

**DELAWARE RIVER BASIN COMMISSION  
FLOOD ADVISORY COMMITTEE MINUTES**

**APRIL 6, 2005**

The April 6, 2005 DRBC Flood Advisory Committee (FAC) meeting began at 10:00 AM at the Commission office (DRBC) in West Trenton, NJ. Alan Tamm of the Pennsylvania Emergency Management Agency chaired the meeting.

**Review of the Draft Minutes from the January 26, 2005 Meeting**

Rick Fromuth gave a brief summary of the minutes from the January 26, 2005 meeting. They were accepted without revisions.

**Hydrologic Conditions – Spring Snowmelt and Flood**

Mr. Fromuth noted that in September of 2004, Tropical Storm Ivan caused the highest flood crest on the Lower Delaware River since 1955. That crest was then exceeded by two to three feet during the April 2005 flood. The DRBC prepared a summary of the April flood, based on Weather Service and USGS data, and posted it on the website on April 5. The flood forecasts made by the National Weather Service provided two to three days of lead time in advance of the flood crest on the lower main stem Delaware. Flood forecasts by the Weather Service were adjusted during the course of the storm as real-time information on rainfall and stream stage became available.

The April 2005 flooding was caused by a series of hydrologic events. A widespread rain storm on March 28-29 produced over two inches of rain on the northern and western portions of the basin. An upper basin snowpack of approximately three inches began to melt with this storm, and temperatures remained warm enough to continue snowmelt during the next week. A second storm on April 2-3 produced two to five inches of rain in the upper half of the basin. Nearly all of the snowpack melted by the end of the second rain storm. The combined total of the two rain storms and snowmelt produced runoff amounts as high as ten inches in portions of the upper basin. (Staff Note: Subsequent review of NOAA precipitation frequency data indicates that the combined available runoff from the rain storms and snowmelt over a one week period has a 100-year recurrence or a one in 100 chance of occurring in any year. This is similar to the one in 100 chance flood crest frequency determined by the U.S. Geological Survey for the April flood on the main stem Delaware).

New crest records were set for the Beaver Kill at Cooks Falls and the Delaware River at Callicoon. Generally, on the main stem, the flood crest was the third or fourth highest on record. Flooding along the lower basin tributaries (Lehigh, Schuylkill, and smaller) was not as severe as on the main stem and in the upper basin. The flood crest at Trenton of 25.33 ft was 3.27 ft lower than the flood of 1955.

A summary of the April flooding, including flood crests heights and ranking of the flood crest against past floods, has been posted on the DRBC web site. There were 4,000 hits on the flood web site during the first three days following the flooding.

Alan Tamm noted that as of 18:00 hours on April 4 it looked like the impact was substantially felt by the population with over 5,500 people evacuated from their homes. The April flood was a significant event as seen from the stage data. Based on the newspaper accounts, this has seriously affected both New Jersey and Pennsylvania.

Mr. Fromuth said that PPL's Lake Wallenpaupack was forced to open the gates on top of the dam and allow the reservoir to spill, due to the amount of runoff from rainfall and snowmelt in the watershed. Mr. Petrewski stated that the inflows reached in the 20,000 cfs range in Wallenpaupack and they released a

maximum of around 8,000 cfs through the flood gates and hydro turbine penstock. PPL called the Delaware River Master and the Weather Service so that the flood stage forecast could be adjusted. (Staff Note: Subsequent analysis by the National Weather Service indicates that the additional height of the flood crest due to the Lake Wallenpaupack release was approximately four inches for the Delaware River at Port Jervis, NY). Mr. Gilman noted that water supply or power generation reservoirs, even if they have to release, still significantly lower the peak flow. Mr. Petrewski said looking at the Hawley hydrograph, you could see that the spill raised the water level along the Lackawaxen about two feet, but, had the reservoir not been in place, the crest would have been five feet higher. John Moyle said he was part of the conference call Sunday morning at 7:00 am on April 3 concerning the release of water from Lake Wallenpaupack. He said that someone needs to go through their operational procedures and distribute them to all of the coordinators in order to avoid early morning conference calls trying to explain to people who are not normally familiar with the impacts on the river. There are a lot of lessons that they have learned from this. Better real-time data is helpful and they can do a better job just having those tools.

