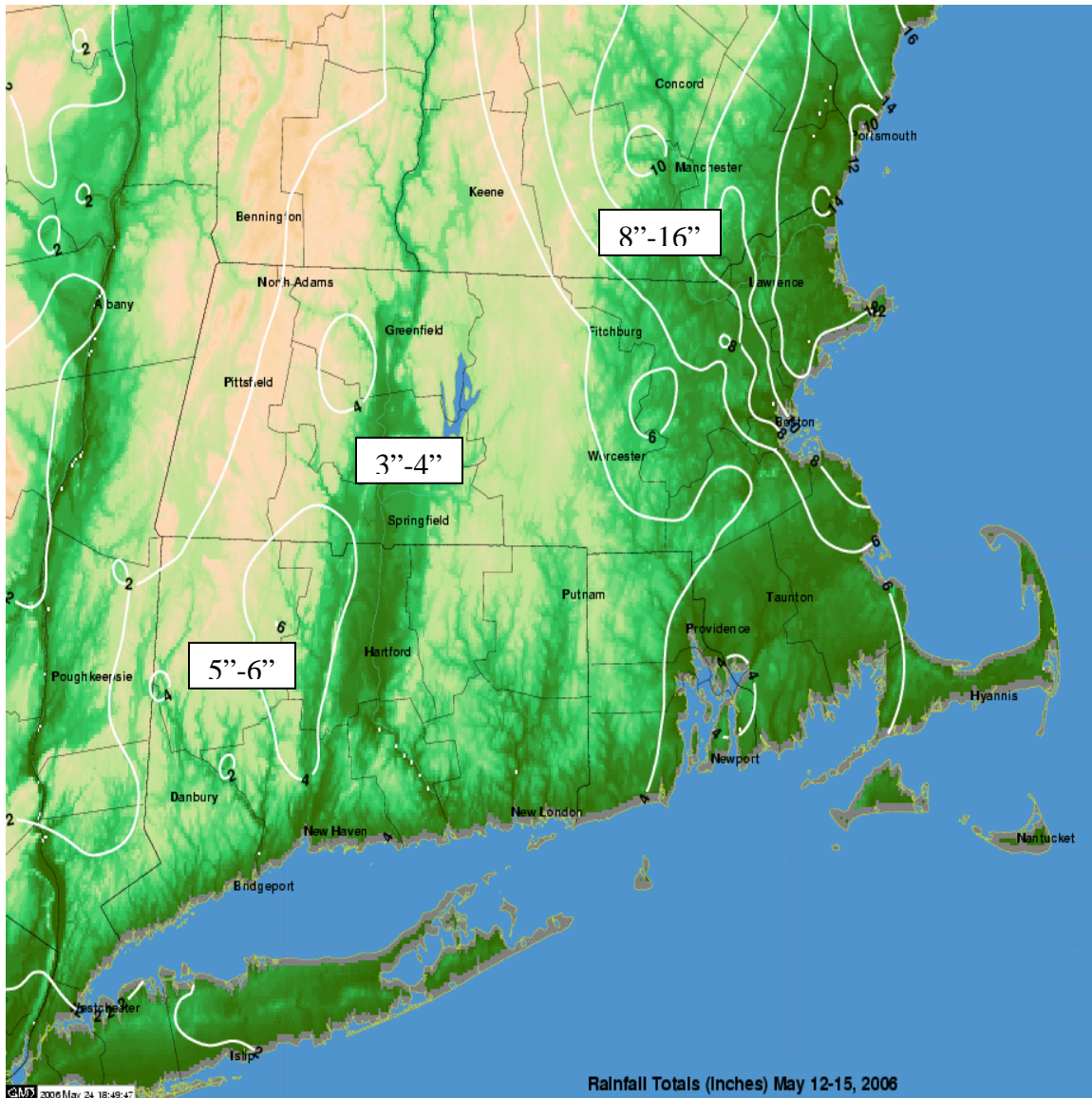


## **Flood of May 2006**

During the period 12 through 15 May 2006, approximately 3 to 16 inches of rainfall fell within New England River basins. The storm was widespread with the most significant rainfall being isolated to the Naugatuck River basin receiving 5 to 6 inches of rainfall, portions of the Connecticut River basin receiving 3 to 4 inches, and the Merrimack River basin receiving between 8 to 16 inches of rainfall. In the Naugatuck River basin, rainfall began on the 12<sup>th</sup> and ended on the 13<sup>th</sup> causing main stem river levels to rise and crest just below flood stage. In the Merrimack River basin, rainfall began on the 13<sup>th</sup> and ended on the 15<sup>th</sup>, with 24-hr rainfall totals exceeding 7-inches, and 4-day rainfall exceeding 10-inches, thereby approximating or exceeding the 100-year frequency rainfall. The Connecticut River basin did not experience significant flooding as main stem rivers and most tributaries did not reach flood stage. The flooding that developed as a result of this storm system turned out to be a historic event within the Merrimack River basin that had not been experienced since the flood of September 1938.

