

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

August 22, 2007

The August 22, 2007 Flood Advisory Committee (FAC) meeting began at 10:00 AM at the Commission office (DRBC) in West Trenton, NJ.

A. Introductions and Review of the Draft Minutes from the May 2nd Meeting

Peter Gabrielsen announced that this would be his last meeting as chair of this committee and the last meeting that he will be attending. Scott Steigerwald, the current Vice-Chair, will take over as Chair. A request was made for nominations to fill the federal Vice-Chair position. Mr. Gabrielsen nominated Jason Miller, USACE and it was accepted.

Bob Hainly had one correction to the minutes. On page 3, where Gary Petrewski said they were about to enter into a contract with the USGS to install a new gage on the Lackawaxen, the location of that gage is at a town called Rowland. The minutes were accepted with corrections noted. The approved summary will be posted on the DRBC web site. Tapes of the meeting may also be reviewed upon request.

B. Hydrologic Conditions Report

A presentation of the current hydrologic conditions was given by Richard Fromuth, DRBC. The southern US has had a tremendously hot and dry summer. Delaware and the central part of Pennsylvania, have shared these conditions and have been very dry. May was a very dry month, and there has been varying amounts of rainfall from mid-June on in different parts of the basin. On August 6th, the state of Pennsylvania declared a drought watch primarily because of the dry conditions in the Susquehanna Basin, but also the northern part of the Delaware Basin had low groundwater levels.

Precipitation over the last 30 days shows a departure from normal in the southern part of the basin up until the recent rain. In the 60-day period, the upper part of the basin is basically normal in parts of the Pepacton, Neversink, and Mongaup watersheds. Southeastern Pennsylvania and New Jersey are in the two to four inch deficient range.

There is currently about a 70 bg void in the New York City reservoirs combined, which is not that far from the normal storage for this time of year.

Mr. Gabrielsen added that for most of the summer we have been in an atmospheric pattern that has protected us from any tropical activity. Now that the frontal zone has moved a little further north, we might start to see tropical activity accelerate, which usually happens between now and the end of September. The tropics bear watching as to what will be happening along the whole eastern seaboard from Florida to New England.

C. Update on DRBC Funding and Staffing Changes

Bob Tudor stated since October 1, 1996, the federal government has withheld its 20% fair share contribution towards the Commission's annual operating budget while remaining an active voting commission member.

One possible way the DRBC hopes to get federal funding reinstated is through authorizing language in the Water Resources Development Act (WRDA) stating that the Secretary of the Army *shall* allocate funds to the Delaware River Basin Commission, Susquehanna River Basin Commission and the Interstate Commission on the Potomac River Basin according to their compacts. This bill has passed both the House and the Senate and has come out of the conference committee process. There has been a lot of discussion in the press that the President would use his veto powers on this bill but it is rumored that both the House and Senate have enough votes to override his veto if this occurs. A separate appropriations is still likely if WRDA becomes law.

The Commerce, Justice, and Science Bill passed by the U.S. House of Representatives includes \$250,000 for flood warning improvements in the Delaware River Basin. Congressman Dent was responsible for the bill, the House approved it, and it is in the NOAA budget. The Senate does not have a similar earmark and the two have not met yet in committee to finalize what the expense is going to be. If it is funded through NOAA then DRBC would work with the Weather Service to try to fit that into projects that are mutually beneficial related to flood warning.

There was a lot of interest in evolving the AHPS system to have a flood inundation mapping component. The Army Corps of Engineers received \$300,000 this year towards flood inundation mapping along the Delaware. There is language in the FY08 Energy and Water on the Senate side for another \$300,000 to supplement the previous funding.

Mr. Tudor then discussed staffing changes. He said Rick Fromuth has announced his retirement and that this would be his last Flood Advisory Committee meeting as a full-time Commission employee. As a result of that and other dynamics, the DRBC has decided to make some changes in the organization. Prior to now, there have been five branches; Operations, Information Management, Planning, Project Review, and Modeling and Monitoring. These five branches have now been consolidated them down to three: Modeling and Monitoring Assessment, Water Resources Management, and Planning and Information Technology. Basically, DRBC is consolidating most of their engineering capability under the Water Resources Management Branch and within that branch there will be two sections: a project review section and an operations section. Bill Muszynski is the head of the Water Resources Management Branch. Mr. Muszynski was most recently the Deputy Administrator at EPA Region II, and has also worked with the Army Corps of Engineers.

