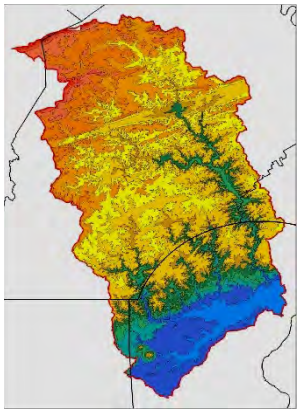
Brandywine Christina
Two States Joined by a Common Source Watershed

April 15, 2021



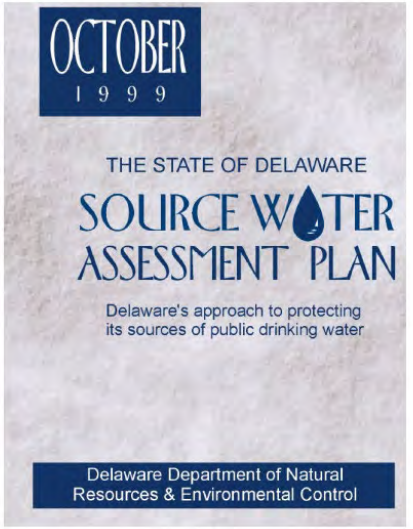
EPA Region 3: Source Water Leadership Forum

Gerald Kauffman/Martha Narvaez
UD Water Resources Center
Newark, Del.

Brian Winslow
Brandywine Red Clay Alliance
West Chester, PA

Safe Drinking Water Act

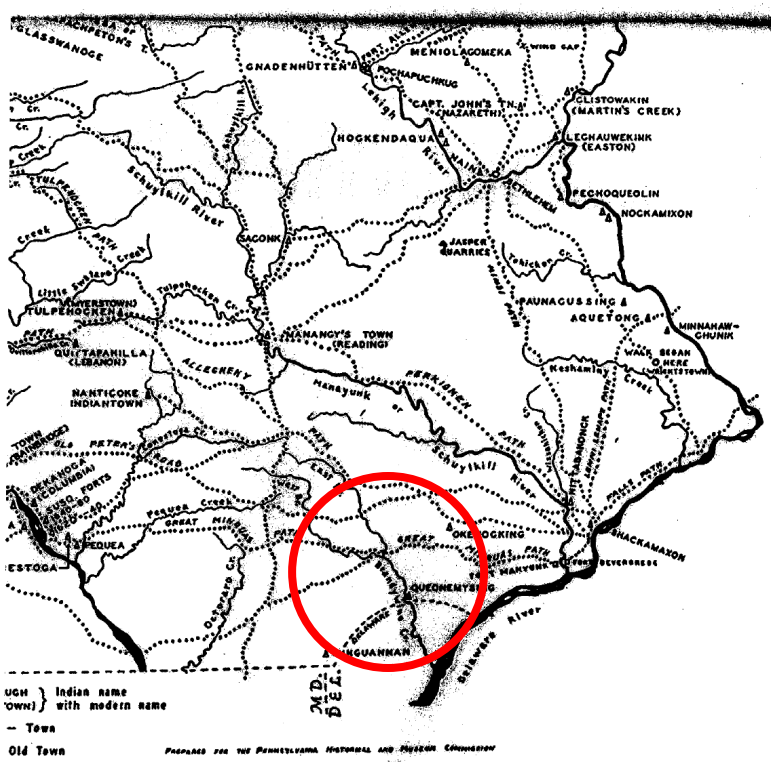
- 1974 Act
- Updates 1986, 1996
- Source Water Assessment and Protection Program (SWAPP)
  - Previously, focus was on water treatment
  - Move toward protecting the source watersheds
  - More cost effective to alleviate threats than treat contamination
- Delaware's Source Water Assessment Plan (SWAP)
  - DNREC developed in consultation with EPA and CTAC, approved 1999



