

**Table 3. Water Quality Parameters, Laboratory Methods, and Detection Limits**

Parameter	Laboratory	Methodology	Detection Limit (mg/l)	References
Total Ammonia (TNH <sub>3</sub> )	PADEP	Colorimetry	0.020	USEPA 350.1
	CAS*	Colorimetry	0.010	USEPA 350.1R
Dissolved Ammonia (DNH <sub>3</sub> )	PADEP	Block Digest, Colorimetry	0.020	USEPA 350.1
		Block Digest, Colorimetry	0.010	USEPA 350.1R
Total Nitrogen (TN)	PADEP	Persulfate Digestion for TN	0.040	Standard Methods #4500-N <sub>org</sub> -D
Dissolved Nitrogen (DN)	PADEP	Persulfate Digestion	0.040	Standard Methods #4500-N <sub>org</sub> -D
Total Organic Nitrogen (TON)	N/A	TN minus TNH <sub>3</sub> and TNO <sub>x</sub>	N/A	N/A
Dissolved Organic Nitrogen (DON)	N/A	DN minus DNH <sub>3</sub> and DNO <sub>x</sub>	N/A	N/A
Total Kjeldahl Nitrogen (TKN)	CAS*	Block Digest, Flow Injection	0.050	USEPA 351.2
Dissolved Kjeldahl Nitrogen (DKN)	CAS*	Block Digest, Flow Injection	0.050	USEPA 351.2
Total Nitrite plus Nitrate (TNO <sub>x</sub> )	PADEP	Cd-reduction, Colorimetry	0.010	USEPA 353.2
	CAS*	Colorimetric by LACHAT	0.002	USEPA 353.2
Dissolved Nitrite plus Nitrate (DNO <sub>x</sub> )	PADEP	Cd-reduction, Colorimetry	0.010	USEPA 353.2
	CAS*	Colorimetric by LACHAT	0.002	USEPA 353.2
Dissolved Orthophosphate (DOP)	PADEP	Colorimetry	0.010	USEPA 365.1
	CAS*	Colorimetric Determination	0.002	USEPA 365.1
Dissolved Phosphorus (DP)	PADEP	Block Digest, Colorimetry	0.010	USEPA 365.1
	CAS*	Colorimetric Determination	0.002	USEPA 365.1
Total Phosphorus (TP)	PADEP	Persulfate Digest, Colorimetry	0.010	USEPA 365.1
	CAS*	Colorimetric Determination	0.002	USEPA 365.1
Total Organic Carbon (TOC)	PADEP	Combustion/Oxidation	0.50	SM 5310D
	CAS*	Chemical Oxidation	0.05	GEN 415.1/9060
Total Suspended Solids (TSS)	PADEP	Gravimetric	5.0	USGS I-3765
	CAS*	Residue, non-filterable	1.1	SM2540D
Suspended Sediment Fines & Sand	USGS	**		
Suspended Sediment (SS)	SRBC	**		
	USGS	**		

\* Columbia Analytical Services, Rochester, N.Y. (New York sites only)

\*\* TWRI Book 3, Chapter C2 and Book 5, Chapter C1, Laboratory Theory and Methods for Sediment Analysis (Guy and others, 1969)

## PRECIPITATION

Precipitation data were obtained from long-term monitoring stations operated by the U.S. Department of Commerce. The data are published as Climatological Data–Pennsylvania, and as Climatological Data–New York by the National Oceanic and Atmospheric Administration (NOAA) at the National Climatic Data Center in Asheville, North Carolina. Quarterly and annual data from these sources were compiled across the subbasins of the Susquehanna River Basin and are reported in Table 4 for Group A sites.

Precipitation for 2009 was above average at all Group A sites except Lewisburg. Highest departure from the LTM for precipitation was recorded at Conestoga, Pa., with 2.73 inches above the LTM. Highest precipitation months occurred during April to June at all sites, with an average of 2.33 inches above the LTM. January to March had the lowest precipitation amounts with an average of 2.66 inches below the LTM. Lower rainfall during the frozen ground months coupled with higher flows during spring and summer when plant uptake and infiltration are higher likely resulted in below LTM flows for 2009.

**Table 4. Summary of Annual Precipitation for Selected Areas in the Susquehanna River Basin, Calendar Year 2009**

River Location	Season	Calendar Year 2009 Precipitation Inches	Average Long-term Precipitation inches	Departure From Long-term inches
Susquehanna River above Towanda, Pa.	January-March	7.15	7.56	-0.41
	April-June	12.41	10.54	1.87
	July-September	12.56	11.17	1.39
	<u>October-December</u>	8.87	9.14	-0.27
	<b>Yearly Total</b>	40.99	38.41	2.58
Susquehanna River above Danville, Pa.	January-March	6.87	7.74	-0.87
	April-June	12.60	10.69	1.91
	July-September	12.77	11.38	1.39
	<u>October-December</u>	8.89	9.26	-0.37
	<b>Yearly Total</b>	41.13	39.07	2.06
West Branch Susquehanna River above Lewisburg, Pa.	January-March	4.83	8.40	-3.57
	April-June	11.60	11.03	0.57
	July-September	12.66	12.43	0.23
	<u>October-December</u>	10.59	9.66	0.93
	<b>Yearly Total</b>	39.68	41.52	-1.84
Juniata River above Newport, Pa.	January-March	4.29	7.74	-3.45
	April-June	13.46	9.73	3.73
	July-September	9.26	10.05	-0.79
	<u>October-December</u>	11.15	8.97	2.18
	<b>Yearly Total</b>	38.16	36.49	1.67
Susquehanna River above Marietta, Pa.	January-March	5.24	8.21	-2.97
	April-June	13.13	10.73	2.4
	July-September	12.34	11.52	0.82
	<u>October-December</u>	10.58	9.44	1.14
	<b>Yearly Total</b>	41.29	39.90	1.39
Conestoga River above Conestoga, Pa.	January-March	4.26	8.92	-4.66
	April-June	14.23	10.74	3.49
	July-September	15.15	12.59	2.56
	<u>October-December</u>	11.92	10.58	1.34
	<b>Yearly Total</b>	45.56	42.83	2.73

