

Chapter 1: Pollution Control Strategy

1.1 What Is a Pollution Control Strategy?

A pollution control strategy (PCS) is a set of discrete and specific measures identified and implemented to achieve reductions in pollution levels. The purpose of the measures is to meet set standards and goals in a specific watershed. The measures may vary by source type as well as by the pollutant that is being targeted. These measures may include practices such as pasture fencing in the agriculture sector, retrofitting stormwater Best Management Practices (BMPs) in the urban sector, and providing public education forums on watershed topics to name just a few examples.

Developing the PCS is a multifaceted and comprehensive process that according to the USEPA is made up of four main steps: determine priority pollutants, identify control measures, incorporate the control measures into a plan, and involve the public in development and implementation of the plan. The Christina PCS was realized by working through these four steps. As a result, it is a document developed through a public process and is the best combination of management practices and control technologies intended to meet the Christina Basin TMDLs.

The following sections in Chapter 1 discuss the role and process of developing a Tributary Action Team and the elements that have gone into developing the Christina Basin PCS. The following chapters discuss the key components discussed by the Tributary Action Team throughout the development of the PCS. The information in these chapters, specifically Chapters 2 and 3, is critical in understanding the Christina Basin and the nutrient and bacteria reduction goals that need to be met. The information presented in these chapters is also a critical component in developing the recommendations set forth in Chapter 4 of this document. The Christina Basin PCS is unique in that it also dedicates a portion of the PCS to monitoring and a cost/benefit analysis. Chapter 5 summarizes the current and ongoing water quality monitoring in the Delaware portion of the basin and the importance of monitoring in the implementation of the PCS. Chapter 6 of the Christina Basin PCS provides a detailed look at the economic benefits that the Christina Basin provides and the costs of the implementation of the recommendations outlined in Chapter 4.

1.2 Tributary Action Teams

The Delaware PCS process places great importance on public participation. In the state of Delaware the concept of Tributary Action Teams (TAT) was first developed by the Center for the Inland Bays (CIB). The team process enables citizens to get involved in sorting out the difficult issues, wrestling with the trade-offs, and developing ways to reduce pollution and improve the health of the environment. In this way, the strategies have greater support in the communities they impact (www.dnrec.state.de.us/water2000/Sections/Watershed/WS/pcs.htm).

A TAT holds the responsibility of preparing the PCS. A TAT is comprised of a group of local stakeholders with varying interests in the watershed. The team is convened by a “neutral” organization such as Cooperative Extension, a school district, or a local watershed group. The team, led by a facilitator, defines the issues specific to the watershed in multiple ways so that all people within the community understand the water quality problems and the connection to what

occurs on land and the resulting water quality problems. After defining the problems, the team frames the potential solutions in various ways to make the solutions understandable and the goals achievable for multiple stakeholders. Once the process is completed and the document is finalized, the team submits the strategy to DNREC for review and, ultimately, promulgation. The team decides which approaches will be most effective in its watershed, based on extensive study, comments at citizen forums, advice from experts, and discussions at public team meetings. In this way, the community defines a strategy that it is willing to implement.

1.3 The Christina Basin Tributary Action Team Process

The Christina Basin TMDLs were established by the USEPA in April 2005. After finalizing the high flow TMDLs, the Christina Basin Clean Water Partnership Policy Committee recommended a schedule for the TAT approach to achieve the high flow TMDLs in the Delaware portion of the Christina Basin. In January 2006 the USEPA modified the Christina Basin high and low flow TMDLs. DNREC requested IPA-WRA serve as a neutral convening organization for the team and provide the following functions: correspond with the team about monthly meetings, bring the team's recommendations to DNREC, and manage the funds made available to the team for purposes of completing the PCS. In December 2005 and January 2006 IPA-WRA began the process of forming a TAT for the Christina Basin PCS.