Delaware River Basin

Christina River Basin

America's Founding Watershed



Queonemysing 1688

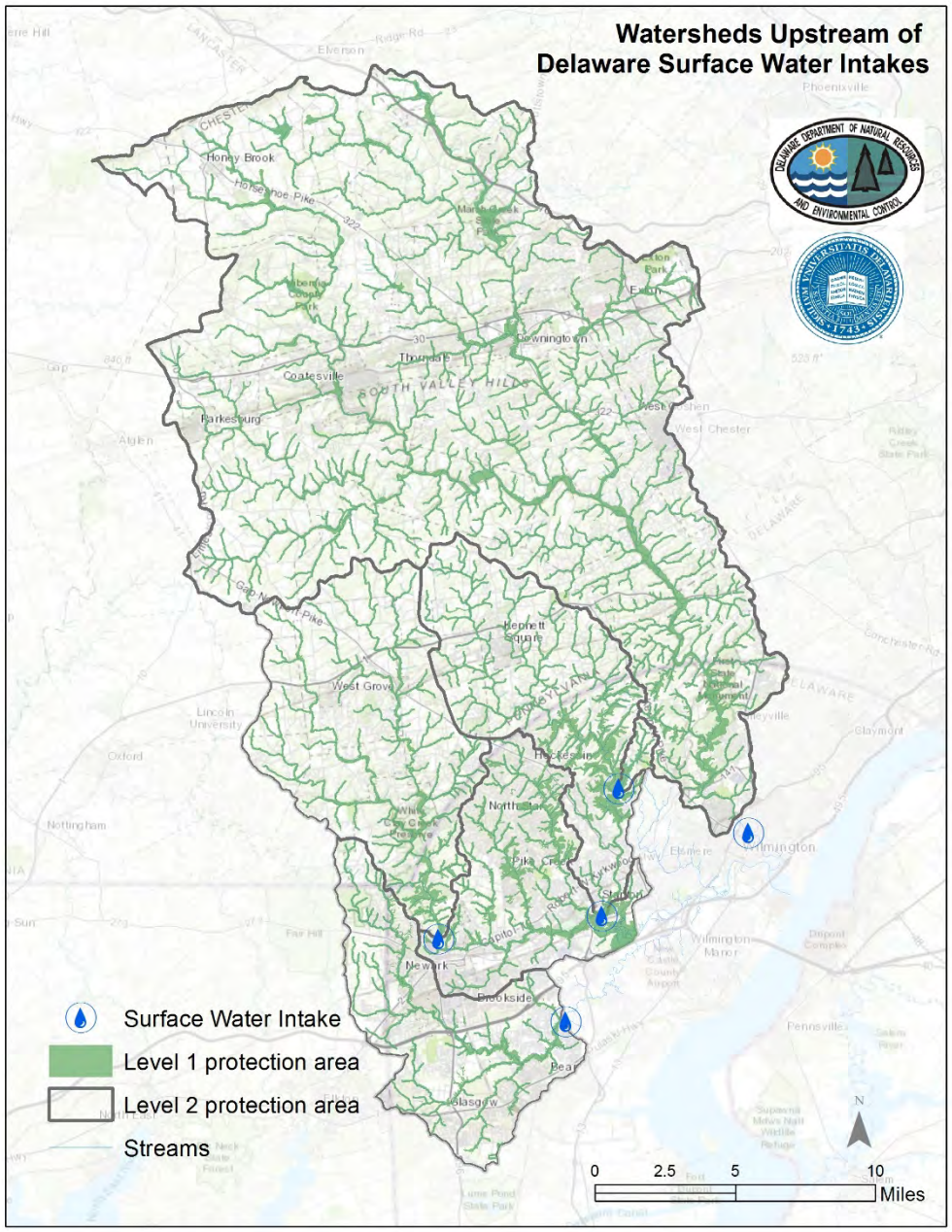
3 Lower Counties of Pennsylvania 1749

Brandywine Plant from the air, 1929.

Sole Source of Drinking Water for First State's Largest City

Brandywine Plant (1929)

First State National Park
2014 AD



2/3 of Del. drinking water is from Brandywine Christina.

2/3 of Del. surface water supply is from Pa.

