

RECENT AND ONGOING FLOOD STUDIES AND PROJECTS IN THE DELAWARE RIVER BASIN (Working DRAFT)

Last Updated: October 10, 2008

Project	Lead Agency/ Partners	Purpose/ Deliverables	Time Frame	Cost
RESERVOIR OPERATIONS				
Delaware River Basin Flood Analysis Model Project	<p>Lead: U.S. Geological Survey, Pennsylvania & New Jersey Water Science Centers and National Research Program (USGS)</p> <p>Partners: U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) and Philadelphia District (Corps); National Weather Service, Mid-Atlantic River Forecast Center (NWS); Delaware River Basin Commission, Water Resources Management Branch, Operations Section (DRBC)</p>	<p>Flood hydrographs at existing NWS flood forecast points</p> <p>Reservoir stage, storage and discharge hydrographs</p> <p>For different storm events, the model will be capable of evaluating effects of reservoir voids and release operations on downstream flood crests.</p> <p>The model will provide a tool to inform the development of discharge mitigation plans for 15 basin reservoirs.</p> <p>The model <u>will not</u> determine policy regarding the use of reservoir storage for flood mitigation. Model results will be among the considerations that inform reservoir management and policy decisions.</p>	January 2009 - Presentation of model and product deliverables	<p>Four basin states committed a combined total of \$500,000.</p> <p>Additional funds and in-kind services from USGS, NWS and USACE totaling \$265,000.</p> <p>Total Project Cost = \$765,000.</p>
Flexible Flow Management Program (FFMP) for the New York City Delaware Basin Reservoirs	<p>Lead: Decree Parties to the Delaware River Basin Commission</p>	<p>The proposed amendments of the FFMP are consistent with provisions of an agreement dated September 26, 2007 among the parties to the 1954 Supreme Court decree in New Jersey v. New York – the states of Delaware, New Jersey, and New York, the Commonwealth of Pennsylvania and the City of New York.</p> <p>The FFMP provides a comprehensive framework for addressing multiple flow management objectives, including water supply, drought mitigation, spill mitigation, protection of the tailwaters fishery, a diverse array of habitat needs in the main stem Delaware River, the Delaware Estuary and Delaware Bay, recreational uses and salinity repulsion.</p>	<p>Implemented in 2007;</p> <p>Amendments to DRBC Water Code pending final rule adoption.</p>	
Spill Mitigation Program at Lake Wallenpaupack	<p>Lead: PPL Corporation</p>	<p>The PPL spill mitigation program for Lake Wallenpaupack is based on snowpack and the 48 hour precipitation forecast.</p>	Implemented in 2007	
Snowpack Monitors in Neversink and Pepacton Watersheds	<p>Lead: New York City Department of Environmental Protection (NYCDEP)</p> <p>Partners: National Weather Service Delaware River Basin Commission</p>	<p>In 2006, DRBC received a grant to buy two automatic snowpack monitors for installation in the NYCDEP watershed. In 2008, NYCDEP installed electronic load type sensors; the first in the Neversink watershed and the second in the Pepacton watershed. NYCDEP is responsible for maintenance and telemetry.</p> <p>Snowpack based storage management is a type of discharge mitigation that has previously been implemented in the Delaware River Basin. Such programs are based on the concept that a percentage of the water equivalent in the snow pack on the watershed above a reservoir will eventually flow into the reservoir and can be counted as storage. Automatic monitors will be used to supplement manual snow surveys working towards easier, quicker and more accurate snowpack data collection.</p>	Installed in 2008	\$22,000 grant to DRBC through NOAA's automated flood warning system grant program
STRUCTURAL AND NON-STRUCTURAL				
Multi-jurisdictional Use and Management of Water Resources for the Delaware River Basin, NY, PA, NJ and DE	<p>Lead: U.S. Army Corps of Engineers Philadelphia District</p> <p>Partner: Delaware River Basin Commission</p>	<p>TASK 2 - Multi-jurisdictional approach to flood mitigation</p> <ul style="list-style-type: none"> -Identify flood prone areas within the Delaware Basin using FEMA claims data -Develop a Potential Solution Matrix, including all structural and non-structural solutions -Apply the Potential Solution Matrix to identified damage centers (New Hope, Yardley, Easton and Upper Makefield PA; Lambertville, Stockton, Harmony and Belvidere NJ; and Rockland and Colchester, NY). -Update stage-frequency relationships for main stem Delaware gages plus selected tributaries so they reflect recent floods. Coordinated with other agencies (i.e. USGS, FEMA Region II and III, DRBC) to ensure protocol consistency. -Apply available historic Corps reports and analyses to assemble stage-damage data for major damage centers for the Delaware River main stem, and selected tributaries as identified in J2000, apply available damage and stage estimates from recent storm events in the Delaware River Basin and express damage data at a current price level. -Conduct Structure Inventory at the identified damage centers with ground/first floor and zero damage elevations for all commercial/residential and industrial structures within the 100 year floodplain 	Draft Plan was made available for agency review in June 2008	<p>Federally funded, Total Project Cost = \$1,000,000</p> <p>Task 2 = \$490,000. (\$475,000 to USACE; \$15,000 to DRBC)</p>
