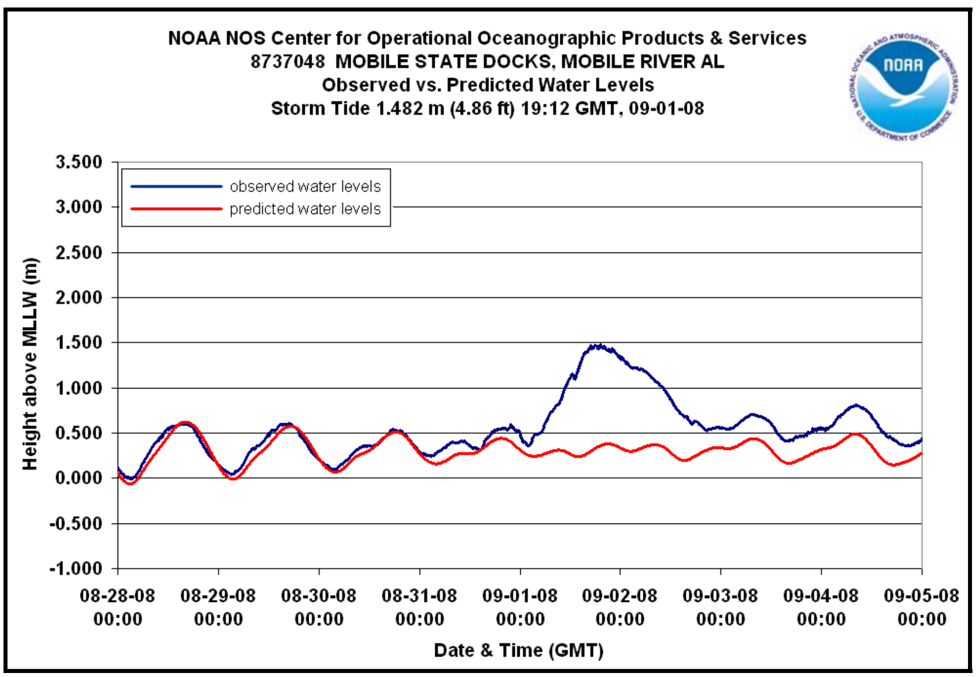


Figure 14. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Mobile State Docks, AL before, during, and after Hurricane Gustav.

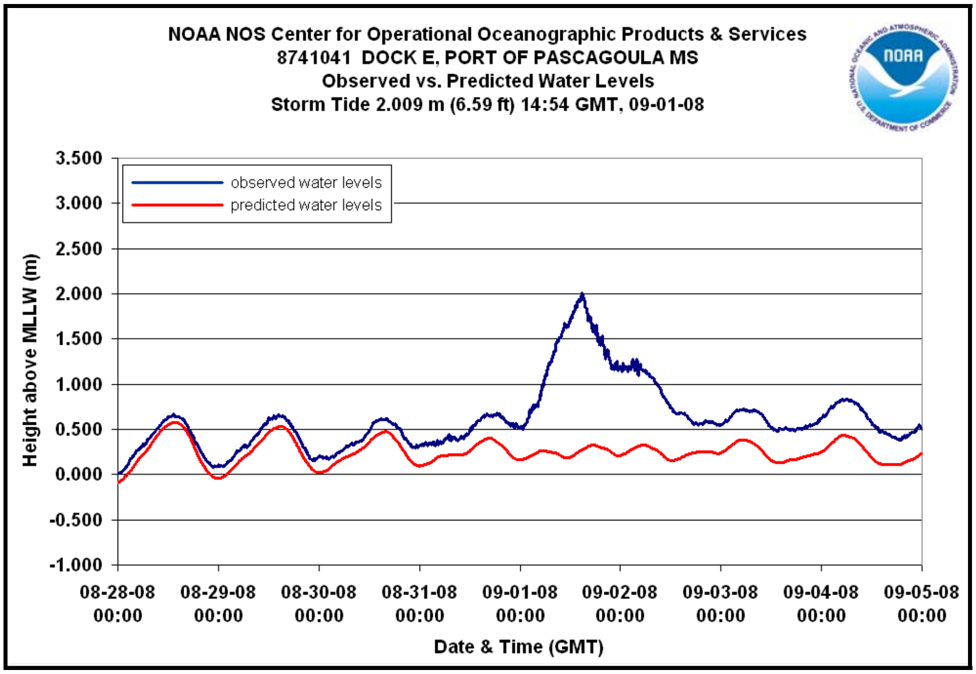


Figure 15. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Dock E, Port of Pascagoula, MS before, during, and after Hurricane Gustav.

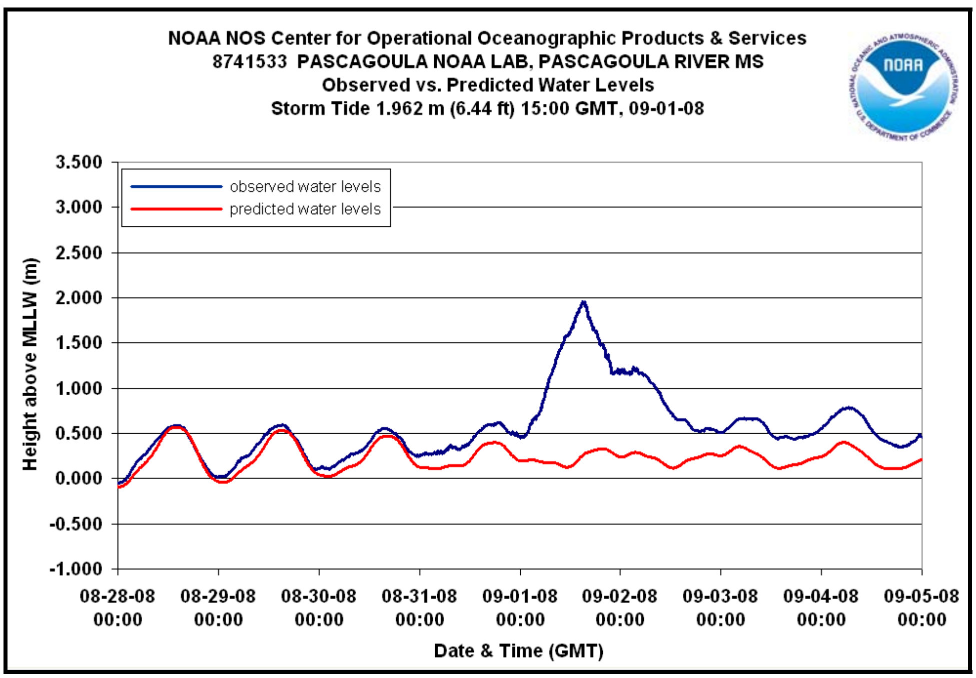


Figure 16. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Pascagoula NOAA Lab, MS before, during, and after Hurricane Gustav.

