

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

August 9, 2006

The August 9, 2006 Flood Advisory Committee (FAC) meeting began at 10:00 AM at the Commission office (DRBC) in West Trenton, NJ. Peter Gabrielsen of the National Weather Service chaired the meeting.

A. Introductions and Review of the Draft Minutes from the May 3rd Meeting

No comments were made regarding the draft minutes. The summary, once approved, will be posted on the DRBC web site. Tapes of the meeting may be reviewed upon request.

Open Business:

Chair and Vice-Chair Nominations will be open for the next meeting. Mariana Leckner, NJ Office of Emergency Management was due to serve as the Chair succeeding Peter Gabrielsen, but she has recently left the NJ Office of Emergency Management to pursue a graduate degree. Generally, State and Federal representation of the Chair alternates, leaving the next office of Chair to a State Organization.

Action:

1. Nominations for both Chair and Vice-Chair will be sought from the Flood Advisory Members.

B. Hydrologic Conditions Report and Discussion of June Flooding

A brief presentation of the current hydrologic conditions and an overview of the late June flood was given by Mr. Fromuth.

This year's hurricane forecast was downgraded slightly from the earlier forecast to seven to nine hurricanes with three to four storms major hurricanes (Category 3 or more).

Extremely heavy rainfall over the Delaware River Basin during the June 24-28 period caused flash flooding and record to near-record flood crests along many streams and rivers throughout the basin, including the main stem Delaware River. Although hydrologic conditions were normal to dry prior to Saturday, June 24, the broad area of the rainfall and its intensity in the western and northern portions of the basin produced the flooding. National Weather Service data indicate that six to over 15 inches of rain fell in the Schuylkill, Lehigh, and upper Delaware River watersheds during the period. At least five inches fell throughout most of the Delaware River Basin, with the exception of portions of New Jersey and the immediate Philadelphia area which received less.

Heavy rainfall during June 24-26 saturated the ground and produced bank full and minor flooding conditions by early Tuesday, June 27. This set the stage for high runoff potential for any additional precipitation. Then, precipitation on June 27 and early on Wednesday, June 28 produced from two to over six inches of rainfall in the Schuylkill, Lehigh, and Lackawaxen watersheds as well as in Sullivan and Delaware Counties in New York State. The high rate of runoff combined with the saturated ground and already bank full streamflow conditions to produce the near record flooding. During the evening of June 27, National Weather Service flash flood warnings were in effect for nearly all counties in the Pennsylvania and New York portions of the basin.

There have been three major floods on the main stem Delaware River in less than two years. A scatterplot of peak streamflow at the Trenton, NJ USGS gage that contained data from 1895 to present was displayed. The plot shows that there has been a span of 41 years between the flood of record, 1955 and the next major flood, the January 1996 flood.

As a way to assign a frequency to the rainfall, a reference called a point precipitation frequency estimate, NOAA Atlas 14 was identified. For points throughout the northeast, a 100-120 year precipitation record has been used to develop area specific frequency curves for a given rainfall duration. The program can be accessed at <http://hdsc.nws.noaa.gov/hdsc/pfds/>. The NOAA frequency analysis for 12" in the area of Upper Wayne County or Southern Delaware County, correlates to a 1 in 200 to a 1 in 300 chance in any given year. This analysis used a more conservative 7 day duration as opposed to 5 day duration.

The report, 'Land Cover change in Eastern US 1973-2000' with USGS authors Thomas Loveland and William Acevado, was referenced because it looked at 20 different eco regions in the Eastern US. It can be found at: <http://eros.usgs.gov/LT/LCCEUS.html>. The report is not specific to the Delaware River Basin, but it considers all the eco regions in the Delaware River Basin; including the Ridge and Valley Province, Northern Appalachians, Northeast Highlands. For a region wide rainfall event such as occurred in June, the total amount of developed land to total amount of forest cover is small in the northern half of the basin. This is not to implicate that development is not important, but it is a good reference and serves to outline the need to more explicitly examine land use changes basin wide.

Rick Fromuth also gave an overview of the maximum inflow and outflow rates of the reservoirs, reviewed gage crests, discussed the spilling that occurred with the NYC reservoirs and Blue Marsh reservoir in the Schuylkill Basin and discussed normalized flows during the storm.

Information relating to these topics can be found on the DRBC website at: http://www.state.nj.us/drbc/Flood_Website/events.htm#2006.

