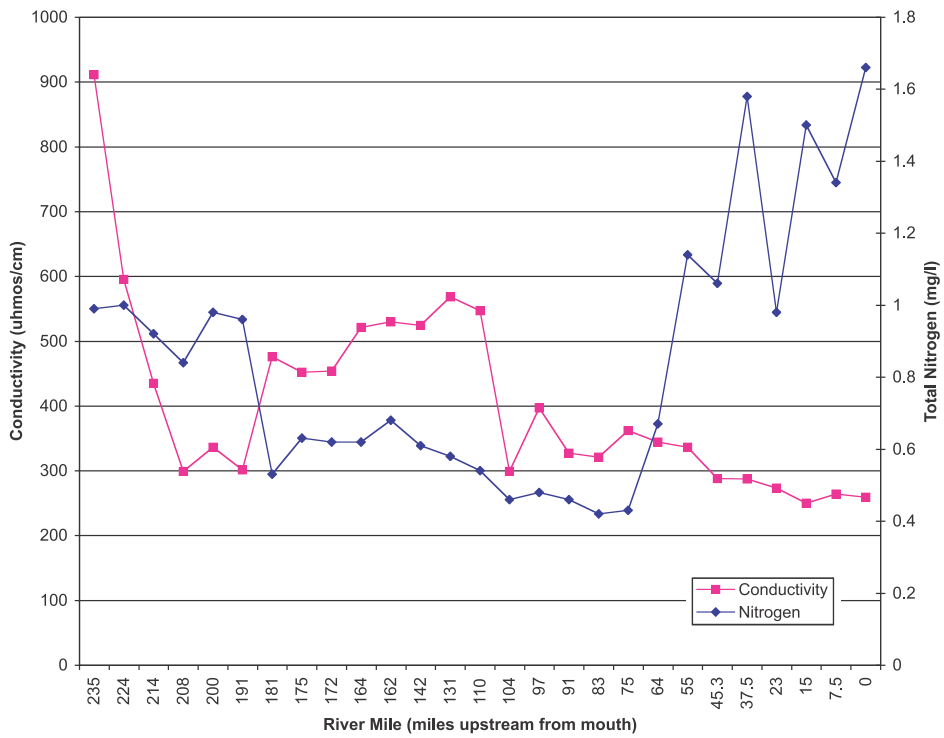
river began to recover to "middle" and "higher" water quality. WBSR 15.0 and WBSR 7.5 had nonimpaired macroinvertebrate communities. This lower section of the West Branch Susquehanna Subbasin had more agricultural influences. The pollution sources in this portion of the river were less commonly due to mining activities, as indicated by high conductivity, and were more often due to agricultural activities, as indicated by higher concentrations of nitrogen around river mile 55 (See Figure 10).

1994 Results/Discussion

The results for the 1994 West Branch Susquehanna Subbasin Survey are depicted in Figure 11 on the following page. These results are not directly comparable to the 2002 data since different analysis methods were used and the samples were taken at different flows; however, large differences in the categories indicate that there may have been some change. There were few drastic changes in water quality, biological condition, and habitat from 1994 to 2002, with the following exceptions: CHLLS 0.9, WBSR 162.0, WBSR 164.2, WBSR 55.0, ANDR 0.4, CLFD 42.2, DRUR 0.7, and FISH 2.1. Three of the changes were in water quality, four were in habitat condition, and one was in biological and habitat condition. At six of these eight sites, the conditions improved over the 8-year period.

Forty-three percent of the sampling sites that were historically and currently sampled were either moderately or severely impaired in 2002 compared to 47 percent in 1994. Excellent or supporting habitat was found at 91 percent of the sites in 1994 and 88 percent of the sites in 2002. This indicates there has been no major change in the overall condition of the subbasin. The West Branch Susquehanna River was impaired in the same sections in 2002, as it was in 1994. It was impaired in the headwaters and it was impaired from around Clearfield to approximately river mile 55.

Figure 10. *Nitrogen (mg/l) versus Conductivity (µhmos/cm) according to River Mile*

