

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

JANUARY 26, 2005

The Flood Advisory Committee (FAC) meeting chaired by Alan Tamm began at 10:00 AM in the Commission office (DRBC) in West Trenton, NJ.

Review of the Draft Minutes from the July 1, 2004 Meeting

Minutes were reworded on page 3 based on comments from Scott Hoffman, USGS-Pennsylvania. The minutes were accepted with Mr. Hoffman's changes.

Observations/Recommendations Based on 2004 Flood Events

Rick Fromuth reported that there were five tropical storms during the summer and fall of 2004 and two other events that caused flooding. Flooding was significant on the main stem of the Delaware and the tributaries. On July 12, 2004, severe flooding affected Burlington County, NJ. There was a total of 13.1 inches in Tabernacle, NJ. A number of dams failed and major damage occurred. Another event with 5-6 inches of rain occurred in Philadelphia and its western suburbs on July 31-August 1, and many roads were closed for a period of time. On August 13, Tropical Storm Bonnie hit the upper part of the basin harder than the lower part, leaving 6+ inches of rainfall in some areas. On August 30, Tropical Storm Gaston passed over the basin and continued the saturated conditions in the Basin. About ten days later, Tropical Storm Frances came through leaving 2-4 inches of rainfall from the top of Bucks County and north. Then Tropical Storm Ivan occurred about a week later, and the whole upper basin received 3+ inches. That uniform rainfall over the basin caused the highest stage of the Delaware River at Trenton since 1955. The work that was done by the emergency crews in the flooding after Ivan was outstanding. The weather was perfect during the high river stage, and without the warning, people would not have expected severe flooding due to the lack of heavy rain in the lower basin.

The dams on the Lehigh River significantly reduced flood peaks along the Lehigh. The flow at Trenton peaked at 201,000 cfs, and the stage was 23.4 feet. In the upper Delaware, Callicoon set a new record stage at 17.33 feet. Thousands of people along the main stem were evacuated, and property damage was widespread. The Corps of Engineers estimated the damage reduction from their flood control dams in the Schuylkill, Lehigh, and Lackawaxen watersheds at \$52 million. The forecasting products provided by the National Weather Service were critical in preventing loss of life along the main stem Delaware. Tropical Storm Jeanne moved through the Basin about two weeks after Ivan. The upper basin did not get as much rain with Jeanne, and the peak at Trenton was just about seven feet lower than during the flooding from Ivan. Urban streams in the lower basin experienced major flooding from Jeanne.

Structural projects that were well maintained prevented damage during the flood events. The stream and precipitation gaging network was critical, and property owners were able to use stage forecasting products on-line. Completed flood mitigation projects such as property acquisition and flood proofing also prevented flood damage. Newspaper articles indicated that streamside residents along the Neshaminy, who had their homes elevated, were very satisfied with the outcome of the flooding. Computerized reverse 911 warning systems were also valuable along the Neshaminy.

A number of residences are located in the floodplain downstream of Pepacton Reservoir on the East Branch of the Delaware River. Due to exceptionally wet conditions during the 2004, the reservoir has spilled frequently. When the spill rate gets over about 2,000 cfs, areas downstream begin flooding. There has been a long standing issue as to whether the City of New York should lower the level of storage for Pepacton Reservoir, when the probability of refill is high to provide some mitigation from spill rate.

However, Pepacton is a water supply reservoir and not a flood control reservoir, and the maximum release rate is about 700 cfs. At this rate, a volume of two billion gallons can be released over five days. The reservoir holds about 141 billion gallons, and one inch of runoff equals about seven billion gallons. Downstream citizens have requested a program whereby the City would lower the level of the reservoir when there is snowpack to replace storage, and also during the hurricane season if the probability of refill is high. Such a program must be approved by the Parties to the 1954 Supreme Court Decree because it relates to the water allocation among the Basin States and the purpose for which the water is being used.

