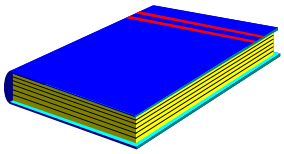
REPORT ANNOUNCEMENT



SUSQUEHANNA RIVER BASIN COMMISSION January 2008

NUTRIENTS AND SUSPENDED SEDIMENT TRANSPORTED IN THE SUSQUEHANNA RIVER BASIN, 2006, AND TRENDS, JANUARY 1985 THROUGH DECEMBER 2006

Publication No. 252 ***by: Kevin McGonigal***

The purpose of this report is to present basic information on annual and seasonal loads and yields of nutrients and suspended sediment (SS) measured during calendar year 2006 at SRBC's six long-term monitoring sites listed in Table 1 on the back of this announcement. Included in the report are several data comparisons aimed at removing the effects of flow to determine if improvements are occurring. This includes comparisons of 2006 values of total nitrogen (TN), total phosphorus (TP), and SS with several baselines developed from the historical datasets and trends in flow-adjusted concentrations (FACs) for the period 1985 through 2006. Statistics for 2006 for the six long-term sites are listed in Table 1. Summary statistics for all 23 sites that are part of the Chesapeake Bay Program's Non-tidal Water Quality Monitoring Network also are included.

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 were selected for long-term monitoring of nutrient and SS transport in the basin. All samples were analyzed for various species of TN and TP, total organic carbon (TOC), and SS.

Precipitation data are summarized for the 2006 Susquehanna River Watersheds above Towanda, Danville, and Marietta, and the West Branch Susquehanna, Juniata, and Conestoga River Watersheds. 2006 precipitation was above average at all sites ranging from 2.18 inches above the long-term mean (LTM) at Newport to 7.75 inches above the LTM at Danville. Heavy rain from Tropical Storms Ernesto and Alberto contributed to above average values.

Nutrient and Suspended-Sediment Loads and Yields

Nutrient and SS loads were computed for the six long-term sites for calendar year 2006. Heavy rainfall in the north led to 2006 loads of TP and SS at Towanda and Danville being above the LTM while TN remained below the LTM. TN, TP, and SS were below LTMs at Newport and Marietta, while TP and SS were below LTM at Conestoga. Lewisburg had above LTM loads of TP and below LTM loads of TN and SS.

Baseline Comparison

The annual fluctuations of nutrient and SS loads and water discharge make it difficult to determine whether the changes were related to land use, nutrient availability, or annual water discharge. To make that determination, data collected were used to create a linear relationship (baseline) between water discharge ratios (annual discharge/long-term discharge) and annual yields. Linear plots were created using the initial five years of each dataset, the first and second halves of each dataset, and the entire dataset. The 2006 yields and discharge ratios then were plotted on these graphs to see where improvements may have occurred. All baseline comparisons showed decreases in TN at all sites except at Newport. Increases in TP and SS yields were shown at Towanda and Danville, while Newport, Marietta, and Conestoga all showed improvements. Baseline comparisons at Lewisburg showed increases in TP and decreases in TN and SS.

Nutrient and Suspended-Sediment Trends

Trends for monthly mean flow and FAC were computed for the period January 1985 through December 2006 for flow, SS, TOC, and several forms of nitrogen and phosphorus. FAC trends represent the trends after the effects of flow have been removed. This is the concentration that relates to the effects of nutrient-reduction activities and other actions taking place in the watershed. For 2006, trends in FACs were found to be decreasing for TN, TP, and SS at all sites except for TP at Towanda and SS at Lewisburg, which both showed no significant trends. Increasing trends in dissolved orthophosphate were found at Towanda, Danville, Marietta, and Newport. No significant trends in flow were found.

This report is available in electronic format at www.srbc.net. It is also available on CD by contacting Ava Stoops at 717-238-0423 or srbc@srbc.net.