Mr. Gilman said the work of the DRBC Flood Advisory Committee increased the effectiveness of the warning system and it showed in this flood. Mr. Fromuth noted that the committee members have worked to improve flood warning in the long term. Their goals were incorporated in the Basin Plan, and are such that they do need readjustment for each flood event.

Mr. Moyle asked if the release of water from Lake Wallenpaupack was strictly from a dam safety standpoint. Mr. Petrewski responded that it was dam safety. The decision was made to open the gates and control the spill, rather than allowing water to overtop the roller gates at an uncontrolled rate. The maximum spill rate was 6,300 cfs at a lake elevation of 1,190 ft. This release rate was necessary to stabilize the lake level and avoid overtopping the roller gates. During the four to five hours of the 6,300 cfs release, the inflow to the reservoir was still in the 14,000 to 15,000 cfs range.

George McKillop mentioned that when the April flood event first started to appear in the forecast models, The Weather Service thought ground zero was going to be New England, similar to the 1987 floods. There was still significant snowpack up in northern New England, and it appeared that was going to be the area that would get hit the worst. As the week progressed and the models ran through, the Weather Service saw the event continually shift further to the western basins. The Weather Service thought the forecast and hydrologic coordination calls went very well as they have in the past. This group has done a lot in the last ten years to make a lot of improvements in these multi-agency calls with PEMA and all the agencies involved. This reduces a lot of the redundant questions. It is very successful, which was demonstrated again during this event.

Mr. Gilman said that it might be possible to get imagery from the satellites that would show the inundation areas during the peak of this flood. That map would go a long way to figure out where the mitigation efforts should be focused from now on. There was discussion about the importance of establishing high water marks from the flooding in order to identify target areas for flood mitigation, and the potential of using disaster funds to accomplish this work as quickly as possible.

Mr. Fromuth noted that the DRBC receives many questions about the current activities in the basin in response to the flooding. Mr. Tamm stated that the DRBC needs to capture some of this discussion, formalize it, and be proactive as far as the information goes. Mr. Fromuth said that DRBC has put together a draft statement documenting the existence of this committee and the work that it has done in the flood warning recommendations. Mr. Zagone said one thing that served them well in FEMA over the last ten years has been success stories, and this (the work of the Flood Advisory Committee) is obviously a success story. There are forums in which this can be presented, and can get to the right political sources. Mr. Gilman noted that the New Jersey Commissioner was doing some interviews today, and in the background they provided him, there is a note about this meeting to discuss the flooding and the flood

control strategies. Mr. Moyle said that the Governor has also directed the Commissioner to work with DRBC and the Corps to give him a report as far as what has been going on and what needs to be done.

Joe Gavin noted that if funding was available, having flood stage forecast maps on the DRBC web site would be very useful to property owners. Mr. Fromuth asked if there is a way to either scan them or digitize the paper flood stage forecast maps for the Delaware that were prepared in the early 1990s. Mr. Gavin said that is feasible. Those outlines were based on four foot topography for the basin back in the 1980s, and are better than your standard USGS 30 meter or 10 meter grid. Mr. Fromuth said that the maps seemed fairly accurate when reviewed against the flooding from Tropical Storm Ivan.

Mr. Fromuth mentioned a program that was put in place this year to void some storage in Pepacton Reservoir. He displayed a graph that shows the amount of the void and the ratio of the void to the water equivalent in the snowpack. The maximum void allowable was 50 percent. At the time of the March 28-29 storm, the void was approximately 10 bg. The program ended March 31. The release works are not able to make large releases prior to flooding. The maximum rate of release out of Pepacton is 750 cfs. Seven years ago (1996), the Commission adopted a resolution to lower Pepacton Reservoir in early winter, but at the time the Parties to the Decree, whose approval is required for these programs, noted that the action was not to set a precedent and it was only a one time action. About four years later, the last time there was high spring flood potential, the DRBC suggested that a similar program be put in place. That concept was rejected at the time by the Decree Parties, and there was no serious flooding.

