Meeting Minutes

Project Name:	FEMA Region II NJ/NY Coastal Study		
Meeting:	*TAP and Introduction to COAT Meeting*		
Date:	*11/10/2011*	Time:	*10:00 – 12:30*
Place:	*NJDEP Trenton, NJ and Conference Call*		
Attendees:	***In Person:*** *NJDEP: John Moyle, Joseph Ruggeri, John Scordato, Chris Gould, Kunal Patel* *NJDEP & Sustainable Jersey, Climate Adaptation Task Force: Christine Schell* *NJDEP Coastal Management Office: Wes Bickford* *Stevens: Phillip Orton* *Barnegat Bay Partnership: Martha Maxwell-Doyle* *Jacques Cousteau (Rutgers University): Lisa Aurmueller and Robert Koch* *Stockton: Dan Barone and Kim McKenna* *NJAFM &Baker: Jim DeAngelo* *NOAA National Weather Service: Gary Szatkowski* *USGS: Heidi Hoppe* *FEMA Region II: Scott Duell, Bill McDonnell* *FEMA Region II Support Center: Tolga Yilmaz* *RAMPP: Mike Proctor, Alan Niedoroda, Gabe Toro, Jen Lavin, Heidi Carlin* *Regional Project Management Lead: Bo Juza* ***Via Phone:*** *NYC Mayor's Office of Long Term Planning and Sustainability: Jonathan Dickinson* *NYC Buildings Department: Joseph Ackroyd* *Stevens: Jon Miller* *Monmouth University: Tony MacDonald* *Columbia University: Vivien M. Gornitz* *NYSDEC: Kelly Higgins-Roche and Arvind Goswami* *NYSDOS: Barry Pendergrass* *USACE – New York District: Frank Buonaiuto and Lynn Bocamazo* *FEMA Region II: Alan Springett and Pat Griggs* *FEMA Region III: Robin Danforth* *FEMA HQ: Jonathan Westcott* *FEMA Region II Support Center: Andrew Martin* *RAMPP: Jeff Gangai, Dan Zell, Milver Valenzuela, Ginni Melton*		
Notes			

Mike Proctor began the meeting by introducing himself and asking everyone in the room to introduce themselves. Scott Duell thanked everyone for being here and said there is an impressive group of subject matter experts at this meeting. Scott thanked NJ DEP for hosting the meeting.

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Bill McDonnell introduced the Coastal Outreach Advisory Team (COAT) (see slide 2). He mentioned that we will specifically be reaching out to Monmouth County to organize a meeting for Monmouth and Ocean County to accommodate 100 or more people and then introduced Jen Lavin with RAMPP to talk more about the COAT. Jen then mentioned that the COAT is a subgroup of the Technical Advisory Panel (TAP) and is intended to have a broader reach to academia, researchers, and outreach experts. We are also looking for active community members, chamber of commerce, non-profit institutions, marketing and public communications groups to join the COAT. Jen then talked about the level of commitment that each member can choose. We need word of mouth marketers of the program, so members can do very simple tasks from just spreading the word, communicating the message, to more involved tasks like helping edit and create informative fact sheets and other outreach materials. We are also looking for members to participate in one hour meetings once every other month (bi-monthly) in person or via webinar. We are looking for input on the outreach strategy that is being developed now and FEMA and RAMPP will ask COAT members for input. We are also looking for feedback on what outreach materials are working and not working and what materials people prefer to see, what works and doesn't work in the communities, identify potential issues, etc. Jen concluded the presentation by showing the NJDEP, Jacques Cousteau, and NYC are leading the COAT, and RAMPP is supporting administratively. FEMA is the overall supporter.

Mike Proctor then reviewed the overall agenda and mentioned that the bulk of the presentation will be presented by Alan Niedoroda, Jeff Gangai, and others with RAMPP. We will briefly review the last TAP meeting in April. Since that date, we completed our production model runs and defined our methods for statistical analysis. Today we will also have a brief discussion on how we get to the preliminary maps and on.