Another measure to help mitigate flooding downstream is to remap the floodplain. (Note: Since the January 19th Flood Advisory meeting, the NYSDEC has reported to DRBC that the FEMA flood maps below Pepacton Dam are not correct, and that a new evaluation of the 100 year floodplain is needed. The State of New York is going to do this, and the City of New York is providing funding. Once the remapping is complete, flood mitigation steps for structures in the floodplain can be established.

Walt Nickelsberg reported that the National Weather Service is working on determining a flood stage for the East Branch Delaware River at Harvard, and is trying to get satellite telemetry added to the USGS stream gage at Downsville. Once a flood stage is determined for Downsville, both Harvard and Downsville could be added as flood stage forecast points to the Weather Service's real time network. Mr. Fromuth noted more information is needed on the degree of flood mitigation that lowering the spill rate can provide. A hydraulic model needs to be run to show the difference in downstream flood stage due to changes in spill rates.

Bob Schopp asked if the Town of Colchester requested FEMA to update the flood insurance studies. Mr. Fromuth said that the existing study will be updated based on the remapping conducted by the NYSDEC. Mr. Nickelsberg noted the procedure developed for the Yardley, PA area along the Delaware River. In this case, a cautionary flood stage, below the level at which damage would occur was used so that statements would be issued earlier, but without putting a flood warning out for the river. Tina Johnstone stated that the NYCDEP has had a SCADA system in place where they remotely monitor all the reservoirs. NYCDEP notifies the Delaware County Emergency Management when Pepacton Reservoir is within 24 hours of spilling, and when there is a 100 cfs change in the spill rate.

Mr. Schopp said the Pepacton Reservoir flooding issue is comparable to New Jersey water supply reservoirs. Computations were performed for those reservoirs showed that even if the reservoirs are full, the peak spill rate is 15-20% less than if the reservoir was not there. Ms. Johnstone reported that NYCDEP performed an analysis of the flooding from Tropical Storm Ivan which showed that the peak flow coming into Pepacton Reservoir was 34,000 cfs while the peak spill rate was only 17,000 cfs.

Jeff Mahood asked if there have been any education efforts to let people know how much that reservoir helped them, and Ms. Johnstone said that there has been. Mr. Fromuth stated that an input/output analysis of the reservoir is needed to look at reductions in spill rate caused by different voids in the reservoir. Mr. Fromuth stated that if it is established that the feasible reductions in spill rates are not going to effectively change flooding downstream, other forms of flood mitigation will be necessary. Mr. Tamm said that communities and individuals have to make decisions as to how much abuse from flooding they will take. There are a number of measures communities can take such as structural measures, property acquisition, or construction of dams and levees. The way the federal funding is being cut, communities will need to have flood hazard mitigation plans in place in order to be eligible for pre-disaster mitigation funds. Also, if a state has a hazard mitigation plan in place, then the state can apply on behalf for pre-disaster funds on behalf of the municipality. Individual property owners cannot apply.

Mr. Tamm also noted that under the Flood Insurance Reform Act, which Mr. Gilman noted is pending, claim payouts would be reduced with repetitive flood losses. Communities and residents need to consider

this potential reduction in the benefits for repetitive flood losses when considering the mitigation methods to include in flood mitigation plans and flood mitigation measures to implement. Scott Steigerwald asked if an enhanced local flood warning system would be eligible for pre-disaster mitigation funding. Mr. Tamm said even though it is a mitigation activity, it is not generally funded under mitigation programs. Greg Westfall asked if it was a requirement that there be repetitive flood losses to be eligible for pre-mitigation funding. Mr. Tamm responded that FEMA's intent is to maximize the reduction of repetitive loss properties and future repetitive loss claims. A repetitive loss property is defined as one that has had two \$1,000 claims from the National Flood Insurance program in the past ten years. In order for a project to be eligible under most of the federal funding, the project has to be determined to be cost effective. The first priority of FEMA appears to be to reduce the claims for the National Flood Insurance program. However, FEMA will also consider documented loss even if the properties are not insured. This is why historic information and photographs are important. Mr. Mahood noted that some Federal mitigation programs, such as those completed by the Corps or NRCS, use flood insurance claims as supporting information, but not as the primary justification for the mitigation. These programs sometimes use modeling and elevation vs. damage information to estimate expected annual damages or expected damages from a given flood in the evaluation of mitigation projects.

