

Flood Event of 3/6/2011 - 3/18/2011

Brandywine

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Chadds Ford	9.00	3/11/2011	11.88	11,600	Moderate	Christina	Brandywine Creek	Delaware	Delaware
Wilmington	16.50	3/11/2011	17.34	16,100	Minor	Christina	Brandywine Creek	New Castle	New Castle

Delaware

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Cooks Falls	10.00	3/11/2011	13.07	19,300	Minor	Delaware	Beaver Kill	Delaware	Delaware
Cooks Falls	10.00	3/7/2011	11.37	13,600	Minor	Delaware	Beaver Kill	Delaware	Delaware
Fishs Eddy	13.00	3/11/2011	13.34	29,700	Minor	Delaware	Delaware River	Delaware	Delaware
Minisink Hills	10.00	3/11/2011	10.47	12,100	Minor	Brodhead	Brodhead Creek	Monroe	Monroe
Shoemakers	6.00	3/11/2011	6.90	4,850	Minor	Bush Kill	Bush Kill	Monroe	Cambria
Shoemakers	6.00	3/7/2011	6.04	3,820	Minor	Bush Kill	Bush Kill	Monroe	Cambria
Walton	9.50	3/11/2011	12.25	12,100	Minor	Delaware	West Branch Delaware River	Delaware	Delaware
Walton	9.50	3/6/2011	11.78	10,900	Minor	Delaware	West Branch Delaware River	Delaware	Delaware

James

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Bremo Bluff	19.00	3/11/2011	21.50	-9,999	Minor	James	James River	Fluvanna	Fluvanna

Bremo Bluff	19.00	3/8/2011	19.00	-9,999	Minor	James	James River	Fluvanna	Fluvanna
Palmyra	17.00	3/11/2011	17.79	20,400	Minor	James	Rivanna River	Fluvanna	Fluvanna
Richmond	12.00	3/12/2011	14.78	64,400	Minor	James	James River	Henrico	Independent City
Richmond	12.00	3/8/2011	12.69	47,100	Minor	James	James River	Henrico	Independent City

Juniata

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Shirleysburg	10.00	3/11/2011	13.43	11,700	Moderate	Juniata	Aughwick Creek	Huntingdon	Huntingdon
Spruce Creek	8.00	3/11/2011	8.45	6,500	Minor	Juniata	Little Juniata River	Huntingdon	Huntingdon
Williamsburg	12.00	3/11/2011	13.77	9,470	Moderate	Juniata	Frankstown Branch Juniata River	Blair	Blair

Lehigh

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Bethlehem	16.00	3/11/2011	17.17	46,800	Minor	Lehigh	Lehigh River	Lehigh	Northampton
Lehighton	10.00	3/11/2011	12.95	24,300	Moderate	Lehigh	Lehigh River	Carbon	Carbon
Walnutport	8.00	3/11/2011	12.72	42,500	Moderate	Lehigh	Lehigh River	Northampton	Northampton

Main Stem Delaware

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Delaware Water Gap	21.00	3/12/2011	22.88	-9,999	Minor	Main Stem Delaware	Delaware River	Warren	Monroe
Easton (Phillipsburg, NJ)	22.00	3/12/2011	26.12	-9,999	Minor	Main Stem Delaware	Delaware River	Warren	Northampton

Frenchtown	16.00	3/12/2011	17.21	-9,999	Minor	Main Stem Delaware	Delaware River	Hunterdon	Hunterdon
New Hope (Lambertville, NJ)	13.00	3/12/2011	13.07	-9,999	Minor	Main Stem Delaware	Delaware River	Hunterdon	Bucks
Riegelsville	22.00	3/7/2011	22.35	-9,999	Minor	Main Stem Delaware	Delaware River	Warren	Bucks
Riegelsville	22.00	3/12/2011	25.20	-9,999	Minor	Main Stem Delaware	Delaware River	Warren	Bucks
Stockton	18.00	3/12/2011	19.14	-9,999	Minor	Main Stem Delaware	Delaware River	Hunterdon	Hunterdon
Trenton	20.00	3/12/2011	20.59	147,000	Minor	Main Stem Delaware	Delaware River	Mercer	Mercer

