



**Susquehanna River
Basin Commission**

Susquehanna Large River Assessment Project

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ABSTRACT

In 2002, the Susquehanna River Basin Commission (SRBC) conducted a pilot study to determine appropriate methods of biologically assessing the large rivers of the Susquehanna River Basin (basin). Based on the results of that survey, SRBC determined that a combination of rock basket samplers and traditional Rapid Bioassessment Protocol (RBP) methods was the most efficient and consistent collection method to sample the Susquehanna River. These methods were implemented in the 2005 Susquehanna Large River Assessment Project (Hoffman, 2006) at 25 stations on the mainstem Susquehanna River and at the mouths of its major tributaries: the West Branch Susquehanna River, the Juniata River, and the Chemung River.

The U.S. Environmental Protection Agency (USEPA) has developed a field operations manual for the National River and Stream Assessment (NRSA), detailing data collection methods for both wadeable and nonwadeable streams (USEPA, 2008). During summer 2007, SRBC staff collected macroinvertebrate and water chemistry data at the same 25 stations as above using the draft USEPA river assessment protocols.

Composite benthic macroinvertebrate samples were collected at each station from three D-frame net sweeps at each of 10 transects. Field and laboratory water quality samples and overall observations of the site also were collected at each site.

Eight of the sites were designated as nonimpaired, 14 sites were slightly impaired, and three sites were moderately impaired. Only 38 out of 667 laboratory and field water quality data points exceeded standards or levels of tolerance for aquatic life, indicating that the Susquehanna River contains fairly good water quality.

For future river assessment projects, SRBC plans to continue data collection using slightly modified USEPA collection methodologies, possibly incorporating fish data collection at selected sites. Staff also will be considering alternative methods for assessing physical habitat and determining ways to assess the reservoir system at the lower end of the Susquehanna River.

INTRODUCTION

SRBC has been performing biological assessments throughout the basin since the late 1970s. When USEPA introduced the first version of the RBP manual (Plafkin and others, 1989), SRBC adopted those methods for use in its interstate stream monitoring program and its rotating subbasin surveys. However, neither the previous nor current RBP methods (Barbour and others, 1999) used by SRBC in the aforementioned surveys accurately depict the biological integrity of the basin's large rivers: the mainstem Susquehanna, Chemung, West Branch Susquehanna, and Juniata Rivers. Thus, in 2002, SRBC initiated a pilot project to determine proper methods of biologically assessing the large rivers in the basin. From this pilot project, staff determined that a combination of rock-filled basket samplers and traditional RBP methods was the most effective and consistent collection method for sampling the Susquehanna River (Hoffman, 2003).

In summer 2005, staff collected biological and water quality data at 25 stations on the mainstem Susquehanna River and at the mouth of its major tributaries using the methodology described above. During summer 2007, staff changed the methodology to mimic the methods drafted by USEPA for the NRSA (USEPA, 2008). The results are described in the sections below.

Although the NRSA data collection includes fish, physical habitat, toxicology, and other parameters in addition to benthic macroinvertebrates, SRBC staff chose to focus efforts on benthic

macroinvertebrate sampling. Benthic macroinvertebrates were used to assess biological conditions for several reasons. Benthic macroinvertebrates are sensitive to a wide range of stressors, have a wide range of documented pollution tolerances, and are found in a wide variety of habitats throughout lotic systems (Flotemersch and others, 2001a). Additionally, SRBC has background macroinvertebrate data from various sites on the large rivers of the basin from subbasin surveys and interstate streams monitoring, as well as the previous river assessment studies.

Basin Geography

The Susquehanna River Basin is the largest river basin on the east coast of the United States, draining 27,510 square miles. The Susquehanna River originates at Otsego Lake, N.Y., and flows 444 miles through New York, Pennsylvania, and Maryland to the Chesapeake Bay at Havre de Grace, Md.

The study area for this survey stretched from Sidney, N.Y., to Marietta, Pa., and encompassed every subbasin in the Susquehanna River Watershed. A total of 25 sampling stations were established as follows: seven in the Upper Susquehanna Subbasin; one at the mouth of the Chemung River; 10 in the Middle Susquehanna Subbasin; one at the mouth of the West Branch Susquehanna River; five in the Lower Susquehanna Subbasin; and one at the mouth of the Juniata River (Figure 1 and Table 1). Downstream of Marietta, Pa., the river flows through a series of impoundments and could not be sampled using the methods in this study.



SRBC staff preparing a macroinvertebrate sample at Sidney, N.Y.