Dave Burd said he volunteers to head emergency management in Lamgerville, NJ. He wanted to report that a lot of people worked very hard during the flooding from Tropical Storm Ivan to be able to predict flood crests and get information out. Emergency personnel were able to know what was going to happen and were able to move their people and do some planning.

George McKillop said because of the significant flooding in the region, the National Weather Service (NWS) decided in October to formulate a tropical cyclone event review team for the entire eastern region. This will be an opportunity for the NWS to take the team's report, look at the findings and recommendations, and then see if they can be applied into the Delaware River Basin. Mr. Schopp said the Delaware River Joint Toll Bridge Commission was approached about adding a sensor at East Phillipsburg. Perhaps more sensor locations can be added. After the July flooding in Burlington, the USGS is getting one new gage with telemetry, a couple rain gauges, and will upgrade a few of the existing gages.

Mr. Tamm asked Mr. Fromuth if DRBC has looked at any of the ecological impacts from these floods or if that is being considered. Mr. Fromuth said that no study is planned, but such an activity would be consistent with the recently adopted Basin Water Resources Plan. However, due to lack of resources, there are no plans by the DRBC staff to go out and make an assessment of the damage to ecological or historical resources that were impacted.

Progress Toward Implementation of Flood Warning Recommendations

Mr. Fromuth discussed work that has been done on the DRBC website over the past six to eight months by Gail Blum and Clark Rupert of the DRBC staff. This work was done with a grant from the State of New Jersey Office of Emergency Management. The work is a part of the outreach effort listed in the 2002 flood recommendations report. The NJOEM agreed to fund a limited portion of the estimated cost of improving public education. Ms. Blum produced a new website and three brochures to hand out at Commission meetings and other functions. DRBC has tried to provide access to the information that other agencies provide on flood warning and flood mitigation. Some educational information geared towards school age children is also included. The page containing "DRBC's tips on finding information during period of high flood potential" is linked to Emergency Management pages. These are maintained by the Binghamton office of the Weather Service and Mount Holly. The page also links to the flood crest forecast and river statements by each of these two Weather Service offices. Every time there is a flood crest during an event, special river flood statements are updated so there is a verbal forecast of what the flood stage will be in addition to the AHPS data that can be accessed.

The page provides a set of links to the ADAPS system; one for each of the two Weather Service offices. A direct link to the USGS gage at Trenton has been added, as well as a general page that provides descriptive information on the AHPS system. The NOHRSC remote sensing center analyses are helpful at this time for assessing the snowpack. One of the products on this site is a daily model output of snow water equivalent. The model uses daily meteorology results of ground snow surveys and the data from aerial over-flights which detect the radiation coming from the ground, and determines a daily estimated water equivalent. The web site is also linked to the DRBC streamflow information page which is linked to each of the real-time gages provided by the USGS. It is also linked to flash flood warnings that are put out by the Weather Service. There is a short section on floodplain mitigation as well as the flood insurance program which provides links to other FEMA websites. Information is provided on the Flood Advisory Committee. This site was used during Tropical Storm Ivan, particularly in the Upper Basin, as a source of information when other sources of flood crest information were not available.

