

## **Delaware River Basin Interstate Flood Mitigation Task Force**

### **Draft Report Comments and Response**

The Interstate Flood Mitigation Task Force was formed last fall at the direction of the Governors of Delaware, New Jersey, New York and Pennsylvania, who also serve as Delaware River Basin Commissioners.

The draft report and recommendations now appear on the commission's web site at [http://www.nj.gov/drbc/Flood\\_Website/taskforce/index.htm](http://www.nj.gov/drbc/Flood_Website/taskforce/index.htm).

In addition to testimony at public meetings in each state, written comments will be accepted until March 7, 2007, and should be mailed to: Robert Tudor, Deputy Executive Director, DRBC, P.O. Box 7360, 25 State Police Drive, West Trenton, NJ 08628 or emailed to [Robert.Tudor@drbc.state.nj.us](mailto:Robert.Tudor@drbc.state.nj.us).

#### **Public Meeting Schedule:**

Thursday, February 8, 2007 – Sen. Charles D. Cook County Office Building  
Delhi, NY

Thursday, February 15, 2007– Carvel State Office Building  
Wilmington, DE

Tuesday, February 20, 2007 – William Antheil Elementary School  
Ewing, NJ

Tuesday, February 27, 2007 – Hugel Science Center, Lafayette College  
Easton, PA



# **DELAWARE RIVER BASIN FLOOD MITIGATION TASK FORCE**

## **PRELIMINARY ACTION PLAN PUBLIC REVIEW DRAFT**

JANUARY 30, 2007

Cover photos courtesy of:  
Gary Paulachok, United States Geological Survey  
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National Aeronautics and Space Administration  
New York City Department of Environmental Protection  
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Delaware River Basin Commission

## Executive Summary

In September 2004, April 2005 and June 2006, three major floods caused devastation along the main stem Delaware River, repeatedly damaging property and disrupting tens of thousands of lives. These were the worst floods to occur on the main stem since the flood of record in 1955. The last occurrence of three main stem floods of comparable magnitude within so short a time span was in the period from 1902 to 1904.<sup>1</sup>

Thankfully, during the 2004, 2005 and 2006 floods, advances in flood warning technology minimized loss of life. Nine deaths are attributed to these events.<sup>2</sup> Though tragic, this number compares favorably with the approximately 100 lives lost during the record event of a half-century ago. However, encroachments into the flood plain by the built environment have created new threats – including the potential for greater damage to property and the environment.

Over the past fifty years, businesses, industries, residences, roads, and utilities, including public and private water supply and wastewater facilities, have been constructed within the floodplain. One consequence is that our communities and built infrastructure are affected more than ever by floods. Another is that the environmental impacts of flooding are more serious than in the past. Flood waters infiltrate wastewater systems, introducing industrial waste and raw or partially treated sewage into waterways. In addition, debris and contaminants from the built environment are washed downstream, where they may not only cause additional damage to people and property, but potentially may settle on the river bottom and cause ecological harm for years to come. In addition, development within the floodplain is accompanied by diminished vegetation, which leaves waterways more susceptible to stream bank erosion, particularly during floods. Severe erosion can convert a narrow, deep, clear and cold channel that is resistant to flooding, into a wide, shallow, turbid and warm one that is increasingly flood prone.

Reducing flood loss is a responsibility shared by federal, interstate, state, and local agencies throughout our region. Recognizing this, the governors of the four basin states – Delaware, New Jersey, New York and Pennsylvania – directed the executive director of the Delaware River Basin Commission, Carol Collier, to convene an interstate task force to develop a set of recommended measures for mitigating and alleviating flooding impacts along the Delaware and its tributaries. In their September 2006 letter to Ms. Collier, the governors wrote, “Individually, the Basin states can move forward with policies and regulations to reduce and mitigate the impacts of flooding, but we believe that through coordinated effort on a regional basis, we can do more to reduce flood loss within the Basin than we could accomplish acting separately, on our own. The Delaware River Basin Commission is the obvious vehicle for developing flood loss reduction and flood mitigation plans that cannot be accomplished by any single state or local government but that require a holistic watershed

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<sup>1</sup> Serious floods along the main stem occurred on March 2, 1902, October 11, 1903 and March 8, 1904. Flood stages on the main stem at Trenton during these events reached 23.6 feet (7<sup>th</sup> highest on record), 28.5 feet (3<sup>rd</sup> highest on record) and 30.6 feet (highest ever), respectively. The 1904 event was caused by an ice jam at Trenton.

