

Table 1. Land Use Percentages for the Susquehanna River Basin and Selected Tributaries

Site	Urban	Agricultural	Forested	Other
Towanda	4	23	72	1
Danville	9	22	67	2
Lewisburg	4	11	84	1
Newport	6	19	74	1
Marietta	12	37	49	2
Conestoga	21	49	29	1
Susquehanna River Basin	7	22	70	1

NUTRIENT MONITORING SITES

Data were collected from three sites on the Susquehanna River and three major tributaries in the basin. These six sites, selected for long-term monitoring of nutrient and SS transport in the basin, are listed in Table 2, and their general locations are shown in Figure 2.

The Susquehanna River at Towanda, Pa., was selected because it represents the contribution from New York State, although the drainage area does include the Tioga River Watershed in northern Pennsylvania and an area along the northern tier counties of eastern Pennsylvania. The drainage area at Towanda is 7,797 square miles, of which 6,262 square miles lie in New York.

The Susquehanna River at Danville, Pa., has a drainage area of 11,220 square miles, and includes part of northcentral Pennsylvania (the Tioga River Watershed) and much of southcentral New York. Data collected at Danville represent the loadings from tributaries between Towanda and Danville.

Data collected from the West Branch Susquehanna River at Lewisburg, Pa., represent the loadings from this major tributary to the mainstem. The West Branch includes much of northcentral Pennsylvania and has a drainage area of 6,847 square miles. The combined drainage areas above Lewisburg and Danville represent 65.7 percent of the total Susquehanna River Basin.

The Juniata River, a major tributary to the mainstem, includes much of southcentral Pennsylvania, and has a drainage area, above Newport, Pa., of 3,354 square miles. This station represents the loadings from the Juniata River. The combined drainage areas at Danville, Lewisburg, and Newport represent 77.9 percent of the Susquehanna River Basin.

The Susquehanna River at Marietta, Pa., is the southern-most sampling site upstream from the reservoirs on the lower Susquehanna River, and represents the inflow to the reservoirs from its 25,990-square-mile drainage area. This drainage area represents 94.5 percent of the total Susquehanna River Basin.

Table 2. Data Collection Sites and Their Drainage Areas

USGS Identification Number	Original Sites	Short Name	Drainage Area (square mile)
01531500	Susquehanna River at Towanda, Pa.	Towanda	7,797
01540500	Susquehanna River at Danville, Pa.	Danville	11,220
01553500	West Branch Susquehanna River at Lewisburg, Pa.	Lewisburg	6,847
01567000	Juniata River at Newport, Pa.	Newport	3,354
01576000	Susquehanna River at Marietta, Pa.	Marietta	25,990
01576754	Conestoga River at Conestoga, Pa.	Conestoga	470

