

Delaware Water Quality Issues

Water Quality Workshop

January 18, 2017

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Division of Watershed Stewardship



POPULATED PLACES

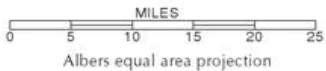
- 25,000 – 99,999 • **Wilmington**
24,999 and less • **Smyrna**
State capital ★ **Dover**

TRANSPORTATION

- Interstate; limited access highway 
Other principal highway 
Railroad 
Ferry 

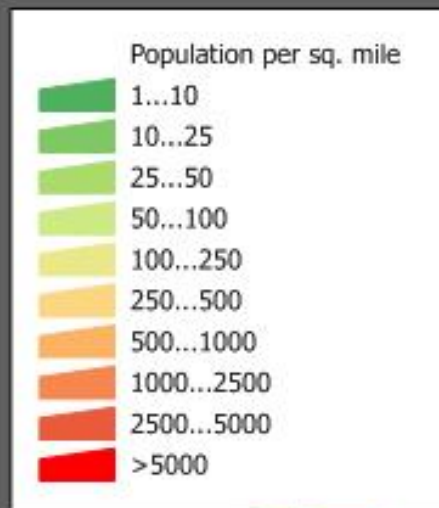
PHYSICAL FEATURES

- Streams 
Lakes 
Highest elevation in state (feet) **+448**
The lowest elevation in Delaware is sea level (Atlantic Ocean).

