

**Larry Merrill Abstract**

Acting Chief, Watershed Restoration Branch  
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The Targeted Watersheds Grant Program was proposed in 2002 by the Bush Administration to encourage successful community-based approaches to protect and restore the nation's watersheds. This competitive grant program provides needed resources to those watershed organizations whose restoration plans set clear goals and objectives with special consideration given to water quality monitoring, innovation, a public education component and strong community support. The Christina River Basin Clean Water Partnership is a wonderful example of partnerships in action working together to identify real problems in real places and then fixing them. In the 2003 selection process, the first year of funding in the Targeted Watersheds Grant Program, the Christina Basin application was the highest ranked application from over 170 submittals. This impressive milestone and the award of \$1 million in Federal grant funds was a testimony to the multi-state, multi-organizational effort that is working diligently to improve the water quality conditions in the Christina Basin. At stake is the health of an environmentally and economically significant residential, agricultural, and industrial watershed that provides numerous recreational opportunities and serves as a primary source of drinking water for many of its over 500,000 residents. However, there is no time to rest. With the implementation push provided by the Targeted Watershed grant and the pending completion of the high flow Total Maximum Daily Load study in early 2005, the partners and residents of the Christina Basin must have a renewed commitment to achieve the water quality management goals established for the Christina Basin.

***Sara Wozniak Abstract:***

In order to determine the health of the Delaware portions of the Christina Basin using concrete data, a team from the Water Resources Agency developed a report card structure to grade each of the subwatersheds. Drawing from existing water quality, watershed and stream quality data, a water quality ladder approach was used to ensure ease of public understanding. In this approach, the top of the ladder (those with grades of "A") corresponds with those areas of best possible quality while the bottom (those with grades of "F") represent the worst possible water quality rating. Nineteen various indicators were each graded on this scale for the 17 subwatersheds based on assigned criteria levels, and the mean of those grades were used to determine the overall grade for the subwatersheds and basin. This study showed that the overall grade for the Delaware portions of the Christina Basin was a C, indicating that there is a need for improving watershed health.

**John Harrod Abstract:**

Smartyards, a unique component of the Delaware Nature Society's Backyard Habitat program, is an incentive based effort to encourage homeowners to improve water quality by planting native, water friendly plants and reducing or eliminating the need chemical fertilizer and pesticide applications. While many efforts, such as the Total Maximum Daily Loads (TMDL) process, are underway at both federal and state levels, public understanding of nonpoint source pollution issues is necessary to cultivate awareness and create solutions. Smartyards helps individuals understand their own impact on the health of waterways by making the connection between land use practices and water quality. Participants certify their residences as official Backyard Habitat sites, while learning resource conservation practices and discovering how to provide habitat for a greater diversity of wildlife species; thereby, helping ensure the health of our streams and rivers by reducing the reliance on products that contribute to non-point source pollution.

Through grant funding, Smartyards participants receive a landscaping package valued at approximately \$500 and one-on-one technical assistance from Delaware Nature Society trained Habitat Stewards to help them certify their property. Certification allows the National Wildlife Federation and state affiliates like the Delaware Nature Society to map certified habitats and determine where wildlife corridors have been created and pinpoint specific watersheds that would benefit from the Backyard Wildlife Habitat program. Certification also provides an opportunity for property owners to educate and inspire others in their community. Smartyards has produced an enthusiastic response from homeowners, regulatory agencies, and funders. While homeowners are eager to receive the landscaping packages and learn how to make a difference locally, regulatory and funding agencies are encouraged by Smartyards ability to address TMDL's, increase citizen education and action, and to be easily duplicated in various watersheds.

### **Janet Johnson**

#### **Social Attitudes Towards Stream Buffers**

#### **Abstract**

A mailed questionnaire was administered to over 800 streamside landowners in Pennsylvania, Delaware and Maryland to determine current streamside land use, measure landowner willingness to create and maintain forested buffers, and gauge attitudes about alternative policies for encouraging streamside buffers. Thirty three percent of landowners who reported that agriculture was the dominant land use indicated they were willing to create forested buffers, whereas 51% of owners of wood lots, and 41% of owners of residential properties indicated they were willing to create buffers. Large majorities of all types of property owners said that they were willing to maintain existing streamside forests. Half of all landowners said they would be more interested in creating or maintaining buffers if they contained plants other than trees in at least some areas. Willingness to create and willingness to maintain buffers were positively correlated with feelings of connection to nature, concern about the environment, and reported participation in pro-environmental behaviors. Landowners were asked about the importance of various possible impacts of streamside forests on their willingness to create or maintain streamside forests. Concern about maintenance costs and loss of income and appearance were negatively related to willingness to maintain. Belief in the importance of streamside forests for stream protection, providing wildlife and fishing habitat, improving downstream areas, and improving bank stability were positively associated with willingness to create and maintain streamside forests. Impacts such as too much shade, pests, encroachment of vegetation, and maintaining view of the stream and meadow were not significantly related to willingness to create or maintain streamside

forest. Respondents supported educational, voluntary, and financial assistance policies for the encouragement of streamside forests rather than a regulatory approach.