One of the features of this new website is a map that is linked to information about each state. This is in a format similar to the Commission's drought information page. Ms. Blum added a link to a FEMA web page which allows estimation of flood risk for a particular location. The approach FEMA is taking is that everybody is located in a flood zone with either a high, moderate, or low degree of risk. A link is also provided to a site called Hazard Maps at www.hazardmaps.gov, where it is possible to get an aerial photo that has the Q3 floodplain overlaid. That data is not highly accurate, but it is an indicator of the inundation from the 100 year floodplain. A link is provided to the FEMA map store. The catalog section, allows users to view the online flood insurance rate map. The site is also linked to the Association of State Floodplain Managers web site. The New Jersey Office of Emergency Management flood mitigation page and page on flood awareness are both linked and are tied to resources that would be available ... through the state of New Jersey for flood mitigation. There is also a link to New Jersey NRCS. DRBC staff would like to add more capabilities, and ultimately be able to show the status of flood mitigation efforts. Some of the individual websites now linked contain some of that information.

When Rob Klosowski was working on the staff at the DRBC, he assembled a FEMA flood claims database. Based on the data, he categorized repeat claims, and also included a section on total claims. Gail has linked these maps to the site and added a reference map which has all of the watersheds identified. There is also an option for opening this map in Adobe Acrobat format so you can magnify it in areas where the labeling is crowded. A legend is included to link watershed numbers with watershed names. The web site also includes a reference list of resources that have been collected over the years and are stored in the DRBC library.

A page was also developed with month-by-month information about recent floods that have occurred. This page includes links to the Weather Service, USGS, and other resources. A set of slides showing storm hydrographs was developed to summarize Tropical Storms Ivan and Jeanne. The Weather Service estimates of flood damage and stores the data through the National Climatic Data Center. A county-by-county assessment of dollar flood damage and loss of life is provided for each County. Mr. Tamm asked Mr. Fromuth if he was taking his narratives of the storms from the National Climatic Data Center. Mr. Fromuth said in most cases, the DRBC staff has developed its own summaries based on on-line information. Mr. Tamm suggested that the storm narratives include links to the National Climatic Data Center to provide another perspective based on what scientists and experts are saying. Mr. Tamm asked the Commission's permission to use the web site development as part of the enhanced Pennsylvania State plan.

Mr. Fromuth asked the Committee to test the website and make any suggestions. Mr. McKillop asked if DRBC was advertising this site. Mr. Fromuth responded that they tried to put features on the front of the

website based on most current activities that the Commission is involved with, but have not made a special presentation of it. The brochures are ready to be distributed.

Mr. Gilman described the preferred risk policy for flood insurance. The average flood insurance policy costs \$500 and up, but a preferred risk policy, which is available in low risk flood zones provides coverage at a more reasonable rate. Mr. Fromuth noted that a link could be added to the web site noting that low-risk insurance options are available for property owners outside of the 100 year floodplain.

Mr. Gilman said that a year ago, the state legislature passed a bond issue that appropriated \$25 million for flood control projects. Applications were sent out to municipalities in New Jersey asking for applications for potential projects. The only requirement was that in order for a project to be eligible for funding, it must provide flood prevention. Out of 36 applications, 18 projects were eligible, and the actual amount of those applications was about \$18.3 million. Out of \$25 million, possibly \$4 million will go to projects in the Delaware Basin. These are all structural projects.

Mr. Tamm asked Mr. Gilman if he has received any updates as to the status of the state's hazard mitigation plan. Mr. Gilman said New Jersey's plan has been rejected for a second time. Mr. Tamm said that Pennsylvania's standard state plan has been approved.

Mr. McKillop referred to the web site link to the National Weather Service's NOHRSC centers web page by Tom Carroll's group in Minnesota. Mr. Carroll informed them that NOHRSC will begin an airborne snow survey in the east, and run it through February 11. This will add a lot of real-time data to the snow database. Mr. McKillop discussed the interactive snow link. The snow model data capabilities are set up to include a wide range of remote sensing data like the radar, the satellite, the airborne survey, and all the ground truth data. NOHRSC incorporates the data into their database, and then runs the data through their snow energy balance model. They are able to get the modeled data out on a daily basis between the surveys. Mr. McKillop asked members to get the message out to partners, co-workers, peers, etc., that current snow water equivalent data is available. Tom Carroll's group can work with people who have specific needs, such as estimating the snow pack for Pepacton Reservoir.

