
ASSESSMENT OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

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Susan R. LeFevre, Biologist
Darryl L. Sitlinger, Water Quality Technician

ABSTRACT

The Susquehanna River Basin Commission (SRBC) used a water quality index (WQI) and the U.S. Environmental Protection Agency's (USEPA's) Rapid Bioassessment Protocol III (RBP III) to assess the chemical water quality, biological conditions, and physical habitat of 52 sample sites in the Interstate Streams Water Quality Network from July 1, 2002, to June 30, 2003. Only 41 out of 1,182 possible parameter observations exceeded water quality standards. Assessment results indicate that approximately 33 percent of the sites supported nonimpaired biological communities. Water quality impacts in the New York-Pennsylvania border streams tend to be mostly from metals, while most Pennsylvania-Maryland border sites have higher nitrogen and nitrate values in addition to some elevated metals.

A Pearson Product Moment Correlation was performed on WQI, RBP III score, and physical habitat score to determine any relationships between the parameters. A significant ($p < 0.05$) positive correlation occurred between biological community scores and physical habitat scores for river and Group 3 sites; however, river habitat scores and Group 3 biological and habitat scores were not normally distributed. These relationships, while based on a small number of observations, are presented as subjects to be

considered by resource managers, local interest groups, elected officials, and other policy-makers.

INTRODUCTION

One of SRBC's functions is to review projects that may have interstate impacts on water resources in the Susquehanna River Basin. SRBC established a 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 state agencies do not assess all of the interstate streams and do not produce comparable data needed to determine potential impacts on the water quality of interstate streams. SRBC's ongoing interstate monitoring program is partially funded through a grant from the USEPA.

The interstate water quality monitoring program includes periodic collection of water and biological samples from interstate streams, as well as assessments of their physical habitat. Water quality data are used to: (1) assess compliance with water quality standards; (2) characterize stream quality and seasonal variations; (3) build a database for assessment of water quality trends; (4) identify streams for reporting to USEPA under Section 305(b) of the Clean Water Act; (5) provide information to signatory states for 303(d) listing and possible Total Maximum Daily Load

(TMDL) development; and (6) identify 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's interstate monitoring program began in April 1986. For the first five years, results were reported for water years that ran from October to September. In 1991, SRBC changed the reporting periods to correspond with its fiscal year that covers the period from July to June. This report is presented for fiscal year 2003, which covers July 1, 2002 to June 30, 2003.

BASIN GEOGRAPHY

The Susquehanna River Basin is the largest river basin on the Atlantic Coast of the United States, draining 27,510 square miles. The Susquehanna River originates at the outlet of Otsego Lake, Cooperstown, N.Y., and flows 444 miles through New York, Pennsylvania, and Maryland to the Chesapeake Bay at Havre de Grace, Maryland. Eighty-three streams cross state lines in the basin (Table 1). Several streams traverse the state lines at multiple points, contributing to 91 crossings. Of those 91 crossings, 45 streams flow from New York into Pennsylvania, 22 from Pennsylvania into New York, 15 from Pennsylvania into Maryland, and nine from Maryland into Pennsylvania. Many streams are small, and 32 are unnamed.

METHODS

Field and Laboratory Methods

Sampling frequency

In Water Year 1989, the interstate streams were divided into three groups, according to the degree of water quality impairment, historical

water quality impacts, and potential for degradation. These groupings were determined based on historical water quality and land use. To date, these groups remain consistent and are described below.

Streams with impaired water quality or judged to have a high potential for degradation due to large drainage areas or historical pollution were assigned to Group 1. In sampling period 2002-2003, New York-Pennsylvania Group 1 streams were sampled August, November, March, and May. Pennsylvania-Maryland Group 1 stations were sampled July and August, November and December, February, and June. Benthic macroinvertebrates were collected and habitat assessments were performed in Group 1 streams during July and August 2002.

Streams judged to have a moderate potential for impacts were assigned to Group 2. Water quality samples, benthic macroinvertebrate samples, and physical habitat information were obtained from Group 2 stations once a year; preferably during base flow conditions in the summer months. In this sampling period, water chemistry, macroinvertebrate, and physical habitat information were collected during July and August 2002.

Streams judged to have a low potential for impacts were assigned to Group 3. During previous reporting years, these stations were not sampled but were visually inspected for signs of degradation once a year. However, beginning in fiscal year 2000, the biological and habitat conditions of these streams were assessed during May. Field chemistry parameters also were measured on Group 3 streams at the time of biological sampling. New York-Pennsylvania border and Pennsylvania-Maryland border stream stations sampled during fiscal year 2003 are listed in Tables 2 and 3, respectively, and are depicted in Figures 1 through 4.

Stream discharge

Stream discharge was measured at all stations unless high stream flows made access impossible. Several stations are located near U.S. Geological Survey (USGS) stream gages. These stations