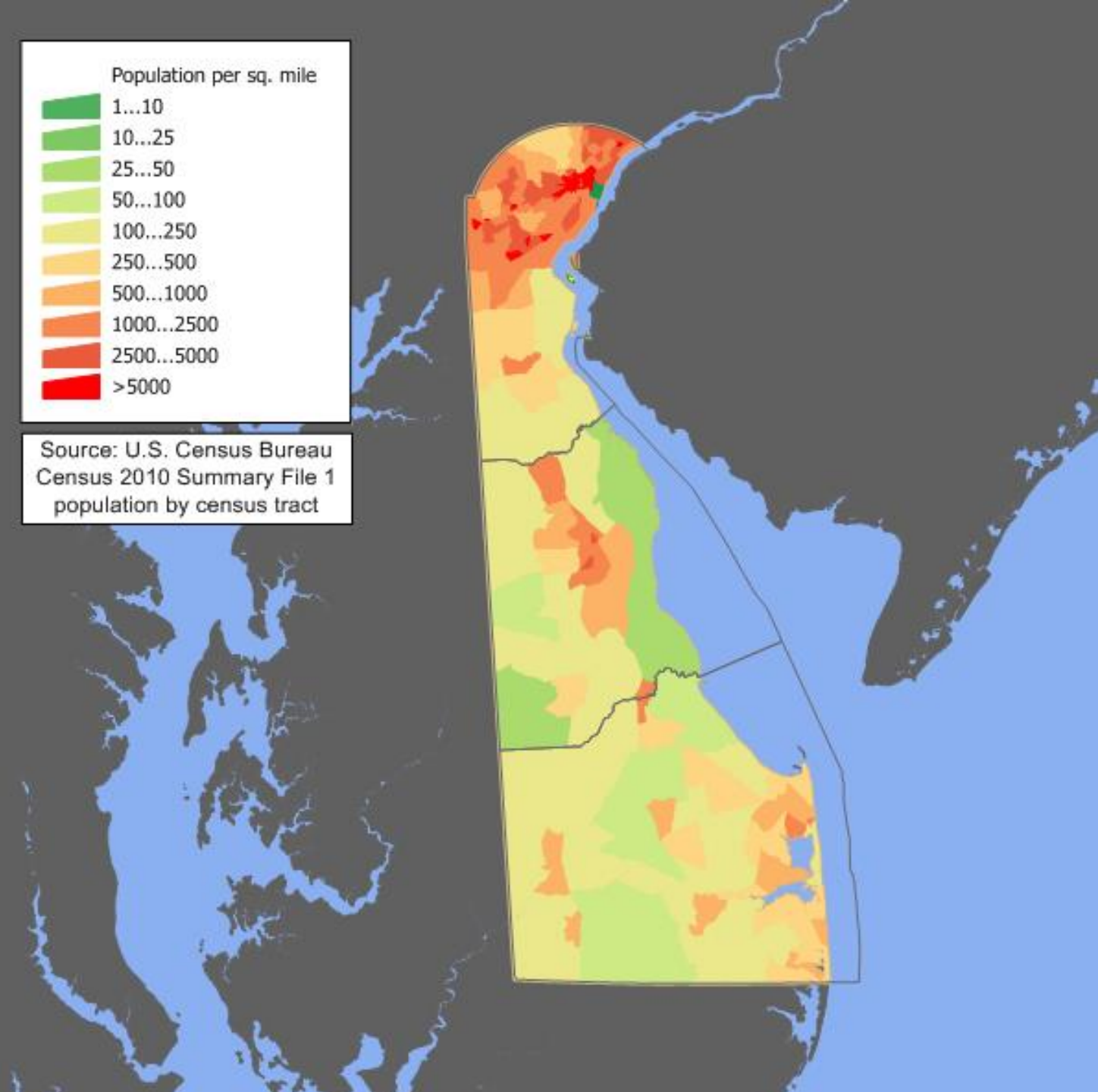


Delaware Stats

- Total Area: 1,982 Miles
- Width: 30 Miles
- Length: 96 Miles
- Mean Elevation: 60 Feet
- Population (2015): 945,934



Source: U.S. Census Bureau
Census 2010 Summary File 1
population by census tract



Some History

1609 – Henry Hudson and his crew aboard the Half Moon enter the mouth of what will become known as Delaware Bay.

1631 – Dutch established a trading post in what is present-day Lewes, calling the colony Zwaanendael, or "Valley of the Swans".

1776 to 1783 – Revolutionary War.

1787 – Delaware becomes the first state to ratify the U.S. Constitution.

1802 - DuPont founded using capital raised in France and gunpowder machinery imported from France.

1830s to 1840s – Canning industry begins.

More History

1859 – Railroad reaches Delmar. Farmers are now able to ship perishable goods outside of Delaware to cities such as Wilmington, Philadelphia and Baltimore.

1923 – Cecile Steele of Ocean View orders 50 chicks for her egg-laying business, but instead receives 500 birds thanks to a clerical error. The foul-up gives birth to the modern broiler industry, and will make Sussex County not only the birthplace, but the leading county of broiler production in the United States.

1924 – du Pont Highway opens

Statewide Surface Water Nutrient Statistics

(4500 Samples Over 5 Years)

Nutrient (Target Range)	Min	Max	Median
Total Nitrogen (1.0 – 3.0)	0.005	49.6	2.7
Total Phosphorus (0.1 – 0.2)	0.003	3.85	0.09

Potential Consequences of Nutrient Overenrichment

- Low Dissolved Oxygen
- Nuisance Algal Growth
- Harmful Algal Blooms
- Fish & Shellfish Kills
- Human Health Effects

Algal Production and Respiration Equations

Photosynthesis (Day):