The last two years of wet hydrologic conditions have caused many spills over Pepacton Dam. The people downstream from Pepacton are the most frequently vulnerable to spills and that dam has received the most attention. In both 2003 and 2004, there was an agreement reached by the Parties to the Decree to lower the storage. The first one in 2003 was down to a specific void (5 bg). In 2004, it was not limited like that; it was based on 50 percent of the water equivalent in the snowpack. The difficulty is that the program involves water supply reservoirs not reservoirs that are designed for flood control. The reservoirs must be drawn down slowly. The Parties to the Decree, especially New York City, are not interested in a program without a snowpack, because it could affect their water supply. There has been discussion about implementing a permanent spill reduction program for Pepacton Reservoir in response to snowpack.

The State of New York has worked to understand the flood problems below Pepacton and bring that out to the rest of the Decree Parties. Evidently, there are structures there that are above the 100-year floodplain that have flooded recently with less than a 100-year storm. Remapping of the flood plain is proposed with the City of New York providing funds. The State has been working with the Town of Colchester to address the flooding from an overall perspective. Mr. Nechamen asked if anyone has estimated how the 10 bg void might have translated to a reduction in the peak just downstream in terms of cfs or in terms of flood stage. (Staff Note: Subsequent to this meeting, the NYCDEP performed an analysis of the effect of the 10 bg void. It showed that the void prevented the reservoir from spilling during the March 28-29 event, which was approximately a 5-year event. The void was filled however by this event and the reservoir was full by the time of the April 2-3 rainstorm). When the model for the flood remapping is done, it will probably be the tool that is needed to give the best estimate of the reduction in flood stage attributable to the void. Fred Nuffer, of the NYSDEC and the DRBC Commissioner from New York State, has attended meetings of the Decree Parties and explained that the state and the city are working on the remapping of the floodplain. Once the HEC RMS model is done, there will be better answers about changes in stage due to a void program.

Bob Hainly asked if it is possible to use this event to talk to Congress again about funding for the flood warning system, since the timing is pretty good. This could show that the flood warning system worked as is, but it could be better. On top of that, there is funding available moving through the Appropriations

Subcommittees right now. Clarke Rupert added that timing is everything, and this would be a good time to reinforce the message. It is just a matter of coming up with the right strategy. This is the time that the Appropriations Committee is dealing with these kinds of issues. Senator Specter is a key person because he is on the Appropriations Committee. Another appropriator is Rodney Frelingheisen. He is on the Water and Energy Subcommittee. Mr. Gilman said if there is a disaster declaration, recommendations will be made to FEMA for funding to do other things to the warning system, which could result in a substantial amount of money.

Mr. Hainly responded to Mr. Rupert saying that their plan is to request funding through NOAA's budget and the Weather Service in a manner similar to what is being done in the Susquehanna River Basin. Starting this year, the Susquehanna River Basin Commission is taking a two-prong approach to fund the Susquehanna flood warning system. One is to support the existing flood forecasting system, and also to approach increasing funding to the USGS for the National Streamflow Information Program which is essentially a USGS program to support streamgaging with federal funding. Right now, funding for the Susquehanna flood forecasting system to support the streamgages, the rain gages, and the DCPs comes through the Weather Service to the USGS. The idea now is to try to get the funding for the stream gage network to come directly to the USGS through the NSIP program. He suggested looking at both sides and trying to get the network supported through the USGS and the flood warning system through NOAA. Congressman Don Sherwood, who is on the Interior Appropriations Subcommittee, is in the eastern part of the Susquehanna Basin in Luzerne County and part of his district covers the Upper Delaware River. He is interested in the Susquehanna's flood warning system. Mr. Rupert said that the Delaware system would be an interesting point to discuss with him. Mr. Hainly said he was supportive of the Susquehanna program.

Mr. Tamm asked if anyone has looked at the streamgages as far as the frequency of this event. Mr. Gilman said that Bob Schopp's analysis shows that along the Delaware River, this is between a 100- and 500-year flood depending on how you look at it. The Corps of Engineers redid the flood insurance studies for FEMA for the Delaware River recently and according to their analysis and the discharges, which FEMA adopted, this was only about a 50-year flood. USGS said the flow from this flood was roughly 242,000. USGS' analysis indicates that 225,000 would be a 100-year flood; the Corps indicates that 288,000 would be a 100-year flood and 238,000 would be a 50-year flood. According to the Corps, this is more like a 50-year flood and according to the USGS it exceeds the 100-year flood. (Staff Note: The 100-year flood discharge of 288,000 cfs was determined by a Hydrologic Coordinating Committee with which DRBC participated in 1978. The value was based on a flood crest frequency analysis by the U.S. Geological Survey.)

