SUSQUEHANNA RIVER BASIN COMMISSION

SUMMARY REPORT

The Susquehanna River Basin Commission (SRBC) established the Interstate Stream Monitoring Program in 1986 to collect data that were not available from monitoring programs implemented by state agencies in New York, Pennsylvania, and Maryland. The primary purpose of the program is to collect water quality data, assess biological conditions, and rate physical habitat for more than 80 streams that cross state boundaries in the Susquehanna River Basin.

The water quality data collected in the Interstate Streams Monitoring Program are used in a number of ways including assessing streams for compliance with state water quality standards, characterizing stream quality and seasonal variations, providing information to SRBC's member states for Integrated Listing requirements and possible Total Maximum Daily Load development, and identifying areas for restoration and protection. Biological conditions are assessed using benthic macroinvertebrate and fish populations, which provide an indication of the biological health of a stream and serve as indicators of water quality. Habitat assessments provide information concerning potential stream impairment from erosion and sedimentation, as well as an indication of the stream's ability to support a healthy biological community.

SRBC monitors and submits an annual report on the water quality and biological conditions of more than 50 locations on these interstate streams (Figure 1). Reports and summaries for previous years are also available at *www.srbc.net/interstate_streams/archive.htm.*

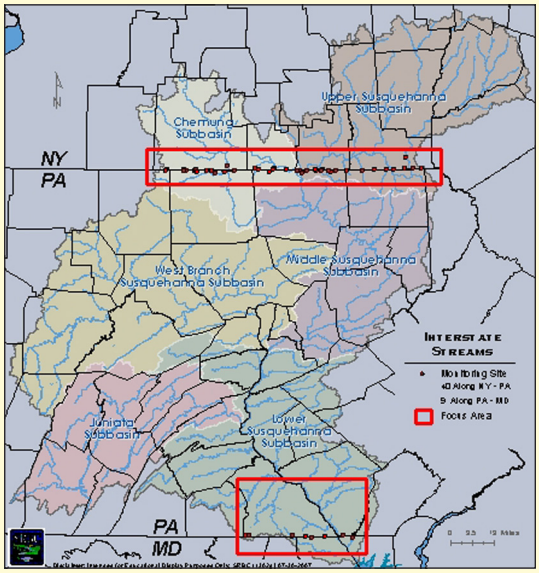

Figure 1. Locations of Interstate Streams Sampling Sites

Assessment of Interstate Streams in the Susquehanna River Basin

Monitoring Report # 27
January 1, 2013 – December 31, 2013

September 2014
Publication No. 293

Methods

This calendar year 2013 Interstate Streams report contains analyses of monitoring data collected from January 1, 2013 to December 31, 2013. The interstate streams are divided into three groups based on the degree of water quality impairment, historical water quality impacts, and potential for degradation (Table 1).

Table 1. Monitoring Groups

	Potential for Impacts	Number of Sites	Sampling Frequency
Group 1	Highest	17	Quarterly water quality, annual biological and habitat assessment
Group 2	Moderate	11	Annual water quality, biological, and habitat assessment
Group 3	Low	21	Annual field chemistry, biological, and habitat assessment

Results for laboratory water quality analyses for chemical parameters were compared to state water quality standards and used to compute a simple water quality index (WQI). Five-year trend graphs were created for biological conditions and water quality indices values for each monitoring site. Stream discharge data were obtained for U.S. Geological Survey gages or were measured instream, unless high stream flows made access impossible. Depth-integrated water samples were collected at each of the sites, and field chemistry measurements were performed to determine certain parameters.

Nutrient and metal concentrations were analyzed at ALS Environmental, Middletown, Pa. Benthic macroinvertebrates were collected at Group 1 and 2 sites during July and August 2013 and at Group 3 sites during May 2013. Macroinvertebrates were collected using Rapid Bioassessment Protocol III protocols. Fish community data were collected by electrofishing, consisting of three passes over a stream reach equivalent to ten times the average wetted-width, with a range of 100-400 meters.