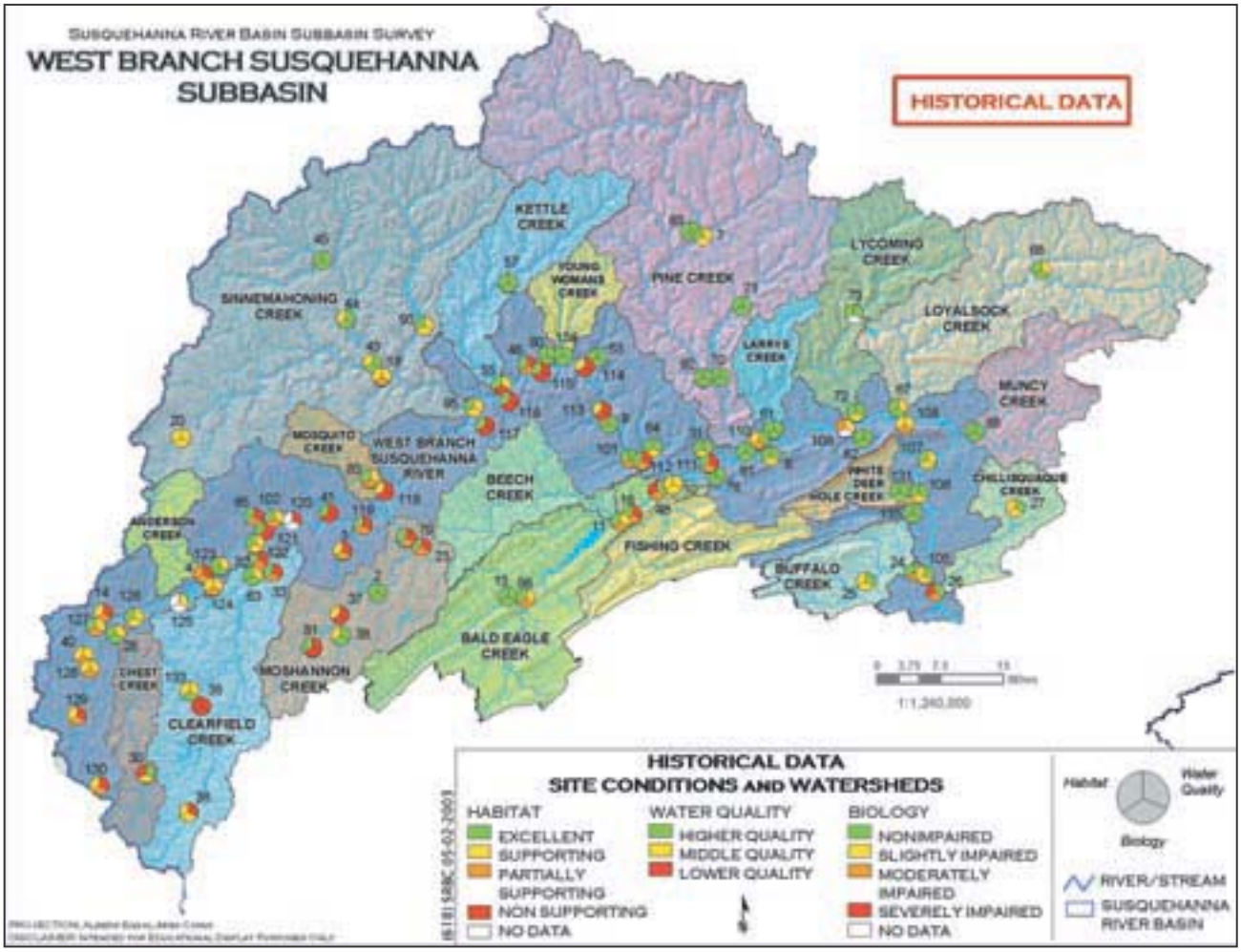


Conclusions

This subbasin had excellent habitat compared to other subbasins in the Susquehanna River Basin; however, it had a large percentage of severely degraded streams. Forty-six percent of the 2002 sampling sites had either moderately or severely impaired biological conditions. Approximately 83 percent of the moderately and severely impaired sites were affected by AMD. The next largest source of pollution was from agriculture. There was minimal effect from urban areas, as there is little urban land use in this watershed. Some of the most degraded watersheds within this subbasin were Muddy Run, Clearfield Creek, Moshannon Creek, Beech Creek, Two Mile Run, Dents Run, Cooks Run, Alder Run, Bear Run, Deer Creek, Little Anderson Creek, and Montgomery Creek. Some of the highest quality watersheds in this subbasin were Pine Creek, First Fork Sinnemahoning, Driftwood Branch Sinnemahoning, Young Womans Creek, Hyner Run, Paddy Run, Lick Run, and White Deer Creek.

The streams in the West Branch Susquehanna Subbasin have the potential to be very high quality streams due to the excellent habitat in this region. The watershed already supports very high quality streams such as Pine Creek. Numerous AMD remediation projects, such as limestone dosing, limestone drains, and passive treatment wetlands, are being implemented throughout the West Branch Susquehanna Subbasin; however, much work remains to be done in order to restore the streams in this watershed.

A second year of more intensive sampling will be conducted in the West Branch Susquehanna Subbasin starting in the fall of 2003. SRBC will focus on a smaller watershed within the West Branch Susquehanna Subbasin based on the survey results and input from watershed organizations and local government entities. The data collected will be provided to these local groups to support protection or remediation efforts in the watershed.



H. Wolbert

Figure 11. *Water Quality, Biological, and Habitat Categories in 1994 Sample Sites in the West Branch Susquehanna Subbasin*

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For raw data from this survey or more information concerning SRBC, visit our website: **www.srbc.net.**