Alan Niedoroda then presented the project update. He showed the study area map (see slide). The study area shows that there can be very significant areas of inland propagation of flood waters, but also some areas that will not be affected much. The next slide addressed the project work scope, which includes, just to name a few, assembling bathymetry/topographical data, analyze recorded storms, model synthetic storms, add run-up, add wave crest heights, and finally make the flood maps. 159 hurricanes and over 60 tropical storms were modeled for this study. The team also measured coastal high water marks where available after storm events. There are 600,000 nodes of information that they gathered and now they are going to do a statistical analysis. They are going to determine, 500, 100, 50, and 10 year flood elevations. We are in the last third section of this project.

Alan then gave a brief history of the NFIP and the coastal flood study program. The first studies were done in the 1970s and the 1980s. Then there was a decade break and in 2004 and 2005 more coastal studies were begun. In the decade of "rest" a lot of new information and study information was developed and the science of modeling has drastically improved. As a consequence each of the new studies either now underway or recently completed has developed specific methods to address specific issues that are new and important. For example, there are three different but related processes that

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have been used to create a set of synthetic hurricanes based on an optimized sampling and representation of the storm meteorological parameters.

Mike asked if anyone had any questions before we moved on.

Question: John Scordato asked regarding the 500, 100, 50, and 10 storms. Are coastal surge models run as well?

Answer:

Mike clarified that we run a series of synthetic storms and that the combined results of these storms are statistically analyzed to determine the elevations for the various return periods at the various nodes of the model. There is not a "10-year storm run" as would occur in a riverine situations.

Question: Dr. Orton asked how Philadelphia/Region3 study fits in.

Answer: Alan N. said they are meeting about this and determining now how this data can be incorporated.

Question: Chris Gould asked how Irene affected the study.

Answer: Alan N. said the timing of the storm was bad, since we were in the data verification phase when it happened. Irene was a unique storm, but the rain that occurred was modeled and showed Irene did not really have an effect on our modeling and study. Analysis would not have changed with Irene. The audience mentioned we have to be sure to have this same message shared with the public.

Mike P. also mentioned that high water marks were done in NY and NJ and we can compare them to our models to give the public a sense for how Irene fits into the model.

Alan N. then talked about the new hydrodynamic model (ADCIRC) and its grid. The model can handle dikes, roadways, embankments, and has a very high spatial resolution. As mentioned, we are simulating a total of 159 storms. Larger storms have tracks spaced further apart and their tracks are randomly spread out to ensure a statistically probable model.

Because of the demands of the computational resources by the ADCIRC model, it is desirable to reduce the number of parameters as much as practical. One of these parameters could be taken as the relationship between the tide of storm landfall and the phase of the astronomical tide. Where the tide range is small compared to the heights of the storm surges this can be handled with a simple statistical adjustment. However, this assumption is not valid in the Region 2 study. The effects of the phase of the astronomical tide on the surge heights cannot be simply determined by modeling the surge at mid-tide and either adding or subtracting the tide amplitude. In the Region 2 study random semi-diurnal tide phases were incorporated, since if a storm occurs during high tide, the combined storm and

astronomical water level will rise higher than a simple addition would indicate. The presence of the high astronomical tide at the time of maximum surge means that the water experiences a reduction in bottom friction and can overtop barriers to propagate further inland, (these are called non-linear effects). If you use a random tide phase, you have enough information and smooth's out the model, which is a better way to go.

For extra tropical storms, 60 simulations of 30 historic storms were used. The tide cycle was randomized.

The next slide showed the considerable amount of Quality Assurance/Quality Control (QA/QC) that is going on throughout the study process. Scanning software is run and several levels of QC are performed throughout the project/study. Animations and automated scripts help with the QA/QC.

Mike P. mentioned that thanks to QC, some storms caused problems and the models had to be rerun, which was bad for the schedule and budget implications, but is a good thing to ensure the inconsistencies were taken care of.

Question: Robert Koch - wave height was taken into account but how about swell period and direction?

Answer: Alan N. said that it was largely incorporated. The modeling starts two and a half days ahead of land fall, which is quite far out for the east coast, since the storm move quickly here. The wave heights are propagated ahead, but what we don't capture is another weather pattern that might be out there as well, influencing the weather system. Mike P. said that it's important to keep in mind that we are producing FEMA flood insurance maps for 1% Annual Chance Events (ACEs). Jeff Gangai on the phone pointed out that for the extra tropical historic storms, exact climate conditions were modeled and those are eight day simulations.