Main Stem Susquehanna

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Bloomsburg	19.00	3/12/2011	22.58	180,000	Moderate	Upper Main Stem Susquehanna	Susquehanna River	Columbia	Columbia
Camp Hill	7.00	3/7/2011	7.60	2,850	Minor	Yellow Breeches	Yellow Breeches Creek	Cumberland	Cumberland
Camp Hill	7.00	3/11/2011	10.11	4,800	Moderate	Yellow Breeches	Yellow Breeches Creek	Cumberland	Cumberland
Conowingo	23.50	3/12/2011	27.79	487,000	Moderate	Lower Main Stem Susquehanna	Susquehanna River	Harford	Cecil
Conowingo	23.50	3/8/2011	24.17	317,000	Minor	Lower Main Stem Susquehanna	Susquehanna River	Harford	Cecil
Danville	20.00	3/12/2011	22.57	170,000	Minor	Upper Main Stem Susquehanna	Susquehanna River	Montour	Montour
Harper Tavern	9.00	3/11/2011	14.32	16,300	Moderate	Swatara	Swatara Creek	Lebanon	Lebanon
Harper Tavern	9.00	3/7/2011	10.66	9,530	Minor	Swatara	Swatara Creek	Lebanon	Lebanon
Harrisburg	17.00	3/12/2011	20.09	397,000	Moderate	Lower Main Stem Susquehanna	Susquehanna River	Dauphin	Dauphin
Hershey	7.00	3/7/2011	7.44	9,490	Minor	Swatara	Swatara Creek	Dauphin	Dauphin

Hershey	7.00	3/12/2011	10.97	17,200	Moderate	Swatara	Swatara Creek	Dauphin	Dauphin
Hogestown	8.00	3/11/2011	10.04	9,560	Moderate	Conodoguinet	Conodoguinet Creek	Cumberland	Cumberland
Marietta	49.00	3/12/2011	52.86	434,000	Moderate	Lower Main Stem Susquehanna	Susquehanna River	Lancaster	Lancaster
Meshoppen	27.00	3/11/2011	30.23	145,000	Minor	Upper Main Stem Susquehanna	Susquehanna River	Wyoming	Wyoming
Middletown (Old Site)	11.00	3/8/2011	11.20	-9,999	Minor	Lower Main Stem Susquehanna	Swatara Creek	Dauphin	Dauphin
Middletown (Old Site)	11.00	3/13/2011	15.10	-9,999	Moderate	Lower Main Stem Susquehanna	Swatara Creek	Dauphin	Dauphin
Monroeton	15.50	3/11/2011	15.90	12,000	Minor	Upper Main Stem Susquehanna	Towanda Creek	Bradford	Bradford
Penns Creek	8.00	3/11/2011	10.06	9,320	Moderate	Penns Creek	Penns Creek	Snyder	Snyder
Shermans Dale	9.00	3/11/2011	11.82	13,000	Moderate	Lower Main Stem Susquehanna	Sherman Creek	Perry	Perry
Sunbury	24.00	3/12/2011	26.01	308,000	Moderate	Lower Main Stem Susquehanna	Susquehanna River	Snyder	Northumberland
Towanda	16.00	3/12/2011	18.96	124,000	Moderate	Upper Main Stem Susquehanna	Susquehanna River	Bradford	Bradford
Tunkhannock	11.00	3/11/2011	13.06	18,000	Minor	Upper Main Stem Susquehanna	Tunkhannock Creek	Wyoming	Wyoming
Wilkes-Barre	22.00	3/11/2011	27.55	161,000	Moderate	Upper Main Stem Susquehanna	Susquehanna River	Luzerne	Luzerne

Neshaminy

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Langhorne	9.00	3/7/2011	9.71	7,850	Minor	Neshaminy	Neshaminy Creek	Bucks	Bucks
Langhorne	9.00	3/11/2011	9.51	7,540	Minor	Neshaminy	Neshaminy Creek	Bucks	Bucks

North Branch Potomac

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Cumberland	10.00	3/11/2011	10.96	10,800	Minor	North Branch Potomac	Wills Creek	Allegany	Allegany

North Branch Susquehanna

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Bainbridge	15.00	3/12/2011	16.02	24,200	Minor	North Branch Susquehanna	North Branch Susquehanna River	Chenango	Chenango
Binghamton	14.00	3/11/2011	14.39	-9,999	Minor	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome
Chenango Forks	10.00	3/11/2011	10.35	22,300	Minor	North Branch Susquehanna	Chenango River	Broome	Broome
Conklin	12.00	3/11/2011	15.06	33,600	Moderate	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome
Conklin	12.00	3/7/2011	12.34	24,100	Minor	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome
Cortland	8.00	3/11/2011	10.95	7,620	Moderate	North Branch Susquehanna	Tioughnioga River	Cortland	Cortland
Greene	13.00	3/12/2011	13.90	11,000	Minor	North Branch Susquehanna	Chenango River	Chenango	Chenango
Sherburne	8.50	3/11/2011	10.28	7,710	Moderate	North Branch Susquehanna	Chenango River	Chenango	Chenango
Vestal	18.00	3/11/2011	22.26	59,100	Moderate	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome
Vestal	18.00	3/7/2011	18.25	-9,999	Minor	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome
Waverly	11.00	3/11/2011	16.17	76,800	Moderate	North Branch Susquehanna	North Branch Susquehanna River	Bradford	Tioga
Waverly	11.00	3/7/2011	12.59	52,200	Minor	North Branch Susquehanna	North Branch Susquehanna River	Bradford	Tioga
Windsor	17.00	3/7/2011	18.44	-9,999	Minor	North Branch Susquehanna	North Branch Susquehanna River	Broome	Broome

