

# Action for Red Clay Creek (ARCC)



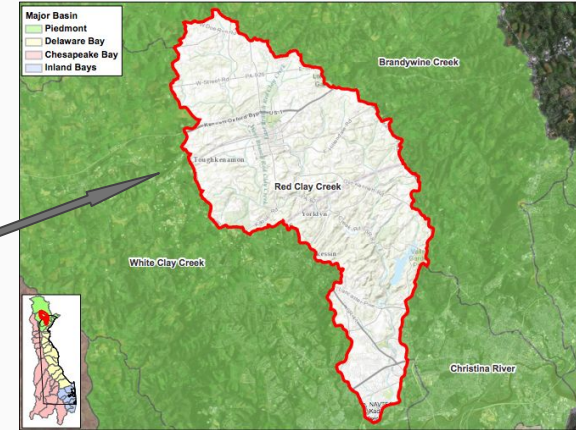
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# Overview

- Background
- History
- Mission Statement
- Three Problems, Goals, and their Solutions
- Existing Organizations and Regulations to aid us
- Conclusion/Timeline

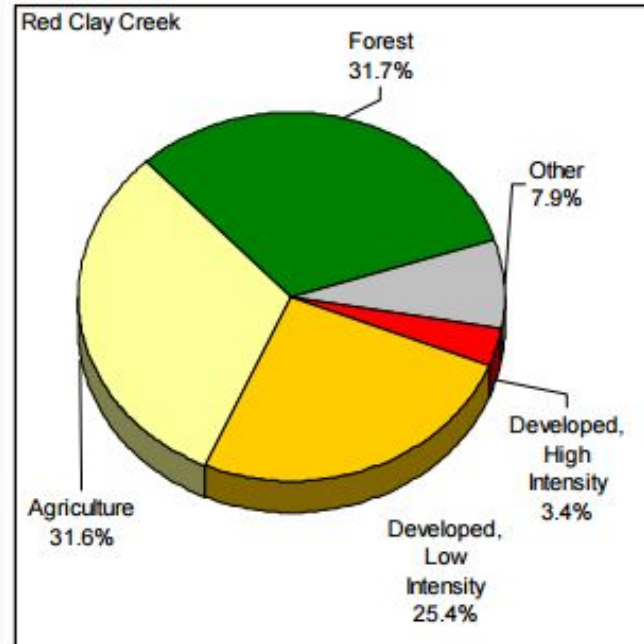
# Red Clay Creek: Background

- 54 square miles
- Part of Christina River Basin  
(in Delaware River Basin)
- Location:
  - New Castle County, DE
  - Chester County, PA
- Population: 47,000
- Five subwatersheds
- Hoopes Reservoir



# History

- Population increase
- Urbanization
- Flooding
- Land use changes



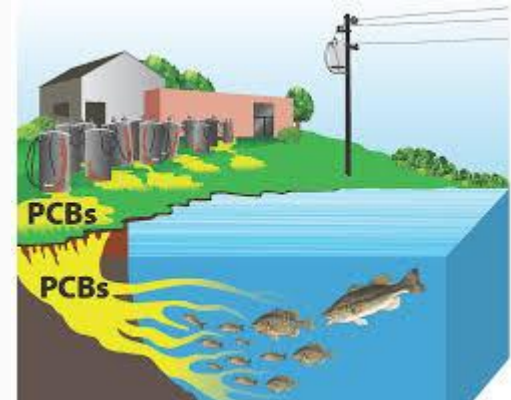
# Mission Statement

The goals of the Action for Red Clay Creek plan (ARCC) are:

- Attain the acceptable levels of TMDLs
- Improve water quality such that each water body is removed from the EPA 303d list of impaired streams
- Reduce flooding in the Red Clay Creek watershed by 50%
- Accomplish all goals by the year 2030

# Problem 1: Contaminants

- High levels of PCBs, dioxins, and chlorinated pesticides
- Toxic to humans and wildlife and bioaccumulate in fatty tissue
- Degrade water quality
- Sources:
  - point source discharges
  - Industrial land runoff
  - Agricultural lands



# Goal 1: Contaminants

- Reduce the presence of contaminants
- Meet fishable standards
- Identify point and nonpoint sources
- Enforce local, state, and federal regulations



# Riparian Buffers

- Vegetative barrier separating water body from agricultural and industrial runoff
- Prevents contaminants from entering water body and absorbs excess nutrients
- Trees planted in plastic tubes to protect from wildlife and provide forested buffer

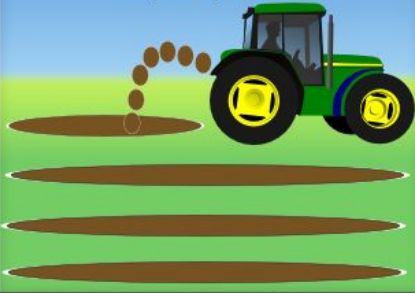


Tree seedlings utilized to create buffer



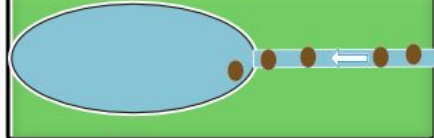
# Problem 2: Nutrients

Nitrogen and phosphate fertilizer is spread on fields to help crops grow.