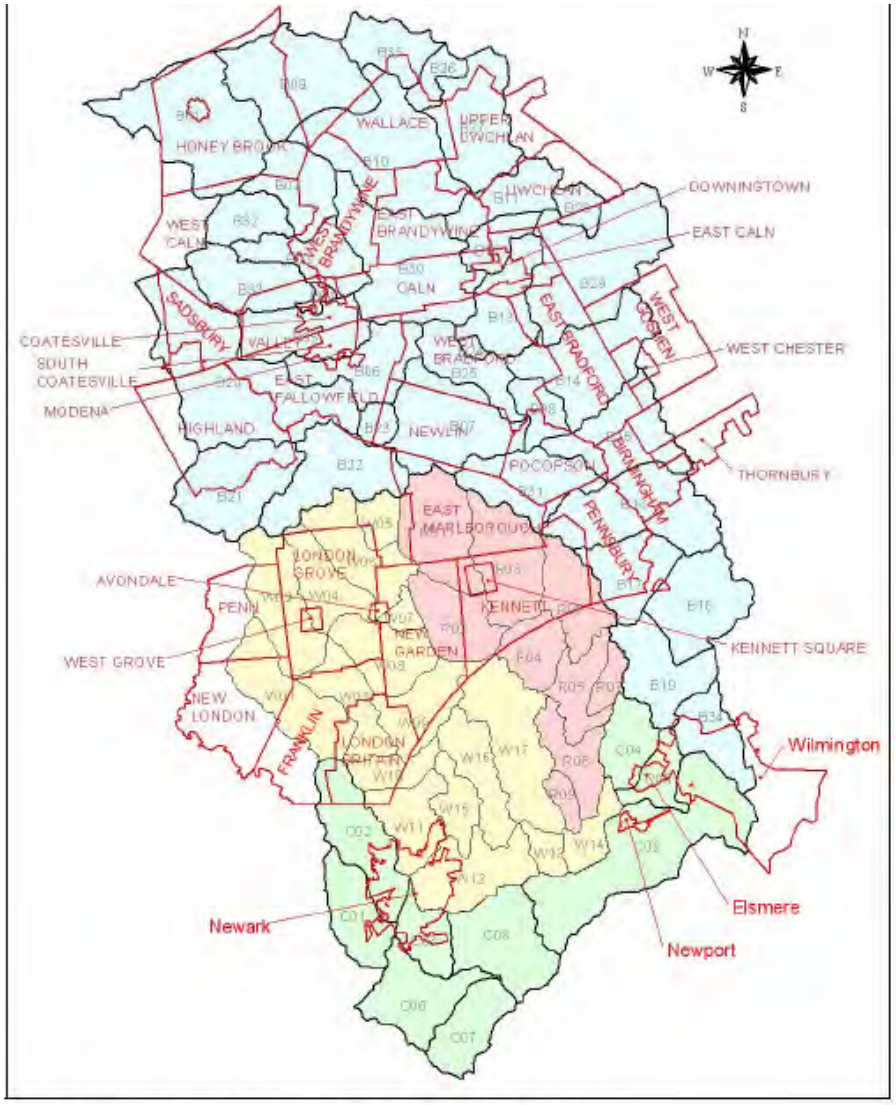


Figure 2-2. Municipalities with MS4 permits in Christina River Basin

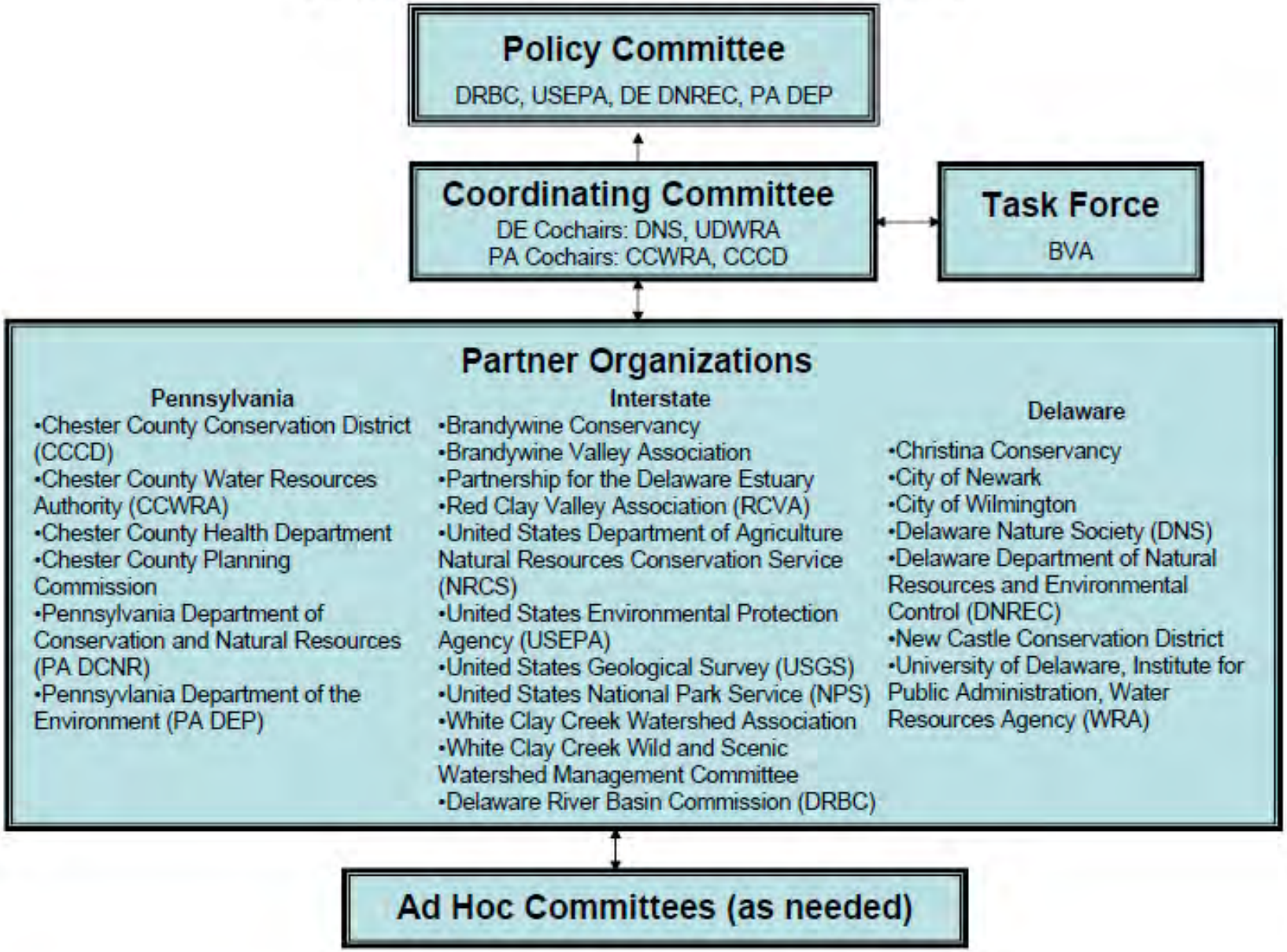
1945: Brandywine Valley Association, USA's first small watershed organization.