Passaic

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Boonton above Reservoir (Old Site)	5.00	3/7/2011	6.32	3,620	Moderate	Passaic	Rockaway River	Morris	Morris
Boonton above Reservoir (Old Site)	5.00	3/11/2011	7.03	4,700	Major	Passaic	Rockaway River	Morris	Morris
Boonton below Reservoir	5.00	3/11/2011	7.95	4,030	Moderate	Passaic	Rockaway River	Morris	Morris
Boonton below Reservoir	5.00	3/7/2011	6.92	2,940	Minor	Passaic	Rockaway River	Morris	Morris
Chatham	6.00	3/11/2011	6.41	1,620	Minor	Passaic	Passaic River	Morris	Morris
Little Falls	7.00	3/12/2011	11.81	15,600	Major	Passaic	Passaic River	Passaic	Passaic
Lodi	6.00	3/7/2011	8.13	2,870	Major	Passaic	Saddle River	Bergen	Bergen
Lodi	6.00	3/11/2011	9.49	3,560	Major	Passaic	Saddle River	Bergen	Bergen
Macopin Intake Dam	5.50	3/11/2011	7.17	2,790	Moderate	Passaic	Pequannock River	Passaic	Passaic
Macopin Intake Dam	5.50	3/7/2011	5.93	1,580	Minor	Passaic	Pequannock River	Passaic	Passaic
Mahwah	8.00	3/11/2011	10.72	8,180	Moderate	Passaic	Ramapo River	Bergen	Bergen
Mahwah	8.00	3/7/2011	11.16	9,320	Moderate	Passaic	Ramapo River	Bergen	Bergen
Pine Brook	19.00	3/12/2011	22.04	6,260	Major	Passaic	Passaic River	Morris	Morris
Pompton Lakes	11.50	3/7/2011	15.83	8,710	Major	Passaic	Ramapo River	Passaic	Passaic
Pompton Lakes	11.50	3/11/2011	16.72	9,650	Major	Passaic	Ramapo River	Passaic	Passaic
Pompton Plains	16.00	3/11/2011	22.11	17,700	Major	Passaic	Pompton River	Passaic	Morris

Pompton Plains	16.00	3/7/2011	20.32	14,400	Major	Passaic	Pompton River	Passaic	Morris
Wanaque	5.00	3/11/2011	8.04	3,740	Major	Passaic	Wanaque River	Passaic	Passaic

Potomac

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Frederick	15.00	3/7/2011	16.01	16,100	Minor	Potomac	Monocacy River at Jug Bridge	Frederick	Frederick
Frederick	15.00	3/11/2011	16.94	17,800	Minor	Potomac	Monocacy River at Jug Bridge	Frederick	Frederick
Little Falls (Washington DC)	10.00	3/12/2011	10.88	154,000	Minor	Potomac	Potomac River	Montgomery	Montgomery
Martinsburg	10.00	3/11/2011	10.23	2,790	Minor	Potomac	Opequon Creek	Berkeley	Berkeley
Point of Rocks	16.00	3/12/2011	19.92	121,000	Minor	Potomac	Potomac River	Frederick	Frederick
Shepherdstown	15.00	3/12/2011	19.50	-9,999	Moderate	Potomac	Potomac River	Jefferson	Jefferson
Wisconsin Ave, Washington, DC	6.00	3/12/2011	7.81	-9,999	Moderate	Potomac	Potomac River	Dist. of Columbia	Dist. of Columbia

Rappahannock

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Remington	15.00	3/11/2011	16.30	13,500	Minor	Rappahannock	Rappahannock River	Fauquier	Fauquier

Raritan

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Blackwells Mills	9.00	3/11/2011	9.19	4,340	Minor	Raritan	Millstone River	Somerset	Somerset
Blackwells Mills	9.00	3/7/2011	9.88	4,970	Minor	Raritan	Millstone River	Somerset	Somerset

Bound Brook	28.00	3/11/2011	28.49	19,100	Minor	Raritan	Raritan River below Calco Dam	Somerset	Somerset
Bound Brook	28.00	3/7/2011	28.40	18,900	Minor	Raritan	Raritan River below Calco Dam	Somerset	Somerset
Manville	14.00	3/7/2011	14.89	15,300	Minor	Raritan	Raritan River	Somerset	Somerset
Manville	14.00	3/11/2011	14.94	15,300	Minor	Raritan	Raritan River	Somerset	Somerset
Raritan	10.00	3/7/2011	10.01	8,840	Minor	Raritan	North Branch Raritan River	Somerset	Somerset
Stanton	8.00	3/11/2011	9.13	5,530	Minor	Raritan	South Branch Raritan River	Hunterdon	Hunterdon