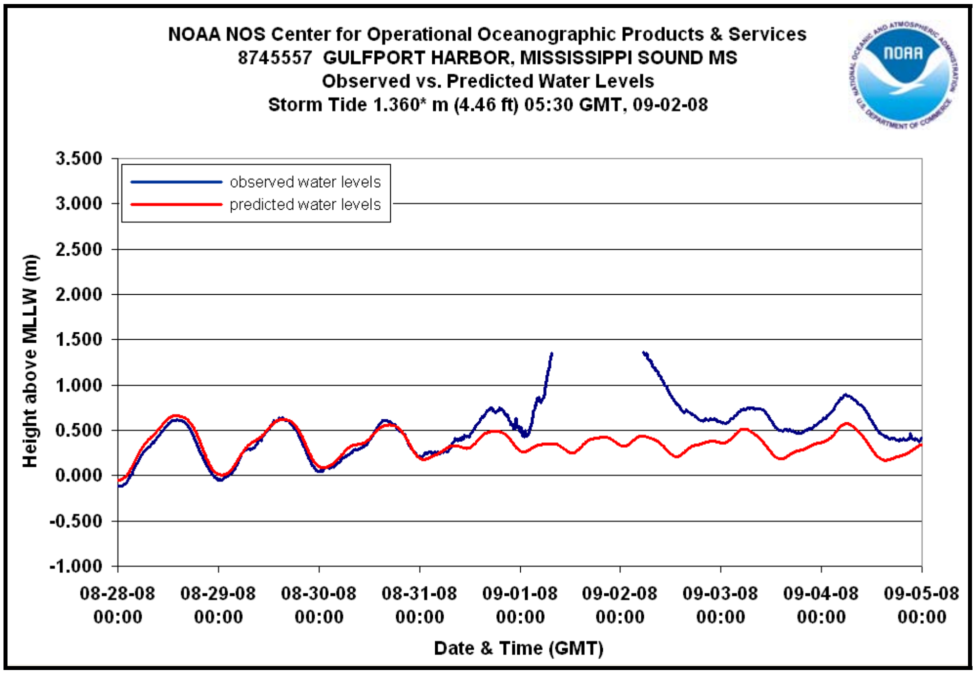


Figure 17. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Gulfport Harbor, MS before, during, and after Hurricane Gustav. *Sensor reached its physical limit on measurements and did not record a maximum elevation.

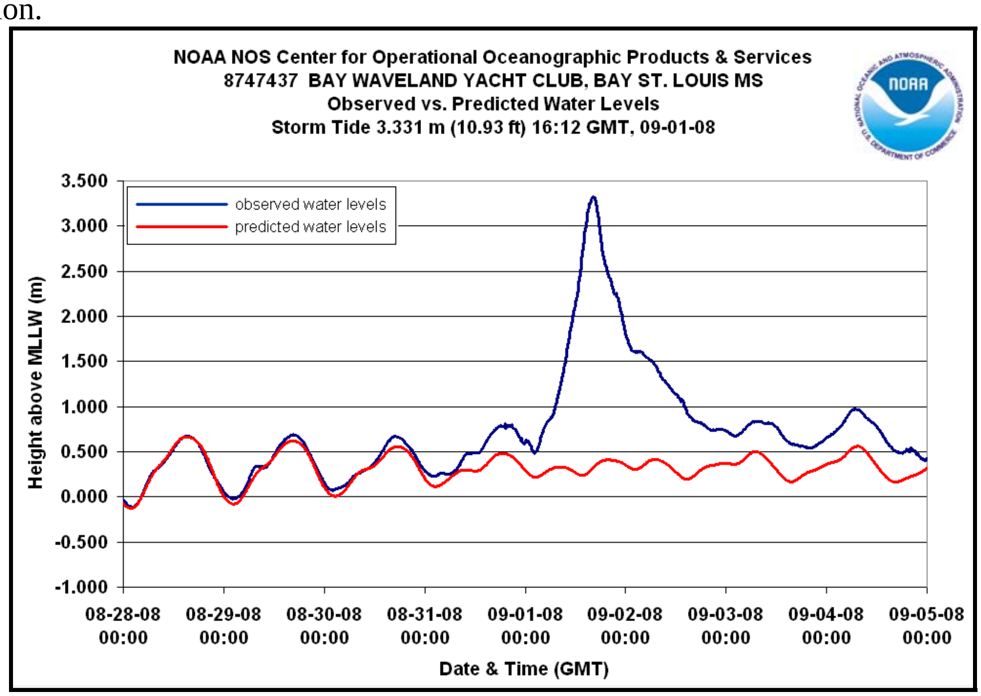


Figure 18. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Bay Waveland Yacht Club, MS before, during, and after Hurricane Gustav.

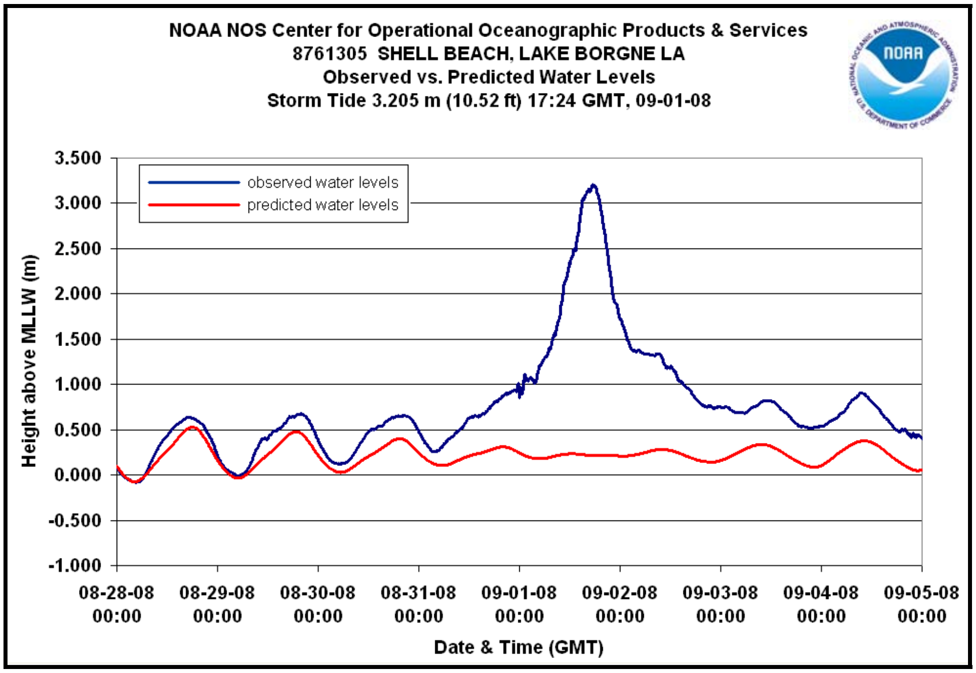


Figure 19. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Shell Beach, LA before, during, and after Hurricane Gustav.