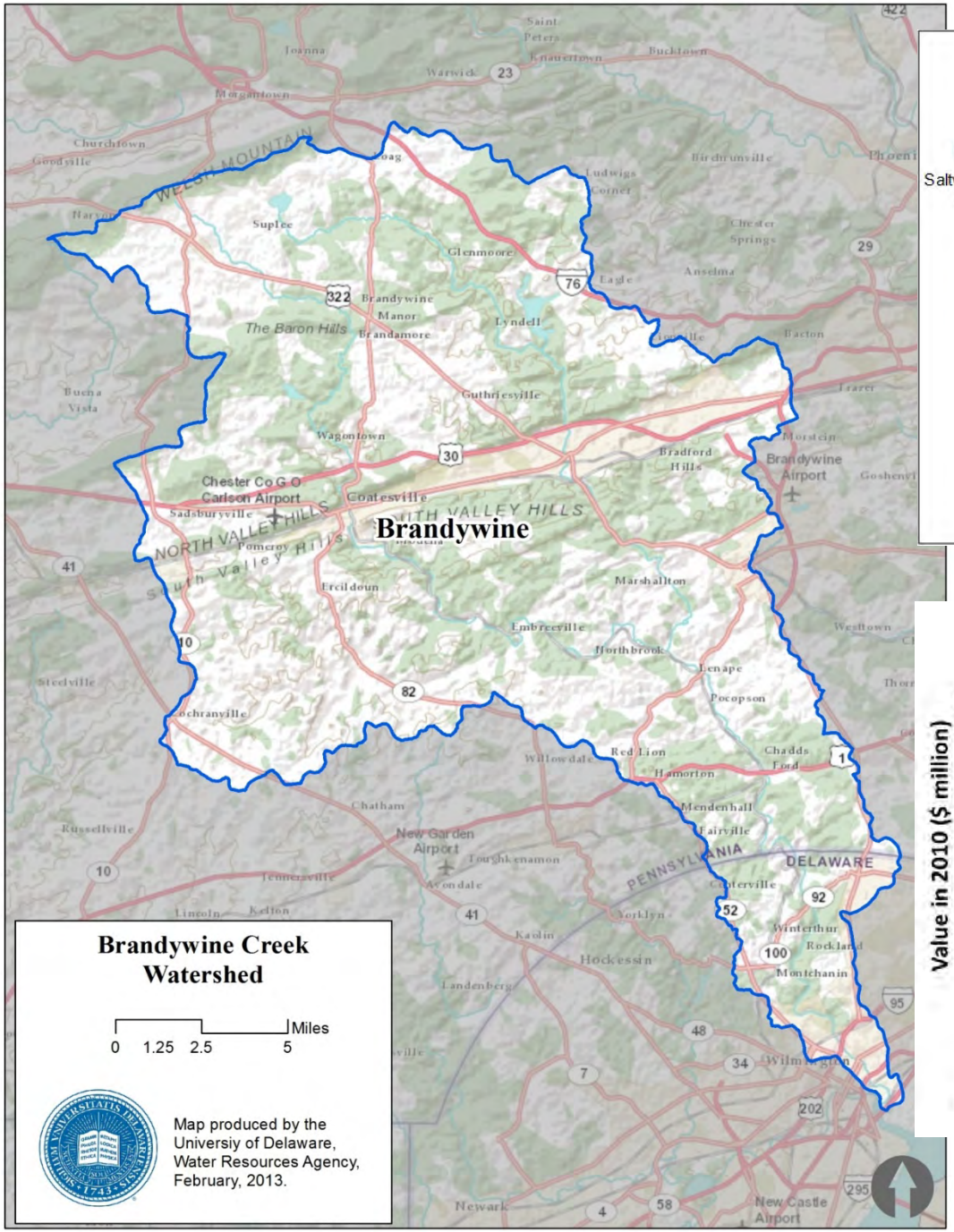
2000: White Clay Creek National Wild and Scenic River, one of two in US designated on watershed basis.

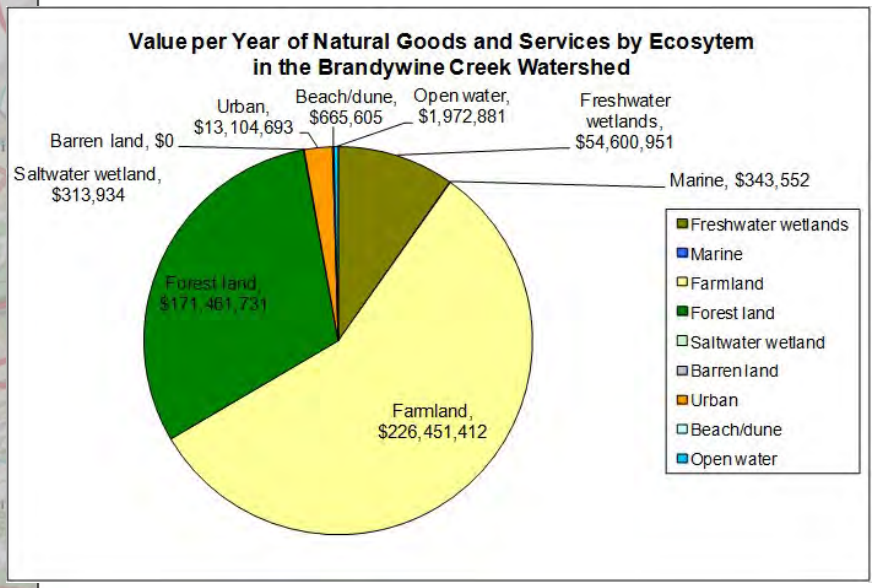
2008: CBCWP completes $1 million EPA TWG, tops in US of 170 watersheds.

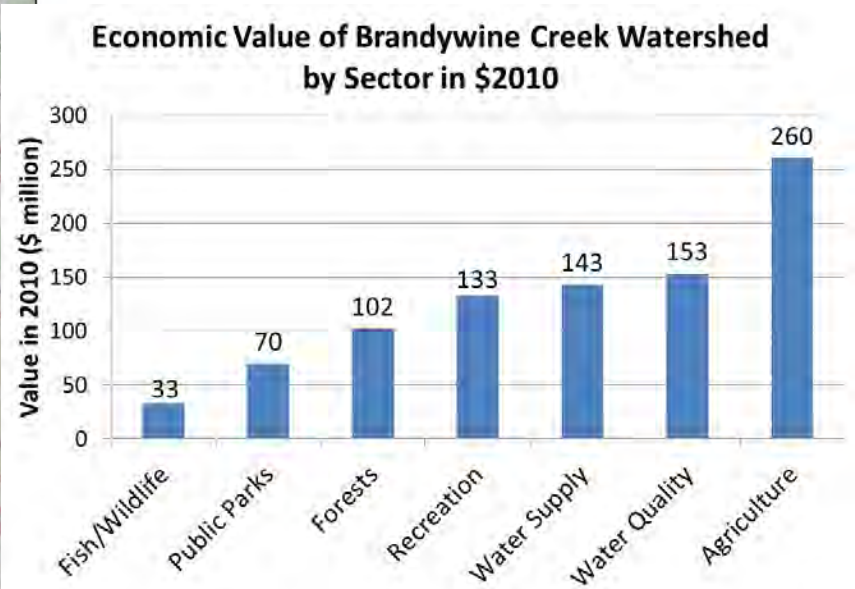
2013: William Penn Foundation forms Brandywine Christina Cluster.