Schuylkill

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Berne	12.00	3/11/2011	14.20	20,100	Moderate	Schuylkill	Schuylkill River	Berks	Berks
Philadelphia	11.00	3/11/2011	11.03	47,100	Minor	Schuylkill	Schuylkill River	Philadelphia	Philadelphia
Pottstown	13.00	3/11/2011	14.13	26,500	Minor	Schuylkill	Schuylkill River	Montgomery	Montgomery
Reading	13.00	3/11/2011	15.01	26,200	Minor	Schuylkill	Schuylkill River	Berks	Berks

South Branch Potomac

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Springfield	15.00	3/11/2011	15.24	21,900	Minor	South Branch Potomac	South Branch Potomac River	Hampshire	Hampshire

West Branch Susquehanna

Site	Flood Stage	Date	Crest	Flow	Category	Basin	Stream	County of Gage	County of Forecast Point
Beech Creek Station	11.00	3/11/2011	11.59	5,240	Minor	West Branch Susquehanna	Bald Eagle Creek	Clinton	Clinton

Lewisburg	18.00	3/11/2011	20.78	122,000	Minor	West Branch Susquehanna	West Branch Susquehanna River	Northumberland	Union
Loyalsockville	12.00	3/11/2011	12.34	25,900	Minor	West Branch Susquehanna	Loyalsock Creek	Lycoming	Lycoming
Milton	19.00	3/11/2011	21.72	-9,999	Minor	West Branch Susquehanna	West Branch Susquehanna River	Union	Northumberland
Montgomery	20.00	3/11/2011	22.70	-9,999	Minor	West Branch Susquehanna	West Branch Susquehanna River	Lycoming	Lycoming
Muncy	20.00	3/11/2011	22.70	-9,999	Moderate	West Branch Susquehanna	West Branch Susquehanna River	Lycoming	Lycoming

Weather Summary

A slowly retreating anticyclone over the western Atlantic and an approaching anticyclone moving out of western Canada produced a multi-faceted precipitation event over the eastern United States on 5-7 March 2011. A deep moisture plume from the Gulf moved up the Mississippi and Ohio Valleys producing a large area of heavy rainfall. Cold air from the advancing anticyclone turned the western edge of the precipitation to snow. Heavy snow developed on the western side of the frontal zone as a wave developed along the frontal zone. As this wave moved up the front, heavy snow was observed from south-central Pennsylvania into New England. Based on the work of Stuart and Grumm (2009) and Maddox et. al. (1979), this event possessed classic characteristics of a heavy rainfall event. The sharp north-south frontal system and moisture plume had a classic Maddox-synoptic event type look. The Maddox-Synoptic event is characterized by a sharp north-south frontal zone with a poleward surge of deep moisture in the warm in the warm air. This plume of deep moisture is often associated with strong low-level poleward flow. The plume of deep moisture or atmospheric river (AR: Neiman et al 2008) along the coast during this event brought heavy rains to the region. The moisture surge was associated with above normal precipitable water (PW) and above normal v-wind anomalies indicating the potential a meteorologically and climatologically significant event. This event had persistent and anomalous moisture and anomalous southerly and then easterly flow, the moisture and implied convergence are key ingredients or a significant heavy rainfall event. From Rich Grumm NWS WFO-CTP. A slow moving north-south oriented frontal band brought heavy rainfall to the Mid-Atlantic region on 10-11 March 2011. Rainfall exceeded 75 mm over a broad region of eastern Pennsylvania, New Jersey and southern New York State. Coming on the heels the heavy rainfall event of 5-6 March 2011, flooding was observed over most of the same region. Many points in eastern Pennsylvania saw moderate to major flooding. Northern New Jersey saw several points reach the 3rd or 4th highest flood stages on record. This was a classic Maddox-Synoptic type event, with sharp north-south frontal system. The precipitable water and wind anomalies ahead of the frontal boundary were 3 to 4 σ above normal. The 850 hPa moisture flux was typically in the 3

Source: Grumm NWS WFO CTP

Crest Statistics and Flood Information

First flood of 2 that occurred in Mar, 2011

First flood of 18 that occurred in 2011

Number of Floods at MARFC Forecast Points - 113

Number of Floods Cresting in Minor Range - 70

Number of Floods Cresting in Moderate Range - 33

Number of Floods Cresting in Major Range - 10

Number of Floods Cresting in Missing Range - 0