



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 lines in the Susquehanna River Basin.

The water quality data collected in the Interstate Streams Program are used in a variety 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 303(d) listing and possible Total Maximum Daily Load (TMDL) development, and identifying areas for restoration and protection. Biological conditions are assessed using benthic macroinvertebrate 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/pubinfo/techdocs/Publications/techreports.htm>.

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# Assessment of Interstate Streams in the Susquehanna River Basin

July 1, 2007 - December 31, 2008

## Summary Report

[www.srbc.net/interstate\\_streams](http://www.srbc.net/interstate_streams)

SRBC uses a web-based report format to make the Interstate Streams data more easily accessible to government agencies and the general public. This document is a companion publication for the calendar year 2008 (CY-08) web-based report and summarizes all the findings. The full web-based report can be found online at [www.srbc.net/interstate\\_streams](http://www.srbc.net/interstate_streams).

## 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).

Beginning this year, the Interstate Streams project changed from the previous fiscal year approach to a new calendar year reporting period. In order to make this transition, the current report contains analyses of monitoring data from one and one half years, from July 1, 2007 to December 31, 2008. The next report will cover data and analyses from January 1 to December 31, 2009.

Stream discharge data were obtained from 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 taken to determine certain parameters.

Nutrient and metal concentrations were analyzed at the Pennsylvania Department of Environmental Protection Bureau of Laboratories. Benthic macroinvertebrates were collected using Rapid Bioassessment Protocol III protocols at Group 1 and 2 stations July 30 - August 8, 2007, and July 21 - 23, 2008; Group 3 stations were sampled May 27 - 29, 2008. 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.

Eleven habitat parameters were evaluated at all stations where a macroinvertebrate sample was collected. These parameters include 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.

Results of laboratory water quality analyses for chemical parameters were compared to state water quality standards. In addition, a simple water quality index (WQI) was calculated, and values that exceeded the 90<sup>th</sup> percentile for each grouping were noted.



Cascade Creek near Cascade Valley, N.Y.

Table 1. Explanation of Sites

Stream Group	Potential for Impacts	Sampling Frequency
Group 1	Highest	Quarterly water quality, annual biological and habitat assessment
Group 2	Moderate	Annual water quality, biological, and habitat assessment
Group 3	Low	Annual field chemistry, biological, and habitat assessment

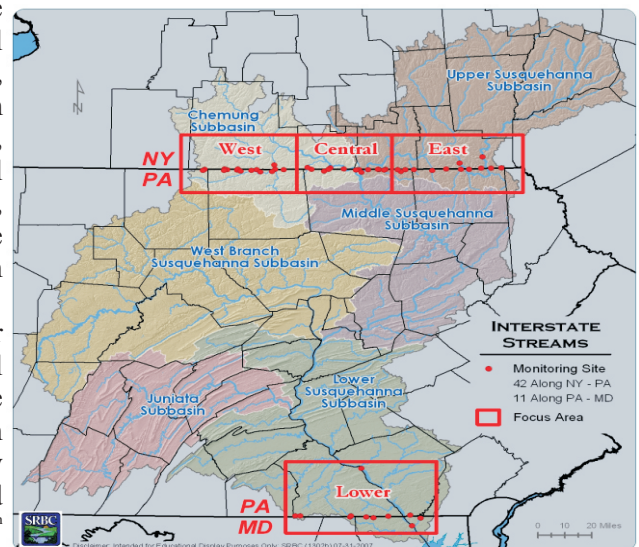


Figure 1. Locations of Interstate Stream Sampling

(over)

## Results and Conclusions

### Water Quality

Group 1 streams were sampled six times, while Group 2 streams were sampled twice. Field chemistry parameters were measured at Group 3 streams once. Water quality in 22 percent of Group 1 and 2 Interstate streams continued to meet designated classes and water quality standards during CY-08. Of the 1285 total observations, 94 exceeded water quality standards. Twenty-five out of the 32 sites had parameters exceeding water standards, with 18 of those having more than one violation. The parameter that most frequently exceeded water quality standards was total iron, followed closely by total aluminum. Total iron and total aluminum appear to be naturally high in some of these watersheds but still exceed New York water quality standards. Tioga River is the only waterway that has documented abandoned mine discharge indicated by high metals and high acidity. The Pennsylvania-Maryland border streams are located in a heavily agricultural region, and nutrient concentrations were high at many of these sites.

### Biological and Habitat Conditions

For the current report, Group 1 and 2 streams were sampled for macroinvertebrates and habitat in the summers of 2007 and 2008. However, Group 3 streams were sampled only in 2008.

In 2007, 14 sampling sites were designated as nonimpaired, 10 sites were slightly impaired, and six sites were moderately impaired (Figure 2). The biological conditions at six sites (Seeley Creek, Trowbridge Creek, North Fork Cowanesque River, Long Arm Creek, Scott Creek, and Cowanesque River 2.2) were designated as moderately impaired. No streams were designated severely impaired in 2007. The most common reasons for low biological metric scores at these sites were low EPT Index and high percentages of dominant taxa. Physical causes of these biological impairments may include upstream impoundments, agriculture, urban impacts, and channelization. Conowingo Creek and Susquehanna River 10.0 downstream of the Conowingo Dam were not sampled for macroinvertebrates due to access issues and deep waters, respectively.