Mr. Tamm asked what the state is of the long-term weather predictions and if there is hope to utilize those long-term predictions somewhere in the next five years for void management in water supply reservoirs. Mr. Nickelsberg said that he does not think the science is there yet. Perhaps it is available for a shorter long-term, like a month, but not for six, eight months, a year. Mr. Tamm asked what the prognosis is for basin hydrologic conditions when the June tropical storm season starts if there is a high saturation in the soils because of the wet spring. Mr. Nickelsberg said he is only looking at the here and now. Mr. McKillop said the science for longer term forecasting is not quite there; however, that does not mean that they are not working in that direction and getting there. A big portion of the AHPS money is being spent on ensemble forecasts and the long-term probabilistic forecasts. This is all part of the AHPS goal to provide longer term probabilistic forecasts for water resource management. Long-term probabilistic forecasts are another option for reservoir void management, and are under development.

#### **Report on Tropical Cyclone Event Review Team Efforts – National Weather Service**

Mr. McKillop said the Weather Service viewed the very active Hurricane season as an opportunity to look at their operations in depth to see how they can improve upon their operations and the execution of the

flood and forecast program. The report is in final draft form now. This report really gets into the core of National Weather Service operations. It looks at the entire eastern half of the United States, not just the Delaware Basin. There are a lot of practices that are taking place in and around the Delaware Basin that are highlighted, and use by other areas of the eastern half of the United States is encouraged.

The 2004 hurricane season was very unusual. There were remnants of eight cyclone systems that moved through the eastern region of the U.S, and three of them were hurricane strength when they reached landfall. The Delaware Basin saw five of these, and then there were two additional heavy rain events that occurred outside of the season. Weather Service operations and management saw this as a great opportunity to review the forecast and warning system. They commissioned an event review team. The team sent out post surveys to all of the Weather Service field offices to get a lot of the feedback. There were observations of practices that take place in the field offices that need to be shared with other offices. In addition, the recommendations that have been reported are primarily recommendations that are at a regional level. It is not something that one particular field office can do, but it is an implementation that needs to take place across the region. Highlights of the report are:

1. Pre-event operations. The Weather Service wants to continue to do outreach to the public, to the users, to the media for the dangers of the inland flooding and the dangers associated with that and also continue to highlight the “turn around don’t drown” campaign which originally started in the southern region and has now become a national campaign. As a continuing effort, they are trying to get people to understand that when you come across a flooded roadway, you have to turn around, you cannot cross.
2. Hydromet operations. There were recommendations with respect to Doppler radar program, QPF forecasting and collaboration efforts in sharing this data.
3. Hydrologic warnings. During Ivan, the models just kept painting a different picture every six hours. Unfortunately, that is the state of the science. The latest information is run through the models and produces a set of results, then six hours later, updated information is run through the models and produces different results. The team has recognized that there are some smarter ways to handle that. One of them is for slow responding rivers – start utilizing this river flood watch. Instead of going directly to a flood warning based on a QPF only forecast, put out a river flood watch. Then as it gets closer to the event, start thinking about putting out the warning.
4. Flash flood warning. NWS changed its policy on issuing flash flood warnings. They are trying to reserve this flash flood warning product to basically indicate those types of events producing rapid runoff, where there is a rapid inundation of water into a normally dry area and the need for action is immediate. The warnings go out before the flash flooding is actually occurring. One of the tools that NWS has is the flash flood monitoring prediction tool (FFMP), which takes advantage of the radar technology. A couple of years ago this tool was not a premier tool in the office when it came to flash flooding. It is now the premier tool in the office. The next challenge is to disseminate this information out on the AHPS web pages to emergency managers and other users.
5. Radar technology. One of the big problems in the tropical environment is that tropical air masses link with mid-latitude air masses and as a result, there is a struggle with using the radar technology. There are different ZR relationships for these air masses and the radar senses and estimates rainfall better if the correct relationship is specified. There is now software in a couple of Weather Service offices that enables the use of different ZR relationships from mixing air masses and produces a better picture. One recommendation was to get all NWS offices to use it.
6. Collaboration/coordination between the Weather Service offices and their partners. There has been great success utilizing the technology with the conference calls, and sending things ahead of

time so users have the graphics in front of them as they discuss whatever is occurring. One recommendation was to really forge a partnership with the USGS.