## WATER DISCHARGE

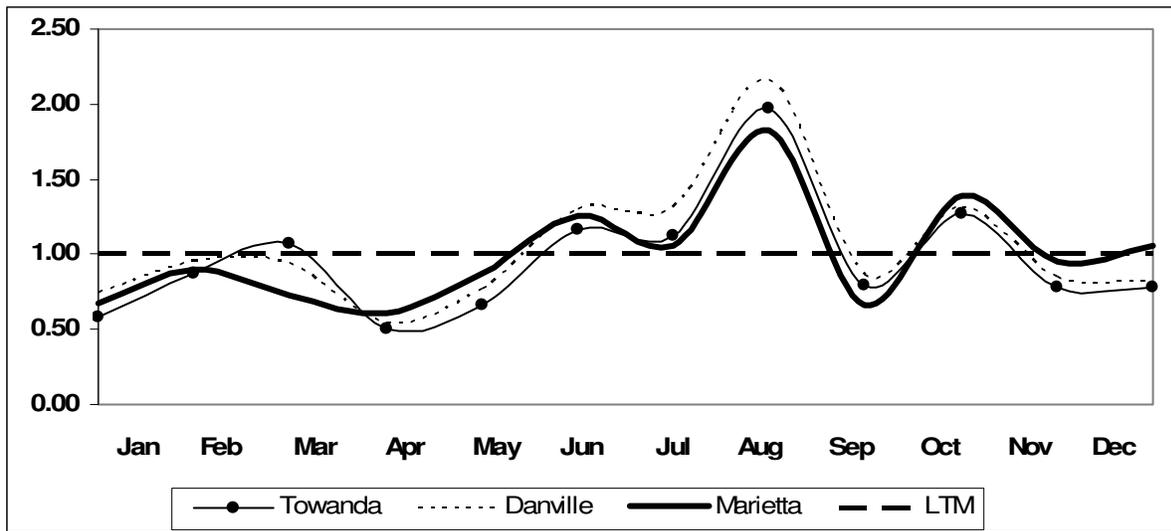
Water discharge data were obtained from the USGS and are listed in Table 5. Monthly water discharge ratios are plotted in Figure 3 for all sites. The water discharge ratio is the actual flow for the time period divided by the LTM for the same time period. Thus, a value of one equals the 2009 flow being the same as the

LTM, while a value of three equals the 2009 flow being three times the volume of the LTM. Discharge values were below the LTM all sites for 2009. Highest departures from the LTM were at Newport and Towanda at 85 percent of LTM. Mainstem sites had above LTM flows during June, August, and October. Flows levels at tributary sites were at or above LTM during August, October, and December.

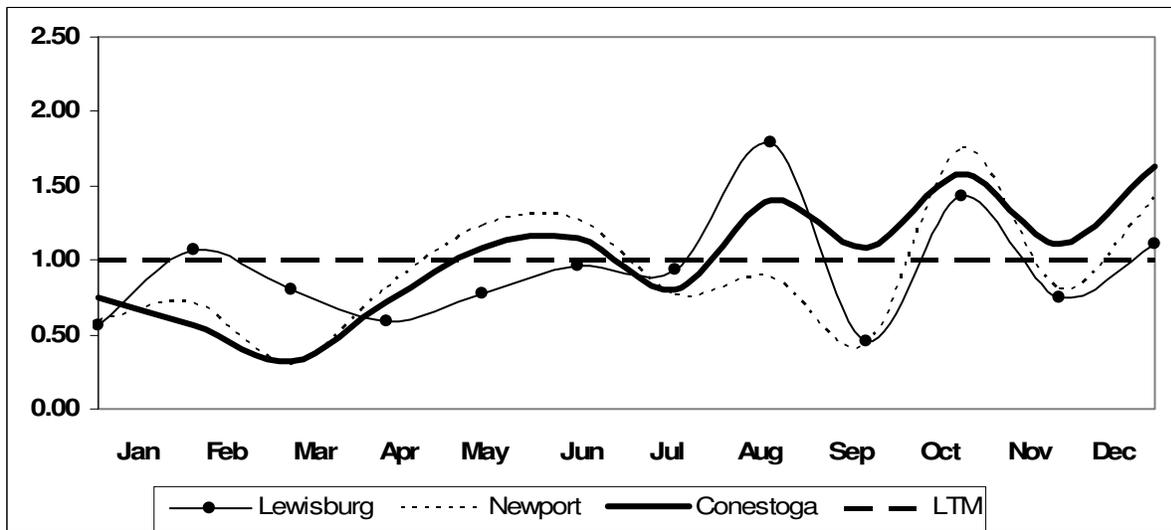
**Table 5. Annual Water Discharge, Calendar Year 2009**

Site	Years of Record	Long-term Annual Mean cfs <sup>1</sup>	2009	
			Mean cfs	Percent of LTM <sup>2</sup>
Towanda	21	11,755	10,031	85
Danville	25	16,492	14,903	90
Lewisburg	25	10,785	9,247	86
Newport	25	4,372	3,705	85
Marietta	23	38,933	34,659	89
Conestoga	25	676	642	95

<sup>1</sup> Cubic feet per second    <sup>2</sup> Long-term mean



A



B

**Figure 3. Discharge Ratios for Long-term Sites, Susquehanna Mainstem Sites (A) and Tributaries (B)**