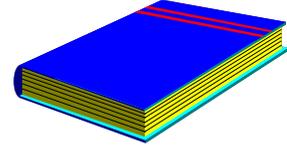


REPORT ANNOUNCEMENT

SUSQUEHANNA RIVER BASIN COMMISSION

11/2001



NUTRIENTS AND SUSPENDED SEDIMENT TRANSPORTED IN THE SUSQUEHANNA RIVER BASIN, 2000 AND TRENDS, JANUARY 1985 THROUGH DECEMBER 2000

Publication No. 218

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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 Chesapeake Bay 2000 Agreement maintains this objective.

The Pennsylvania Department of Environmental 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 2000, 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 2000 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 2000 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 2000 for the Susquehanna

River Watersheds above Towanda and Danville, Pa., the West Branch Susquehanna River and Juniata River Subbasins, the Susquehanna River Watershed above Marietta, Pa., and the Conestoga River Watershed. Precipitation ranged from 14.58 inches below normal in the Juniata Subbasin to 4.45 inches above normal in the watershed above Towanda.

Water Discharge

Mean water discharges for calendar year 2000 are listed, along with the long-term annual mean discharge and percent of long-term annual mean discharge for each site. Annual mean water discharge was above normal at Towanda and Danville and below normal at Lewisburg, Newport, Marietta, and Conestoga. Streamflow ranged from 75.5 percent of normal at Newport to 120.6 percent at Towanda.

Annual Nutrient and Suspended-Sediment Loads and Yields

Nutrient and suspended-sediment loads were computed for each site for calendar year 2000. 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 loads of TN and TP were at Conestoga. Newport had the smallest SS load. 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 2000 at Towanda, Danville, Lewisburg, and Marietta were highest in the spring, followed by winter, then fall. Seasonal discharges at Newport and Conestoga were highest in the winter, followed by spring. Seasonal variation of TN loads corresponded with seasonal variation of water discharge. Seasonal TP loads corresponded with seasonal discharges at all sites except Newport. SS loads generally corresponded with discharge. The exception was at Newport.

Comparison of the 2000 Loads and Yields of Total Nitrogen, Total Phosphorus and Suspended Sediment with the baselines

Annual yields and water-discharge ratios for 2000 were plotted against the baselines developed from the initial five years of data collection. The plots indicate that there were significant decreases of TN at all sites. TP yields were higher than the baseline yields at Towanda, Newport, Marietta, and Conestoga. The TP yields at Danville and Lewisburg showed no significant change. There was a significant increase of SS at Marietta and a decrease at Danville. There were no changes in yields at Towanda, Lewisburg, Newport, and Conestoga.

Discharge, Nutrient, and Suspended-Sediment Trends

Trends were computed for the period January 1985 through December 2000 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
It also is available on compact disc.
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