Mr. Tamm said he noticed that there often appears to be precipitation differences between forecasting centers, but he now understands that this is a recognized issue in the NWS and they are working towards correcting it. He asked if there are differences in the algorithms that they are using. Mr. McKillop said it is primarily differences in forecasters' interpretation of the data. Mr. Nickelsberg said that there is a different consistency check through all the surrounding offices. QPF is not checked right now.

### **General Discussion on Recent Member Activities in Flood Loss Reduction**

Mr. Fromuth said that Mr. Tamm had been interested in establishing a subcommittee on flood vulnerability modeling nine months ago, and he believes they have had meetings outside this committee to discuss that. Mr. Tamm said something that is very important to the Commonwealth of PA is trying to manage risks and part of that is trying to determine what the vulnerability of the communities is and whether there is a decision made to evacuate. The director of operations uses the term "how bad is bad" because in the past, the governor has asked what it means when the forecasts say that there is going to be significant precipitation. They have not been able to provide the answer to the governor. They are looking at GIS technologies that are available. There is this desire to be able to predict out in the future based on other expert sources, what the likelihood of damage will be from a particular weather event. The goal is to be able to tell the governor as the weather forecasts are coming in just how bad it is expected to be.

Mr. Tamm said what PEMA found in Tropical Storm Ivan was that the floodplain maps were very good in identifying the floodplain flood. There is an illustration for Monroe County where they overlaid the impact area of people who have registered with FEMA for disaster assistance along the floodplains, and also included the national land cover database from 1999 that shows low density residential, high density residential, and commercial, industrial, and transportation facilities for Monroe County and the vicinity. While Ivan was widespread and the damage ranged from the Delaware to the Ohio, the border for Pennsylvania in the Delaware Basin did not necessarily conform to the floodplains. Nonetheless, Mr. Tamm found that it is a reasonable tool and he brought this up to Monroe County. The county said the April event was very much different and it was essentially the area along the Delaware that had the impact.

Mr. Tamm noted that there was one person in the Delaware Water Gap area that said she wanted her whole town bought out or elevated. It is very important to determine the frequency of these events and try to do some proactive management on risks and determine whether or not it is a wise decision as a state and as a nation to rebuild there or to move them out.

Mr. Tamm has attended some training on HAZUS, and is favorably impressed. The underlying database was a horrendous effort to compile, and they have close to \$40 million invested in the program at this point. Given any particular scenario, it can estimate some vulnerabilities. How good those computed vulnerabilities are is basically dependent upon the underlying data. The approach is taking census tract and blocks and equally distributing the building stock and population over that block. PEMA is thinking about repopulating the census data to the 30 meter grid cells on national land cover to produce a 100-foot by 100-foot census-based block. PA will continue to look at this and how to incorporate the USGS and the National Weather Service capabilities into this prediction program such that, using the seven- to ten-day forecast, they can give a probability scenario with risk bars or range bars. Then as the event gets closer to happening, they will have a better handle on what the vulnerability is going to be. Currently, PEMA has the new release of HAZUS up and running and it seems to be a marked improvement over the previous versions. They have looked at the work that the Corps of Engineers did on the Susquehanna between Wilkes Barre and Sunberry and they got very good elevation data. The Corps did not use

HAZUS. Mr. Gavin said the Corps has come up with a couple approaches for distribution of population and building stock other than just the percentage of the census block that is under water. Mr. Tamm said that one of PEMA's concepts is to use LANDSAT imagery because it goes through the entire United States and plots out on a 30 by 30 meter grid what the land use actually is; i.e., crops, deciduous trees. There are 40 different classifications of which residential, high density residential and commercial and industrial are of primary importance because that is where the people are. You can take the economic information from the census and populate those faster than identifying them from the satellites.

Mr. Nechamen suggested that the Flood Advisory Committee have a conversation about FEMA's modernization program because it is ongoing. There is a lot of money going into it and managers are at a crossroads between doing a lot of lousy maps or a smaller number of really good maps and taking them to Congress to suggest they finish the better quality mapping process. The good maps will have details with lidar two-foot accuracy confidence. They will not only know where the floods are going, but how deep they are going to be and how frequent. That is the level of information required for detailed mitigation planning.

