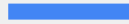


# TRAP

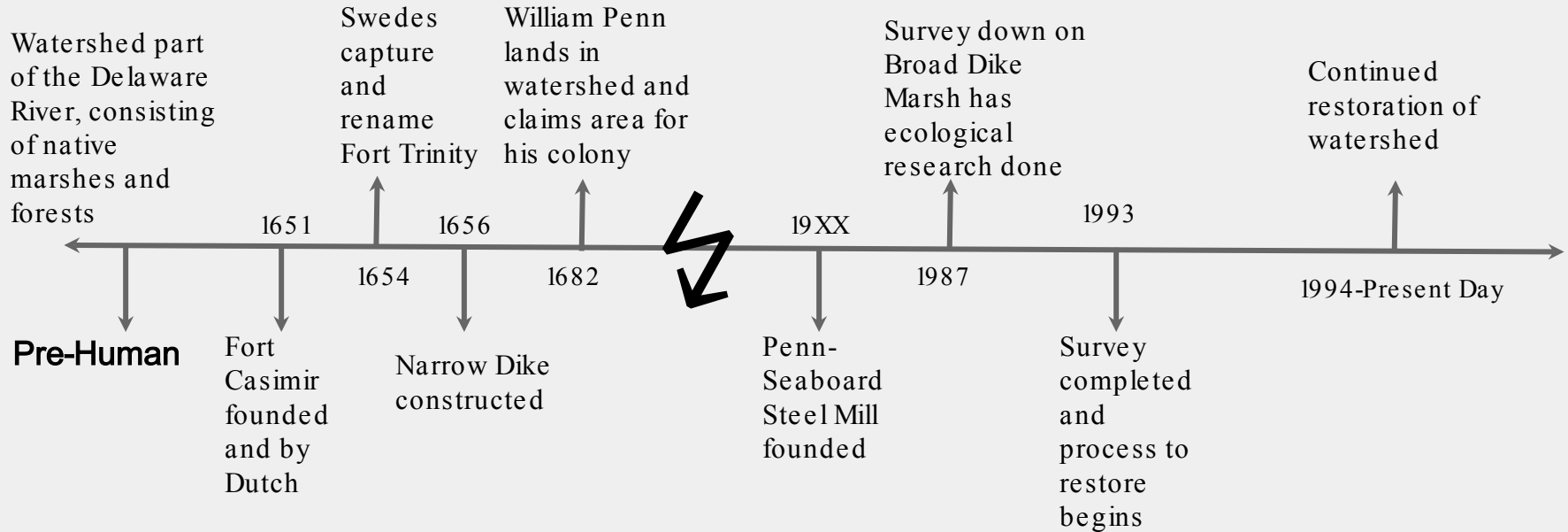


Trinity Restoration Action Plan

# Mission Statement

TRAP intends to make restoration progress to the Trinity Watershed of New Castle, Delaware. Currently, the watershed is negatively impacted by impervious cover, industrial pollution, and invasive species/vegetation issues. TRAP is meant to be fully instituted by 2044, and its goals are inspired by the 1994 “Northern Delaware Wetlands Rehabilitation Plan.”

# Watershed (Human) History & Description



# Problem & Issues

## P1. Impervious Cover

- Urbanization of the area led to  $\frac{2}{5}$  of the Trinity Watershed to have impervious cover. Another  $\frac{2}{5}$  is cultivated lawns. This causes a larger volume of runoff with a greater amount of pollutants (ie oil and fertilizers).

## Causes:

- Urban and suburban area
- Impervious surface and cultivated lawn cover most of the watershed
- Highway development

# Goals & Objectives

## G1. Reduce Impervious Surfaces

Introduce rain gardens, swales, perennial beds, or other forms of planted areas in urban areas to reduce impervious cover and encourage stormwater infiltration. Land contours and vegetation decrease the rate of stormwater, resulting in infiltration. The sediments and pollutants are filtered through the plants prior to the surface runoff reaching the closest body of water or wetland. The soil and sediments are held in place by the root system to prevent erosion.

# Problem & Issues

## P2. Industrial Pollution

- Both legacy and new contaminants exist in the area and are carried into the water, including heavy metals. Continued development along the Route 9 corridor worsens this issue.

## Causes:

- Heavily industrial area
- Lack of heavy metal testing
- Continued development
- Lead Poisoning

# Goals & Objectives

## G2. Clean Industrial Pollutants

Test the watershed area for the presence of such pollutants. Knowledge is lacking on the lasting effects of the previously listed potentially harmful activities. Tests for heavy metals such as lead as well as silicon and acidic compounds. A first test may be to measure absorbance of water in the watershed to see how many particles are contained within after filtration of larger detritus from the water, following it up with silica test for the water. When tests are completed and the watershed area has been assessed for industrial pollutants an action plan can be made for addressing them. This plan will prioritize the most potentially harmful pollutants and most affected areas in cleanup and restoration.

