

Delaware River Basin Flood Warning Enhancements

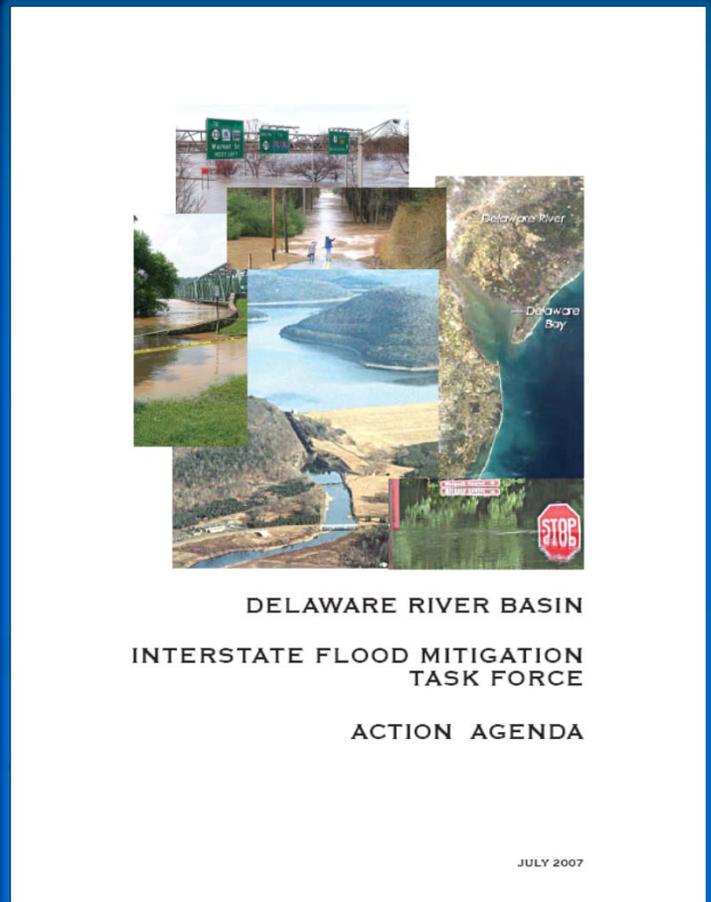


Presented at:
NJ Water Monitoring
Council Meeting
May 30, 2012

Robert Tudor, Deputy Executive Director
Delaware River Basin Commission

DRB Interstate Flood Mitigation Task Force:

- Reservoir Operations
- Structural and Non-Structural
- Stormwater Management
- Floodplain Mapping
- Floodplain Regulations
- Flood Warning



6 Priority Management Areas
45 Recommendations
July 2007

Delaware River Enhanced Flood Warning System

- Goal: To implement the Flood Warning recommendations of the Interstate Flood Mitigation Task Force.
- Supported by the DRB Congressional Task Force. Dollars made available through NOAA grant funding:
 - FY08: \$235,000
 - FY09: \$235,000
 - FY10: \$200,000
- Partners:



**US Army Corps
of Engineers®**



Activities funded through NOAA grant:

- Inventory/evaluate precipitation & stream gage network
- Establish new river forecast points
- Extend rating curves
- Flood harden stream gages at key forecast locations
- Flood warning education & outreach
- Flash flood forecasting improvements
- Develop site specific models for fast responding watersheds
- Flood Inundation Mapping into AHPS

The poster features a blue header with the title "Delaware River Basin Enhanced Flood Warning System". Below the header, there are four main sections: 1) A screenshot of a NOAA web-based forecasting interface showing a map of the Delaware River Basin with a green dot indicating a forecast point. 2) A photograph of a stream gage structure with the text "USGS Stream Gage Montclair, NJ" overlaid. 3) A screenshot of a NOAA forecast graph showing a blue line representing a forecast and a red line representing observed data. 4) Two photographs of flood damage: "Washington Crossing Bridge April 2005" and "Lambertville, N.J. Flooding April 2005".

**Delaware River Basin
Enhanced Flood Warning System**

Washington Crossing Bridge
April 2005

Lambertville, N.J. Flooding
April 2005

**Flood Warning Improvements Made Possible
Through Congressional and NOAA Grant Support
FY2008-2010**

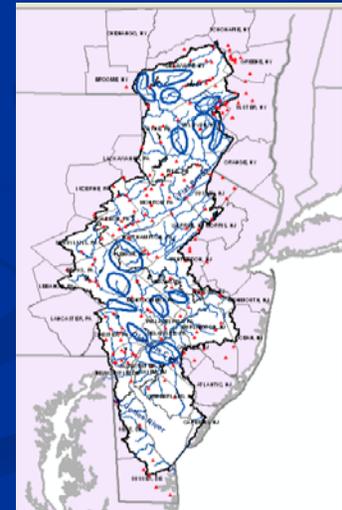
Partners:

