REPORT ANNOUNCEMENT

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SUSQUEHANNA RIVER PILOT STUDY: LARGE RIVER ASSESSMENT PROJECT

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The Susquehanna River Basin Commission (SRBC) has been conducting biological stream assessments throughout the Susquehanna basin since the late 1970s. In the early years, SRBC used a Surber sampler for monitoring until the U.S. Environmental Protection Agency (USEPA) introduced the first version of the Rapid Bioassessment Protocol (RBP) manual in 1989, (Plafkin and others, 1989). SRBC used the RBP method in its interstate stream monitoring program and its rotating subbasin surveys. Then in 1999, SRBC adopted a more current RBP method (Barbour and others, 1999).

When SRBC considered assessing the basin's larger rivers (mainstem Susquehanna, Chemung, West Branch and Juniata), it was apparent that neither RBP methods would accurately depict their biological integrity. In 2002, SRBC initiated a pilot project to determine the proper methods of biologically assessing the large rivers. The information collected during the pilot project will be used in future years to select and calculate metrics for a benthic macroinvertebrate index of biotic integrity (IBI) to assess the biological conditions of the rivers of the basin. The data also will be used in SRBC's 305(b) assessments and to complement state assessment efforts.

Study Area

SRBC staff conducted the pilot project on the Susquehanna River between Windsor, N.Y., and Sayre, Pa., during September 23-26, 2002. Ten original sites on the Susquehanna River were chosen for the project; however, high river flows at the time of collection precluded collection at two sites and reduced the collection effort at several other sites.

Methods

The methods section of the report describes data collection, chemical water quality, physical habitat and macroinvertebrate sampling.

Chemical water quality. Water samples were collected at each of the sites, and nutrient, metal and ion concentrations were measured in the laboratory. Temperature, dissolved oxygen, pH, alkalinity and acidity were measured in the field.

Physical habitat. Eleven physical stream characteristics were field-evaluated at the time of sample collection. Other characteristics, such as stream type, weather conditions, substrate, land use and other important stream features also were noted.

Macroinvertebrate sampling. Staff collected benthic macroinvertebrate samples using four separate methodologies: vacuum benthic sampler (Figure 1), rock basket (Figure 2), multiplate sampler (Figure 3) and modified RBP. Samples were collected at five sites along a transect across the river. The five sites were at the left and right banks and at three internal sites.

Figure 1. Vacuum Benthic Sampler Used in River Assessment Project

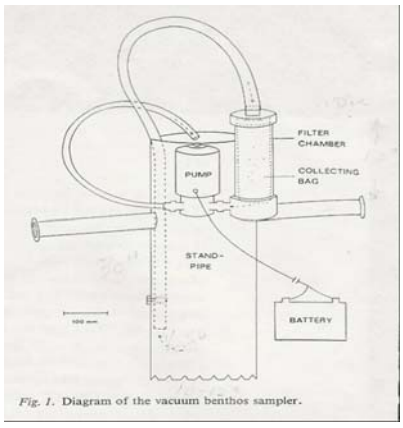

Fig. 1. Diagram of the vacuum benthos sampler.

Figure 2. Rock Baskets

(over)

Figure 3. Multi-plate Samplers

Results

Water quality. Most of the river sites met water quality standards, with only 10 out of 216 values (largely nutrient parameters) exceeding their limits.

Biological communities. Most of the sites on the river had assessment scores that indicated little impairment. The only site that consistently scored poorly was the site located downstream of the sewage treatment plant in Binghamton, N.Y.

Physical habitat. The Susquehanna River at Windsor, N.Y., served as the reference site for the habitat assessment. All sites on the river had either excellent or supporting habitat conditions.

Discussion

Water Quality. Overall, the Susquehanna River, in the stretch encompassed by this study, contains fairly good water quality, with a few nutrient parameters that are slightly elevated.

Macroinvertebrate communities. Fewer samples than originally planned were taken because a significant storm event elevated the river's flow (quadrupled base flows) just prior to the study commencing. However, several inferences can be drawn from the data collected in the reduced sampling effort.

1. Multi-plate and vacuum benthic samplers are less effective in collecting larger numbers (200+) of benthic macroinvertebrates.
2. Rock basket samplers consistently scored higher on several metrics.
3. At several sites, the biological assessment of the river varied depending upon location of the sampler.
4. The biological communities found during the pilot study were similar to those assessed during the most recent interstate streams survey.

Comparison of sampler types. While each sampler type has advantages and disadvantages for large river sampling, SRBC staff determined that a combination of rock baskets and RBP methods will be used for future river assessment projects. Rock baskets were effective in sampling deeper waters and produced consistent results. RBP methods also will be used as a comparison to the subbasin survey and interstate streams projects. The vacuum benthic sampler is too difficult to control in free-flowing water and is inconsistent in collecting larger numbers of macroinvertebrates. Multi-plate samplers also are inconsistent in this regard.

Future Studies

In summer 2004, SRBC staff will be sampling a larger portion of the mainstem Susquehanna River and its large tributaries using the sampling methods described above. The sampling sites will include 20 sites on the mainstem Susquehanna River from Sidney, N.Y., to Marietta, Pa., and one site at the mouth of each of the larger tributaries.

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This report is available on the
Susquehanna River Basin Commission website at:
www.srbc.net/technicalreports.htm
It also is available on compact disc.
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