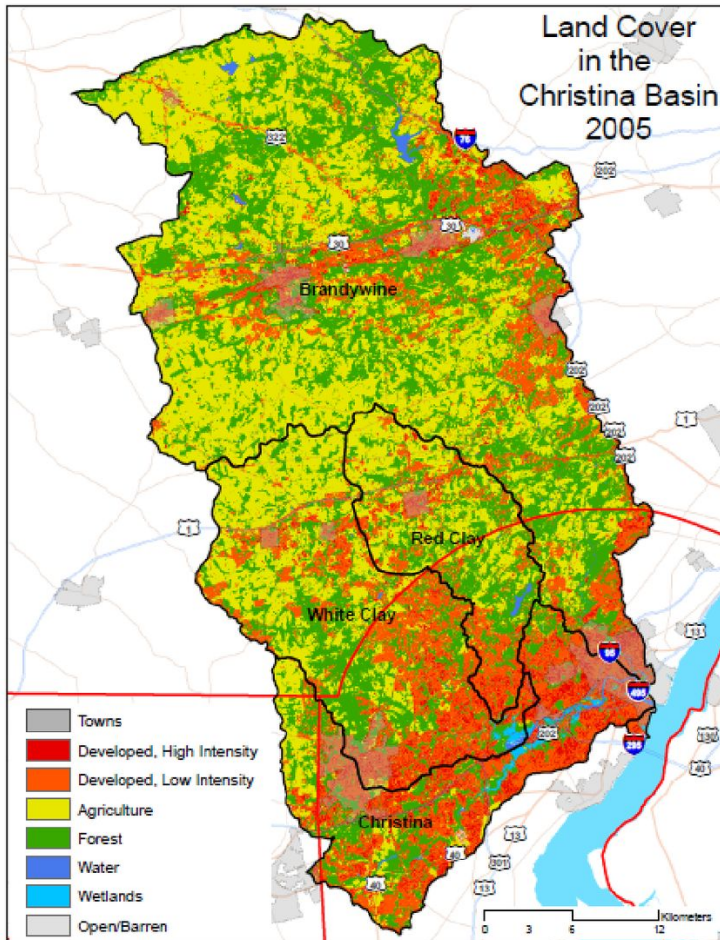




# Brandywine Environmental Action Network (BEAN)

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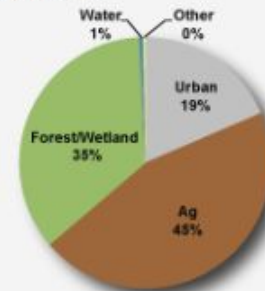
## Brandywine Creek's Vital Statistics

**Size:** 324 square miles

**Population:** 250525

*Source: U.S. Census*

### Land Use:



*Source: NOAA Coastal Services Center (CSC), Coastal Change Analysis Program (C-CAP) Land Cover data based on analysis of Landsat 30m resolution imagery.*

**States:** DE, PA

**Counties:** DE: New Castle PA: Chester, Delaware, Lancaster MD: Cecil

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# Colonial Background/History

- Unami Lenape used the area for fishing, hunting, and agriculture
- Disease and warfare reduced their numbers and allowed Sweden to colonize in 1636
- Swedes soon gave way to the Dutch (1654) and English (1681)
- William Penn's religious tolerance attracted many to the region
- In 1724 Lenape lodged formal complaint that dams hurt their fishing



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## Post-Colonial Background/History



- The Brandywine's strong waters allowed it to become an industrial mill center
- Industrial output grew during the Civil War and both world wars
- Horsecar line, cars, highways contributed to suburbanization of watershed
- Corporate friendly tax policies still draw people to Wilmington



# Brandywine Conservancy



**BRANDYWINE  
CONSERVANCY**

Mission Statement: “The Brandywine Conservancy protects and conserves the land, water, natural and cultural resources of the Brandywine-Christina watershed.”

