

The Basin by Bus:
The 2005 10th Annual Christina Basin Bus Tour
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Over 50 members of the Christina Basin Clean Water Partnership from Delaware and Pennsylvania had the opportunity to tour the Christina River Basin on Friday, September 9th 2005, as part of the *10th Annual Christina Basin Bus Tour*. Tour participants visited the sites of Christina Basin restoration projects in both Pennsylvania and Delaware, seeing first hand examples of watershed management strategies put in place to protect this important resource.

Bob Struble and Jim Jordan of the BVA coordinated the tour. This year's itinerary was put together by Dan Greig, Steve Williams, and Jerry Kauffman, and included stops at the following sites:

Chester County, PA

- Phillip's Mushroom Farms, waste water management pond and spray field
- Floodplain Forest Restoration, Bucktoe/Red Clay Creek, Kenett Township
- Norwood Road-Ludwig's Creek Stormwater Retrofitting Project

New Castle County, DE

- Newark Reservoir (drive-by)
- University of Delaware, WRA Rain Garden
- Pike Creek Stream Restoration at Three Little Bakers Golf Course

As in previous years, the group was treated to warm, sunny weather as the full bus departed from the New Garden Township Building in Chester County to begin their tour. The morning was spent at the Pennsylvania sites, with a lunch break back at the New Garden Township Park, before continuing on to Delaware in the afternoon.

Phillip's Mushroom Farms

Phillip's Mushroom Farms, in the Red Clay Creek watershed, are known for their exotic mushrooms, as well as traditional varieties. The farm currently has a 500,000 gallon tank for collecting water used in production. They recently added a 1.5 million gallon HDPE-lined pond for the purpose of collecting waste water from facility wash down. The pond has aerators installed to churn up solids and reduce their build up on the pond's bottom. The added capacity will hold the nutrient rich water until it can be sprayed onto an adjacent hay field for



nutrient absorption, reducing run-off. The hay can later be harvested for use as mushroom compost at the farm. In addition to providing for the farms' current waste water output, the pond's capacity is large enough for future expanded output.

Floodplain Forest Restoration at the Confluence of the Bucktoe and Red Clay Creeks



Tour led by William J. Ryan III – Ecological Restorationist/Land Manager, Brokaw Property
As of summer 2005, this riparian buffer restoration project has encompassed approximately 7 acres of privately owned land across the West Branch of Red Clay Creek, adjoining approximately 280 acres of preserved lands. A neighbor rents the floodplain for horse pasture, which resulted in the wetlands and stream banks being browsed and compacted by the animals. This in turn prevented natural

reforestation of the area.

Extensive work has taken place towards the project's goals. The restoration process has included the re-delineation of livestock fences to increase the riparian buffer width and keep livestock out of flood plain areas, native trees and shrubs have been planted along the bank -with some species of seedlings gathered on the site, and mowing to control invasive species and reduce rodent habitat. Native species that were transplanted include: Bitternut Hickory, Black Gum, Black Birch, Swamp White Oak, Sycamore, and Green Ash. The project also included the removal of invasive species such as Japanese Hops, Sting Nettle, Mile-a-Minute, Curly Dock, and Burdock. A 'wet meadow' and ephemeral pools add diversity to the available habitat. The ephemeral pools currently provide egg-laying sites for Spring Peepers, and American frogs.

Norwood Road-Ludwig's Creek Restoration Project

Tour led by Charlotte Sprenkle - Watershed Coordinator, Chester County Conservation



This stream restoration project involves the private property of 7 landowners in the Brandywine Cristina River Basin – a sub-watershed of the Brandywine Creek. This urban stream valley was eroded by inadequate stormwater controls upstream and the construction of new developments with large amounts of paved surfaces built on steep slopes in the upper watershed. Record rainfall amounts in 2003 and 2004 added to the erosion problems.