### **Martha Corrozi Abstract**

Nonprofit organizations have an important role in service provision and in a number of activities that govern the nation, including watershed management. As the nature and importance of watershed management continues to evolve environmental nonprofit organizations will be expected to assist the government in managing watersheds throughout the nation. The Christina River Basin applies a watershed management approach in which a variety of nonprofit organizations have an important role in the watershed management process.

The watershed management approach is complex and the research, *The Role of Nonprofit Organizations in the Management of the Christina River Basin*, explores the complexity of involving nonprofit and government organizations in the management of the Christina River Basin. The sources of information were key informants in government and nonprofit organizations performing work in the Basin. The key informant identification was limited to persons with an established connection to the Christina Basin Water Quality Management Task Force and Committee or municipalities, counties, regional, state and nonprofit organizations currently addressing issues in the Basin.

The key informants' responses confirm that a variety of views and academic disciplines are represented throughout the nonprofit organizations in the Basin, resulting in a variety of roles for the nonprofit organizations. Although the respondents conveyed that nonprofit organizations in the Basin play a variety of roles, most of the respondents, both government and nonprofit, expressed that the significant if not primary role of nonprofit organizations is conveying information and educating key players in the Basin. Even though the respondents were overwhelmingly positive in discussing the relationship of nonprofit and government organizations and the role of nonprofit organizations in general, a variety of drawbacks were mentioned. This analysis describes the overall role of the nonprofits and the drawbacks and benefits associated with them as it relates to the management of the Christina River Basin. This analysis will also discuss key areas for future research regarding the role of nonprofit organizations in the Christina River Basin.

### **Andrew Homsey**

Presentation Abstract:

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"Playing the Hand You're Dealt:  
Optimizing the Utility of Analog Data--A Case Study"

In the course of using GIS to address water resource or other issues, existing data are often missing, inadequate, or in an inappropriate format for use. For instance, soils data

from the NRCS for northern New Castle County exist only in traditional map-book format. New Soil Survey Geographic (SSURGO) data for the region are pending, but research tasks may require data immediately.

For example, a 2004 study for the New Castle County Department of Landuse undertaken by the Water Resources Agency, Institute for Public Administration at the University of Delaware (UDWRA), sought to develop a water budget for the Cockeyville formation at Hockessin, Delaware. Since no adequate digital soils data existed, and accurate information on Hydrologic Soil Group was necessary to model infiltration for the water budget, it was critical to obtain the best available detailed soils data for the area. Procedures were developed to rapidly extract high-quality, spatially accurate digital soils data from the 1970 Soil Conservation Service paper map series, which had been produced using hand-drawn lines atop aerial photographs.

This exercise demonstrates that, given inadequate or not readily available data, adaptive re-use of non-digital sources can often provide viable, high-quality data layers to address a research question.

### **Bob Struble: Presentation on Brandywine Valley Association for the Christina Basin Conference – October 13, 2004**

The Brandywine Watershed has a long history of pioneering efforts and accomplishments in watershed management. The Brandywine Valley Association was organized in 1945 and is the oldest small watershed association in America. It has been a model for many similar organizations throughout the United States and internationally.

One of the earliest projects of BVA was the formation of the Chester County Conservation District in 1948 to provide technical assistance for farmers interested in implementing conservation plans. Soil erosion was a serious problem in the 1940's and the Conservation District's assistance significantly reduced sediment loads in the creek. In 1948 the first limnological studies in the Brandywine began under Dr. Ruth Patrick from the Academy of Natural Sciences. These studies continued on a regular basis through the Academy of Natural Sciences until the Chester County Water Resources Authority and the U.S. Geological Survey began regular studies in 1969.

Other major projects by the Association included the first landfill in Chester County in 1954 and the organization of the Chester County Water Resources Authority, still the only county water resources authority in Pennsylvania, in 1961. The Authority was formed to implement the Brandywine Watershed Work Plan for flood control and water supply which includes five dams to protect areas prone to flooding as well as provide flow augmentation in dry years.

The BVA pioneered the concept of land application of treated wastewater effluent in 1972 and continues to promote this technology. The association was also instrumental in the early recycling programs in the watershed and in 1986 began education programs for local school districts. Currently the education programs make over 15,000 student

contacts a year at the BVA's Myrick Conservation Center in Pocopson Township and at individual schools. The Watershed Learning Center program, Indoor Out School and Watershed School are all ongoing education programs focusing on the importance of water resources as part of an overall environmental education program.

Working through friendly persuasion the association emphasizes the educational approach using sound technology and good science. The association is supported by over 800 members, both individual and corporate, and is governed by a board of 30 volunteer directors and managed by a staff of five full-time and 25 part-time employees.