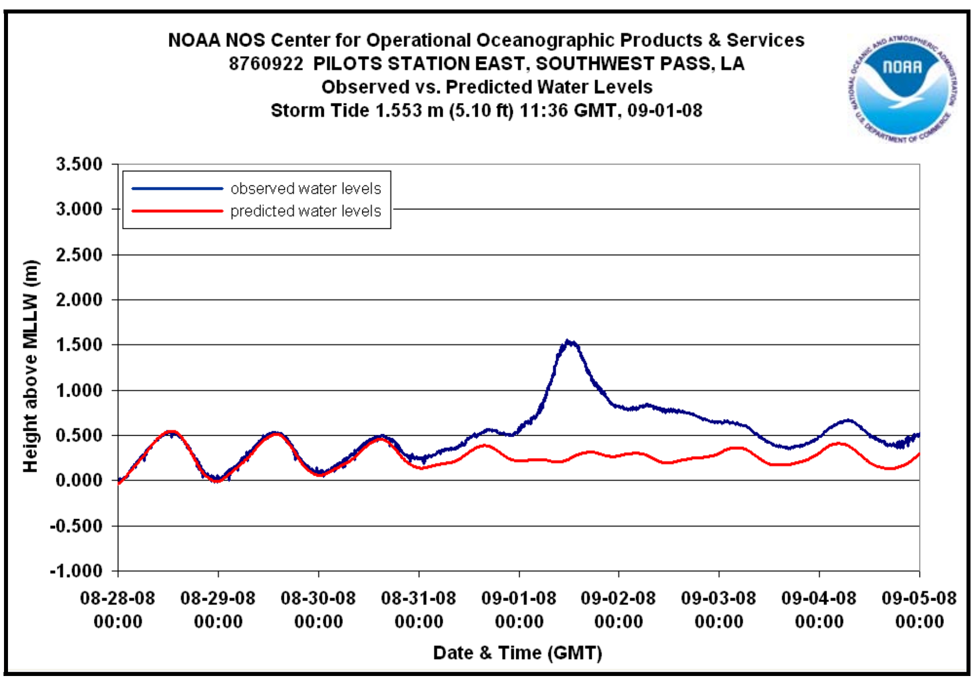


Figure 20. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Pilots Station East, LA before, during, and after Hurricane Gustav.

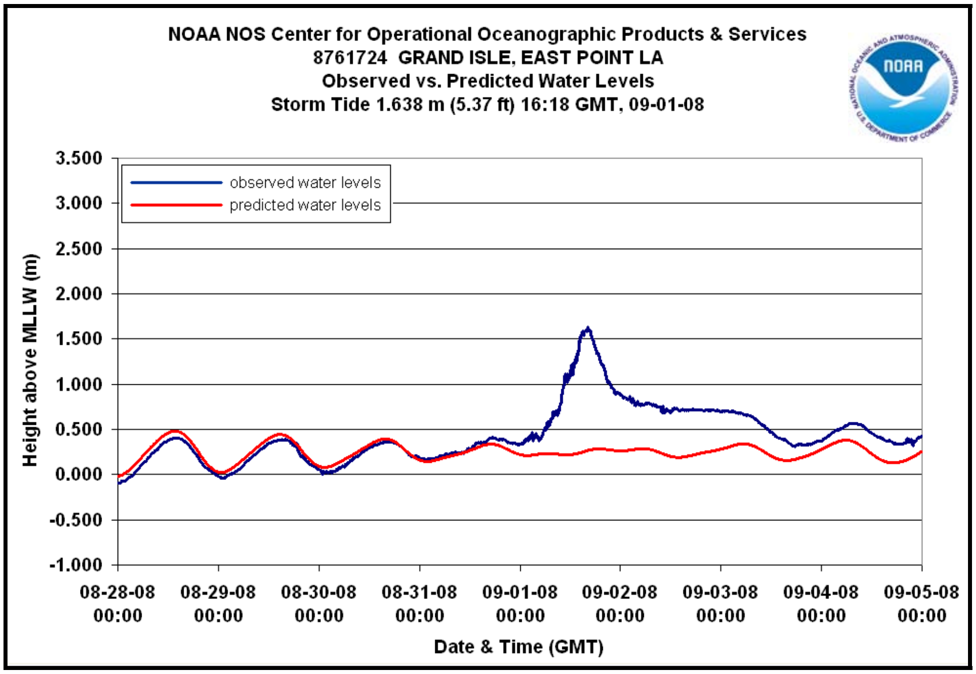


Figure 21. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Grand Isle, LA before, during, and after Hurricane Gustav.