Mr. Gilman said NJ has delayed doing any studies for ungaged streams because the method of predicting flows for those streams, which was produced by USGS, is about 30 years old. He noted that FEMA is rushing to do the map modernization and wants to digitize the maps for every county in the next two years. The data that is going into these county-wide maps is the same old data that they have had for the last twenty years. They really cannot do this for ungaged streams right now because the equations they used 25 years ago are basically the same, so you get the same result.

Joe Zagone said that the map modernization process is a question of money. He thinks the mapping is a great deal further ahead today than five years ago. FEMA wants new maps, better maps, and new studies. However, they do not have the money to do it immediately. The first phase is the digitization. They are moving into the next phase where maps are available through modern technology (GIS format) as opposed to the old paper maps. The digitized data is just a rehash of the old maps, but sometimes Congress does not realize the technical aspects of things. If they see a digitized map, they think it is great and they are prone to provide more funding. Better mapping will require additional money. Mr. Gilman said that FEMA asked for \$500 million a year for five years, and so far they have received \$500 million after three years. Mr. Zagone said they need the users to press Congress for the money.

Mr. Nechamen said he has reviewed the money that FEMA was offering for mapping in New York. If that money was used to develop really good maps, it would get a third of the state's counties done covering 85% of our population with outstanding maps. Then, the state could show the product to Congress and ask for another five years of funding to finish the job. Using the existing funds to map everything will result in substandard maps everywhere. He believes Congress may only consider the appearance of these inferior maps, rather than the quality and accuracy of the mapping, and stop the funding, believing the job is complete. Mr. Zagone cited the problem that if you do not have a full set of digitized maps that all congressional constituents can access and look at, then there would be a great deal less congressional support for the funding request. Those who are technically concerned want better mapping, but may have to accept some of this in order to get the money to do the better technical mapping. Mr. Gilman said that FEMA three years ago digitized the Bergen County, NJ map. They used base maps that were inferior to what the State of New Jersey had. Now FEMA is using aerial digitized maps and, with the leaves on the trees, you cannot even see the streets. There is a rush to digitize everything, and he does not think that is what Congress wants. They want good maps, not old maps with new dates on them.

Mr. Gilman wanted to report on two other things in New Jersey. At the last meeting he reported that New Jersey had accepted applications for grants for the \$25 million in flood control projects. Out of this \$25

million, about \$4 million of the projects were located in the Delaware Basin. Mr. Moyle said funding approval has been introduced to the Senate and has gone through the Senate Environment Committee, but it has not moved out of there and there is no movement in the NJ Assembly. Mr. Gilman said that with this week's flooding, there might be a renewed interest in getting this money appropriated. The other thing to report on is that as a result of the flooding in September 2004 on the Delaware River, New Jersey only received a total of six applications for mitigation projects. Four of them were in the Delaware River Basin. Of those four, the City of Lambertville wanted to elevate one structure but they tore it down before they got the application filed. There were some structures proposed for elevation in the Rancocas Creek Basin, but the applicants probably got disgusted with the paperwork. There are only two active applications left for mitigation flooding. One is to mitigate protecting mechanical electric equipment in the State House parking garage in Trenton. The other is to elevate a bunch of structures along the Delaware River in Harmony Twp. Until this flood occurred, we have been arguing with FEMA as to whether this work would be eligible. Since Monday, hopefully, FEMA has changed their mind because that is the only other mitigation project that is active on the Delaware River.

