Numerical Modeling Study of the Western Closure Complex Project

Summary

The New Orleans District (MVN) contracted the Coastal and Hydraulics Laboratory (CHL) to examine the effects of the proposed Western Closure Complex (WCC) project on surge levels and wave heights with the numerical models ADCIRC and STWAVE. The WCC project will be constructed to reduce the risk of flooding and consists of a floodgate south of the Harvey and Algiers canals. The purpose of the WCC floodgate is to reduce flooding north of the gate location during storm events. A detailed description of the floodgate specifications is provided by MVN. This section focuses on the difference in surge and waves with and without the WCC floodgate in place.

Storm water levels and wave heights were computed with the proposed Western Closure Complex project in place and compared with the base condition (the 2010 grid previously developed for LACPR/FEMA). A suite of 10 storms was selected for simulation by CHL in consultation with MVN from the existing Louisiana storm suite database developed for previous FEMA and LACPR studies. The performance of the project was evaluated by conducting a sensitivity analysis, i.e. by comparing the WCC simulated storm water levels and wave heights to the previously run base condition simulated results.

In general, the changes in maximum surge as a result of the WCC project are small for all storms simulated, on the order of 0.2 ft or less for areas south of the project floodgate location. Likewise, the changes in maximum waves as a result of the WCC project are small for all storms simulated, on the order of 0.5 ft or less for areas south of the project floodgate location. For areas north of the WCC floodgate, the maximum storm surge is reduced by 2-11.5 ft in the Harvey Canal and Intracoastal Waterway, depending on the storm characteristics (such as track) and statistical surge level (return frequency). Changes in maximum wave heights were not computed for areas north of the WCC floodgate due to the resolution of the STWAVE model domain.

Study Area

The WCC project is located on the west bank of the Mississippi River, south of New Orleans and includes a floodgate south of the intersection of the Harvey Canal and Intracoastal Waterway. The bathymetry and topography are shown in Figure 1.

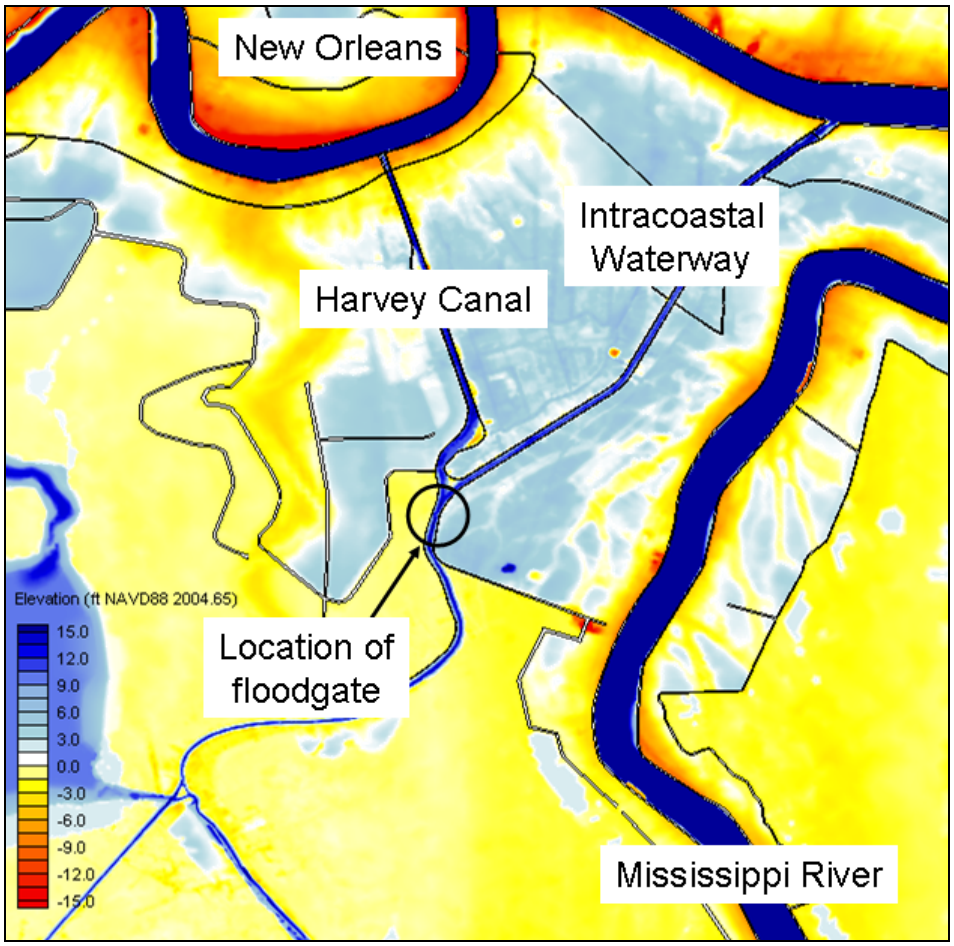


Figure 1: Bathymetry/topography (ft NAVD88 2004.65) for study area.

Grid Modifications

MVN provided CHL with geo-referenced data files containing the location of the proposed project and the base grid levee alignment was modified accordingly. The base grid levee heights in this area are based upon the authorized 2010 levee elevations and are generally 30 ft high. The floodgate was also modeled with a height of 30 ft. Figure 2 shows the base grid levee alignment and the grid modifications for the with-project WCC alignment. Figure 3 shows the bathymetry and topography in the immediate vicinity of the WCC floodgate for the base grid as well as the modified with-project WCC alignment.

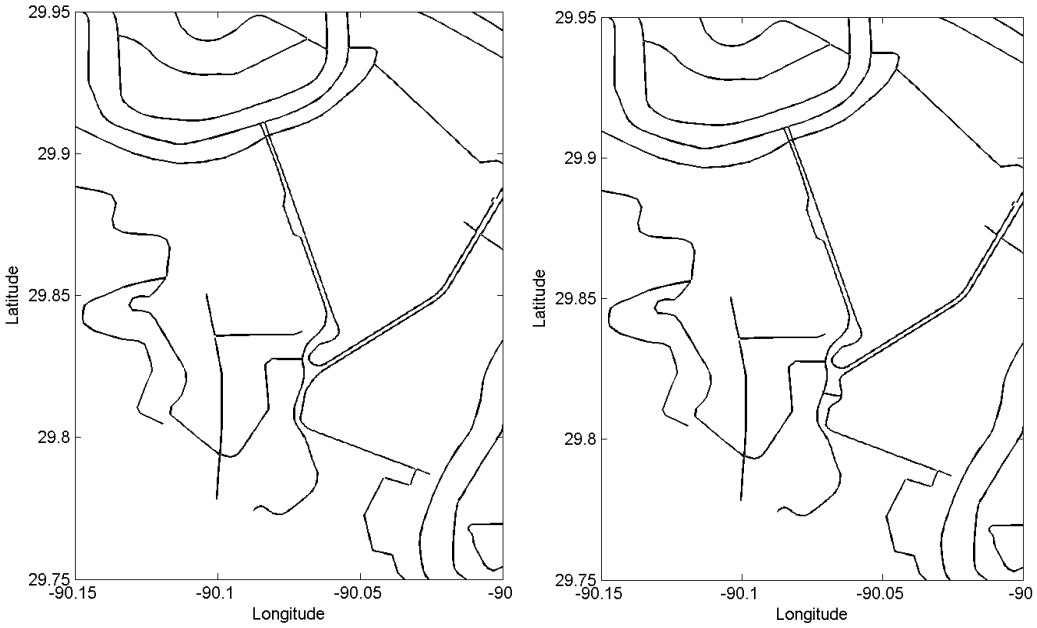


Figure 2: Base grid (2010) levee alignment (left panel) and with-project grid (WCC) levee alignment (right panel).

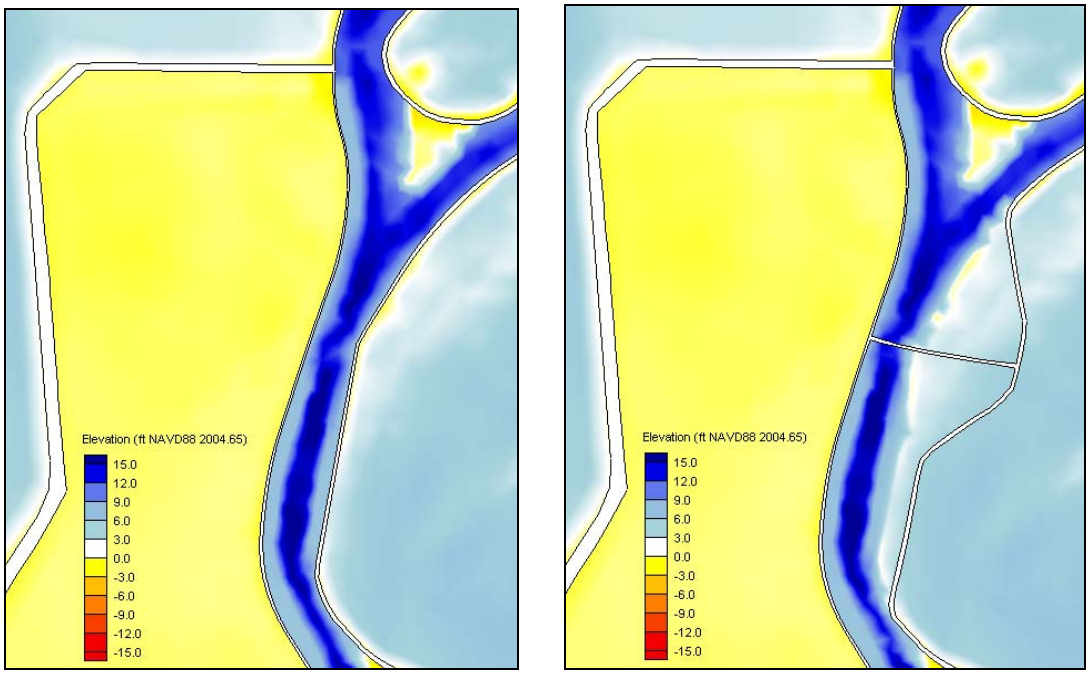


Figure 3: Bathymetry/topography (ft NAVD88 2004.65) in the immediate vicinity of the WCC floodgate for the base grid 2010 alignment (left panel) and the modified with-project WCC alignment (right panel).

Storm Selection

As requested by MVN, ten storms were to be selected for simulation according to the following criteria: 1) three storms having a surge level corresponding to a 50-year water level in the vicinity of the WCC within +/- 0.5 ft; 2) three storms having a surge level corresponding to a 100-year water level in the vicinity of the WCC within +/- 0.5 ft; 3) three storms having a surge level corresponding to a 500-year water level in the vicinity of the WCC within +/- 0.5 ft; and lastly, 4) Storm 050 because the characteristics of that synthetic storm were most similar to recently occurring Hurricane Gustav (2008). The trajectories for the WCC storm suite are shown in Figure 4.

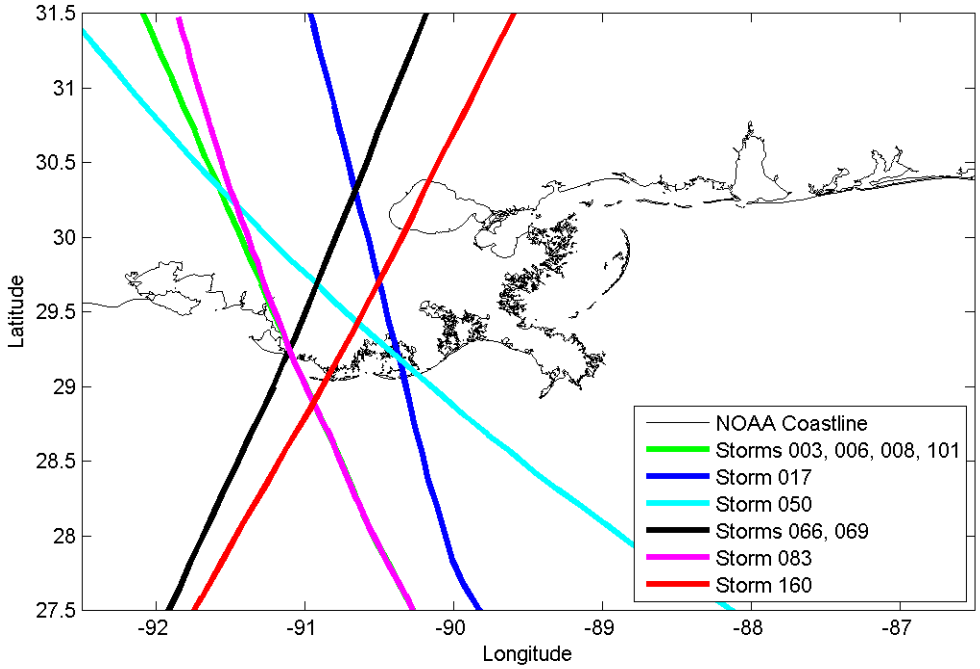


Figure 4: Storm tracks for the WCC storm suite.

Five save locations in the vicinity of the WCC from the L274 save point set were analyzed to aid in the selection of storms that produce the various water levels (50-yr, 100-yr, 500-yr) in the project area (Figure 5). Statistics for these and other save locations were computed in a prior study (LACPR/FEMA) and the statistical surge levels at the five selected save locations are given in Table 1. Knowing the statistical 50-yr, 100-yr, and 500-yr water levels at these five save locations, the previously simulated storms were examined to see which storms produced the statistical levels at the particular locations of interest within +/- 0.5 ft. That is, the storm responses for all 152 LAEAST storms were examined at each of the five points to determine which storms produce the statistical 50-, 100-, and 500-yr water levels. For example, at Point 10, the 50-yr level was determined to be 6.0 ft. Storms 11, 12, 66, 94, 137, and 153 all produced water levels around the 6.0 ft mark. For Point 37, the 50-yr level was determined to be 4.6 ft. Storms 3, 11, 66, 82, 101, and 112 all produced water levels around the 4.6 ft mark. This was repeated for the other three save locations and storms that produced the 50-yr water levels at those locations are given in Table 2. The storms that came closest to producing

the 50-yr water level at most/all of the five points are Storms 003, 066, and 101. These storms were therefore selected for simulation. This procedure was repeated for the 100-yr and 500-yr return periods and the resulting selected storms are also given in Table 2.

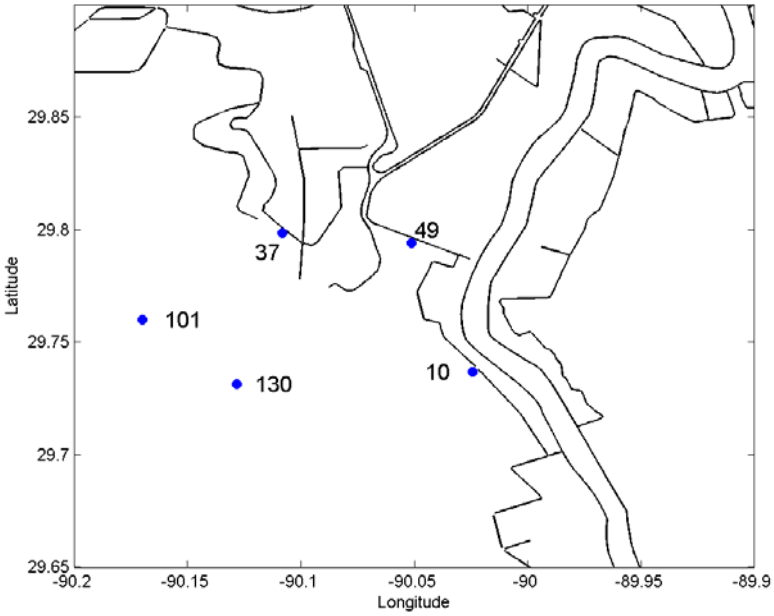


Figure 5: Location of the five L274 save points analyzed as part of the storm selection procedure. The background image is the base condition levee alignment.

Table 1: Surge Levels from 2010 Statistics.

L274 Save Point	**50-yr surge (ft NAVD88 2004.65)**	**100-yr surge (ft NAVD88 2004.65)**	**500-yr surge (ft NAVD88 2004.65)**
10	6.0	8.1	12.3
37	4.6	6.3	9.4
49	5.4	7.5	11.6
101	4.7	6.1	8.4
130	5.3	7.1	10.2

Table 2. Storms that Produced Statistical Surge Levels in Table 1.

L274 Point	50-yr surge	100-yr surge	500-yr surge
10	011 012 066 094 137 153	008 093 102 111	017 069
37	003 011 066 082 101 112	006 008 087 111 118 127 145 160	017 069 083 097
49	003 011 012 066 082 101 152 153	006 008 072 102 111 160	017 069 149
101	003 066 067 072 082 101 118 131	006 008 014 015 053 093 126 145 160	018 069 083 097 140
130	003 011 012 066 067 068 082 101 112 131 137 153	006 008 072 102 126 127 145 160	017 069
Selected Storms	**003 066 101**	**006 008 160**	**017 069 083**

Surge Response

In general, the changes in maximum surge as a result of the WCC project are small for all storms simulated for areas south of the project floodgate, on the order of 0.2 ft or less. For the with project condition, surge is prevented from propagating north of the floodgate into the Harvey Canal and Intracoastal Waterway. Instead, this volume of water is distributed over a much larger area south of the floodgate. Hence, the changes in maximum surge are small for areas south of the floodgate.

Maximum surge and difference results are shown in Figures 6-8 for Storm 160 (a storm that produced the 100-year water level in the vicinity of the project for the base condition). For areas north of the WCC floodgate, the maximum storm surge is reduced by 2-11.5 ft in the Harvey Canal and Intracoastal Waterway, depending on the storm characteristics (such as track) and statistical surge level (return frequency). In general, the maximum storm surge is reduced by 4-6 ft in the Harvey Canal and Intracoastal Waterway for those storms which produce the 50-year water level (Storm 003, Storm 066, and Storm 101), 4.5-7 ft for those storms which produce the 100-year water level (Storm 006, Storm 008, and Storm 160), and 7.5-11.5 ft for those storms which produce the 500-year water level (Storm 017, Storm 069, and Storm 083). For Storm 050 (Gustav-like storm), the maximum storm surge is reduced by 2-4 ft in the Harvey Canal and Intracoastal Waterway. Maximum surge and difference maps for the base condition (2010) and with-project condition (WCC) for the entire storm suite are provided in Appendices A through C.

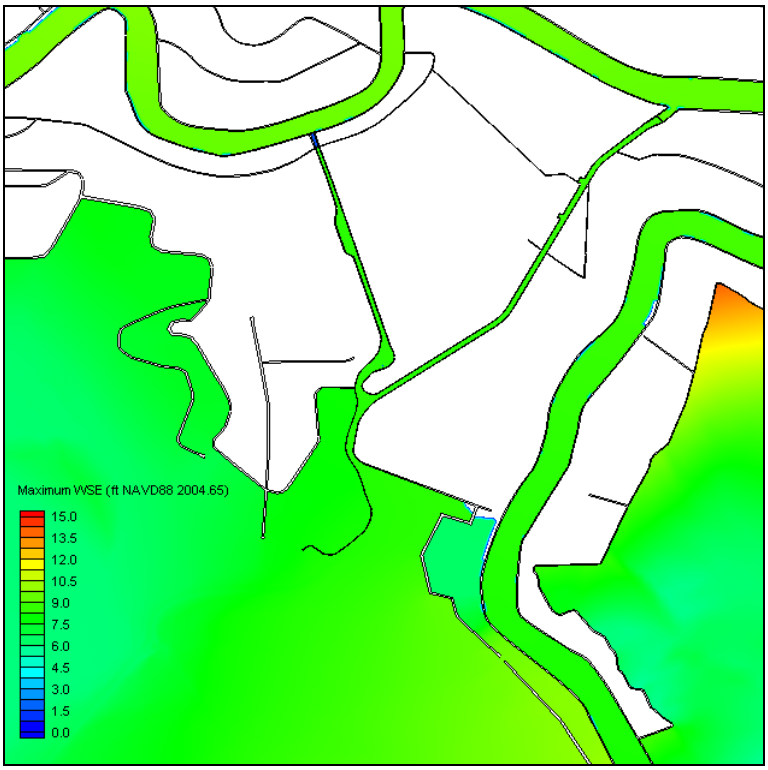


Figure 6: Maximum Surge (ft NAVD 88 2004.65) for Storm 160 for the base (2010) condition.

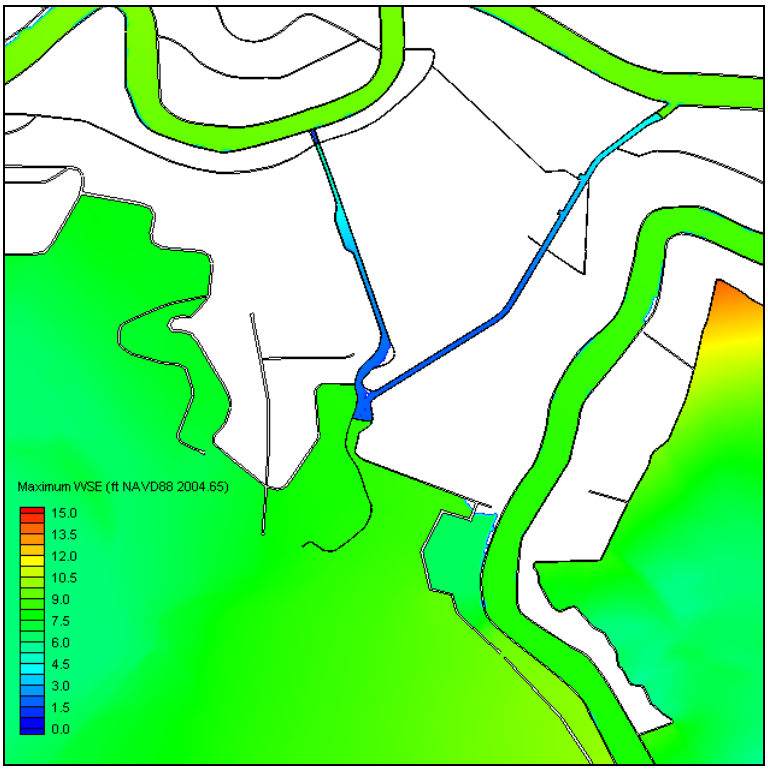


Figure 7: Maximum Surge (ft NAVD 88 2004.65) for Storm 160 for the with-project (WCC) condition.

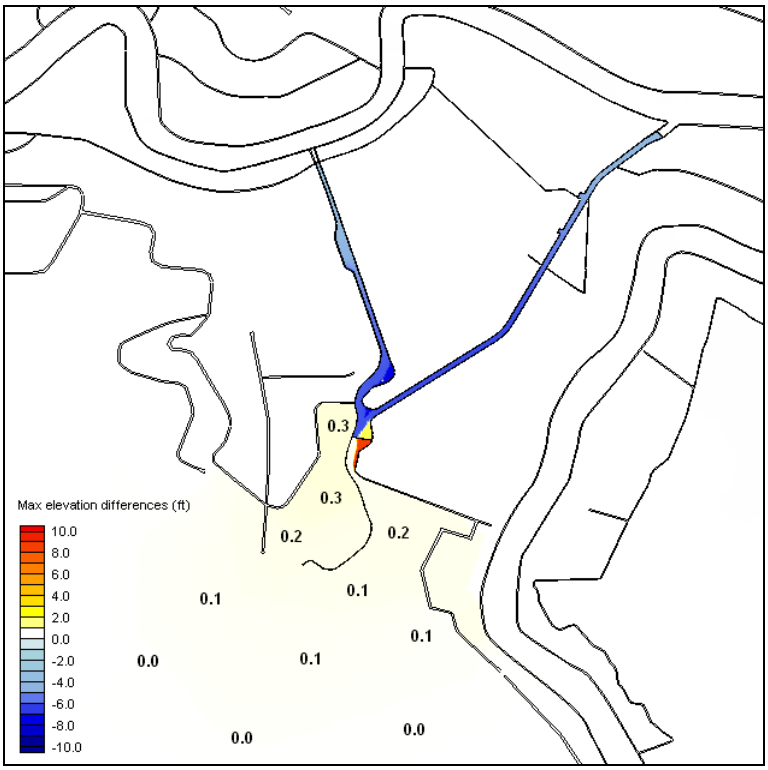


Figure 8: Differences in Maximum Surge (ft) for Storm 160: WCC minus Base condition.

Waves Response

The resolution of the STWAVE grid is fixed at 200 meters throughout the project site. Therefore, it is not possible to simulate the wave behavior in the Harvey Canal and Intracoastal Waterway immediately north of the WCC floodgate structure with the pre-existing STWAVE grid. However, for areas south of the WCC floodgate, the changes in maximum waves as a result of the WCC project are small for all storms simulated, on the order of 0.5 ft or less. Because the surge differences are small south of the floodgate, the changes in maximum wave height are likewise small.

Maximum waves and difference results are shown in Figures 9-11 for Storm 160 (a storm which produced the 100-year water level in the vicinity of the project for the base condition). Maximum wave heights and difference maps for the base condition (2010) and with-project condition (WCC) for the entire storm suite are provided in Appendices D through F. Note that the effects of bottom friction on waves are not included in this report.

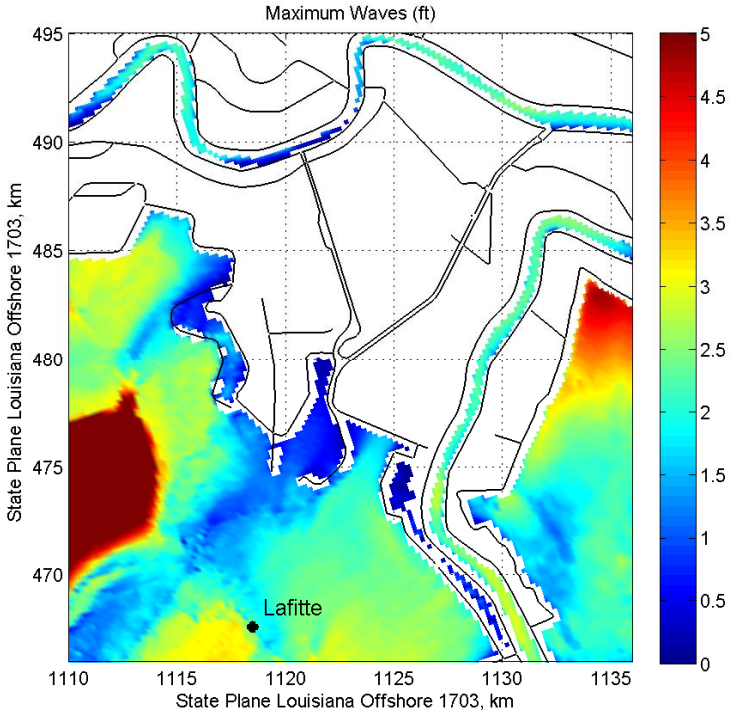


Figure 9: Maximum Waves (ft) for Storm 160 for the base condition.

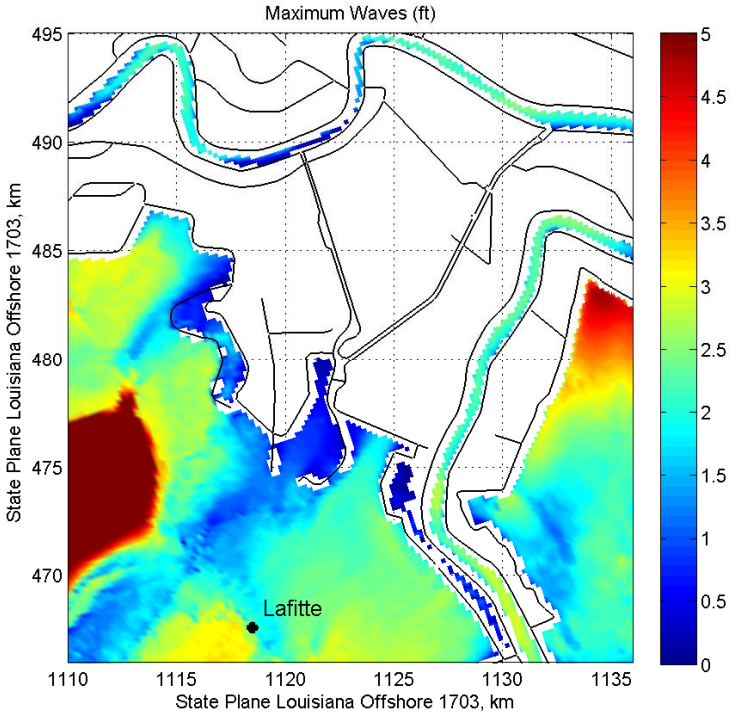


Figure 10: Maximum waves (ft) for Storm 160 for the with-project condition.

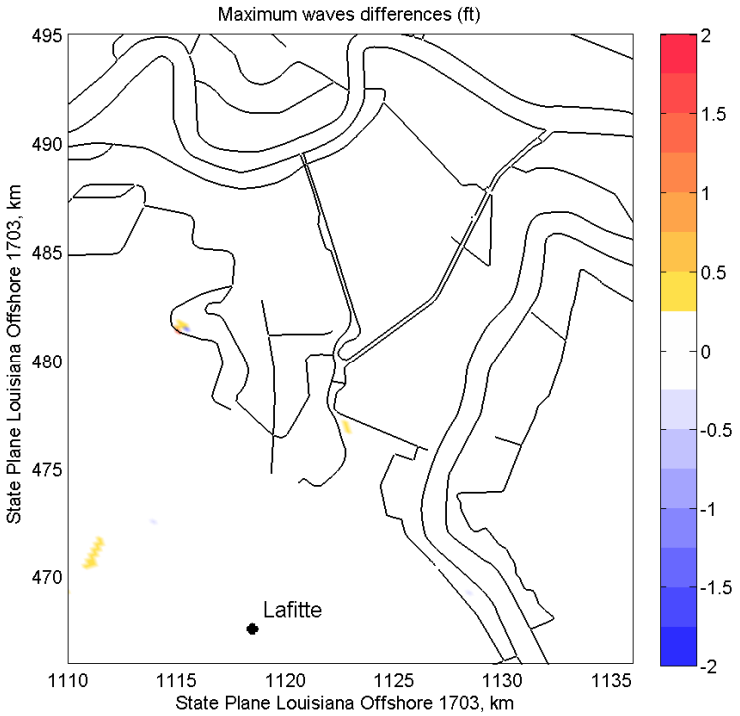


Figure 11: Differences in Maximum Wave Heights (ft) for Storm 160: WCC minus 2010.

Save Locations and Time Series

Six save locations were selected by MVN and CHL for further examination of water level time series. The save locations sites are shown in Figure 12 and listed in Table 3 below.

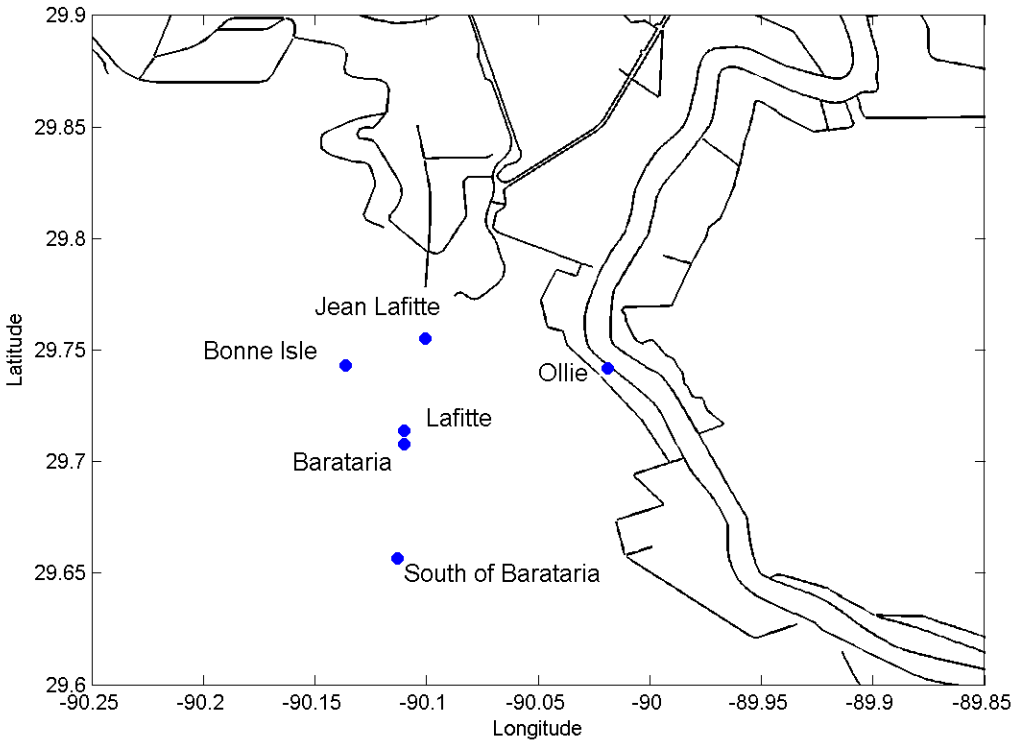


Figure 12: Location map of the six save points.

Table 4 gives the maximum surge values for each of the ten storms at each of the six save locations for the base (2010) and with-project (WCC) conditions. Note that data marked "Dry" indicates that the particular save location did not inundate for a given storm event. For all of the six save locations, the difference in maximum surge is small, on the order of 0.20 ft or less for all storms simulated. The average difference in maximum surge is 0.03 ft.

Table 5 gives the maximum wave height values for each of the ten storms at each of the six save locations for the base (2010) and with-project (WCC) conditions. The six save locations are located to the west of the Mississippi River; therefore the values given in Table 5 are based on the South STWAVE domain. For all of the six save locations, the difference in maximum wave height values is small, on the order of 0.03 ft or less for all storms simulated. Note that the effects of bottom friction on waves are not included in this report.

Surge time series results are shown in Figure 13 for Storm 160 (a storm which produced the 100-year water level in the vicinity of the project for the base condition) at Lafitte. The difference in simulated storm surge between the base and with-project scenarios is negligible. The full set of time series for each save location and storm are located in Appendix G.

Table 3: Coordinates for the six save points.

Save Point	Name	Longitude	Latitude
1	South of Barataria	-90.112850000	29.656869444
2	Jean Lafitte	-90.100408333	29.755002778
3	Bonne Isle	-90.136361111	29.743013889
4	Lafitte	-90.110091667	29.713788889
5	Barataria	-90.110086111	29.708047222
6	Ollie	-90.018895800	29.741990400

Table 4: Maximum surge values (ft NAVD88 2004.65) for each of the ten storms at each of the six save locations for the base (2010) and with-project (WCC) conditions.

	South of Barataria		Jean Lafitte		Bonne Isle		Lafitte		Barataria		Ollie	
	2010	WCC	2010	WCC	2010	WCC	2010	WCC	2010	WCC	2010	WCC
003	5.79	5.79	5.12	5.23	4.68	4.72	5.54	5.55	5.70	5.70	4.98	5.00
006	7.64	7.64	6.78	6.94	6.11	6.16	7.30	7.30	7.45	7.44	6.37	6.40
008	7.84	7.85	6.88	7.03	6.29	6.34	7.44	7.45	7.61	7.61	6.44	6.47
017	11.24	11.24	10.81	10.85	8.40	8.56	11.15	11.17	11.28	11.28	12.57	12.57
050	4.65	4.65	4.08	4.09	3.58	3.60	4.35	4.35	4.55	4.55	Dry	Dry
066	5.30	5.30	5.34	5.40	4.71	4.76	5.39	5.40	5.52	5.52	5.26	5.29
069	10.53	10.54	10.99	11.07	9.73	9.81	10.83	10.86	10.85	10.87	12.30	12.33
083	10.17	10.17	10.06	10.15	9.76	9.79	9.97	10.00	10.06	10.07	10.08	10.17
101	6.04	6.04	5.20	5.25	4.74	4.77	5.66	5.67	5.83	5.84	4.99	5.01
160	7.90	7.90	7.83	7.89	6.26	6.36	7.88	7.92	7.93	7.96	9.12	9.16

Table 5: Maximum wave heights (ft NAVD88 2004.65) for each of the ten storms at each of the six save locations for the base (2010) and with-project (WCC) conditions.