Oxygen
Produced



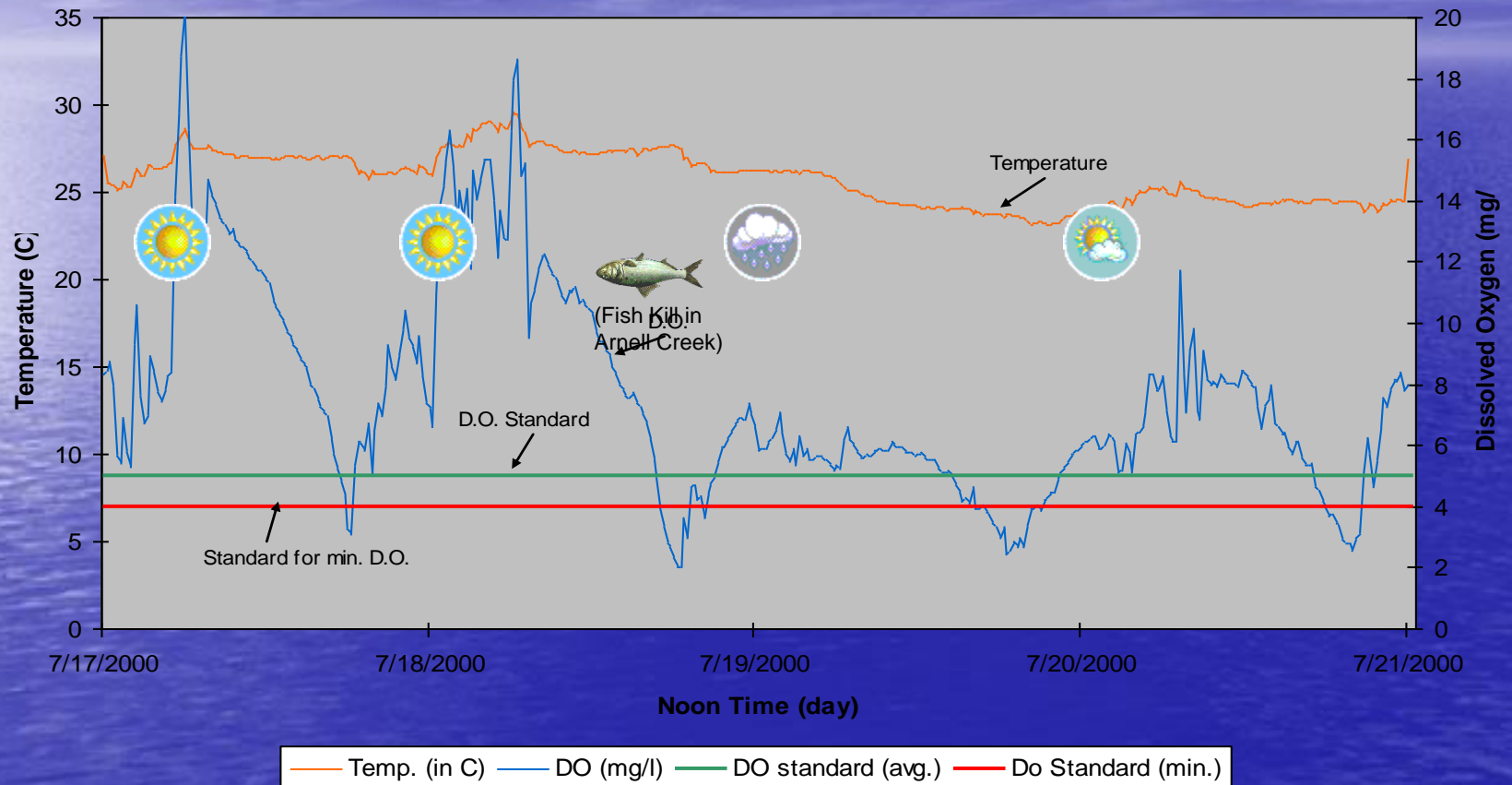
Respiration (Night):



