

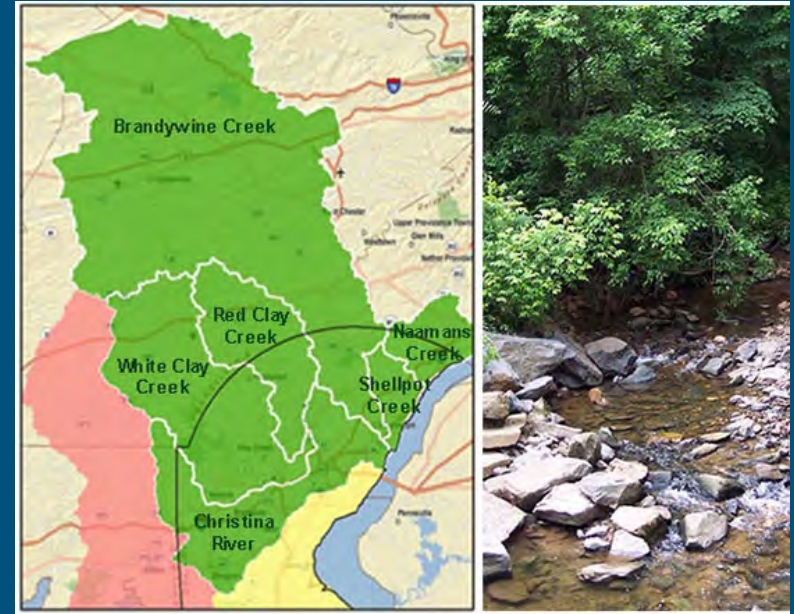
# Red Clay Creek Action Plan (RCCAP)



By: Mitchel Guarracino, Erik Rodriguez, Benjamin Spitz, and Max Stong

# Overview

- Background
- History
- Mission Statement
- Existing organizations and regulations to aid
- Problems, Goals, and Solutions (3)
- Conclusion/Timeline

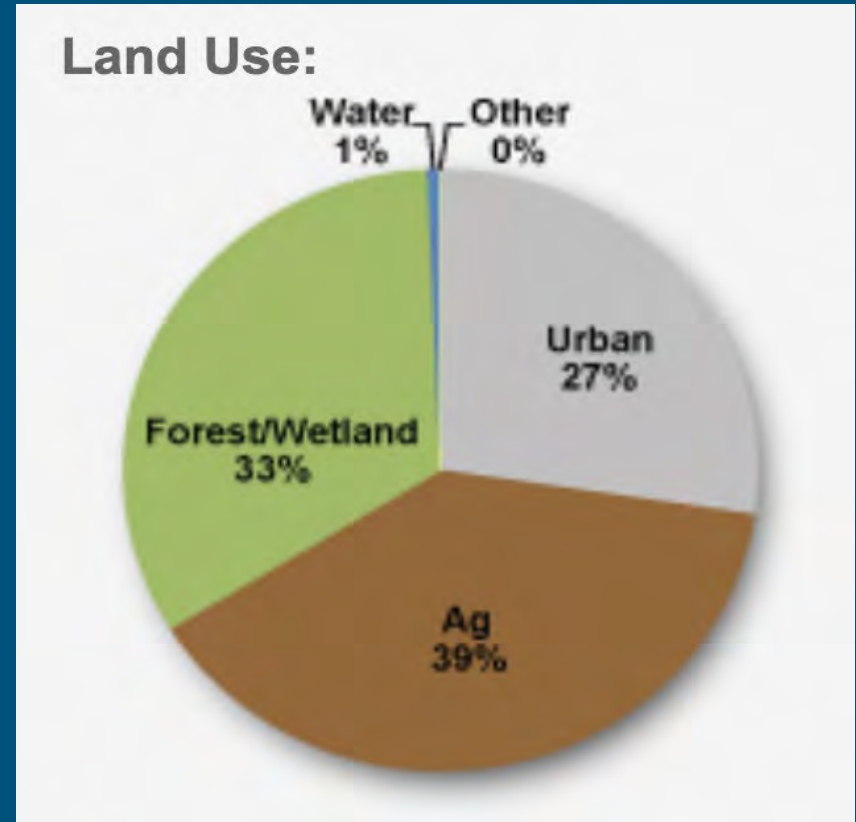


Delaware Department of Natural Resources and Environmental Control (DNREC). (n.d.). *Piedmont*. Retrieved from Delaware Watersheds:



# History

- Creek inhabited by the Lenape Tribe before European colonization.
- The Wilmington-Western railroad was constructed adjacent to the Red Clay to help move supplies and goods from Yorklyn to Wilmington
- The upper Red Clay has been dominated by agricultural uses
- Nowadays, the Upper Red Clay primarily is used for mushroom production, corn, soybeans & pastrual uses.
- Urbanization of Lower Red Clay began in mid 20th Century



# Mission Statement

The Red Clay Creek Action Plan (RCCAP) aims to achieve quality standards that are high enough to make the Red Clay Creek fishable by the year 2030.



# Existing Organizations

---

- Brandywine-Red Clay Alliance
- Chester County Agricultural Council
- Delaware Department of Natural Resources (DNREC) and Pennsylvania Department of Environmental Protection
- New Castle County and Chester County
- Christina Basin Clean Water Partnership (CBCWP)



# Existing Regulations

---

- National Pollutant Discharge Elimination System (NPDES)
  - Federal permit program created during the Clean Water Act of 1972 that addresses water pollution by regulating point sources that discharge pollutants to waterways in the United States.
- Section 303(d) of The Clean Water Act
  - Helps a state in listing its impaired waters and and the pollutants they contain. This section also helps in creating a total maximum daily load limit, which states the maximum amount of a pollutant allowed to enter the water.