IPA-WRA identified interested stakeholders and citizens, who represent various interest groups, for appointment/membership on the Christina Basin TAT. The individuals contacted included water utilities, nonprofit organizations in the basin (for example, Brandywine Conservancy, Delaware Nature Society, Red Clay Valley Association, Christina Conservancy, and White Clay Creek Wild and Scenic Committee), state, county, and local government organizations, homebuilders, industry, and citizens living and working in the Delaware portion of the Christina Basin. Even though members were identified and invited to join the team at the initial stage, new members joined the team throughout the entire process. The Christina Basin TAT process has benefited from a committed group of stakeholders over the 18-month process. These individuals attended the Christina Basin TAT monthly meetings on a consistent basis and contributed significantly to the development of the Christina Basin PCS. Table 1.1 lists the Christina Basin TAT Members.

The TAT process began with contacting potential Team members and continued with an initial meeting to discuss the TMDLs set for the Delaware portion of the Christina Basin, the roles and responsibilities of the TAT, and the goals of the PCS. The team continued to meet on a monthly basis to discuss the issues and concerns unique to the Christina Basin and to develop an issues framework. In June 2006 the Christina Basin TAT hosted a public forum to identify the guiding principles for the PCS. The public forum is discussed in more detail in Section 3.4. Once the guiding principles for the PCS were determined, the TAT identified the sector-specific recommendations through a series of meetings and forums. The meetings were held throughout the Christina Basin with the intent of exposing the group to the diversity of land use and water quality concerns contained within the Christina Basin. Table 1.2 outlines the Christina Basin TAT meeting schedule, meeting locations, and meeting tasks.

Table 1.1 Christina Basin Tributary Action Team Members

Committee Member	Organization
Jennifer Adkins	Partnership for the Delaware Estuary
Colleen Arnold	City of Wilmington, Public Works Department
Jessie Benjamin	Representing New Castle County Conservation District
Andrea Bennett	USEPA – Region 3
Jan Bowers	Chester County Water Resources Authority (Pa.)
Laura Boyer	DNREC, Division of Water Resources, Watershed Assessment Section
Katherine Bunting-Howarth	DNREC, Division of Water Resources, Watershed Assessment Section
Kara Coats	City of Wilmington
Randy Cole	DelDOT
Martha Corrozi	University of Delaware, Institute for Public Administration-Water Resources Agency
Sarah Deacle	Delaware Center for Horticulture
Kelley Dinsmore	City of Newark
Maryanne Edwards	Citizen
Lorraine Fleming	Christina Conservancy
David Fournier	United Water Delaware
Jennifer Gochenaur	Delaware Nature Society
Elaine Grehl	University of Delaware, Institute for Public Administration-Water Resources Agency
John Harrod	Delaware Nature Society
George Haggerty	New Castle County, Department of Land Use
John Hayes	Delaware Rural Water Association
Jerry Heisler	Reybold Group
Amie Howell	USEPA – Region 3
Stephen Johns	Vandemark & Lynch, Inc.
Jason Jones	Citizen
Lyle Jones	DNREC, Division of Water Resources, Watershed Assessment Section
Jim Jordan	Red Clay Valley Association
Francis Julian	Homebuilders Association of Delaware
Gerald Kauffman	University of Delaware, Institute for Public Administration-Water Resources Agency
Joel Karmazyn	Citizen
Jim King	Citizen
Carl Koch	Greeley and Hansen
Vikram Krishnamurthy	Delaware Center for Horticulture
Rich LaPointe	City of Newark
Stephen Lefebvre	Homebuilders Association of Delaware
Robert Lonsdorf	Brandywine Conservancy
Molly Mackil	VanDemark & Lynch, Inc
Karen Marshal	Greater Brandywine Village Revitalization
Stacey McNatt	New Castle County, Department of Land Use
Angelina Micheva	University of Delaware, Institute for Public Administration-Water Resources Agency
Anne Mundel	DNREC, Source Water Assessment
Doug Nicol	Citrusuco
Ginger North	Delaware Nature Society
Bryan Pariseault	URS Corporation
Nancy Parker	Artesian Water Company
Frank Piorko	DNREC, Division of Soil and Water Conservation
Morgan Price	DNREC, Site Investigation and Restoration Branch
Alex Rittberg	DNREC, Division of Air and Waste Management
Bart Ruiter	DuPont
John Schneider	DNREC, Division of Water Resources, Watershed Assessment Section
Gary Schwetz	Delaware Center for Horticulture
Michael Sistik	City of Newark
Saurabh Srivastava	New Castle County, Department of Special Services
Linda Stapleford	White Clay Creek Wild and Scenic Program
John Stefferud	Natural Lands Trust
Martin Wollaston	University of Delaware, Institute for Public Administration, Planning Services
Lisa Wool	Partnership for the Delaware Estuary
Leslie York-Hubbard	University of Delaware, Department of Occupational Health and Safety
Jonathan Zangwill	Delaware River Basin Commission
Melissa Zechiel	University of Delaware, Institute for Public Administration-Water Resources Agency