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### **Linda Stapleford Abstract**

#### **White Clay Creek National Wild and Scenic River**

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*“...certain selected rivers of the Nation ...shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.”*

#### *National Wild and Scenic Rivers*

The White Clay Creek watershed is renowned in the bi-state area for its scenery, recreational opportunities, historic features, and water supply resources. In 2000 the creek and its tributaries in Pennsylvania and Delaware were designated by federal legislation into the National Wild and Scenic Rivers System. This marked the first time an entire watershed, rather than just a section of river, was designated into the system. This “beyond-the-riverbank” approach takes into consideration the variety of influences outside the river corridor that affect river habitat and water quality.

Municipalities, counties, state and federal agencies, together with private organizations and citizens sought the designation and developed the Management Plan to protect the White Clay Watershed and its special natural and cultural resources. These stakeholders continue to work in partnership through the White Clay Creek Watershed Management Committee. They have been engaged in the past few years in projects to: *improve and conserve water quality and water quantity; conserve open space, woodlands, wetlands and geologic features; protect native plant and animal species; preserve cultural, historical and archaeological sites; enhance outdoor recreation opportunities; and encourage environmental education and outreach.*

### **Cooch Abstract.**

I will plan to talk about the history of the Christina Conservancy and its mission, some of our activities, the history of the area around Cooch's Bridge including iron mining and the milling industry, touch on the conservation easement on the farm, which is the site of the only battle during the Revolution, and finally, a brief account of the Battle of Cooch's Bridge.

### **The History of the Christina Basin – George Washington Slept Here**

**Gerald J. Kauffman, Director of Watershed Policy  
University of Delaware, Institute for Public Administration, Water Resources  
Agency**

#### **Abstract:**

The waters of the Christina Basin are unique in Delaware for their water supply, ecological, economic, and historic values. The Brandywine, Red Clay, White Clay and Christina watersheds provide over 60 percent of the drinking water for the First State. The basin is the habitat of the only six trout streams in Delaware. Bald eagles, a federally protected species, nest near Churchman's Marsh. Two hundred and twenty seven years ago, the watershed was the site of two battles in the War for Independence – the Battle of Cooch's Bridge near Newark, Delaware and the Battle of the Brandywine near Chadds Ford, Pennsylvania.

By historic accounts the Christina Basin is Delaware's first watershed. The indigenous people of the watershed, the Minquas and the Lenape, knew a rocky landing at the mouth of the *Suppekongh* creek as *Hopkohacking* or "the place where we smoked the tobacco pipe." In 1638 the Swedes arrived aboard the *Kalmar Nykel* and established Fort Christina at "The Rocks" on the Minquas Kill (the Swedes then named it Christina Kill) as the first permanent European settlement in Delaware. In 1765, Mason and Dixon finished the survey of their line that separated parts of the Christina Basin into three states. On September 3, 1777 the watershed was the site of Delaware's only Revolutionary War battle at Cooch's Bridge (debated to be the first time where the stars and stripes, the Betsy Ross flag, were unfurled in battle).

Just over 200 years ago, the Dupont's chose the falls of the Brandywine Creek above Wilmington to power their gunpowder mills. In 1849, just before the Civil War, Harriet Tubman escaped slavery and traveled the Underground Railroad over the Christina and the Brandywine through Wilmington toward freedom in Canada. In 1886, the watershed was at the crossroads of the transportation web along the Atlantic seaboard as the B & O railroad built a second line parallel to the Pennsylvania RR through Newark and Wilmington. In 1931, the City of Wilmington built Hoopes Reservoir in the Red Clay Creek watershed, the first and largest reservoir in Delaware. During the Second World War, the Dravo shipyard was the largest industrial employer in Delaware as it built 187 ships along the tidal Christina at Wilmington.

On October 24, 2000, President Clinton signed a law designating the White Clay Creek as a national wild and scenic watershed, the first in Delaware and the first nationally to be designated on a watershed basis instead of a river corridor basis. Water supplies and water conservation plans in the basin helped residents get through the 100 - year drought of 2002. Last year, the federal Environmental Protection Agency recognized the Christina Basin with a \$ 1 million grant as the number one ranked watershed in the USA (out of over 170 watersheds) according to the targeted watershed grant initiative. Several months ago, the newspaper reported that the Port of Wilmington at the mouth of the Christina River imports some of the highest tonnage of fresh fruit in the USA. The Christina Basin is prominent in many ways, first in water supply and first in history.

The Christina Basin occupies an important place in Delaware and American history. It's streams and geology such as the Christina River, Purgatory Swamp, and Iron Hill are mentioned prominently by historians of the American Revolution. The watershed, with headwaters in Maryland and Pennsylvania above the Mason and Dixon Line, is the only one in Delaware with waters that flow through three states. This historic watershed provides irreplaceable resources such as drinking water for 500,000 people in Delaware and Pennsylvania and nesting grounds for the bald eagle, our nation's symbol. The basin is a resource to be treasured for its natural and historic values. And yes, General George Washington did sleep here.