<sup>2</sup> Mortality data was obtained from the National Weather Service (NWS/NOAA) National Climatic Data Center (NCDC) Storm Event database.

approach. As much as any time since the Commission was created in 1961, now seems an appropriate moment for coordinated action through the DRBC.”

The Delaware River Basin Interstate Flood Mitigation Task Force was assembled in October 2006. It is comprised of 32 members from a geographically diverse array of government agencies (legislative, executive, federal, state and local), private businesses and not-for-profit organizations. The group has identified a total of 44 consensus recommendations for a proactive, sustainable, and systematic approach to flood damage reduction. The recommendations are based upon a set of six guiding principles concerning floodplain restoration, floodplain protection, institutional and individual preparedness, local stormwater management and engineering standards, and the use of structural and non-structural measures. They are grouped within six priority management areas as follows:

- Reservoir operations: The task force calls for an evaluation of reservoir spill and discharge mitigation programs, along with development of a flood analysis model to evaluate alternative reservoir operating plans and to assess the downstream effect of reservoir voids of different magnitudes. The model would facilitate coordination of reservoir operating plans for flood mitigation objectives.
- Structural and non-structural measures: The task force calls on policy-makers to assign higher priority and allocate greater funding to the acquisition of property and elevation and/or flood-proofing of structures within the floodplain. It offers strong support for state dam safety programs and recommends improved maintenance of other flood control structures. An evaluation of mitigation measures basinwide by the U.S. Army Corps of Engineers is recommended, to include an analysis of the ecological, economic, long-term operation and maintenance, and social costs and benefits of all flood mitigation options.
- Stormwater management: The task force calls for minimizing stormwater runoff from new development and reducing runoff from existing development through the implementation of watershed stormwater management plans; long-term maintenance of stormwater infrastructure, including detention ponds, inlets, catch basins, outfalls and other devices; the use of non-structural stormwater management options; expanded incentives for achieving stormwater management objectives; stronger enforcement of stormwater management regulations; and development of stream restoration and debris removal guidelines.
- Floodplain mapping: Because the Delaware River is an interstate waterway, coordination is needed for development of a seamless floodplain map that is consistent throughout the basin. The task force calls upon the states to coordinate flood study and mapping updates, incorporate existing and planned development and residual risk zones into new maps, and re-define and re-map the floodway along the main stem and its tributaries.
- Floodplain regulation: Currently, the regulations applicable to floodplain areas in the Delaware Basin vary widely. The task force urges that existing floodplain regulations be catalogued, evaluated and updated and that uniform regulation of floodplains within the basin be established. It further recommends that a coordinated education, outreach and training program about floodplain protection and regulation be undertaken, that a flood hazard disclosure requirement be

imposed, that a repetitive loss reduction strategy be adopted and that riparian zones be defined in accordance with uniform standards basinwide.

- Flood warning: The task force recommends that development of an advanced basinwide flood warning system proceed in a coordinated fashion. The existing system is comprised of flow gages, flash flood and flood forecasting, and education and outreach components. It is coordinated and funded by multiple organizations at the federal, state and local levels. The task force urges that the river gage network and its forecast points be evaluated, that rating tables be extended, that gages be flood hardened (i.e., able to withstand larger flood events), that flash flood forecasting be improved, that flood inundation maps be developed, that up-to-date Dam Emergency Action Plans be maintained, that a coordinated flood education and outreach program be developed and that a comprehensive program be undertaken to address coastal flooding.

The Interstate Flood Mitigation Task Force has concluded that no set of mitigation measures will entirely eliminate flooding along the Delaware River or its tributaries. However, the members believe that a combination of measures will improve the basin's resiliency – its capacity to prepare for and recover from flooding – in the future.