	South of Barataria		Jean Lafitte		Bonne Isle		Lafitte		Barataria		Ollie	
	2010	WCC	2010	WCC	2010	WCC	2010	WCC	2010	WCC	2010	WCC
003	1.05	1.05	1.15	1.15	0.52	0.52	0.52	0.52	1.12	1.12	0.00	0.00
006	1.87	1.87	1.84	1.84	1.15	1.15	1.15	1.15	1.71	1.71	0.00	0.00
008	2.03	2.03	1.94	1.94	1.25	1.25	1.25	1.25	1.80	1.80	0.00	0.00
017	3.94	3.94	3.54	3.54	2.76	2.76	2.76	2.76	3.41	3.41	0.00	0.00
050	0.69	0.69	0.82	0.82	0.10	0.10	0.10	0.10	0.85	0.85	0.00	0.00
066	1.02	1.02	1.31	1.31	0.66	0.66	0.66	0.66	1.38	1.38	0.00	0.00
069	3.25	3.25	3.15	3.15	2.56	2.56	3.15	3.12	3.08	3.08	0.00	0.00
083	3.15	3.15	2.99	2.99	2.59	2.62	2.72	2.72	2.59	2.59	0.00	0.00
101	1.18	1.18	1.15	1.15	0.56	0.56	1.21	1.21	1.15	1.15	0.00	0.00
160	2.20	2.20	1.80	1.80	1.57	1.57	2.20	2.20	2.36	2.36	0.00	0.00

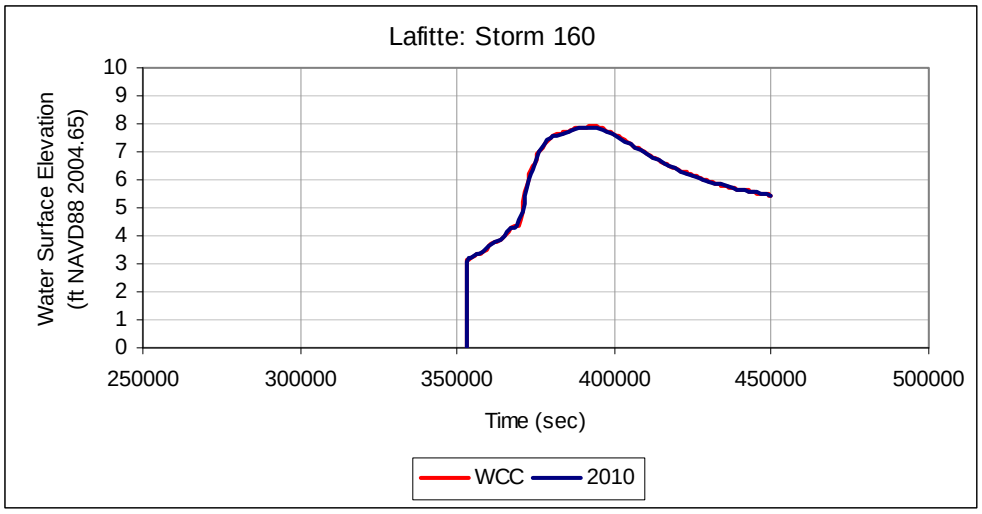
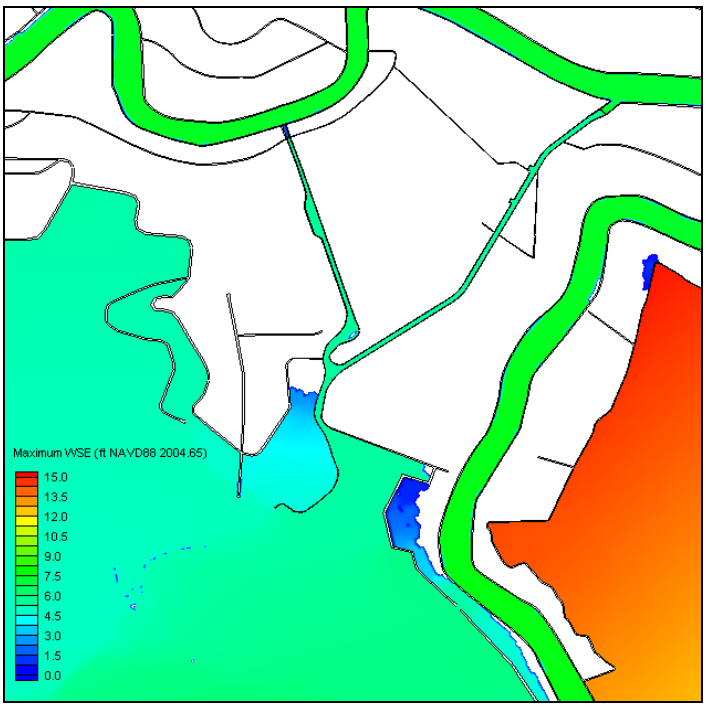


Figure 13: Time series of surge at Lafitte for Storm 160 for the base (2010) and with-project (WCC) conditions.

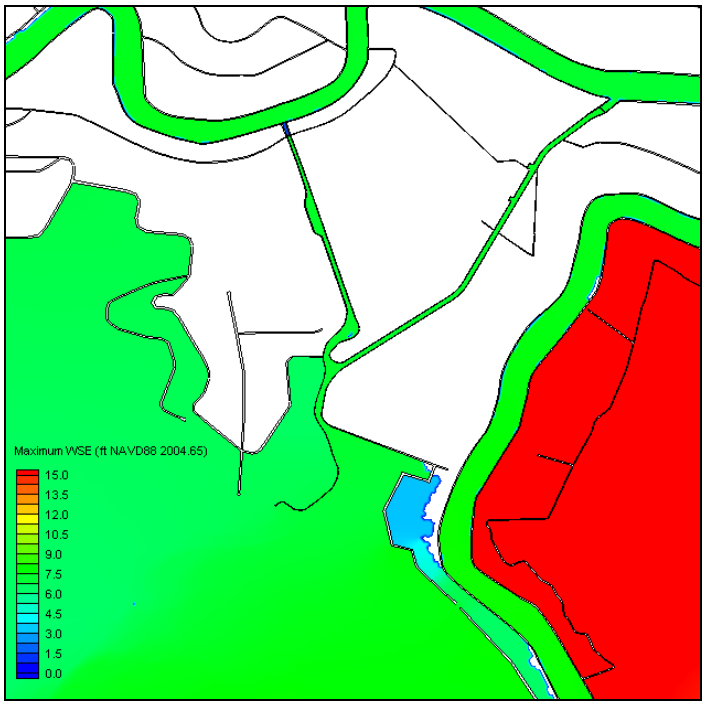
Conclusions

In general, the changes in maximum surge as a result of the WCC project are small for all storms simulated, on the order of 0.2 ft or less for areas south of the project floodgate location. Likewise, the changes in maximum waves as a result of the WCC project are small for all storms simulated, on the order of 0.25 ft or less for areas south of the project floodgate location. For areas north of the WCC floodgate, the maximum storm surge is reduced by 2-11.5 ft in the Harvey Canal and Intracoastal Waterway, depending on the storm characteristics (such as track) and statistical surge level (return frequency). Changes in maximum wave heights were not computed for areas north of the WCC floodgate due to the resolution of the STWAVE model domain.

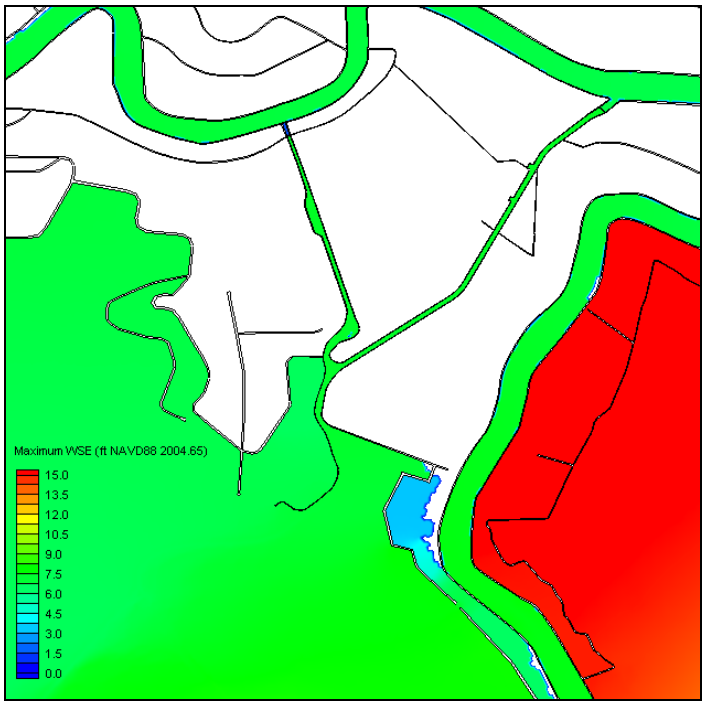
Appendix A: Maximum Surge Figures for the Base Condition (2010)



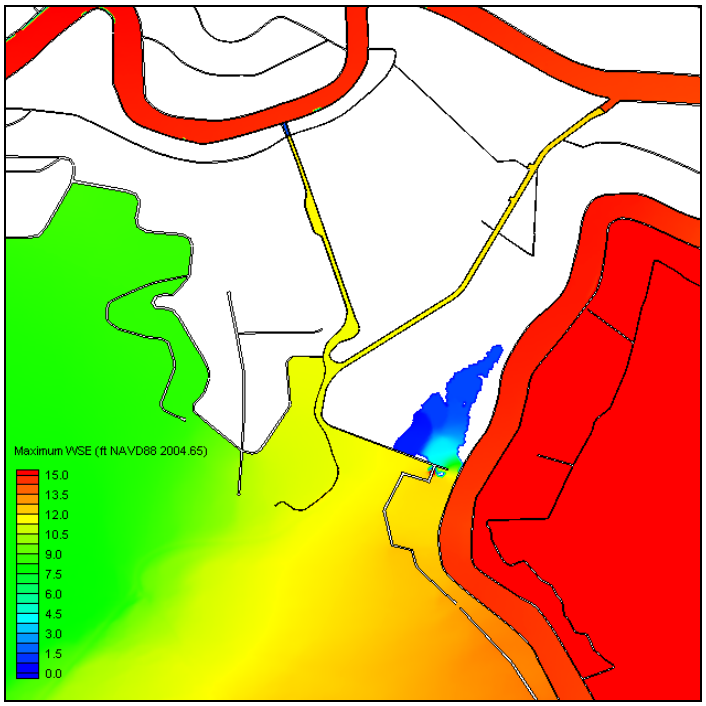
Maximum Surge (ft NAVD88 2004.65) for Storm 003



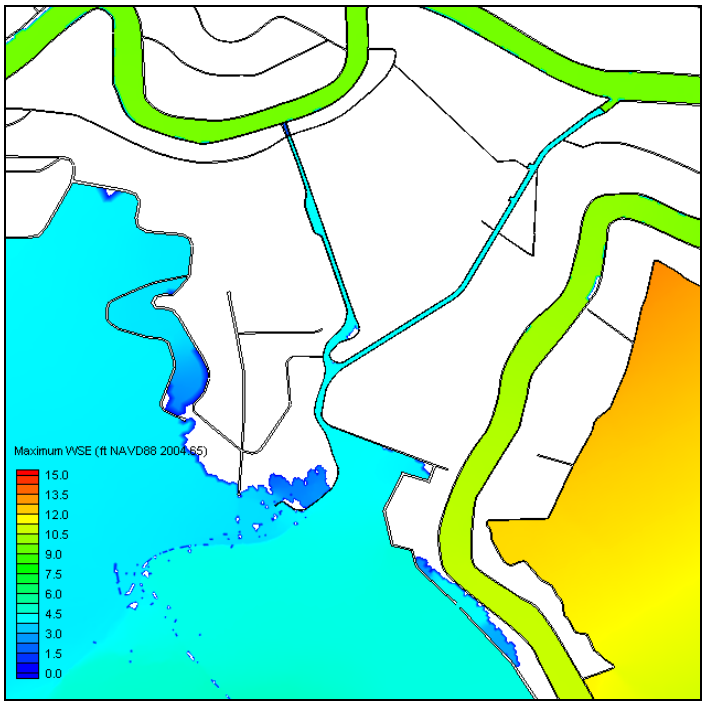
Maximum Surge (ft NAVD88 2004.65) for Storm 006



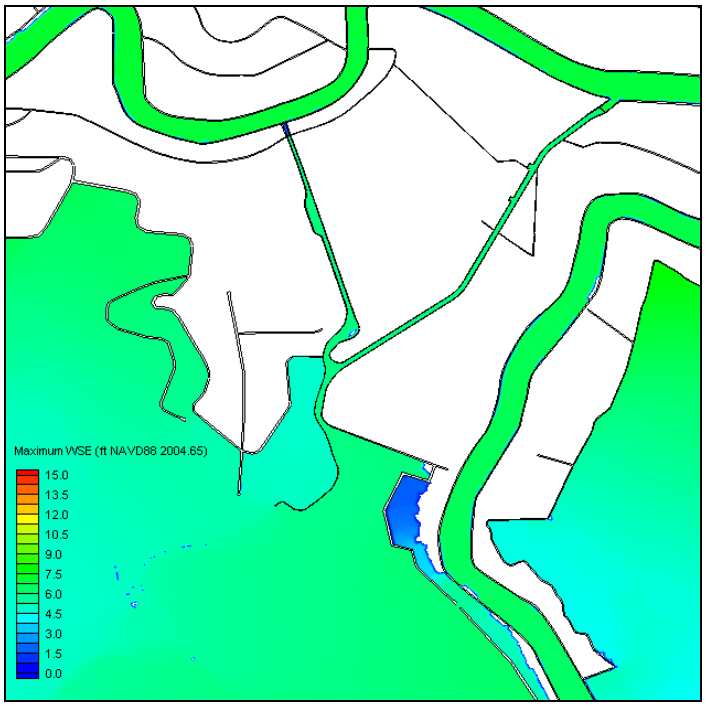
Maximum Surge (ft NAVD88 2004.65) for Storm 008



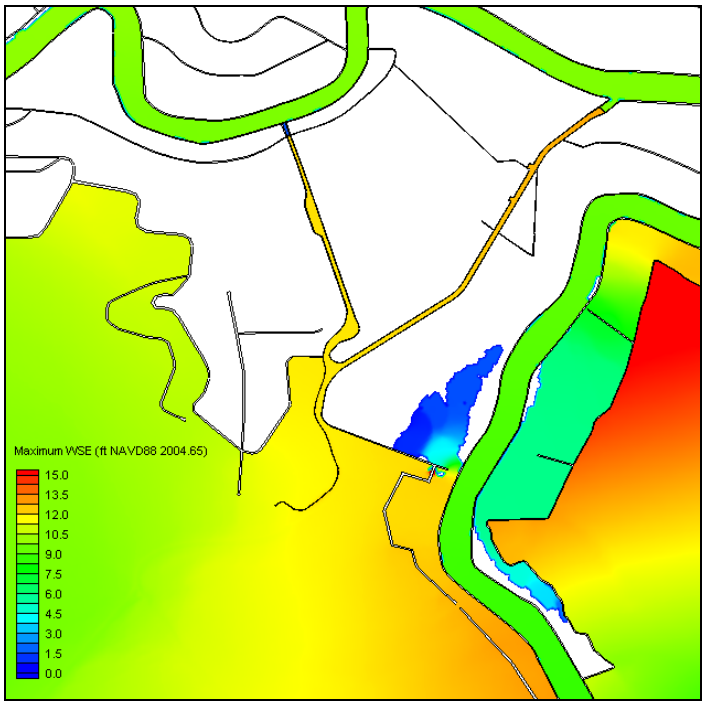
Maximum Surge (ft NAVD88 2004.65) for Storm 017



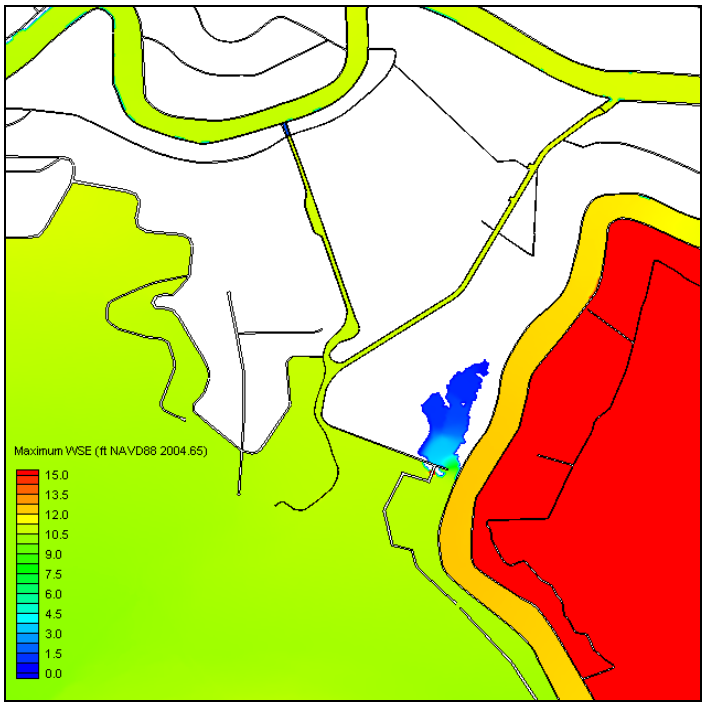
Maximum Surge (ft NAVD88 2004.65) for Storm 050



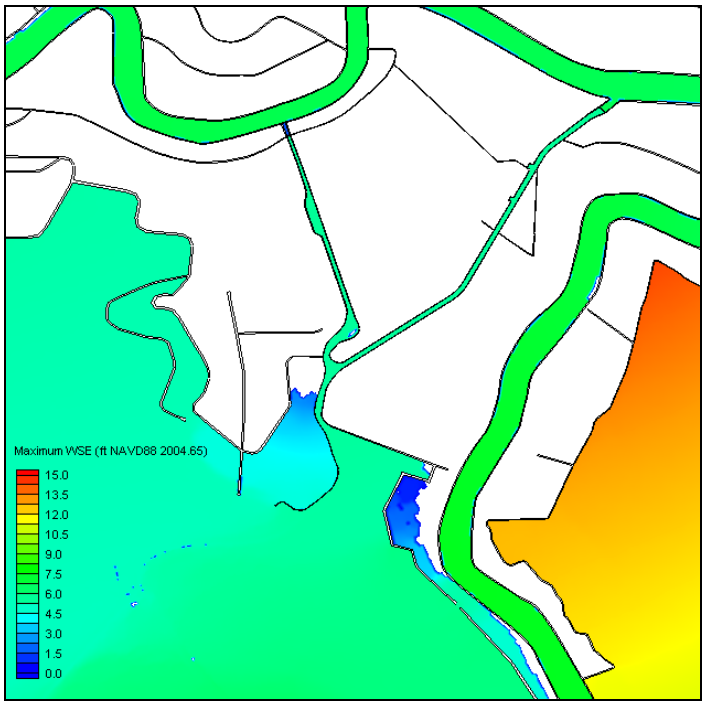
Maximum Surge (ft NAVD88 2004.65) for Storm 066



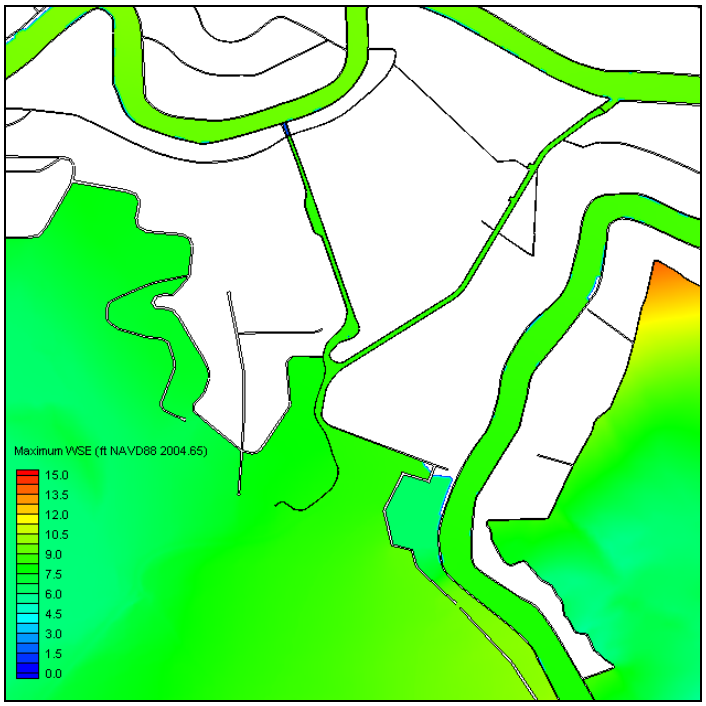
Maximum Surge (ft NAVD88 2004.65) for Storm 069



Maximum Surge (ft NAVD88 2004.65) for Storm 083

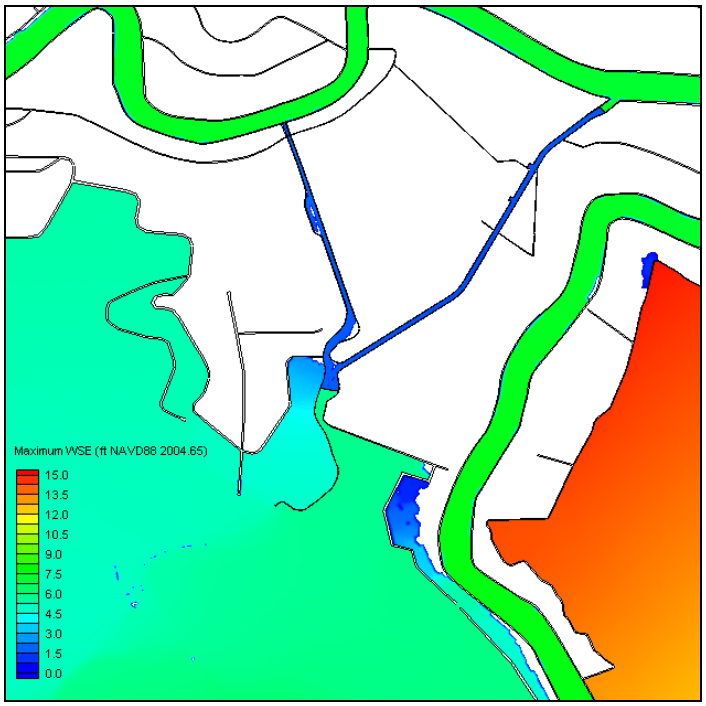


Maximum Surge (ft NAVD88 2004.65) for Storm 101

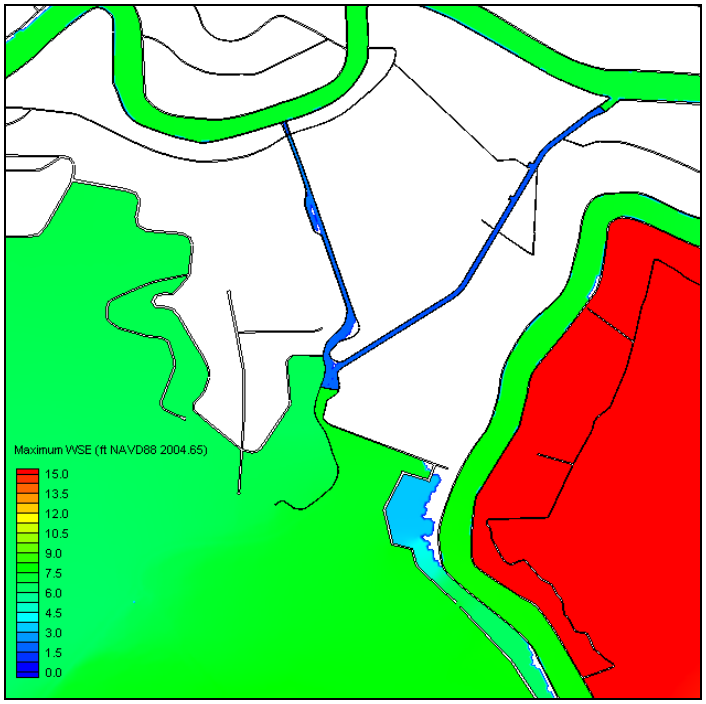


Maximum Surge (ft NAVD88 2004.65) for Storm 160

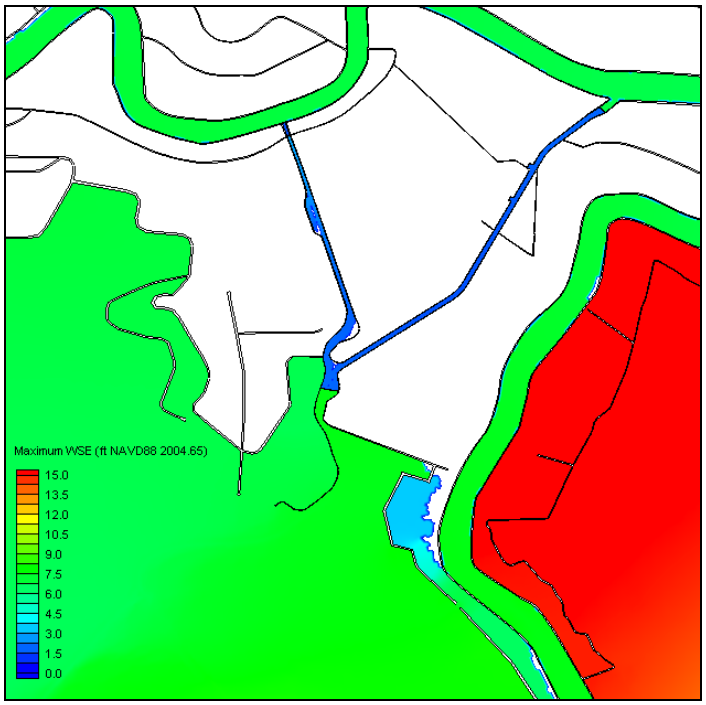
Appendix B: Maximum Surge Figures for the With-Project Condition (WCC)



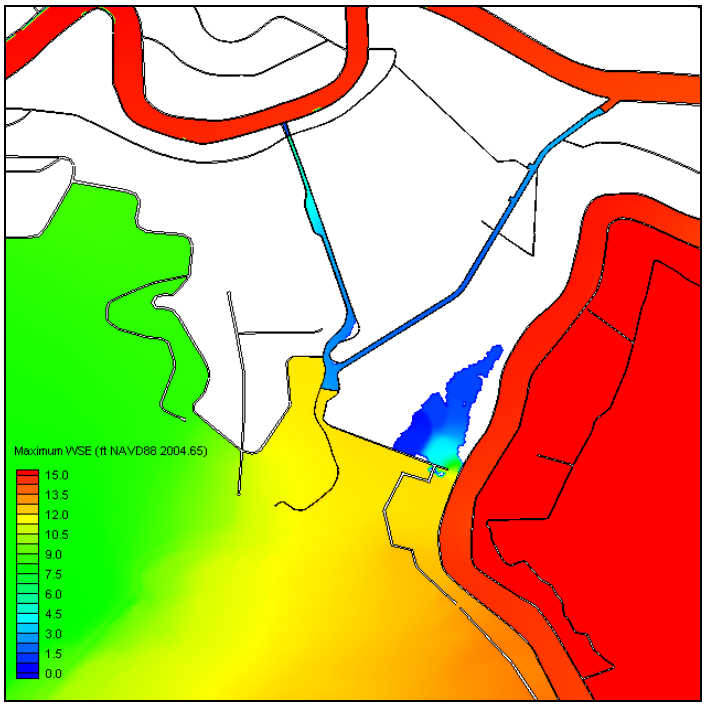
Maximum Surge (ft NAVD88 2004.65) for Storm 003



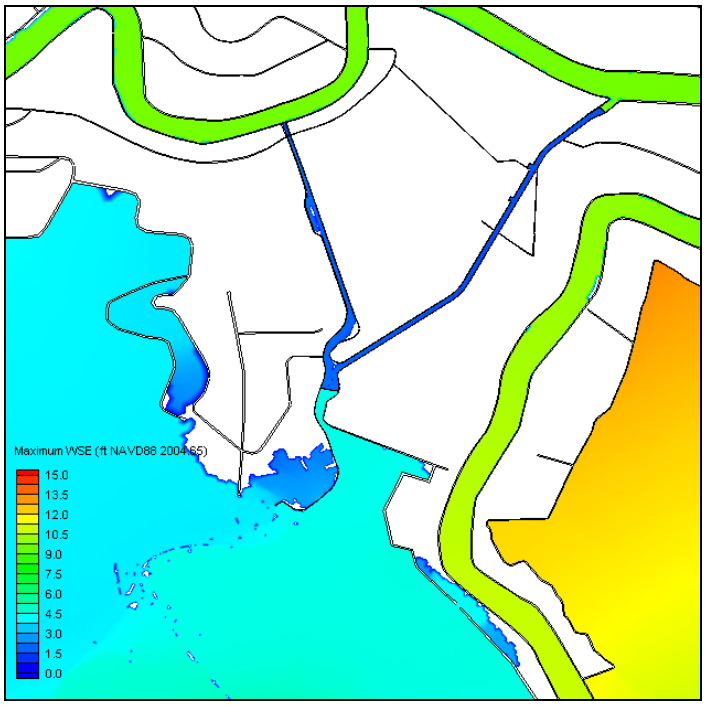
Maximum Surge (ft NAVD88 2004.65) for Storm 006



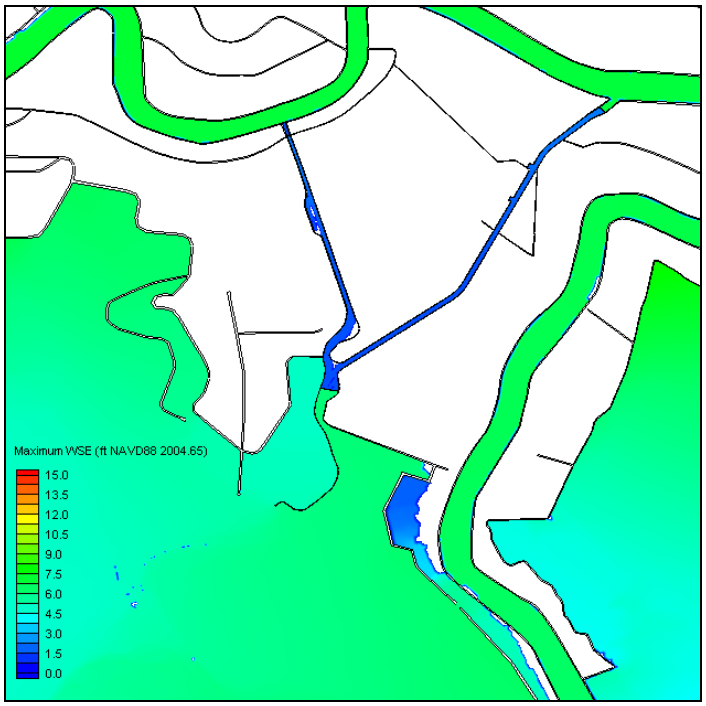
Maximum Surge (ft NAVD88 2004.65) for Storm 008



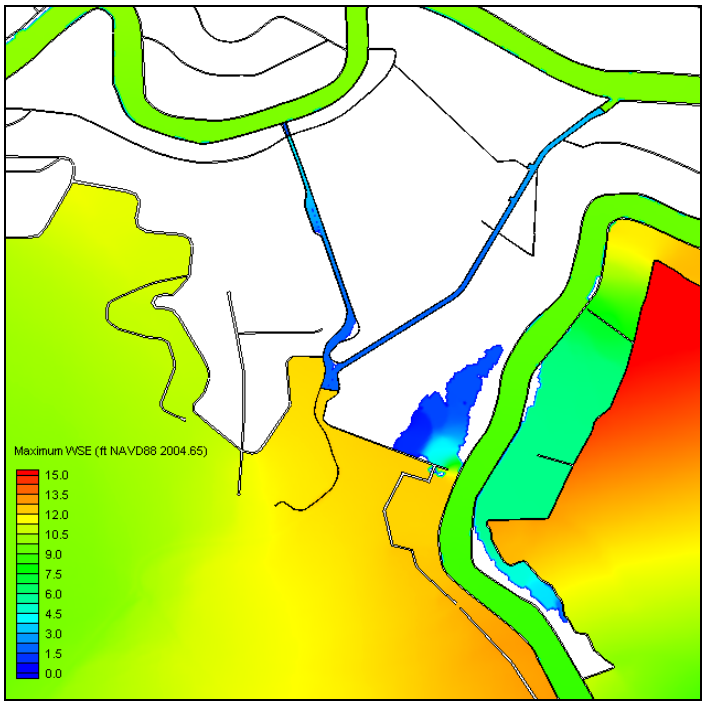
Maximum Surge (ft NAVD88 2004.65) for Storm 017



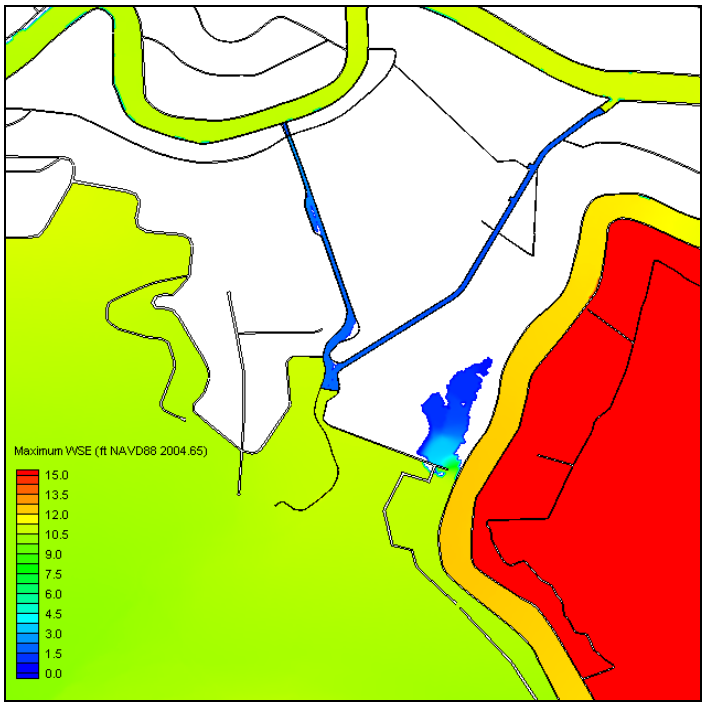
Maximum Surge (ft NAVD88 2004.65) for Storm 050



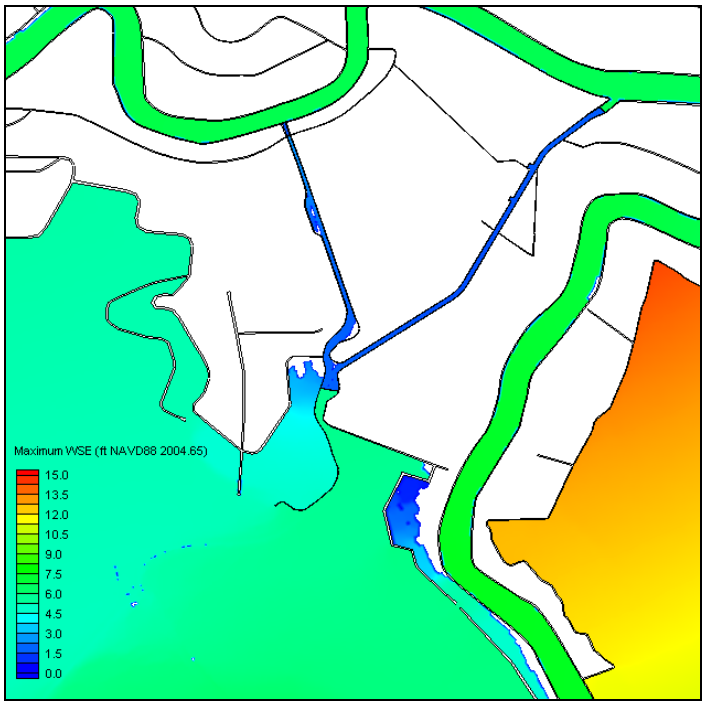
Maximum Surge (ft NAVD88 2004.65) for Storm 066



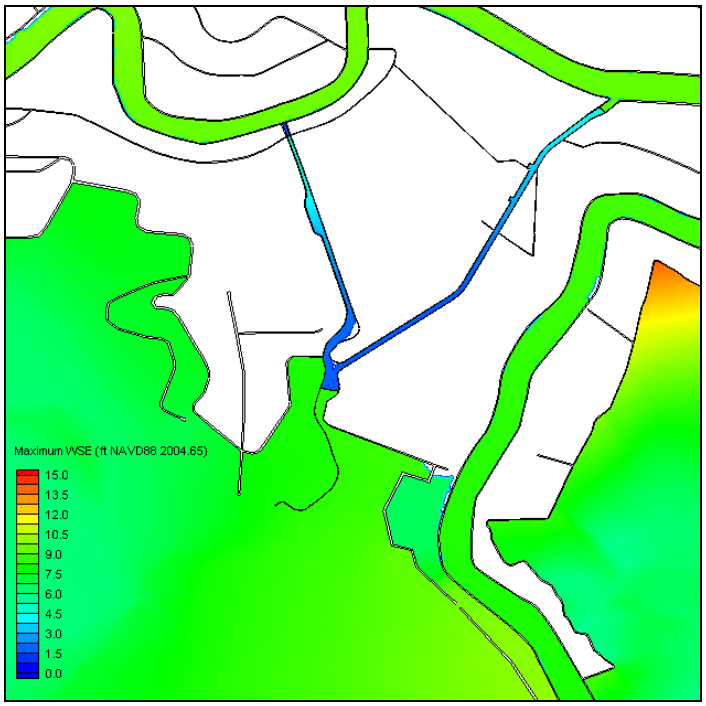
Maximum Surge (ft NAVD88 2004.65) for Storm 069