- Provides conservation and land planning assistance.
- Riparian buffer plantings, stormwater management designs, conservation easements.
- Engages the community with projects and partners with municipal officials, nonprofits, and other agencies.
- Brandywine Creek Greenway



## Brandywine Creek TMDL:

- Clean Water Act requires assessment of water bodies every 2 years
- Listed on 303(b) list as impaired water body - requires TMDL
- 2006 - TMDL for sediment, bacteria, nutrients

$$\text{TMDL} = \sum \text{WLA}_i + \sum \text{LA}_i + \text{MOS}$$

**Baseline and WLA nitrogen and phosphorus loads for CSO discharges**

Location	CSO ID numbers	Baseline (kg/day)	WLA (kg/day)	Reduction
<b>Total Nitrogen</b>				
Little Mill Creek (C05)	27, 28, 29	2.606	0.618	76.3%
Christina River (C09)	5, 6, 7, 9a, 9c, 10, 11, 12, 13, 14, 15, 16, 17, 30	5.931	1.631	72.5%
Brandywine Cr. (B34)	3, 4a, 4b, 4c, 4d, 4e, 4f, 18, 19, 20, 21a, 21b, 21c, 22b, 22c, 23, 24, 25, 26, RR	11.443	4.107	64.1%
Total CSO load	-	19.980	6.356	68.2%
<b>Total Phosphorus</b>				
Little Mill Creek (C05)	27, 28, 29	0.441	0.104	76.4%
Christina River (C09)	5, 6, 7, 9a, 9c, 10, 11, 12, 13, 14, 15, 16, 17, 30	1.003	0.276	72.5%
Brandywine Cr. (B34)	3, 4a, 4b, 4c, 4d, 4e, 4f, 18, 19, 20, 21a, 21b, 21c, 22b, 22c, 23, 24, 25, 26, RR	1.966	0.730	62.9%
Total CSO load	-	3.410	1.110	67.4%



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## Mission Statement

BEAN's mission is to increase the safety of recreational activities in the Brandywine Creek by improving in-stream habitat quality by 2035.





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# Problem 1: Nutrients

## Sources:

- Wastewater treatment plants
- Urban stormwater runoff
- **Agricultural Runoff- 45% land use**

## Solution

- Agricultural BMPs
- Nutrient management plans for applicable farms



Stream crossing with exclusion fencing (NRCS Alabama).

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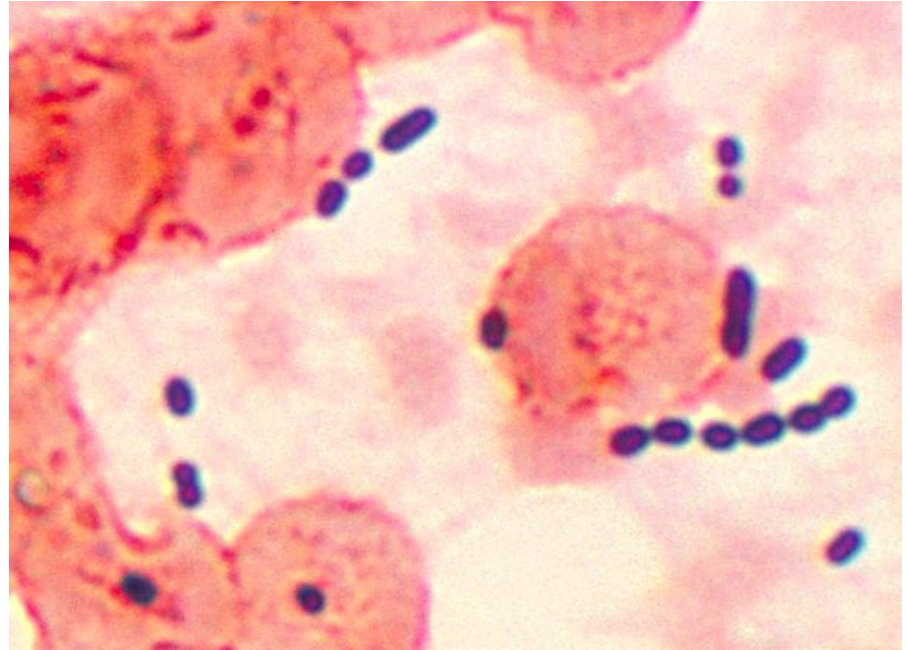
## Problem 2: Bacteria

Sources:

- Sewage, agriculture, wildlife

Solution

- Source-based
  - Human, Livestock, Dogs, Wildlife
- Reduce stormflow



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## Problem 3: Sediment

Sources:

- Urban and agricultural

Solution

- Permeable pavement
- Rain gardens
- Riparian buffers





## BEAN goals

- Permeable pavement and rain gardens in urban areas - reduce sediment
- Riparian buffer zones in agricultural areas - reduce sediment
- Install agricultural BMPs
- Ensure farmers obtain and implement a nutrient management plan
- Reduce stormflow and use adaptive source-based strategies to decrease bacteria