

which had no significant trend due to more than 20 percent of the values being below the method detection limit (BMDL). This also occurred for dissolved ammonia nitrogen (DNH₃) at Towanda, Danville, Lewisburg, and Newport. No significant trends were found for flow for the time period.

INTRODUCTION

Nutrients and SS entering the Chesapeake Bay (Bay) from the Susquehanna River Basin contribute to nutrient enrichment problems in the Bay (USEPA, 1982). The Pennsylvania Department of Environmental Protection (PADEP) Bureau of Laboratories, the U.S. Environmental Protection Agency (USEPA), the U.S. Geological Survey (USGS), and the Susquehanna River Basin Commission (SRBC) conducted a 5-year intensive study at 12 sites from 1985-89 to quantify nutrient and SS transported to the Bay via the Susquehanna River Basin. In 1990, the number of sampling sites was reduced to five long-term monitoring stations. An additional site was included in 1994.

In October 2004, 13 additional sites (two in New York and 11 in Pennsylvania) were added as part of the Chesapeake Bay Program's Non-tidal Water Quality Monitoring Network. In October 2005, four more sites (three in New York and one in Maryland) were added to the existing network. This project involves monitoring efforts conducted by all six Bay state jurisdictions, USEPA, USGS, and SRBC to create a uniform non-tidal monitoring network for the entire Bay watershed.

PURPOSE OF REPORT

The purpose of this report is to present basic information on annual and seasonal loads and yields of nutrients and SS measured during calendar year 2009. Comparisons are made to LTM and to various baselines, including baselines created from the initial five years of data, the first half of the dataset, the second half of the dataset, and those created from the entire dataset for each site. Additionally, seasonal baselines were created using the initial five years

of data from each site. Seasonal and annual variations in loads are discussed, as well as the results of flow-adjusted trend analyses for the period January 1985 through December 2009 for various forms of nitrogen and phosphorus, SS, TOC, and discharge.

DESCRIPTION OF THE SUSQUEHANNA RIVER BASIN

The Susquehanna River (Figure 1) drains an area of 27,510 square miles (Susquehanna River Basin Study Coordination Committee, 1970), and is the largest tributary to the Chesapeake Bay. The Susquehanna River originates in the Appalachian Plateau of southcentral New York, flows into the Valley and Ridge and Piedmont Provinces of Pennsylvania and Maryland, and joins the Bay at Havre de Grace, Md. The climate in the Susquehanna River Basin varies considerably from the low lands adjacent to the Bay in Maryland to the high elevations, above 2,000 feet, of the northern headwaters in central New York State. The annual mean temperature ranges from 53° F (degrees Fahrenheit) near the Pennsylvania-Maryland border to 45° F in the northern part of the basin. Annual precipitation in the basin averages 39.15 inches and is fairly well distributed throughout the year.

Land use in the Susquehanna River Basin, shown in Table 1, is predominantly rural with woodland accounting for 69 percent; agriculture, 21 percent; and urban, 7 percent. Woodland occupies the higher elevations of the northern and western parts of the basin and much of the mountain and ridge land in the Juniata and Lower Susquehanna Subbasins. Woods and grasslands occupy areas in the lower part of the basin that are unsuitable for cultivation because the slopes are too steep, the soils are too stony, or the soils are poorly drained. The Lower Susquehanna Subbasin contains the highest density of agriculture operations within the watershed. However, extensive areas are cultivated along the river valleys in southern New York and along the West Branch Susquehanna River from Northumberland, Pa., to Lock Haven, Pa., including the Bald Eagle Creek Valley.



Figure 1. The Susquehanna River Basin, Subbasins, and Population Centers

Table 1. 2000 Land Use Percentages for the Susquehanna River Basin and Selected Tributaries

Site Location	Waterbody	Water/Wetland	Urban	Agricultural			Forest	Other
				Row Crops	Pasture/Hay	Total		
Original Sites (Group A)								
Towanda	Susquehanna	2	5	17	5	22	71	0
Danville	Susquehanna	2	6	16	5	21	70	1
Lewisburg	West Branch Susquehanna	1	5	8	2	10	84	0
Newport	Juniata	1	6	14	4	18	74	1
Marietta	Susquehanna	2	7	14	5	19	72	0
Conestoga	Conestoga	1	24	12	36	48	26	1
Enhanced Sites (Group B)								
Campbell	Cohocton	3	4	13	6	19	74	0
Rockdale	Unadilla	3	2	22	6	28	66	1
Conklin	Susquehanna	3	3	18	4	22	71	1
Smithboro	Susquehanna	3	5	17	5	22	70	0
Chemung	Chemung	2	5	15	5	20	73	0
Wilkes-Barre	Susquehanna	2	6	16	5	21	71	0
Karthus	West Branch Susquehanna	1	6	11	1	12	80	1
Castanea	Bald Eagle	1	8	11	3	14	76	1
Jersey Shore	West Branch Susquehanna	1	4	6	1	7	87	1
Penns Creek	Penns	1	3	16	4	20	75	1
Saxton	Raystown Branch Juniata	< 0.5	6	18	5	23	71	0
Dromgold	Shermans	1	4	15	6	21	74	0
Hogestown	Conodoguinet	1	11	38	6	44	43	1
Hershey	Swatara	2	14	18	10	28	56	0
Manchester	West Conewago	2	13	12	36	48	36	1
Martic Forge	Pequea	1	12	12	48	60	25	2
Richardsmere	Octoraro	1	10	16	47	63	24	2
Entire Basin	Susquehanna River Basin	2	7	14	7	21	69	1

Major urban areas in the Upper and Chemung Subbasins are located along river valleys, and they include Binghamton, Elmira, and Corning, N.Y. Urban areas in the Middle Susquehanna include Scranton and Wilkes-Barre, Pa. The major urban areas in the West Branch Susquehanna Subbasin are Williamsport, Renovo, and Clearfield, Pa. Lewistown and Altoona, Pa., are the major urban areas within the Juniata Subbasin. Major urban areas in the Lower Susquehanna Subbasin include York, Lancaster, Harrisburg, and Sunbury, Pa.

NUTRIENT MONITORING SITES

Data were collected from six sites on the Susquehanna River, three sites on the West Branch Susquehanna River, and 14 sites on smaller tributaries in the basin. These 23 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.