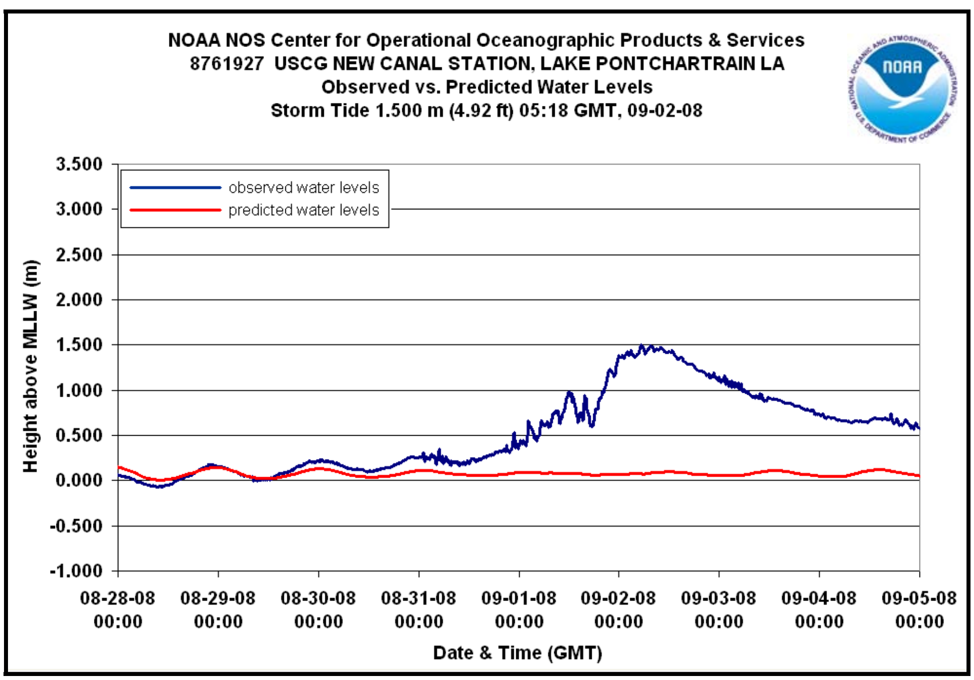


Figure 22. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at USCG New Canal, LA before, during, and after Hurricane Gustav.

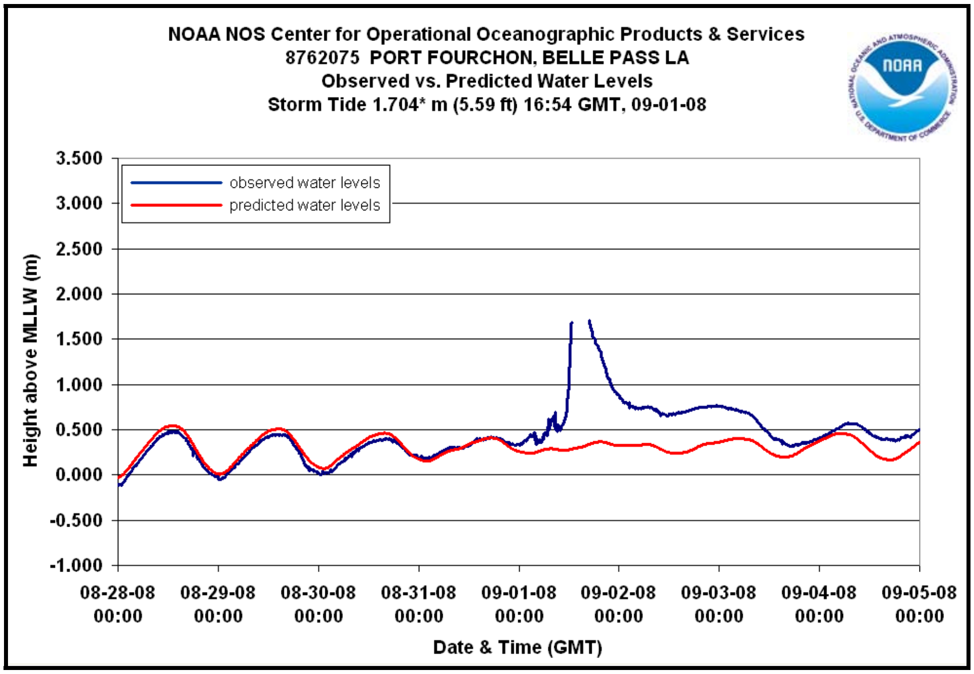


Figure 23. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Port Fourchon, LA before, during, and after Hurricane Gustav. *Sensor reached its physical limit on measurements and did not record a maximum elevation

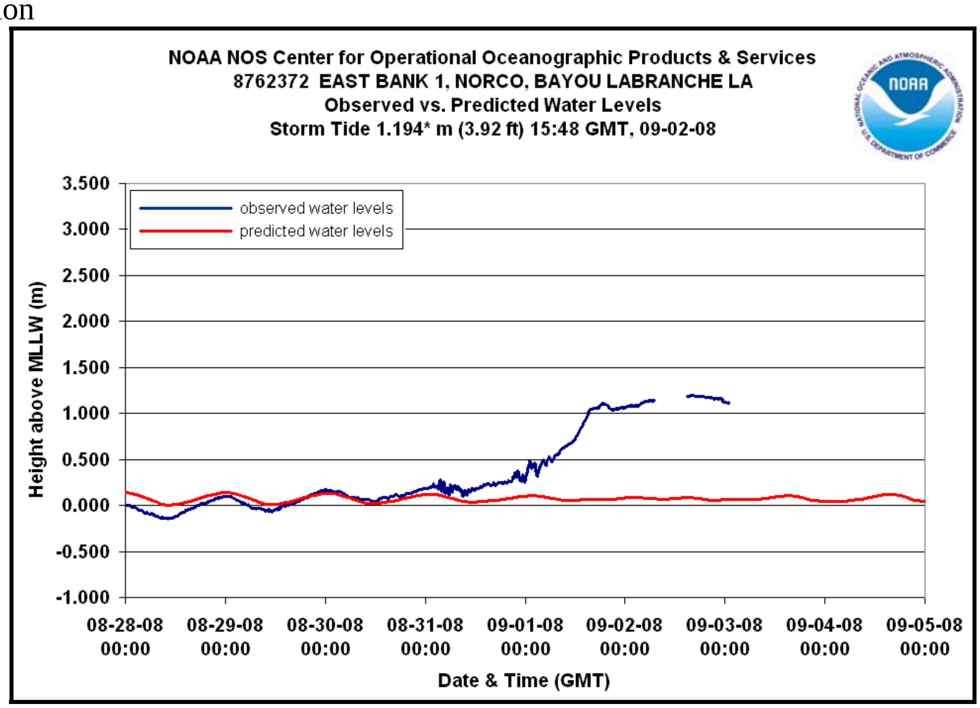


Figure 24. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at East Bank 1, LA before, during, and after Hurricane Gustav. *Sensor reached its physical limit on measurements and did not record a maximum elevation. Station's solar panels had been damaged.

