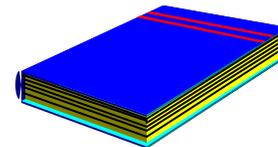


REPORT ANNOUNCEMENT

SUSQUEHANNA RIVER BASIN COMMISSION

07/2001



NUTRIENTS AND SUSPENDED SEDIMENT TRANSPORTED IN THE SUSQUEHANNA RIVER BASIN, 1999

Publication No. 214

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In 1987, Pennsylvania, Maryland, Virginia, and the District of Columbia signed the Chesapeake Bay Agreement to reduce nutrient loads to the Chesapeake Bay. The agreement and subsequent amendments state that, by the year 2000, controllable nutrient loads are to be reduced to 60 percent of the loads transported in 1985.

The Pennsylvania Department of Environmental Protection, Bureau of Water Quality Protection, and Bureau of Laboratories, the U.S. Environmental Protection Agency, and the Susquehanna River Basin Commission have cooperated in a study to quantify nutrient and suspended-sediment transport in the Susquehanna River Basin. The objective of this study was to collect monthly base flow and daily, or more frequent, samples during selected storms from six long-term monitoring sites in the Susquehanna River Basin. The data were used to compute annual nutrient and suspended-sediment loads and to evaluate the results of nutrient reduction efforts.

The purpose of this report is to present basic information on annual and seasonal loads and yields of nutrients and suspended sediment measured during calendar year 1999, and to compare the total nitrogen, total phosphorus, and suspended-sediment loads with the baselines established from the 1985-89 study. Seasonal variations in loads, and trends for the period January 1985 through December 1999 also are discussed.

This report includes sections on:

- Nutrient monitoring sites
- Sample collection and analysis
- Precipitation
- Water discharge
- Annual nutrient and suspended-sediment loads and yields
- Seasonal water discharges and loads

- Comparison of the 1999 loads and yields of total nitrogen, total phosphorus, and suspended sediment with the baselines
- Discharge, nutrient, and suspended-sediment trends

Nutrient Monitoring Sites

Data were collected from three sites on the Susquehanna River and three sites on major tributaries in the basin. These six sites, selected for long-term monitoring of nutrient and suspended-sediment transport in the basin, are:

1. Susquehanna River at Towanda, Pa.
2. Susquehanna River at Danville, Pa.
3. Susquehanna River at Marietta, Pa.
4. West Branch Susquehanna River at Lewisburg, Pa.
5. Juniata River at Newport, Pa.
6. Conestoga River at Conestoga, Pa.

Sample Collection and Analysis

Samples were collected at each of the sites to measure nutrient and suspended-sediment concentrations during baseflow and stormflow periods. Baseflow samples were collected monthly by hand with depth-integrating samplers. Storm or high flow samples were collected daily from the start of the storm to the time when the flow receded to near its pre-storm rate. Storm samples were collected by hand with depth-integrating samplers at all but the Conestoga River site, which is equipped with an automatic pumping sampler that collects a sample every half-hour.

Precipitation

Precipitation data were obtained from long-term stations operated by the U.S. Department of Commerce. Quarterly and annual precipitation data from these sources were summarized for 1999 for the Susquehanna River Basin above Towanda, Pa., the Susquehanna River Basin above Danville, Pa., the West Branch Susquehanna River Basin, the Juniata River Basin, the

Susquehanna River Basin above Marietta, Pa., and the Conestoga River Basin.

The annual precipitation for 1999 was below the long-term average in all drainage areas except the Conestoga River drainage area. Precipitation ranged from 12.56 inches below normal in the Juniata drainage area to 1.05 inches below normal in the Susquehanna River drainage area above Marietta. Precipitation in the Conestoga River drainage area was 1.59 inches above normal.

Water Discharge

Mean water discharges for calendar year 1999 are listed, along with the long-term annual mean discharge and percent of long-term annual mean discharge for each site. The annual mean water discharge for 1999 was below normal at all sites. Streamflow ranged from 69.5 percent of normal at Towanda, Pa., to 86.9 percent of normal at Danville.

Annual Nutrient and Suspended-Sediment Loads and Yields

Nutrient and suspended-sediment loads were computed for each site for calendar year 1999. Loads were computed for total and dissolved ammonia, total and dissolved nitrite plus nitrate, total and dissolved nitrogen, total and dissolved organic nitrogen, dissolved orthophosphate, total and dissolved phosphorus, and suspended sediment.

The greatest loads of total nitrogen (TN), total phosphorus (TP), and suspended sediment (SS) were measured at Marietta. The smallest load of TN was at Conestoga. Newport had the smallest TP and SS loads. The annual yields, in pounds per acre per year, of TN, TP, and SS were greatest from the Conestoga River at Conestoga.

Seasonal Water Discharges and Nutrient and Suspended-Sediment Loads

Seasonal mean water discharges for calendar year 1999 at Towanda, Lewisburg, Newport, and Marietta were highest in the winter, followed by spring, then fall. Seasonal discharges at Danville were highest in the winter, followed by fall, then spring. Seasonal discharges at Conestoga were highest in the winter, followed by fall, then summer. Seasonal variation of TN loads corresponded with seasonal variation of water discharge. Seasonal TP loads corresponded with

seasonal discharges at Danville, Lewisburg, and Conestoga. SS loads varied with seasonal discharges at Towanda, Danville, Lewisburg and Marietta.

Comparison of the 1999 Loads and Yields of Total Nitrogen, Total Phosphorus and Suspended Sediment with the baselines

Annual yields and water-discharge ratios for 1999 were plotted against the baselines developed from the initial five years of data collection. TN yields and water-discharge ratios plotted below the baselines at Towanda, Danville, Lewisburg, Newport, Marietta, and Conestoga indicating that, during 1999, there was a decrease in TN at these sites. Comparison of the 1999 and the baseline SS yields indicate that the SS load decreased in 1999 at Danville and increased at Towanda. There were no changes in SS loads at Newport, Marietta and Conestoga.

Discharge, Nutrient, and Suspended-Sediment Trends

Trends were computed for the period January 1985 through December 1999 for TN, total nitrite plus nitrate, TP, dissolved phosphorus, dissolved inorganic phosphorus, and SS. Both parametric and non-parametric tests were used to estimate direction and magnitude of trends in water quality. Analysis for trend was performed on the monthly mean flow, monthly load, flow weighted concentration, and flow adjusted concentration.

The results of analysis for TN and TP showed improving conditions at all sites. Improving conditions in SS occurred at three of the six stations in the basin.

This report is available on the Susquehanna River Basin Commission website at:

www.srbc.net/technicalreports.htm

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