Oxygen
Consumed



Day/Night Dissolved Oxygen Pattern In Waters With Excessive Nutrients







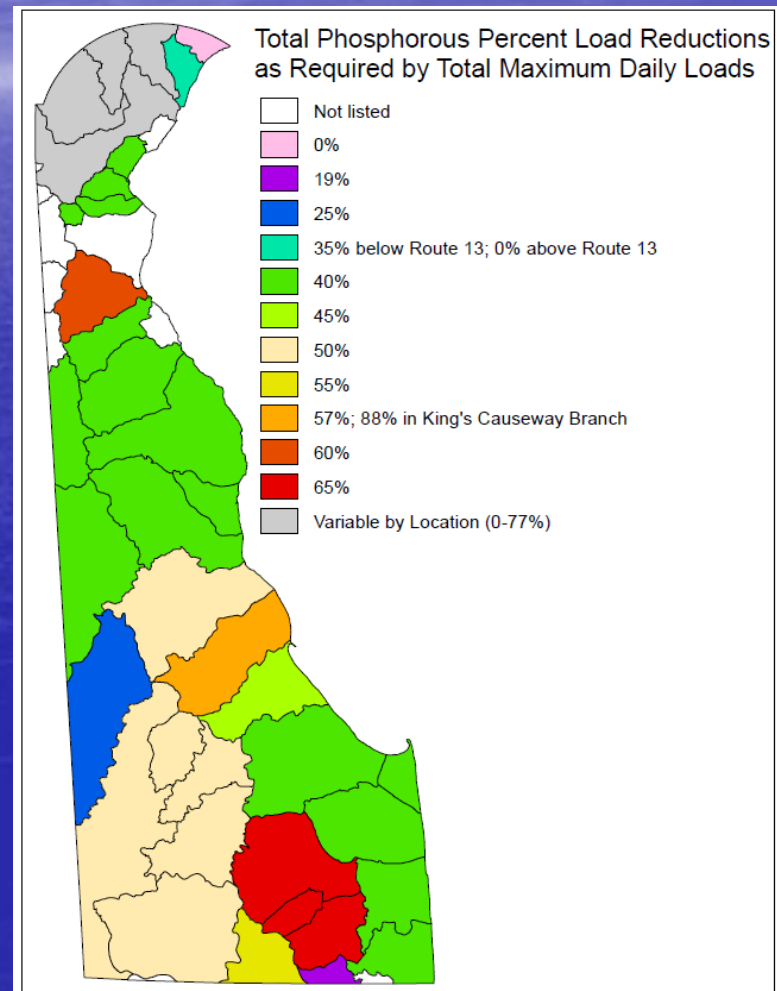
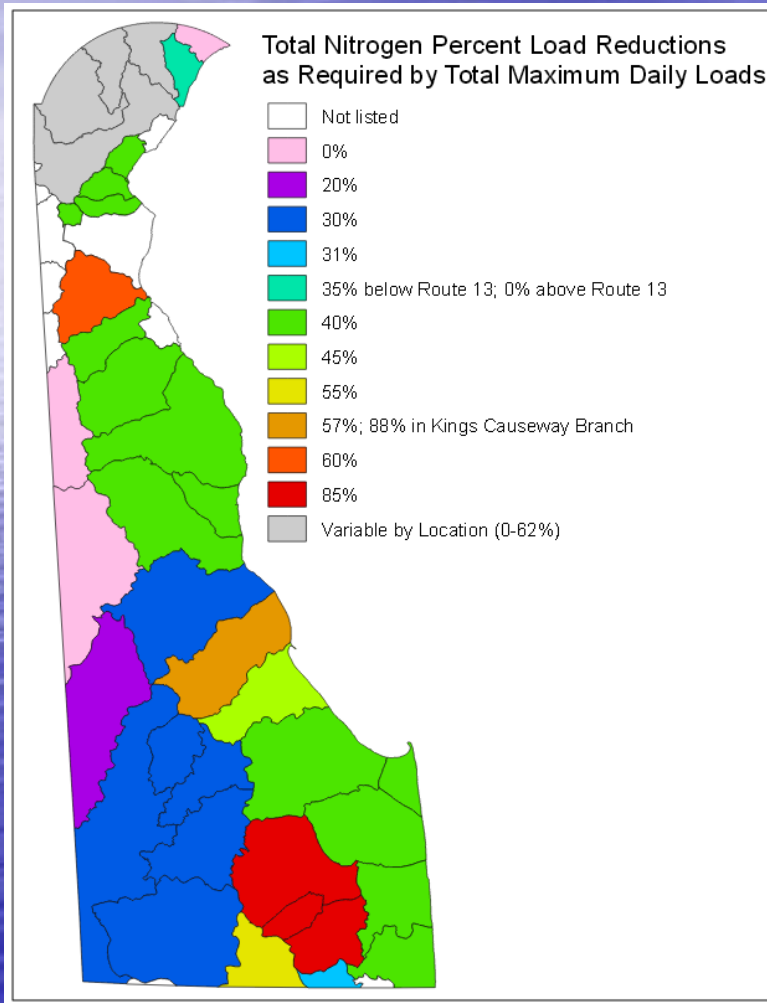




