METHODS

Data Collection

This strategy is based entirely on existing data and information — no new water quality information was collected. The Pa. Department of Environmental Protection (PADEP) served as the primary source of information. Additional sources included the U.S. Geological Survey (USGS), SRBC monitoring data, Skelly & Loy, Inc., Dietz-Gourley Consulting, LLC, and Bloomsburg and Wilkes universities. In its calculations, SRBC focused on water quality data collected post-2000. Data from years prior to 2000, however, were not excluded and were utilized when more recent data were not available.

Data Review & Database Creation

In total, there are 745 unique stations in the database, containing 17,661 individual samples. The database emphasizes information on discharges and instream stations, but also includes information on boreholes, strip pits, and impoundments. Only instream and discharge stations were utilized for the analyses. Of the 745 unique stations, 346 are AMD discharge points while 399 are instream points. In the final strategy, of the 346 discharge points, only 320 were used for analysis because several points were sampled on the same total discharge flow.

Data Comparisons

Using GIS, SRBC calculated the amount of AML areas within each of the four Anthracite Coal Fields and the ten major Anthracite Coal Field watersheds. Calculations of AMD stream mileage were also made for the Coal Field watersheds.

Staff further compared the difference in discharge flows and metal loads/yields between both the coal fields and individual watersheds.

Current Stream Conditions

Using the most recent data at mainstem sampling locations, SRBC selected 128 of the 399 instream data points to analyze current stream conditions.

Those 128 points were then used for a GIS mapping exercise to illustrate sections of the watershed mainstem not meeting water quality standards for pH and iron and/or aluminum concentrations.

AMD Loadings to the River

Fourteen tributaries that contain listed AMD impairment along with five AMD discharges from the Anthracite Coal Region flow into the Susquehanna River. Those fourteen tributaries and five discharges were analyzed for their direct AMD (iron, manganese, aluminum, acidity) loading contribution to the Susquehanna River. All five of the discharges that directly flow into the Susquehanna River are located in the Northern Field.

Comparison of Anthracite Coal Field Discharges

Flow, iron, manganese, aluminum, and acidity loading were calculated for all the 320 discharges found in the Anthracite Region of the Susquehanna River Basin. The 320 discharges were then ranked from highest to lowest for each parameter. The top 10 ranked discharges for each parameter were selected and are noted in Tables 3 - 7.

Twenty discharges were represented in at least one of the Top-10 parameter rankings. Since these 20 discharges comprise a vast majority of the flow and AMD loading that impacts the Susquehanna River Basin, they constitute the initial treatment system recommendations plan of this strategy, called the "Top-20 Plan." Based on strategic selection of treatment plant sites, in some cases, several Top-20 Plan discharges could be treated at the same plant. Strategic treatment plant site selections would also allow, in some cases, adjacent discharges not in the Top-20 Plan to be incorporated into the treatment plant. Consequently, 10 active treatment plants were suggested for construction consideration. These 10 plants would treat 16 of the Top-20 Plan discharges as well as 20 adjacent discharges for a total of 36 of the 320 total discharges.

Potential Consumptive Water Use Mitigation Sites

Due to massive mine pool water storage capacity, the Anthracite Coal Region holds tremendous potential as a center for consumptive water use mitigation projects that will also improve basin water quality. Using the Anthracite Region Water Quality Database, SRBC highlighted several potential consumptive water use mitigation/water quality improvement projects to create a short list of examples for initial investigation. The estimated amount of water creation/storage for each of these prospective projects was calculated to illustrate the consumptive use mitigation potential held within the Anthracite Region of the Susquehanna River Basin.

Coordination

In 2009, a partnership emerged between SRBC and the Eastern Pennsylvania Coalition for Abandoned Mine Reclamation (EPCAMR), particularly in light of EPCAMR's Anthracite Region Mine Pool Mapping Initiative in the Western-Middle Field. The two organizations began sharing data, which proved beneficial to both parties in their project endeavors. That partnership endures as both agencies work together to implement the restoration strategy and continue the mine pool mapping effort in the other Anthracite Coal Fields.