C. Opportunity for Public and Interested Party Comments

Questions and comments were received from residents and others impacted by the recent flooding. The following issues were raised during the public comment period:

- DRBC must place more of an emphasis on floods, perform hydrological modeling, have flood control regulations in place, impose limits on capacity and impose directed releases in anticipation of heavy rains.
- It was asked if flood control structure, such as his proposed Wallpack Main Stem Dam with 120 BG of storage, would have been effective during the June flood.
- Is there a possibility to divert more water to NYC and possibly release it in the Hudson?
- Ice Jam flooding and potential dispersal of ice jams using explosives was discussed.
- It was asked why the DRBC did not react to the forecasts to release water from the reservoirs.
- It was suggested that the Corps work in conjunction with the NYC reservoirs and provide funding to manage some of the capacity as a void.
- DRBC should allocate more of its base funding towards flood control.
- Regarding flood warning, the NWS server was not available during the flood.
- Several gages should be examined due to missing data during the June flood.
- PPL should coordinate Lake Wallenpaupack releases with the River Master so that they do not affect the flood peaks.

- It was asked if Prompton Reservoir could hold more flood storage in coordination with Lake Wallenpaupack to lessen the effects on the Lackawaxen.
- It was stated that the effect of attenuation by the reservoirs can sometimes hurt in instances of 1-2 punch storms by changing the time flood water peaks come downstream.

There was discussion on each of the issues. Meeting tapes may be reviewed upon request.

D. Delaware River Flood Risk Verification Project (Jon Janowicz, FEMA, Region III)

The Delaware River Flood Risk Verification project was presented by Jon Janowicz of the FEMA Region III Philadelphia office. The project will look at the past three floods as they relate to flood map products. The project will look at flood frequency, heights and discharges and evaluate if the risk has changed in some areas. The objective of the project is to establish the accuracy of existing flood insurance studies, and update studies and maps that may be in error. FEMA would like to assure that their product represents today's flood risk as best they can for the purposes of floodplain management and flood insurance.

The flood risk verification project will be completed by FEMA staff (in the Philadelphia and Harrisburg offices) and contracted staff (Gannett Fleming, Greenhorne, URS, and Dewberry & Davis) using disaster relief funding. Additionally, they plan to coordinate with USGS, the Corps and FEMA Region II.

Action:

1. It was suggested that the FAC invite Jon back in six months time to further report on the project. This would correspond with the February 2007 meeting.

E. Storage Void Evaluation of NYC Reservoirs

Presentation of Model Simulations for the Upper Delaware River Basin Flooding of April 2005 by Ted Rodgers of the National Weather Service, Middle Atlantic River Forecast Center (MARFC).

In response to a request by DRBC, the NWS MARFC performed model simulations using their operational forecast system to examine the effects of spilling reservoirs and simulated reservoir voids during the April 2-4, 2005 rainfall event. Hypothetical simulations were run to examine the impacts various potential voids in the New York City water supply reservoirs would have had on flood crests on the Upper Delaware.

Initial results demonstrated that, even though they spilled during this event, reservoirs contributed to a reduction in downstream flood crests. The results were as follows:

1. The effect of having Cannonsville and Pepacton reservoirs in the watershed reduced crests at Hale Eddy, Fishs Eddy, and Callicoon by 2.2 ft, 1.0 ft, and 1.1 ft, respectively. Even though they spilled, these two reservoirs reduced crests downstream.
2. The effect of reducing the pool levels at Cannonsville and Pepacton by roughly 5 billion gallons would have the effect of reducing downstream crests at the above listed forecast points by 1.5 ft, 1.0 ft, and 1.1 ft, respectively vs. the full pool condition.
3. The effect of reducing the pool levels at Cannonsville and Pepacton by 10 billion gallons of water or more in these simulations has the same effect on crests as a no spill scenario. Crest reductions vs. the full pool condition would be 2.4 ft, 1.1 ft, and 1.2 ft, respectively at the three stations. The crest is driven entirely by initial surface runoff.

4. Even though they spilled, the five reservoirs (Pepacton, Cannonsville, Neversink, Rio, and Wallenpaupack) likely reduced the magnitude of flood crests on the lower Delaware (Barryville to Trenton) by roughly 0.5 to 1.5 feet.

It should be noted that the methodology used for these simulations is based on output from the MARFC's hydrologic forecast model, and MARFC believes the results in this report are reasonably accurate. However, it should be noted that this model is optimized for operational river forecasting, not hydraulic engineering studies.