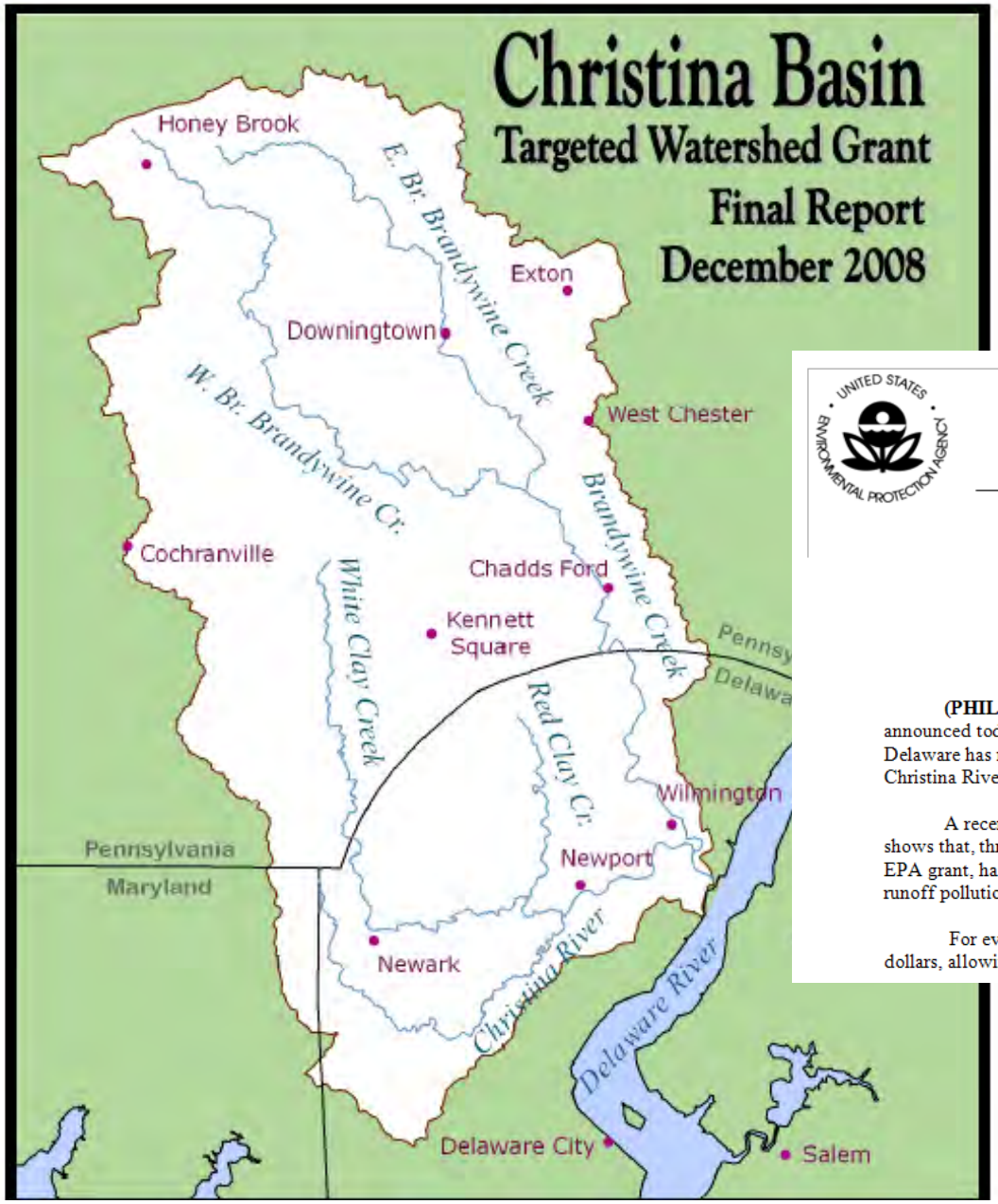
Christina Basin Clean Water Partnership




Brandywine
Brandywine Creek Watershed
0 1.25 2.5 5 Miles
Map produced by the Universiy of Delaware, Water Resources Agency, February, 2013.


Value per Year of Natural Goods and Services by Ecosytem in the Brandywine Creek Watershed
Urban, $13,104,693
Beach/dune, $665,605
Open water, $1,972,881
Freshwater wetlands, $54,600,951
Barren land, $0
Saltwater wetland, $313,934
Marine, $343,552
Forest land, $171,461,731
Farmland, $226,451,412
Freshwater wetlands
Marine
Farmland
Forest land
Saltwater wetland
Barren land
Urban
Beach/dune
Open water


Economic Value of Brandywine Creek Watershed by Sector in $2010
Value in 2010 ($ million)
300
250
200
150
100
50
0
33
70
102
133
143
153
260
Fish/Wildlife
Public Parks
Forests
Recreation
Water Supply
Water Quality
Agriculture