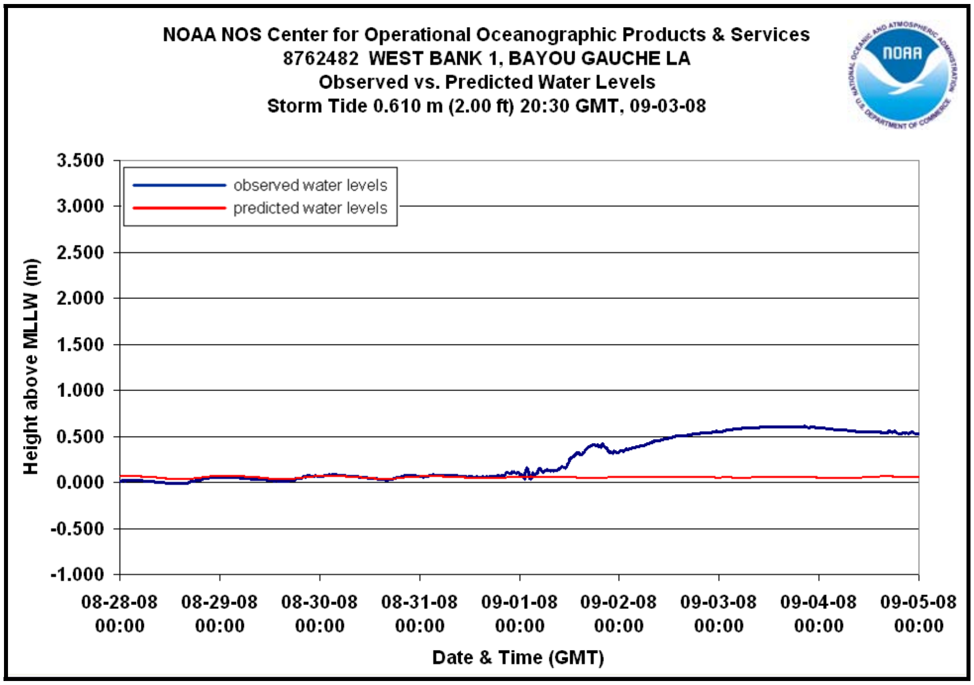


Figure 25. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at West Bank 1, LA before, during, and after Hurricane Gustav.

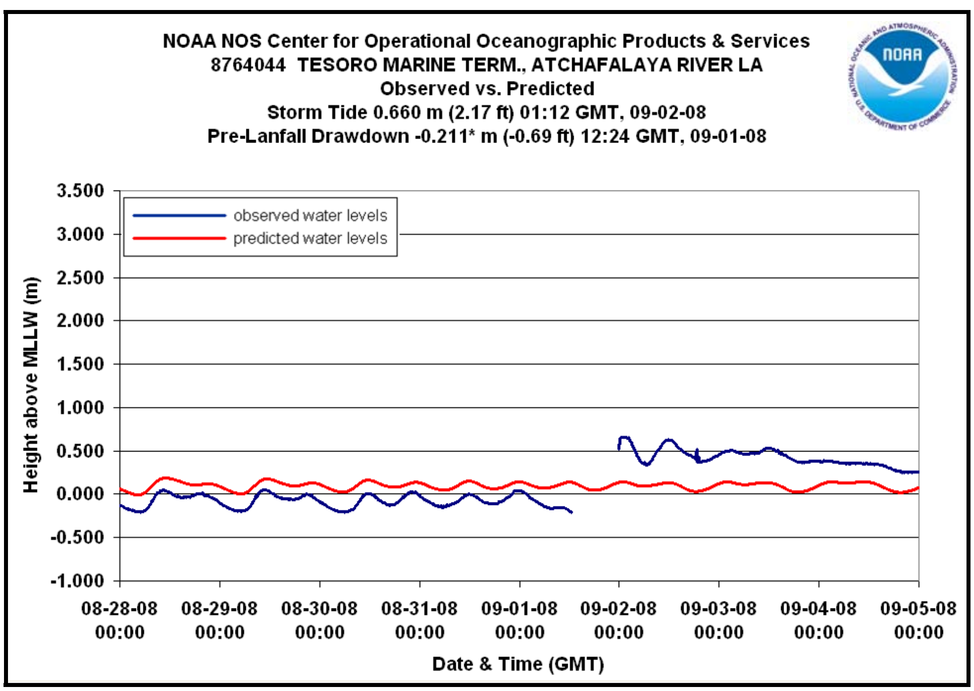


Figure 26. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Tesoro Marine Terminal, LA before, during, and after Hurricane Gustav. *Sensor reached its physical limit on measurements and did not record a minimum elevation.

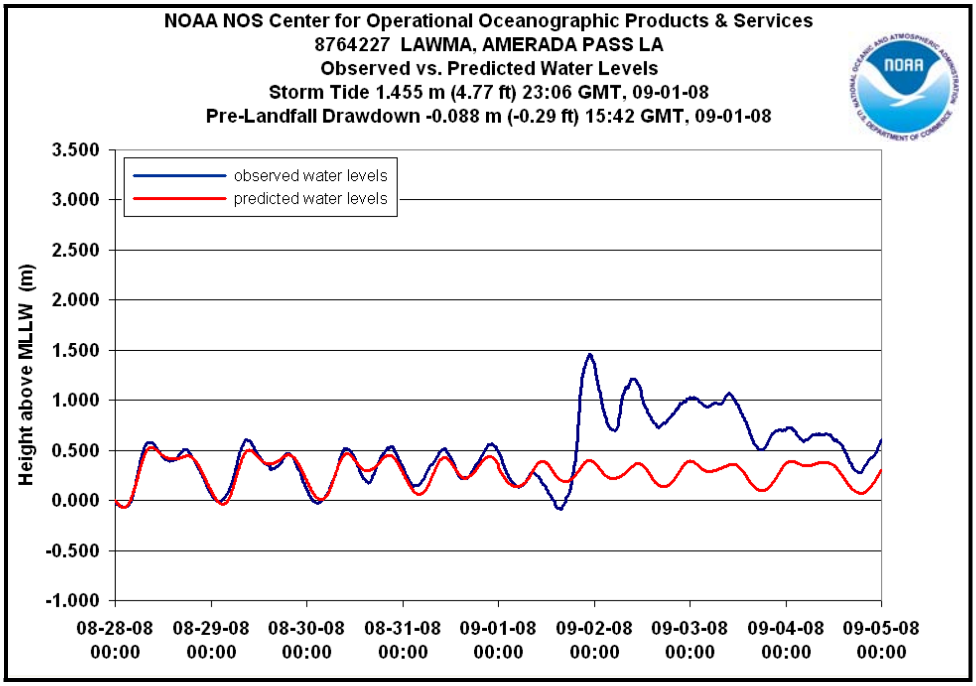


Figure 27. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at LAWMA, Amerada Pass, LA before, during, and after Hurricane Gustav.

