

Conclusions and Recommendations

The evaluation protocols will assist in the comparison of Monroe County streams relative to their Aquatic Life Use (ALU) IBI scoring benchmarks. This is when the metrics used to analyze the stream organisms reflect the best or the clearest indication of the quality of the stream.

Raw data is statistically evaluated through the metric standardization and normalization equations and index calculations. Stream impairments are indicated by low biological assessment scores. This year there were 44 stream stations evaluated, 31 with the riffle-run and 7 with the multihabitat assessment protocols. During November, 6 low gradient sites were re-sampled for macroinvertebrates and chemical analyses. Overall, 4 out of 38 summer season (June – September), and 2 out of 6 winter season (October – May) sample sites were impaired. The sites that did not attain their benchmark were AQUACR11 (43.0), CHERCR15 (32.2), RED_RU03 both seasons, SAMBCR06 both seasons, BRODCR21 (40.8) and BRODCR13 (44.8). There were 3 sites that did not reach the collection protocol benchmarks, which require 200 total macroinvertebrate specimens per site (+/- 40 organisms): CHERCR06 (117), AQUACR13 (Replicate 269) and BRODCR19 (Replicate 250). Additionally, due to the change in metric calculations for the 2009 riffle-run method, Monroe County's 2008 macroinvertebrate samples were re-calculated with the new 2009 metrics. This indicated that 6 sites had dropped 11 points or more in the biological score as shown in Table 5. Table 6 depicts a comparison of the biological score of the seasonal sampling results, which were not dissimilar and further details are located in Appendix A.

It is recommended that the Monroe County Water Quality Study continue to utilize the Instream Comprehensive Evaluations and Multihabitat Assessment protocols for consistency with DEP guidelines. Lower scores recorded for sampling may not meet the ALU benchmarks for indicated thresholds, however, these situations may be due to or have been influenced by natural conditions such as marshy wetlands, or could be attributed to the differences in previous sampling procedures and methodologies for assessments. Historically, Monroe County streams had their designated uses based on public meetings and no sampling data. HQ and EV streams were probably largely undeveloped prior to 1977 when Chapter 93 was adopted with the current designations.

For successful instream functions, organisms must have optimal habitat conditions to be balanced, as they fulfill their position within the trophic dynamics of the aquatic ecosystem and associated processes. These dynamics represent the food chain and flow of nutrients and energy. Streams that contain good water quality will support macroinvertebrates that are both sensitive to and tolerant of pollution, with no dominant groups or types of organisms within that community population. Consequently, when a stream has increased organic pollution found in point and nonpoint sources (nutrients found in fertilizers, sewage and other sources), it may affect the physical and biological functions of watersheds since fewer pollution sensitive organisms are able to colonize within these poor environmental conditions.

The potentially impaired sites and probable cause of impairment are indicated below. These sites are recommended to be referred to DEP for further investigation.

Aquashicola Creek (AQUACR11) - Immediately upstream of bridge on Mt. Eaton Road.

Lat. 40° 52' 27.95" Long. -75° 19' 55.27"

The biological score was 43.05 out of 55.0.

- Low EPT and Beck4 was recorded at this site. This site could be impacted by the commercial land use upstream of this site.

Brodhead Creek (BRODCR13) - Approximately 200 yards upstream of confluence with Delaware River & DWGNRA Boundary Control Point.

Lat. 40° 59' 26.15" Long. -75° 08' 06.13"

The biological score was 44.8 out of 50.0.

- High Hilsenhoff index, low Beck's and low EPT were recorded at this site. This site is downstream from several WWTPs and is at the bottom of the watershed.

Brodhead Creek (BRODCR21) - Immediately upstream of Manwalamink WWTP discharge & downstream of confluence.

Lat. 40° 59' 40.77" Long. -75° 08' 21.32"

The biological score was 40.85 out of 50.0.

- No Plecoptera taxa, low EPT & modified Beck's and high Hilsenhoff indices and Beck's Index Score < 20 were recorded at this site. We are not sure why this site is impacted and will continue to investigate.