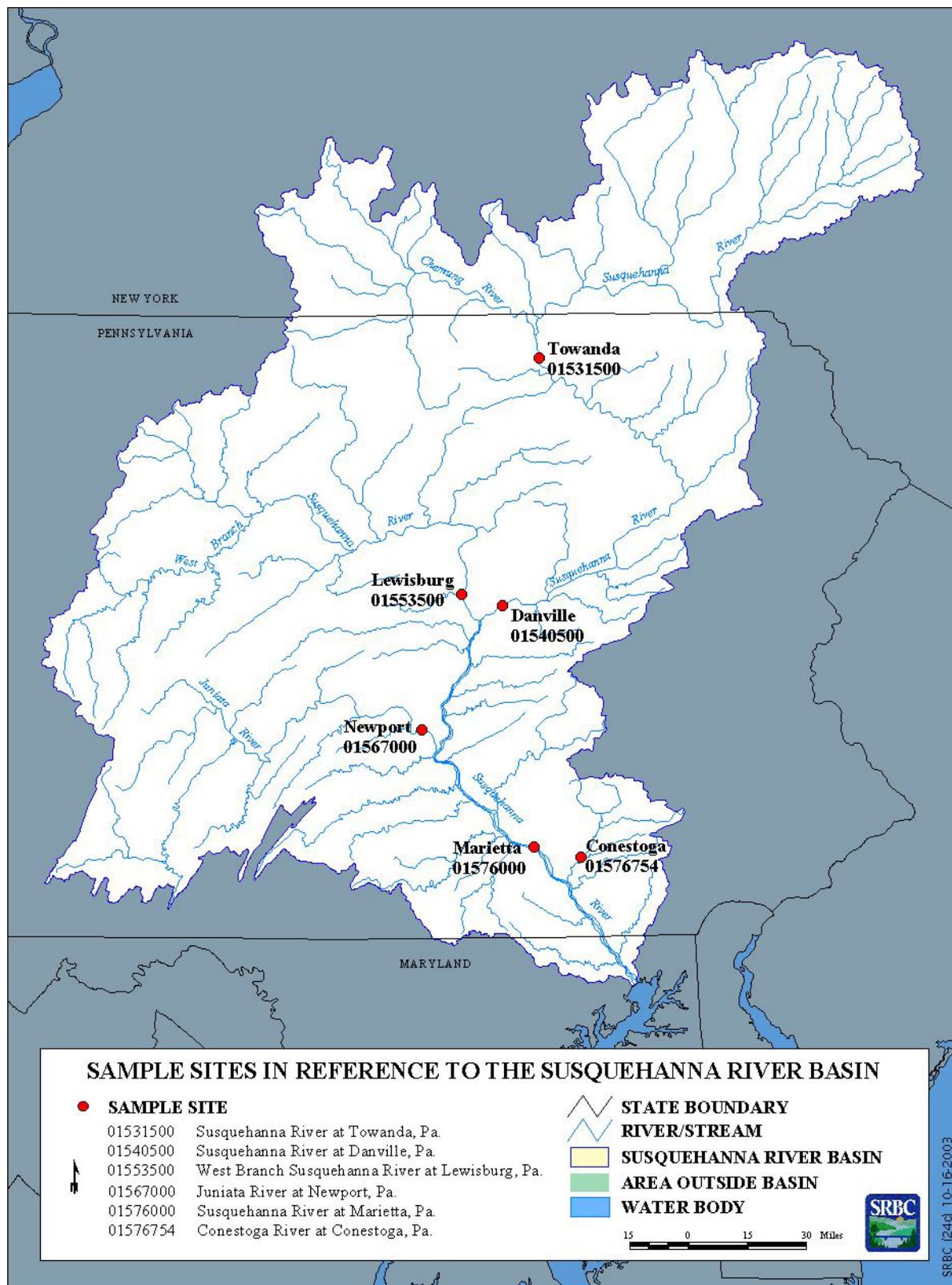


Figure 2. Locations of Sampling Sites within the Susquehanna River Basin

Data collected from the Conestoga River at Conestoga, Pa., provide loadings from a major tributary watershed that is actively farmed and is experiencing an increase in agricultural nutrient management programs. Additionally, this watershed is experiencing an increase in development. The drainage area of this basin above the sampling site is 470 square miles.

SAMPLE COLLECTION AND ANALYSIS

Samples were collected to measure nutrient and SS concentrations during various flows. Generally, two samples were collected per month; one near the twelfth of the month and one during monthly base flow conditions. Additionally, a minimum of four high flow events were sampled, targeting one per season. When possible, a second high flow event was sampled in accordance with spring planting in the basin. During high flow sampling events, samples were collected daily during the rise and fall of the hydrograph. The goal was to gather a minimum of three samples on the rise and three samples on the fall with one sample as close to peak flow as possible. Sampling continued until flows returned to prestorm levels. All low flow and random samples were collected by hand with USGS depth-integrating samplers. Multiple vertical samples were taken at each site and then composited so that a representative sample was obtained. Winch operated depth-integrating

samplers were used during high flow events to insure that the full water column was sampled.

Whole water samples were collected to be analyzed for TN species, TP species, TOC, and SS. Additionally, filtered samples were collected to analyze for dissolved nitrogen (DN) and dissolved phosphorus (DP) species. All samples were delivered to the PADEP Laboratory in Harrisburg to be analyzed the following workday. The parameters and laboratory methods used are listed in Table 3. SS samples were analyzed at SRBC.

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. Due to high rainfalls in the spring and fall, precipitation totals exceeded the LTM at all sites for 2003.

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

Parameter	Laboratory	Methodology	Detection Limit (mg/l)	References
Ammonia (total)	PADEP	Colorimetry	0.020	USEPA 350.1
Ammonia (dissolved)	PADEP	Block Digest, Colorimetry	0.020	USEPA 350.1
Nitrogen (total)	PADEP	Persulfate Digestion for TN	0.040	Standard Methods #4500-N _{org} -D
Nitrogen (dissolved)	PADEP	Persulfate Digestion	0.040	Standard Methods #4500-N _{org} -D
Nitrite plus Nitrate (total)	PADEP	Cd-reduction, Colorimetry	0.010	USEPA 353.2
Nitrite plus Nitrate (dissolved)	PADEP	Cd-reduction, Colorimetry	0.010	USEPA 353.2
Orthophosphate (dissolved)	PADEP	Colorimetry	0.002	USEPA 365.1
Phosphorus (dissolved)	PADEP	Block Digest, Colorimetry	0.010	USEPA 365.1
Phosphorus (total)	PADEP	Persulfate Digest, Colorimetry	0.010	USEPA 365.1
Organic Carbon (total)	PADEP	Combustion/Oxidation	0.50	SM 5310D