Delaware River Basin Comprehensive New York, New Jersey, Pennsylvania, Maryland and Delaware: Interim Feasibility Study for New Jersey	<p>Lead: U.S. Army Corps of Engineers Philadelphia District</p> <p>Partner: New Jersey Department of Environmental Protection (NJDEP)</p>	<p>The NJDEP has committed funding to be cost shared with the US Army Corps of Engineers (USACE) for the preparation of a feasibility study to evaluate possible flood mitigation options, including flood-proofing and removing or relocating structures within the floodplain of the Delaware River Basin.</p> <p>The Feasibility Cost Share Agreement between NJDEP and the USACE was signed on July 27, 2006. The NJDEP and USACE have met with Delaware River town residents and local officials to perform visual inspections and gather information on the 2004, 2005 and 2006 flooding. NJ continues to provide cost-share funding and the USACE continues to move forward on the study.</p>	Feasibility Report expected to be submitted by Philadelphia District, USACE in 2013	Total Project Cost: \$3.9 Million (Cost shared 50/50 by USACE and NJDEP)

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A Multi-Jurisdictional Flood Mitigation Plan for Municipalities in the Non-tidal, New Jersey portion of the Delaware River Basin	Lead: Delaware River Basin Commission Partners: New Jersey Department of Environmental Protection (NJDEP), New Jersey Office of Emergency Management (NJOEM), Mercer, Hunterdon, Warren and Sussex Counties in New Jersey	Serves to increase the coordination and cooperation among intergovernmental entities in carrying out flood mitigation; Demonstrates a firm local commitment to flood mitigation; Leverages a wide array of funding opportunities to implement actions; and complies with federal legislative requirements for local mitigation plans to meet eligibility requirements for mitigation grant funding. 43 municipalities in Mercer, Hunterdon, Warren & Sussex Counties participated. Deliverables included: -Basin-scale mitigation strategies and priorities -Compendium of local mitigation strategies -Analysis of flood insurance claims and repetitive loss properties -Flood hazard identification and vulnerability assessment	June 2008 - Draft Plan delivered to NJOEM August 2008 - Draft Plan forwarded to FEMA for review	FEMA Flood Mitigation Assistance Grant, Total Project Cost = \$130,550 Federal Share: \$97,695.07 Non-federal Share (NJDEP, DRBC): \$32,854.93
South Jersey Levee Inventory	Lead: USDA Natural Resources Conservation Service Partners: NJ Department of Environmental Protection US Army Corps of Engineers Delaware River Basin Commission Delaware Estuary Levee Organization	Purpose: To Identify and characterize the location, extent and condition of existing levees/dikes in South Jersey and the amount, type and extent of vulnerability of people and property protected by these levees including agricultural acreages and businesses.	Spring 2010	
Flood Mitigation in Northampton and Lehigh Counties	Lead: Lehigh Valley Planning Commission (LVPC) Partners: Pennsylvania Emergency Management Agency (PEMA) Federal Emergency Management Agency (FEMA) Region III	Northampton and Lehigh Counties received a \$1M in pre-disaster mitigation earmark funding (through FEMA's PDM program, FY-08) for flood mitigation in Northampton and Lehigh Counties. This funding will be used to complete high and medium priority projects, as identified by their Hazard Mitigation Plan.	FY08 Appropriation	\$1 Million
New York State Acquisition Funding	Lead: New York State Department of Communities and Development Partners: New York State Department of Environmental Conservation (NYSDEC)	New York State is providing acquisition funding through the State Department of Communities and Development to buy out homes in flood-prone areas. Sullivan will receive \$4 million; Ulster, Orange and Delaware counties, \$2 million each. Other counties receiving money include: Broome, \$750,000; Chenango, \$750,000; Herkimer, \$750,000; Montgomery, \$750,000; Otsego, \$750,000; Schoharie, \$750,000; and Tioga, \$750,000. To qualify for the program, homes must be primary residences appraised at under \$250,000. Preference would be given to homes that have been flooded twice since April 1, 2004, and are appraised at under \$100,000. The county's emergency management director and a town building official will certify that homes qualify.	2008-2009	\$15.25 Million