Question: John Scordato asked what would the worst case scenario be? What if we have two storms almost back to back, like Lee and Irene.

Answer: Alan said that historically, there are no storms that would be so close together that they interact with each other, but they can occur in close proximity to each other and even make landfall near the same place, but what we see is that we need to account for erosion after a storm. Jeff clarified that we are applying an erosion amount to a dune that would be expected during a 100 year event. Mike mentioned that we are not looking at the probable maximum flood.

Comment: Dr. Orton - separation of river flooding and storm surge flooding is interesting and if you would swap Lee and Irene, the effects might have been different. Hudson seems to be more riverine flooding and that is one case where the quick succession superimposing comes into play and can drastically change results.

Question: Chris Gould - You are refining the V and A zones. Are you also establishing coastal A zones?

Answer: Mike said absolutely, yes.

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Question: Gary Szatkowski - what about the central pressure number being used?

Answer: Alan said it's compared to the central pressure usually taken, which is 1013 millibars…

Gabe Toro then talked about the 4108 reference storms used for this study.

Question: Dr. Orton – have you included storms moving northwest?

Answer: Gabe mentioned no, we did not include them, since they are weaker storms (less than 1013 millibars). For the storms to stay strong, they have to move north.

Dr. Orton – You might consider putting a disclaimer on your study about this.

Question: Gary Szatkowski - Did you include the 1933 hurricane in Potomac and how it moved north/northwest and it caused damage?

Answer: Physically, this storm was large, but details might be sketchy, since it has been a while. Alan then said to keep in mind that the number and quality of data gathered has drastically changed over time and the study team wanted to identify a time where they have consistent data, including hurricane hunter data, which ended up being World War 2 and on, but we did also include the 1938 hurricane. Also, 33 millibars is a high category 1 storm. Mike Proctor again reminded the audience that we are mapping to the 1% ACE, but if you were gathering data for critical facilities, you might want to see more data.

Gabe then talked about how to account for model limitations/secondary/epsilons factors (see slides showing the steps and epsilons).

Alan then talked about extra tropical storms. Alan showed several data plots (see slides). Alan mentioned that certain plots show differences in the northern part of the study area versus the southern part.

Methods of Storm Surge Frequency Analysis slide: Alan talked about the technique and how it fits distributions. Alan then talked about "easy fit" software function to test the fit and finding an appropriate distribution.

Gabe Toro then talked about the results for typical node in northern portion of the study area (see slide). The problem is that a 500-year storm surge must occur during some 60-year period – highest observations are always subject to high statistical uncertainty. This makes it dangerous to calculate. Gabe then talked about the team breaking new ground with the upland nodes.

Question: Please clarify if these models don't show that much affect inland, but you want to attribute some effect.

Answer: Gabe clarified that in terms of elevation (height) for both the surge level and the ground level. As the land rises going inland from the shoreline fewer and fewer of the surges will cause flooding. This

requires proper treatment in our statistical analyses of the return periods and we have design an appropriate method.

Question: Are the marshes in the area being taken into account?

Answer: Alan said they are taking this information into account and Gabe said they would never put an area under water if the model doesn't show it to be under water.

Question: John Scordato - Can some preliminary data be shown?

Answer: Mike said no, unfortunately we are not ready yet, since the extra tropical and the tropical storms are not combined yet. The audience mentioned that Monmouth County might be impacted largely, but Mike reminded again that we did not show if the elevations are 100 year and in general, our models are not showing any huge changes.

Alan mentioned that this is a very important coastal study, since there is a lot of population and a lot of high value properties at stake. So we have worked hard to have a highly defendable study.

Question: Gary Szatkowski - is sea level rise being accounted for?

Answer: Alan said yes it is for historic data. Going forward no as FEMA's policy is not to project into the future what the storm surge could be.

Question: Robert Koch - what tidal datum was used and is it vertically corrected?

