

**MINUTES OF
SOUTHEAST LOUISIANA FLOOD PROTECTION AUTHORITY-EAST
COASTAL ADVISORY COMMITTEE MEETING
HELD ON SEPTEMBER 20, 2012**

PRESENT: G. Paul Kemp, Chair
Carlton Dufrechou, Committee Member
John Lopez, Committee Member

The Coastal Advisory Committee of the Southeast Louisiana Flood Protection Authority-East (SLFPA-E or Authority) met on September 20, 2012, in Meeting Room 221, Orleans Levee District Franklin Administrative Complex, 6920 Franklin Avenue, New Orleans, Louisiana. Dr. Kemp called the meeting to order at 3:30 p.m.

Opening Comments: None.

Adoption of Agenda: The agenda was approved.

Public Comments: None.

A. Recap of Hurricane Isaac - Performance of ADCIRC in predictive mode:

Dr. Kemp commented on the unique opportunity of having Dr. Rick Luetlich with the University of North Carolina at Chapel Hill (UNC-CH) and an SLFPA-E Commissioner provide information to the Committee concerning Hurricane Isaac (Isaac) and the ADCIRC modeling for the storm event. The ADCIRC model was created in the 1990's by Dr. Luetlich and Dr. Joannes Westerink and has nearly become the model of choice worldwide for surge modeling.

Dr. Luetlich commented on the size of Isaac, which was larger than Hurricane Katrina. The size of a storm is a huge determinant in the storm surge, which is a reason the category system in terms of wind speed is a poor representer of storm surge. A large category two hurricane can have as great a surge as a small category five hurricane. The size of Isaac versus the category is one of the reasons that people were caught by surprise concerning storm surge. Intensity of winds, track, forward speed and lateral size are important factors in forecasting storm surge.

Dr. Luetlich explained that the ADCIRC model starts out with the laws of physics and that information on tides, winds, atmospheric pressure, wave field, precipitation and runoff can be used in the modeling. Not all of these forces are used in every model run. This information must be provided to the modelers or the modelers must have a way to estimate or calculate this information. The local geographical information (a geographical database of the bathymetry and topography) is also needed for input into the ADCIRC model via an unstructured grid. Modeling results will be no better than the information provided and input into the model. After the geographical information is collected, it must be kept current, including subsidence, land loss and changes to the protection system, and referenced to an appropriate and consistent datum. The use of unstructured grids distinguished ADCIRC from other models and made ADCIRC appropriate for use initially in coastal studies and later in coastal inundation and flooding

studies. The grids are based on triangles, which can be coarse in the middle of the ocean and highly refined in areas of particular interest. A database entry is required at the corner of each triangle for bathymetry, topography and a variety of land characteristics. Sample grids showed triangles sized to represent areas ranging from 20 meters to five kilometers in size. The associated computational effort is directly related to the number of triangles. A greater number of triangles is used for highly complicated areas and fewer triangles are used for areas such as the middle of the ocean.

Dr. Luettich advised that ADCIRC modeling is typically used in non-forecast applications [e.g., forensic studies, FEMA flood insurance program studies to define 100-year flood levels and the USACE's design of the Hurricane and Storm Damage Risk Reduction System (HSDRRS)]. The highly detailed grids that require greater computational resources and more time to run are not so problematic in many of these applications. He discussed a summary of ADCIRC results of after-the-fact studies versus observed data (quality controlled water marks) for four major hurricanes that occurred in the past seven years. A difference of plus or minus one to two feet is a typical performance. Eighty-five percent of the data fell within one-half a meter. He cautioned that ADCIRC's performance must be kept in perspective when using the model for forecasting at a time when there is no perfect information on meteorology.

Dr. Luettich discussed the use of ADCIRC for forecasting storm surge for Isaac. It is important that a grid is already set up and validated. This data has been developed for much of the East and Gulf Coasts due to a variety of FEMA and post-Katrina studies. A balance must be struck in the forecasting process between turnaround time and the amount of detail that is included. The potential for power, internet and computer failures must be taken into account in attempting to use ADCIRC for forecasting. Dr. Luettich stated that he considers this work a pilot or demonstration study and that he was concerned about inserting it into a critical path or critical decision process at this point in time. Forecasts of winds and pressure throughout the entire area being modeled are needed in order to make the water move in a creditable way. The National Hurricane Center (HNC) issues track locations, maximum wind speeds, central pressure and other pieces of information every six hours. This information must be used in a synthetic wind model to create a wind field, which adds error into the process. Hind-cast studies afford an opportunity to gather actual data from various meteorological sources in order to construct a wind field.

Dr. Luettich explained that the roll of ADCIRC forecasting in the context of the greater information flow available to various agencies and the public has yet to be determined. He pointed out the need for uniformity of messaging during times of emergency. He discussed some of the early efforts in attempting to use ADCIRC in forecasting, which lead to the development of the ADCIRC Search Guidance System (ASGS). The ASGS is an automated process with a number of scripts that do most of the work associated with obtaining information from the NHC, sorting out the wind models and following through other required steps from the beginning to the end of the process. The use of the ASGS assumes a pre-existing grid and validated model have already been set up. A distribution community for the ASGS and updates has been set up and training and field exercises are conducted each year. The UNC-CH runs the ASGS twice each day in order to learn additional information about the modeling. He discussed the use of the

ASGS for Hurricane Irene during which about thirty automated advisories were run. About 200 runs were done for Isaac on multiple grids and multiple computer systems using not only the NHC official forecast, but also some alternate scenario based storms. A subset of the results was published on a website by LSU. The UNC-CH is working with a higher end set of visualization tools, which were provided to the U.S. Army Corps of Engineers (USACE), NOAA and the Coast Guard. This effort afforded an opportunity to present some potential scenarios in addition to the official forecast.