Fish community data were collected at all wadeable Group 1 and 2 MD-PA streams in 2013 except OCTO 6.6 where high flow conditions prohibited electrofishing. Since being incorporated into the sampling protocol in 2009, fish community data have been collected at all 23 wadeable Group 1 and 2 Interstate Stream sites. All fish were identified to species except sculpins (*Cottus*), which were identified to genus. Fish community data are presented in the form of commonly used metrics for use in multiple analyses.

Table 2. List of Pennsylvania-Maryland Interstate Streams (sampled in 2013)

Station	Stream and Location	*	Rationale
BBDC 4.1	Big Branch Deer Creek, Fawn Grove, PA	2	Monitor for potential water quality impacts
CNWG 4.4	Conowingo Creek, Pleasant Grove, PA	1	High nutrient loads and other agricultural runoff; nonpoint runoff to Chesapeake Bay
DEER 44.2	Deer Creek, Gorsuch Mills, MD	1	Past pollution from Gorsuch Mills, MD, Stewartstown, PA; nonpoint runoff to Chesapeake Bay
EBAU 1.5	Ebaughs Creek, Stewartstown, PA	1	Municipal discharge from Stewartstown, PA; nonpoint runoff to Chesapeake Bay
FBDC 4.1	Falling Branch Deer Creek, Fawn Grove, PA	2	Monitor for potential water quality impacts
LNGA 2.5	Long Arm Creek, Bandanna, PA	1	Monitor for potential water quality impacts
OCTO 6.6	Octoraro Creek, Rising Sun, MD	1	High nutrient loads due to agricultural runoff from New Bridge, MD; water quality impacts from Octoraro Lake; nonpoint runoff to Chesapeake Bay
SBCC 20.4	South Branch Conewago Creek, Bandanna, PA	2	Monitor for potential water quality impacts
SCTT 3.0	Scott Creek, Delta, PA	1	Historical pollution due to untreated sewage

** Monitoring Group*

Results and Discussion

Biological Health (Macroinvertebrates) and Habitat Conditions

Deer Creek (DEER 44.2) was chosen to serve as the reference site to which all other Maryland-Pennsylvania streams were compared. Deer Creek has routinely served as the reference stream for the MD-PA border region analyses. In 2013, Deer Creek possessed the best combination of biological, chemical, and physical properties throughout the year. Scott Creek (SCTT 3.0) again ranked poorly in terms of biology and habitat. The stream has consistently been characterized by low species diversity and pollution-tolerant macroinvertebrate communities. Physical habitat at Scott Creek has been negatively impacted by the surrounding urban development and related human influences.

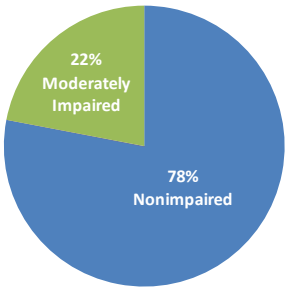

Figure 2. 2013 MD-PA Interstate Streams: Combined Biological Assessments

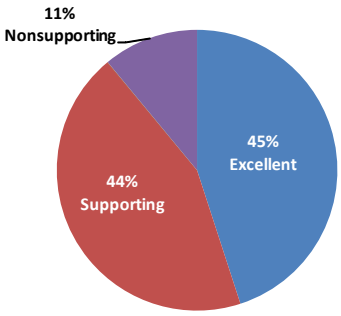

Figure 3. 2013 MD-PA Interstate Streams: Combined Habitat Assessments

Collectively, the Maryland-Pennsylvania border streams monitored in the Interstate Streams project showed consistent to slightly improving conditions in terms of overall stream health. In general, results from the 2013 assessment were quite similar to the previous survey in 2011. The addition of examining biological integrity through fish sampling has supported the assessments made from macroinvertebrate communities.

Conowingo Creek (CNWG 4.4) - Summer and Winter Sampling.