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EPA Environmental News

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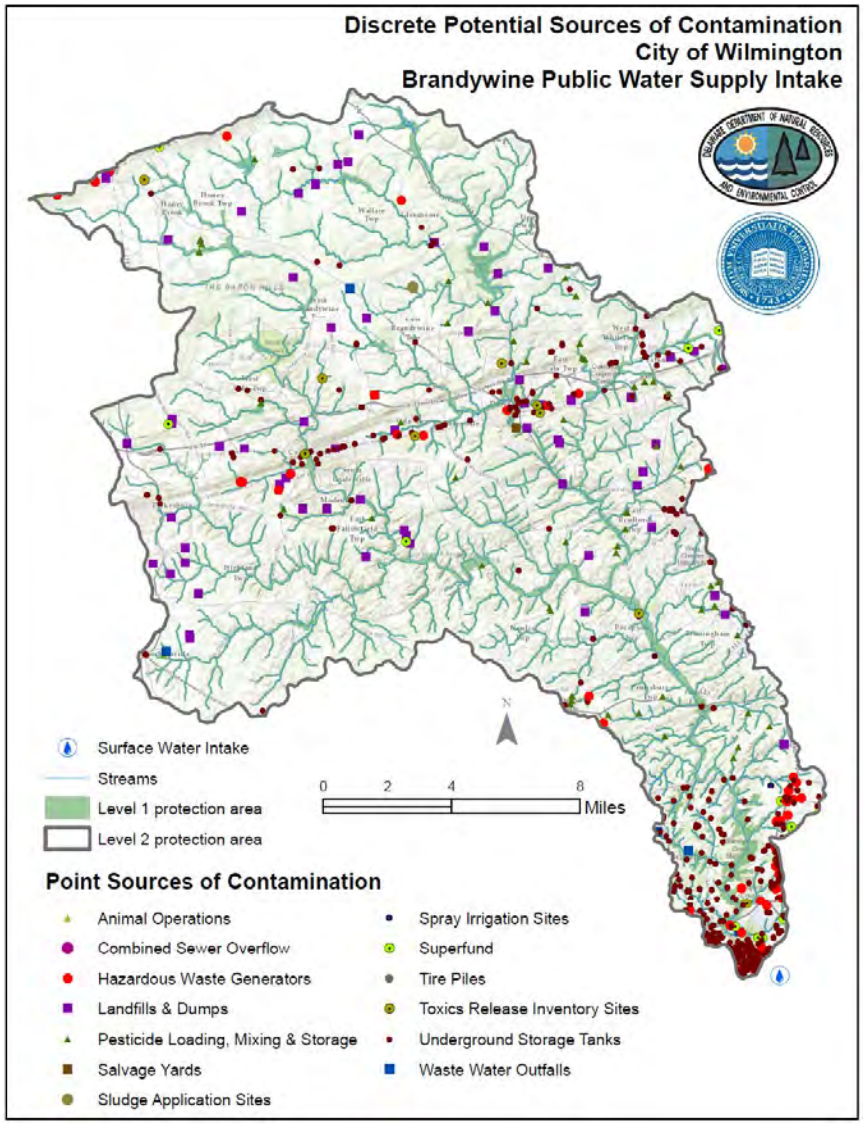
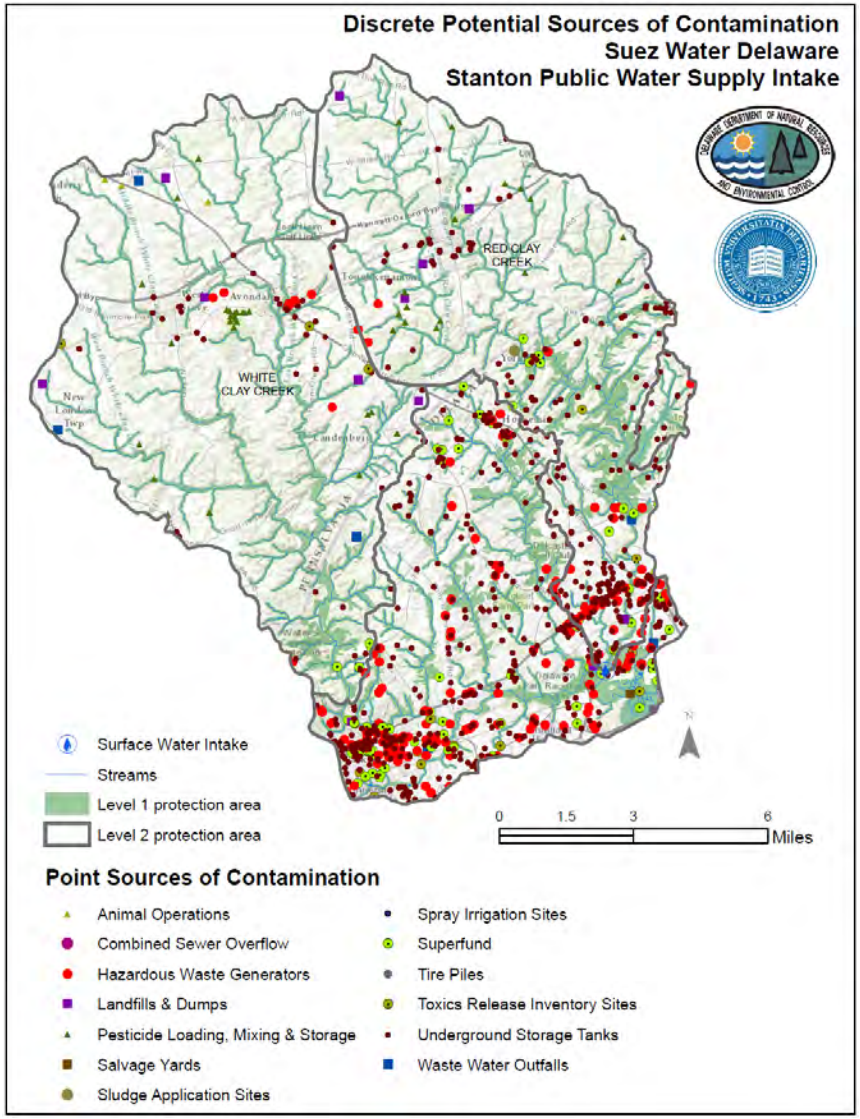
Report Shows Progress Exceeding Plans in Christina River Basin

(PHILADELPHIA, February 5, 2009) – The U.S. Environmental Protection Agency, announced today that the Christina River Basin Clean Water Partnership in Pennsylvania and Delaware has made significant progress in reducing pollution from storm water runoff to the Christina River basin.