The PowerPoint presentation and accompanying report are available online at the DRBC website: http://www.state.nj.us/drbc/Flood_Website/NWSResSimPPTAug2006.pdf and http://www.state.nj.us/drbc/Flood_Website/NWSResSimRPTAug2006.pdf

FAC members asked if the analysis might be reproduced for the June 2006 event. Additionally, Barryville was recommended as a possible gage for any future model simulations.

Discussion of Additional Model Development Potential

A preliminary proposal was developed on July 31st to outline the need and cost to prepare a Flood Analysis Model for the Delaware River Basin. Currently, the NWS is looking at open platform model development and model interaction in order to utilize the best available models whether they are Corps, USGS, etc. In October, Rick Fromuth, Peter Gabrielsen and Peter Ahnert plan to present the flood analysis model proposal as a possible open model development platform to senior NOAA hydrology experts in Washington. Findings from that meeting will be presented at the next Flood Advisory Committee.

Action:

1. The possibility exists for the NWS to complete the void scenario modeling simulations for the most recent June 2006 event. If this occurs, presentation to the FAC at the next meeting could occur.
2. Rick Fromuth, Peter Gabrielsen and Peter Ahnert will present the flood analysis model proposal as a possible open model development platform to senior NOAA hydrology experts in Washington. Findings from that meeting will be presented at the next FAC.

F. Findings of the Draft N.J. Flood Mitigation Task Force Report Requiring DRBC Participation

The following recommendations were taken from the NJ Flood Task Force Report. They have the potential to require DRBC (or FAC) action or participation.

Recommendation 11: Every effort should be made to encourage Pennsylvania and New York, via the DRBC, to adopt the same stringent construction standards and flood hazard area restrictions within the Delaware River basin as New Jersey. Consideration should be given to the establishment of a joint working group to implement the standard.

It was discussed that flood hazard areas differ by state and that it would be advantageous to hold a meeting regarding state floodplain regulations to compare, go over obstacles and look at possibilities for change. While enforcement of regulations is likely to remain the responsibility of the states, there may be room to suggest a recommended set of uniform regulations along the main stem Delaware.

The major difference with NJ flood plain regulations is the NJ Flood Hazard Design

Flood, a more restrictive definition of the floodplain which maps discharges equal to flows 25% greater than the 100 year flood. In addition, NJ maps the floodway as a more restrictive 0.2' rise instead of the national standard of 1.0' rise. Newcastle County, DE also has more restrictive standards than most. In their county, the floodplain and floodway are considered one in the same, therefore allowing no development in the floodplains.

Recommendation 15: DRBC should extend the “Outstanding Basin Waters” classification to remaining segments of the non-tidal Delaware and its tributaries.

This recommendation was discussed as being mostly outside realm of FAC, because it is based on water quality. Justification for Special Protection Waters would best be considered by DRBC Commissioners. The concept is that if the “Outstanding Basin Waters” classification was extended, it might prevent development along stream corridors.

Recommendation 17: Use of snowpack based storage management programs for water supply reservoirs should be evaluated, while recognizing the limited seasonal availability and marginal risk reduction offered by this type of flood mitigation. Evaluation of such programs must consider the water supply risk incurred to the 1954 U.S. Supreme Court Decree Parties in their implementation. In the Upper Delaware River Basin, such programs require unanimous approval of the decree parties.

.....an engineering design model for evaluating operation of the basin’s reservoirs during flood events does not exist. An engineering study using such a model could provide an experimental means for determining the effectiveness of potential reservoir management changes in reducing flood peaks. Accordingly, it is recommended that the feasibility and cost of doing model development and an engineering study be evaluated.

The modeling efforts described today align with this recommendation. In addition to snowpack based voids, it is thought that seasonal or fixed voids should be examined.

Recommendation 18: State and local leaders must encourage the US Congress and Senate to support/fund the USACE feasibility study of the Delaware River Basin in subsequent Federal budgets.

At this time, the State of New Jersey has committed to cost share a geographically limited update of this report.

Recommendation 21: The USACE, in its 1984 Delaware River Basin Study Survey Report, undertook the most recent basin-wide screening of flood control structural and non-structural project alternatives. The Task Force recommends that, as part of the Delaware River Basin Comprehensive Feasibility Study, an update be undertaken that would provide a means for evaluating, from a multi-state perspective, the effectiveness and feasibility of such measures.