The residents of Norwood Road, East Caln Township, Chester County Recreation and Parks Department, Brandywine Conservancy, two housing developments, Pa. Representative Curt Schroder (House 155th), PADEP, and CCCD agreed to a comprehensive repair plan and design for restoration. LandStudies, Inc. and Ecological Construction were contracted for design and construction. Each landowner's property had specific issues associated with it. The most pressing concern was a severely eroded section of the stream bank that was putting a landowner's home in danger. The stream channel was moved, and the flood plain re-graded to restore the stream to a safer course. A rock weir was installed to divert the water channel and the stream valley slopes were reconstructed. In other areas stream bank stabilization was done using erosion control blankets, staples, and live stakes.



Newark Reservoir

As four participants rode past they caught glimpse of the nearly completed Newark Reservoir. The 317 million gallon reservoir is about 90% complete, and the city plans to have it filled by December of 2005. The contractor is currently re-grading the bottom and side slopes of the reservoir, and installing geomembrane and concrete liner. The facility will support the water use needs of area residents, supplementing the water supply derived from local streams. The additional water is particularly needed during times of low stream flow that occur with dry, hot summer weather. With the completion of this project, the City of Newark's water supply should be nearly self-sufficient.

University of Delaware WRA Rain Garden

Tour led by Jerry Kauffman- Director of Watershed Policy, Water Resources Agency, on behalf of Elaine Grehl-Graduate Research Assistant, Water Resources Agency

Outside the entrance to the IPA Water Resources Agency, a newly constructed rain garden has take root where a sloping grassy area once was. Rain gardens are plantings made in shallow depressions to collect runoff, and are not designed to maintain standing water. Instead, they are designed so that the water will evaporate, infiltrate the ground, or be taken up by the plants within 4 days. This sets them apart from wetlands or water gardens where standing water persists. Soil types and rates of infiltration, along with other conditions of a site must be considered when planning the size and depth of the garden.



The WRA rain garden encompasses 4000 ft², and it has the capacity to hold 15,000 ft³ of water runoff from the surrounding impervious surfaces. Species in the garden include the following:

Red Chokeberry – Buttonbush – Sweetpepper bush – Winterberry Holly – Virginia Sweetspire – Spicebush – Wax Myrtle – Swamp Azalea – Bald Cypress – Arrowwood Viburnum – Possomhaw – Blackhaw – Broom Sedge – Swamp Milkweed – Marsh Marigold – Fox Sedge – Joe Pye weed – Marsh Hibiscus – Blue Flag Iris – Soft Rush – Bee balm- Switch Grass – Common three-square – New York Ironweed

Six 4 inch diameter cores have been cut through the underlying clay and filled with stones to increase the rate of infiltration. Wood mulch covers the soil between plants. The rain garden is a work in progress, as planting continues and the project is monitored by Elaine Grehl, WRA graduate research assistant and member of the Longwood Graduate Program.

Pike Creek Stream Restoration at Three Little Bakers Golf Course

Tour led by Steve Williams - Ecological Restoration Coordinator, Department of Natural Resources



As the largest stream restoration project in Delaware's history, this project is in the process of restoring 5000 ft of the stream channel and adjacent bank on Pike Creek, which is part of the White Clay Creek Wild and Scenic River System. This undertaking is the work of the Delaware Department of Natural Resources and Environmental Control, in partnership with Three Little Bakers Golf Course, which owns the land surrounding this portion of the stream.