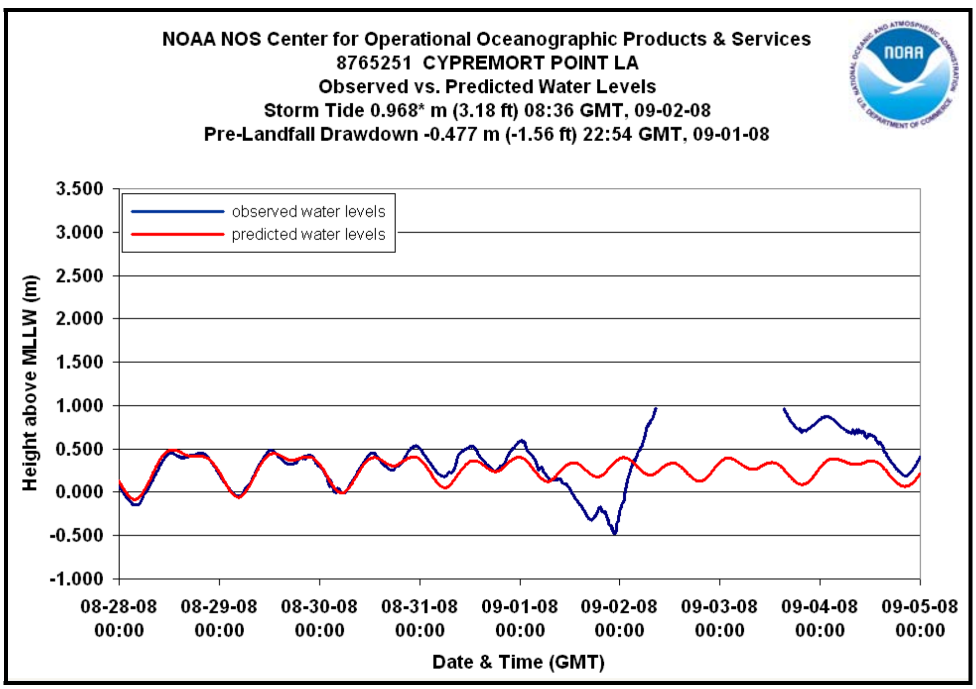


Figure 28. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Cypremort, LA before, during, and after Hurricane Gustav. *Sensor reached its physical limit on measurements and did not record a maximum elevation

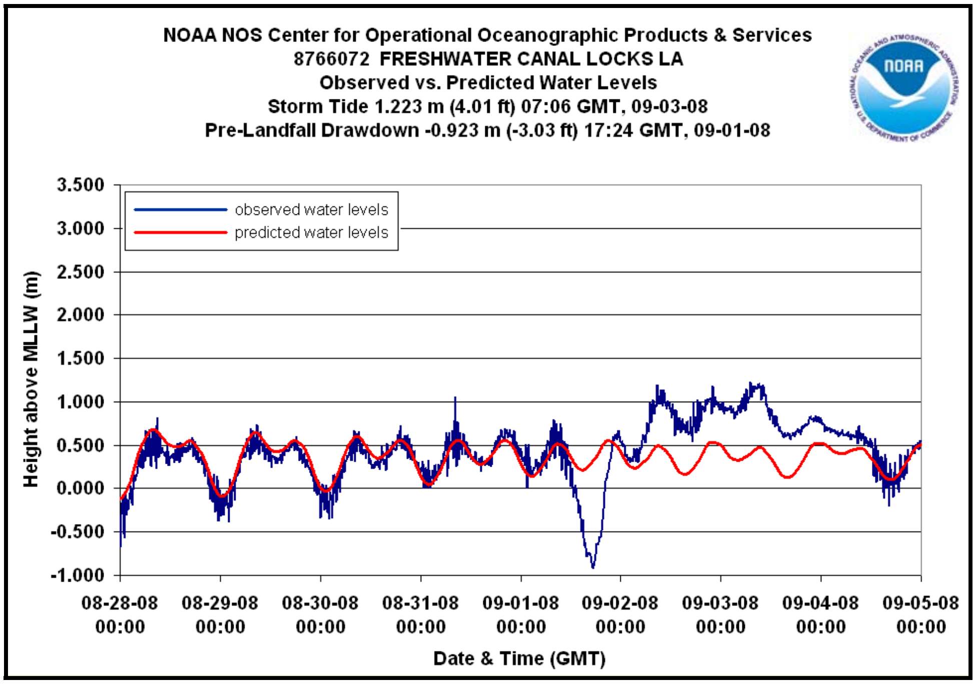


Figure 29. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Freshwater Canal Locks, LA before, during, and after Hurricane Gustav.

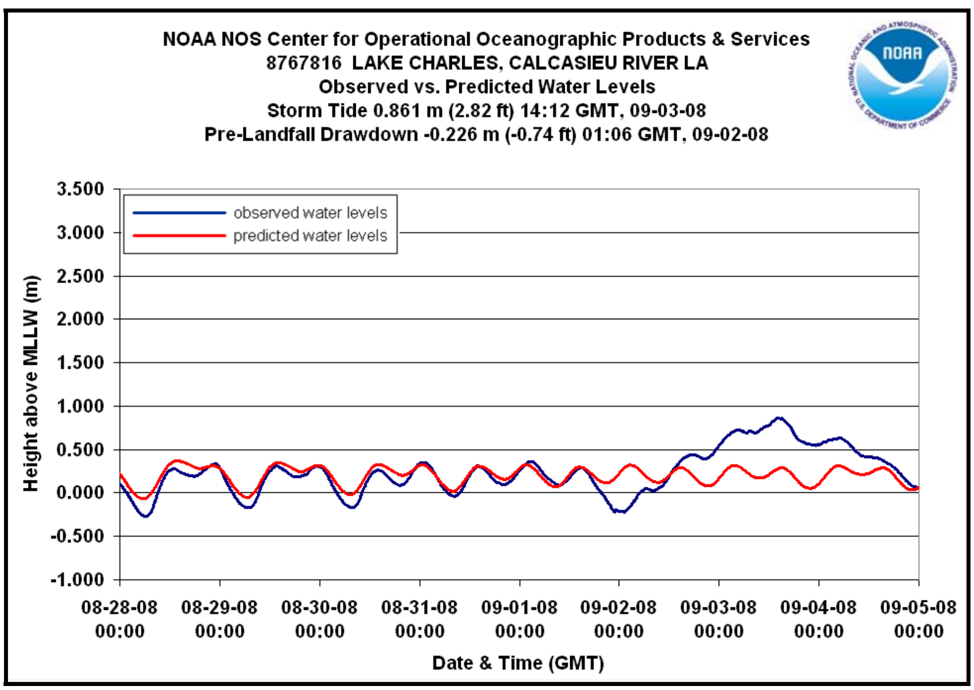


Figure 30. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Lake Charles, LA before, during, and after Hurricane Gustav.