Sambo Creek (SAMBCR06) - Immediately upstream of stormwater discharge pipe, behind Weis Markets.

Lat. 41° 01' 05.65" Long. -75° 11' 04.06"

The summer biological score was 20.21 out of 55.0.

The winter biological score was 12.75 out of 55.0.

- No Plecoptera taxa were recorded at this site and it was dominated by the amphipod Gammarus. This stream is listed on the DEP impaired streams, Category 5 waterbodies list with pollutants requiring a TMDL (Total Maximum Daily Load). This site had a small riparian buffer, and is downstream from the S.R.447 bridge and surrounded by commercial land use. Loss of the riparian habitat buffer and possible on-lot impacts from Fawn Road residential developments may be contributing factors.

Cherry Creek (CHERC15) - From intersection of Middle Road & Blakeslee Road, approximately 275 yards north on Blakeslee Road.

Lat. 40° 56' 45.65" Long. -75° 14' 09.78"

The biological score was 32.24 out of 55.0.

- No Plecoptera taxa, low EPT, low Beck4 and only 2 mayfly and 2 caddisfly taxa were recorded at this site. This low gradient stream is located within an agricultural area and was impacted by the tornado which hit this area.

Red Run (REDRU03) - Approximately 100 yards upstream of Industrial Park Drive.

Lat. 41° 07' 44.20" Long. -75° 22' 44.31"

The summer biological score was 42.3 out of 55.0.

The winter biological score was 49.4 out of 55.0.

- No Plecoptera taxa were recorded at this site for both seasons. After several years of testing, this site might be indicative of the natural condition of this low gradient stream.

The Monroe County Planning Commission and the Conservation District will continue to develop long term trending associated with detailed watershed assessments. Also, the study will continue to document stream segments for those areas that have no data available.

Additional monitoring sites should be selected in consultation with active watershed groups within Monroe County and associated areas. Continued monitoring should be geared toward determining the extent and possible causes of instream impairment. These determinations will provide the County and the watershed associations with the information required to address potential mitigation, restoration and redesignation petitions.

The Monroe County Water Quality Study will continue to utilize bioindicators such as macroinvertebrates to measure ecosystem conditions and will continue to investigate alterations to ecosystem health and utilize scientific studies specifically written for Monroe County by Federal agencies such as the United States Environmental Protection Agency (USEPA), the United States Geological Survey (USGS), and other agencies such as the Delaware River Basin Commission (DRBC). The scientific investigation Report 2008-5030 acknowledges that there must be a focused attention on growth of a population and its effects on land-use which have the ability to result in negative changes to watershed health and stream base flow amid increased demands for water consumption (Sloto 2008).

The MCPC has promoted progressive planning principles such as multi-municipal comprehensive plans for shared, balanced and directed economic growth which provides protection and stability to natural resources and communities. A number of the County's municipalities have partnered together to effectively plan their regions. These plans lay the foundation for municipalities to share in infrastructure, zoning and land use consistency across municipal lines to effectively accomplish similar goals together.

There are certain practices that municipal leaders can initiate to maintain water quality and quantity, instream function and watershed processes. Such actions include utilizing best management practices (BMPs) for stormwater and promoting infill, subdivision and land development ordinances (SALDO) that restrict impervious surfaces, zoning ordinances that incorporate conservation design principles and growth management techniques that direct growth toward designated areas.

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Monroe County has conducted an annual water quality study for the past twenty five years. Through the years, the program has evolved and will continue to do so, and the annual report has been refined to provide a comprehensive analysis of the County's streams.

There are a number of people and organizations to be recognized for their efforts in this year's study:

- The County would like to extend sincerest thanks to all the volunteers (and staff) who gave many hours to assure that accuracy was maintained while collecting field data.
- The continued professional support from Prosser Labs and Aquatic Resource Consulting.
- Without the permission of private property owners, the number of sampling sites would be greatly reduced. The County appreciates them for allowing access to their property.

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