Maximum Surge (ft NAVD88 2004.65) for Storm 083

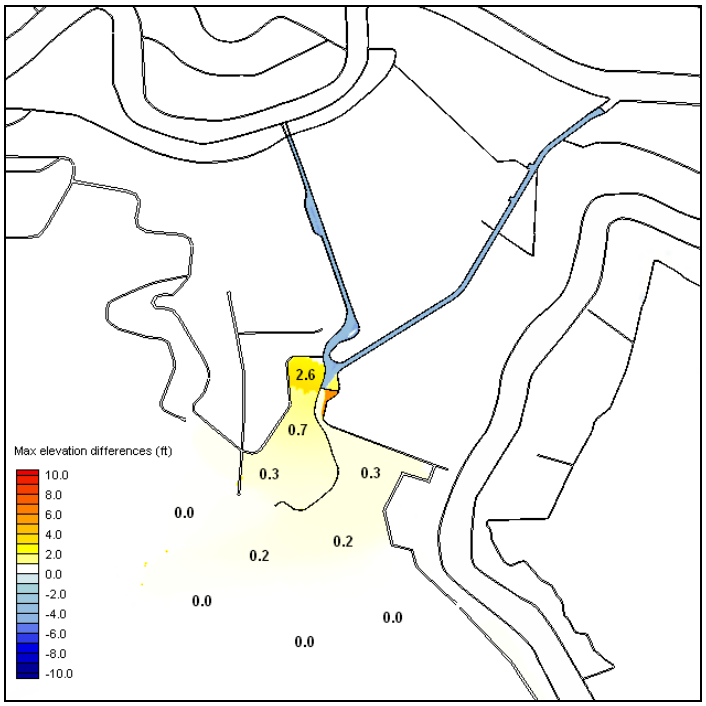


Maximum Surge (ft NAVD88 2004.65) for Storm 101

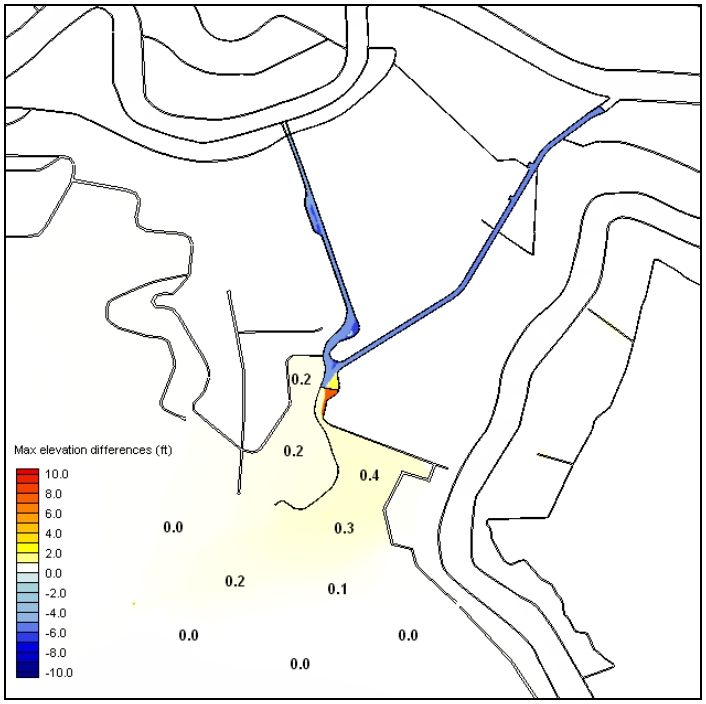


Maximum Surge (ft NAVD88 2004.65) for Storm 160

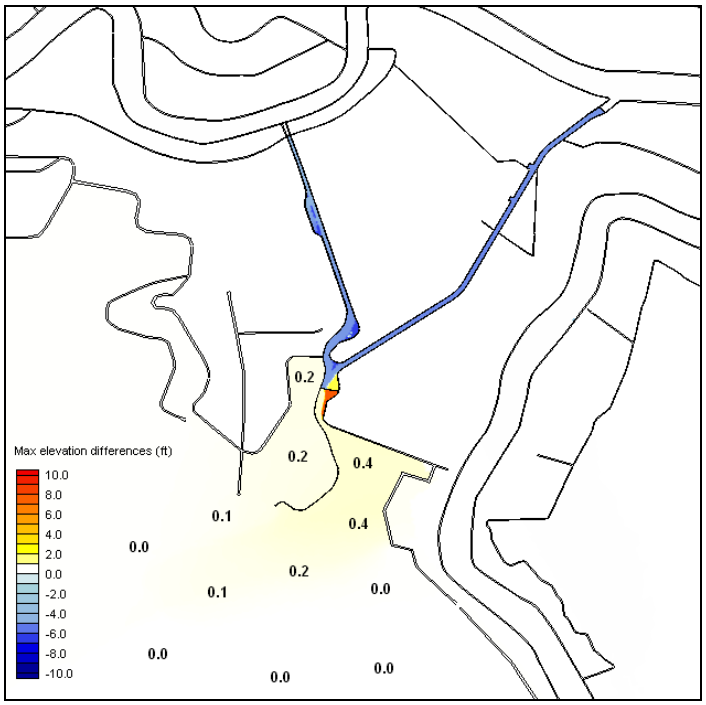
Appendix C: Maximum Surge Difference Figures for WCC minus 2010



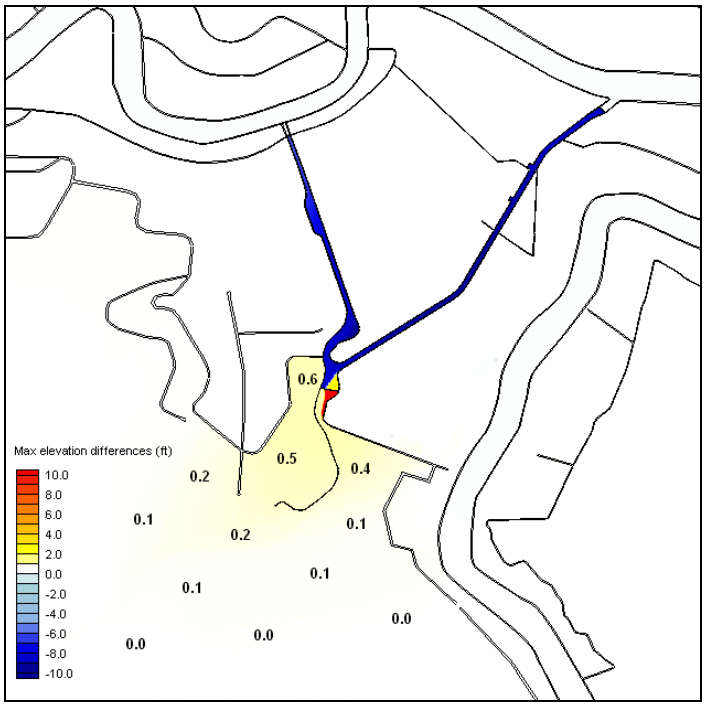
Maximum Surge Differences (ft) for Storm 003



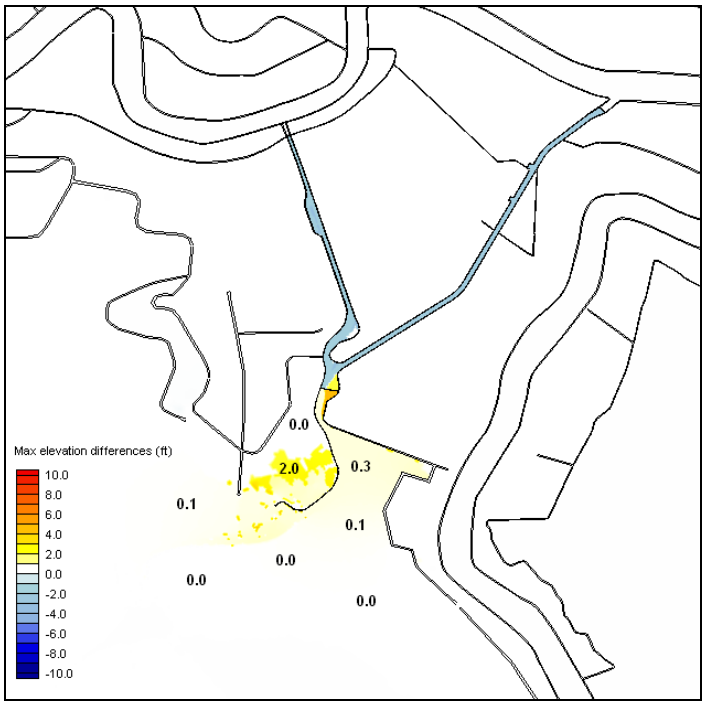
Maximum Surge Differences (ft) for Storm 006



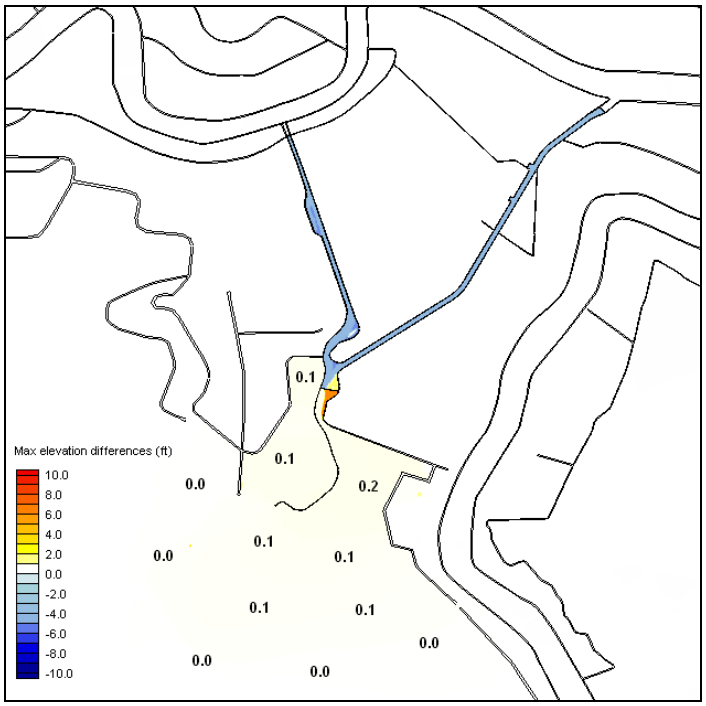
Maximum Surge Differences (ft) for Storm 008



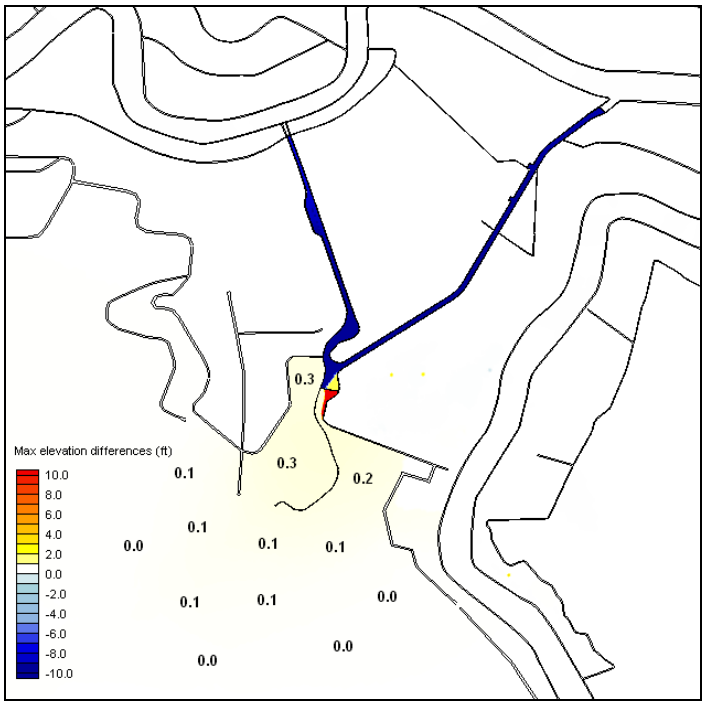
Maximum Surge Differences (ft) for Storm 017



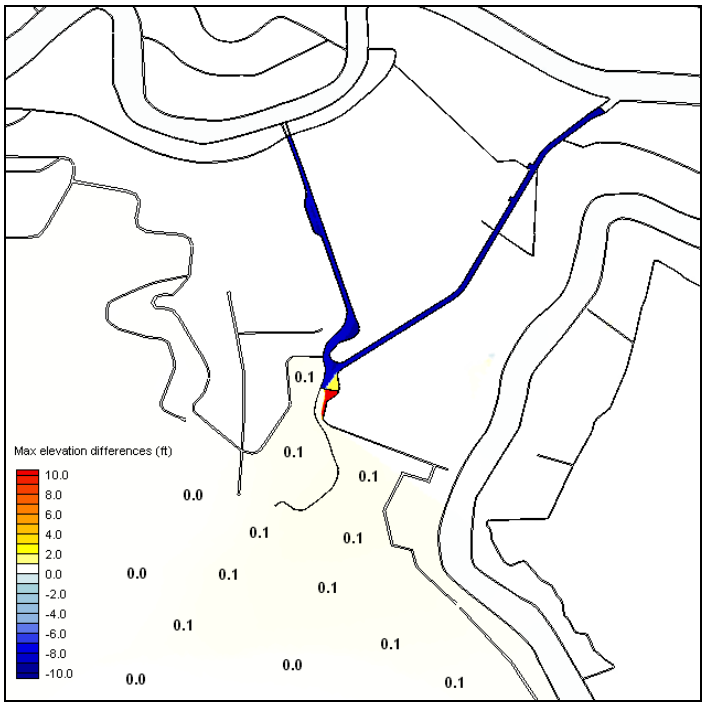
Maximum Surge Differences (ft) for Storm 050



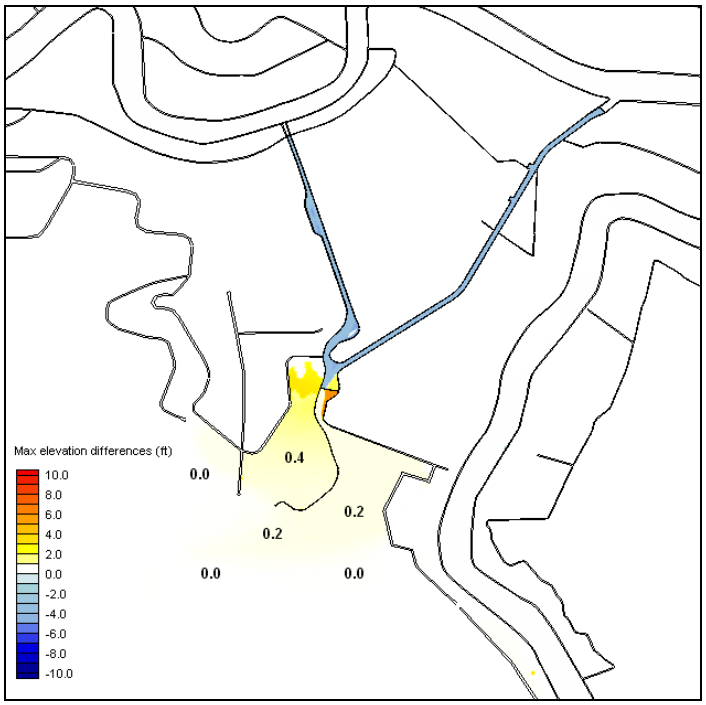
Maximum Surge Differences (ft) for Storm 066



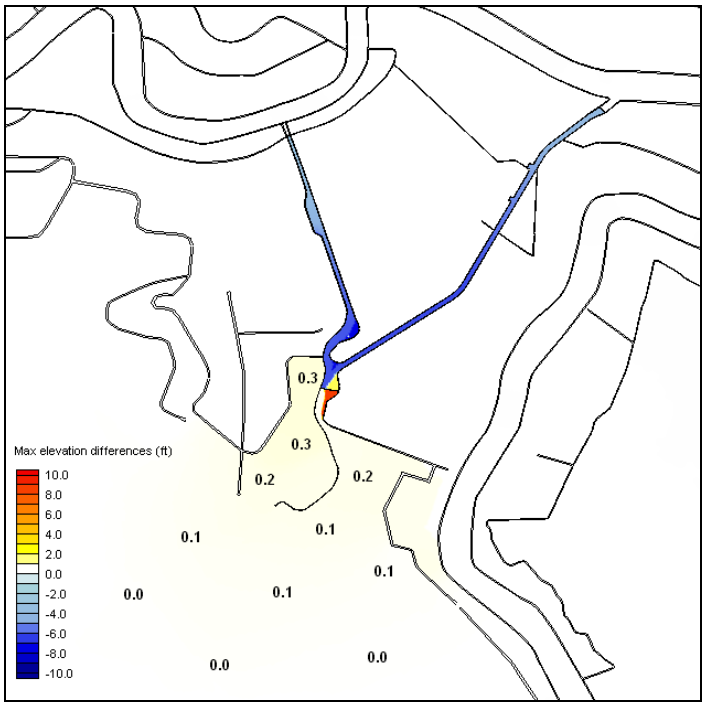
Maximum Surge Differences (ft) for Storm 069



Maximum Surge Differences (ft) for Storm 083

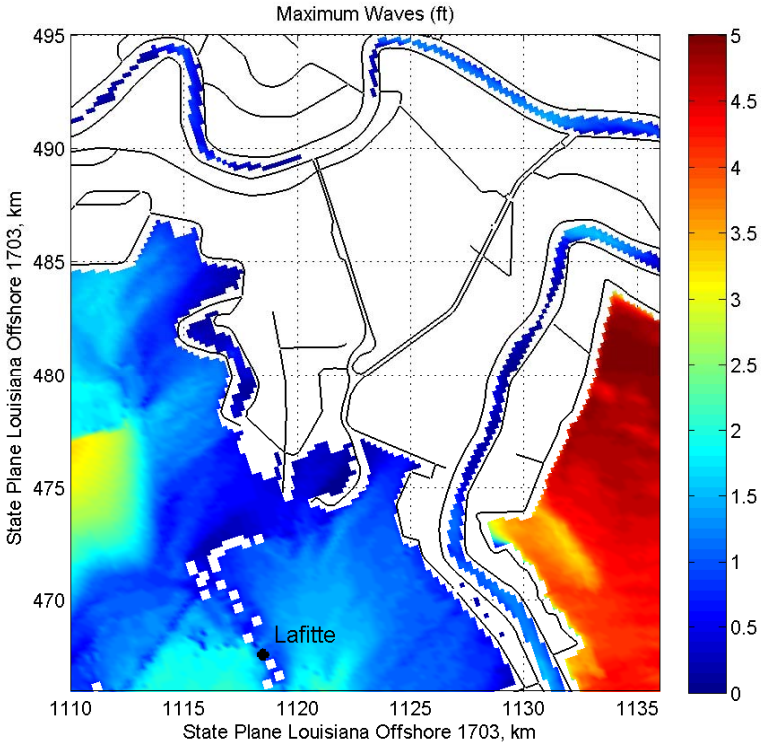


Maximum Surge Differences (ft) for Storm 101

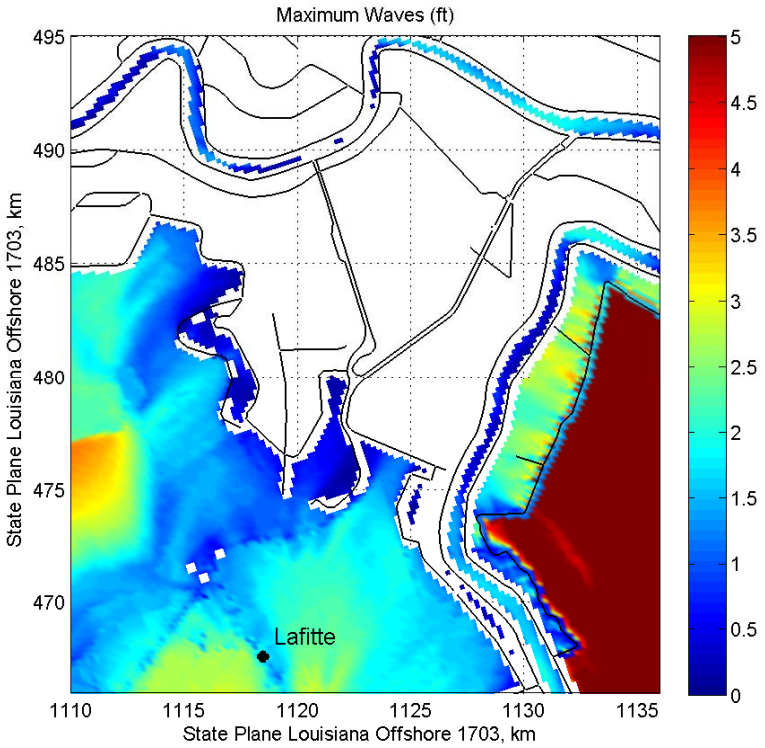


Maximum Surge Differences (ft) for Storm 160

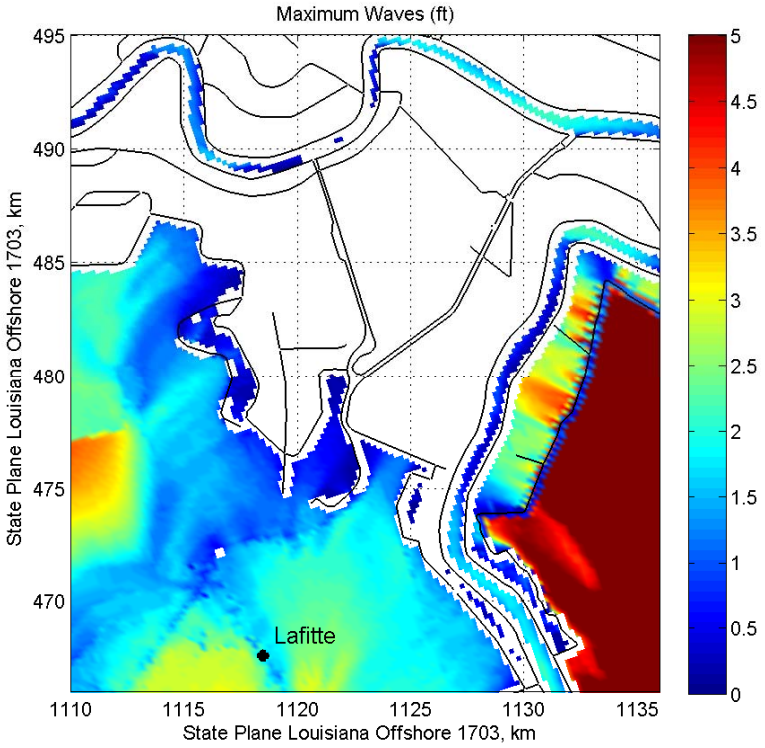
Appendix D: Maximum Waves Figures for the Base Condition (2010)



Maximum Waves (ft NAVD88 2004.65) for Storm 003

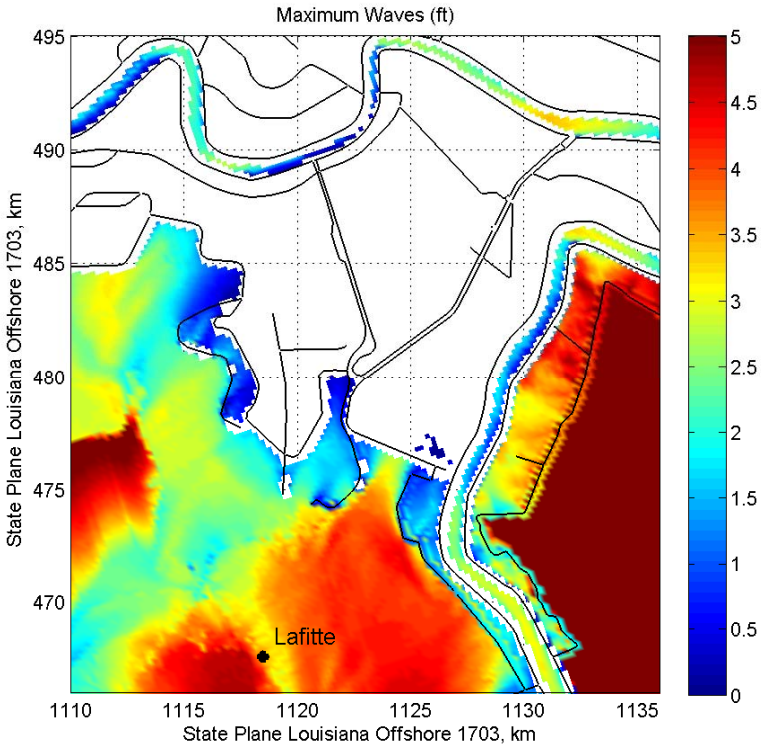


Maximum Waves (ft NAVD88 2004.65) for Storm 006

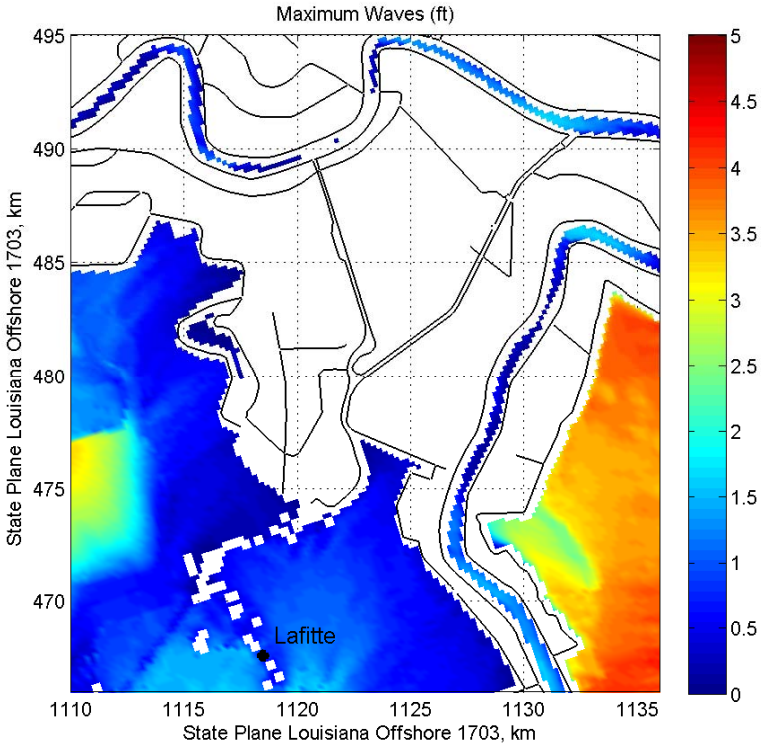


Maximum Waves (ft NAVD88 2004.65) for Storm 008

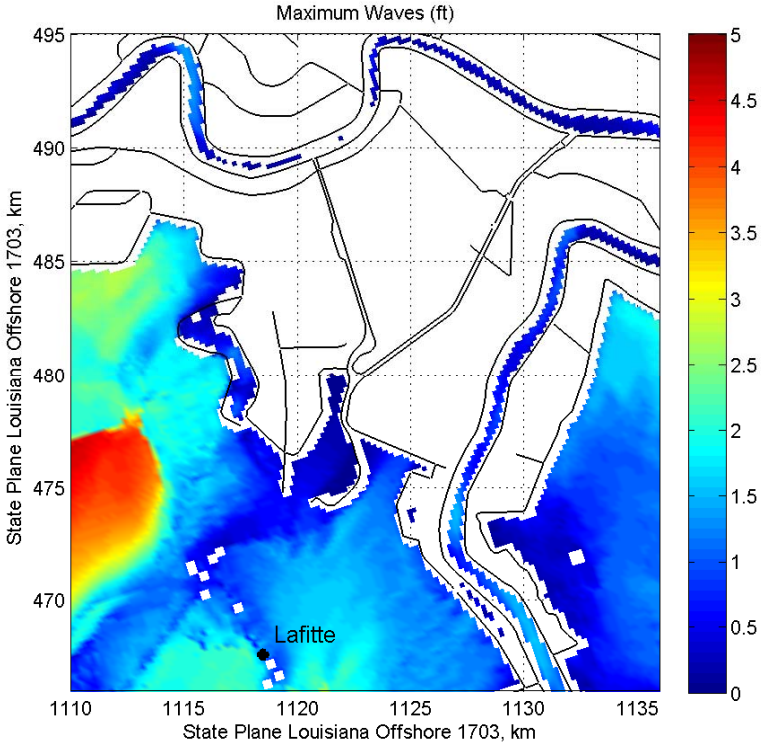
PRELIMINARY RESULTS



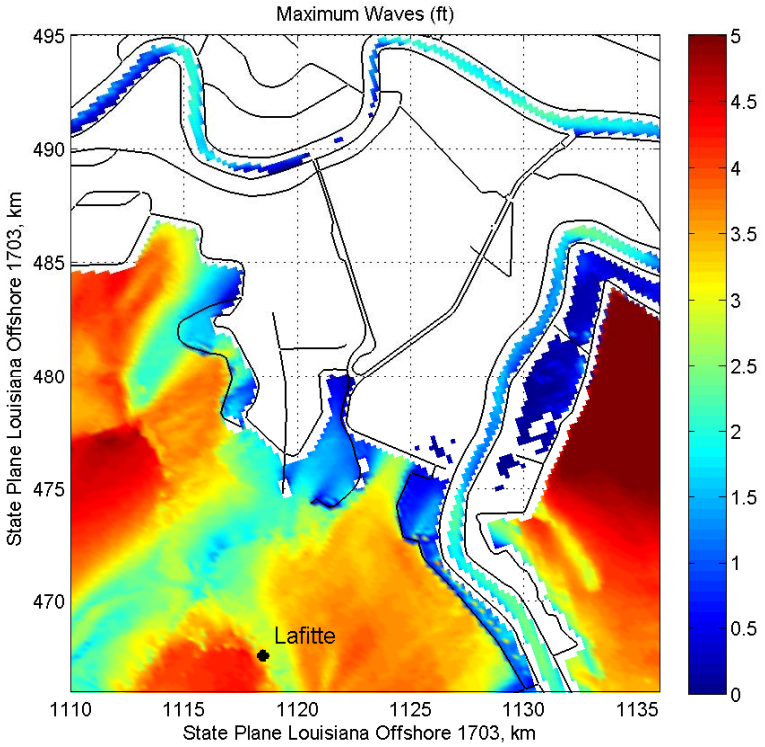
Maximum Waves (ft NAVD88 2004.65) for Storm 017



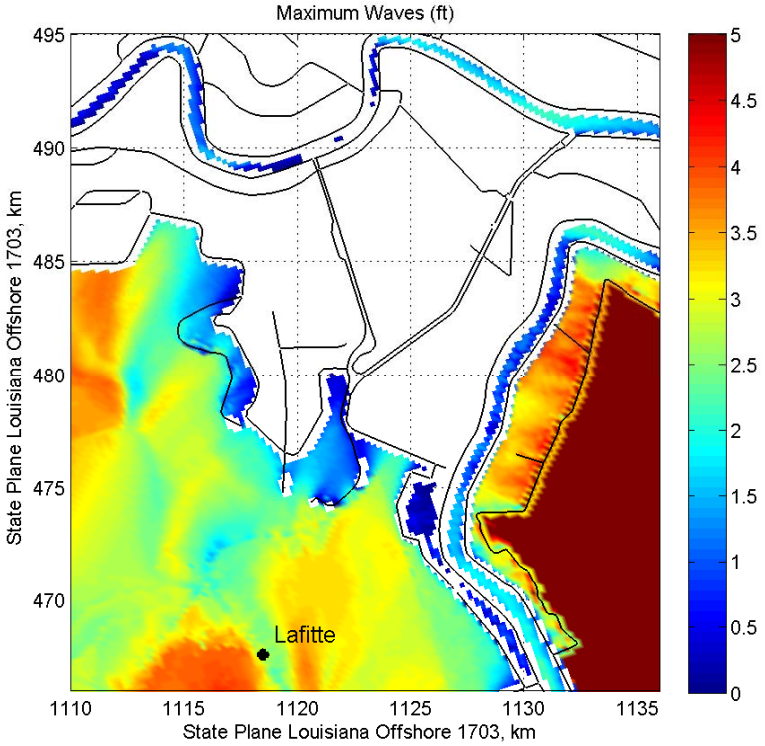
Maximum Waves (ft NAVD88 2004.65) for Storm 050



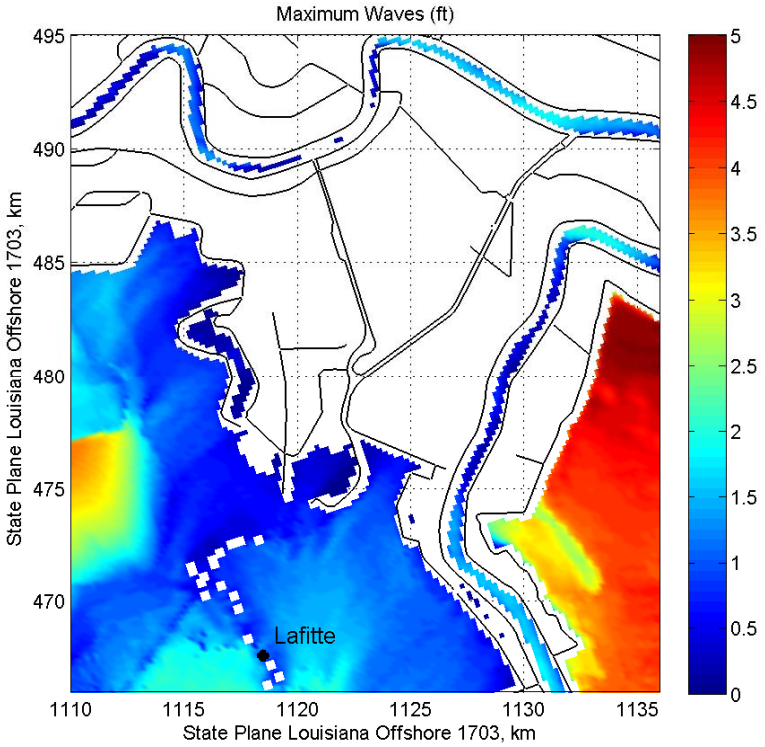
Maximum Waves (ft NAVD88 2004.65) for Storm 066



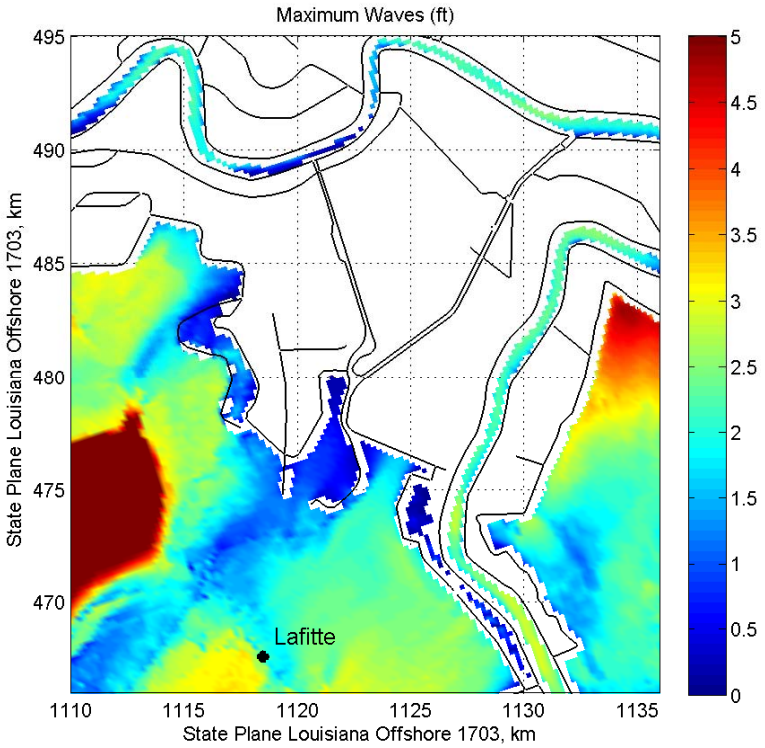
Maximum Waves (ft NAVD88 2004.65) for Storm 069