New Jersey Blue Acres Program (Acquisition Funding)	Lead: NJDEP Green Acres Program	Governor Corzine signed into law the "Green Acres, Farmland, Blue Acres, and Historic Preservation Bond Act of 2007" which was presented to the voters and approved at the November 2007 election. The bond act will provide \$12M for the state to acquire, for recreation and conservation purposes, lands in the floodway of the Delaware River, Passaic River, and Raritan River, and their respective tributaries, that have been damaged by, or may be prone to incurring damage caused by storm-related flooding or that may buffer or protect lands from such damage.	2008-2009	\$12 Million
Pennsylvania Senate Bill 2- SB2	Lead: Pennsylvania Commonwealth Financing Authority	Governor Rendell signed legislation that will provide \$800 million in funding for water and sewer projects, storm water projects, flood control projects, and high hazard unsafe dam projects. Of that, SB-2 provides at least \$100 million in funding for flood-control projects. The money will be awarded as grants to municipalities and agencies. Of that \$100 million, approximately \$91 million will be for capital flood protection projects, while the balance will be available to increase the number of flood-protection grants awarded to municipalities each year, boost support for stream improvement projects, and complete emergency closure work and rehabilitation projects.	Ongoing, next 3 years	\$100 Million
STORMWATER				
Authorization of Stormwater Utilities	Leads: NJ and PA State Legislature	New Jersey: Creation of Stormwater Utility Systems – S-1166 (Smith/D-17): Committee passed, referred to the Senate Budget and Appropriations Committee. Permits municipalities and counties to finance the creation, operation and maintenance of stormwater utility systems through the imposition of tax on residential and commercial properties. Pennsylvania: Completing work on storm water legislation that will entirely revamp the authority and responsibility for planning and implementing a storm water management system.		

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FLOODPLAIN REGULATIONS				
Updated Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)	Lead: New Jersey Department of Environmental Protection (NJDEP)	The NJ Department of Environmental Protection adopted new Flood Hazard Area Control Act rules (N.J.A.C. 7:13), which incorporate more stringent standards for development in flood hazard areas and riparian zones adjacent to surface waters throughout the State. Some of the provisions of the new rule include: - requiring floor elevations and roadway surfaces to be set at least one foot above the State's flood hazard area design flood elevation (125% of the 100-year flow rate reported by FEMA) in order to provide increased flood protection for buildings and public roadways; - a 0% net-fill requirement that now applies to all non-tidal flood hazard areas of the State; and - expansion of riparian zones to 50, 150 or 300 feet in width along surface waters throughout the State.	Adopted: November 5, 2007	
New York State Residential Building Code (Chapter III, Section R323)	Lead: New York State	As of January, 2008, the NYS Residential Building Code incorporated a 2' freeboard standard in studied flood zones.	January 2008	
Floodplain Regulations Evaluation Subcommittee	Lead: Delaware River Basin Commission Flood Advisory Committee (FAC)	In May 2008, New Jersey and Pennsylvania Commissioners requested that a subcommittee of the FAC be formed to address Task Force Recommendation FR-1: "Catalog, Evaluate and Update Existing Floodplain Regulations in the Basin". The subcommittee is charged to review, catalog and evaluate the similarities and differences in floodplain regulations throughout the Basin. The subcommittee will develop and present recommendations for consideration by the FAC. The FAC will consider the subcommittee recommendations and report the results of their deliberations to the Commission at a regularly scheduled Commission meeting.	Fall 2009	
FLOODPLAIN MAPPING				
Digital Flood Inundation Maps for the Main Stem Delaware	Lead: U.S. Army Corps of Engineers Philadelphia District	The Corps of Engineers will be producing digital flood inundation maps for the main stem Delaware using existing data. Mapping will be available from Trenton, NJ north to Port Jervis, NY, excluding the area of the Delaware Water Gap. These maps will be made available to County Emergency Managers. The online mapping will also be available through the NWS AHPS website at the following gages: Matamoras/Port Jervis, Belvidere, Easton/Phillipsburg, Riegelsville, Frenchtown, Stockton, New Hope/Lambertville and Trenton.	Completion expected: December 2008	Funding for this work was made possible by using the \$500,000 provided by the basin states for the flood analysis model as a local cost share to leverage federal funding.