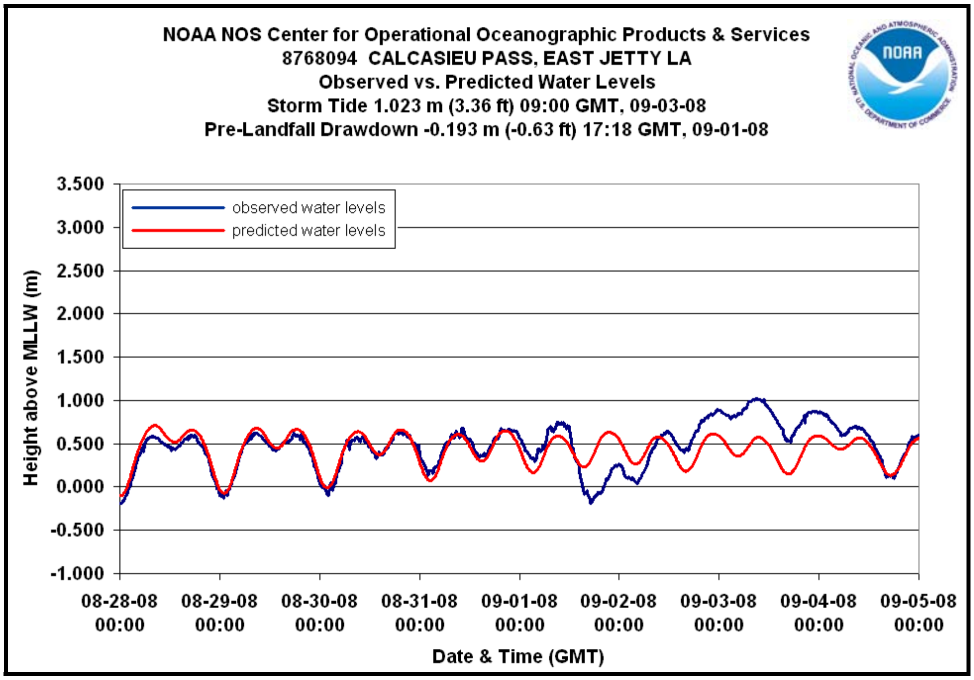


Figure 31. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Calcasieu Pass, LA before, during, and after Hurricane Gustav.

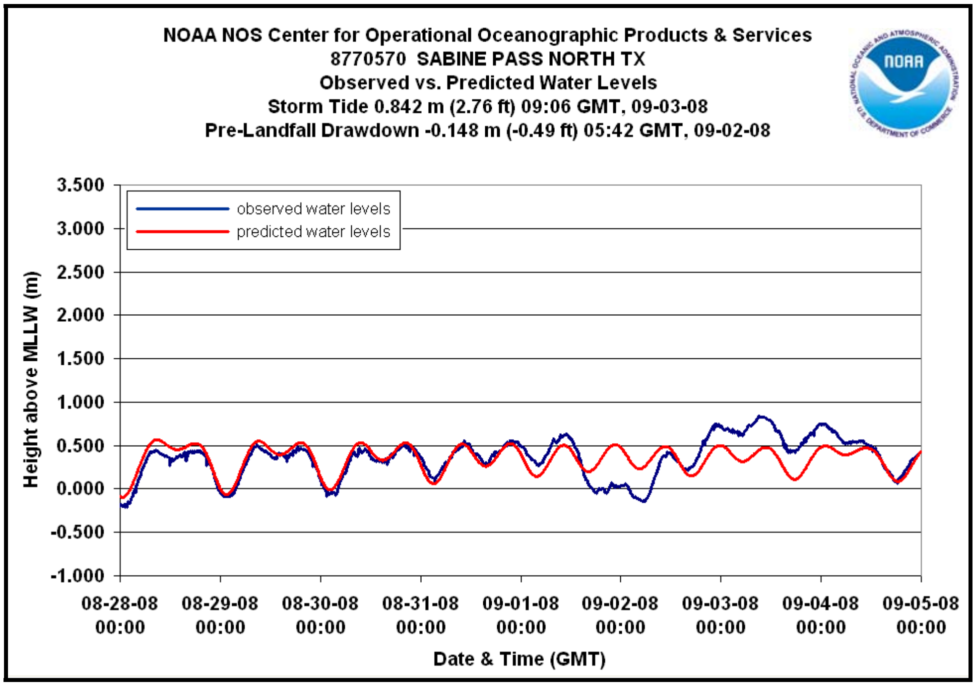


Figure 32. Time series of observed and predicted water levels above Mean Lower Low Water (MLLW) at Sabine Pass, TX before, during, and after Hurricane Gustav.

Appendix 1

Station Name	Station ID	Latitude	Longitude
Key West, FL	8724580	24.55333	-81.80833
Naples, FL	8725110	26.13000	-81.80667
Fort Myers, FL	8725520	26.64667	-81.87167
Port Manatee, FL	8726384	27.63667	-82.56333
C-CUT, FL	8726413	27.66333	-82.61833
St. Petersburg, FL	8726520	27.76000	-82.62667
Old Port Tampa, FL	8726607	27.85833	-82.55333
Mckay Bay Entrance, FL	8726667	27.91333	-82.42500
Berth 223, FL	8726669	27.91717	-82.44383
Seabulk, FL	8726673	27.92333	-82.44500
TPA Cruise Terminal 2, FL	8726694	27.93333	-82.43333
Cedar Key, FL	8727520	29.13500	-83.03167
Panama City, FL	8729108	30.15167	-85.66667
Pensacola, FL	8729840	30.40333	-87.21167
Dauphin Island, AL	8735180	30.25000	-88.07500
Coast Guard Sector Mobile, AL	8736897	30.64833	-88.05833
Mobile State Docks, AL	8737048	30.70833	-88.04333
Dock E, Port of Pascagoula, MS	8741041	30.34833	-88.50500
Pascagoula NOAA Lab, MS	8741533	30.35833	-88.56667
Gulfport Harbor, MS	8745557	30.36000	-89.08167
Bay Waveland Yacht Club, MS	8747437	30.32500	-89.32500
Shell Beach, LA	8761305	29.86833	-89.67333
Pilots Station East, SW Pass, LA	8760922	28.93167	-89.40667
Grand Isle, LA	8761724	29.26333	-89.95667
New Canal Station, LA	8761927	30.02667	-90.11333
Port Fourchon, LA	8762075	29.11500	-90.20000
East Bank 1, Norco, B. LaBranche, LA	8762372	30.05000	-90.36833
West Bank 1, Bayou Gauche, LA	8762482	29.77667	-90.41833
Tesoro Marine Terminal, LA	8764044	29.66667	-91.23667
LAWMA, Amerada Pass, LA	8764227	29.45000	-91.34000
Cypremort Point, LA	8765251	29.71333	-91.88000
Freshwater Canal Locks, LA	8766072	29.55500	-92.30500
Lake Charles, LA	8767816	30.22500	-93.22167
Calcasieu Pass, LA	8768094	29.76500	-93.34333
Sabine Pass North, TX	8770570	29.73000	-93.87000