Maximum Waves (ft NAVD88 2004.65) for Storm 083

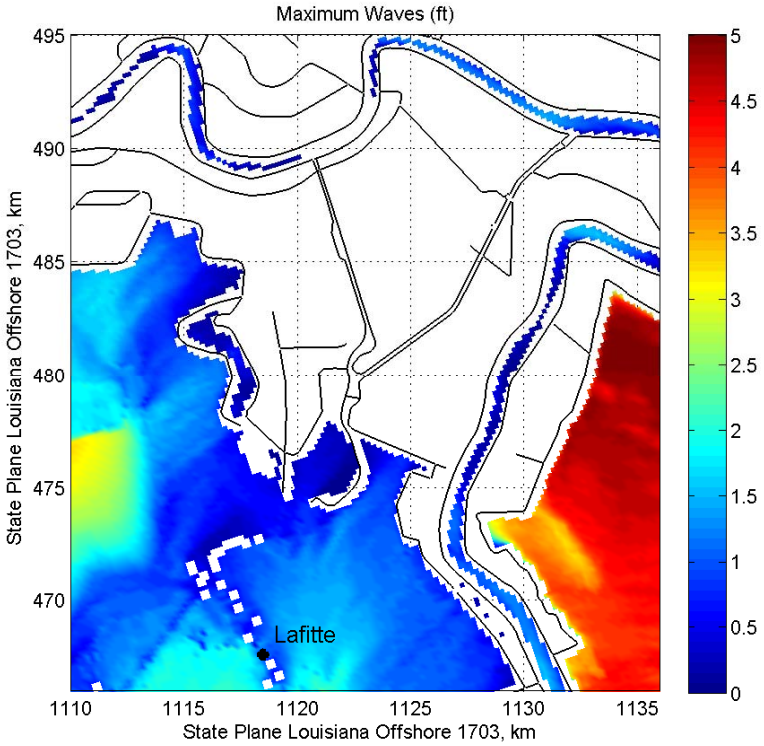


Maximum Waves (ft NAVD88 2004.65) for Storm 101

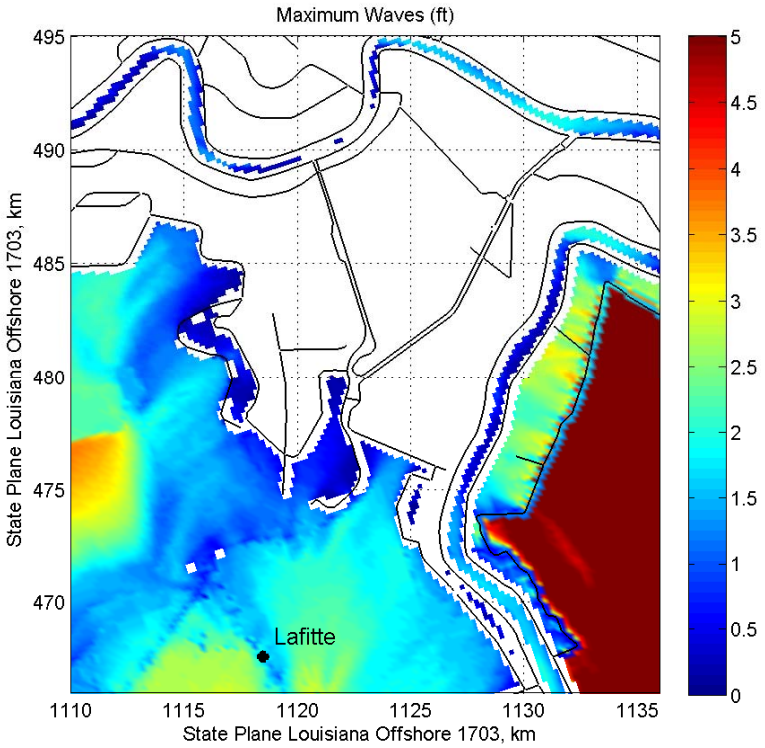


Maximum Waves (ft NAVD88 2004.65) for Storm 160

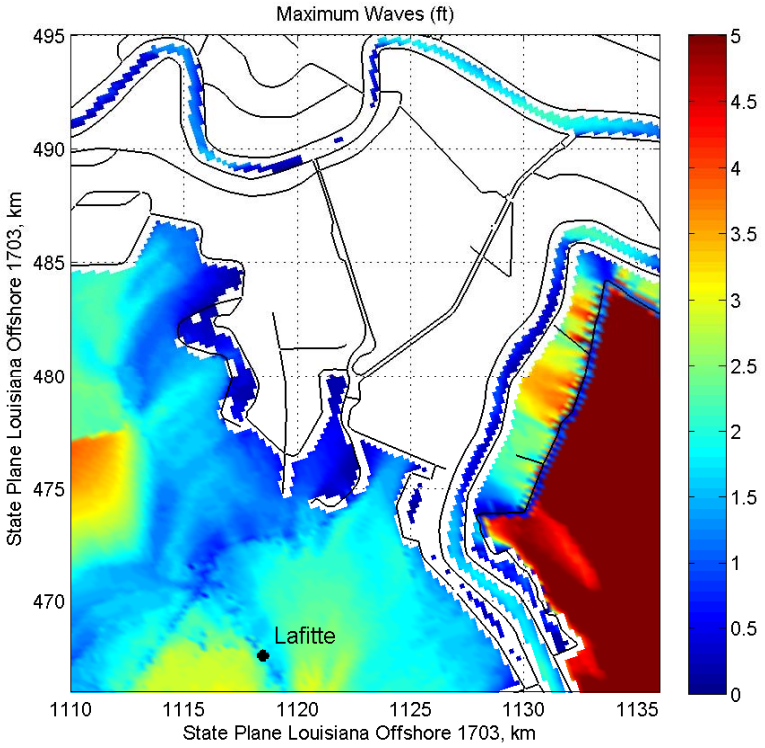
Appendix E: Maximum Waves Figures for the With-Project Condition (WCC)



Maximum Waves (ft NAVD88 2004.65) for Storm 003

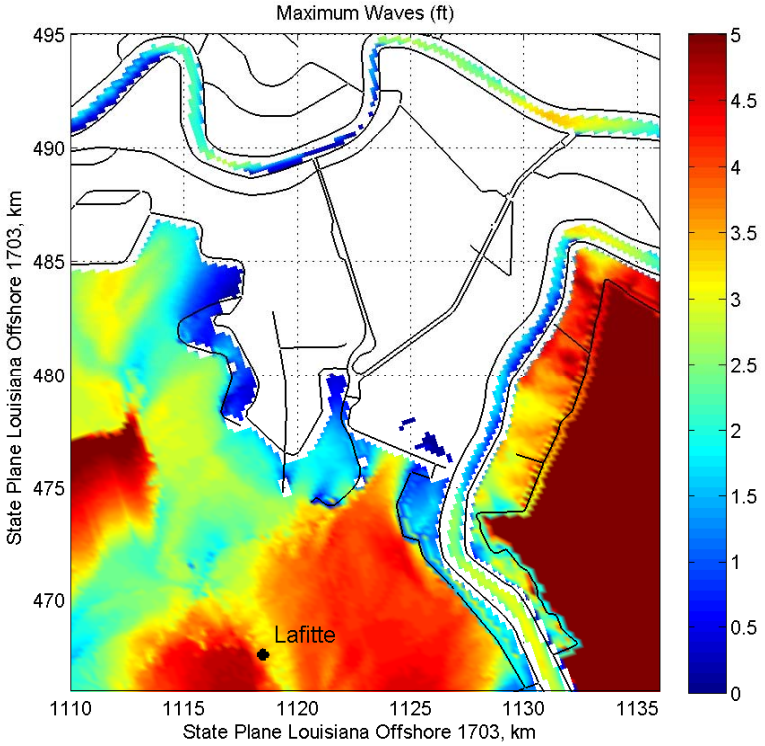


Maximum Waves (ft NAVD88 2004.65) for Storm 006

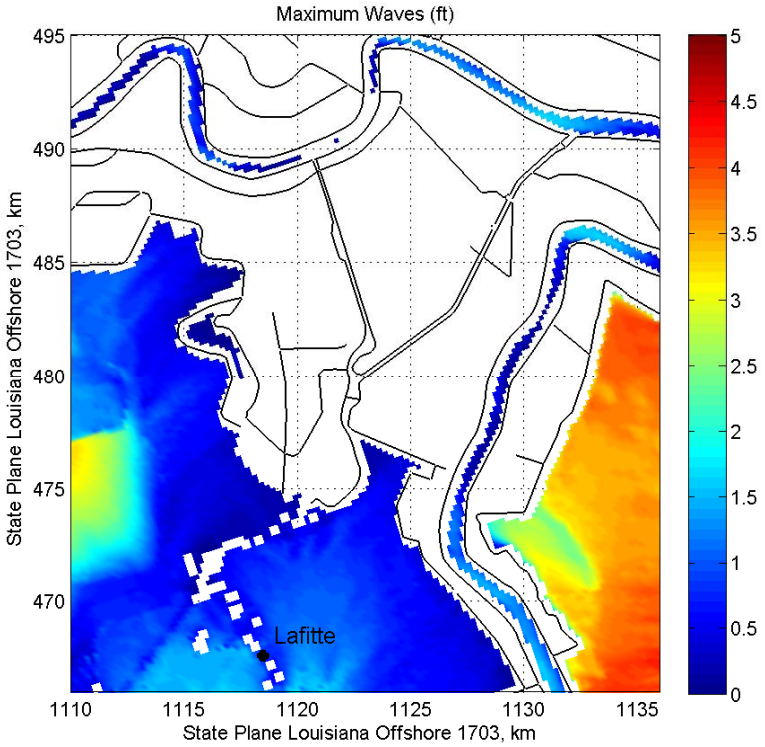


Maximum Waves (ft NAVD88 2004.65) for Storm 008

PRELIMINARY RESULTS

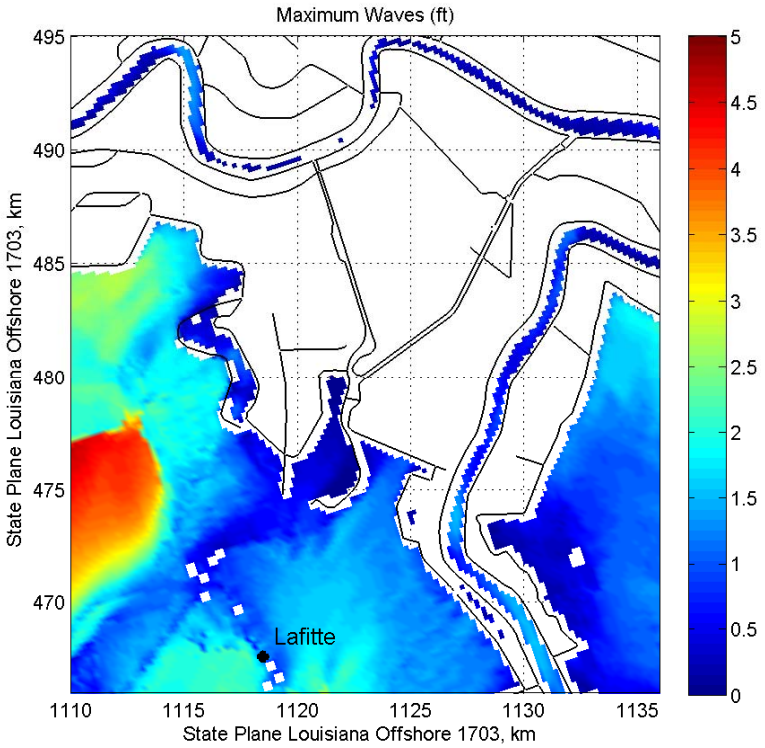


Maximum Waves (ft NAVD88 2004.65) for Storm 017

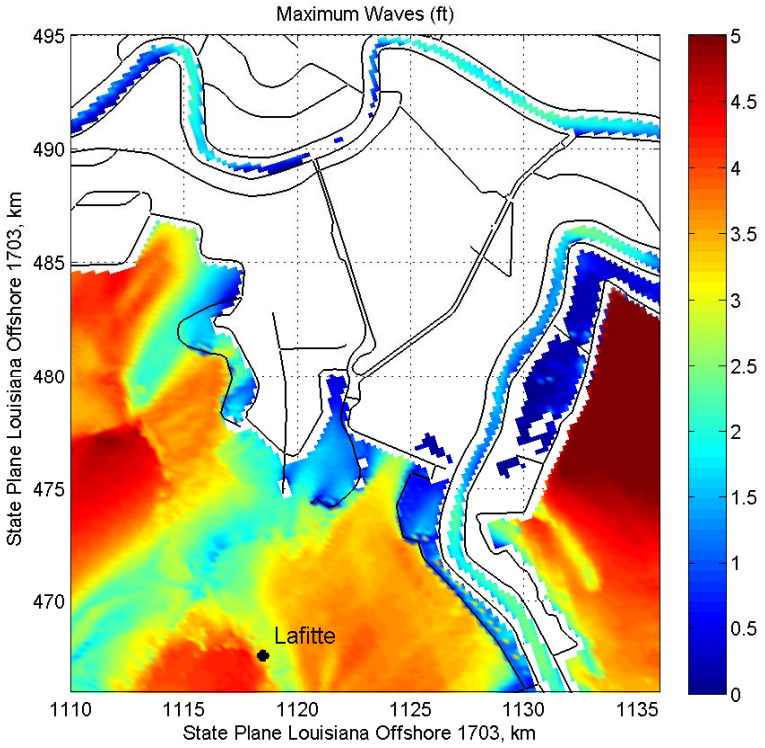


Maximum Waves (ft NAVD88 2004.65) for Storm 050

PRELIMINARY RESULTS

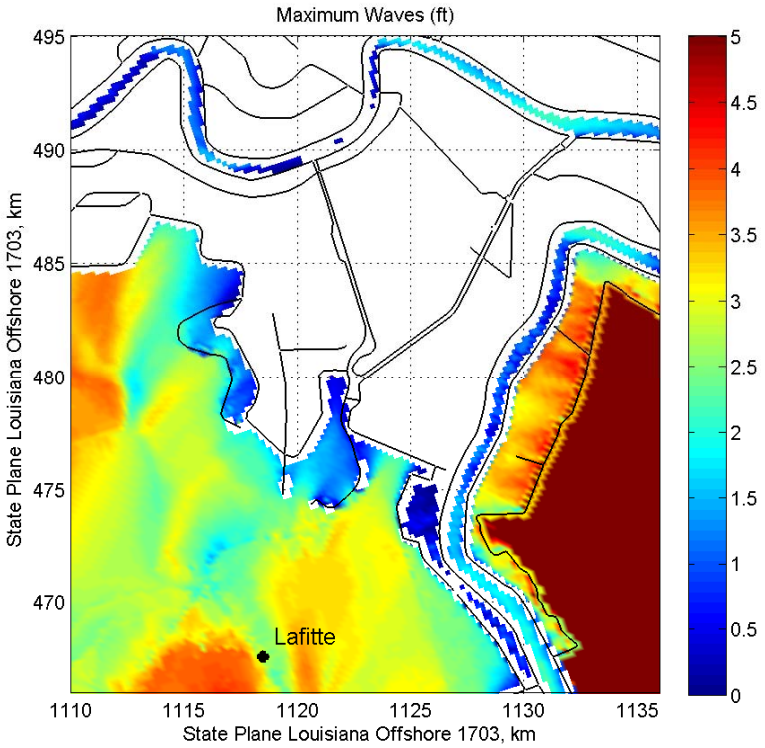


Maximum Waves (ft NAVD88 2004.65) for Storm 066

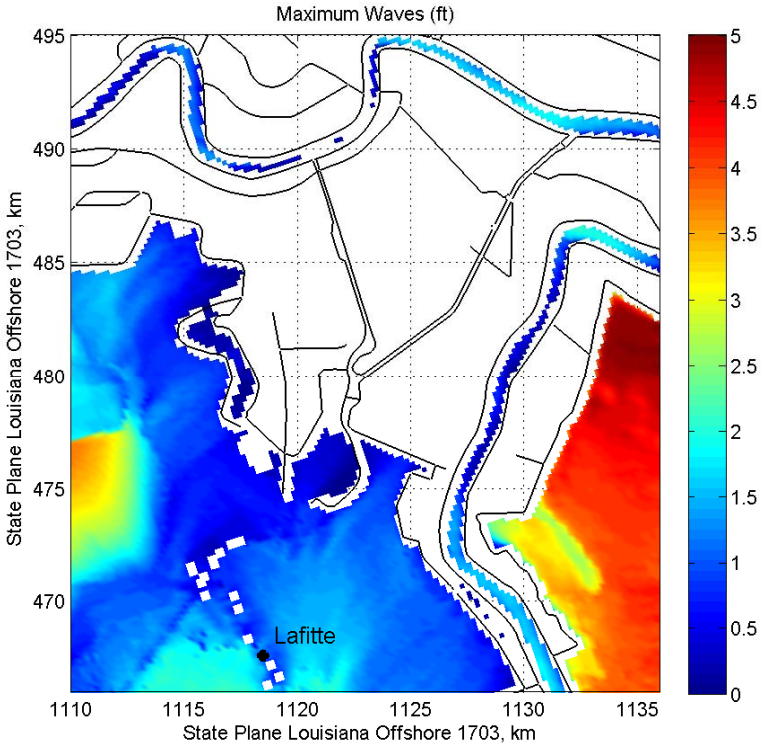


Maximum Waves (ft NAVD88 2004.65) for Storm 069

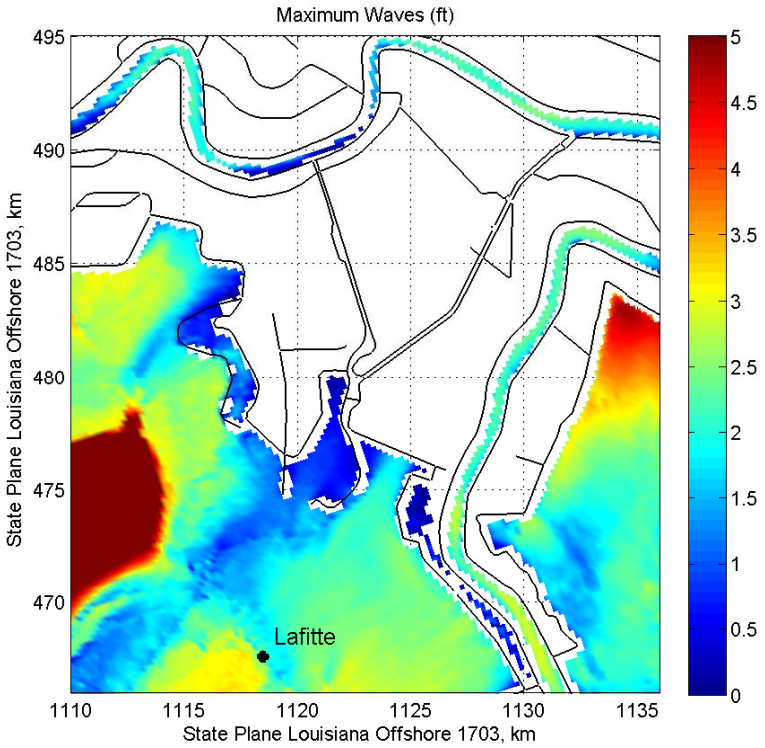
PRELIMINARY RESULTS



Maximum Waves (ft NAVD88 2004.65) for Storm 083

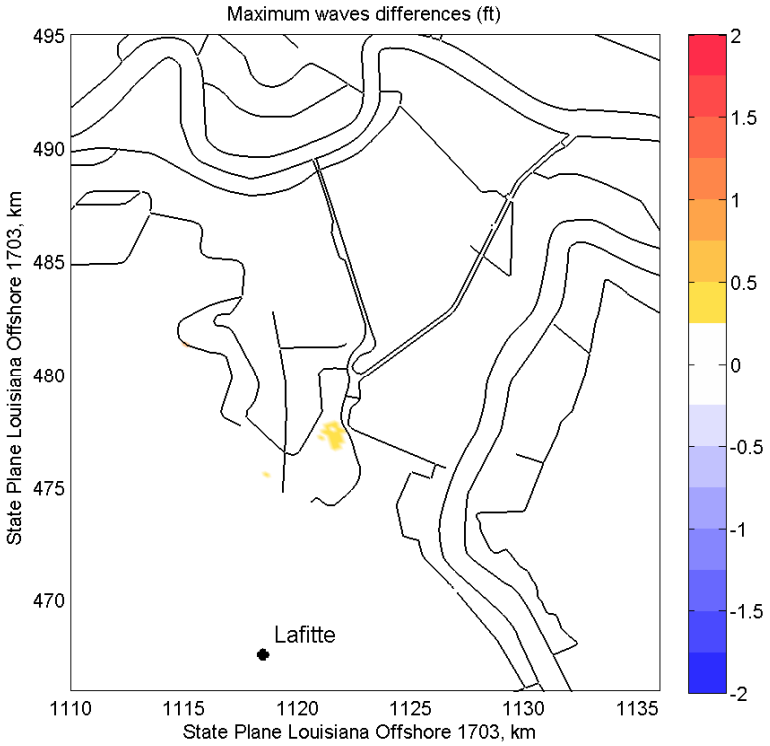


Maximum Waves (ft NAVD88 2004.65) for Storm 101

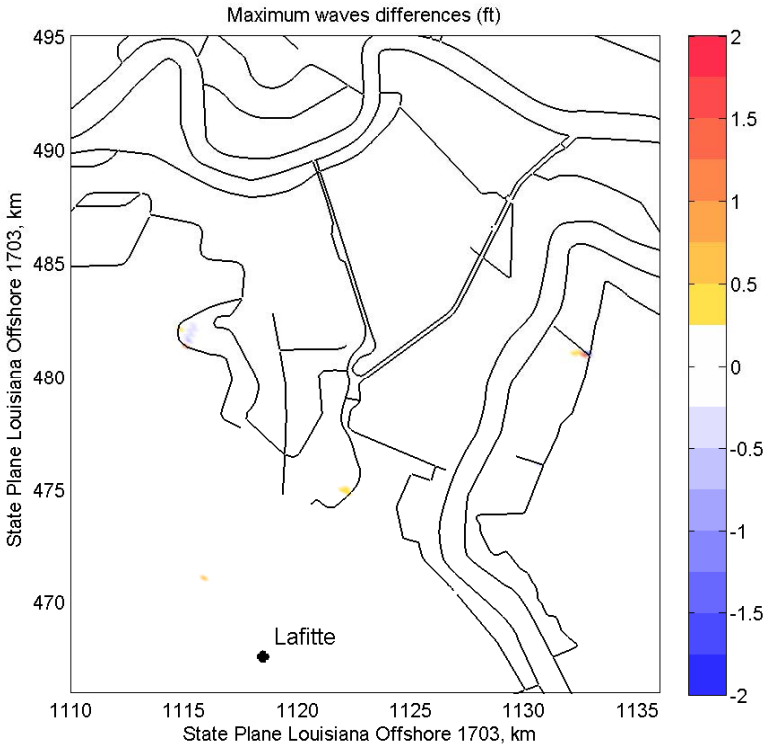


Maximum Waves (ft NAVD88 2004.65) for Storm 160

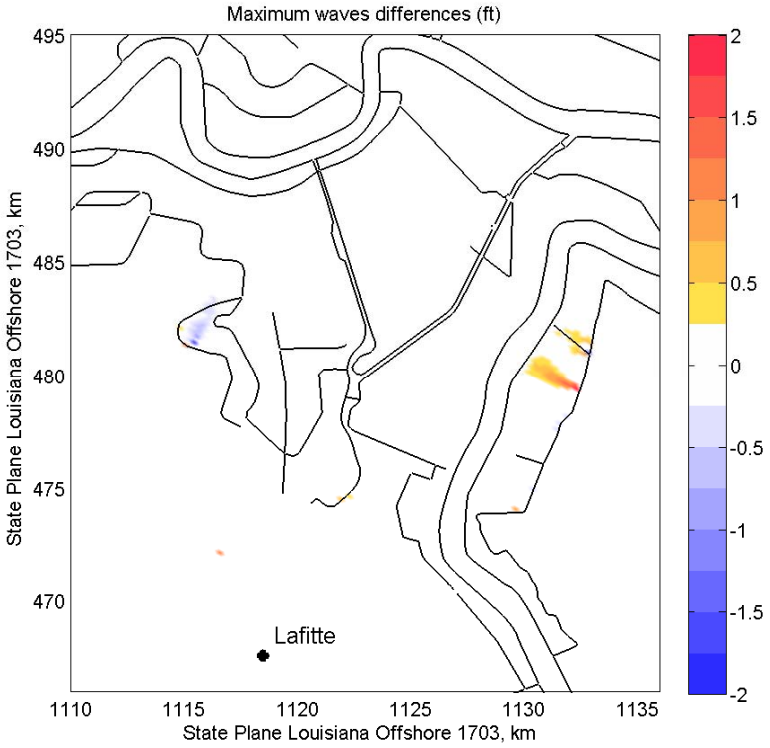
Appendix F: Maximum Waves Difference Figures for WCC minus 2010



Maximum Waves Differences (ft) for Storm 003

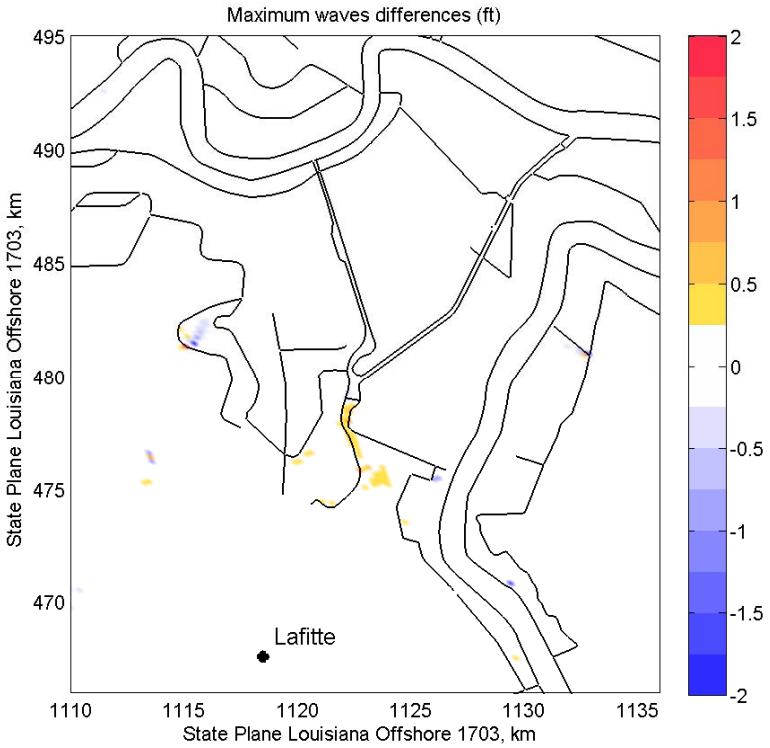


Maximum Waves Differences (ft) for Storm 006

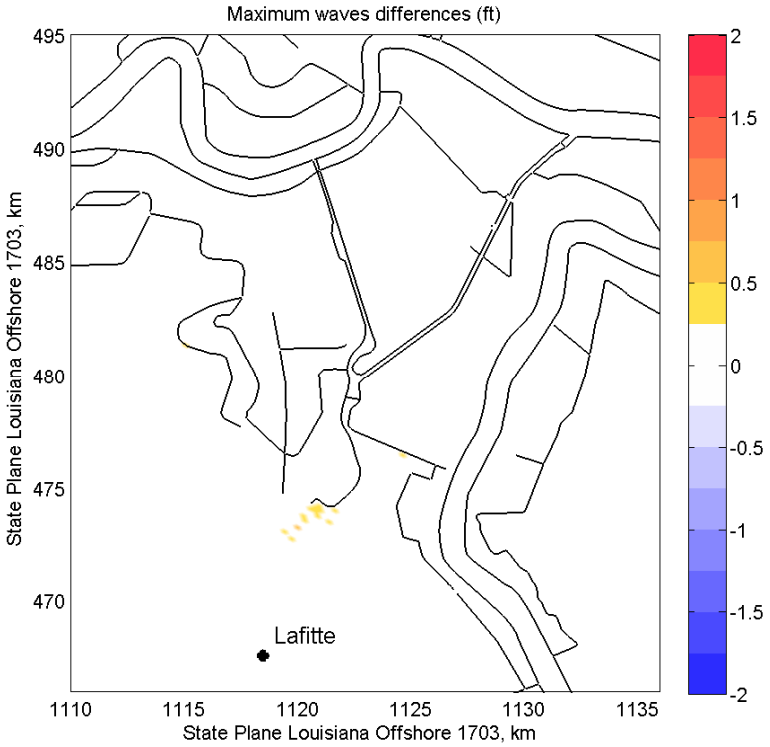


Maximum Waves Differences (ft) for Storm 008

PRELIMINARY RESULTS

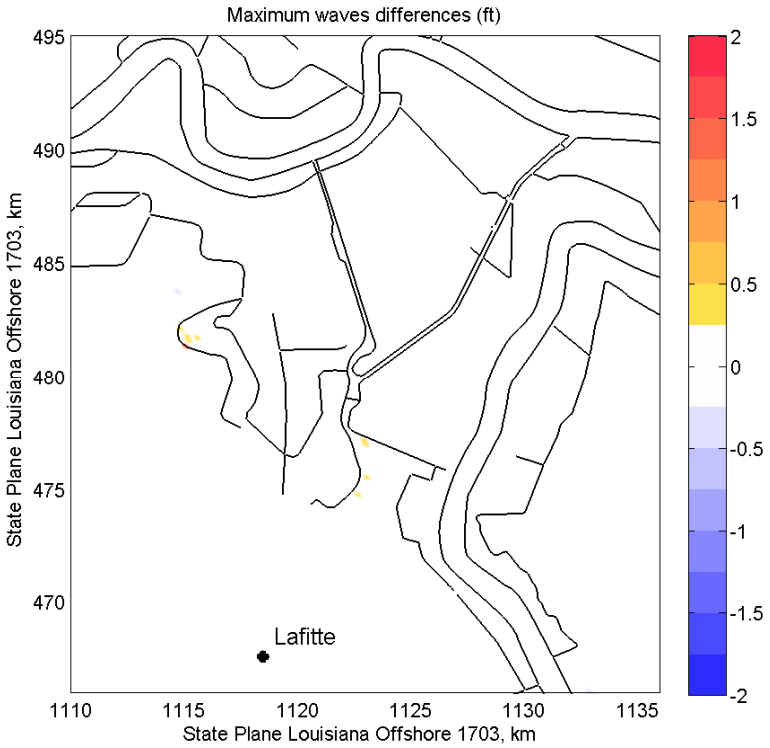


Maximum Waves Differences (ft) for Storm 017

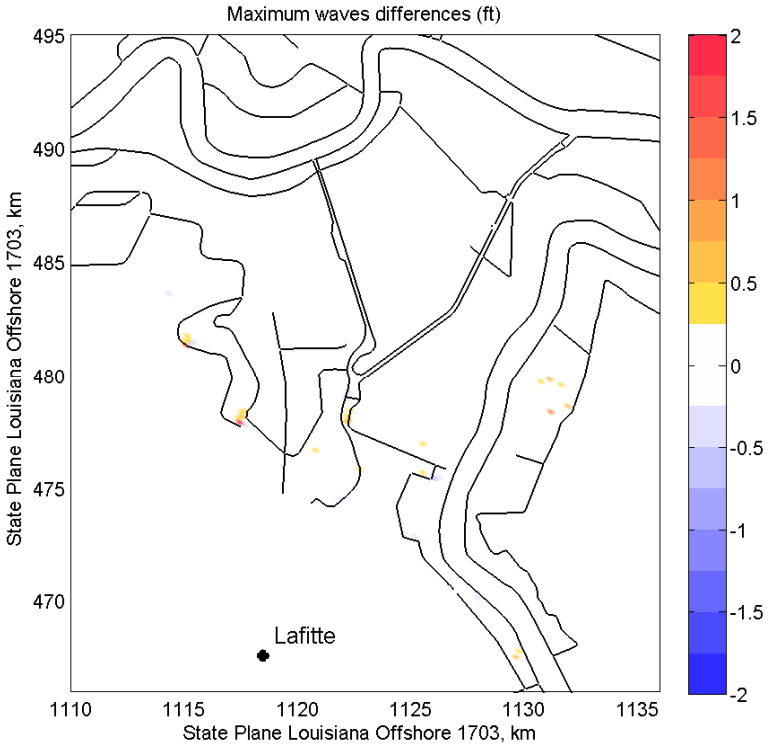


Maximum Waves Differences (ft) for Storm 050

PRELIMINARY RESULTS

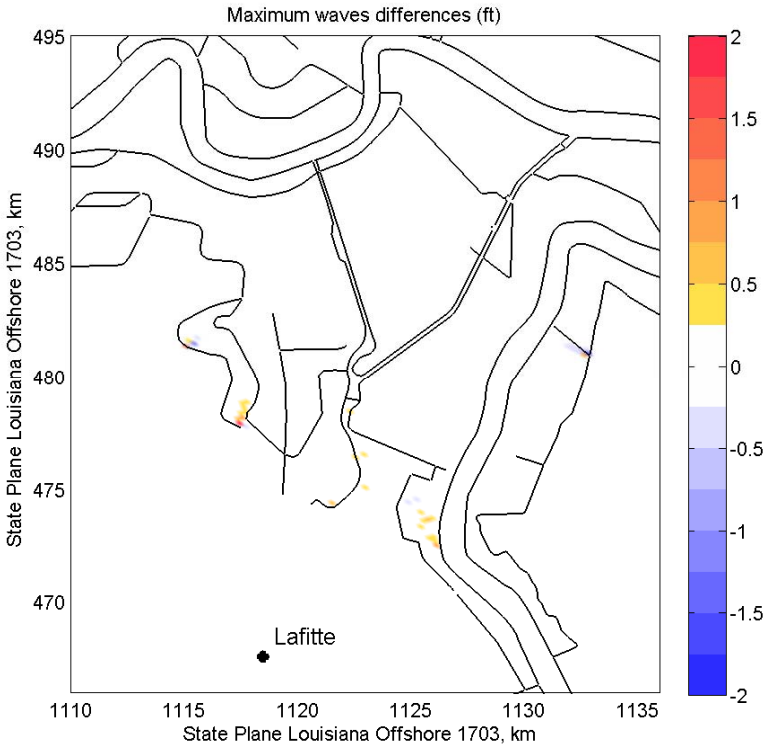


Maximum Waves Differences (ft) for Storm 066

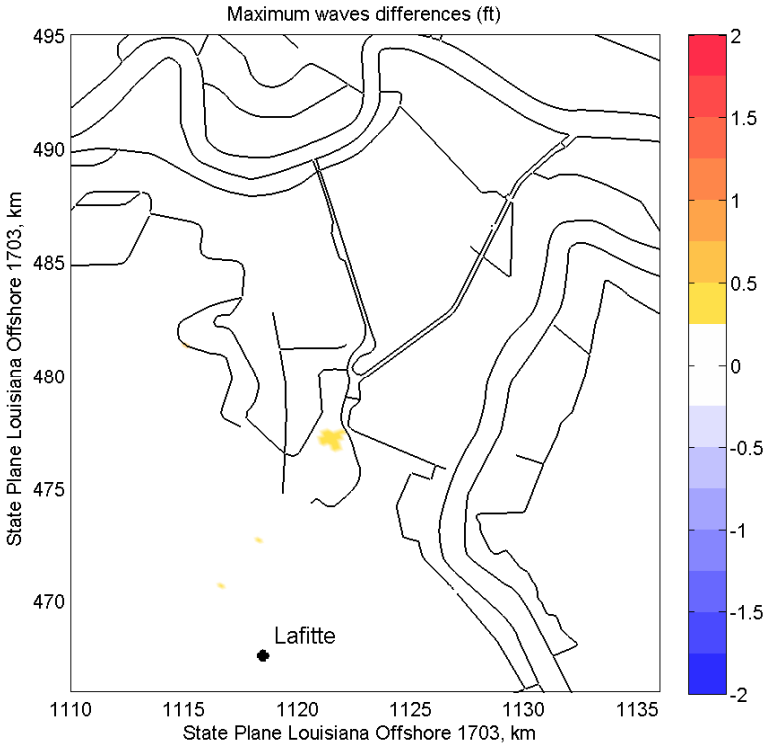


Maximum Waves Differences (ft) for Storm 069

PRELIMINARY RESULTS

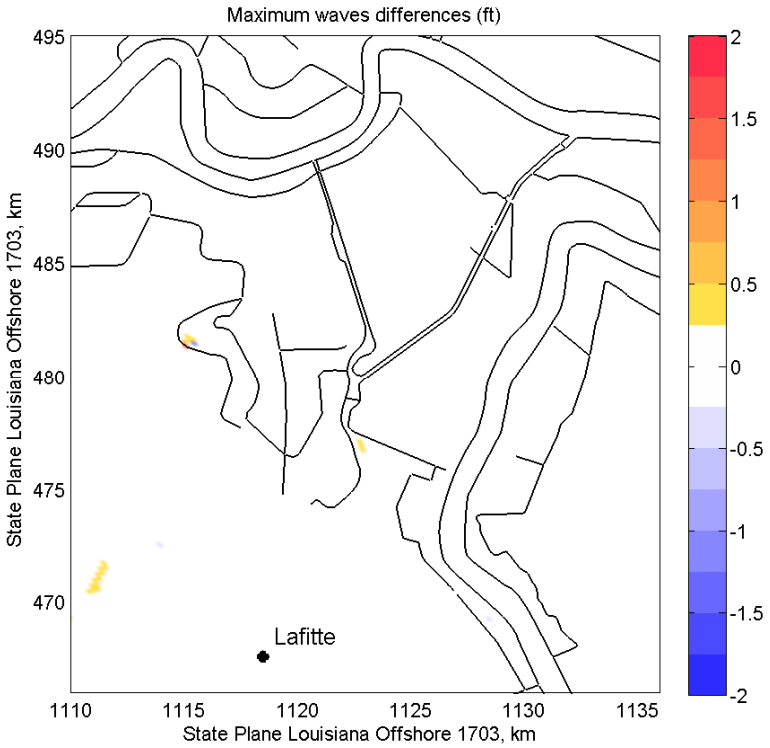


Maximum Waves Differences (ft) for Storm 083



Maximum Waves Differences (ft) for Storm 101

PRELIMINARY RESULTS



Maximum Waves Differences (ft) for Storm 160

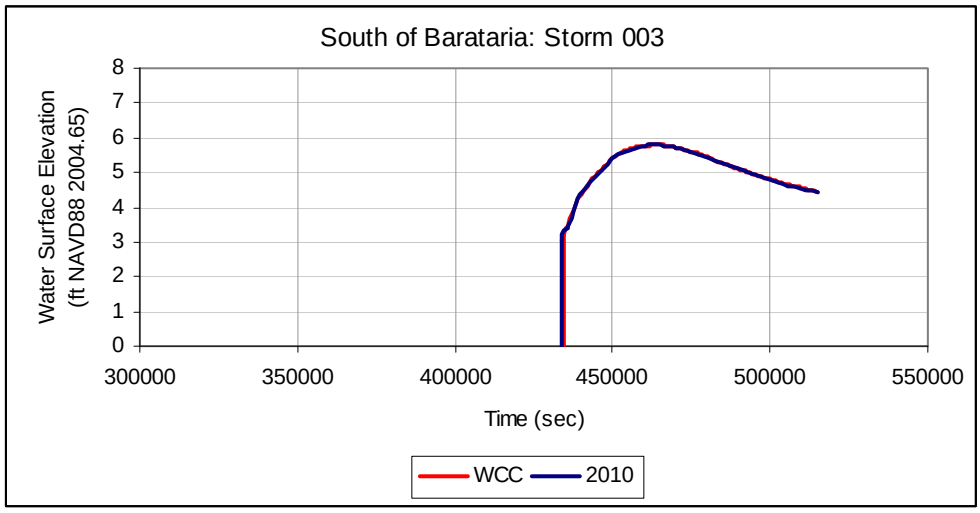
Appendix G: Time Series Plots

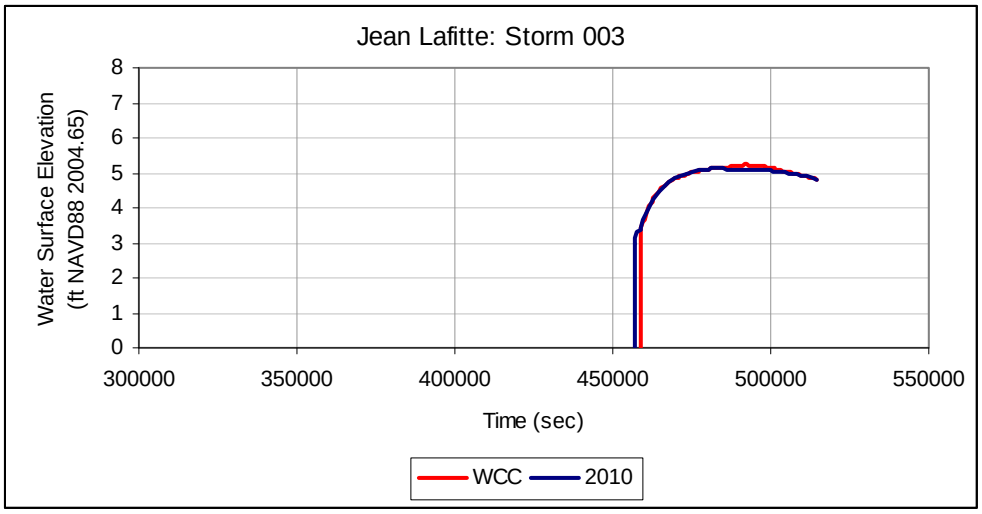
Notes regarding the time series plots:

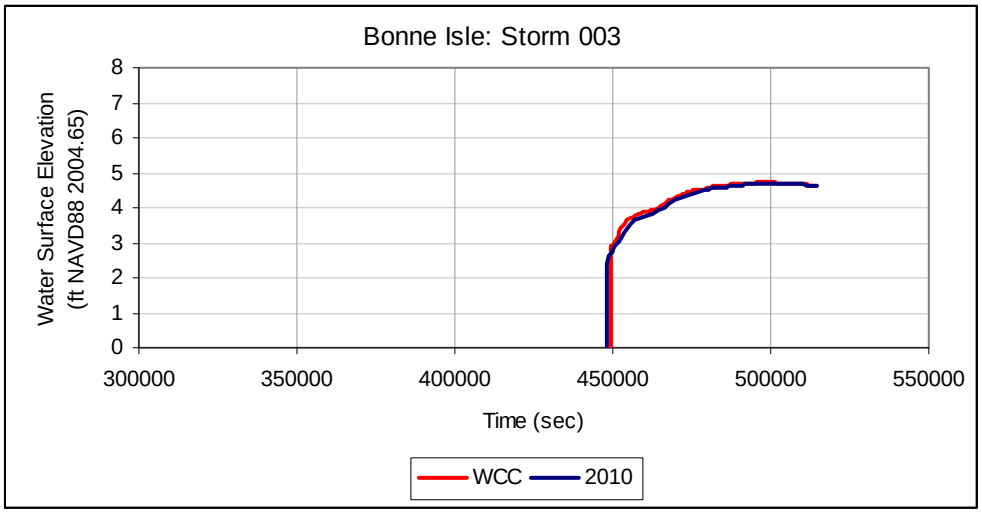
1) All of the save locations, except for Barataria, are location in land areas that are initially "dry." The save location Barataria is located within the Barataria Bay Waterway and is initially "wet." This explains why the water surface elevation time series figures show an initial non-zero value for Barataria while the other locations become instantaneously inundated at some point during the storm simulation.