Water Quality

Overall water quality conditions of the Maryland-Pennsylvania streams sampled in 2013 were good with only 2 percent of measured parameters falling outside of accepted standards. Conowingo Creek (CNWG 4.4) exhibited elevated levels of total nitrogen during spring and fall sampling, measured at 11.2 mg/L and 11.1 mg/L, respectively. A total iron concentration of 1700 µg/L was detected from Octoraro Creek (OCTO 6.6) during spring sampling. Additionally, two tributaries to Deer Creek, Falling Branch Deer Creek (FBDC 4.1) and Big Branch Deer Creek (BBDC 4.1), possessed alkalinity levels below the Pennsylvania standard of 20 mg/L.

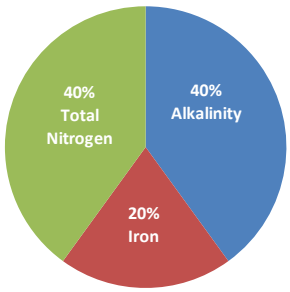

Figure 4. Parameters Exceeding Water Quality Standards for MD-PA Interstate Streams

Table 3. Water Quality Parameter Observations and Standards

Parameter	Standard	Standard Value	Number of Observations	Number Exceeding Standards
Alkalinity	PA aquatic life	20 mg/L	30	2
Total Aluminum	NY aquatic (chronic)	100 µg/L	30	0
Total Iron	NY aquatic (chronic) PA aquatic life	300 µg/L 1500 µg/L	30	1
Nitrate plus Nitrite	PA public water supply	10 mg/L	30	2
pH	NY general MD aquatic life PA aquatic life	6.5-8.5 6.5-8.5 6.0-9.0	30	0
Total Manganese	NY aquatic (chronic)	300 µg/L	30	0
Turbidity	MD aquatic life	150 NTU	30	0
Dissolved Oxygen	PA aquatic life	5.0 mg/L	30	0

Eleven habitat parameters were evaluated at all sites. These parameters included epifaunal substrate, instream cover, embeddedness, velocity/depth regimes, sediment deposition, channel flow status, channel alteration, frequency of riffles, condition of banks, vegetative protective cover, and riparian vegetative zone width. Macroinvertebrate data analysis was based on an evaluation of seven metrics (Rapid Bioassessment Protocol III protocols), which included taxonomic richness, Shannon Diversity Index, Modified Hilsenhoff Biotic Index, Ephemeroptera, Plecoptera, Trichoptera (EPT) Index, percent Ephemeroptera, percent dominant taxa, and percent Chironomidae.

Table 4. Overall Results

	LNGA 2.5	SBCC 20.4	EBAU 1.5	DEER 44.2	BBDC 4.1	FBDC 4.1	SCTT 3.0	CNWG 4.4	OCTO 6.6
MACRO-INVERTEBRATE	Moderately Impaired	Nonimpaired	Nonimpaired	Nonimpaired	Nonimpaired	Nonimpaired	Moderately Impaired	Nonimpaired	Nonimpaired
FISH	Fair	Fair	Good	Good	Good	Fair	Fair	Good	N/A
HABITAT	Supporting	Excellent	Supporting	Supporting	Supporting	Excellent	Nonsupporting	Excellent	Excellent
WQI	51.81	41.78	46.64	42.31	38.78	51.26	61.73	55.65	81.79

SRBC's Interstate Streams Monitoring Program is funded, in part, through a grant from the U.S. Environmental Protection Agency.

SRBC uses a web-based report format to make the Interstate Streams data more easily accessible to government agencies and the general public. This summary is a companion publication for the calendar year 2013 (CY-13) web-based report and summarizes all the findings. The full web-based report can be found online at http://www.srbc.net/interstate_streams/index.aspx. Data for these interstate stream sites, both current and historical, are available by contacting SRBC.

SRBC Contact:
Aaron Henning
Aquatic Biologist
srbc@srbc.net
(717) 238-0423