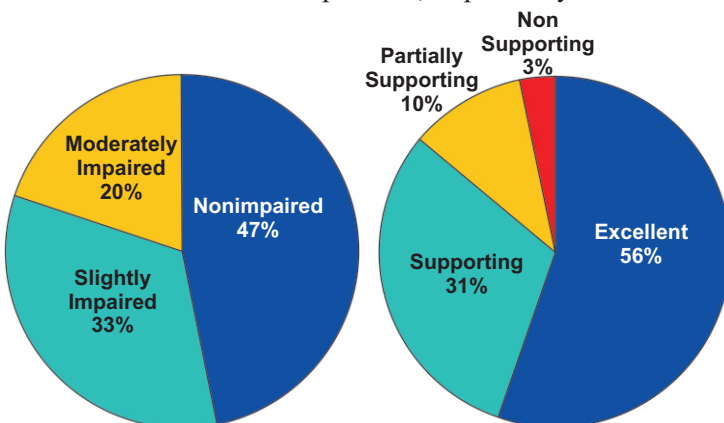


Figure 2. 2007 Biological Condition and Habitat Assessment

Sixteen sites received excellent habitat ratings and nine sites had supporting habitats in 2007. Habitat at three sites (Long Arm Creek, Scott Creek, and Cowanesque River 2.2) had partially supporting habitats, and the habitat at Trowbridge Creek was rated nonsupporting (Figure 2). Habitat was not assessed at Cayuta Creek and Susquehanna River 10.0 due to high flows and deep water, respectively. The most common habitat concerns throughout all interstate streams sites in 2007

were velocity/depth regimes, sediment deposition, condition of banks, and lack of riparian vegetative zones.

Reference sites are selected based on the best combination of water quality, biological conditions, and physical habitat. In 2007, reference sites were Cascade Creek for the New York–Pennsylvania streams, Falling Branch Deer Creek for the Pennsylvania–Maryland streams, and Susquehanna River 289.1 at Sayre, Pa., for the large river sites.

Staff performed macroinvertebrate sampling and habitat assessments at 49 Group 1, 2, and 3 sites in 2008. The biological conditions at 13 sites were nonimpaired, 27 sites were slightly impaired, six sites were moderately impaired, and three sites (Long Arm Creek, Dry Brook, and White Branch Cowanesque River) were severely impaired (Figure 3). As in 2007, the predominant reasons for low biological metric scores at these sites were low EPT Index and high percentages of dominant taxa.

Twenty-two sites received excellent habitat ratings, while 24 sites were rated supporting in 2008. Habitat at Long Arm Creek and Dry Brook were rated partially supporting, while habitat at Trowbridge Creek was rated nonsupporting (Figure 3). The most widespread habitat concerns in 2008 included velocity/depth regimes, channel flow status, and lack of riparian vegetative zones. Macroinvertebrate sampling and habitat assessments were not completed at the Susquehanna River 10.0 due to deep water and at Biscuit Hollow, Bulkley Brook, and Redhouse Run due to dry conditions.

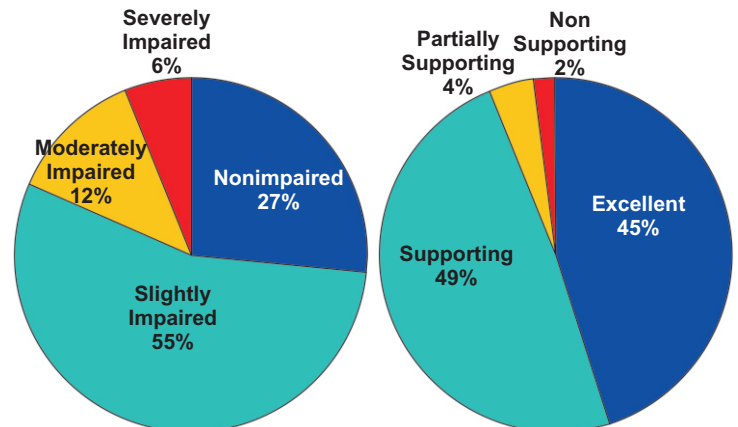


Figure 3. 2008 Biological Condition and Habitat Assessment

Reference sites for 2008 were North Fork Cowanesque River for New York–Pennsylvania streams, Deer Creek for Pennsylvania–Maryland Streams, Tioga River for large river sites, and an unnamed tributary to Smith Creek for Group 3 streams.

The current and historical data collected for the interstate streams monitoring program provide a database that enables SRBC staff and others to better manage water quality, water quantity, and biological resources of interstate streams in the Susquehanna River Basin. The data can be used by SRBC's member states and local interest groups to gain a better understanding of water quality in upstream and downstream areas outside of their jurisdiction. Information collected also can serve as a starting point for more detailed assessments and remediation efforts that may be planned on these streams. Data for these interstate stream sites, both current and historical, are available by contacting SRBC. SRBC's interstate monitoring program is funded, in part, through a grant from the U.S. Environmental Protection Agency.