Updated Hydrologic Information for the Main Stem of the Delaware River	Leads: U.S. Geological Survey, New Jersey & New York Water Science Centers & U.S. Army Corps of Engineers Philadelphia District Partners: U.S. Geological Survey, Pennsylvania Science Centers Federal Emergency Management Agency (FEMA) Region II and Region III Delaware River Basin Commission New Jersey Department of Environmental Protection (NJDEP)	Following the three floods, the flood magnitude and frequency for the eight active streamflow-gaging stations along the main stem Delaware River in New Jersey, New York, and Pennsylvania was updated to include the three recent floods. The updated discharges were developed by Bob Schopp, USGS NJ Water Science Center, and Gary Firda, USGS NY Water Science Center, in consultation with the U.S Army Corps of Engineers Philadelphia District, FEMA Regions II and III, NJDEP-State NFIP Coordinator's Office and DRBC. These updated discharges will be used in future mapping updates. The Delaware River flood frequency report, "Flood magnitude and frequency of the Delaware River in New Jersey, New York, and Pennsylvania: U.S. Geological Survey Open-File Report 2008-1203" was published in 2008 and is now on line at: http://pubs.er.usgs.gov/usgspubs/ofr/ofr20081203 The updated flood-frequency values indicate that the recurrence interval of the September 2004 flood ranged from 20 to 35 years, the recurrence interval of the April 2005 flood ranged from 40 to 70 years, and the recurrence interval of the June 2006 flood ranged from 70 to greater than 100 years. Examination of trends in flood discharges indicate no statistically significant trends in peak flows during the period of record for any of the eight streamflow-gaging stations.	Completed - 2008	
Updated Floodplain Study & Mapping Delineation for New Jersey	Lead: Federal Emergency Management Agency (FEMA) Region II Partners: New Jersey Department of Environmental Protection (NJDEP) Medina Consultants (mapping contractor)	Preparation of new floodplain delineations and associated mapping for 126 miles along the main stem of the Delaware River on the NJ side. Over 500 surveyed river cross-sections, LiDAR information and the updated hydrology will be incorporated into updated hydraulic modeling for preparation of new floodplain mapping that will be incorporated into Mercer, Hunterdon, Warren and Sussex County DFIRMS (Digital Flood Insurance Rate Maps).	2009	The NJDEP has set aside \$1,000,000. FEMA is contributing an additional \$2,500,000 dollars towards completion of this effort.
Updated Floodplain Study & Mapping Delineation for New York	Lead: Federal Emergency Management Agency (FEMA) Region II	In response to the June 2006 flood, FEMA Region II is conducting a flood hazard analysis of certain streams prone to flooding in the Delaware River Basin in New York State. This includes, but is not limited to, 10 miles of the Beaverkill, 13 miles of Willowemoc Creek, 62 miles of the West Branch, 12 miles of the East Branch and 85 miles of the Delaware River from Hancock to Port Jervis. 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. All survey and LiDAR efforts are scheduled to be completed by August 2008 and the hydraulic HEC-RAS modeling will be commenced in August 2008. Preliminary work maps are scheduled to be ready by December 2008 with the official preliminary mapping to be completed and released in March 2009.	Preliminary - March 2009	

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Updated Floodplain Study & Mapping Delineation for Pennsylvania	Lead: Federal Emergency Management Agency (FEMA) Region III	Evaluation of existing 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		
Collection of High Water Mark Elevations	Lead: U.S. Geological Survey	The appendix of the report, "Flood of April 2-4, 2005, Delaware River Main Stem from Port Jervis, New York, to Cinnaminson, New Jersey" contains detailed information for 156 high-water mark elevations obtained on the main stem of the Delaware River from Port Jervis, New York, to Cinnaminson, New Jersey, for the April 2-4, 2005 flood. The report can be accessed at http://pubs.er.usgs.gov/usgspubs/sir/sir20075067 . These high water marks were compared to existing flood insurance study flood profiles by the Army Corps of Engineers - Philadelphia at the request of FEMA.	Published in 2007	