# Problem & Issues

## P3. Invasive Species/Vegetation Issues

- Phragmites and other invasives are taking nutrients from the soils. This makes the soil inhospitable to vegetation. The lack of vegetation and compacted soil make floods more likely.

### Causes:

- Poor land management and abuse of lands
- Invasive species spread



# Goals & Objectives

## G3. Management of Invasive Species and Vegetation Restoration

Actively removing invasive species from the area is the first step in fighting them. Removing these species and encouraging the growth of less nutrient intensive species will help resolve the issue of compacted and nutrient deficient soil. Less nutrient intensive species will also be planted in available areas within the spreading development in order to help protect the floodplain and reduce risks of flooding. This is an especially important effort in highly inhabited areas where there is little vegetation and more lives are at risk. This objective goes hand-in-hand with Goal 1, since reducing impervious surfaces can include planting vegetation in urban and suburban areas, which helps increase water quality, restore habitats, and reduce flooding in the watershed.

# Regulations & Ordinances

**Delaware River Basin Commission (DRBC):** The commission is responsible for the overall management of the Delaware River basin.

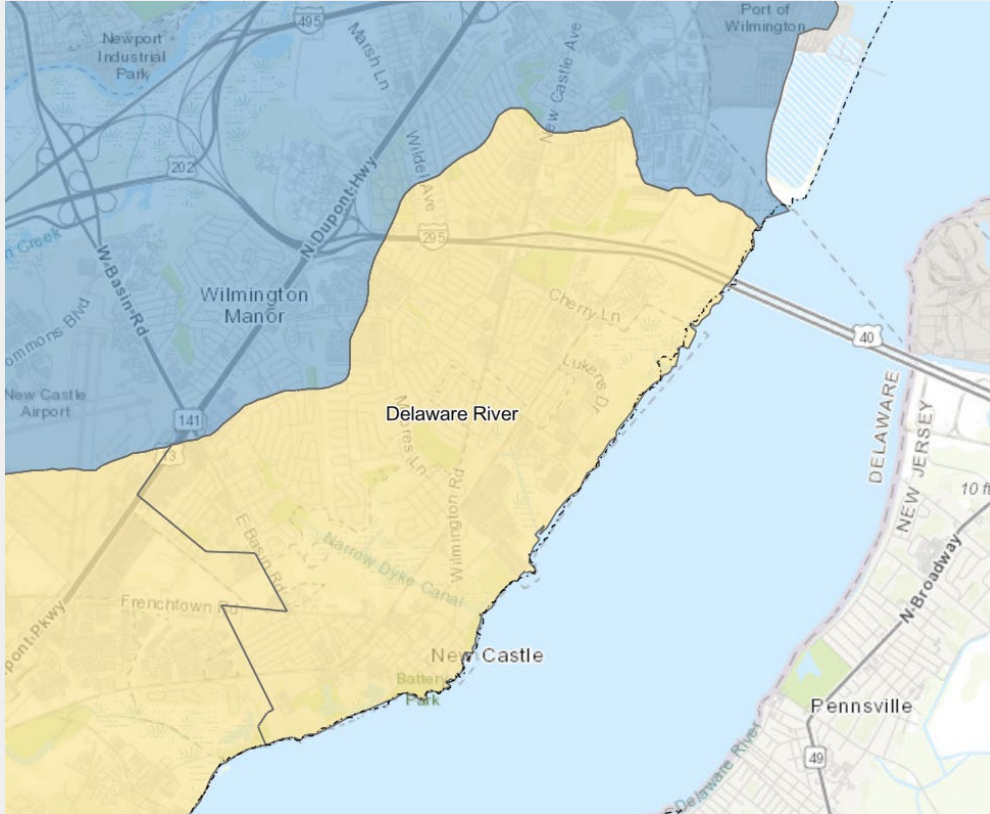
- Consists of five separate bodies, 4 being the states connected to the Delaware River Basin (Delaware, New York, New Jersey, and Pennsylvania)
- Each body on the commission has an equal vote, and they discuss issues of water quality, flood and drought management as well as other issues.

**Vulnerability Assessment and Adaptation Plan:** This plan is how the city of New Castle is managed.

**The Delaware Department of Natural Resources and Environmental Control (DNREC):** This department performs a wide variety of environmental services for the state of Delaware, and more specifically its Division of Water is responsible for several aspects of water management across the state. The Division of Water is responsible for the licensing of water allocation permits, stream and wetland protection, assessment of water quality, and monitoring contaminants in the water among other activities.