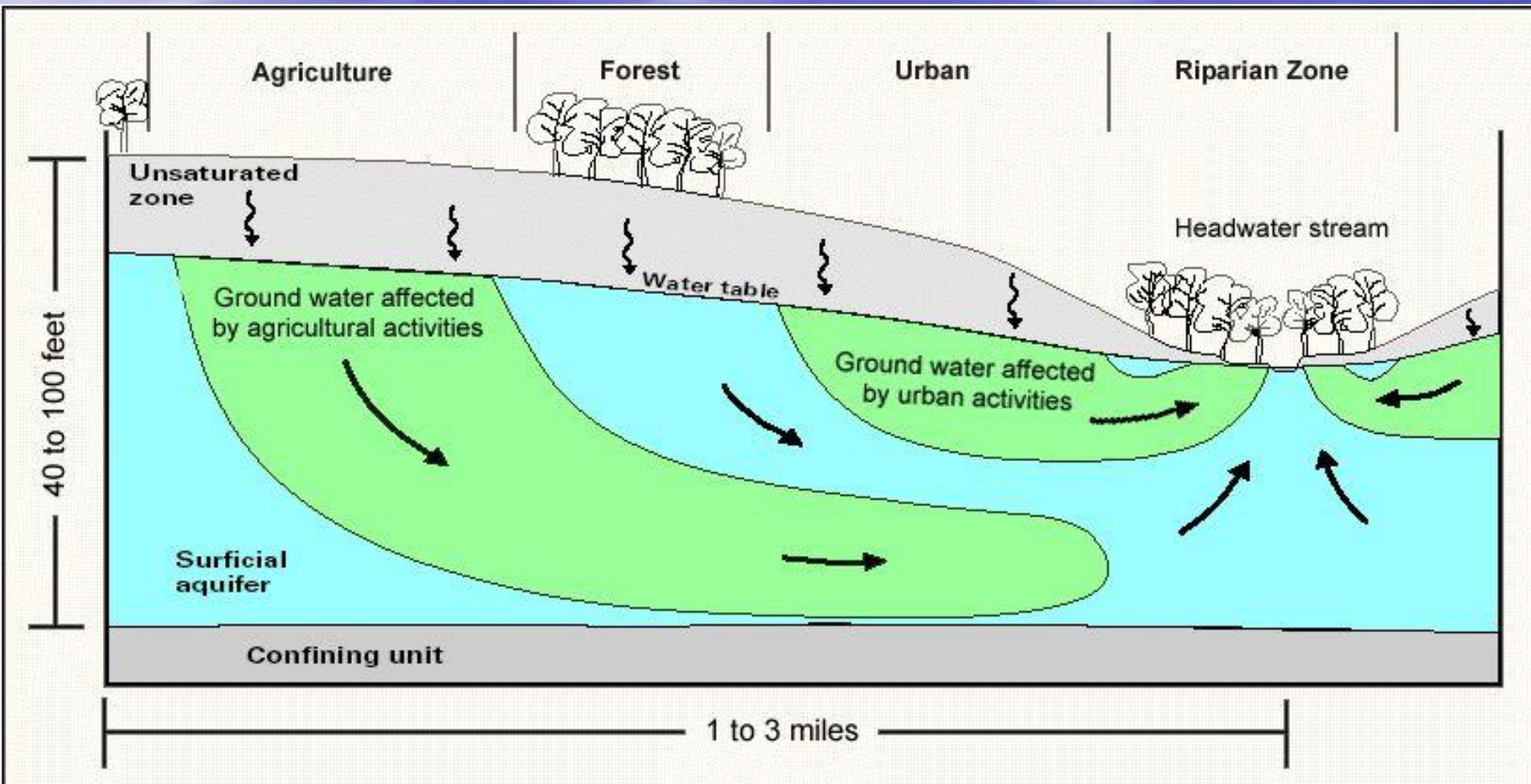




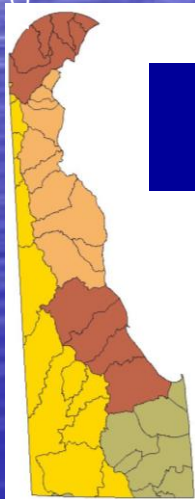
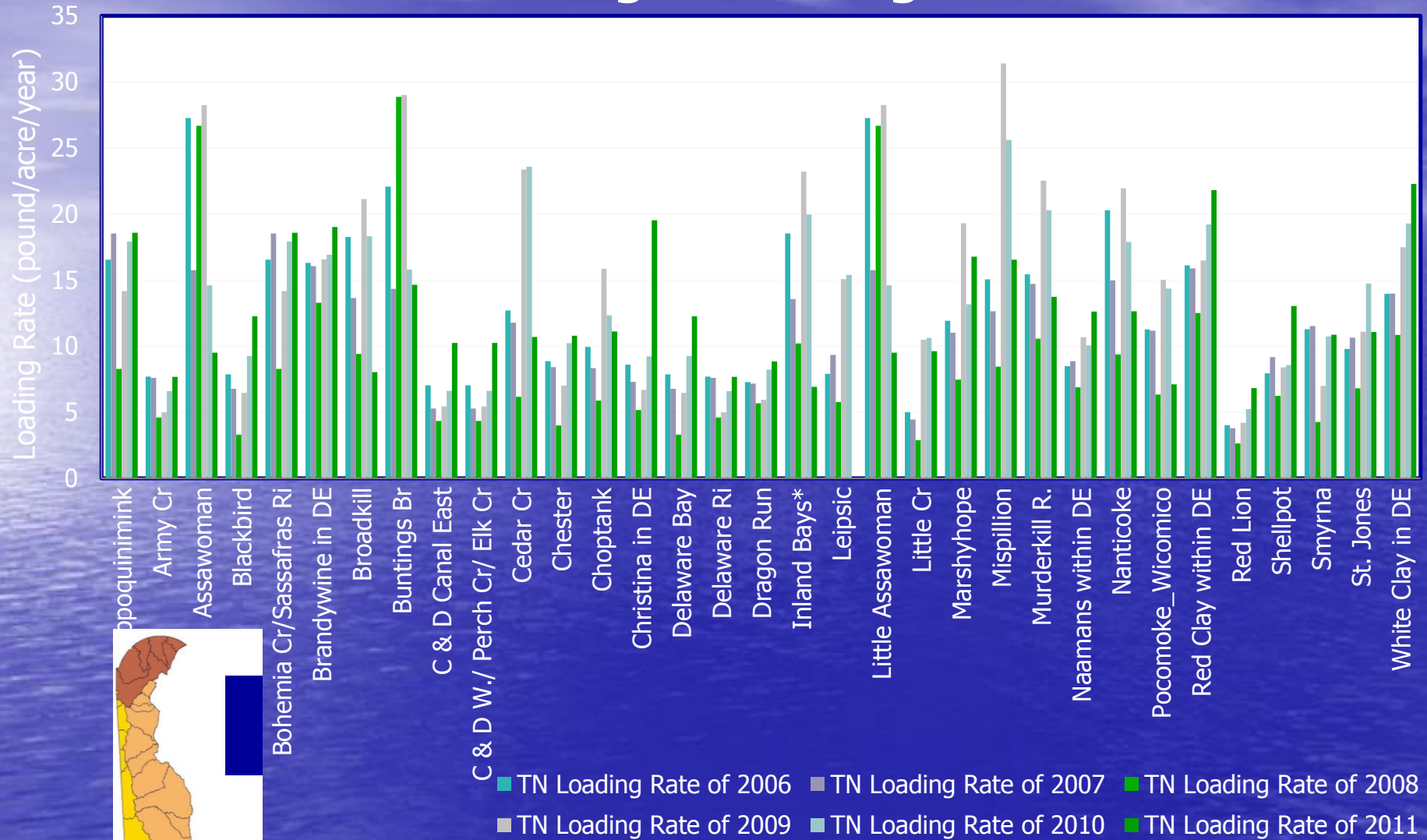
TMDL Reductions for Nutrients



Nutrient Pathways



Total Nitrogen Loading Rates



Nutrient Trends at 133 Stations

- 1998-2014
- 40 or more data points
- 133 Stations for P
 - 45 with trends
 - 22 downward
 - 23 upward
- 132 Stations for N
 - 76 with trends
 - 66 Downward
 - 10 upward