A recent report by the University of Delaware and the Delaware River Basin Commission shows that, throughout the past four years, the Partnership, with the assistance of a $1 million EPA grant, has implemented numerous projects to reduce the harmful effects of stormwater runoff pollution on drinking water supplies, recreation, fisheries, and wildlife.

For every federal dollar invested in the project, the Partnership leveraged more than two dollars, allowing them to exceed the original goals, some by more than 50 percent.


Discrete Potential Sources of Contamination
City of Wilmington
Brandywine Public Water Supply Intake
Surface Water Intake
Streams
Level 1 protection area
Level 2 protection area
0 2 4 8
Miles
Point Sources of Contamination
Animal Operations
Combined Sewer Overflow
Hazardous Waste Generators
Landfills & Dumps
Pesticide Loading, Mixing & Storage
Salvage Yards
Sludge Application Sites
Spray Irrigation Sites
Superfund
Tire Piles
Toxics Release Inventory Sites
Underground Storage Tanks
Waste Water Outfalls


Discrete Potential Sources of Contamination
Suez Water Delaware
Stanton Public Water Supply Intake
RED CLAY CREEK
WHITE CLAY CREEK
Surface Water Intake
Streams
Level 1 protection area
Level 2 protection area
0 1.5 3 6
Miles
Point Sources of Contamination
Animal Operations
Combined Sewer Overflow
Hazardous Waste Generators
Landfills & Dumps
Pesticide Loading, Mixing & Storage
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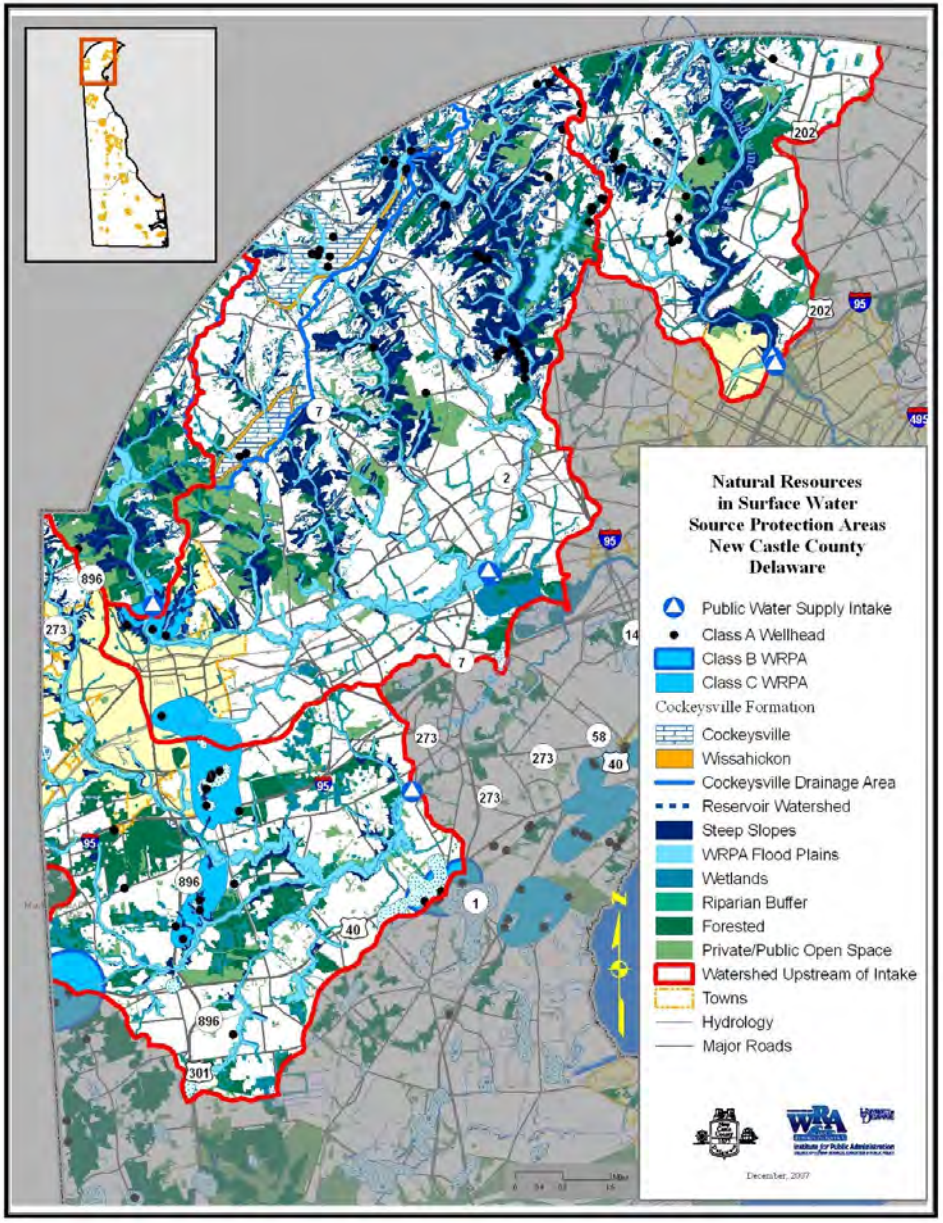
Waste Water Outfalls