D. Status Report on the Flood Mitigation Plan for the Non-Tidal NJ Section of the Delaware River

Laura Tessieri reported that the Flood Mitigation Plan for the Non-Tidal NJ Section of the Delaware River is a regional flood mitigation plan required by FEMA for municipalities to have in place in order to have access to certain federal mitigation funds. DRBC received a grant last year through the FEMA Flood Mitigation Assistance Program to aid in assisting municipalities in four Counties of the Delaware River Basin with preparation of the plan. New Jersey Office of Emergency Management is the sub-grantee and New Jersey DEP is a partner that has contributed matching funds toward the project.

Municipalities were able to be a part of this plan if they were located either partially or entirely within the Delaware River Basin. There are 64 municipalities that were eligible. As of August 22nd, 51 are actively participating, about an 80% rate of participation.

Ms. Tessieri described what a flood mitigation plan is and why it is necessary. The plan will detail the regional and local municipality flood risk in order to determine what can be done at the local level to mitigate flood damages. Each municipality is charged to evaluate its recent flood risk and the effect of recent floods and then come up with a prioritized list of mitigation actions. The aim is to have such a list prepared in order to look to secure funding for those local actions. This plan aims to put power into the hands of the local officials because without this plan, they are not eligible to get federal funds aimed at flood mitigation.

This process started October 2006 and completion of a draft plan is planned for the end of the year. There have been two sets of County level workshops so far, and the third set is scheduled for this October.

E. Delaware River Basin Interstate Flood Mitigation Task Force Report Status

Mr. Tudor said the Final Interstate Flood Mitigation Task Force Agenda was presented to the governors of the four basin states on July 12, 2007. The final task force action agenda is broken into six modules: reservoir operations, structural and non-structural measures, floodplain mapping, floodplain regulations and flood warning. The agenda contains a total of 45 recommendations and can be found online at http://www.state.nj.us/drbc/Flood_Website/taskforce/index.htm.

The task force requested Mr. Tudor to reach out to each of the governors and ask for a briefing so that

they could inform them of what the report says and highlight the things that should take priority. Governor Rendell has reportedly read the whole report and discussed it with his staff. There have been interactions in New York State with the governor's office and the Deputy Executive Secretary of Environment, and they are working through New York DEC to schedule something. Because Delaware is located along the bay and the tidal section, this report does not have the same impact there as it does in the upper parts of the basin. In addition to governor briefings, a congressional briefing on the report is scheduled to occur during the first two weeks of October.

In terms of implementation, there are a few things going on: flood warning, the flood analysis model and the flood inundation maps. It was mentioned that New Jersey is going to adopt their new floodplain regulations in November. In addition, Governor Corzine signed legislation to put on the ballot in November for \$12 million for a new Blue Acres Fund, which would allow additional buyouts for properties in the floodway of the Delaware River. Mr. Tudor said it was his understanding that Governor Rendell, PA seemed to have some strong interest in this and wanted to also have a few initiatives come from the report.

F. Report by Flood Warning Improvements Subcommittee

At the last FAC meeting, a sign up sheet to form a Flood Warning Subcommittee was passed around. Rick Fromuth described that the intent of this committee is to implement the flood warning section of the Interstate Task Force Report and to try to layout, not only the progress that is being made by the individual agencies, but some initiatives that could be worked on by the DRBC and the agencies collectively. Current progress relating to the Flood Warning (FW) recommendations was discussed as follows:

- The National Weather Service has requested inputs from NWS field offices to develop inventories for evaluating precipitation and stream gage adequacy, (FW-1.1, and FW-2) and has requested inputs on priorities for additional river flood warning points (FW-7).
- USGS-New York has extended rating curves for stream gages on the main stem of the Delaware and a few of the major tributaries. There is a rule of thumb for extension, which is to extend to 25% above the flood of record or the 100-year flood whichever is greater. (FW-3).
- USGS – Pennsylvania has floodproofed the stream gage for the Lehigh River at Glendon, PA, and funding is in place, through NJDEP, for USGS-New Jersey to flood proof stream gages on the Delaware River at Tock's Island, Riegelsville, and Trenton. (FW-4)
- The Delaware River Joint Toll Bridge Commission has added automated level gages (radar type sensor) at Easton, Stockton, and Lambertville bridges on the Delaware River. USGS has included this reporting on-line and Walt Nickelsberg said they are also on the AHPS page. Automated level gages are expected to be added to Frenchtown and Washington Crossing bridges by the close of 2008. (FW-2, FW-7)
- Philadelphia District – USACE has received the first half (\$300,000) of funding for the preparations of flood inundation maps for 110 miles of the main stem Delaware River. Basin state funding for the flood analysis model was leveraged as a local cost share to obtain federal funds for the inundation mapping work. (FW-8)