# Problem 1: Stormwater Runoff

## Description:

- Land use within the Red Clay Creek is 27% suburban or urban
- Increased urbanization adds to the amount of impervious surface
- Leads to excessive flooding, contaminants flowing directly into streams, and property damage
- The largest areas are the southern region of the watershed near Stanton and Kirkwood Highway (SR 2) and the Kennett Square area

## Causes:

- Impervious surfaces and increased human development
- Poor drainage system along roads



Lower Red Clay Valley. (n.d.). Red Clay Flooding on 10/01/2011. Retrieved from Lower Red Clay Valley.



# Goal: Reducing Stormwater Runoff

---

- Balance rapid growth of impervious surfaces and urbanization with adequate stormwater management practices
- Educate the public about dangers of polluted runoff
- Reducing litter, picking up after pets, and driving less

# Solution 1: Rain Barrels

---

- Rain barrels are an urban stormwater runoff technique commonly used in residential settings. Water that would normally flow through the gutters of a rooftop are collected in large barrels, typically 50 gallons or more.
- These barrels help reduce the amount of runoff entering a stream during a storm. The water can be released at a later time, or used for greywater systems such as watering the lawn or washing a car.
- More advanced systems can be installed in the homes for flushing toilets or doing laundry



Greater Los Angeles County. (n.d.)*How To Keep Mosquitoes Out of Rain Barrels* Retrieved from Greater Los Angeles County Vector Control District:

# Solution 2: Bioretention Areas & Rain Gardens

- These two stormwater BMPs allow for stormwater runoff to pool in local low points. Once there, stormwater can be filtered through native vegetation and are stripped of many harmful pollutants.
- Bioretention areas and rain gardens help prevent flooding and use soil, plants, and microbes to reduce detrimental contaminants from entering the watershed.
- These BMPs are great for urban areas as they look nice and function well, and there is plenty of room to add these around the Red Clay watershed.



State of Massachusetts. (n.d.). *Bioretention Areas & Rain Gardens*. Retrieved from Massachusetts Clean Water Toolkit:

# Problem 2: Nitrogen Use and Creation in Farming Activities

## Description:

- Watershed dominated by agricultural land uses mostly mushroom production and pastoral land
- Nitrogen allows algal blooms grow
- Algal blooms use up dissolved oxygen making fish suffocate to death
- A study done by DNREC showed that 74% of the Red Clay Creek had high nitrogen levels while 24% of the watershed had moderate nitrogen levels.

## Causes:

- Nitrogen is frequently used as a fertilizer to increase the production of crops
- Nitrogen is also found in animal manure.

# Goal: Reducing Nitrogen Levels

---

## G2: Reducing Nitrogen levels

- Reduce nitrogen levels to moderate
- monitoring techniques and working directly with farmers in the upper portion of the watershed
- Containing the harmful pesticides and keeping them from ending up in the water sources is ideal
- We should also help farmers find better nitrogen alternatives and more efficient fertilization practices while giving them helpful feedback on the health of the watershed
- BMPs or other mitigation tactics could be used if the problem persists

# Solution: Better Farming Practices

---

- Open communication with, and the education of the farmers is very important. Some farmers are unaware of the amount of nitrogen pollution that comes from agricultural uses, and may be over fertilizing their crops. Talking to the local farmers about the how much fertilizer they use and the proper amount needed can help reduce the amount of nitrogen and phosphorus entering the watershed.
- Cover Crops are a common agricultural practice used to extract excess nutrients by planting winter plants in the off season; Grass cover crops such as rye are commonly used which help reduce soil and wind erosion, as well as use up the nutrients in the soil to prevent them from entering the watershed.
- Conservation tillage causes for only 70% of residue cover to be tilled during a planting season. This helps reduce the amount of soil erosion, as well as reduces the fuel and labor used.

# Problem 3: Large Amounts of Harmful Contaminants

---

- The Red Clay Creek Watershed is on the 303d list of impaired waters and has [State of Delaware Fish Consumption Advisories](#) for PCBs, dioxin, and chlorinated pesticides.
- High enough levels of PCBs, dioxin, and chlorinated pesticides to raise concern and make the waters unfishable
- A lot of these harmful contaminants are ultimately contaminating and killing a lot of the aquatic life in the creek
- The Red Clay Creek eventually flows into the White Clay and ends up in the Christiana River, so the contaminants ending up in the Red Clay Creek affect more water bodies and contaminate the fish in downstream rivers.

# Goal: Reducing Harmful Contamination

---

- The goal for harmful contamination in the form of PCBs, zinc, chlorinated pesticides, and dioxins is to reduce these contaminants to a level below that of the “State of Delaware Fish Consumption Advisories.”
- Open up the area to fishers and improve the aquatic life that calls the creek home.
- Reducing suburban/urban use of pesticides and other contaminants used on their lawns, cars, etc.



# Solution: Forest Buffers

---

- Forest buffers are trees, shrubs, bushes, and other vegetation that grow adjacent to a river. These are especially helpful in reducing incoming contaminants in streams and rivers around farm land.
- The vegetation not only helps to absorb contaminants and nutrients from the water before entering the stream, but the roots help to stabilize the bank leading to less erosion and the canopies help shade the water keeping it cooler and reducing algal blooms.
- The benefits of a forest buffer are immense and can greatly improve the quality of a stream or river.



# Conclusion/Timeline

---

- The Red Clay Creek Action Plan (RCCAP) aims to make the Red Clay Creek fishable by the year 2030.
- Solutions include:
  - Rain Barrels, rain gardens and bioretention areas in order to reduce stormwater runoff
  - Better farming practices such as cover crops, conservation tillage and education in order to cut down on nitrogen levels
  - Decrease contaminates by introducing forest buffers

# Questions?