For more information: visit www.nj.gov/drbc/programs/flood/warning.html

Inventory and Evaluation of Precipitation and Stream Gage Networks

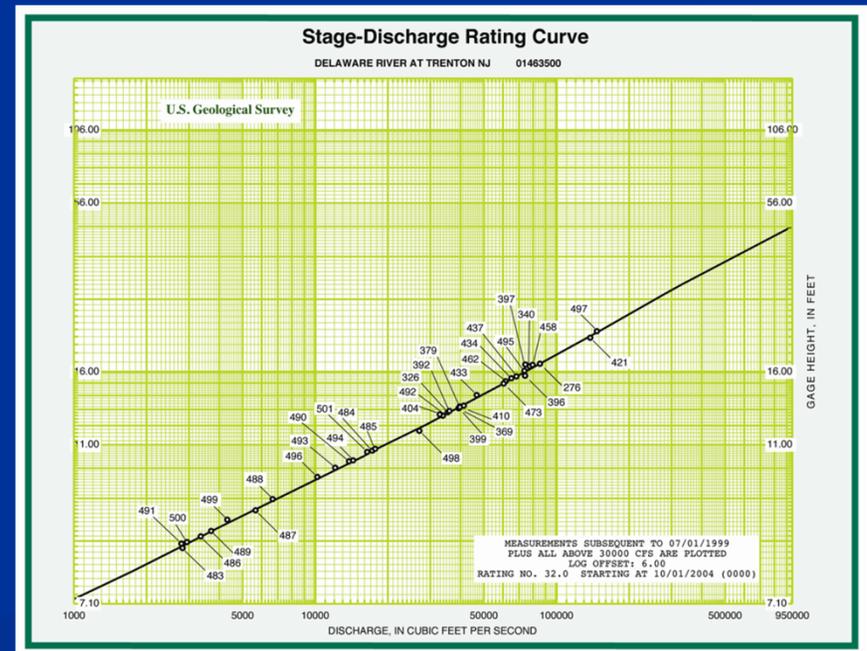
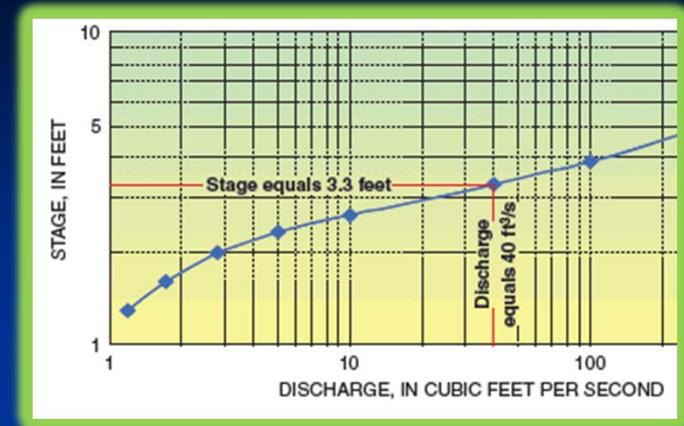
- Updated gage inventories and evaluated necessary improvements to the gage network
- Reports:
 - 2009 Flood Warning Improvement Recommendations for the Delaware River Basin
 - 2011 Detailed Precipitation Network Inventory and Gap Analysis
- New daily forecast points:
 - West Branch Delaware at Walton NY
 - Neversink River at Goddefroy, NY
- Recommendations FW-1, FW-2, FW-7



Extend Rating Curves:

- USGS extended 11 rating curves to 125% of historic peak streamflow for prioritized flood forecast points in the basin.
- Funding still needed for 6 sites in PA
- Recommendation FW-3

01438500 Delaware River at Montague
01440200 Delaware River at Delaware Water Gap
01457500 Delaware River at Riegelsville
01461500 Delaware River at Stockton
01462000 Delaware River at Lambertville
01467000 N Br Rancocas Creek at Pemberton
01472000 Schuylkill River at Pottstown
01470500 Schuylkill River at Berne
01481500 Brandywine Creek at Wilmington
01465200 Neshaminy Creek near Penns Park
01432110 Lackawaxen River at Rowland



(8 rating extensions performed in NY with alternate funding)

Gage Hardening:

- Flood hardened, raised and reinforced 7 streamflow gaging stations above historic flood levels
- Recommendation FW-4



Delaware River above Lackawaxen at Barryville

Gages hardened with NOAA/NWS grant funds:

- 01428500 Delaware River above Lackawaxen at Barryville
- 01427510 Delaware River at Callicoon
- 01436690 Neversink River at Bridgeville
- 01417500 E. Br Delaware River at Harvard
- 01413500 E. Br Delaware River at Margaretville
- 01423000 W. Br Delaware River at Walton
- 01420500 Beaverkill at Cooks Falls

Gages hardened using alternate sources of funding:

- 01432160 Delaware River at Barryville
- 01440200 Delaware River at Delaware Water Gap
- 01457500 Delaware River at Riegelsville
- 01463500 Delaware River at Trenton



Delaware River at Callicoon

Photo credit: Tom Suro, USGS

Education and Outreach:

Flood Warning User Forums Delaware River Basin

September 21, 2010 • Easton, PA
September 22, 2010 • Lambertville, NJ
September 28, 2010 • Narrowsburg, NY

Invited: County and Local Emergency Managers
Time: 8:30 am – 3:30 pm
Cost: FREE
Continental Breakfast and Lunch Provided



Washington Crossing Bridge, June 2006



This is an opportunity to learn about the latest flood warning advancements and offer feedback to the National Weather Service (NWS) and the U.S. Geological Survey (USGS). A similar agenda will be presented at each Forum.

Agenda Topics to Include:

- ◊ Flood Warning Improvements
- ◊ Online Tools for Emergency Managers
- ◊ Current/Future NWS Forecast Products
- ◊ USGS Stream Gages and WaterAlert
- ◊ River Forecasting – How it Works
- ◊ Flash Flood Potential Index
- ◊ Flood Inundation Mapping Tool
- ◊ Nurture Nature's Flood Awareness and Safety Campaign
- ◊ Audience Feedback/ Recommendations

September 21st
Grand Eastonian Suites Hotel
140 Northampton Street
Easton, PA 18042

September 22nd
Inn at Lambertville Station
11 Bridge Street
Lambertville, NJ 08530

September 28th
Tusten Town Hall
210 Bridge Street
Narrowsburg, NY 12764

Reserve your attendance! Please RSVP (name, jurisdiction & date) to Laura Tessieri, DRBC at (609) 883-9500 x304 or Laura.Tessieri@drbc.state.nj.us



Forums funded through Congressional and NOAA grant support.



Lambertville, NJ Forum

- Over 130 county and local emergency management officials attended the 3 Flood Warning User Forums of 2010
- Discussed latest in flood warning advancements, available online tools, and forecast products
- Recommendation FW-11



Narrowsburg, NY Forum

Flash Flood Forecasting Improvements

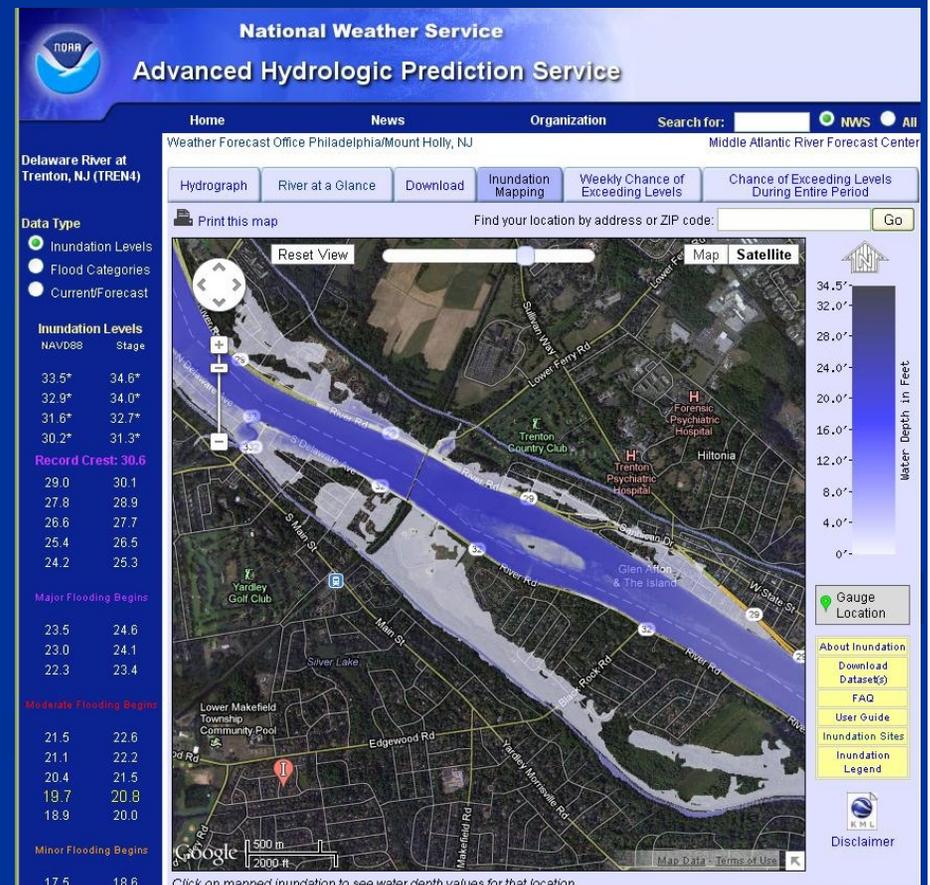
- Site-specific model (DHM-TF) for fast responding watersheds was installed and is being evaluated by WFO Binghamton.
- Should allow more accurate flash flood warnings for the upper basin. (increased lead time & reduction in size of warning)
- Binghamton and Philadelphia WFOs developed flash flood potential indexes (FFPI)
- FW-5, FW-6