Mr. Fromuth stated that the funding for the inundation mapping was received by utilizing the basin state funding of the flood analysis model as a local cost share to leverage an additional agreement with the Corps of Engineers to not only supply some additional money for the modeling, but get some federal funding to do the flood inundation mapping. Jason Miller said they are still finalizing exactly what areas the mapping was going to cover, but they expect it will be a good portion of the main stem to include from Trenton up to the Water Gap and then from above the Water Gap up to Port Jervis. They have not finalized those areas yet, and that will depend on availability and adequacy of topographic data.

The list of actions that the subgroup and different agencies have discussed going forward includes the following:

- DRBC staff will send a list of potential data fields for the precipitation and stream gage inventory to each data collection entity, request comments, and develop a final list. (FW-1.1, FW-2)
- DRBC will request updated stream and precipitation gage information from the members and compile the spreadsheets. (FW-1.1, FW-2)
- All members will provide inputs on recommended additional river forecast points to George McKillop, National Weather Service. The list will be compiled by NWS and routed to members for comments. (FW- 7)
- National Weather Service will request input from MARFC on Pennsylvania stream gages where rating curves require extension and provide this information to USGS-Pennsylvania. (FW-3)
- USGS-New York will provide DRBC with a list of stream gages where flood proofing is required. (FW-4)
- National Weather Service will provide members with critical headwater areas specific locations for implementation of site specific flash flood warning model. (FW-6)
- National Weather Service will obtain details on the provision of bracketed forecasts based on uncertainty for river flood crests. (FW-8)
- National Weather Service and Corps-Philadelphia District will confer on details to insure that Corps produced flood inundation maps are compatible with National Weather Service requirements for AHPS posting. (FW-9)
- DRBC staff will review demonstration gage details as implemented by USGS- New York and evaluate establishing such gages in the lower Delaware Basin. Potential locations for high water mark postings will also be evaluated. (FW-11) Tom Suro said they have two demonstration gages that are interactive right now; one in downtown Albany and one down at West Point Military Academy.

Mr. Fromuth said this is not a comprehensive list, but includes some initial steps for implementing the task force recommendations for flood warning.

G. Overview/Status Report on Delaware River Mapping Projects

Ms. Tessieri reported on current mapping initiatives in NJ, PA and NY.

New Jersey: The NJDEP has set aside \$1,000,000 to begin the preparation of new floodplain delineations and associated mapping for the main stem of the Delaware River (Trenton to Port Jervis). On May 16, 2006, the NJDEP executed a collaborative agreement with FEMA in order to leverage state funding with the current federal Flood Map Modernization Program resources. Over the last year, a working group has formed including the Corps, USGS-NJ, USGS-NY, FEMA Region II and III, DRBC, Medina Consultants and other consultants involved with the map modernization work.

Concurrence was recently reached on the development of updated hydrologic information (discharges for various flood frequencies) for the Delaware River. This new hydrology will be incorporated into the hydraulic modeling for the new mapping. These results will be used for the entire stretch of the Delaware River from Callicoon to Trenton.

Due to the differences in elevations shown in recent cross sections surveyed by Medina Consultants and the cross sections used in the previous USACE HEC-2 model, approximately 350 new cross sections will be performed by Medina Consultants along the Delaware River from Trenton north to the New York State line. These sections will include structures. The cross sections are currently being collected. Following the collection of cross sections, Medina Consultants will run new hydraulic modeling for the new mapping.

Updated topography will be used in the new mapping. County-wide LIDAR Hunterdon County has been flown and is currently being processed. In Mercer, elevation data is being obtained from the Delaware Valley Regional Planning Commission (DVRPC). LIDAR will be flown for areas of Warren and Sussex

counties that were not covered by the New Jersey Highlands Council LIDAR. LIDAR collected by the New Jersey Highlands Council will be merged with this new data to provide complete topography for the study area. Warren and Sussex Counties will have no new detailed studies other than for the Delaware River.