Analysis of Flood-Magnitude and Flood-Frequency Data for Streamflow-Gaging Stations in the Delaware and North Branch Susquehanna River Basins in Pennsylvania	Lead: U.S. Geological Survey	Updated flood-magnitude and flood-frequency data for streamflow-gaging stations on tributaries in the Delaware and North Branch Susquehanna River Basins were analyzed using data through the 2006 water year to determine if there were any major differences in the flood-discharge data. The report can be accessed at http://pubs.usgs.gov/of/2007/1235/ .	Published in 2007	
Regression Equations for Estimating Flood Flows at Selected Recurrence Intervals for Ungaged Streams in Pennsylvania	Lead: U.S. Geological Survey	Regression equations were developed for estimating flood flows at selected recurrence intervals for ungaged streams in Pennsylvania with drainage areas less than 2,000 square miles. The report can be accessed at http://pubs.usgs.gov/sir/2008/5102/ .	Published in 2008	
FLOOD WARNING				
FY-08 Flood Warning Improvements	Lead: National Weather Service Partners: Delaware River Basin Commission U.S. Geological Survey	With DRBC assistance, and promotion by members of Congress (Sponsors: Dent, Holt Lautenberg, Menendez), \$235,000 in federal funds were directed to NOAA-NWS for work on improved flood warning in the Delaware River Basin. This work includes: Evaluation and improvement of existing precipitation and stream gage networks (NWS) Flood hardening of select gages prioritized (USGS) Implementation of flood inundation mapping into AHPS at flood forecast points (NWS & ACOE) <i>Education and outreach component (DRBC)</i>	2008	\$235,000
Updates to the Streamgaging Network	Lead: Delaware River Joint Toll Bridge Commission Partners: U.S. Geological Survey New Jersey Department of Environmental Protection (NJDEP)	Radar-operated river gages are being installed on DRJTBC bridges. USGS operates and maintains the gages while the DRJTBC is responsible for covering the costs for installation, electricity and telecommunications. The gages record the river readings every 15 minutes and transmit the data hourly via satellite or modem to the USGS. These bridges include Easton, Riegelsville, Frenchtown, Stockton, Lambertville and Washington Crossing.	Began in 2005; all are now installed except for Washington Crossing Bridge	
Updates to the Streamgaging Network	Lead: U.S. Geological Survey Partners: New Jersey Department of Environmental Protection (NJDEP) Pennsylvania Department of Transportation (PennDOT)	To date, major gage repairs and upgrades have been accomplished to the existing gages at the Delaware River at Montague, Riegelsville, and Trenton, as well as, the Lehigh River at Glendon gage. The Beaver Kill at Cooks Falls gage and Delaware River at Barryville were relocated. Real-time data is now available online for USGS stations WBr Delaware R at Stilesville (01425000), EBr Delaware R at Downsville (0141700).		
EDUCATION AND OUTREACH				
The Flood Project of the Nature Nurture Foundation	Lead: Nurture Nature Foundation (NNF)	The Flood Project is a flood museum and resource center that will be located in Easton, PA. It is currently in construction, but will be devoted to educating the public on the causes and effects of floods and how communities can work together to prevent flooding and relieve flood damage. http://www.floodproject.org/		
Association of State Floodplain Managers (ASFPM) State Chapters	Leads: New Jersey Association of Floodplain Management (NJAFM) New York State Floodplain and Stormwater Managers Association (NYSFSWA) PA Chapter Steering Committee	Both NJAFM and NYSFSMA are active in addressing and educating about sound floodplain management. Both chapters support and promote the Certified Floodplain Manager (CFM) certification for local officials and others involved in floodplain management. Pennsylvania is in the process of forming a PA chapter of the Association of State Floodplain Managers (ASFPM).	NJAFM Annual Conference: October 21-22nd, 2008 Cherry Hill, NJ www.njafm.org NYSFSWA Annual Conference: September 22 - 23rd, 2008 Middletown, NY www.ny.floods.org	Nonprofit/Volunteer Organizations
FY-08 Flood Warning Improvements	Lead: Delaware River Basin Commission Partner: National Weather Service	An education and outreach component is planned for a portion of the FY-08 \$235,000 appropriation in federal funds directed to NOAA-NWS. A full day workshop aimed at county emergency managers in the Delaware River Basin is planned for 2009.	FY08 Appropriation	