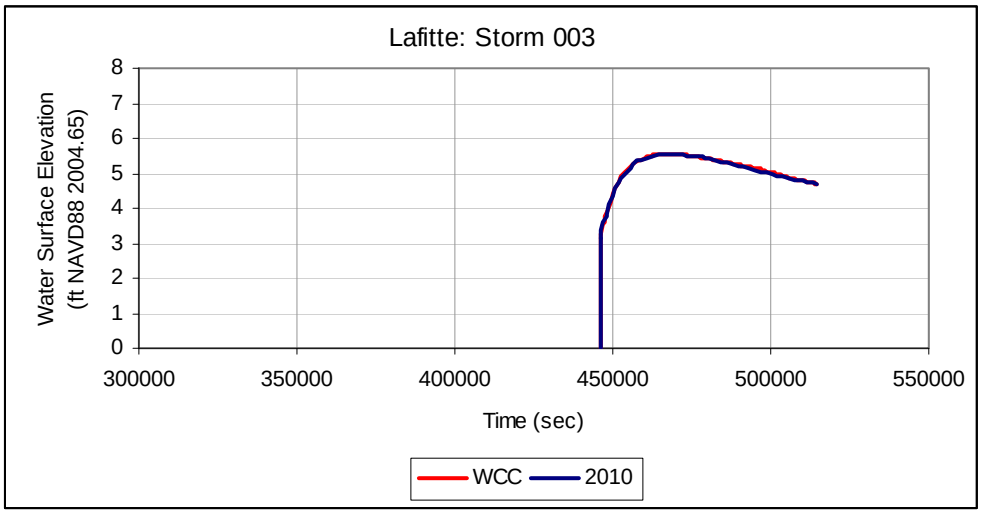
2) Jean Lafitte appears to become inundated at different times for some storms when comparing the with-project versus without-project conditions due to interpolation differences with regards to data extraction methods. The without-project (base/2010) condition was run for a prior study (LACPR/FEMA) and the "nearest node method" was used to extract water surface elevation data for the seven save locations. For the with-project (WCC) condition, the save locations were known a priori and setup within the ADCIRC model prior to making the simulations. Hence, the ADCIRC model code internally calculated the water surface elevations via interpolating among the nearest nodes. The latter data extraction method yields data at the exact latitude/longitude of the save locations whereas the former method yields data at the nearest node latitude/longitude.

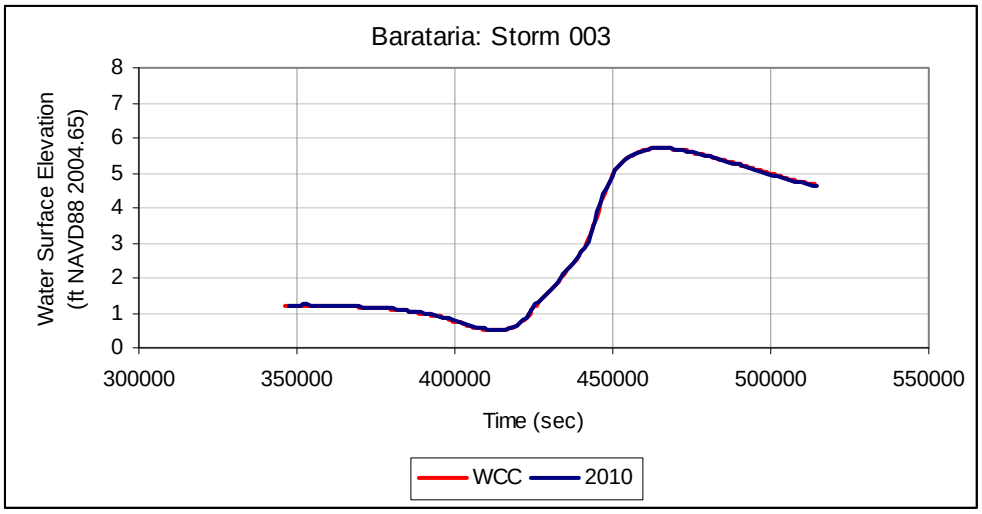
Storm 003

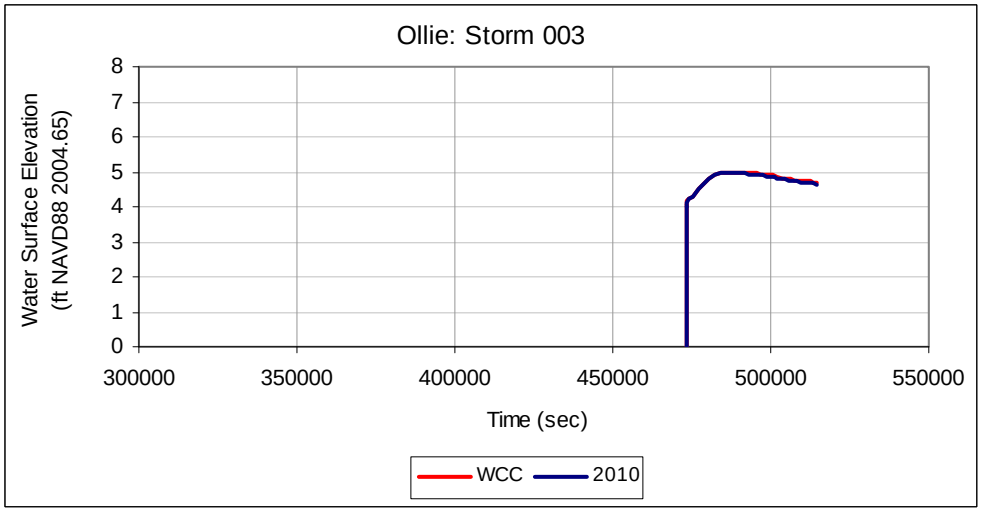



Jean Lafitte: Storm 003
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

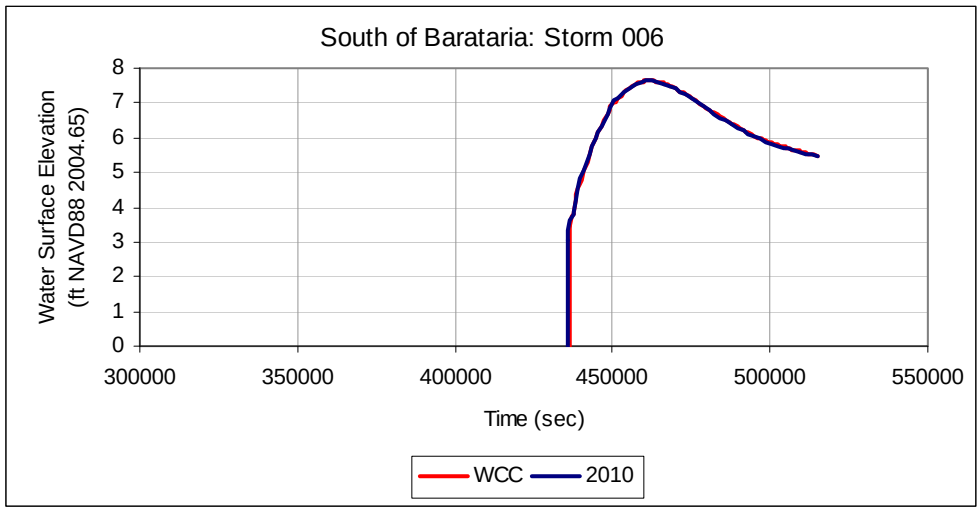

Bonne Isle: Storm 003
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

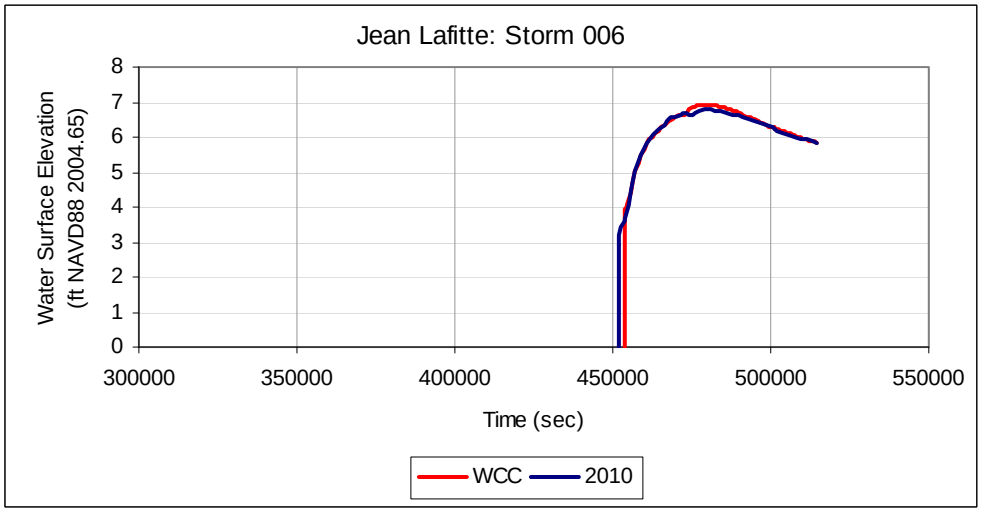

Lafitte: Storm 003
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

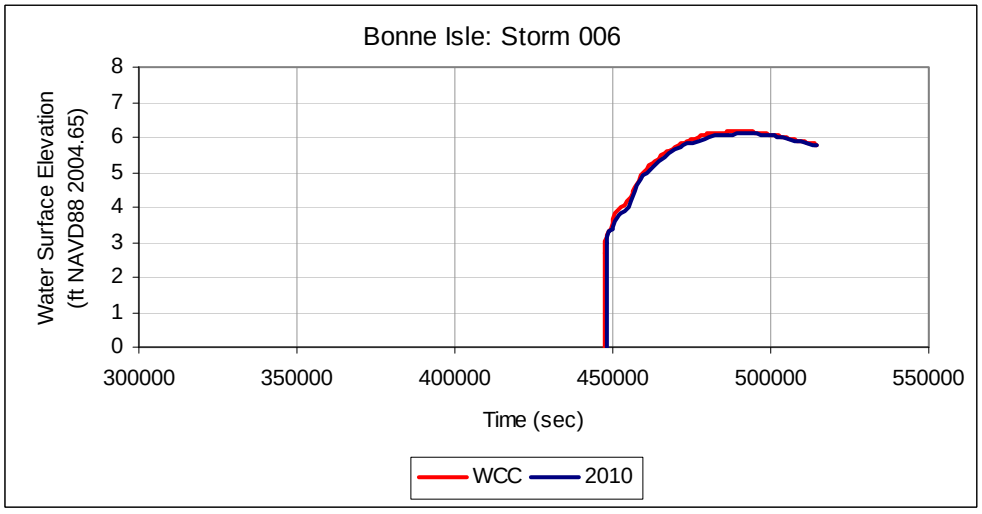

Barataria: Storm 003
Water Surface Elevation (ft NAVD88 2004.65)
8
7
6
5
4
3
2
1
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

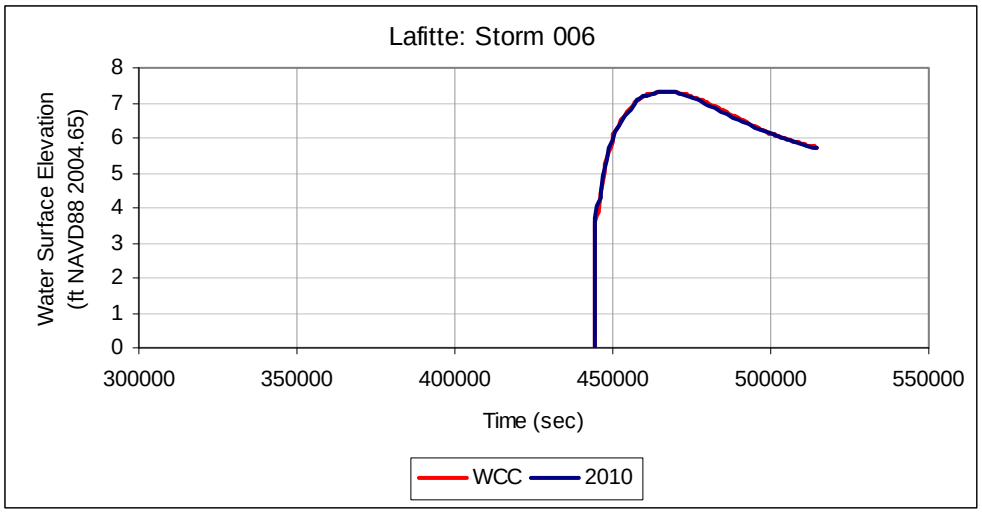

Ollie: Storm 003
Water Surface Elevation (ft NAVD88 2004.65)
8
7
6
5
4
3
2
1
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