Mr. McKillop reported that the Weather Service has had a \$34 million budget cut for the current fiscal year. This will impact the non-discretionary funding such as travel, training, outreach to partners, equipment, etc. If this continues in the next fiscal year, things are going to get much tighter. The AHPS program took a \$1.6 million cut. The Susquehanna River Basin Flood and Warning System once again was not directly funded by Congress. Congress directed the Weather Service to provide funding to the Susquehanna Flood and Warning System directly through AHPS, so \$1 million was directed into Susquehanna from AHPS. The AHPS program is moving along; however, implementation levels have been cut. The good news for the Delaware River Basin is that the Mid-Atlantic River Forecast Center has completed all of the basic AHPS implementation for all their points. They are not slowing down the basic AHPS implementation in the Delaware system. Where you will see some impacts and cuts is in the enhanced services such as the flood inundation mapping efforts.

Mr. McKillop said that the National Weather Service is making some fairly significant changes in the web delivery part of the AHPS program. A lot of the changes are infrastructure-type changes. There were many hits during the hurricane season. The difference between the hits from a year ago during Isabel compared to during Ivan was phenomenal. There is no question that these pages are being used. The Weather Service is currently building an infrastructure to support this. The hydrograph script program is being changed, and graphics are being modified. Ultimately, the user will be able to go into the site and modify the presentation based on their own needs. The new format is expected to be available in next few months.

Mr. Mahood asked if the AHPS information was USGS data. Mr. McKillop responded that the Weather Service uses some USGS data along with Weather Service forecasts. Ted Rodgers added that most sites have USGS data, and there is a link to the USGS site for that particular location. Mr. McKillop said that the committee should probably think about doing another presentation on the whole AHPS web page.

Mr. Tamm asked if the Weather Service is including AHPS into their severe weather courses and into the storm ready program information. Mr. McKillop said yes. Mr. Tamm said it is important that emergency managers are getting that information and then hopefully they will transmit that to their fellow workers and citizens. Mr. McKillop said they have tried to preserve the AHPS outreach training dollars. The Weather Service is currently working with a contractor to allot some training that has been delayed. Mr. Tamm said that PEMA is very excited about emergency management having the ability to forecast river stages. The next phase of emergency management is determining how to predict vulnerability to a weather event.

Follow-up on Vulnerability Modeling Sub-committee Formation

At the last meeting, Mr. Tamm made a suggestion for formation of a group to talk about vulnerability modeling, because the National Weather Service seems to be moving towards vulnerability analysis and FEMA had been going towards modeling or vulnerability under the HAZUS. There is a question of how to determine a good vulnerability number for communities so they can determine what exactly is to be done with respect to hazard mitigation. Based on a meeting at PEMA headquarters during the week of January 17th, it looks like very detailed additional elevation information is one of the key elements needed to improve the accuracy of HAZUS and hopefully incorporate it into the vulnerability analysis of the weather forecasts. Mr. Tamm asked that anyone interested in attending these vulnerability modeling meetings with the Commonwealth of Pennsylvania, let Mr. Tamm know at atamm@state.pa.us.