Currently, the Corps has received \$1M from their General Expenses fund for the Delaware River Basin. A portion of that funding will be spent to look at the 1984 Corps study and extend a limited multi-state regional assessment. The scope of Work is still being developed.

Recommendation 27: The State, in partnership with other state and federal entities, should coordinate the implementation of improvements to flood forecasting and flood-warning system capabilities.

Part of this recommendation relates to the current task of updating the 2002 Flood Warning Recommendations Report. A lot of the ideas conceptualized in 2002, such as AHPS and gage implementation in the upper reaches of the basin, have been implemented due to reorganization and reprioritization of budgets because no funding was allocated following the preparation of the report. Peter Gabrielsen mentioned that he would like to form a subcommittee to review and identify tasks that have been completed and inventory current needs basin wide.

Recommendation 31: The owners of dams located within the Delaware River Basin in New Jersey, Pennsylvania, and New York State should prepare and maintain a current EAP document with associated up to date dam breach inundation mapping. The DRBC should coordinate and ensure that EAP documents for all large impoundments within the Delaware River Basin are shared between the states of New Jersey, Pennsylvania, and New York.

Following the recent incident at Swinging Bridge in the Mongaup system, inundation was required to be updated. DRBC thinks that it is important to inventory, gather and assess emergency inundation mapping and make that mapping available to emergency managers online if possible. The effects of a dam breach in New York State would affect the river as far south as Trenton. It is felt that this mapping should be made available for emergency planning purposes.

G. Status of Approvable All Hazards Mitigation Plans in the Basin

*Flood Mitigation Plan Initiative for the Non-Tidal NJ Section of the Delaware River Basin
DRBC, NJDEP, NJOEM*

Due to the length of the meeting, this agenda item was postponed until the next Flood Advisory Committee meeting.

H. Next Meeting

The next meeting was scheduled for Wednesday, November 15, 2006 at 10:00 am.

**FLOOD ADVISORY COMMITTEE
ATTENDANCE**

August 9, 2006

NAME	AGENCY
AHNERT, Peter	National Weather Service (NWS)
DAVIS, Jim	Delaware Riverside Conservancy
DOUGHERTY, John	Bucks County Emergency Services
DOUGLASS, Bill	Upper Delaware Council
EISENFELD, Lynn	Homeowner
FROMUTH, Rick	DRBC
GABRIELSEN, Peter	NWS/Eastern Region Headquarters
GARLITS, Skip	Homeowner, concerned citizen
HAINLY, Bob	United States Geological Survey (USGS) – Pa.
JANOWICZ, Jon	Federal Emergency Management Agency (FEMA), Region III
JENGO, Don	Lower Mt. Bethel
JESPERSON, Eric	Pa. Mapping & Geographical Information Systems
JOHNSTONE, Tina	New York City Department of Environmental Protection (NYC DEP)
KELSNER, George	Delaware Riverside Conservancy
KOLTALO, Chris	DRBC
LANDRY, Martina	New Hope home and business owner
MAHOOD, Jeff	Natural Resources Conservation Service (NRCS)
MILLER, Jason	United States Army Corps of Engineers (US COE)
MOSES, Dan	FEMA, Region III
MOYLE, John	New Jersey Department of Environmental Protection (NJ DEP)
NAJJAR, Ken	DRBC
NICKELSBURG, Walt	NWS
OVERTON, Bill	Washington Crossing flood victim
PEDRICK, Gail	New Hope homeowner
PETREWSKI, Gary	PPL
PICKERING, Joe & Lynn	Homeowners
REUBER, Michael	National Park Service – Upper Delaware Scenic and Recreational River
RODGERS, Ted	NWS – Mid-Atlantic River Forecast Center

RUGGIERI, Joseph	NJ DEP
RUPERT, Clarke	DRBC
SCHOPP, Bob	USGS
SCORDATO, John	NJ DEP
STEIGERWALD, Scott	Pennsylvania Department of Environmental Protection (PA DEP)
STEVENS, Glen	US COE
TAMM, Alan	Pennsylvania Emergency Management Agency (PEMA)
TESSIERI, Laura	DRBC
VICKERS, John	NYC DEP
VOGT, Bill	Delaware Riverside Conservancy
WIECZOREK, Marisa	Mercer County Planning
ZAGONE, Joseph N.	FEMA, Region III
ZIFF, Barry	New Hope