Answer: Jeff Gangai said that older datums are changed to today's datum for any storm information we might have from previous storms. NOAA v-datum program was used to figure out how all datums relate spatially to each other.

NAVD 88 will be the final datum used, so all studies will be converted to that datum.

Question: Chris Gould – was subsidence considered?

Answer: Jeff clarified that everything that has occurred in the past up until today was accounted for, but again, no projections into the future are being done.

Mike then summarized that we are now at the stage of combining the tropical and extra-tropical statistical results. Gabe talked about the combined analysis and emphasized the data shown on the slides is fictional for the purpose of demonstration only and not actual results. A simple addition is being done to add the value of surge heights. There is a lot of effort that goes into getting the numbers, but at the end, it is simple addition.

Alan then talked about WHAFIS and wave surge analysis. Alan showed a technique created in the Mississippi study and used in this Region II study as well. In concept the 159 individual surge heights at each point are graphed with the horizontal axis being their relative ranks. For each of these points the

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wave heights and periods at the time of maximum surge have also been recorded. These are also graphed. The slide illustrating this shows three sets of points with the one representing the surge heights being a relatively smooth progression from lowest to highest. The wave height and wave period representations also rise with the rank of the surge height but there is more scatter. This scatter is taken into account by fitting regression curves to both the wave height and wave period plots. The surge height associated with the 0.01 annual excedence (the so-called 100-yr level) is determined in a separate procedure. Once you determine what the 100 year storm level you identify the storm with the nearest surge height on the graph. The corresponding best estimate of the wave height and wave period is then taken from the correspond place along the regression curves. ,

Jeff Gangai then talked about next steps and how we get from finalizing surge studies to creating the Flood Insurance Rate Maps (FIRMs). Jeff showed a slide of the project life-cycle. It showed the project at present being right in the middle of the timeline. Jeff mentioned BFEs include four elements of the coastal mapping project: storm surge stillwater elevation, amount of wave setup, wave height above storm surge, and wave run-up above storm surge elevation. All these factors combined will create BFEs. Jeff updated the group on the wave height analysis status and mentioned that field reconnaissance has been done in areas in NJ and NY, looking at dune conditions, high water marks, etc. All NJ counties have most information gathered. We are still waiting for NYC LiDAR information.

Jon Dickinson pointed out that NYC already provided the LiDAR data to FEMA. Andrew Martin clarified that RAMPP is waiting for FEMA Region II to sign the license sharing agreement and they should be signing this today.

Limit of Moderate Wave Action (LiMWA) will be mapped, which shows the coastal A zones. This will not be regulatory flood elevation.

Mike then asked the audience if there were any questions.

Question: Robert Koch - what model was used for dune and bluff erosion?

Answer: Jeff said they use the "540 rule," which is FEMA's standard they use. If it is less than 540 square feet, they do a complete dune removal. Mike asked group to remember that we are creating a regulatory product and not necessarily a product that shows every little detail and possibility. Jeff said 540 rule came from actual storm events in the past and calculated erosion from there and is very defendable.

Question: Joseph Ackroyd - can we have Stillwater elevations for shaded X zones?

Answer: Jeff said they map the 0.2% annual chance boundary, but the elevations will only be shown for 1% annual chance. The table in the FIS shows the stillwater elevations. Alan said the data is available, so we could provide it if needed, but it will not be provided in general. Mike P. commented that this might be a good Risk MAP non regulatory product to provide to the communities.

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Question: Dr. Orton - how do you deal with flooding in areas with a lot of buildings like Manhattan?

Answer: Jeff said they use roughness coefficient and wind data. For wave propagation, we put the buildings in to block the waves, so that's been taking into account.

Scott then gave closing comments. He mentioned that he is impressed with the turnout and interaction and is impressed and thankful to RAMPP for communicating this information with the broader audience. Well done and he looks forward to future meetings.

* Stockton College representatives provided Hurricane Irene Reports for Mantoloking and North Wildwood to the RAMPP project team at the end of the meeting.

These notes are an interpretation of discussions held. Please provide any additions or corrections to the originator within 5 days of the date signed; otherwise they will be assumed correct as written.

Prepared by: Heidi M. Carlin Date: 11/11/11