Outlook for DRBC Staffing to Support Flood Loss Reduction Activities

Mr. Fromuth discussed the six month suspension of the Flood Advisory Committee meeting. He said the Commission's approach last year was due to reduced funding and lack of federal funding. The technical support of the Flood Advisory Committee is affected in two ways. One was funding, and the other was that the person who provided technical support for the committee for a short time left the DRBC in March, and his position was suspended. The situation is not changing this year. At the recent Commission meeting, there had been a request for a 5% increase in DRBC's budget, but the commissioners did not approve that proposal. DRBC had a reduction in the budget from New York State for several years and that is going to continue this year. In addition, there is no prospect of the federal share. Rather than suspend this committee or meet at six-month intervals, the Flood Advisory Committee meetings can continue at DRBC to provide an opportunity for communication. Additional committee support cannot really occur unless DRBC gets additional funding. DRBC can continue to pursue small grants that contribute towards the web work that is being done. Meetings can still be held every three months, if the Committee is willing to go on that way without more DRBC support

State of Delaware Activity

Jerry Kaufman reported that Delaware recently conducted over \$40 million in buyouts of structures in New Castle County. The State government has created a surface water task force of 24 people to prepare a report by April 1. Delaware has engaged the Corps of Engineers to do studies along White Clay Creek and Red Clay Creek creeks. The task force is using precipitation volume data for storm frequency durations. Mr. Kauffman said he understands there is information available that can be used to help get that data – atlas 14. He asked if anyone knew what the status of that report is. Mr. Fromuth said he would send him the address of the web site. Mr. Schopp said that some aerial photographs that would provide drainage area data are still being reviewed. The final product will provide average precipitation over the basin rather than a single point. Mr. Kaufman stated that the current data is 43 years old, and he's happy to report that they got more up-to-date data.

Delaware, for the first time, passed a dam safety law. Mr. Tamm said one of Delaware's other accomplishments is that they have a standard state hazard mitigation plan. Mr. Kaufman said that he has a presentation, and asked if FAC wanted to put it on the agenda for the next meeting. Mr. Mahood asked if Delaware's buyouts were voluntary. Mr. Kaufman said they were mandatory buyouts. Based on the Real Estate section of the newspaper, they are receiving the market value of \$140,000. Out of about 180 to 200 homes in the town of Glennville, 150 were in the floodplain. About 150 were included in the buyouts, and the property is being turned into a wetland restoration area.

Mr. Kaufman reported that there were a handful of people that were quite vocal and that had invested a lot of money to flood proof their homes. Mr. Mahood asked if the buyout included market value and moving expenses. Mr. Kaufman responded that it was \$140,000 per home, and then up to \$25,000 in moving expenses. Mr. Steigerwald noted that this would never work in Pennsylvania. Mr. Kaufman said that is one of the reasons he brought the issue up; he thinks it is very unprecedented to have a whole neighborhood like that move that quickly without a benefit cost analysis. Mr. Tamm asked how soon after the event was the decision made. Mr. Kaufman replied that it happened in a matter of months after the flooding.

Next Meeting

The next meeting of the Flood Advisory Committee is scheduled for Wednesday, April 6, 2005 at 10:00 a.m.

**FLOOD ADVISORY COMMITTEE
ATTENDANCE**

January 26, 2005

NAME	AGENCY
ANASTASIA, Robert	U.S. Army Corps of Engineers (ACOE)
BLUM, Gail	Delaware River Basin Commission (DRBC)
BURD, David K.	Merrill Creek Reservoir
FROMUTH, Rick	DRBC
GILMAN, Clark	NJ Department of Environmental Protection (NJDEP)
HAINLY, Bob	U.S. Geological Survey (USGS) – PA
JOHNSTONE, Tina	NYC Department of Environmental Protection (NYCDEP)
MAHOOD, Jeff	Natural Resources Conservation Service (NRCS)
MCKILLOP, George	National Weather Service (NWS) – Eastern Region Headquarters (ERH)
NICKELSBURG, Walt	NWS
RODGERS, Ted	NWS – Middle Atlantic River Forecast Center (MARFC)
SCHOPP, Bob	USGS
STEIGERWALD, Scott	PA Department of Environmental Protection (PADEP)
TAMM, Alan	Pennsylvania Emergency Management Agency (PEMA)
WESTFALL, Greg	U.S. Department of Agriculture – NRCS