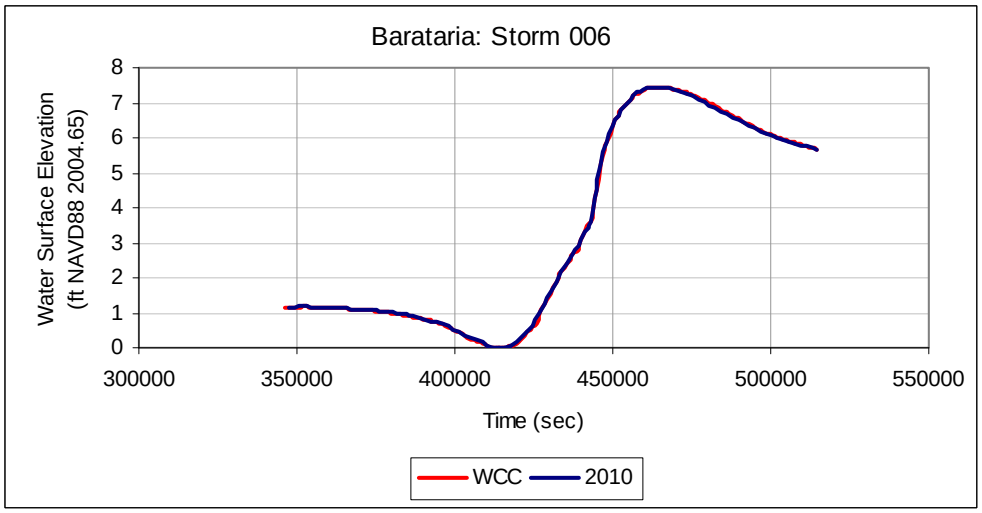
Storm 006

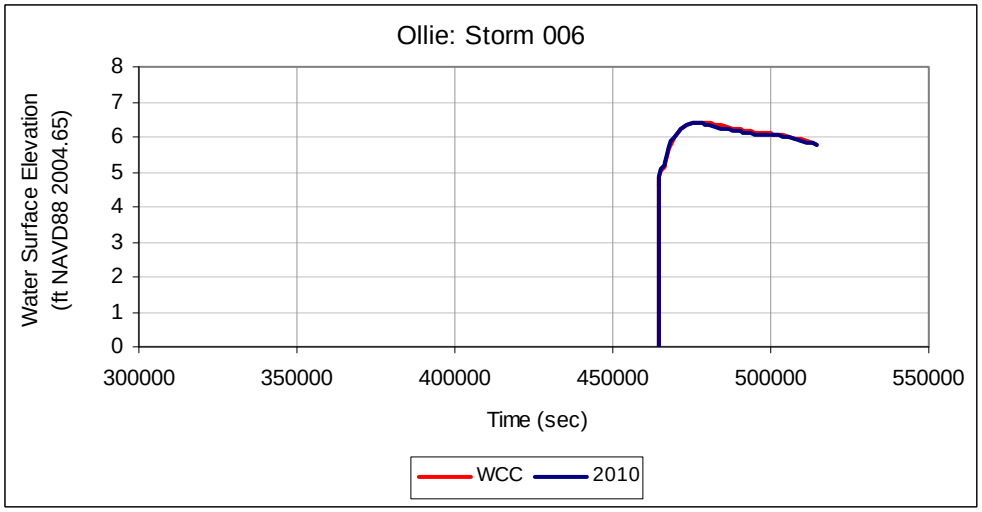

South of Barataria: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010


Jean Lafitte: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

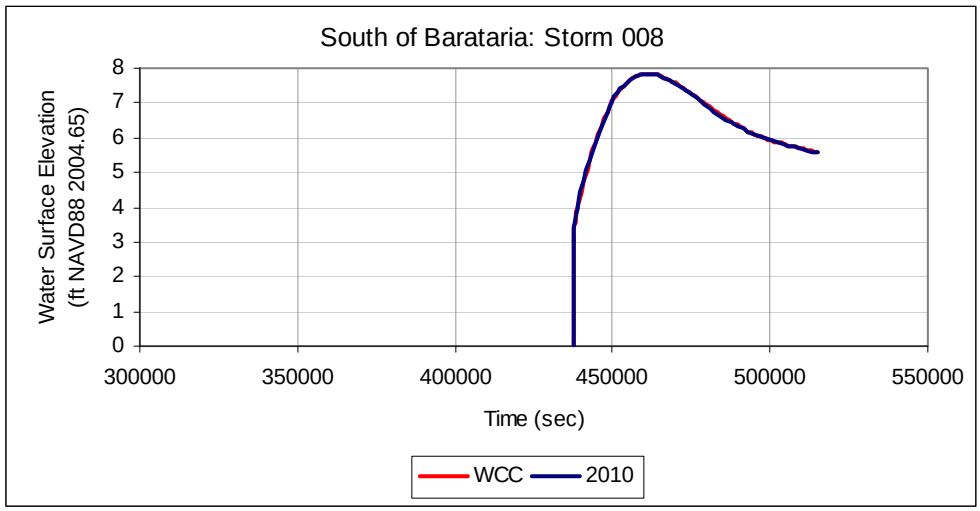

Bonne Isle: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

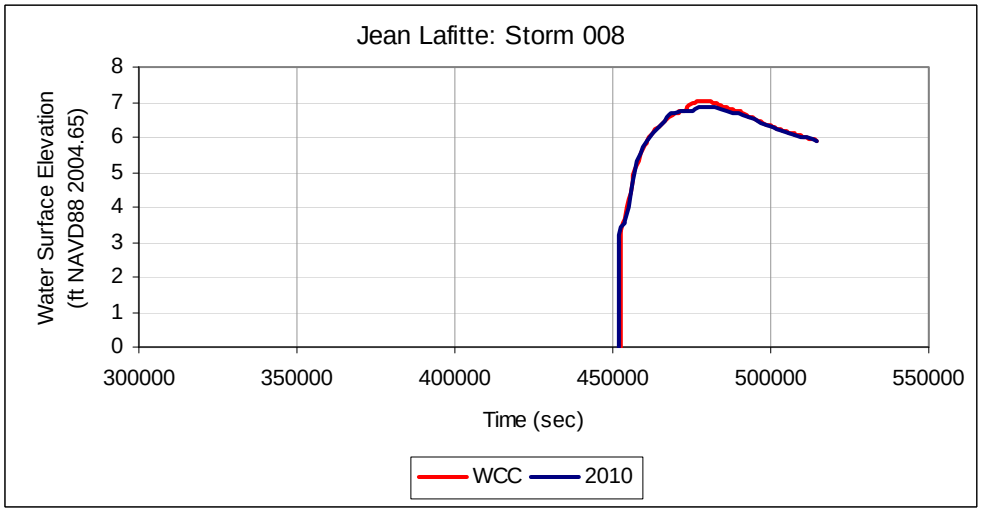

Lafitte: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

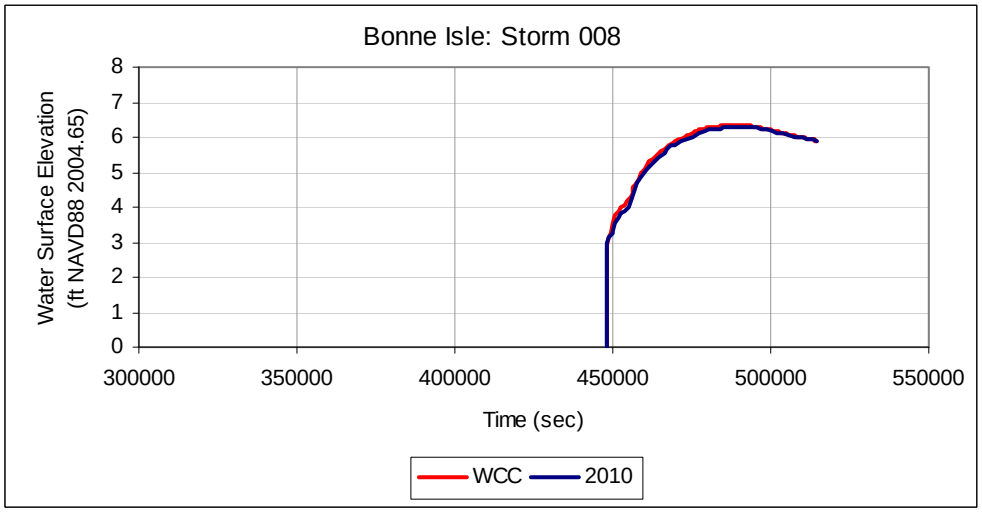

Barataria: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

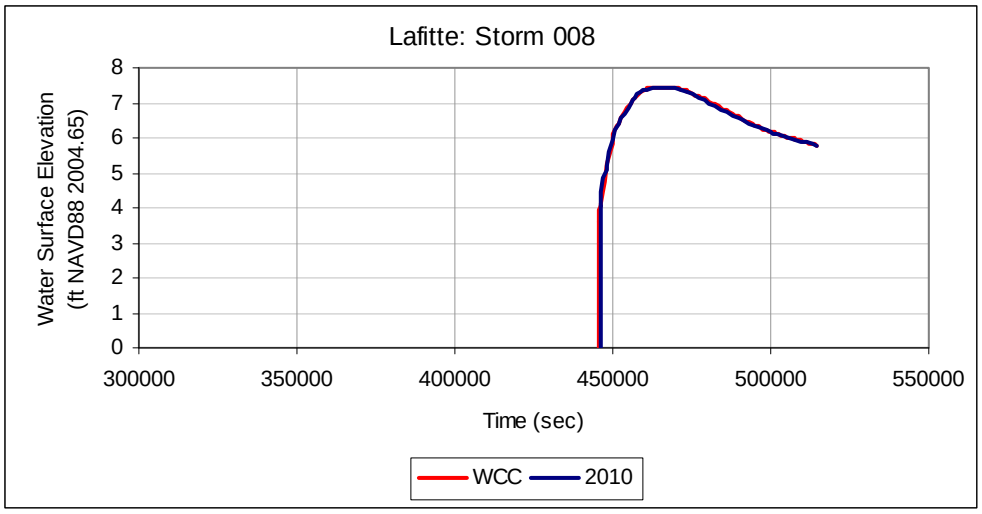

Ollie: Storm 006
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

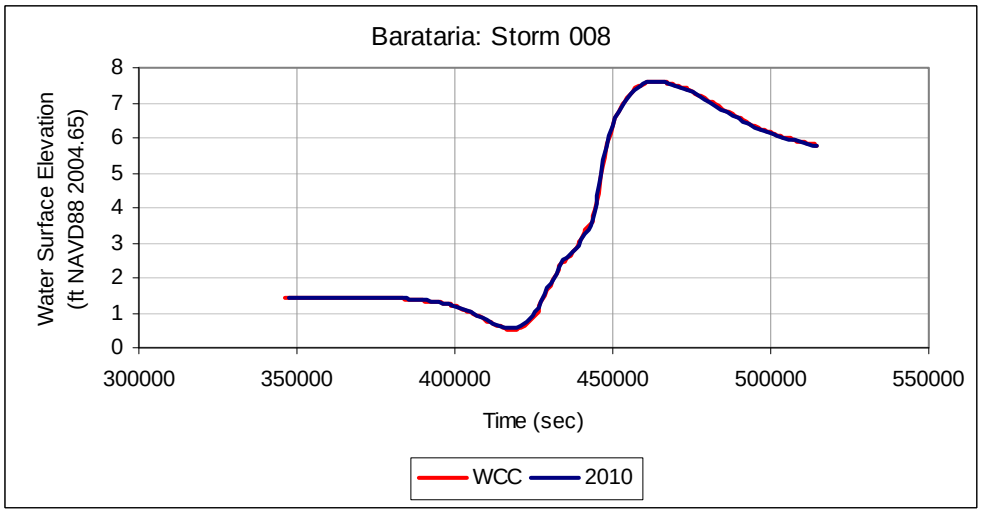
Storm 008

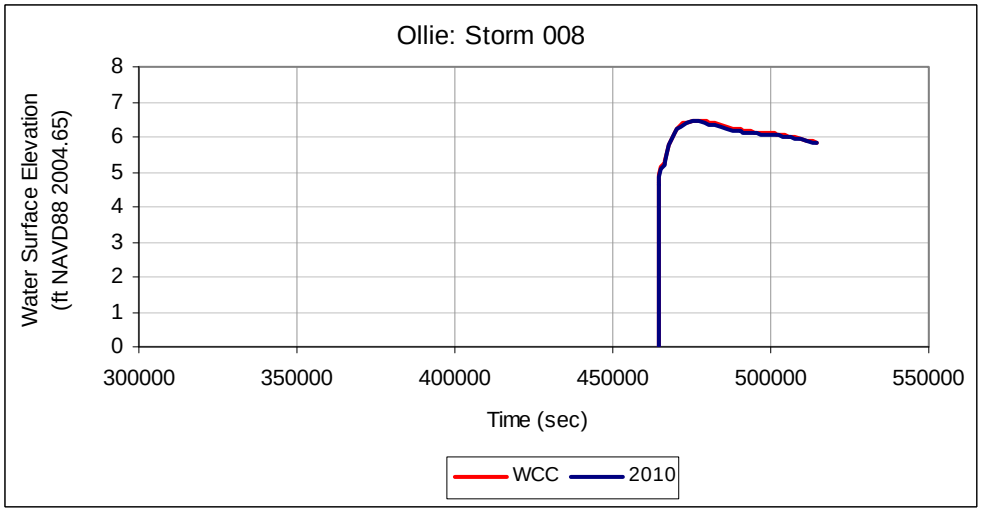

South of Barataria: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010


Jean Lafitte: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

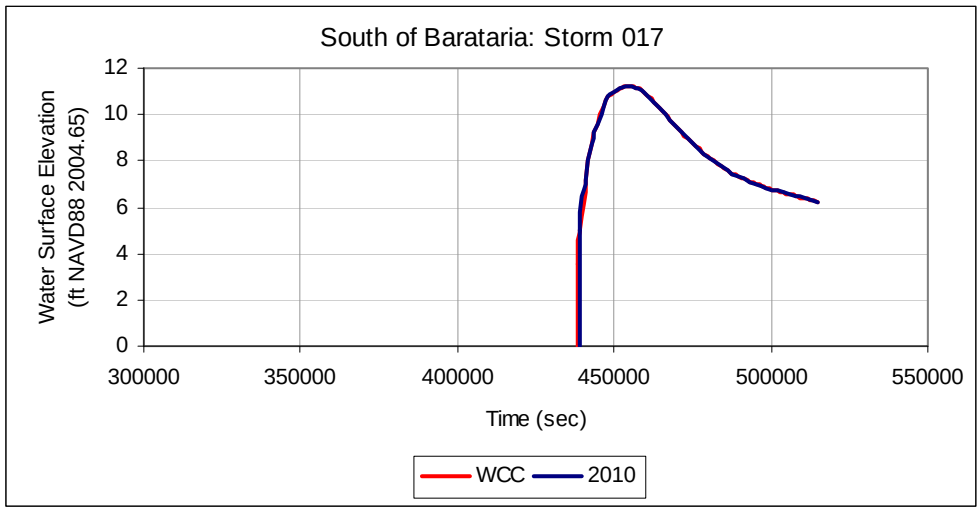

Bonne Isle: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

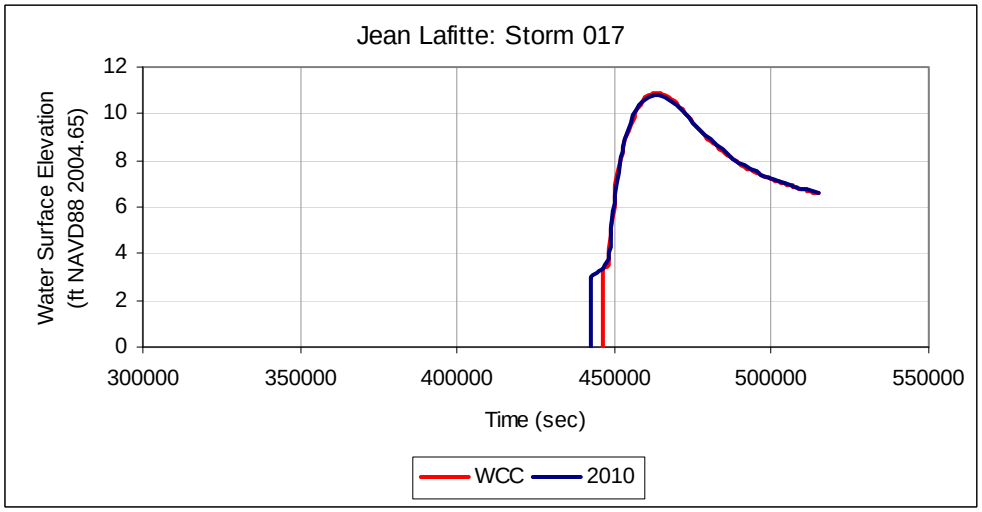

Lafitte: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

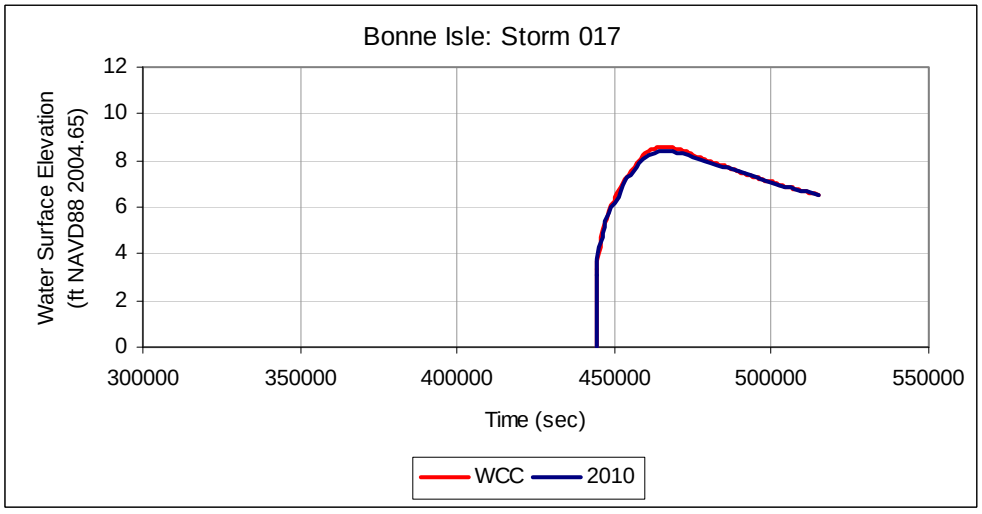

Barataria: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

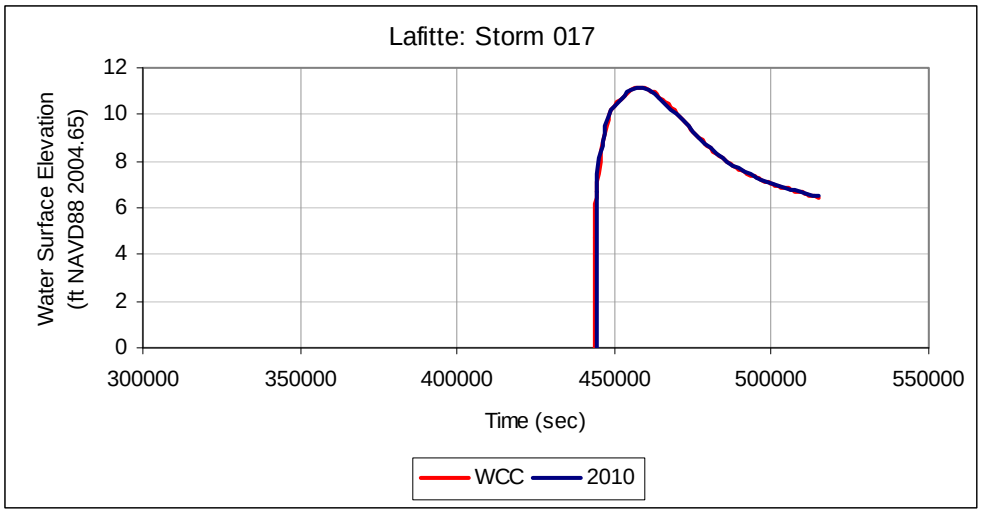

Ollie: Storm 008
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

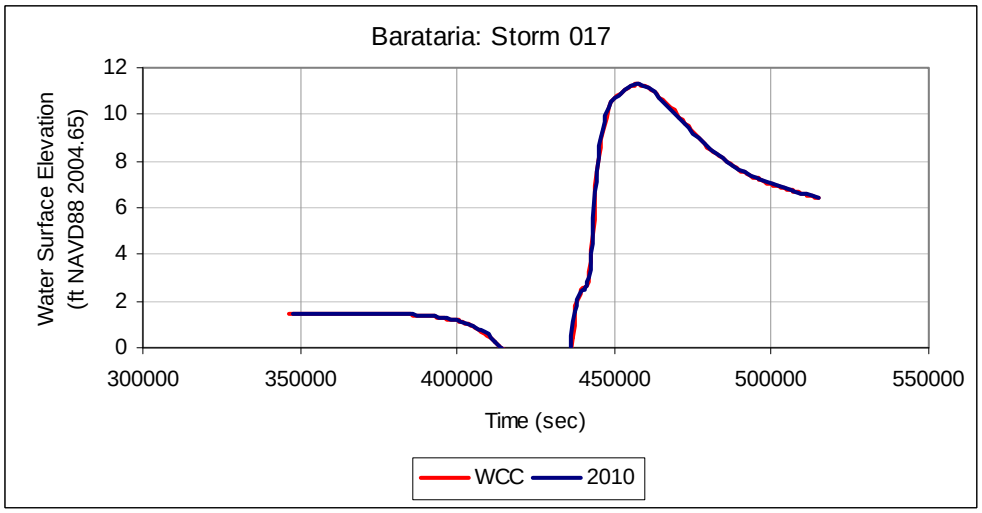
Storm 017

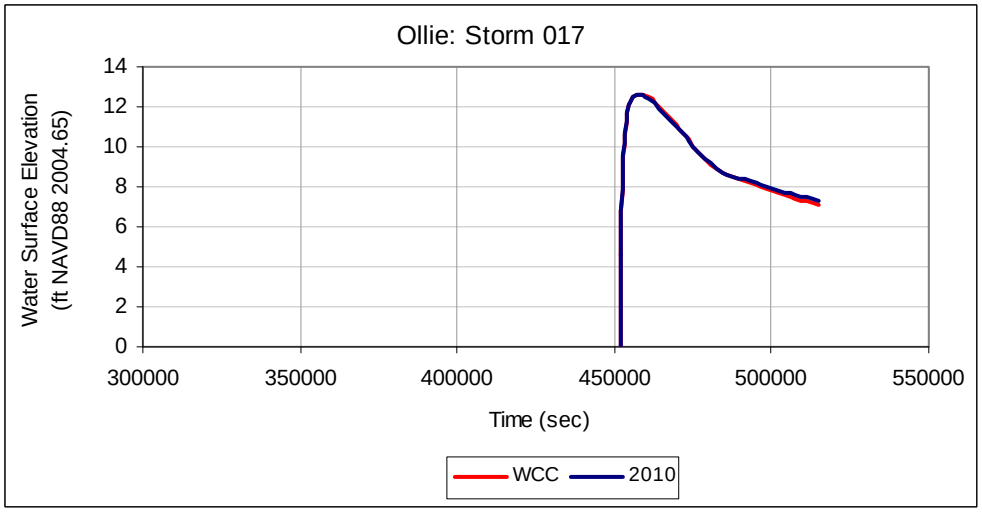

South of Barataria: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010


Jean Lafitte: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

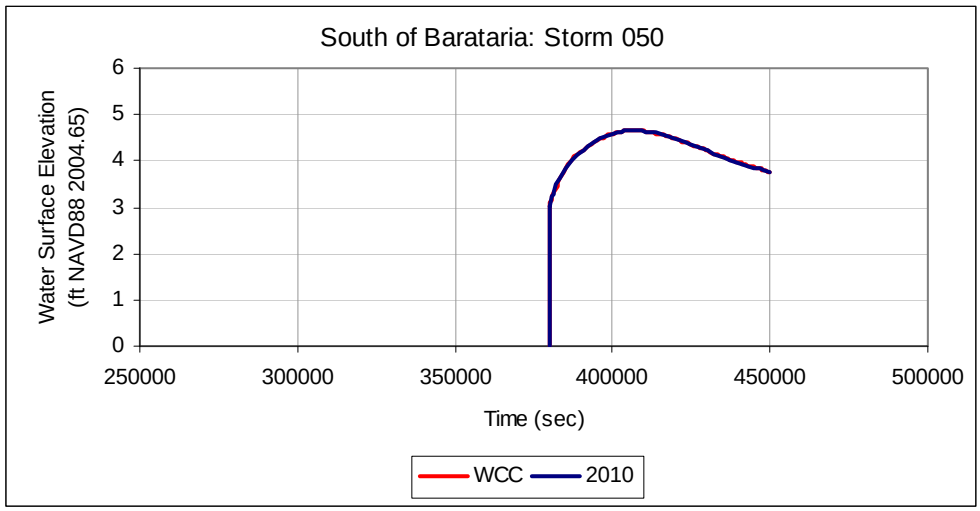

Bonne Isle: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

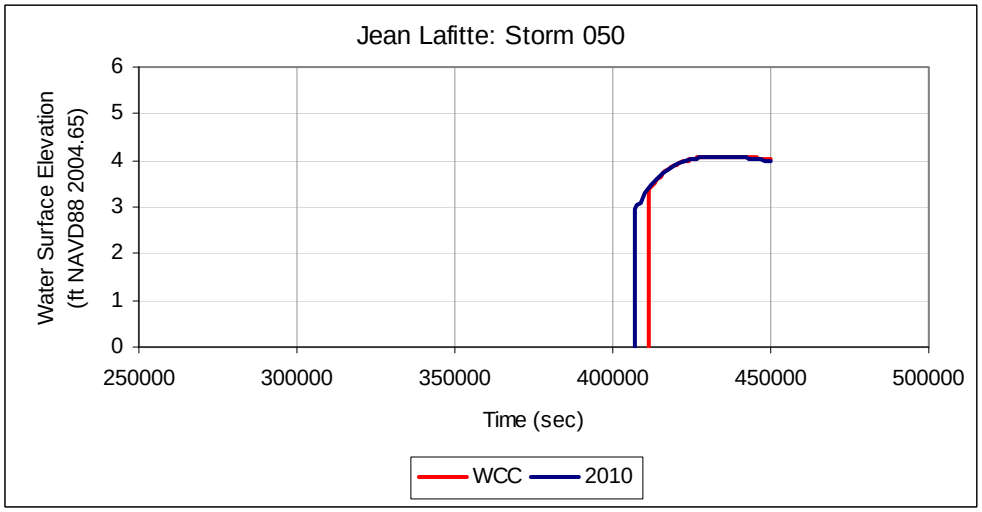

Lafitte: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

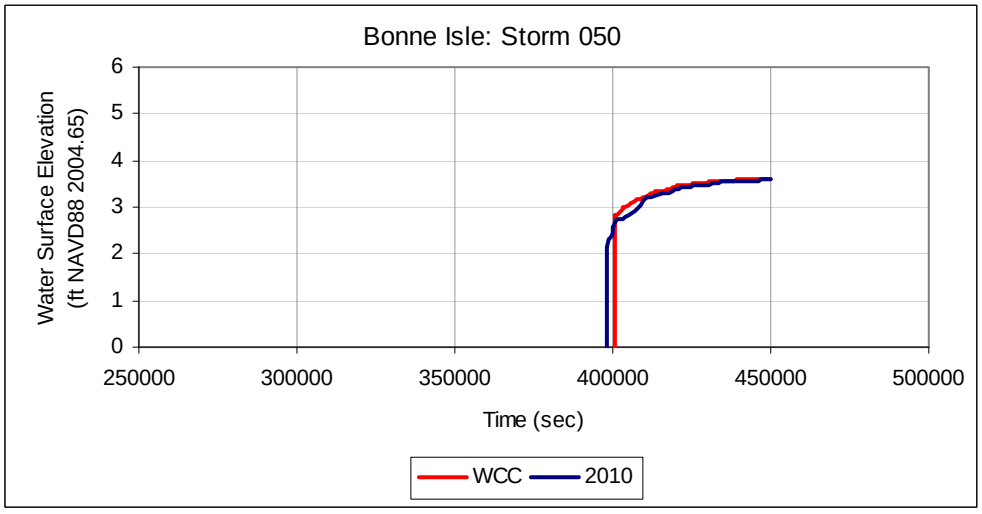

Barataria: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

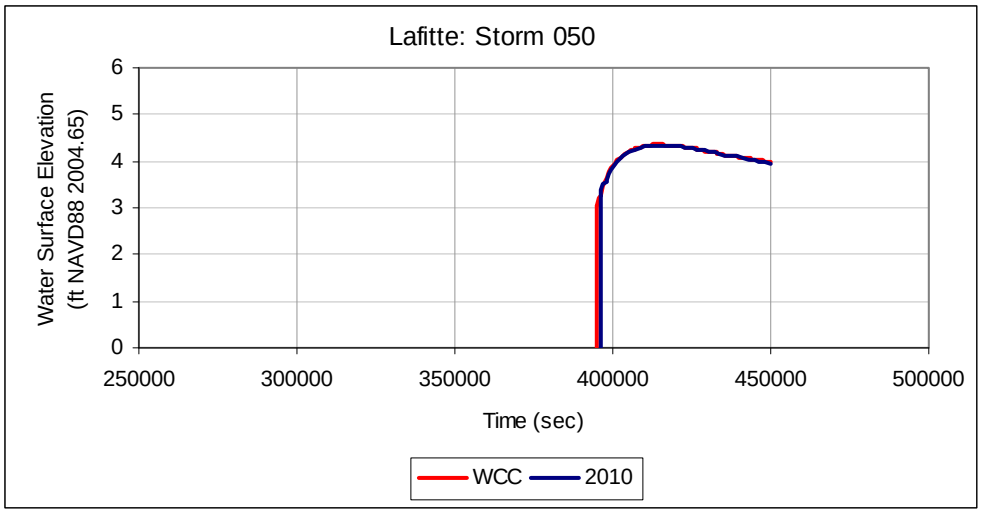

Ollie: Storm 017
Water Surface Elevation (ft NAVD88 2004.65)
14
12
10
8
6
4
2
0
300000
350000
400000
450000
500000
550000
Time (sec)
WCC
2010

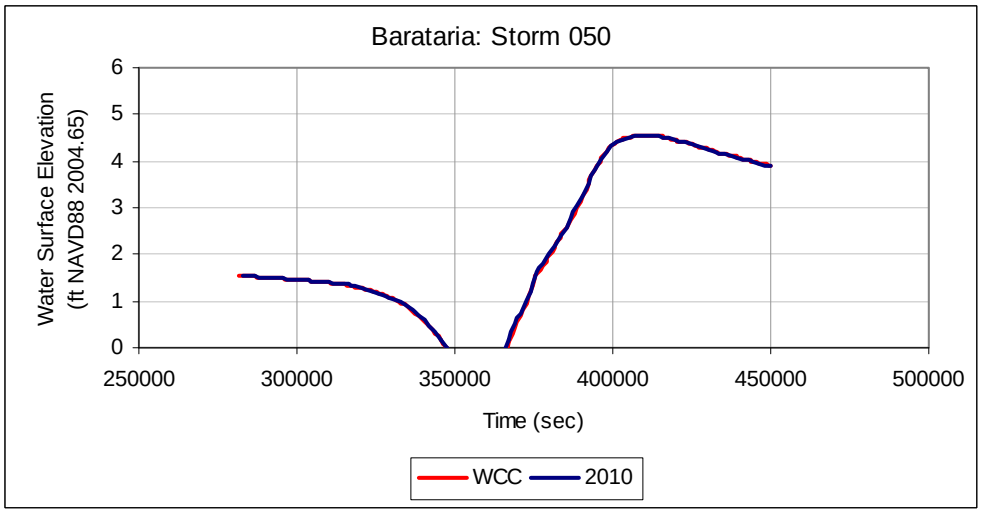
Storm 050

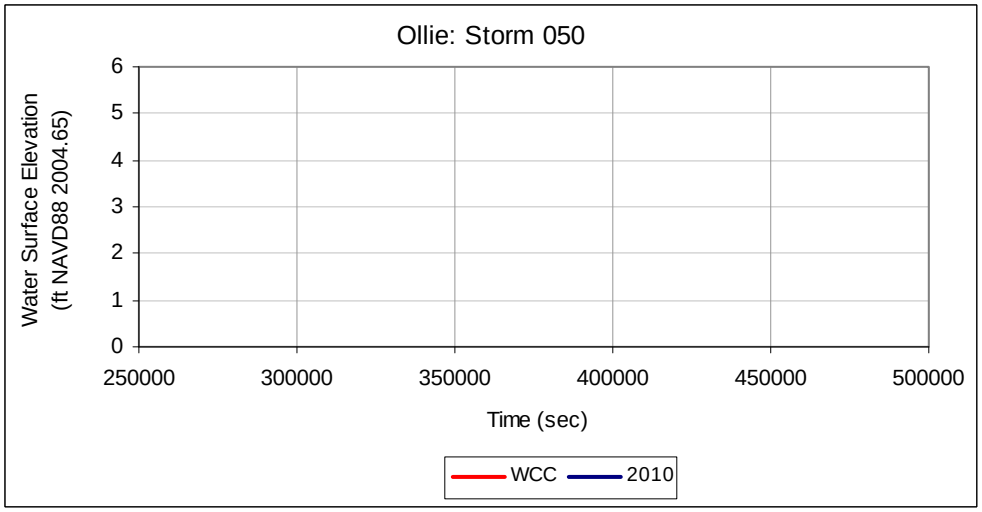

South of Barataria: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010


Jean Lafitte: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

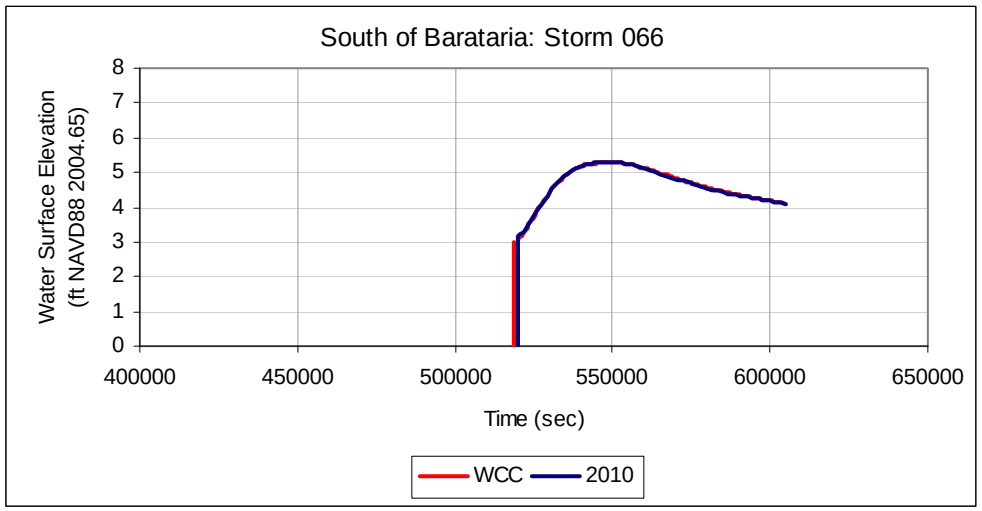

Bonne Isle: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

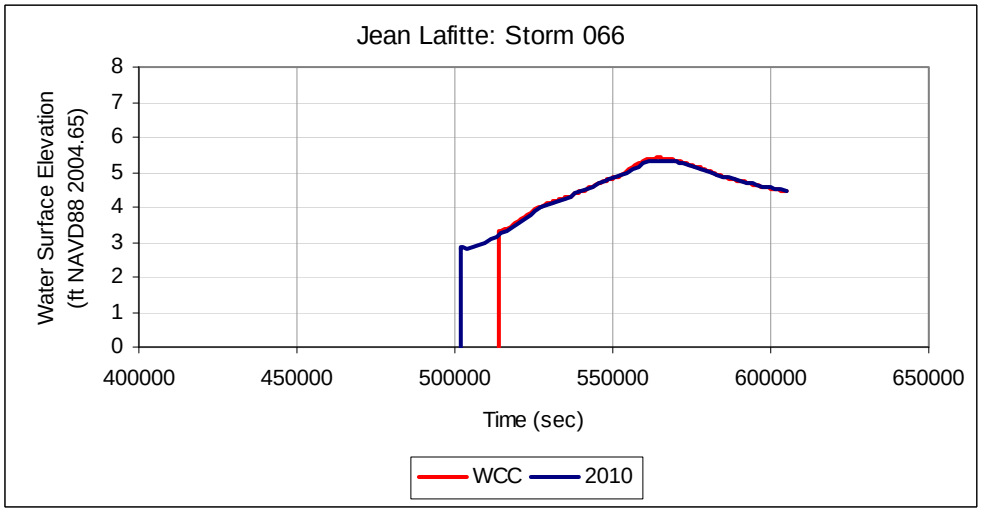

Lafitte: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

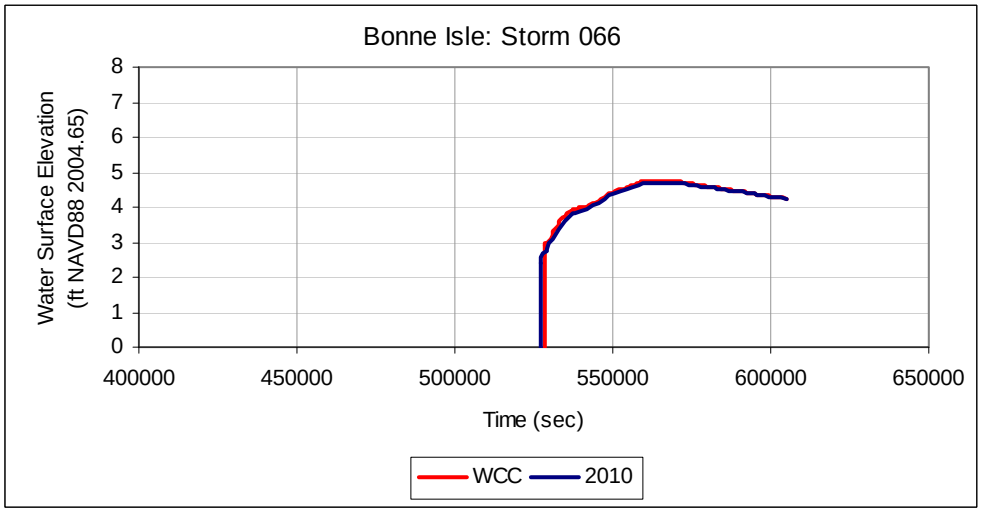

Barataria: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

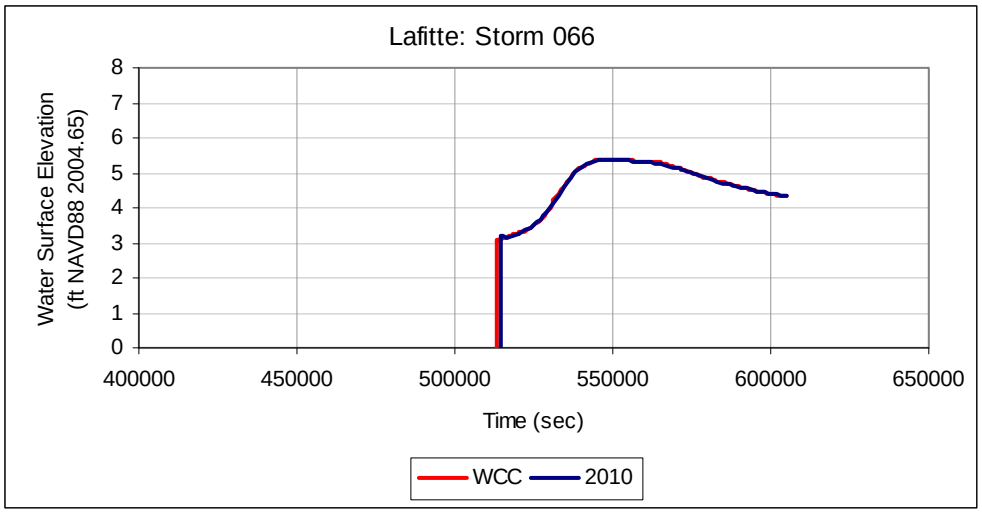

Ollie: Storm 050
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

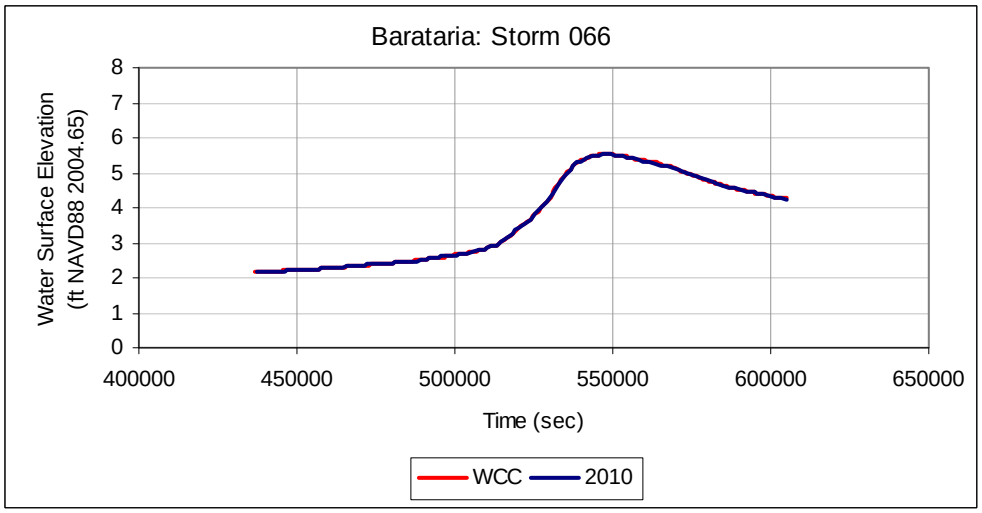
Storm 066

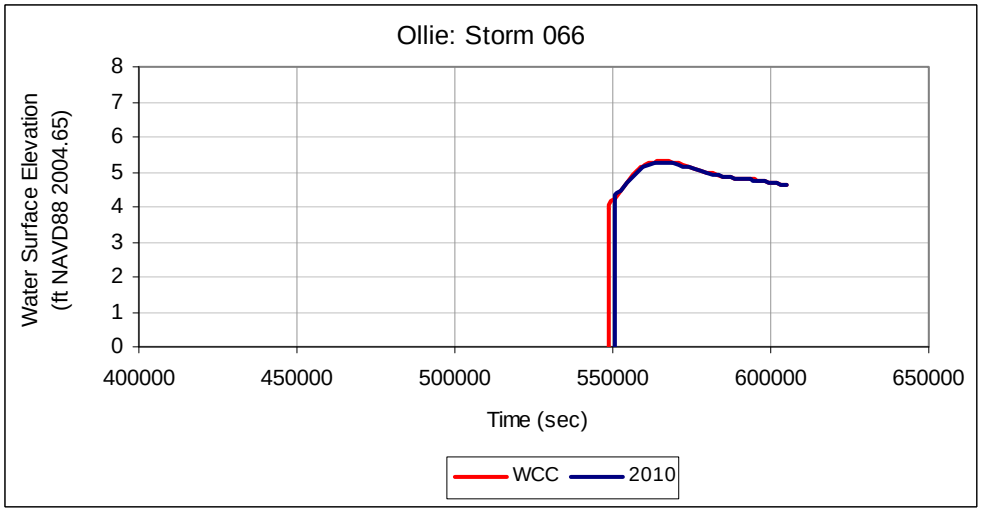

South of Barataria: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010


Jean Lafitte: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

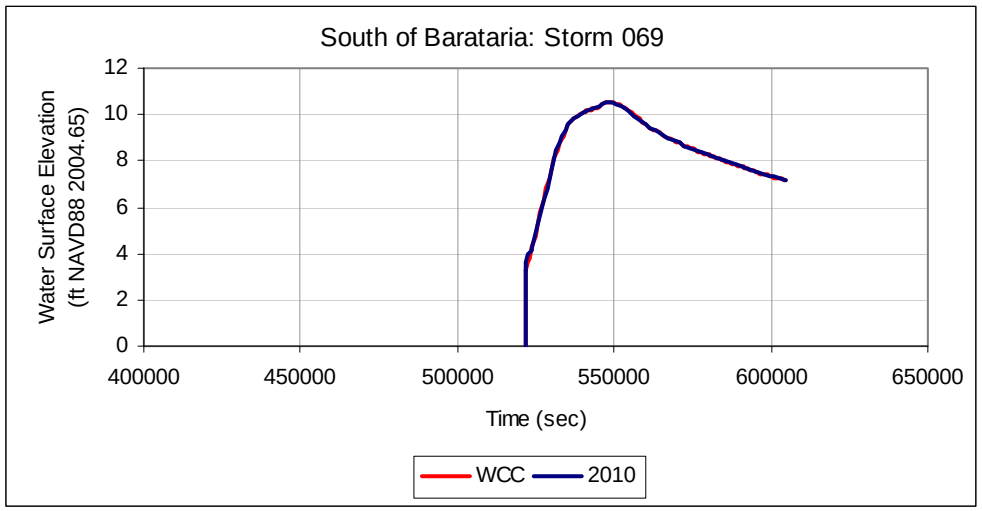

Bonne Isle: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

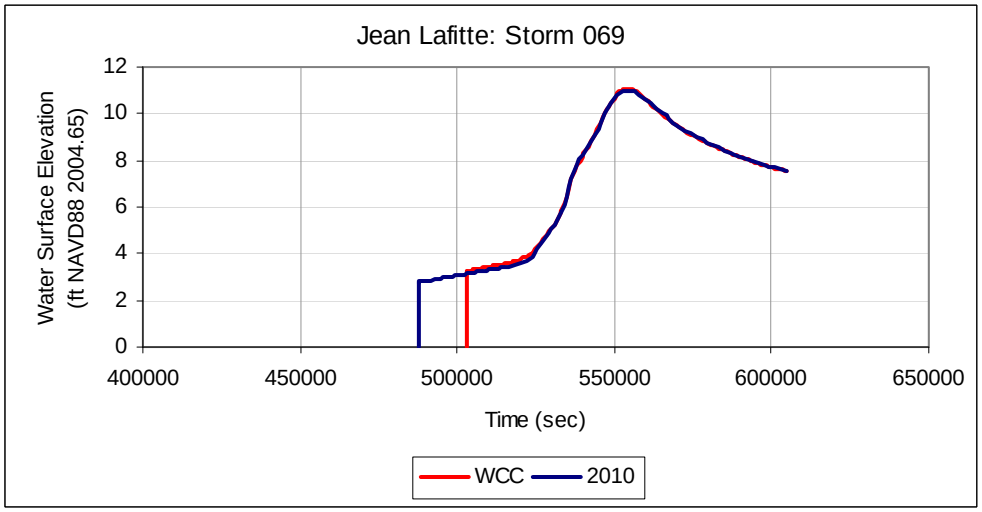

Lafitte: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

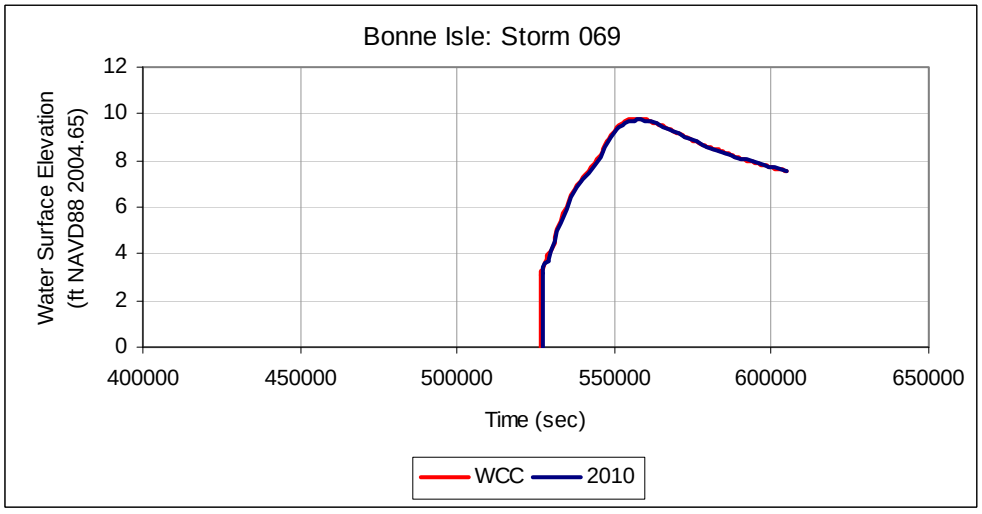

Barataria: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

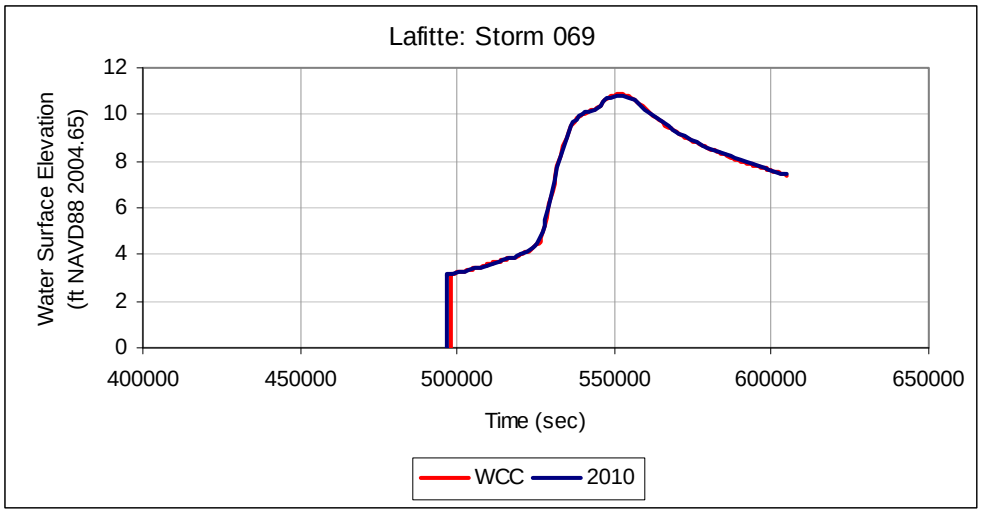

Ollie: Storm 066
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
3
4
5
6
7
8
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

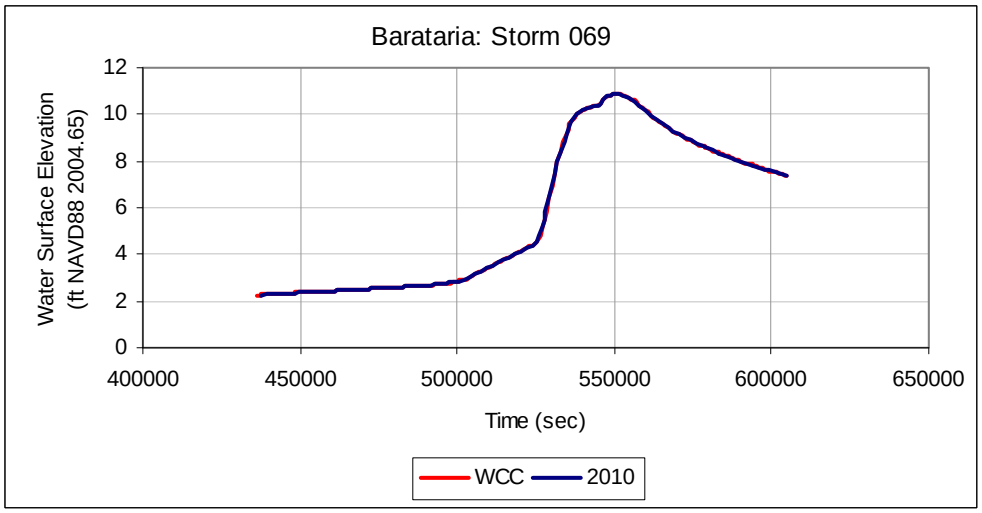
Storm 069

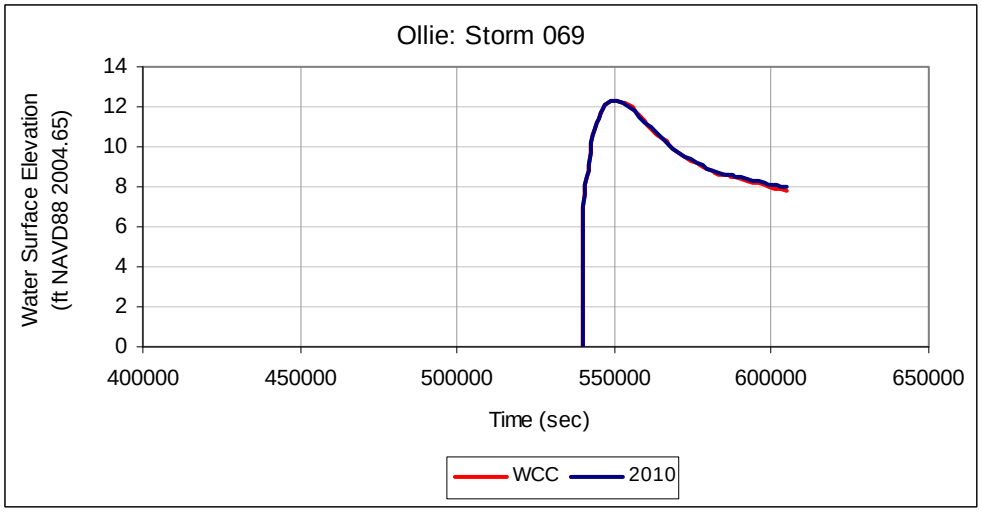

South of Barataria: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010


Jean Lafitte: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

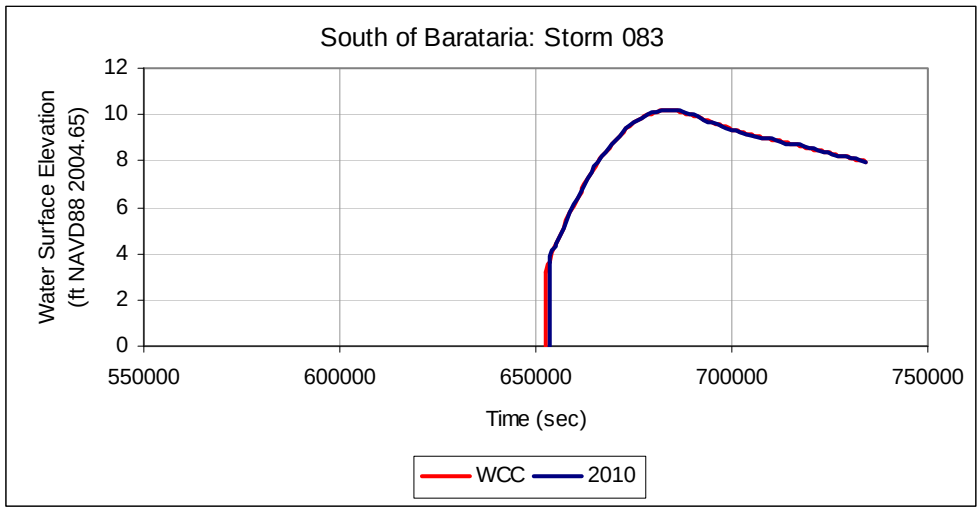

Bonne Isle: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

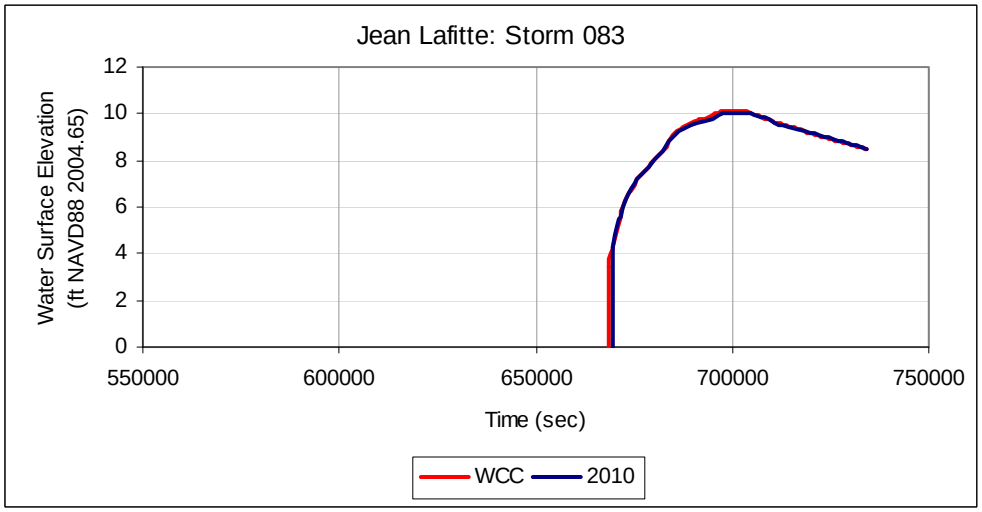

Lafitte: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

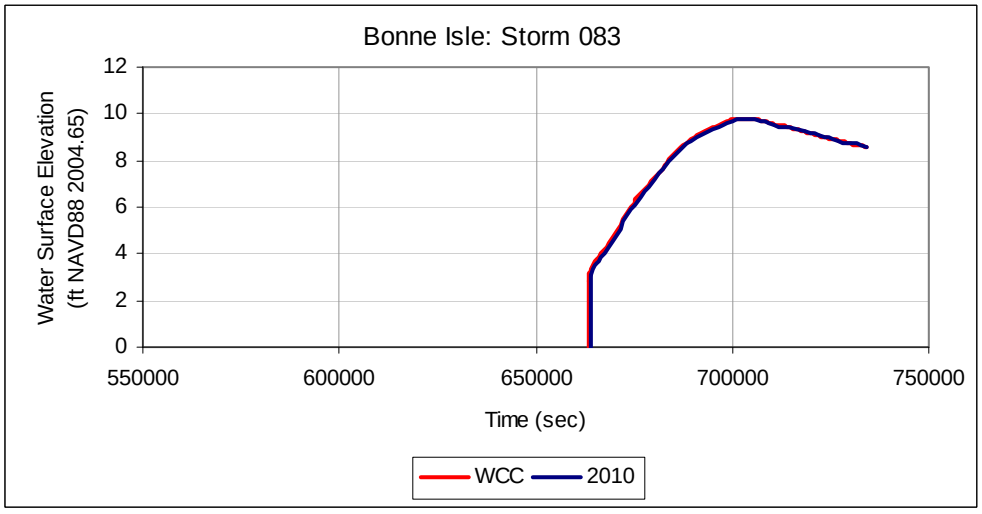

Barataria: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010


Ollie: Storm 069
Water Surface Elevation (ft NAVD88 2004.65)
14
12
10
8
6
4
2
0
400000
450000
500000
550000
600000
650000
Time (sec)
WCC
2010