Dr. Luetlich explained that in its early days (Aug. 25-26) Isaac's forecast track was along the west coast of Florida. Dr. Luetlich was contacted by the Coast Guard relative to potential impacts to the Tampa Bay area and a pre-existing grid was used in order to obtain as much information as possible about this area. As the storm shifted towards the northern Gulf Coast and New Orleans, at least three other grids were run. One of the grids was an ultra light grid with a little less than one million triangles (about one-half million triangle corners), which had a turnaround time of about fifteen minutes. The grid could be zoomed in on the Greater New Orleans area. However, this grid did not include all of the levee information, such as the non-federal levees in Plaquemines Parish. The use of the ultra light grid provided the flexibility to run different scenarios within a forecast cycle; however, it had limitations (e.g.; a poor representation of the Mississippi River and the Rigolets and Chef Passes). The grid used to develop the Louisiana Master Plan with some small modifications was also run. The Master Plan grid has about 2-1/2 times as many triangle corners (nodes) and takes about ten times longer to run (a little over an hour). The UNC-CH was looking for a verified grid with about a million nodes. Some areas were extracted for expediency from the Master Plan grid developed by the State of Louisiana. The goal was to attempt to determine potential water levels along the outside of the protection system. It was assumed that it was less important to try to track and bookkeep any water that topped the system. A five storm ensemble is programmed into the ASGS for the ultra light grid, which allows use of the official forecast and variations on the track and conditions. The Master Plan grid results were published on the LSU website. It took about an hour or two after the ADCIRC runs were completed to develop the pictures for the LSU website. Dr. Luetlich noted that the website provided a good tool for communicating what occurred during Isaac. Part of the post-storm evaluation will deal with the meteorology.

Dr. Luetlich noted that a forecast on August 27th at 10:00 p.m. (Advisory No. 28) based on a storm track that was accurate to some extent put water levels of about eight or nine feet in the Caernarvon-Braithwaite area. A run with the storm to the left of the track placed water levels at about four feet in the Caernarvon-Braithwaite area. On August 28th at 4:00 a.m. (Advisory No. 29) conditions in the Caernarvon-Braithwaite area were looking more like what really happened with ten feet or more of water. Evacuations needed to have already occurred by the time of Advisory No. 30 on August 28th at 10:00 a.m. He commented on the need to have the right answers far enough ahead of time for mass decisions. The ADCIRC modeling results basically dealt with surge. Dr. Luetlich explained the reasons why precipitation was not included in the ADCIRC modeling for Isaac.

Conditions in Lake Pontchartrain that impact potential surge, the use of SLOSH modeling and National Hurricane Center/National Weather Service forecasts were discussed.

B. Performance of HSDRRS and non-federal levees during Isaac:

Robert Turner, SLFPA-E Regional Director, commented on the performance of the flood protection system during Isaac. The HSDRRS performed very well and no major damage occurred. There was some minor damage to the foreshore protection along Lake Pontchartrain, particularly at the west end of the system in Jefferson Parish. There were some additional minor issues. The non-federal levees (Forty Arpent and Maxent Levees) within the hurricane protection system performed well. A tremendous amount of water was pumped over the Forty Arpent Levee into the Central Wetlands. The height of the water in the Central Wetlands due to rainfall and rain water pumped into the area was about plus three feet. There were no signs of any visible deterioration of the system. The Maxent Levee also performed well. Problems occurred primarily outside of the hurricane protection system. Every non-federal levee outside of the hurricane protection system in St. Bernard Parish was overtopped and the area completely inundated. The non-federal levees outside of the hurricane protection system were not designed to provide protection against storm surge associated with hurricanes and did not provide that protection.

C. Land bridge insights & comments on final Gerwick report:

Dr. Kemp advised that a draft copy of the Gerwick report on the New Orleans Land Bridge (Chef to Rigolets) was received. The report consists of an Arcadis modeling study along with Gerwick's engineering work. He encouraged Committee members to review the report.

Dr. Kemp explained that the Committee wanted to take a good hindcast look at Isaac in order to prepare for its consideration of how to improve protection beyond the 100-year level. One of the first issues to be considered is the use of the Central Wetlands.

Mr. Turner explained that one of the higher risk areas within the system is the IHNC-GIWW corridor. The water surface elevation in this corridor is predicted to rise to about plus eight feet for a one percent chance occurrence event due to rainfall, rain water pumped into the basin and overtopping of the surge barrier after the barrier and Seabrook gates are closed. Any floating objects (e.g., tanks, small vessels and small buildings not firmly affixed to the ground) in this corridor can potentially impact the I-walls. The USACE requested that the SLFPA-E coordinate with the Port of New Orleans to have all floatable objects removed from the corridor prior to a storm event; however, this will be extremely difficult. If the water level can be kept low enough in this corridor, then floatable objects would not impact the wall. One way to keep the water level low is to use the Central Wetlands as a storage unit for the water that gets into IHNC-GIWW corridor. After the surge barrier and Seabrook gates are closed, water can be bled through the old Bayou Bienvenue structure or through some other method into the Central Wetlands. This would have a minimal effect on the water elevation in the Central Wetlands because of its size. The SLFPA-E asked the USACE to consider this concept, which would provide a significant amount of risk reduction for a small amount of money. In addition, the USACE would have to evaluate the non-federal levee.

There was no further business; therefore, the meeting was adjourned.