## MEMBERS OF THE FLOOD MITIGATION TASK FORCE

Rad Anderson	Chief, Planning Section, New York State Emergency Management Office (NYSEMO)
Dave Burd	Emergency Management Coordinator, City of Lambertville, NJ
John Comey	Executive Assistant to Director, Pennsylvania Emergency Management Agency (PEMA)
James Eisel	Supervisor of Delaware County, NY
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Hank Gruber	Chief of Basin Planning, U.S. Army Corps of Engineers
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Dirk C. Hofman	Retired, Cornelis Associates
Marcia Karrow	Hunterdon and Warren Counties, NJ State Assemblywoman
Richard A. Martinkovic	Commissioner of Public Safety, Sullivan County, NY
Frank McCartney	Executive Director, Delaware River Joint Toll Bridge Commission (DRJTBC)
Patricia McSparran	Director, Bureau of Waterways Engineering, Pennsylvania Department of Environmental Protection (PADEP)
Paul Miller	State Hazard Mitigation Officer, New Jersey Office of Emergency Management (NJOEM)
John Moyle	Manager, Bureau of Dam Safety and Flood Control, New Jersey Department of Environmental Protection (NJDEP)
Thomas Murphy	Water Resource Manager, New York City Department of Environmental Protection (NYCDEP)
Bill Nechamen	Chief, Flood Plain Management, New York State Department of Environmental Conservation (NYSDEC)
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Geoff Reese	Assistant Director, Lehigh Valley Planning Commission
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William Winslade	Manager of Yardley Borough, Pennsylvania
Delaware River Basin Congressional Task Force	Congressman Castle, Fitzpatrick, Gerlach, Hinchey and Holt

**Thank you and acknowledgements:**

The Delaware River Basin Flood Mitigation Task Force would like to thank the following individuals for their input, assistance and expertise throughout Flood Mitigation Plan development process:

**Task Force Facilitation:** Robert Tudor (Deputy Executive Director, DRBC)

**Committee Chairs and Co-chairs:**

Richard Fromuth (Operations Branch Head, DRBC)-Reservoir Operations; David Dech (Planning Director, Warren County, NJ) and Scott Steigerwald (Special Projects Coordinator, PADEP Bureau of Waterways Engineering)-Structural and Non-Structural Mitigation Measures; Amy Shallcross (Senior Watershed Protection Specialist, NJ Water Supply Authority)-Stormwater Management; Joseph Ruggeri (Engineer, NJDEP Dam Safety and Flood Control)- Floodplain Mapping; Vince Mazzei (Engineer, NJDEP Land Use Regulation)- Floodplain Regulations; Peter Gabrielsen (Chief Hydrologic Services, NOAA/NWS) and Laura Tessieri (Water Resources Engineer, DRBC)- Flood Warning

**Committee Members and Task Force Contributors:**

Peter Ahnert (Hydrologist, NOAA/NWS), Shannon Blankinship (Executive Assistant, Delaware Riverkeeper Network), Orly Amir (Legislative Assistant, US Rep Rush Holt); Christine Bethke (Project Manager, USACE – Philadelphia); Sandy Blick (Engineer, NJDEP Division of Watershed Management); Phil Chase (Upper Delaware Council); Carol Collier (Executive Director, DRBC); Mary Colvin (Chief Community Mitigation Programs Branch, FEMA Region II); Paul Cronce (Office of Emergency Management, City of Lambertville); Jeff Darwak (Constituent Services Rep, US Rep. Fitzpatrick); Bill Douglass (Executive Director, Upper Delaware Council); Scott Duell (Natural Hazards Program Specialist, FEMA Region II), Dan Fitzpatrick (Program Specialist, PA DCED); Dean Frazier (Commissioner of Watershed Affairs, Delaware County, NY); Edward (Skip) Garlits (Stakeholder); William Gast (Chief Water Planning Engineer, PADEP); Gene Gruber (Mitigation Division Director, FEMA/DHS Region III); Robert Homovich (Supervisor Town of Colchester, NY); Jim Mershon (On-site Coordinator, Merrill Creek Reservoir); Joe Miri (Chief, NJDEP Office of Water Policy); Robert Molzahn (President, Water Resources Association of the Delaware River Basin); Ken Murin, (Environmental Program Mgr., PADEP Bureau of Waterways Engineering); Mary Ellen Noble (Associate Director, Delaware Riverkeeper Network); Gary Petrewski (Sr. Engineer, Peaking Power, PPL Electric Utilities Corporation); Dave Rosenblatt (Administrator Engineering/Construction, NJDEP); Ted Rodgers (Hydrologist, NOAA/NWS); Paul Rush (Bureau of Water Supply, NYC DEP); Linda Spalinski (Delaware River Joint Toll Bridge Commission); Glen Stevens (Chief Hydrology, Hydraulics & Coastal Engineering, USACE – Philadelphia);

**Delaware River Basin Commission Support Staff:**

Sherry Garrahan, Clarke Rupert, Donna Woolf, Susan Owens



RECOMMENDATIONS  
OF THE  
DELAWARE RIVER BASIN  
INTERSTATE FLOOD MITIGATION  
TASK FORCE

Reducing flood loss is a responsibility shared by federal, interstate, state, and local agencies throughout our region. Recognizing this, the governors of the four basin states – Delaware, New Jersey, New York and Pennsylvania – directed the executive director of the Delaware River Basin Commission, Carol Collier, to convene an interstate task force to develop a set of recommended measures for mitigating and alleviating flooding impacts along the Delaware and its tributaries.