Storm 083


South of Barataria: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
550000
600000
650000
700000
750000
Time (sec)
WCC
2010


Jean Lafitte: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
4
2
0
550000
600000
650000
700000
750000
Time (sec)
WCC
2010


Bonne Isle: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
8
6
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550000
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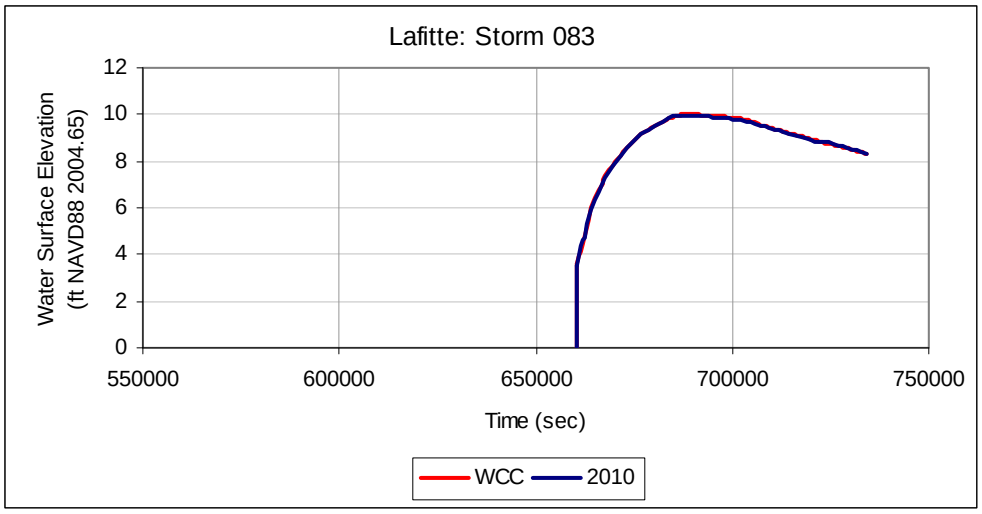
650000
700000
750000
Time (sec)
WCC
2010


Lafitte: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
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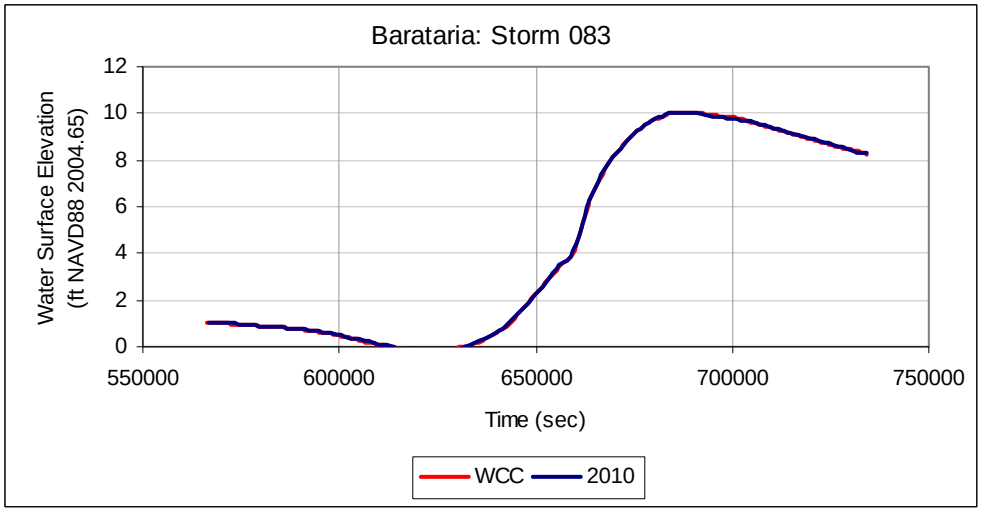
650000
700000
750000
Time (sec)
WCC
2010


Barataria: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
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6
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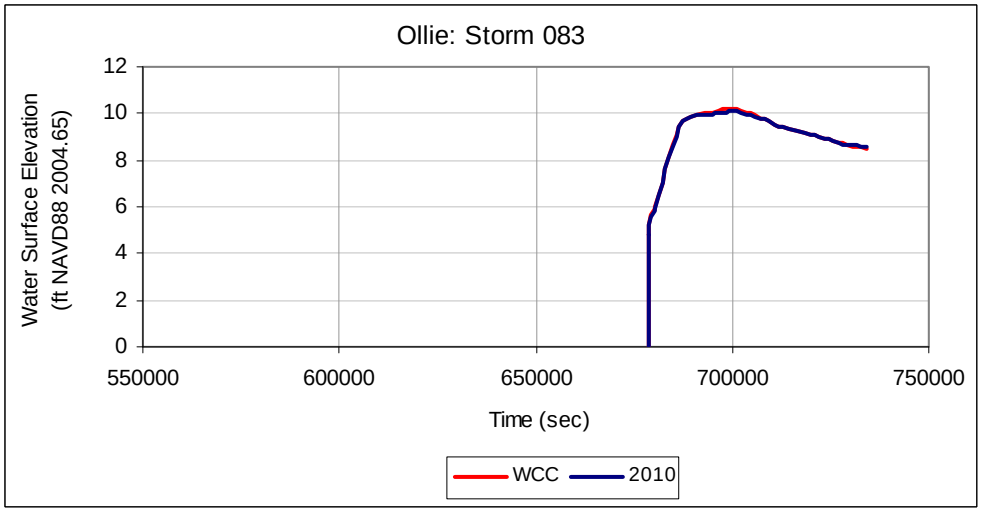
650000
700000
750000
Time (sec)
WCC
2010


Ollie: Storm 083
Water Surface Elevation (ft NAVD88 2004.65)
12
10
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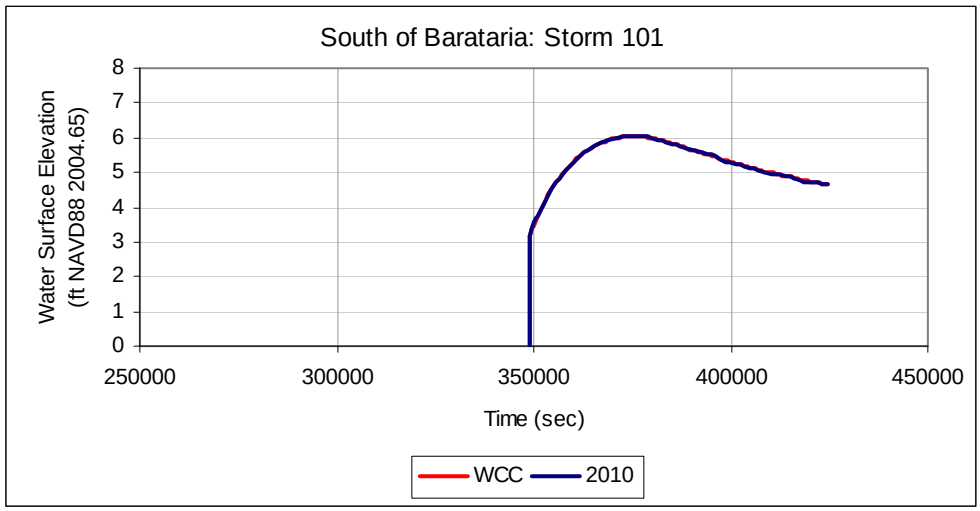
550000
600000
650000
700000
750000
Time (sec)
WCC
2010

Storm 101


South of Barataria: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
0
1
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3
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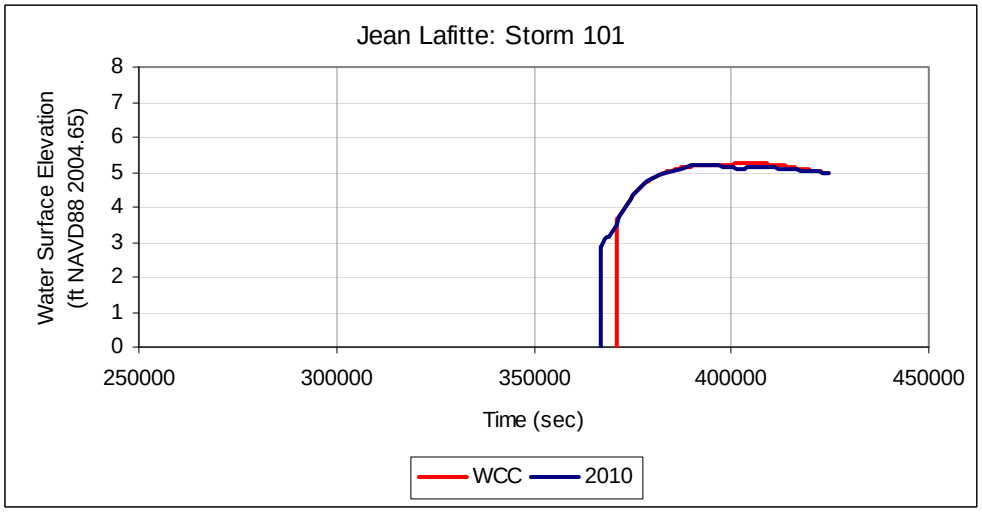
250000
300000
350000
400000
450000
Time (sec)
WCC
2010


Jean Lafitte: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
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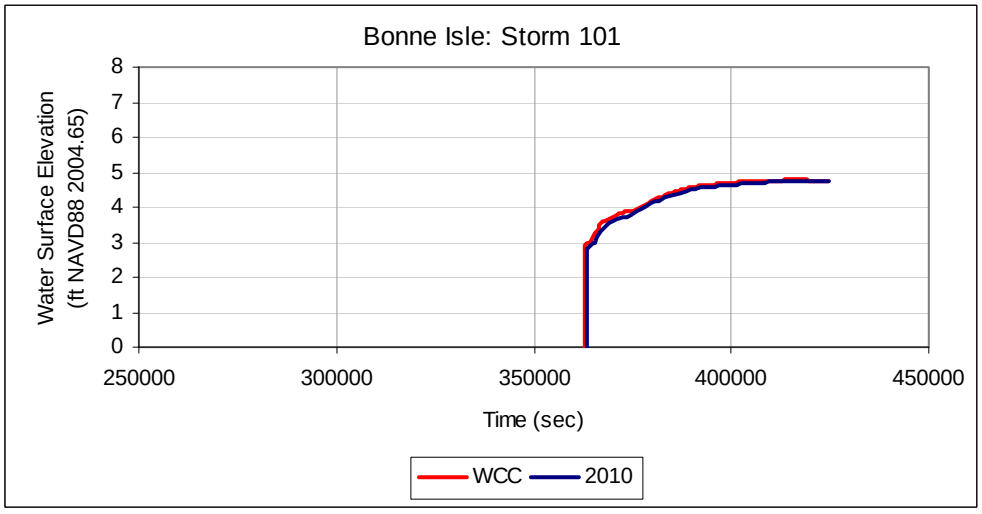
Time (sec)
WCC
2010


Bonne Isle: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
0
1
2
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4
5
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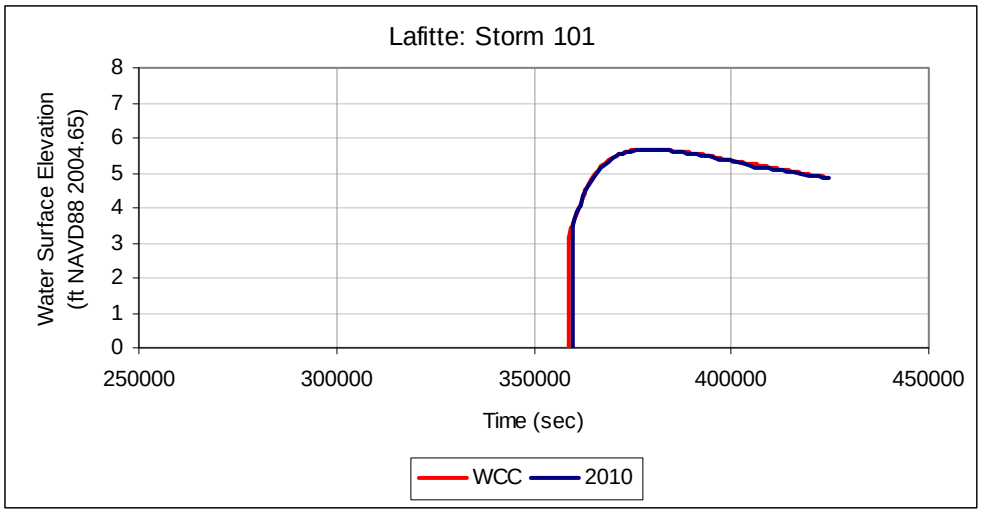
250000
300000
350000
400000
450000
Time (sec)
WCC
2010


Lafitte: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
0
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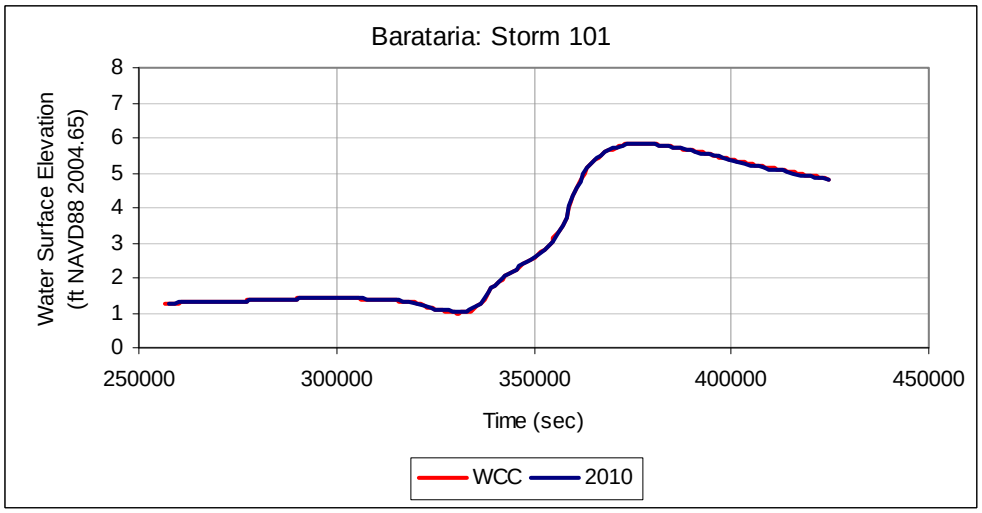
250000
300000
350000
400000
450000
Time (sec)
WCC
2010


Barataria: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
0
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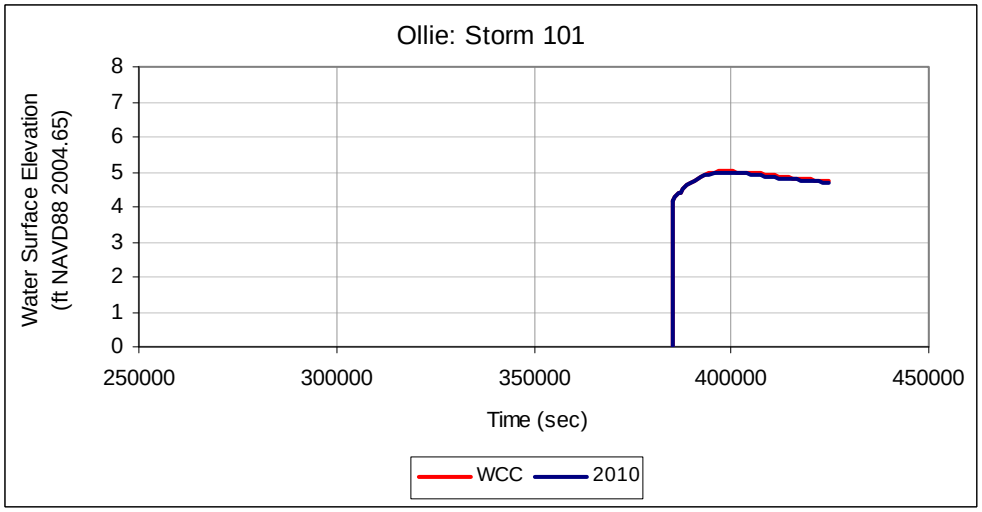
400000
450000
Time (sec)
WCC
2010


Ollie: Storm 101
Water Surface Elevation (ft NAVD88 2004.65)
0
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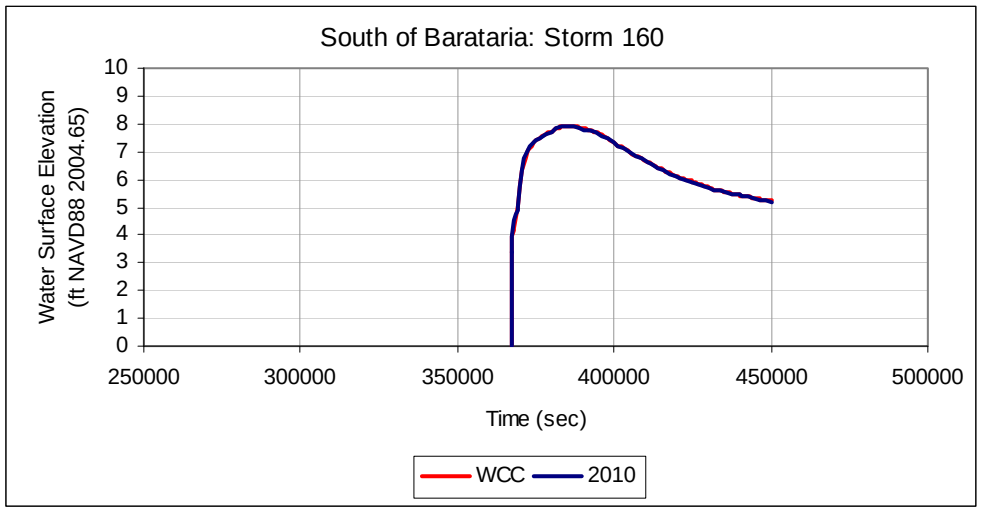
250000
300000
350000
400000
450000
Time (sec)
WCC
2010

Storm 160


South of Barataria: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
10
9
8
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250000
300000
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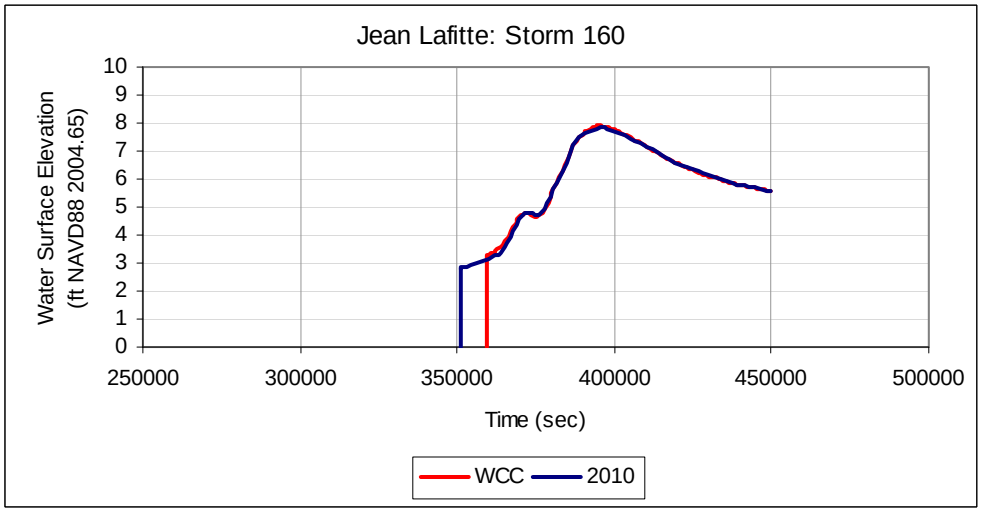
400000
450000
500000
Time (sec)
WCC
2010


Jean Lafitte: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
10
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250000
300000
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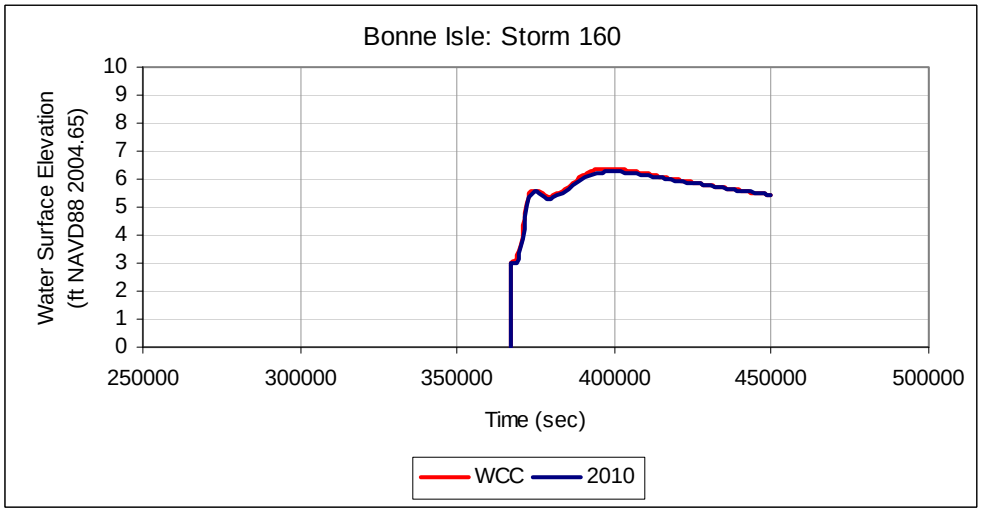
400000
450000
500000
Time (sec)
WCC
2010


Bonne Isle: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
10
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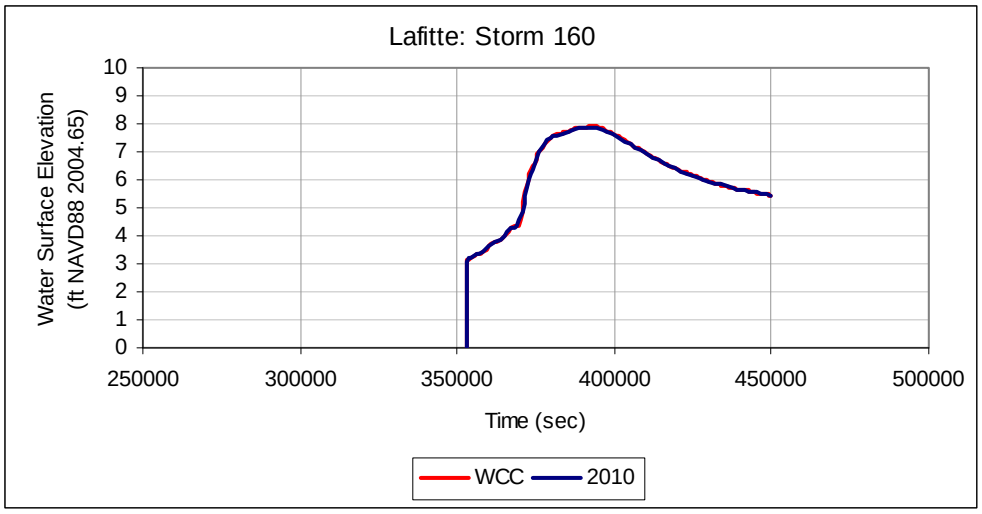
Time (sec)
WCC
2010


Lafitte: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
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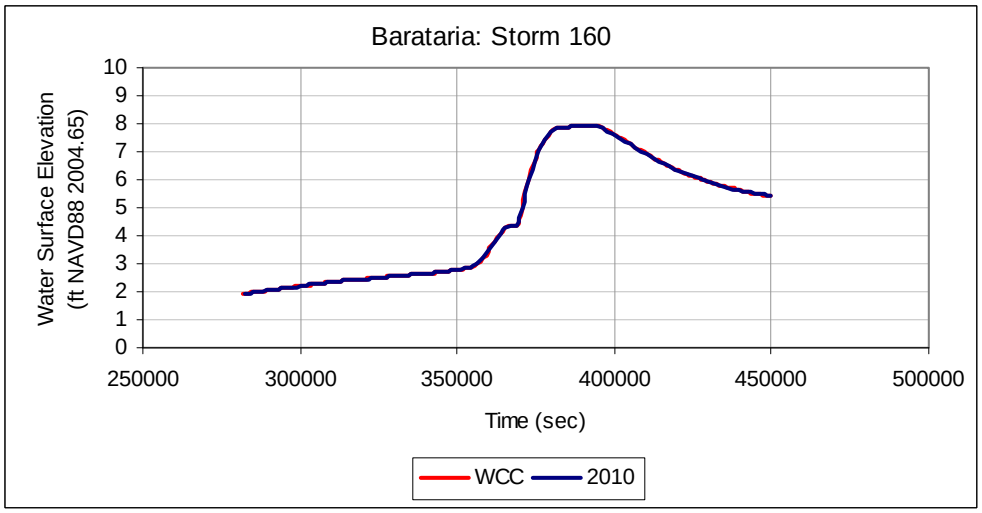
400000
450000
500000
Time (sec)
WCC
2010


Barataria: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
10
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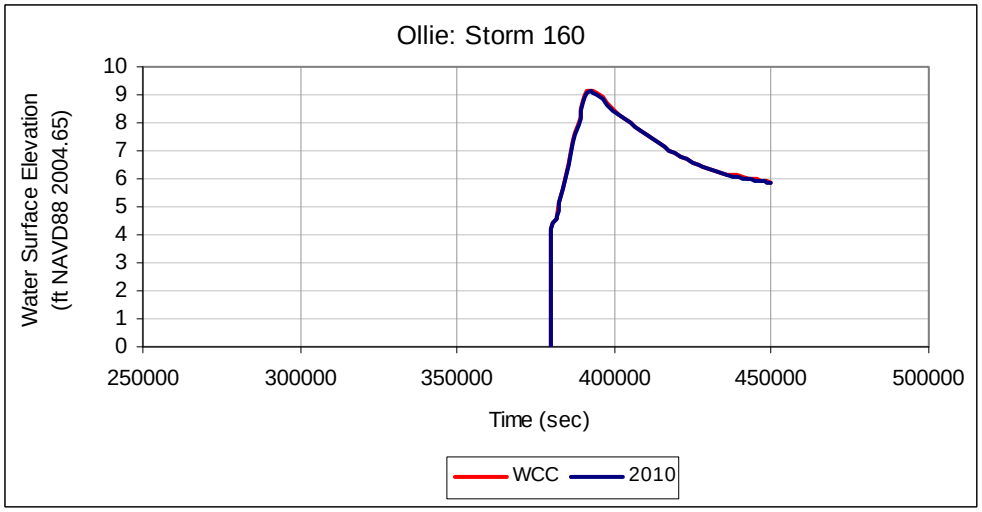
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010


Ollie: Storm 160
Water Surface Elevation (ft NAVD88 2004.65)
10
9
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1
0
250000
300000
350000
400000
450000
500000
Time (sec)
WCC
2010

Peak Surge Comparison: 2007 Base vs. with WCC

Difference = WCC - Base Positive = Surge Increase

~2%

	Storm 003			Storm 066			Storm 101		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_91	5.1	5.4	0.3	5.5	5.7	0.2	5.1	5.3	0.3
D_85	5.4	5.5	0.1	5.7	5.9	0.2	5.4	5.5	0.1
D_106	5.4	5.6	0.2	5.8	6.0	0.2	5.4	5.6	0.2
D_119	5.4	5.6	0.2	5.7	5.9	0.2	5.6	5.8	0.2
D_16	6.3	6.3	0.0	6.7	6.6	0.0	6.6	6.6	0.0
D_12	6.3	6.3	0.0	6.8	6.8	0.0	6.7	6.7	0.0

~1%

	Storm 006			Storm 008			Storm 160		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_91	6.6	7.1	0.5	6.7	7.2	0.5	8.2	8.3	0.1
D_85	7.1	7.4	0.3	7.2	7.5	0.3	9.3	9.2	-0.1
D_106	7.0	7.5	0.5	7.1	7.7	0.5	9.8	9.5	-0.3
D_119	7.2	7.6	0.5	7.3	7.8	0.5	9.8	9.4	-0.5
D_16	8.5	8.6	0.0	8.7	8.8	0.1	10.7	10.8	0.1
D_12	8.5	8.6	0.1	8.7	8.8	0.1	11.1	11.3	0.2

~0.2%

	Storm 017			Storm 069			Storm 083		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_91	11.2	11.6	0.4	11.3	11.9	0.6	10.2	10.4	0.2
D_85	12.6	12.5	0.0	12.2	12.3	0.1	10.2	10.2	0.0
D_106	13.2	13.1	0.0	12.6	12.6	0.1	10.3	10.0	-0.3
D_119	13.1	13.0	-0.1	12.2	12.2	0.0	10.2	9.9	-0.3
D_16	13.6	13.6	0.1	12.3	12.4	0.1	10.4	10.6	0.2
D_12	14.1	14.1	0.1	12.6	12.6	0.1	10.2	10.4	0.2

Gustav

	Storm 050		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_91	3.8	4.0	0.3
D_85	4.1	4.2	0.1
D_106	4.1	4.2	0.1
D_119	4.3	4.3	0.1
D_16	5.0	5.0	0.0
D_12	5.0	5.0	0.0

Peak Surge Comparison: 2007 Base vs. with WCC

Difference = WCC - Base Positive = Surge Increase

2.0%	Storm 003			Storm 066			Storm 101		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_308	4.0	4.4	0.4	4.5	4.7	0.2	4.0	4.4	0.4
D_343	3.8	4.3	0.5	4.5	4.7	0.2	3.8	4.3	0.5
D_344	3.4	4.1	0.7	4.4	4.6	0.1	3.2	4.0	0.8
D_345	2.5	3.5	1.0	4.4	4.6	0.2	2.3	3.3	1.0
D_346	-99999.0	2.9		4.4	4.6	0.2	-99999.0	2.7	
D_347	-99999.0	2.4		4.4	4.6	0.2	-99999.0	-328080.7	
D_342	-99999.0	2.3		4.4	4.6	0.2	-99999.0	-328080.7	
D_341	-99999.0	2.6		4.4	4.6	0.2	-99999.0	2.3	
D_340	2.4	3.5	1.1	4.4	4.6	0.2	2.1	3.3	1.2
D_339	5.1	5.4	0.3	5.5	5.7	0.2	5.2	5.4	0.3
D_414	5.1	5.4	0.3	5.5	5.8	0.2	5.1	5.4	0.3
D_413	5.1	5.4	0.3	5.6	5.8	0.2	5.1	5.4	0.3
D_412	5.1	5.4	0.3	5.6	5.8	0.2	5.1	5.4	0.3
D_84	5.1	5.4	0.3	5.6	5.8	0.2	5.1	5.3	0.3
D_91	5.1	5.4	0.3	5.5	5.7	0.2	5.1	5.3	0.3
D_90	5.1	5.4	0.3	5.5	5.7	0.2	5.1	5.3	0.3
D_89	5.1	5.4	0.2	5.6	5.8	0.2	5.2	5.4	0.2
D_88	5.4	5.5	0.1	5.7	5.9	0.2	5.4	5.5	0.1
D_87	5.4	5.5	0.1	5.7	5.9	0.2	5.4	5.5	0.1
D_86	5.4	5.5	0.1	5.7	5.9	0.2	5.4	5.5	0.1
D_85	5.4	5.5	0.1	5.7	5.9	0.2	5.4	5.5	0.1
D_109	5.4	5.5	0.1	5.8	5.9	0.2	5.4	5.6	0.1
D_108	5.4	5.6	0.2	5.8	6.0	0.2	5.5	5.6	0.2
D_107	5.4	5.6	0.2	5.8	6.0	0.2	5.5	5.6	0.2
D_106	5.4	5.6	0.2	5.8	6.0	0.2	5.4	5.6	0.2
D_105	5.3	5.5	0.2	5.7	6.0	0.3	5.4	5.6	0.2
D_116	5.3	5.5	0.2	5.7	5.9	0.3	5.4	5.6	0.2
D_115	5.3	5.5	0.2	5.6	5.9	0.3	5.4	5.6	0.2
D_118	5.2	5.6	0.4	5.5	5.9	0.4	5.3	5.7	0.4
D_117	5.0	5.5	0.5	5.4	5.9	0.6	5.1	5.6	0.5
D_120	5.1	5.5	0.5	5.3	5.9	0.5	5.2	5.6	0.5
D_119	5.4	5.6	0.2	5.7	5.9	0.2	5.6	5.8	0.2