Due to FEMA's Map Modernization Schedule, the Mercer and Hunterdon County DFIRM (Digital Flood Insurance Rate Map) submissions will not be able to wait for the new cross sections, hydrology and hydraulics to be completed. As a temporary measure, the DFIRMs for these counties will use Pennsylvania's water surface profiles from the COE 1984 study for the Mercer and Hunterdon Countywide DFIRMs. Current maps in these counties are based on the Anderson-Nichols study released in 1973.

Once the new cross sections, hydrology and hydraulics to be completed, the DFIRMs will be updated to incorporate the new study through a LOMR (Letter of Map Revision) or a Physical Map Revision (PMR). The new cross sections, hydrology and hydraulics should be completed in time to be included with the Warren and Sussex County Preliminary DFIRM submissions.

Pennsylvania: Several projects initiated after the June, 2006 floods are currently being finalized including: Evaluation of hydraulic modeling of higher frequency flood elevations (10- & 50-yr) using newly revised hydrology on the Delaware River; Revisions to hydraulic modeling in Lower Mt Bethel Township, Northampton County; Re-evaluation of Flood Flow Estimates by USGS Regional Regression. These 3 projects are in final review and final processing and should be widely available soon.

Pennsylvania is getting statewide LIDAR with flights starting at the western part of the state and progressing east. The eastern part of the state (the Eastern/Delaware River counties) is planned to be collected in 2008 and delivered by Spring 2009.

New York State: In response to the June 2006 flood, FEMA Region 2 is conducting a flood hazard analysis of the flooding sources identified below in the Delaware River Basin in New York State. The scope of the effort includes: LiDAR acquisition, field survey of structure and wet sections, hydrologic and hydraulic modeling, and the development of flood recovery maps. As of the beginning of August, the LiDAR has been flown, field surveys are underway, and the hydrologic analysis is being finalized.

Ms. Tessieri reported that NYC DEP has new dam break inundation mapping downstream of the reservoirs. Mr. Moyle said his understanding of the NYC dam inundation maps is that New York State has them, but they have not yet been accepted or released to the public.

H. Presentation of Model Simulations for the Upper Delaware River Basin Flooding of June 2006

(Ted Rodgers and/or Peter Ahnert, National Weather Service)

Ted Rodgers presented findings from recent reservoir simulations in the Upper Delaware relating to the flood of June 2006. A similar report was conducted previously regarding the April 2005 flood. The purpose for these reports was to look at a few "what if" scenarios for initial conditions prior to the June flood and determine what kind of results could then have been expected at some of their forecast points downstream. Results for various void scenarios for only Cannonsville and Pepacton reservoirs were displayed.

Mr. Rodgers reported that the existence of Cannonsville and Pepacton Reservoirs reduced flood crests from Port Jervis to Trenton anywhere from 0.6 to 1.3 feet. These results show that, even though they spilled, the Cannonsville and Pepacton reservoirs had a beneficial effect downstream by lowering flood crests during both of these events. When reservoirs were prevented from spilling in the model, crest reductions ranged from 2.0 ft at Fishs Eddy, to 10.3 ft at Hale Eddy, to 5.8 ft for the main stem at Barryville. Results of the simulations can be found on-line at:

http://www.state.nj.us/drbc/Flood_Website/NWSmodelsimsJune06flood.htm

Elaine Reichart commented that if the simulations were going to show a no reservoir scenario downstream at Trenton, then the simulation showing a no spill scenario should similarly be extended. Another individual asked if they could go back and quantify the size of a void that would have been

necessary for a no spill scenario. It was stated that the NWS would be able to quantify this and revise the report. *An updated version of the report showing crest reductions for all the void scenarios tested is now online.*

Mr. Ahnert said that although state-of-the-art of precipitation forecasting can tell you that there is going to be very heavy rain tomorrow in the Upper Delaware Basin and that some places are going to get four inches, some places might get ten inches, it cannot tell you exactly where that ten inch strike will be within a 50 mile range. The problem is that if the reservoirs were to be voided due to a forecast, and that forecast is off, the reservoirs might not refill and in fact the heavy rain might fall outside of the basin. In addition, if they were to start releasing from the reservoirs early because of a forecast and that heavy rain moves 50 miles downstream, now you might have added to the flood downstream by releasing that water.