**Northern Delaware Wetland Rehabilitation program (by DNREC):** It was intended to restore Delaware wetlands along the Christiana and Delaware rivers, much of which were either reduced in size due to surrounding industrial and suburban development, or cut off from the surrounding rivers in order to prevent the wetlands from replenishing.

# GIS Watershed Inventory

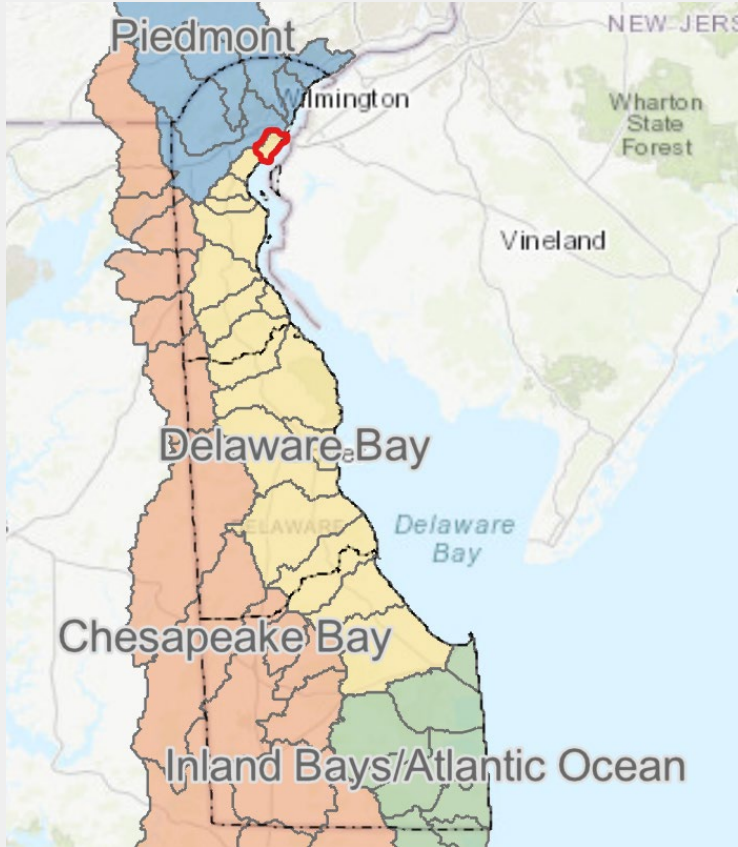


The Trinity Watershed covers 6.5 square miles and encompasses the city of New Castle.

It comprises three main tributaries that flow into the Delaware River.

*Left: The Trinity Watershed delineated on a map.*

# GIS Watershed Inventory



It is the northernmost watershed in the Delaware Bay basin (seen highlighted in red).

Actions taken in the Trinity Watershed affect all of the Delaware Bay.

*Left: The Trinity Watershed shown in comparison to other Delaware watersheds and within the major basins.*

# Alternatives Analysis for Problem 3

Each option is ranked on a scale from 1-5, 1 being the worst and 5 being the best, for each of several characteristics. The scores were totaled to help select the most effective option for addressing the problem.

Options for Goal 3	Monetary Cost	Labor Requirement	Previous Executions	Required Government Participation	Time Requirement	Predicted Effectiveness	Total Points Earned (X/30)
Planting native vegetation	3	2	5	4	4	5	<b>23</b>
Best land management practices	4	3	5	1	2	4	19
Community outreach	5	4	2	4	2	1	18

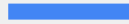
Based on the decision matrix, planting native vegetation was chosen as the best method for the Trinity Watershed, with a total score of 23. It has been shown to be an effective method in the past by DNREC (*The Northern Delaware Wetlands Rehabilitation Plan*), who planted native wild rice in marshlands to help reduce invasive species and restore habitats and vegetation. The effort has proved to be successful and the area is mostly covered in wild rice today

# Recommendations

TRAP is to be spearheaded by DNREC and backed by other organizations that have a stake in the jurisdiction over the area including:

- New Castle County Government
- Trustees of the New Castle Commons
- Delaware Department of Transportation
- Larger entities from the state and national level are expected to provide the majority of funding for this project with a total project estimate of \$3,000,000.
- The Northern Delaware Wetlands Rehabilitation Plan and The Route 9 Corridor Land Use and Transportation Plan can also be referenced to maximize funding and achieve the best results.

# Thank you!



From: Ben, Brenna, Esse, Garrett, Grace, Jack, Jim, and Leah