D_122	6.0	6.0	0.0	6.3	6.3	0.0	6.2	6.2	0.0
D_121	6.2	6.2	0.0	6.5	6.5	0.0	6.5	6.5	0.0
D_17	6.4	6.4	0.0	6.6	6.6	0.0	6.7	6.6	0.0
D_16	6.3	6.3	0.0	6.7	6.6	0.0	6.6	6.6	0.0
D_15	6.3	6.3	0.0	6.7	6.7	0.0	6.6	6.6	0.0
D_14	6.3	6.3	0.0	6.7	6.7	0.0	6.6	6.6	0.0
D_13	6.3	6.4	0.0	6.8	6.8	0.0	6.7	6.7	0.0
D_12	6.3	6.3	0.0	6.8	6.8	0.0	6.7	6.7	0.0
D_11	6.3	6.4	0.0	6.8	6.8	0.0	6.7	6.7	0.0
D_10	6.4	6.4	0.0	6.9	6.9	0.0	6.7	6.7	0.0
D_9	6.4	6.4	0.0	7.0	7.0	0.0	6.7	6.7	0.0
D_124	6.3	6.3	0.0	7.0	7.0	0.0	6.6	6.6	0.0
D_123	6.3	6.3	0.0	7.0	7.0	0.0	6.6	6.6	0.0
D_142	5.9	5.9	0.0	6.5	6.5	0.0	6.2	6.2	0.0
D_141	6.3	6.3	0.0	7.0	7.0	0.0	6.6	6.6	0.0
D_140	6.3	6.3	0.0	7.0	7.0	0.0	6.7	6.7	0.0
D_139	6.3	6.3	0.0	7.0	7.0	0.0	6.7	6.7	0.0
D_138	6.4	6.4	0.0	7.2	7.2	0.0	6.9	6.9	0.0
D_137	6.4	6.5	0.0	7.3	7.3	0.0	6.9	6.9	0.0
D_136	6.5	6.5	0.0	7.4	7.4	0.0	6.9	6.9	0.0
D_135	6.4	6.4	0.0	7.4	7.4	0.0	6.9	6.9	0.0
D_134	6.4	6.4	0.0	7.4	7.4	0.0	6.8	6.8	0.0
D_133	6.3	6.3	0.0	7.3	7.3	0.0	6.8	6.7	0.0
D_132	6.3	6.3	0.0	7.3	7.3	0.0	6.7	6.7	0.0
D_131	6.2	6.2	0.0	7.3	7.3	0.0	6.6	6.6	0.0
D_130	6.2	6.2	0.0	7.3	7.3	0.0	6.6	6.6	0.0
D_144	6.2	6.2	0.0	7.4	7.4	0.0	6.6	6.6	0.0
D_143	6.3	6.3	0.0	7.5	7.5	0.0	6.7	6.7	0.0
D_148	6.3	6.4	0.0	7.6	7.6	0.0	6.7	6.7	0.0
D_147	6.3	6.3	0.0	7.6	7.6	0.0	6.7	6.7	0.0
D_146	6.2	6.2	0.0	7.4	7.4	0.0	6.6	6.6	0.0
D_145	6.1	6.1	0.0	7.4	7.4	0.0	6.5	6.5	0.0
D_18	6.1	6.1	0.0	7.4	7.4	0.0	6.5	6.5	0.0
D_280	6.1	6.1	0.0	7.3	7.3	0.0	6.5	6.4	0.0
D_279	6.0	6.0	0.0	7.2	7.2	0.0	6.4	6.4	0.0
D_178	5.8	5.8	0.0	3.9	3.9	0.0	5.5	5.5	0.0
D_277	6.1	6.1	0.0	7.3	7.3	0.0	6.5	6.5	0.0

D_276	6.1	6.1	0.0	7.3	7.3	0.0	6.5	6.5	0.0
D_275	6.1	6.1	0.0	7.3	7.3	0.0	6.6	6.6	0.0
D_274	6.0	6.1	0.0	7.3	7.3	0.0	6.5	6.5	0.0
D_273	6.0	6.0	0.0	7.2	7.2	0.0	6.5	6.5	0.0
D_272	6.0	6.0	0.0	7.2	7.2	0.0	6.5	6.5	0.0
D_271	6.0	6.0	0.0	7.1	7.2	0.0	6.5	6.6	0.0
D_270	6.0	6.0	0.1	7.1	7.1	0.0	6.5	6.5	0.0
D_269	5.9	6.0	0.1	7.0	7.1	0.1	6.4	6.5	0.0
D_268	5.9	5.9	0.1	7.0	7.0	0.1	6.4	6.4	0.0
D_267	5.9	5.9	0.0	7.0	7.0	0.0	6.4	6.4	0.0
D_266	5.8	5.8	0.0	6.9	6.9	0.0	6.3	6.3	0.0
D_265	5.8	5.8	0.0	6.9	6.9	0.0	6.3	6.3	0.0
D_264	5.8	5.9	0.0	7.0	7.0	0.0	6.3	6.3	0.0
D_263	5.8	5.9	0.0	7.0	7.0	0.0	6.3	6.3	0.0
D_262	5.8	5.9	0.1	7.0	7.1	0.0	6.3	6.3	0.0
D_261	5.8	5.9	0.1	7.1	7.1	0.0	6.3	6.3	0.0
D_260	5.8	5.8	0.1	7.0	7.1	0.0	6.2	6.2	0.0
D_259	5.7	5.7	0.0	6.9	7.0	0.0	6.1	6.1	0.0
D_258	5.6	5.6	0.0	6.8	6.8	0.0	6.0	6.0	0.0
D_257	5.4	5.5	0.1	6.6	6.6	0.0	5.9	5.9	0.0
D_256	5.3	5.3	0.1	6.4	6.4	0.0	5.7	5.8	0.0
D_255	5.1	5.2	0.0	6.1	6.2	0.0	5.6	5.6	0.0
D_254	5.0	5.1	0.0	6.0	6.0	0.0	5.5	5.6	0.0
D_432	5.0	5.0	0.0	5.8	5.9	0.0	5.5	5.5	0.0
D_433	4.8	4.8	0.0	5.7	5.7	0.0	5.3	5.3	0.0
D_434	4.8	4.8	0.0	5.6	5.7	0.0	5.3	5.4	0.1
D_435	5.2	5.3	0.1	5.9	6.0	0.0	5.9	5.9	0.1
D_438	5.4	5.5	0.1	6.1	6.1	0.1	6.1	6.1	0.1
D_437	5.4	5.5	0.1	6.0	6.1	0.1	6.0	6.1	0.1
D_436	5.2	5.4	0.1	6.0	6.0	0.1	5.9	6.0	0.2
D_447	5.2	5.3	0.1	5.9	6.0	0.1	5.9	6.0	0.1
D_446	5.2	5.2	0.1	5.9	6.0	0.0	5.8	5.9	0.1
D_445	5.1	5.1	0.0	5.9	5.9	0.0	5.7	5.7	0.1
D_444	4.9	4.9	0.0	5.8	5.8	0.0	5.4	5.5	0.1
D_443	4.7	4.8	0.0	5.6	5.7	0.0	5.2	5.3	0.0
D_442	4.6	4.7	0.0	5.5	5.5	0.0	5.1	5.1	0.0
D_441	4.6	4.6	0.0	5.6	5.6	0.0	5.0	5.0	0.0

D_440	4.5	4.5	0.1	5.5	5.6	0.0	4.8	4.9	0.0
D_439	4.3	4.4	0.1	5.4	5.5	0.1	4.6	4.7	0.1
D_448	4.4	4.5	0.0	5.4	5.5	0.1	4.7	4.8	0.0
D_449	4.7	4.7	0.0	5.6	5.6	0.0	4.9	5.0	0.0
D_450	4.8	4.8	0.0	5.7	5.8	0.0	5.1	5.1	0.0
D_451	4.9	4.9	0.0	5.9	5.9	0.0	5.1	5.2	0.0
D_452	4.9	5.0	0.0	6.0	6.1	0.0	5.2	5.3	0.0
D_453	4.8	4.8	0.0	6.0	6.1	0.0	5.1	5.1	0.0
D_454	4.7	4.8	0.0	6.0	6.1	0.0	5.0	5.0	0.0
D_455	4.6	4.6	0.1	5.9	6.0	0.0	4.7	4.8	0.0
D_456	4.4	4.5	0.0	5.8	5.8	0.0	4.5	4.5	0.0
D_457	4.3	4.3	0.0	5.6	5.7	0.0	4.4	4.4	0.0
D_458	4.1	4.2	0.0	5.5	5.6	0.0	4.3	4.3	0.0
D_464	4.0	4.0	0.0	5.4	5.5	0.0	4.1	4.1	0.0
D_463	3.9	3.9	0.0	5.3	5.3	0.0	3.9	4.0	0.0
D_462	3.8	3.9	0.0	5.2	5.3	0.0	3.9	3.9	0.0
D_461	3.7	3.7	0.0	5.1	5.2	0.0	3.8	3.8	0.0
D_460	3.6	3.6	0.0	5.0	5.0	0.0	3.8	3.8	0.0
D_465	3.5	3.5	0.0	4.9	5.0	0.0	3.6	3.6	0.0
D_459	5.6	5.5	0.0	4.3	4.3	0.0	5.3	5.3	0.0

1.0%

	Storm 006			**Storm 008**			**Storm 160**		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_308	6.2	6.4	0.2	6.3	6.5	0.2	7.3	7.5	0.2
D_343	6.1	6.4	0.3	6.2	6.5	0.3	7.5	7.8	0.2
D_344	6.0	6.3	0.2	6.1	6.3	0.2	7.6	7.8	0.3
D_345	6.0	6.3	0.3	6.1	6.3	0.2	7.6	7.9	0.3
D_346	6.0	6.3	0.3	6.1	6.3	0.2	7.6	7.9	0.3
D_347	6.0	6.3	0.3	6.1	6.3	0.2	7.7	7.9	0.3
D_342	6.0	6.3	0.3	6.1	6.3	0.2	7.7	7.9	0.3
D_341	6.0	6.3	0.3	6.1	6.3	0.2	7.6	7.9	0.3
D_340	6.0	6.3	0.3	6.1	6.3	0.2	7.6	7.9	0.3
D_339	6.7	7.2	0.5	6.7	7.2	0.5	8.0	8.2	0.1
D_414	6.7	7.2	0.5	6.7	7.2	0.5	8.1	8.2	0.1
D_413	6.7	7.2	0.5	6.7	7.2	0.5	8.1	8.3	0.1
D_412	6.7	7.2	0.5	6.7	7.2	0.5	8.2	8.3	0.2

D_84	6.6	7.1	0.5	6.7	7.2	0.5	8.2	8.3	0.1
D_91	6.6	7.1	0.5	6.7	7.2	0.5	8.2	8.3	0.1
D_90	6.6	7.2	0.5	6.7	7.2	0.5	8.3	8.4	0.1
D_89	6.8	7.2	0.5	6.8	7.3	0.5	8.5	8.6	0.0
D_88	7.1	7.4	0.3	7.2	7.5	0.3	9.0	8.9	-0.1
D_87	7.1	7.4	0.3	7.2	7.5	0.3	9.0	8.9	-0.1
D_86	7.1	7.4	0.3	7.2	7.5	0.3	9.1	9.0	-0.1
D_85	7.1	7.4	0.3	7.2	7.5	0.3	9.3	9.2	-0.1
D_109	7.1	7.5	0.3	7.2	7.6	0.4	9.4	9.2	-0.2
D_108	7.1	7.5	0.4	7.2	7.7	0.4	9.6	9.4	-0.2
D_107	7.1	7.5	0.4	7.2	7.7	0.5	9.7	9.5	-0.2
D_106	7.0	7.5	0.5	7.1	7.7	0.5	9.8	9.5	-0.3
D_105	7.0	7.5	0.5	7.1	7.6	0.6	9.9	9.6	-0.3
D_116	6.9	7.5	0.5	7.0	7.6	0.6	9.9	9.6	-0.3
D_115	6.9	7.5	0.5	7.0	7.6	0.6	9.8	9.4	-0.4
D_118	6.8	7.6	0.7	6.9	7.7	0.8	10.0	9.5	-0.5
D_117	6.6	7.5	0.9	6.7	7.7	0.9	10.1	9.5	-0.6
D_120	6.6	7.5	0.9	6.7	7.6	0.9	10.0	9.4	-0.6
D_119	7.2	7.6	0.5	7.3	7.8	0.5	9.8	9.4	-0.5
D_122	7.8	8.1	0.3	8.0	8.3	0.3	10.0	10.1	0.1
D_121	8.3	8.4	0.1	8.5	8.6	0.1	10.2	10.4	0.2
D_17	8.5	8.6	0.1	8.7	8.8	0.1	10.6	10.7	0.1
D_16	8.5	8.6	0.0	8.7	8.8	0.1	10.7	10.8	0.1
D_15	8.5	8.6	0.0	8.7	8.7	0.1	10.8	10.9	0.1
D_14	8.5	8.5	0.1	8.6	8.7	0.1	10.9	11.0	0.1
D_13	8.5	8.6	0.1	8.7	8.8	0.1	11.1	11.2	0.1
D_12	8.5	8.6	0.1	8.7	8.8	0.1	11.1	11.3	0.2
D_11	8.5	8.6	0.1	8.7	8.8	0.1	11.3	11.4	0.1
D_10	8.5	8.6	0.1	8.7	8.8	0.1	11.5	11.6	0.0
D_9	8.6	8.6	0.1	8.7	8.8	0.1	11.8	11.8	0.0
D_124	8.5	8.5	0.1	8.6	8.7	0.1	12.1	12.1	0.0
D_123	8.5	8.5	0.1	8.6	8.7	0.1	12.2	12.3	0.1
D_142	7.9	8.0	0.0	8.1	8.1	0.1	12.3	12.3	0.0
D_141	8.4	8.5	0.0	8.6	8.6	0.1	12.2	12.3	0.0
D_140	8.5	8.5	0.0	8.6	8.6	0.0	12.2	12.2	0.1
D_139	8.5	8.5	0.0	8.6	8.7	0.0	12.1	12.2	0.1
D_138	8.7	8.7	0.0	8.8	8.9	0.0	12.4	12.4	0.0

D_137	8.7	8.7	0.0	8.9	8.9	0.0	12.6	12.6	0.0
D_136	8.8	8.8	0.0	8.9	8.9	0.0	12.8	12.8	0.0
D_135	8.7	8.7	0.0	8.9	8.9	0.0	12.9	12.9	0.0
D_134	8.6	8.6	0.0	8.8	8.8	0.0	12.9	13.0	0.0
D_133	8.5	8.6	0.0	8.7	8.7	0.0	12.9	13.0	0.0
D_132	8.5	8.5	0.0	8.6	8.6	0.0	13.0	13.0	0.0
D_131	8.4	8.4	0.0	8.5	8.6	0.0	13.1	13.1	0.0
D_130	8.4	8.4	0.0	8.5	8.5	0.0	13.2	13.2	0.1
D_144	8.4	8.4	0.0	8.5	8.5	0.0	13.4	13.5	0.1
D_143	8.5	8.5	0.0	8.6	8.7	0.0	13.7	13.8	0.1
D_148	8.5	8.6	0.0	8.7	8.7	0.0	13.9	14.0	0.1
D_147	8.4	8.5	0.0	8.6	8.6	0.0	13.9	14.0	0.1
D_146	8.3	8.3	0.0	8.4	8.4	0.0	13.8	13.8	0.1
D_145	8.2	8.2	0.0	8.3	8.3	0.0	13.7	13.8	0.0
D_18	8.2	8.2	0.0	8.3	8.3	0.0	13.7	13.8	0.0
D_280	8.1	8.1	0.0	8.2	8.3	0.0	13.7	13.7	0.0
D_279	8.0	8.0	0.0	8.1	8.1	0.0	13.5	13.6	0.0
D_178	6.6	6.5	0.0	5.6	5.6	0.0	5.0	5.0	0.0
D_277	8.0	8.0	0.0	8.1	8.1	0.0	13.7	13.7	0.0
D_276	8.0	8.0	0.0	8.1	8.1	0.0	13.8	13.8	0.1
D_275	7.9	8.0	0.0	8.1	8.1	0.0	13.8	13.9	0.1
D_274	7.9	7.9	0.0	8.0	8.0	0.0	13.7	13.8	0.1
D_273	7.8	7.8	0.0	7.9	7.9	0.0	13.6	13.6	0.1
D_272	7.8	7.8	0.0	7.9	7.9	0.0	13.4	13.5	0.1
D_271	7.7	7.8	0.0	7.8	7.9	0.0	13.3	13.3	0.1
D_270	7.7	7.7	0.1	7.8	7.8	0.1	13.1	13.2	0.1
D_269	7.6	7.6	0.1	7.7	7.7	0.1	12.9	13.0	0.1
D_268	7.5	7.5	0.1	7.5	7.6	0.1	12.7	12.8	0.1
D_267	7.5	7.5	0.1	7.6	7.6	0.1	12.6	12.6	0.1
D_266	7.4	7.4	0.0	7.5	7.5	0.0	12.5	12.6	0.1
D_265	7.3	7.4	0.0	7.4	7.5	0.0	12.4	12.5	0.1
D_264	7.4	7.4	0.0	7.5	7.5	0.0	12.4	12.5	0.1
D_263	7.3	7.4	0.0	7.4	7.5	0.0	12.5	12.5	0.1
D_262	7.3	7.4	0.1	7.4	7.5	0.0	12.5	12.6	0.1
D_261	7.3	7.4	0.1	7.4	7.4	0.1	12.6	12.6	0.1
D_260	7.2	7.3	0.1	7.2	7.3	0.1	12.5	12.5	0.1
D_259	7.1	7.1	0.1	7.1	7.2	0.1	12.3	12.4	0.1

D_258	6.9	7.0	0.1	7.0	7.0	0.1	12.0	12.1	0.1
D_257	6.7	6.8	0.1	6.8	6.9	0.0	11.7	11.8	0.1
D_256	6.6	6.7	0.1	6.7	6.7	0.0	11.4	11.5	0.1
D_255	6.4	6.5	0.0	6.5	6.6	0.0	11.1	11.2	0.1
D_254	6.3	6.4	0.0	6.4	6.5	0.1	10.8	10.9	0.1
D_432	6.2	6.3	0.1	6.3	6.4	0.1	10.6	10.7	0.1
D_433	6.1	6.1	0.1	6.1	6.2	0.1	10.3	10.4	0.1
D_434	6.1	6.1	0.1	6.1	6.2	0.1	10.1	10.3	0.1
D_435	6.6	6.7	0.1	6.7	6.8	0.1	10.3	10.4	0.1
D_438	6.8	6.9	0.1	6.9	7.0	0.1	10.4	10.5	0.1
D_437	6.7	6.9	0.1	6.8	7.0	0.2	10.3	10.4	0.2
D_436	6.6	6.8	0.2	6.7	6.9	0.2	10.2	10.4	0.2
D_447	6.6	6.8	0.1	6.7	6.9	0.1	10.2	10.4	0.2
D_446	6.6	6.7	0.1	6.7	6.8	0.1	10.2	10.3	0.1
D_445	6.5	6.6	0.1	6.6	6.6	0.1	10.2	10.3	0.1
D_444	6.2	6.3	0.1	6.3	6.4	0.1	10.0	10.1	0.1
D_443	6.0	6.1	0.1	6.1	6.1	0.1	9.8	9.9	0.1
D_442	5.9	6.0	0.1	5.9	6.0	0.1	9.6	9.7	0.1
D_441	5.9	5.9	0.1	5.8	5.9	0.1	9.6	9.8	0.1
D_440	5.7	5.8	0.1	5.7	5.7	0.1	9.6	9.8	0.2
D_439	5.5	5.6	0.1	5.4	5.5	0.1	9.5	9.7	0.2
D_448	5.7	5.8	0.1	5.6	5.7	0.1	9.5	9.7	0.2
D_449	6.0	6.0	0.0	5.9	5.9	0.0	9.9	10.0	0.2
D_450	6.1	6.2	0.0	6.0	6.1	0.0	10.1	10.3	0.2
D_451	6.3	6.3	0.0	6.1	6.2	0.0	10.3	10.5	0.2
D_452	6.3	6.4	0.0	6.2	6.3	0.0	10.5	10.7	0.2
D_453	6.2	6.2	0.0	6.1	6.1	0.0	10.5	10.7	0.2
D_454	6.0	6.1	0.0	5.9	6.0	0.0	10.4	10.6	0.2
D_455	5.8	5.9	0.1	5.7	5.8	0.0	10.2	10.5	0.2
D_456	5.6	5.6	0.0	5.5	5.6	0.0	10.0	10.3	0.2
D_457	5.4	5.5	0.1	5.3	5.4	0.1	9.9	10.1	0.2
D_458	5.3	5.3	0.1	5.2	5.3	0.1	9.7	10.0	0.2
D_464	5.0	5.1	0.1	5.0	5.0	0.0	9.6	9.8	0.2
D_463	4.9	4.9	0.0	4.8	4.9	0.0	9.4	9.6	0.2
D_462	4.8	4.8	0.0	4.7	4.7	0.0	9.2	9.4	0.1
D_461	4.6	4.6	0.0	4.5	4.6	0.0	9.0	9.1	0.2
D_460	4.5	4.5	0.0	4.4	4.5	0.0	8.8	8.9	0.2

D_465	4.4	4.4	0.0	4.3	4.4	0.0	8.7	8.9	0.2
D_459	6.2	6.2	0.0	5.4	5.4	0.0	6.2	6.3	0.1

0.2%

	Storm 017			**Storm 069**			**Storm 083**		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_308	9.9	10.6	0.7	10.4	11.1	0.7	10.1	10.3	0.2
D_343	10.4	11.2	0.8	10.6	11.5	0.9	10.1	10.4	0.2
D_344	10.4	11.4	1.0	10.6	11.6	1.0	10.1	10.4	0.3
D_345	10.3	11.5	1.2	10.4	11.7	1.3	10.1	10.5	0.3
D_346	10.3	11.5	1.2	10.4	11.7	1.4	10.1	10.5	0.4
D_347	10.3	11.6	1.3	10.4	11.8	1.4	10.2	10.5	0.4
D_342	10.3	11.6	1.3	10.4	11.8	1.4	10.2	10.5	0.4
D_341	10.3	11.6	1.3	10.3	11.8	1.4	10.1	10.5	0.4
D_340	10.5	11.8	1.3	10.5	12.0	1.5	10.2	10.6	0.4
D_339	10.7	11.8	1.1	10.7	12.0	1.3	10.3	10.6	0.3
D_414	10.8	11.6	0.8	11.1	11.8	0.8	10.2	10.5	0.3
D_413	11.0	11.7	0.7	11.2	11.9	0.7	10.2	10.5	0.2
D_412	11.1	11.6	0.6	11.3	11.9	0.6	10.2	10.4	0.2
D_84	11.1	11.6	0.6	11.3	11.9	0.6	10.2	10.4	0.2
D_91	11.2	11.6	0.4	11.3	11.9	0.6	10.2	10.4	0.2
D_90	11.4	11.6	0.3	11.4	11.8	0.5	10.2	10.4	0.2
D_89	11.6	11.8	0.2	11.5	11.8	0.3	10.2	10.3	0.2
D_88	12.0	12.1	0.1	11.8	12.0	0.2	10.2	10.3	0.1
D_87	12.1	12.2	0.0	11.9	12.0	0.2	10.2	10.3	0.1
D_86	12.2	12.2	0.0	11.9	12.1	0.1	10.1	10.2	0.1
D_85	12.6	12.5	0.0	12.2	12.3	0.1	10.2	10.2	0.0
D_109	12.7	12.7	0.0	12.3	12.4	0.1	10.2	10.1	-0.1
D_108	13.0	12.9	0.0	12.4	12.5	0.1	10.3	10.1	-0.2
D_107	13.1	13.0	0.0	12.5	12.6	0.1	10.3	10.0	-0.3
D_106	13.2	13.1	0.0	12.6	12.6	0.1	10.3	10.0	-0.3
D_105	13.3	13.2	-0.1	12.6	12.6	0.0	10.3	9.9	-0.4
D_116	13.2	13.2	-0.1	12.5	12.6	0.0	10.3	9.9	-0.4
D_115	13.1	13.0	-0.1	12.4	12.4	0.0	10.2	9.8	-0.4
D_118	13.3	13.2	-0.1	12.5	12.5	0.0	10.3	9.8	-0.4
D_117	13.3	13.2	-0.1	12.5	12.5	0.0	10.2	9.7	-0.5
D_120	13.2	13.1	-0.1	12.4	12.3	0.0	10.2	9.7	-0.5

D_119	13.1	13.0	-0.1	12.2	12.2	0.0	10.2	9.9	-0.3
D_122	13.2	13.3	0.0	12.2	12.3	0.1	10.2	10.3	0.1
D_121	13.3	13.4	0.1	12.2	12.3	0.1	10.3	10.5	0.2
D_17	13.5	13.6	0.1	12.3	12.4	0.1	10.4	10.6	0.2
D_16	13.6	13.6	0.1	12.3	12.4	0.1	10.4	10.6	0.2
D_15	13.7	13.7	0.1	12.4	12.5	0.1	10.4	10.5	0.2
D_14	13.7	13.7	0.1	12.4	12.5	0.1	10.3	10.4	0.2
D_13	14.0	14.0	0.0	12.5	12.6	0.1	10.3	10.5	0.2
D_12	14.1	14.1	0.1	12.6	12.6	0.1	10.2	10.4	0.2
D_11	14.3	14.3	0.0	12.6	12.7	0.1	10.2	10.4	0.2
D_10	14.5	14.5	0.0	12.8	12.8	0.0	10.3	10.4	0.2
D_9	14.8	14.8	0.0	13.0	13.0	0.0	10.3	10.4	0.1
D_124	15.1	15.1	0.0	13.2	13.3	0.0	10.3	10.3	0.1
D_123	15.1	15.1	0.0	13.2	13.3	0.1	10.2	10.3	0.1
D_142	15.3	15.3	0.0	13.2	13.3	0.1	9.5	9.7	0.1
D_141	15.3	15.4	0.1	13.2	13.3	0.1	10.1	10.2	0.1
D_140	15.2	15.2	0.1	13.1	13.2	0.1	10.1	10.2	0.1
D_139	15.1	15.2	0.1	13.0	13.1	0.1	10.2	10.2	0.1
D_138	15.4	15.5	0.1	13.2	13.2	0.1	10.5	10.5	0.0
D_137	15.5	15.5	0.0	13.2	13.3	0.0	10.5	10.6	0.0
D_136	15.5	15.6	0.0	13.3	13.3	0.0	10.5	10.6	0.0
D_135	15.5	15.6	0.0	13.3	13.3	0.0	10.5	10.5	0.0
D_134	15.4	15.5	0.0	13.3	13.3	0.0	10.3	10.3	0.0
D_133	15.3	15.4	0.0	13.2	13.2	0.0	10.2	10.2	0.0
D_132	15.2	15.3	0.0	13.1	13.2	0.0	10.1	10.1	0.0
D_131	15.1	15.2	0.1	13.1	13.1	0.0	10.0	10.0	0.0
D_130	15.1	15.1	0.0	13.0	13.1	0.0	9.9	9.9	0.0
D_144	15.2	15.2	0.1	13.1	13.1	0.0	9.9	9.9	0.0
D_143	15.4	15.5	0.1	13.4	13.4	0.1	10.0	10.1	0.1
D_148	15.6	15.6	0.1	13.5	13.6	0.1	10.0	10.1	0.1
D_147	15.4	15.5	0.1	13.4	13.5	0.0	9.9	9.9	0.0
D_146	15.2	15.2	0.0	13.2	13.3	0.1	9.7	9.7	0.0
D_145	15.1	15.1	0.0	13.1	13.2	0.1	9.6	9.6	0.0
D_18	15.1	15.1	0.0	13.1	13.2	0.1	9.5	9.6	0.0
D_280	15.0	15.0	0.0	13.0	13.1	0.1	9.5	9.5	0.0
D_279	14.8	14.9	0.1	12.9	13.0	0.1	9.3	9.3	0.0
D_178	8.3	8.3	0.0	4.8	4.8	0.0	6.3	6.3	0.0

D_277	14.7	14.9	0.2	13.0	13.0	0.0	9.2	9.2	0.0
D_276	14.7	14.9	0.1	13.0	13.0	0.0	9.2	9.2	0.0
D_275	14.7	14.8	0.1	13.0	13.0	0.0	9.1	9.2	0.0
D_274	14.6	14.7	0.1	12.8	12.9	0.0	9.0	9.1	0.0
D_273	14.5	14.6	0.1	12.6	12.7	0.0	8.9	8.9	0.0
D_272	14.4	14.4	0.1	12.5	12.5	0.1	8.8	8.9	0.0
D_271	14.3	14.3	0.1	12.3	12.3	0.1	8.7	8.8	0.0
D_270	14.1	14.2	0.1	12.1	12.2	0.1	8.6	8.6	0.0
D_269	13.9	14.0	0.1	11.9	12.0	0.1	8.4	8.5	0.1
D_268	13.7	13.8	0.1	11.7	11.8	0.1	8.3	8.3	0.1
D_267	13.6	13.6	0.1	11.6	11.6	0.0	8.2	8.3	0.0
D_266	13.5	13.6	0.1	11.5	11.5	0.1	8.1	8.2	0.0
D_265	13.4	13.5	0.1	11.4	11.4	0.1	8.1	8.1	0.0
D_264	13.4	13.6	0.1	11.3	11.4	0.0	8.0	8.1	0.0
D_263	13.4	13.6	0.2	11.4	11.4	0.0	8.0	8.1	0.0
D_262	13.4	13.6	0.2	11.4	11.5	0.0	8.0	8.0	0.0
D_261	13.4	13.6	0.1	11.4	11.5	0.0	7.9	8.0	0.1
D_260	13.2	13.3	0.1	11.3	11.4	0.0	7.8	7.9	0.1
D_259	12.9	13.0	0.1	11.1	11.1	0.0	7.6	7.7	0.1
D_258	12.6	12.7	0.1	10.8	10.9	0.1	7.5	7.5	0.0
D_257	12.3	12.4	0.1	10.6	10.6	0.1	7.3	7.4	0.0
D_256	11.9	12.0	0.1	10.3	10.3	0.1	7.2	7.2	0.0
D_255	11.6	11.7	0.1	10.0	10.0	0.1	7.0	7.1	0.0
D_254	11.4	11.5	0.1	9.7	9.8	0.1	6.9	6.9	0.0
D_432	11.2	11.4	0.1	9.6	9.6	0.1	6.8	6.9	0.1
D_433	10.9	11.0	0.1	9.3	9.4	0.1	6.6	6.6	0.0
D_434	10.8	11.0	0.2	9.2	9.3	0.1	6.6	6.7	0.1
D_435	11.3	11.5	0.2	9.5	9.6	0.1	7.2	7.3	0.1
D_438	11.5	11.8	0.2	9.6	9.7	0.1	7.4	7.5	0.1
D_437	11.5	11.7	0.3	9.5	9.6	0.1	7.4	7.5	0.1
D_436	11.4	11.7	0.3	9.4	9.6	0.2	7.3	7.4	0.2
D_447	11.4	11.6	0.2	9.4	9.6	0.1	7.2	7.4	0.1
D_446	11.4	11.5	0.2	9.4	9.5	0.1	7.2	7.3	0.1
D_445	11.3	11.4	0.2	9.4	9.5	0.1	7.0	7.1	0.1
D_444	10.9	11.1	0.2	9.2	9.3	0.1	6.7	6.8	0.1
D_443	10.6	10.8	0.2	9.0	9.1	0.1	6.5	6.6	0.1
D_442	10.4	10.6	0.2	8.8	8.9	0.1	6.4	6.5	0.1

D_441	10.4	10.6	0.2	8.8	9.0	0.1	6.4	6.4	0.1
D_440	10.3	10.5	0.2	8.8	8.9	0.1	6.2	6.3	0.1
D_439	10.0	10.3	0.3	8.6	8.8	0.2	5.9	6.1	0.1
D_448	10.2	10.5	0.2	8.8	8.9	0.2	6.3	6.4	0.1
D_449	10.6	10.8	0.2	9.1	9.2	0.2	6.6	6.7	0.1
D_450	10.8	11.0	0.2	9.3	9.4	0.2	6.7	6.8	0.1
D_451	11.0	11.2	0.2	9.5	9.6	0.2	6.9	6.9	0.0
D_452	11.1	11.3	0.2	9.7	9.8	0.2	6.9	7.0	0.0
D_453	10.9	11.1	0.2	9.5	9.7	0.1	6.7	6.8	0.0
D_454	10.7	10.9	0.2	9.5	9.6	0.1	6.6	6.6	0.0
D_455	10.4	10.6	0.2	9.2	9.4	0.1	6.3	6.3	0.1
D_456	10.0	10.3	0.3	9.0	9.2	0.2	6.0	6.1	0.1
D_457	9.7	10.0	0.3	8.8	9.0	0.2	5.8	5.9	0.1
D_458	9.4	9.7	0.3	8.6	8.8	0.2	5.7	5.8	0.1
D_464	9.1	9.3	0.2	8.4	8.6	0.2	5.5	5.6	0.1
D_463	8.8	9.0	0.2	8.2	8.4	0.1	5.3	5.4	0.1
D_462	8.5	8.7	0.2	8.0	8.2	0.1	5.2	5.2	0.0
D_461	8.1	8.3	0.2	7.8	7.9	0.1	5.0	5.0	0.0
D_460	7.8	8.0	0.2	7.6	7.7	0.1	4.8	4.9	0.0
D_465	7.7	7.9	0.2	7.5	7.6	0.1	4.7	4.8	0.0
D_459	7.7	7.7	0.0	5.5	5.6	0.1	6.0	6.0	0.0

Gustav

	Storm 050		
	Base (ft. NAVD88 2004.65)	WCC (ft. NAVD88 2004.65)	Difference (ft.)
D_308	-99999.0	-328080.7	
D_343	-99999.0	-328080.7	
D_344	-99999.0	-328080.7	
D_345	-99999.0	-328080.7	
D_346	-99999.0	-328080.7	
D_347	-99999.0	-328080.7	
D_342	-99999.0	-328080.7	
D_341	-99999.0	-328080.7	
D_340	-99999.0	-328080.7	
D_339	3.8	4.1	0.3
D_414	3.8	4.1	0.3
D_413	3.8	4.1	0.3

D_412	3.7	4.0	0.4
D_84	3.7	4.0	0.4
D_91	3.8	4.0	0.3
D_90	3.9	4.0	0.2
D_89	4.0	4.1	0.1
D_88	4.1	4.2	0.1
D_87	4.1	4.2	0.1
D_86	4.1	4.2	0.1
D_85	4.1	4.2	0.1
D_109	4.1	4.2	0.1
D_108	4.1	4.2	0.1
D_107	4.1	4.2	0.1
D_106	4.1	4.2	0.1
D_105	4.0	4.1	0.1
D_116	4.0	4.1	0.1
D_115	4.0	4.1	0.2
D_118	3.9	4.2	0.3
D_117	3.8	4.2	0.4
D_120	3.8	4.2	0.3
D_119	4.3	4.3	0.1
D_122	4.8	4.8	0.0
D_121	4.9	4.9	0.0
D_17	5.1	5.0	0.0
D_16	5.0	5.0	0.0
D_15	5.0	5.0	0.0
D_14	5.0	5.0	0.0
D_13	5.0	5.0	0.0
D_12	5.0	5.0	0.0
D_11	5.1	5.1	0.0
D_10	5.1	5.1	0.0
D_9	5.1	5.1	0.0
D_124	5.1	5.0	0.0
D_123	5.1	5.1	0.0
D_142	4.7	4.7	0.0
D_141	5.1	5.1	0.0
D_140	5.1	5.1	0.0
D_139	5.1	5.1	0.0

D_138	5.2	5.2	0.0
D_137	5.2	5.2	0.0
D_136	5.2	5.2	0.0
D_135	5.2	5.2	0.0
D_134	5.1	5.1	0.0
D_133	5.1	5.1	0.0
D_132	5.0	5.0	0.0
D_131	5.0	5.0	0.0
D_130	5.0	4.9	0.0
D_144	5.0	5.0	0.0
D_143	5.0	5.0	0.0
D_148	5.1	5.0	0.0
D_147	5.0	5.0	0.0
D_146	4.9	4.9	0.0
D_145	4.8	4.8	0.0
D_18	4.8	4.8	0.0
D_280	4.8	4.8	0.0
D_279	4.8	4.8	0.0
D_178	8.2	8.2	0.0
D_277	5.1	5.1	0.0
D_276	5.2	5.2	0.0
D_275	5.2	5.2	0.0
D_274	5.1	5.1	0.0
D_273	5.1	5.1	0.0
D_272	5.2	5.2	0.0
D_271	5.2	5.3	0.0
D_270	5.3	5.3	0.0
D_269	5.2	5.3	0.0
D_268	5.2	5.2	0.0
D_267	5.3	5.3	0.0
D_266	5.2	5.2	0.0
D_265	5.2	5.2	0.0
D_264	5.3	5.3	0.0
D_263	5.3	5.3	0.0
D_262	5.3	5.3	0.0
D_261	5.3	5.3	0.0
D_260	5.2	5.3	0.0

D_259	5.2	5.2	0.0
D_258	5.1	5.1	0.0
D_257	5.0	5.0	0.0
D_256	4.9	4.9	0.0
D_255	4.8	4.9	0.0
D_254	4.8	4.9	0.0
D_432	4.8	4.8	0.0
D_433	4.6	4.7	0.0
D_434	4.7	4.7	0.0
D_435	5.3	5.3	0.0
D_438	5.5	5.5	0.1
D_437	5.5	5.6	0.1
D_436	5.3	5.5	0.1
D_447	5.3	5.4	0.1
D_446	5.3	5.3	0.1
D_445	5.2	5.2	0.0
D_444	5.0	5.0	0.0
D_443	4.8	4.8	0.0
D_442	4.7	4.7	0.0
D_441	4.6	4.7	0.0
D_440	4.5	4.5	0.0
D_439	4.3	4.4	0.1
D_448	4.7	4.7	0.0
D_449	5.0	5.0	0.0
D_450	5.1	5.1	0.0
D_451	5.1	5.1	0.0
D_452	5.2	5.2	0.0
D_453	5.0	5.0	0.0
D_454	4.8	4.8	0.0
D_455	4.6	4.6	0.0
D_456	4.4	4.4	0.0
D_457	4.2	4.2	0.0
D_458	4.1	4.1	0.0
D_464	3.9	3.9	0.0
D_463	3.8	3.8	0.0
D_462	4.2	4.2	0.0
D_461	4.2	4.2	0.0

D_460	4.2	4.2	0.0
D_465	4.0	4.0	0.0
D_459	7.6	7.6	0.0