Mr. Hainly said that the Susquehanna River Basin Commission is taking the lead to see if they can get interest in Congress to fund the streamgaging networks through the USGS for the purpose of supporting flood forecasting programs and the data that the National Weather Service needs to make their forecast. USGS also got a request from a couple counties in Pennsylvania to take a look at the HAZUS-NH model to see if that could be enhanced to help them better assess their vulnerability and risk to floods and to also help them to manage and respond to the flood. The type of inundation mapping required is the same as that sought for the AHPS program. It is not going to tell you that based on a QPF of six inches, you are going to get a 100-year flood. It is going to tell you that based on a QPF of six inches, you are going to get a water elevation of 30 feet at a certain point and it is going to cover a specific area. The HAZUS model can do that, but not with the data that are now in the default program. The hydrology that HAZUS uses to predict the runoff is pretty crude. It gives you a number and it gives you a good estimate, but not the best estimate. Since the USGS has mapping and hydrology in its mission, they are looking at bringing better elevation data and better hydrologic data that provide a better product coming out of HAZUS, which can help with disaster mitigation strategies. Then, the QPF from the National Weather Service can be used to start the planning process of how to respond to the impending flood. In addition, HAZUS could be used to manage a flood in real-time. Using data from real-time streamgages, you could input that data and produce an updated flood inundation map and determine what the response is going to be as the flood is occurring. The overall solution is to get the local communities the information they need and blend that with both the Weather Services planning for AHPS with the flood inundation mapping for larger areas, large tributaries on the main stem, and use the flood inundation maps that come out of HAZUS to help manage their smaller areas around the community.

Mr. Tamm said that it would be nice if ultimately the existing data, the census data, and building stock data that drives HAZUS could be used to generate not only damage assessments, but also updates to the flood maps. Maybe the algorithm can be calibrated to make sure that the results are consistent with what is acceptable under the NFIP. There are provisions that may be able to be put into HEC RAS as an alternative processor in the program to help give the lateral extent to the actual flood depths.

Mr. Nechamen said that a pilot program in Schoharie County, New York, southwest to Albany, focused on the modernization techniques using lidar detailed topography. There is a well gaged stream, which is responsible for most of the flooding there. Upstream gage readings were tied to inundations areas for four foot elevation intervals and for the 10-, 50-, 100-, 500-year floods. This was combined with a reverse 9-1-1 calling system to warn the homes and businesses that are in the inundation zones with about two hours notice. The system was used with Ivan, which was not a huge event in that area, and it worked. Mr. Fromuth said that there are a couple of programs with reverse 9-1-1 in the Delaware Basin. He is aware of programs in Bucks County along the Neshaminy Creek and in New Castle County, Delaware.



Mr. Fromuth noted that the DRBC was preparing a summary statement on the role of the DRBC and Flood Advisory Committee, including general recommendations for future flood loss reduction and posting them on the DRBC web site. He requested comments from the members on the draft document.

Mr. Fromuth said the DRBC needs to know how to direct callers interested in property buyouts. Communities and counties that have hazard mitigation plans in place have a lot better chance of getting money for that type of activity than the ones that do not. There is pre-disaster and post-disaster mitigation money that involves a cost share and then it has to be approved by FEMA to request for the funds. Mr. Gilman said in New Jersey that person would be Kathy Lear. Mr. Tamm said that Ron Killins would be the principal point of contact in Pennsylvania. Mr. Nechamen said the contact in New York would be Susan Bergman of the State Emergency Management office. Mr. Zagone said that general information on HMDP is available on the FEMA website as well. Mr. Tamm said that PEMA's website has the Hazard Mitigation Grant briefing on video on its website. The procedure will probably be very similar if the presidential disaster declaration is declared.

**Next Meeting**

The next meeting of the Flood Advisory Committee is scheduled for Wednesday, July 13, 2005 at 10:00 a.m.

**FLOOD ADVISORY COMMITTEE  
ATTENDANCE**

**April 6, 2005**

<b>NAME</b>	<b>AGENCY</b>
FROMUTH, Rick	Delaware River Basin Commission (DRBC)
GILMAN, Clark	NJ Department of Environmental Protection (NJ DEP)
HAINLY, Bob	U.S. Geological Survey (USGS) – PA
MCKILLOP, George	National Weather Service – Eastern Region Headquarters (NWS ERH)
MOYLE, John	NJ DEP
NICKELSBURG, Walt	NWS
PETREWSKI, Gary	PPL
REUBER, Michael	National Park Service (NPS) – Upper Delaware
RODGERS, Ted	NWS – Middle Atlantic River Forecast Center (MWRFC)
RUPERT, Clarke	DRBC
SCHOPP, Bob	USGS
SCORDATO, John	NJ DEP
TAMM, Alan	Pennsylvania Emergency Management Agency (PEMA)
WESTFALL, Greg	U.S. Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS)
ZAGONE, Joseph N.	Department of Homeland Security (DHS) – Federal Emergency Management Agency (FEMA) Reg. III