Saffir-Simpson Scale for Hurricane Classification

	Wind Speed (Kts)	Wind Speed (MPH)	Pressure (mb)
Tropical Depression	20-34	23-38	
Tropical Storm	35-64	39-73	
Category 1	65-82	74-95	> 980
Category 2	83-95	96-110	965-979
Category 3	96-113	111-130	945-964
Category 4	114-135	131-155	920-944
Category 5	> 135	> 155	< 920

Appendix 2

Excerpt From:

Tide and Current Glossary, NOAA National Ocean Service, Silver Spring, MD, 2000 (http://www.tidesandcurrents.noaa.gov/publications/glossary2.pdf) and the Storm QuickLook Frequently Asked Questions homepage (http://www.tidesandcurrents.noaa.gov/quicklook_faqs.shtml)

Bench mark (BM): A fixed physical object or mark used as reference for a horizontal or vertical datum. A tidal bench mark is one near a tide station to which the tide staff and tidal datums are referred. A primary bench mark is the principal mark of a group of tidal bench marks to which the tide staff and tidal datums are referred.

Chart datum: The datum to which soundings on a chart are referred. It is usually taken to correspond to a low-water elevation, and its depression below mean sea level is represented by the symbol Z_o. Since 1980, chart datum has been implemented to mean lower low water for all marine waters of the United States, its territories, Commonwealth of Puerto Rico, and Trust Territory of the Pacific Islands. See datum and National Tidal Datum Convention of 1980.

Datum (vertical): For marine applications, a base elevation used as a reference from which to reckon heights or depths. It is called a tidal datum when defined in terms of a certain phase of the tide. Tidal datums are local datums and should not be extended into areas which have differing hydrographic characteristics without substantiating measurements. In order that they may be recovered when needed, such datums are referenced to fixed points known as bench marks. See chart datum and bench marks.

Geodetic datum: See National Geodetic Vertical Datum of 1929 (NGVD 1929) and North American Vertical Datum of 1988 (NAVD 1988).

Mean Lower Low Water (MLLW): A tidal datum. The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch. See National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch.

North American Vertical Datum of 1988 (NAVD 1988): A fixed reference for elevations determined by geodetic leveling. The datum was derived from a general adjustment of the first-order terrestrial leveling nets of the United States, Canada, and Mexico. In the adjustment, only the height of the primary tidal bench mark, referenced to the International Great Lakes Datum of 1985 (IGLD 1985) local mean sea level height value, at Father Point, Rimouski, Quebec, Canada was held fixed, thus providing minimum constraint. NAVD 1988 and IGLD 1985 are identical. However, NAVD 1988 bench mark values are given in Helmert orthometric height units while IGLD 1985 values are in dynamic heights. See International Great Lakes Datum of 1985, National Geodetic Vertical Datum of 1929, and geopotential difference.

National Geodetic Vertical Datum of 1929 (NGVD 1929): A fixed reference adopted as a standard geodetic datum for elevations determined by leveling. The datum was derived for surveys from a general adjustment of the first-order leveling nets of both the United States and Canada. In the adjustment, mean sea level was held fixed as observed at 21 tide stations in the United States and 5 in Canada. The year indicates the time of the general adjustment. A synonym for Sea-level Datum of 1929. The geodetic datum is fixed and does not take into account the changing stands of sea level. Because there are many variables affecting sea level, and because the geodetic datum represents a best fit over a broad area, the relationship between the geodetic datum and local mean sea level is not consistent from one location to another in either time or space. For this reason, the National Geodetic Vertical Datum should not be confused with mean sea level. See North American Vertical Datum of 1988 (NAVD 1988).

National Tidal Datum Epoch: The specific l9-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken and reduced to obtain mean values (e.g., mean lower low water, etc.) for tidal datums. It is necessary for standardization because of periodic and apparent secular trends in sea level. The present National Tidal Datum Epoch is from 1983 to 2001. It is reviewed annually for possible revision and must be actively considered for revision every 25 years.

National Water Level Observation Network (NWLON): The network of tide and water level stations operated by the National Ocean Service along the marine and Great Lakes coasts and islands of the United States.

Tide: The periodic rise and fall of a body of water resulting from gravitational interactions between Sun, Moon, and Earth. The vertical component of the particulate motion of a tidal wave. Although the accompanying horizontal movement of the water is part of the same phenomenon, it is preferable to designate this motion as tidal current. Same as astronomic tide.

Tide (water level) gauge: An instrument for measuring the rise and fall of the tide (water level).

Storm Surge: The onshore rush of sea or lake water caused by the high wind and the low pressure centers associated with a landfalling hurricane or other intense storm. The amplitude of the storm surge at any given location is dependent upon the orientation of the coast line with the storm track, the intensity, size and speed of the storm, and the local bathymetry. In practice, storm surge is usually estimated by subtracting the normal or astronomical tide from the observed storm tide at tide stations. This difference between observed storm tides and astronomical tide can have other components such as regional elevated mean sea levels in the Gulf of Mexico due to the Loop Current, elevated sea levels on the West Coast due to El Niño Southern Oscillation (ENSO), or local elevated sea levels due to river runoff in tidal rivers.

Storm Tide: The maximum water level elevation measured by a water level station during storm events. Depending on location, the storm tide is the potential combination of storm surge, local astronomical tide, regional sea level variations and river runoff during storm events. Since wind generated waves ride on top of the storm surge (and are not included in the definition), the total instantaneous elevation may greatly exceed the predicted storm surge plus astronomical tide. It is potentially catastrophic, especially on low lying coasts with gently sloping offshore topography. NOAA measures storm tide elevations from a common reference datum of Mean Lower Low Water (MLLW) which is the U.S Nautical Chart Datum.

For further information on the Storm Technical Reports and Storm QuickLook product, contact:

NOAA, National Ocean Service
CO-OPS, Products and Services N/OPS3
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E-mail: Storm QuickLook (tide.predictions@noaa.gov)