**DEVELOPMENT OF THE BWA STREAMWATCH PROGRAM**

**INTRODUCTION**

The Brodhead Watershed Association was founded in 1989 to protect and preserve the water resources of the Brodhead Creek and its tributaries. The organization has a diverse membership including individuals, municipalities, businesses, educators, sportsmen/women, resort owners and environmentalists. Our work focuses on increasing public awareness of issues relating to water resources through education, community involvement, and stewardship.

Working closely with BWA members, and organizations such as the Concerned Citizens of Barrett Township and Trout Unlimited, the Brodhead Watershed Association's Streamwatch Program has been developing since August 1990. The parameters included in the study were identified with the assistance of the Monroe County Planning Commission and East Stroudsburg University's Biology Department. Procedures were standardized under the direction of the Monroe County Cooperative Extension Office and DER's (now DEP) Bureau of Water Quality.

The focus of the Streamwatch program has been to foster stewardship of local streams by volunteers, and develop a long term baseline of data on water quality in the watershed. The Streamwatch Program is dependent upon volunteer commitment. A study of this kind would be financially impossible if professional services were contracted. Given reliable equipment, informative training sessions, and standardized procedures, volunteers have proven to be a viable means of stream monitoring.

Research has shown that the best way to determine the "health" and condition of a stream is to repeatedly sample a variety of sites on a regular basis. This information must be compiled and regularly analyzed to note any changes. Major changes may be indicative of problems and would serve as reason to notify the proper officials for closer inspection.

 **BACKGROUND**

Over the past years, the Poconos has experienced rapid growth and development. Along with the economic benefits of this expansion comes the possibility of water quality degradation. Careful planning and monitoring on both a county and local level help to insure responsible growth while at the same time protecting the environmental attributes which characterize the region.

To date, water quality in most of the Brodhead watershed remains good. It is for this reason that it is important to continue to collect data on the Brodhead, Paradise, Pocono, Marshalls, McMichael and Cherry creeks and their tributaries in order to establish a continuing baseline profile. Good data showing the quality of the water as it currently exists is extremely important for future planning. Ultimately our goal is to safeguard these waterways from any backsliding in water quality.

In August 1990, the Brodhead Watershed Association's Board of Directors created the Streamwatch Committee with the purpose of designing a citizen's stream monitoring program. The goal developed for the program was involvement of a large number of individuals in monitoring water quality and observing stream habitat in order to develop an informed constituency for water quality.

The committee's next order of business was to identify parameters to be tested and equipment to be purchased. After much consideration, the parameters chosen to start up the program were water temperature and pH. Visual observations of the stream and nearby area are another important part of the Streamwatchers job. Digital pH/temperature meters were chosen based on their high degree of accuracy and limited potential for human error.

After attending various seminars on stream monitoring, the committee began recruiting volunteers and determining possible testing sites within the watershed. Procedures and data management methods were then standardized. Liability release and property access forms were created. DER was contacted and introduced to the proposed program and requested to provide additional input.

An initial orientation meeting was scheduled to explain the program and group volunteers into regional teams. Test sites were finalized and later mapped. The teams were then given individualized training sessions emphasizing the handling of the equipment, calibration, data recording, and the importance using standardized procedures. Implementation of the Streamwatch Program began the first week of August 1991.

At the conclusion of the first year, the Streamwatch Committee evaluated the strengths and weaknesses of the program. Based upon the findings of this evaluation the committee decided to discontinue the use of the digital field monitoring equipment and purchase LaMotte reagent pH and turbidity kits. This decision sacrificed precision for consistency and reduced maintenance costs.

In August 1992, the BWA Streamwatch program inaugurated an annual fecal coliform monitoring program. 60 water samples throughout the watershed were collected for testing. A certified lab in Monroe County performed lab work. The results of these tests as well as the data compiled during the first year were forwarded to each municipality and the Monroe County Planning Commission.

In 1992 the Streamwatch program expanded to include biological sampling at selected sites in the watershed. Aquatic insect samples were collected and evaluated at a variety of locations in the Northern, Paradise, and Lower areas during the fall of 1992. However, the time commitment (two hours per site) necessary to continue this program turned out to be more than our volunteers could provide.

As of August 1, 1993 BWA's Streamwatch program encompassed 93 sites (plus data from 19 sites in the upper McMichael creek) and 75 volunteers. Heath Potter, intern from East Stroudsburg University devoted the summer of 1993 to establishing procedures for Quality Control and creating documentation files for every site. All volunteers were accompanied to their sites and testing procedures checked for standardization in methodology. In later years, other interns have followed in Heath’s footsteps and worked with volunteers to maintain the quality of our program.

In 1997, the accuracy of the LaMotte and Hach pH, nitrate and orthophosphate kits was compared by having duplicate samples tested by a certified laboratory. The Hach equipment was determined to be more accurate and a switch was made.

In 2003 a “sub-association” was formed in the Cherry Valley and stream monitoring began using the Environmental Alliance for Senior Involvement (EASI) protocols. Over the next few years, due to lack of support from EASI, the Cherry Valley volunteers began using BWA’s Streamwatch protocols.

In 2010 we became aware that the chemical reagent packages used with the nitrate test varied greatly in quality. We worked with the Hach Co. Quality Control department and determined that, at the low levels of nitrate found in our streams, reliable results could not be guaranteed. However, Hach is the only company that provides a field test kit for nitrates suitable for volunteers to use. We developed an internal quality control procedure of testing new chemicals when they came from Hach, using a standard solution, thus assuring that, before new chemicals were provided to volunteers, they provided acceptable results. We also reduced the frequency of nitrate tests, asking volunteers to test only once a quarter.

 In 2006 all Streamwatch data collected to date was enter into the statewide database developed by the PA Organization for Watersheds and Rivers (POWR). That database was discontinued and BWA had to retrieve the data entered there. With help from POWR staff and BWA volunteers, we were able to develop our own database using Excel software. Data management volunteers enter data as it is received from Team Leaders and the data is shared through Dropbox. To receive a copy of data to date, email info@brodheawatershed.org with stream name, site number and description you are interested in.