NCC, Wilmington, Newark Code and open space protects 54% of source watershed:

* Brandywine Cr. (46%)
* White/Red Clay (59%)
* Christina River (45%)

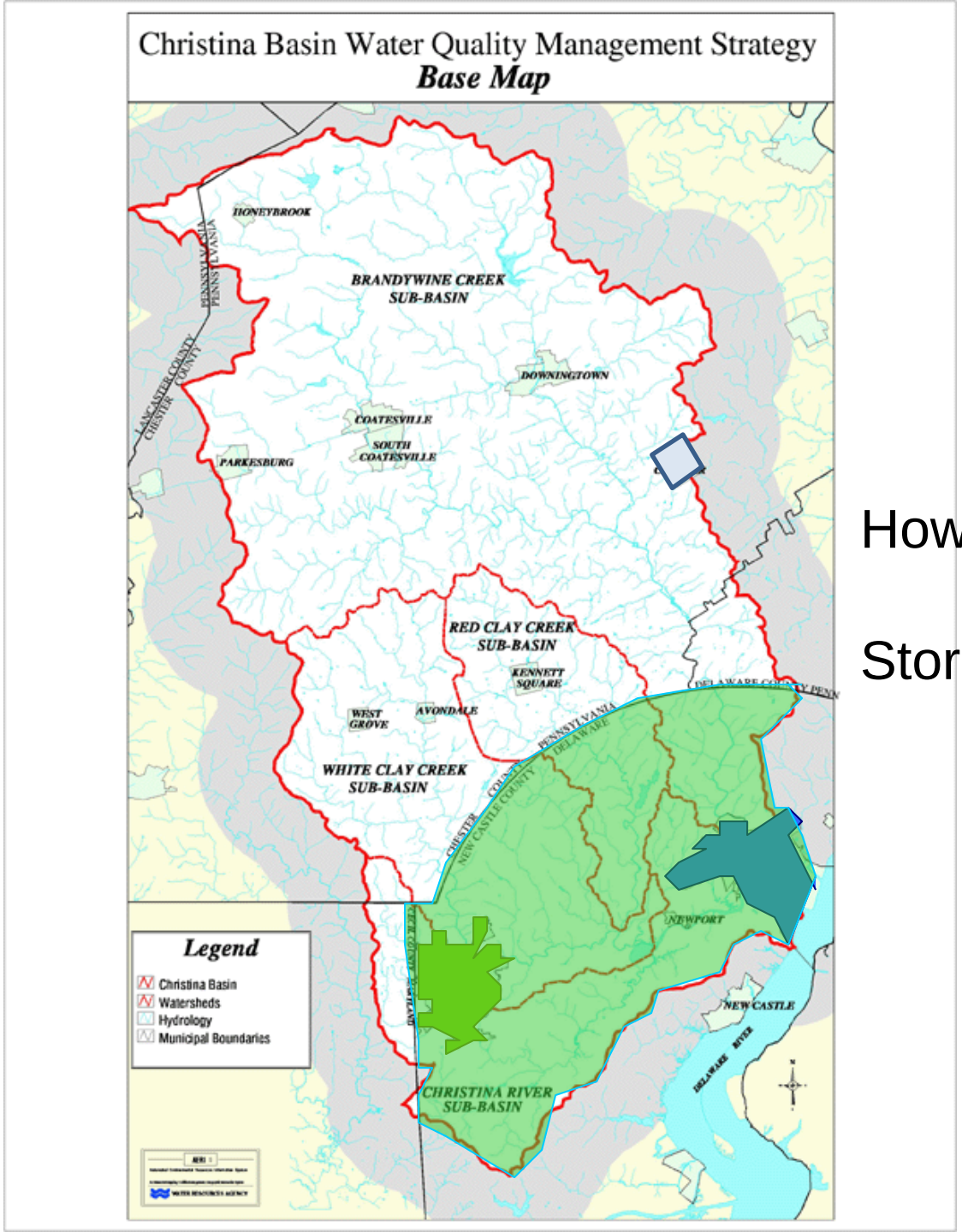
			CONTAMINANT POTENTIAL				OBSERVED DATA	
			Contaminants not present in sufficient quantities in Source Water Area to cause concern.	Contaminant(s) present in significant quantities in Source Water Area but monitoring data indicates no or minimal releases	Contaminant(s) could be present at levels of concern. No or insufficient monitoring. Additional information may be required.	Data indicate that contaminant(s) are present in sufficient quantities in Source Water Area to cause concern. (Permitted Discharge or Non-Permitted Release)	Naturally occurring contaminant(s) detected in source (raw) water at levels > 50% of the MCL, but <100% of the MCL. Synthetic contaminant(s) found above Detect Level, but below the MCL. Active treatment may be in place	Contaminant(s) detected in source (raw) water at levels greater than 100% of the MCL. Active treatment may be in place
			INCREASING CONTAMINANT POTENTIAL				DETECTION	EXCEEDANCE
VULNERABILITY RATING	Surface Water Intakes GWUDI Well Poor Integrity Well Cockeysville Well Shallow Unconfined Well	INCREASING VULNERABILITY	3	4	5	6	6	7
	Crystalline Bedrock Well Semi-Confined Well Deep Unconfined Well		2	3	4	5	6	7
	Confined Well		1	2	3	4	6	7

SUSCEPTIBILITY SCALE

LEAST MODERATELY MOST

1	2	3	4	5	6	7
Not	Very Low	Low	Moderate	High	Very High	Exceeds Standard

Figure 5. Source water susceptibility determination matrix



How to fund?

Stormwater Utilities

The EPA Region 3
Source Water Collaborative … Is Back!