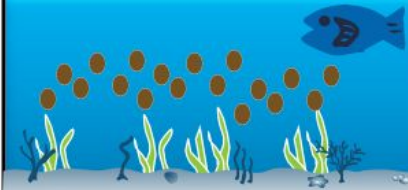


Rain causes runoff to streams, rivers, and lakes.

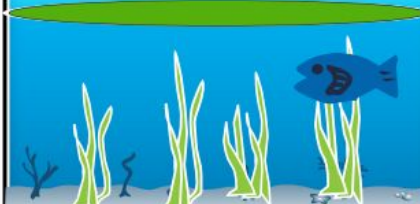
Runoff increases nitrogen and phosphate levels.



Causing an overgrowth of algae - called an algae bloom.



Large amounts of algae die and are decomposed by bacteria - that use up much of the oxygen in the process.



Causing plants and fish to die and destroy the ecosystem.



# Problem 2: Nutrients



Nutrient of Concern	Concentration	Historical Trend
Zinc	Exceeds chronic and acute state levels 85% of the time	Decreasing
Phosphorus	Exceeds EPA levels 90% of the time	Decreasing
Nitrogen	Does not exceed standard	Increasing

Non-point nutrient sources:

- Agriculture: pastures and mushroom farms
- Silviculture
- Lawn Fertilization

# Goal 2: Nutrients

Reduce nutrient concentrations to state and EPA water quality standards by:

- Eutrophication education
  - Encourage reduction of fertilizer and use of alternative methods
- Incentive programs
  - Encourage farmers to implement best management solutions...

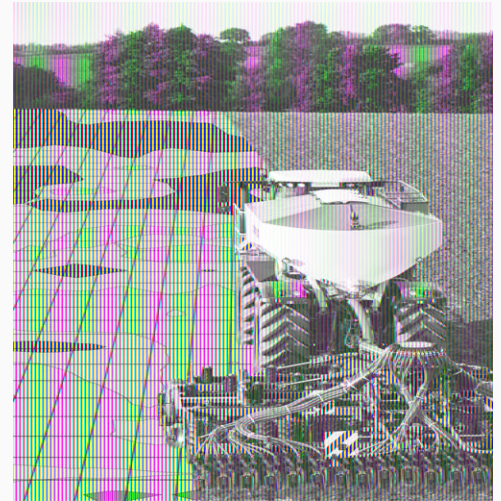
# Precision Farming & Cover Crops

## Precision Farming

- Only apply fertilizer to crops that need it
- Decreases nutrient pollution in runoff

## Cover Crops

- Crops planted that remain through the winter
- Absorb excess nutrients and stabilize soil



Seeder used for precision farming

# Problem 3: Stormwater Runoff & Flooding

- Increase in development
- Historical increase in impervious area
- Issues with designated water use



Red Clay Creek Flooding, October 1st 2010

# Goal 3: Stormwater Runoff & Flooding

- Encouraging better municipal stormwater management and planning
- Educate the public on ways they can encourage infiltration





# Bioretention Areas & Constructed Wetlands

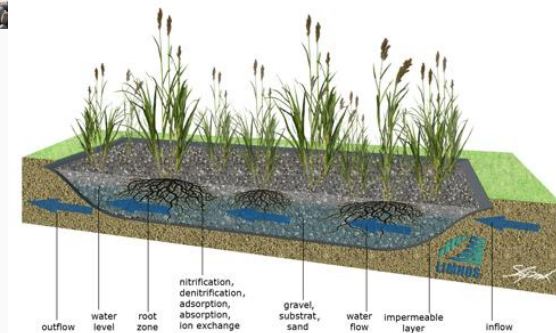
## Bioretention Areas

- Shallow depressions that collect and filter runoff
- Promote infiltration and reduce overall runoff



## Constructed Wetlands

- Mimic natural wetlands
- Water contained as standing water on surface or saturated water just below soil surface





# Existing Organizations\*

\*not an exclusive list

1. Local municipalities (Five PA townships + New Castle County)
2. Brandywine Red Clay Alliance
3. Christina Basin Clean Water Partnership (CBCWP)
4. Delaware River Basin Commission (DRBC)
5. U.S. Environmental Protection Agency (EPA)



# Existing Regulations

- Christina Basin TMDL Implementation Partnership Plan (CTIP)
- Total Maximum Daily Load (TMDLs)
- National Pollutant Discharge Elimination System (NPDES)
- Stormwater Management Act (PA Act 167)



# Tentative Schedule

Tentative Deadline	Action(s) to be completed
December 31st, 2017 (Preliminary)	<ul style="list-style-type: none"><li>• Compile list of necessary sources, contacts, regulations, and standards</li><li>• Begin compiling data</li></ul>
December 31st, 2020 (Identification)	<ul style="list-style-type: none"><li>• Identify, locate, and assess all point and nonpoint pollution sources and stormwater management systems</li><li>• Identify other areas of highest concern</li></ul>
December 31st, 2025 (Interim goals)	<ul style="list-style-type: none"><li>• Have all programs in place, up, and running in order to meet ultimate requirements</li><li>• Reverse increasing nitrogen trends</li><li>• Have at least half of streams removed from EPA 303d list of impaired streams</li><li>• Reduce flooding by 25%</li></ul>
December 31st, 2030 (Final goals)	<ul style="list-style-type: none"><li>• Attain proper concentrations for TMDLs</li><li>• Reduce flooding by 50%</li><li>• Have each water body removed from EPA 303d list of impaired streams</li></ul>