Photo credit: Mike Schaffner, USGS

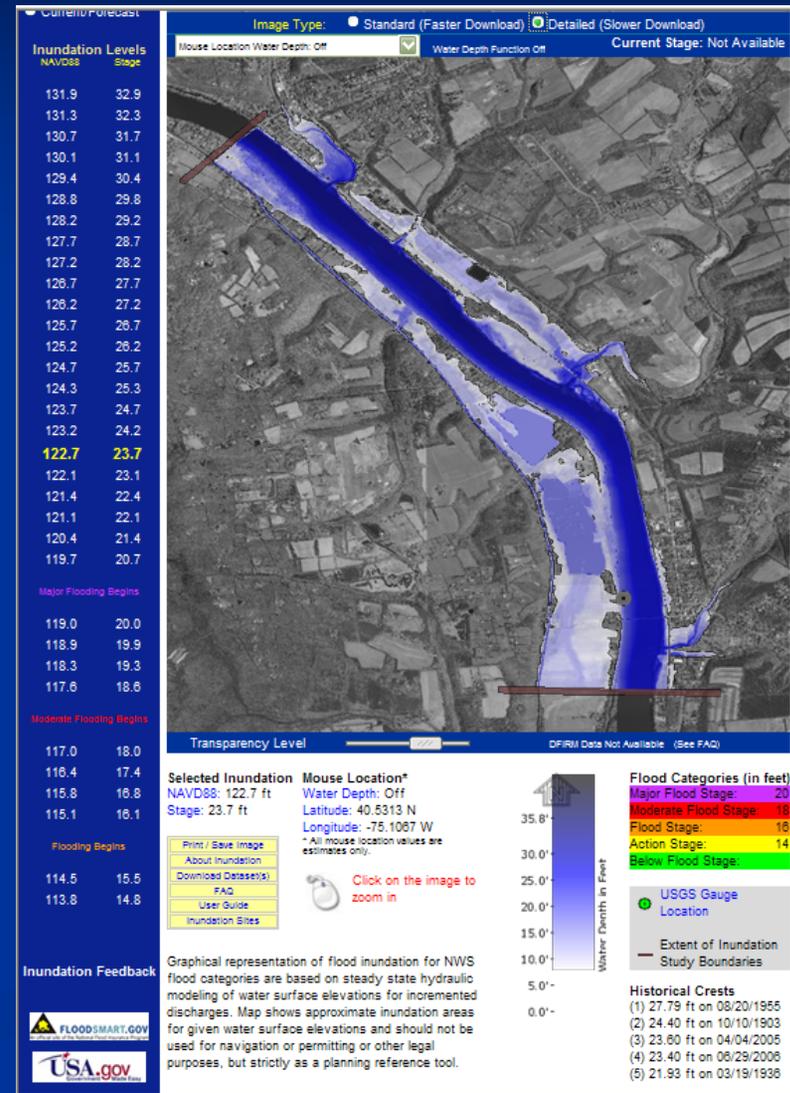
Inundation Mapping

- Flood Inundation Maps prepared for 9 NWS River Forecast locations along the Delaware River main stem.
- Maps provide information on the spatial extent and depth of flood waters.
- U.S. Army Corps of Engineers, Philadelphia District developed mapping. NWS provides the mapping online through the Advanced Hydrologic Prediction Service (AHPS).
- Recommendation FW-9



Potential Mapping Uses:

- Further Public Awareness of Risk Areas
- Better Understanding of Historical Events
- Land Use Planning
- Emergency Management Planning



Future Work:

- As funds are allocated, the Delaware River Basin Enhanced Flood Warning System's project partners will continue to work together to implement the flood warning recommendations of the Task Force.
- Ongoing efforts will ensure that the existing flood warning system is not only maintained, but utilizes technological advancements.