Table 1.2 Christina Basin Tributary Action Team Time Table and Meeting Schedule

Meeting	Date	Location	Task
	April 8, 2005		USEPA issues Christina Basin high flow TMDLs
	December 9, 2005		Christina Basin Clean Water Partnership Policy Committee recommends schedule for Delaware Tributary Action Team approach to develop implementation strategy by December 2006
	January 2006		USEPA modifies Christina Basin high and low flow TMDLs
	December 2005/January 2006		Christina Basin Tributary Action Team Assembled
1	February 15, 2006	University of Delaware Newark, Del.	Kickoff Meeting
Conference	March 11, 2006	Delaware National Estuarine Research Reserve Dover, Del.	DNREC Tributary Action Team Conference
2	March 15, 2006	University of Delaware, Wilmington Campus Wilmington, Del.	Poster Presentation and Generation of Concerns
3	April 12, 2006	Delaware Nature Society Hockessin, Del.	Issues Framework/Public Engagement
4	May 17, 2006	Kalmar Nyckel Tall Ship Wilmington Riverfront (Christina River) Wilmington, Del.	Committee Forum
5	June 20, 2006	Delaware Center for Horticulture Wilmington, Del.	Public Forum
6	July 12, 2006	Winterthur Winterthur, Del.	Forum and Poster Session Debriefing
7	August 16, 2006	University of Delaware Newark, Del.	Review Sector Specific BMP Matrices
Bus Tour	September 8, 2007	Christina Basin Del. and Pa.	Christina Basin Watershed Annual Bus Tour
8	September 13, 2006	Longwood Gardens Kennett Square, Pa.	Recommendations Drafted
9	October 18, 2006	Deerfield Country Club Newark, Del.	Recommendations Drafted
10	November 14, 2006	Porky Oliver Golf Course Wilmington, Del.	Recommendations Drafted
11	December 14, 2006	Marriott Hotel, University of Delaware Newark, Del.	Christina Basin Clean Water Partnership Policy Committee Meeting Final Recommendations/Future Role
Briefing	March 6, 2007	Newark Municipal Building Newark, Del.	Briefing for City of Newark Representatives
12	March 28, 2007	Delaware Nature Society Hockessin, Del.	PCS Review
Briefing	April 5, 2007	City/County Building Wilmington, Del.	Briefing for City of Wilmington Representatives
Conference	May 12, 2007	Rusty Rudder Rehoboth, Del.	PCS Review
13	June 6, 2007	Blue Ball Dairy Barn Wilmington, Del.	PCS Review
Briefing	July 31, 2007	New Castle County Department of Special Services	Briefing for New Castle County Representatives
14	November 5, 2007	Chase Center on the Riverfront Wilmington, Del.	Final Meeting PCS Proposal to DNREC

1.4 Christina Basin Tributary Action Team Public Forum

The TAT approach practiced in Delaware emphasizes the importance of holding public forums. Through public forums and educational resources the TAT helps the local communities become familiar with the major issues and the potential solutions for achieving the TMDLs. The forum serves as a venue for the public to provide input on the priorities in the watershed and a strategy that will be implemented. During the public forums the community comes together to discuss the various approaches to the issues and the potential solutions and ultimately identifies “common ground” on which the team can base its strategy. The public forum plays a central role in getting community feedback from members of the community who cannot participate regularly on the team but would like to stay up-to-date on the process and provide input.