The Delaware River Basin Interstate Flood Task Force convened on four occasions; October 25, 2006, November 11, 2006, December 6, 2006 and December 20, 2006. The Task Force is comprised of 32 members representing a broad array of governmental (both legislative and executive), private sector as well as non-profit interests. In addition to the Task Force members, many more individuals participated in creation of this preliminary action plan through the formation of focus area work groups. The Task Force has identified the following 44 recommendations to effectuate a more proactive, sustainable and systematic approach to flood damage reduction in the basin:

### **Reservoir Operations**

- R-1 Develop a Flood Analysis Modeling Tool
- R-2 Develop an Interoperable Reservoir Operating Plan
- R-3 Evaluate Discharge Mitigation Programs for Reservoirs
- R-4 Evaluate Snowpack Based Storage Management
- R-5 Publish Information on the Basin's Existing Major Impoundments
- R-6 Evaluate Availability and Accuracy of Data

### **Structural and Non-Structural Measures**

- S-1 Fund a Comprehensive Flood Mitigation Study of the Entire Delaware River Basin
- S-2 Prioritize the Completion of State and Local Hazard Mitigation Plans
- S-3 Ensure Financial Assistance for State, County and Municipal Flood Mitigation Projects
- S-4 Provide Training for Local Officials to Maximize Use of Available Mitigation Funding
- S-5 Create Partnering Programs for Floodplain Acquisition
- S-6 Establish Funding Priority Areas for Acquisition, Elevation, and Floodproofing
- S-7 Maintenance of Flood Control Structures, excluding dams
- S-8 Dam Safety Programs
- S-9 Evaluate and Coordinate Flood Mitigation Plans and Strategies

## **Stormwater**

- SM-1 Develop Regional and Tributary-Based Watershed Stormwater Management Plans
- SM-2 Long-term Management of Stormwater Best Management Practices (BMPs) and Infrastructure
- SM-3 Non-Structural Stormwater Management for New and Redevelopment
- SM-4 Enforcement of Existing Stormwater Standards and Regulations
- SM-5 Provide and Promote Incentives to Reduce Stormwater Runoff from Existing Development
- SM-6 Develop and Maintain Precipitation and Streamflow Data
- SM-7 Stream Restoration and Debris Removal Guidelines
- SM-8 Stormwater Management through Special Protection Waters Designation

## **Floodplain Mapping**

- FM-1 Coordinated Flood Study and Mapping Updates
- FM-2 Incorporate Existing and Future Planned Development and Residual Risk Zones into New Mapping
- FM-3 Redefine and Remap the Floodway along the Delaware River Main Stem and its Tributaries

## **Floodplain Regulations**

- FR-1 Catalog, Evaluate and Update Existing Floodplain Regulations in the Basin
- FR-2 Develop a Coordinated Education, Outreach and Training Program
- FR-3 Repetitive Loss Reduction Strategy for the Basin
- FR-4 Flood Hazard Disclosure Requirements
- FR-5 Standardized Riparian Corridors

## **Flood Warning**

- FW-1 Inventory and Evaluate Precipitation Observing Stations in the Basin
- FW-2 Evaluate River Gage Network
- FW-3 Extend Rating Tables

- FW-4 Flood Harden Gages at Key Forecast Locations
- FW-5 Improve Flash Flood Forecasting
- FW-6 Develop an Implementation Plan for the NWS Site Specific Model
- FW-7 Evaluate River Forecast Points
- FW-8 Provide River Forecasts with Confidence Level Information
- FW-9 Develop Flood Forecast Inundation Maps
- FW-10 Maintain Up-to-Date High Hazard Dam Emergency Action Plan (EAP) Documents
- FW-11 Establish a Coordinated Flood Warning Education and Outreach Program
- FW-12 Develop a Flood Coordination Mechanism
- FW-13 Coastal Flooding Impacts

# Delaware River Basin



New York

Pennsylvania

New Jersey

Maryland

Delaware