

2010 SUSQUEHANNA LARGE RIVER ASSESSMENT PROJECT

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ABSTRACT

Historically, only a few studies were ever conducted to evaluate the condition of large river systems. In recent years, however, that has changed in light of new and expanded methods expressly designed to allow for large river assessments. Many federal, state, and local entities that are interested in the role of larger rivers on industry, power generation, drinking water supply, recreation, and other issues are now able to bring focus to larger river systems. In particular, for the past eight years, the Susquehanna River Basin Commission (SRBC) has been applying expanded technology and methods to monitor the mainstem Susquehanna River.

SRBC conducted a pilot study in 2002 to determine appropriate methods for biologically assessing the large rivers of the Susquehanna River Basin (basin). Based on the results of that study, SRBC determined at that time 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). In 2007, SRBC adapted this protocol for the 25 stations previously sampled. In late summer 2008, SRBC staff collected data at 17 of the same 25 original stations following the NRSA protocols. In 2009, high flows greatly limited SRBC's sampling opportunities. Given the high-flow restrictions, SRBC staff chose to collect data only at the eight stations that were not sampled in 2008, ensuring that all 25 original stations would be covered over the 2008 to 2009 period. In 2010, 16 of the 25 sites were sampled in late summer.

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

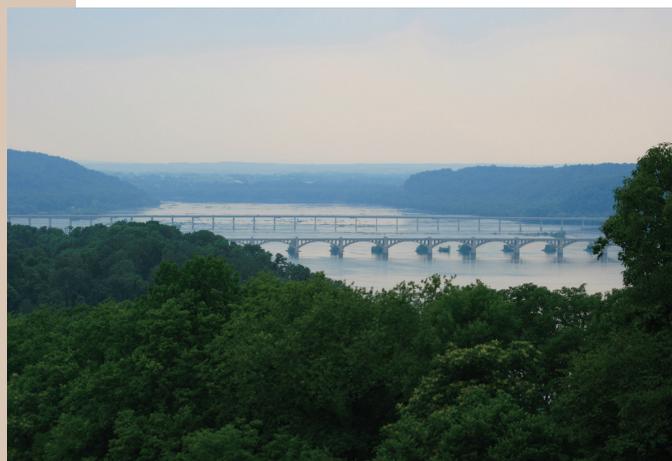
Three of the sites were designated as nonimpaired, nine sites were slightly impaired, and four sites were moderately impaired. Only 3.6 percent (14 of 384) of the water quality values exceeded their respective limits, indicating fairly good water quality in the Susquehanna River.

SRBC plans to continue using the adapted NRSA nonwadeable river protocols in future assessments. Fish collection has also been added to the protocol for field efforts starting in 2011, and SRBC plans to develop protocols to properly assess the reservoirs in the lower reach 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 depicted 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).

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Susquehanna River at Columbia, Pa.

In summer 2005, SRBC 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 previously described. In 2007, staff changed the methodology to mimic the methods drafted by USEPA for NRSA (USEPA, 2008). These methods have been used for the past four years.

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.

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 in Cooperstown, N.Y.,

and flows 444 miles through New York, Pennsylvania, and Maryland to the Chesapeake Bay at Havre de Grace, Md.

This year's Large River Assessment stretched from Sidney, N.Y., to Danville, Pa., and encompassed a total of 16 stations: six in the Upper Susquehanna Subbasin, seven in the Middle Susquehanna Subbasin, one on the Chemung River, one on the Juniata River, and one on the West Branch Susquehanna River (Figure 1). Downstream of Harrisburg, Pa., the river flows through a series of dams and reservoirs, which this protocol is not designed to assess.

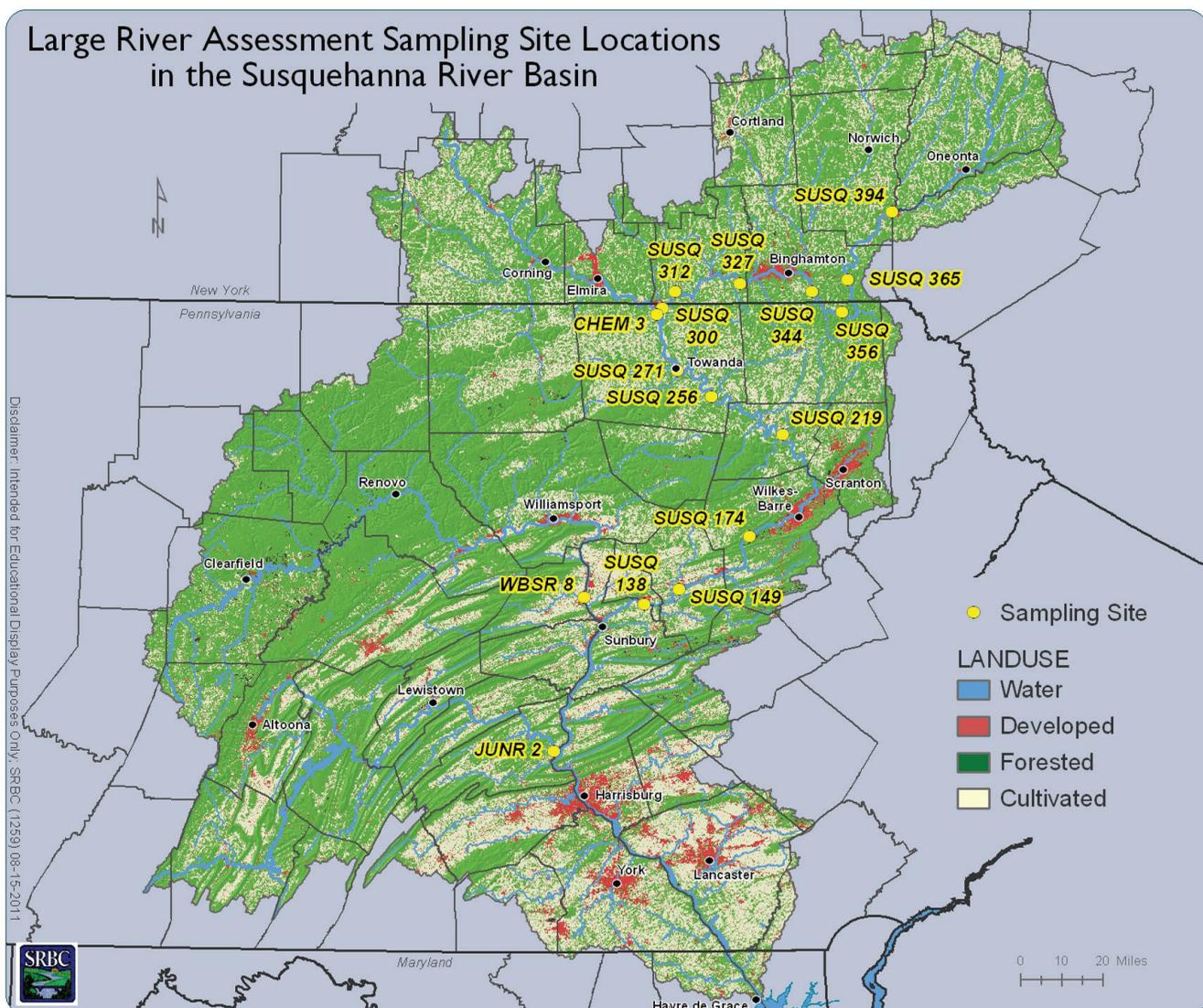


Figure 1. Susquehanna River Site Locations