The Christina Basin TAT determined that hosting a public forum in a central location in the basin, in the beginning of the process, would be beneficial. A public forum was held at the Delaware Center for Horticulture in Wilmington, Delaware, on Tuesday, June 20, 2006. The forum attracted over 50 participants. The forum participants included stakeholders from a variety of organizations as well as residents with a personal interest in the health of the rivers and tributaries in the basin.

The Christina Basin TAT developed three approaches to bring to the public forum to serve as points of discussion and to obtain feedback on the community’s concerns related to developing a strategy to achieve the Christina Basin TMDLs. The following approaches were developed for the public forum and used as a basis for the discussion:

- *Approach 1*–We Can All Pitch in to Help the Christina Basin: Everyone has a role in cleaning up the basin and voluntary actions will reduce the pollution.
- *Approach 2*–Science and Regulation are the Solution to Pollution: Science and regulation are the best and only way to reduce the pollution.
- *Approach 3*–Equity for All: Everyone should contribute to the clean up according to their pollutant load contribution, pay-as-you-go.

These approaches were outlined in detail in an issues document that was distributed at the forum. The issues document was used to educate the group, facilitate discussion, and help identify what is most important to the participants and other stakeholders not represented at the forum. The participants were asked which approach most closely represented their interests or was the most feasible approach to achieve the TMDLs promulgated by the USEPA for the Delaware portion of the Christina Basin.

This forum served as a useful educational tool for the stakeholders and the team. Several members of the public mentioned that this was the first time they were hearing about many of the pollution problems in the basin. Some were taught about sources of pollution they did not know were an issue, for example septic systems and CSOs. People living in the basin learned about some of the negative behaviors impacting the waters of the Christina Basin as well as some of the concerns of other citizens, community activists, government entities, and nonprofit organizations in the basin. People were connected with others in the community who have an interest in protecting the Christina Basin.

After extensive discussion for all three approaches the outcome of the forum is that there are pros and cons to each approach and all three approaches must be considered when developing the recommendations for achieving the high flow TMDLs in the Delaware portion of the basin.

Major themes that resulted from the forum for the team to consider when developing the Christina Basin PCS included:

- Equity for all stakeholders in the basin is a critical.
- Money is a major roadblock. All of these solutions take money. No matter how educated stakeholders become, money is an essential consideration.
- There is no quick fix, improving the water quality is a long and difficult process.
- Other cities have fixed these problems, Delaware can too.
- Move beyond “preaching to the choir.”
- Education is key to any approach.
- A Christina Basin community is necessary to connect everyone who wants to help clean up the basin.
- Enlightened leadership is essential.
- This is a tri-state effort, Delaware, Pennsylvania, and Maryland must be involved.
- Delaware is a small state, and we need to use this opportunity to our advantage.

The public forum served to identify that the best approach to reducing the nutrient and bacteria loads is a combination of the three approaches presented at the forum. A multi-faceted approach—considering recreational, economic, water supply, and biological components—is the way to get everyone in the basin involved and to care about what happens. Achieving the TMDLs set for the basin will need to include all stakeholders—government, citizens, corporations, and legislators—in the form of regulatory, scientific, and voluntary efforts that are equitable to everyone in the basin.

The forum informed people about the TAT process, which most did not know was occurring in the areas where they live, work, or play. The public forum served to identify the stakeholders’ concerns and priorities. An additional benefit of the forum was that several people became members of the TAT. In addition to new team members, individuals who did not want to participate on the team on a regular basis, but were interested in following the development of the strategy were able to become involved in the process and stay up-to-date on the activities of the group through email communication. The information collected at the forum was used to guide the development of the recommendations contained in this document, specifically the recommendations outlined in Chapter 4.