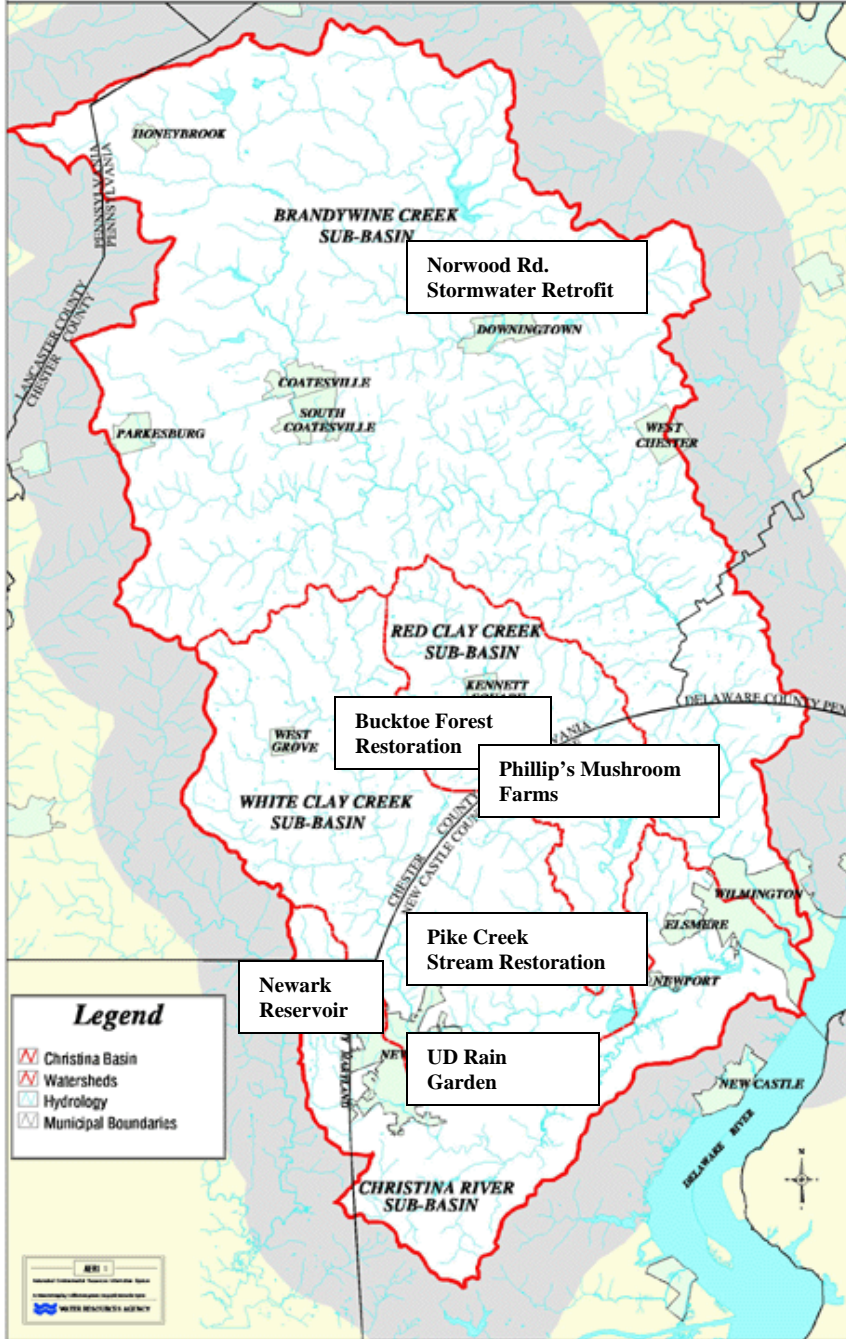
Project goals include: bank stabilization and erosion reduction, habitat creation, improvement of water quality, and maintaining the natural look of the stream. Stream-

side wetlands and meander bends to the stream channel are being added. Riffle-pool-run-sequences have been put in the stream channel as well. Construction is expected to be completed by August, with planting to follow soon after.

Looking Towards the Future

The Christina Basin Clean Water Partnership is already looking forward to seeing the results of upcoming restoration projects. The 11th Annual Christina Basin Watershed Tour is scheduled to take place in September of 2006, on the first Friday after Labor Day.

Christina Basin Water Quality Management Strategy *Base Map*



Locations along the Christina Basin Bus Tour (2005)