While Corps of Engineers Dams in the Naugatuck River basin began to empty flood storage (20 percent utilized) on the 13<sup>th</sup>, Corps Dams in the Merrimack basin began to cut back releases and store flood runoff. The flood event that materialized within the Merrimack turned out to be a significant event where river levels on some tributaries exceeded flood stage by over 5-feet and main stem Merrimack River by 6 to 7 feet, a condition that hasn't been experienced in over 65-years.

Merrimack River basin rainfall totals ranged from 8 to 12 inches at Corps Dams; however, the lower portion of the basin through eastern Massachusetts experienced the greatest volume of rainfall ranging from 13 to 16 inches over uncontrolled tributaries of the Merrimack River. Rainfall frequency approximated 100-year totals over a 24-hr period and slightly exceeded 100-year frequency extending the data over a 4-day period (4-day 100-year rainfall totals equal to about 10- inches). Recorded peak river levels at



the USGS gage along the Merrimack River at Lowell, MA was 58.9 ft, approximately 7-feet above flood stage, and only 1.6 ft lower than the historic flood of September 1938. In Manchester, NH the recorded peak river level was about 19.9 ft, about 6-feet above flood stage, and about 6-feet lower than the historic September 1938 flood. Analysis shows that had Corps Dams not been constructed, river levels along the Merrimack River at Manchester and Lowell would have exceeded the historic September 1938 levels by 0.3-ft and 0.6-ft, respectively. This flood was the most significant flooding

experienced along the main stem Merrimack River since the Corps Merrimack system of flood control dams began construction in 1941 and ended in 1962.

Based on a cursory review of rainfall data, recorded peak flows, and reports of flooding, it was concluded that the lower, uncontrolled tributaries in Massachusetts experienced some of the most significant flooding along Spicket and Shawsheen Rivers, which empty into the Merrimack River between Lowell and Haverhill. Coastal rivers through Massachusetts, like the Ipswich River, also experienced major flooding. Upstream of Lowell, tributaries such as the Contoocook and Piscataquog Rivers contributed to significant runoff along the Merrimack River within the upper reaches at Concord and Manchester, NH. The area downstream of the Corps Everett Dam along the Piscataquog River in Goffstown, NH experienced the highest river levels since the flood of September 1938. This storm was considered a major flood event within the Merrimack River basin and based on preliminary analysis from the USGS is estimated to be equal to or slightly greater than a 100-year flood event along the Merrimack River



from Manchester downstream to its mouth through Haverhill, as well as along specific tributaries such as the Piscataquog River in Goffstown, NH and the Spicket River in Methuen, MA.

During this runoff event, flood control storage utilized at Corps reservoirs ranged from 45 to 83 percent within the Merrimack River basin. Blackwater Dam reached 83 percent full, peaking 3.0 ft below spillway crest, and is the 2<sup>nd</sup> highest pool stage recorded (April 1987 flood event produced a pool level 1.1-ft higher).

Specific river stage information showing the effectiveness of Corps reservoirs is presented below.

### Effectiveness of Corps of Engineers Dams

Location	D.A. (sq. mi.)	Flood Flow (cfs)	Obs. Peak (cfs)	Natural Peak (cfs)	Reduction %	ft
<b>Merrimack River Basin</b>						
Merrimack R @ Concord, NH	2,385	30,200	35,400	66,300	47	7.7
Merrimack R @ Manchester, NH	3,092	46,060	74,700	106,200	30	6.3
Merrimack R @ Lowell, MA	4,635	48,000	105,750	130,950	19	2.3
Piscataquog R @ Goffstown, NH	202	3,460	10,000	14,250	30	1.8
Contoocook R @ River Hill, NH	760	11,700	10,250	28,550	64	6.0
<b>Naugatuck River Basin</b>						
Naugatuck R @ Beacon Falls, CT	259	8,725	7,340	16,745	56	3.8

### Observed Stream Gage Data

River	Location	Peak Flow	Peak Stage
Merrimack	Concord, NH	35,400	15.12
Merrimack	Manchester, NH	74,800	19.87
Merrimack	Lowell, MA	105,750	58.83
Warner	Davisville, NH	9,300*	12.34*
Piscataquog	Goffstown, NH	10,100*	12.55*
Soucook	Concord, NH	5,660*	14.92*
Lamprey	Newmarket, NH	9,100*	18.2*
Exeter	Brentwood, NH	3,320*	12.0*
Spicket	Methuen, MA	2,520*	12.12*
Concord	Lowell, MA	3,700	8.17
Shawsheen	Wilmington, MA	1,220	8.98
Ipswich	Ipswich, MA	4,600*	10.53*
Aberjona	Winchester, MA	1,270	16.0

\* Flood of Record