



# Assessment of Interstate Streams in the Susquehanna River Basin

Monitoring Report #24

January 1, 2010 – December 31, 2010

September 2011

Publication No. 273

## 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 at many of the 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 [http://www.srbc.net/interstate\\_streams/archive.htm](http://www.srbc.net/interstate_streams/archive.htm).

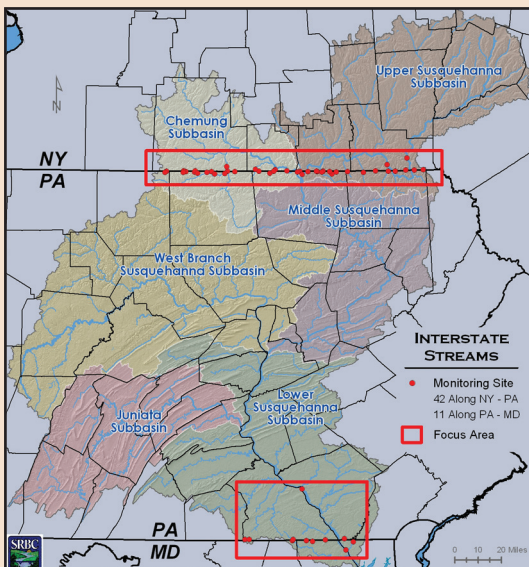


Figure 1. Locations of Interstate Streams Sampling Sites

## Methods

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).

The calendar year 2010 Interstate Streams report contains analyses of monitoring data collected from January 1, 2010 to December 31, 2010.

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 the Pennsylvania Department of Environmental Protection Bureau of Laboratories. Benthic macroinvertebrates were collected at Group 1 and 2 sites during July and August 2010 and at Group 3 sites during May 2010. Macroinvertebrates were collected using Rapid Bioassessment Protocol III protocols. Macroinvertebrate data analysis was based on an evaluation of seven metrics, which included taxonomic richness; Shannon Diversity Index; Modified Hilsenhoff Biotic Index; Ephemeroptera, Plecoptera, Trichoptera (EPT) Index; percent Ephemeroptera; percent dominant taxa; and percent Chironomidae.

Fish community data were collected by electrofishing, consisting of two passes over 75 meters of stream, at five wadeable Group 1 and 2 sites during May 2010. 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. A modified version of the Fish Index of Biological Integrity for Maryland Streams was used to assess fish communities.

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.

Reference sites are selected based on the best combination of biological conditions, water quality, and physical habitat. In 2010, the reference sites were Deer Creek (DEER 44.2) for the PA-MD streams, Bentley Creek (BNTY 0.9) for NY-PA streams, and the Tioga River (TIOG 10.8) for the large rivers group. The reference site for Group 3 streams was Smith Creek (SMIT) near East Lawrence, Pa.

Table 1. Explanation of Sites

	Potential for Impacts	Number of Sites	Sampling Frequency
Group 1	Highest	21	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

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**Water Quality**

Water quality at Group 1 sites was sampled quarterly in 2010, while Group 2 sites were sampled once. Field chemistry was performed at all Group 3 streams once. All data were analyzed together and results are presented in Figure 2. In total, 51 of 691 (7 percent) individual parameter observations were outside of water quality standards. Of the 32 Group 1 and 2 sites, 17 exhibited water quality values outside of accepted state limits. Only four of the 21 Group 3 sites had water quality values exceeding state standards. Total iron, pH, and total aluminum were the measured parameters most frequently exceeding water quality standards. In total, 10 of the 53 Interstate Streams sites had two or more parameters measured outside of state standards.

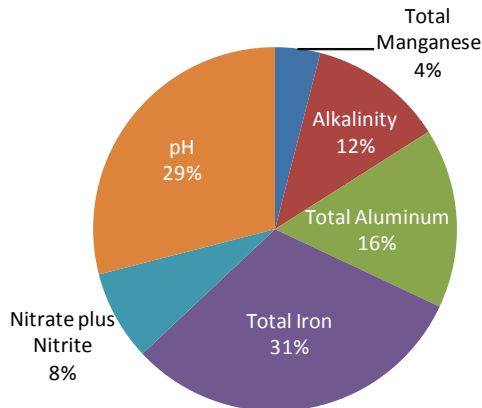


Figure 2. Parameters Exceeding Water Quality Standards

**Biological Condition: Macroinvertebrate Communities**

In 2010, 16 of the 51 interstate streams sites at which macroinvertebrate samples were collected possessed nonimpaired IBI scores. Biological conditions at 27 sites were slightly impaired, while seven were moderately impaired and only one site was rated as severely impaired. The most common reasons for low macroinvertebrate IBI metric scores were high percentages of dominant taxa, low overall taxonomic diversity, and poor EPT Index values.

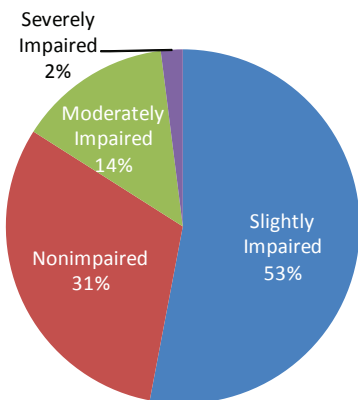


Figure 3. CY-10 Macroinvertebrate IBI Rating

**Biological Condition: Fish Communities**

In 2010, fish communities were sampled at five Group 1 and 2 streams. Eighteen Group 1 and 2 streams were sampled previously in 2009. The two years combined provide an overall assessment of the fish communities of the wadeable Group 1 and 2 interstate streams. Twenty of the 23 streams sampled received ratings of “Good” or “Fair.” A total of 33 unique species were detected across all sites.

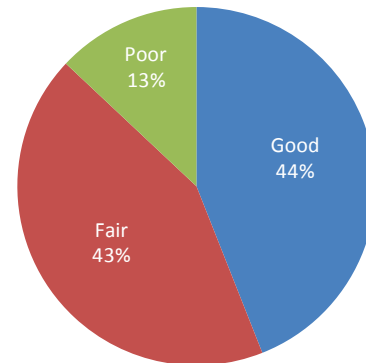


Figure 4. 2009/2010 Combined Fish IBI Rating

**Physical Habitat Conditions**

Available physical habitat was assessed at 52 sites in 2010. Thirty sites were rated as having excellent habitat, 14 had a rating of supporting, and six were deemed partially supporting. Dry Brook (DRYB), a Group 3 site, was the only site designated as having nonsupporting habitat. The most common habitat concerns across all interstate stream sites were riparian vegetative zone width, condition of banks, and channel flow status.

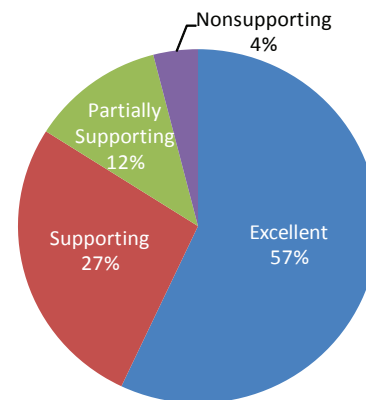


Figure 5. 2010 Physical Habitat Rating

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 2010 (CY-10) web-based report and summarizes all the findings. The full web-based report can be found online at [http://www.srbc.net/interstate\\_streams](http://www.srbc.net/interstate_streams). Data for these interstate stream sites, both current and historical, are available by contacting SRBC.

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