Someone asked a question about voids being pre-released prior to a storm. Mr. Rodgers said the amount of time it takes to release from these reservoirs is significant. Five billion gallons in one would take roughly ten days and that is assuming it does not rain in those ten days. During the April 2005 event, Pepacton was operating on the 50% snow water equivalent void and the water level was down, but there was a rain event March 28-29 which filled that couple of feet of void. Then a couple of days later, the big rain came and the void that was there had been wiped out by the previous rain.

I. Status Report on Delaware River Basin Flood Analysis Model

Mr. Fromuth gave a presentation to update everyone on what progress has been made to date. The National Weather Service, U.S. Geological Survey, and Corps of Engineers are each involved in the development of the flood modeling analysis tool. The USGS Pennsylvania District led the development of an interagency proposal that included additional funds and in-kind services to supplement the state funding. Agreements with the DRBC were finalized in June of 2007 and work began in August.

The model will

- Allow the evaluation of the effects of reservoir voids and release operations on downstream flood crests for different storm events.
- Provide an analytical tool for the development of flood operating plans for reservoirs.
- Provide for the ability to examine, modify, and improve the model and datasets as new information and technology become available.
- Provide a means of demonstrating the operations of reservoirs and basin hydrology.

The model will not:

- Be run in a real time mode to direct operational changes during flood events. The model is intended to be a planning tool.
- Be used for real time flood forecasting which is provided by the National Weather Service
- Make tradeoffs or policy determinations regarding the use of reservoir storage for flood mitigation. The model will be used to inform policy decision making.

The model components include Rainfall/Runoff Modeling - PRMS Model developed by the USGS, Reservoir Modeling using HEC-ResSim developed by the Corps of Engineers and Flow Routing using the Lag and K Method which is used for the existing NWS Flood Forecasting Model.

The scheduled date of completion is January 2009. There will be a pilot demonstration in the morning session of the December 12, 2007 DRBC Commission meeting. It is planned that the presentation will demonstrate function only for the upper basin, rather than the present calibrated model results.

J. Opportunity for Public and Interested Party Comments

Jane Stanley, with the Nurture Nature Foundation, asked if they could be put on the agenda for the next meeting. They have a project underway to start a flood museum and resource center in Easton, PA. They

would like to involve every agency that is represented on this committee with the project in some way. The museum is moving forward and she'd like to make more information known at the next meeting. The museum's website is: www.floodmuseum.org.

Mr. Fromuth reported that two members of the committee that have served for many years, Walt Nickelsberg of the National Weather Service and Bob Schopp of USGS, are about ready to retire. They were recognized for their support of this committee since its inception and also all the work they have done to advance flood warning within their respective agencies.

K. Next Meeting

The next meeting was scheduled for Wednesday, November 7, 2007 at 10:00 am.

**FLOOD ADVISORY COMMITTEE
ATTENDANCE**

August 22, 2007

NAME	AGENCY
AHNERT, Peter	National Weather Service (NWS)
DEANGELO, Jim	Baker Engineering
FITZPATRICK, Dan	PA Department of Community and Economic Development
COLVIN, Mary	Federal Emergency Management Agency (FEMA)
FORNEY, Dave	National Park Service – Upper Delaware Scenic and Recreational River
FROMUTH, Rick	DRBC
GABRIELSEN, Peter	NWS – Eastern Region Headquarters
GARLITS, Skip	Stakeholder
HAINLY, Bob	United States Geological Survey (USGS) - PA
JANOWICZ, Jon	FEMA Region III
JESPERSON, Eric	PA Mapping and Geographic Information Consortium
MICHELIN, Virginia	Morris County
MILLER, Jason	US Army Corps of Engineers
MOYLE, John	NJ Department of Environmental Protection (NJ DEP)
NOBLE, Mary Ellen	Delaware RiverKeeper Network
NICKELSBURG, Walt	NWS
O’HARA, Patrick	NWS
PLACER, Katrina	Mercer County Planning
REICHART, Elaine	Aquatic Conservation Unlimited
RODGERS, Ted	NWS – Mid Atlantic River Forecast Center
RUPERT, Clarke	DRBC
SAFAFAR, Senobar	NYC Department of Environmental Protection
SCHOPP, Bob	USGS
SCORDATO, John	NJ DEP
STANLEY, Jane	Nurture Nature Foundation
STEIGERWALD, Scott	PA Department of Environmental Protection (PA DEP)
TESSIERI, Laura	DRBC
TUDOR, Bob	DRBC
WILLIAMS, David	Pennsylvania Emergency Management Agency – Eastern Area
YAGECIC, John	DRBC