(over)

Table 1. 2006 Annual, Seasonal, and Annual Long-term Mean Precipitation (inches); Flow (cfs); Loads (in 1000's of pounds), Yields (lbs/ac/yr), Concentration (mg/L), and Trends for Total Nitrogen (TN), Total Phosphorus (TP), and Suspended Sediment (SS) at Towanda, Danville, Lewisburg, Newport, Marietta, and Conestoga, Pa.

Parameter		Period	Towanda	Danville	Lewisburg	Newport	Marietta	Conestoga
Precipitation		Winter	7.09	7.21	7.35	6.02	7.15	7.12
		Spring	14.07	14.48	13.45	11.85	14.55	16.23
		Summer	13.75	13.76	14.81	10.87	12.91	11.78
		Fall	11.29	11.18	10.28	9.54	10.77	11.70
		2006	46.20	46.63	45.89	38.28	45.38	46.83
		LTM	38.56	38.88	41.33	36.10	39.78	42.42
Flow		Winter	18,351	26,286	14,651	6,107	58,806	949
		Spring	14,860	20,780	8,219	3,326	38,825	828
		Summer	12,453	17,197	7,502	1,729	33,643	618
		Fall	15,952	23,163	12,828	3,161	47,223	814
		2006	15,404	21,856	10,800	3,581	44,624	802
		LTM	11,899	16,511	10,966	4,428	39,255	680
TN	Load	Winter	9,671	14,465	7,112	5,875	46,488	3,794
		Spring	6,390	8,869	3,197	2,534	23,019	2,585
		Summer	4,919	6,899	2,730	1,329	21,918	2,380
		Fall	7,353	11,345	5,530	3,128	38,741	3,263
		2006	28,333	41,578	18,569	12,866	130,166	12,022
		LTM	28,683	44,695	23,977	16,385	133,457	10,806
	Yield	2006	5.68	5.79	4.24	6.00	7.83	40.00
		LTM	5.75	6.22	5.47	7.63	8.02	35.90
	Concentration	2006	0.93	0.97	0.87	1.83	1.48	7.61
		LTM	1.22	1.37	1.11	1.88	1.73	8.07
	Trend	*	Improving	Improving	Improving	Improving	Improving	Improving
TP	Load	Winter	800	1,593	477	128	1,672	62
		Spring	1,421	2,595	222	67	1,795	243
		Summer	931	1,650	254	42	1,298	45
		Fall	976	2,017	513	64	1,517	81
		2006	4,128	7,855	1,466	301	6,282	431
		LTM	2,454	3,810	1,376	801	7,966	673
	Yield	2006	0.827	1.094	0.335	0.140	0.378	1.434
		LTM	0.492	0.531	0.314	0.373	0.479	2.239
	Concentration	2006	0.136	0.183	0.069	0.043	0.072	0.273
		LTM	0.105	0.117	0.064	0.092	0.103	0.503
	Trend	*	No Trend	Improving	Improving	Improving	Improving	Improving
SS	Load	Winter	468,516	637,758	145,322	55,395	916,791	18,704
		Spring	4,351,597	6,258,484	54,602	29,757	3,311,798	179,068
		Summer	1,218,108	1,696,086	72,534	11,960	1,119,974	10,162
		Fall	868,577	1,201,122	182,571	23,196	1,078,079	28,261
		2006	6,906,798	9,793,450	455,029	120,308	6,426,642	236,195
		LTM	3,422,900	3,467,305	1,252,899	505,499	7,348,769	370,282
	Yield	2006	1,384	1,364	104	56	386	785
		LTM	686	483	286	235	442	1,231
	Concentration	2006	228	228	21	17	73	150
		LTM	146	107	58	58	95	276
	Trend	*	Improving	Improving	No Trend	Improving	Improving	Improving

* Trend time periods: Towanda 1989-2005; Marietta 1987-2005; Lewisburg, Danville, Newport, and Conestoga 1985-2005.