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- Narrow and deep river.
- 30 miles of the river flow through the Great Cypress Swamp.



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# Poultry in the Pocomoke River Watershed

- 600 million chickens are raised a year.
- One-fifth of all chickens are raised in Worcester and Somerset Counties.
- 750,000 tons of chicken waste is produced each year.



# Poultry in the Pocomoke River Watershed



- Poultry is a \$1.6 billion industry.
- 14,000 people are employed in our area by the poultry industry.



# Chicken houses



# Poultry in the Pocomoke River Watershed

- Chickens produce 13 million pounds of phosphorus and 48 million pounds of nitrogen.
- Phosphorus concentration has increased 25% since 1985.



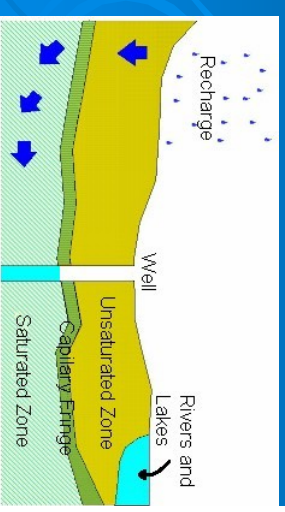
# Chicken manure shed





# Groundwater

- The U.S. Geological Survey, estimates 80% of the fresh water entering the Pocumoke River originates from groundwater sources.
- One-third of all ground water in the Pocumoke watershed has been contaminated by nitrates.



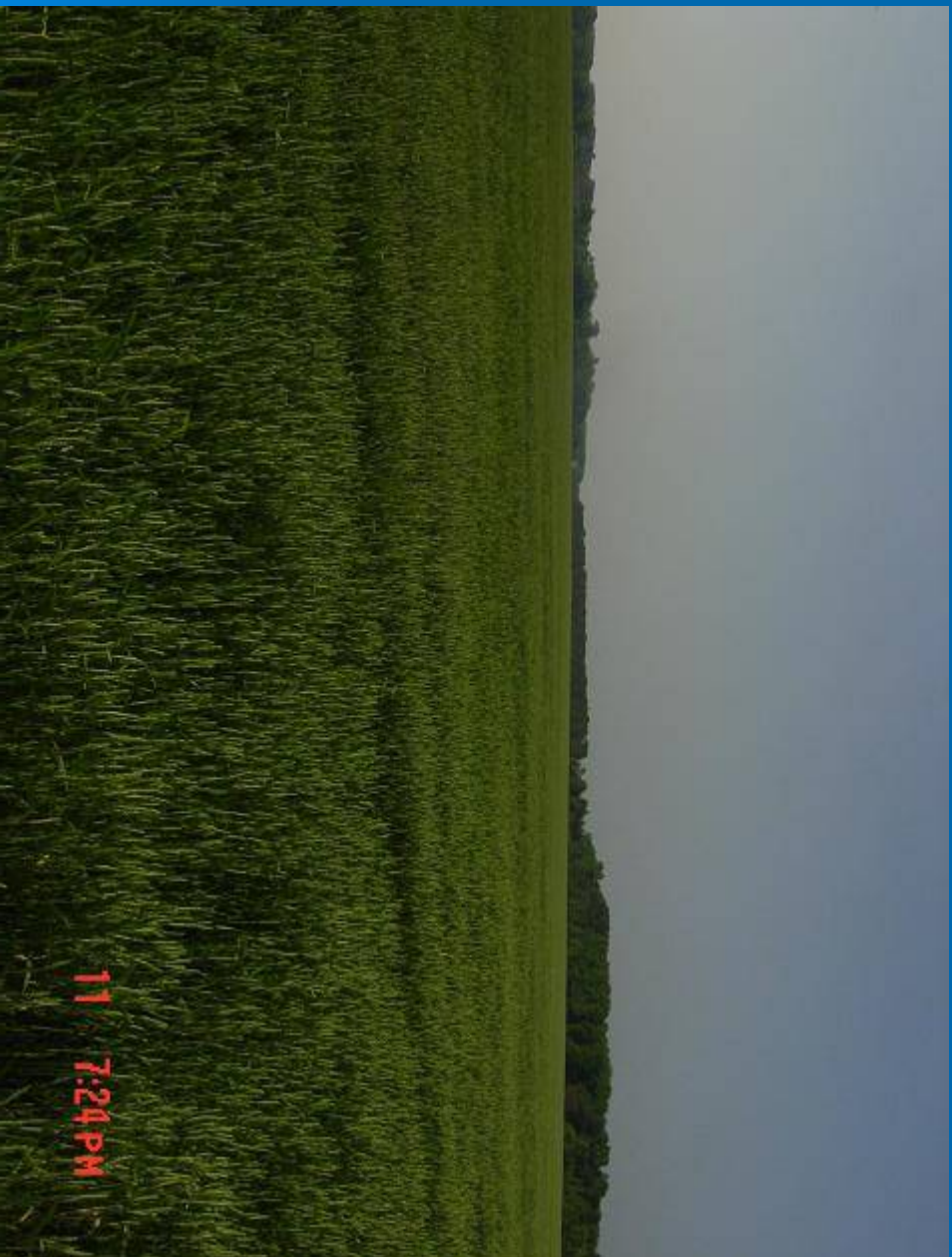
# Solutions

- Find alternative uses for chicken waste products:
  1. Burning as fuel
  2. Converting it into fertilizer pellets
- It is essential that Maryland's new nutrient management plan be enforced.

- Adding phytase to chicken feed reduces the amount of phosphorus in chicken manure.
- Reimbursement to farmers for the addition of phytase will ultimately reduce phosphorus.



# Agriculture





# Agriculture in the Pocomoke River Watershed

- Agriculture contributes 44% of nitrogen and 56% of phosphorus entering the Chesapeake Bay.
- According to CBF, nitrogen pollution is the most serious issue facing the Bay.



➤ Phosphorus is more difficult to deal with than nitrogen.

➤ When annual application of phosphorus exceeds the removal by crops, phosphorus accumulates in soil.



# New Research

- Scientists at University of Maryland Eastern Shore are studying the use of gypsum application in controlling phosphorus movement in farmer's fields.



- Scientists are reinvestigating the use of drainage ponds as storage units in which nutrients are allowed to settle.





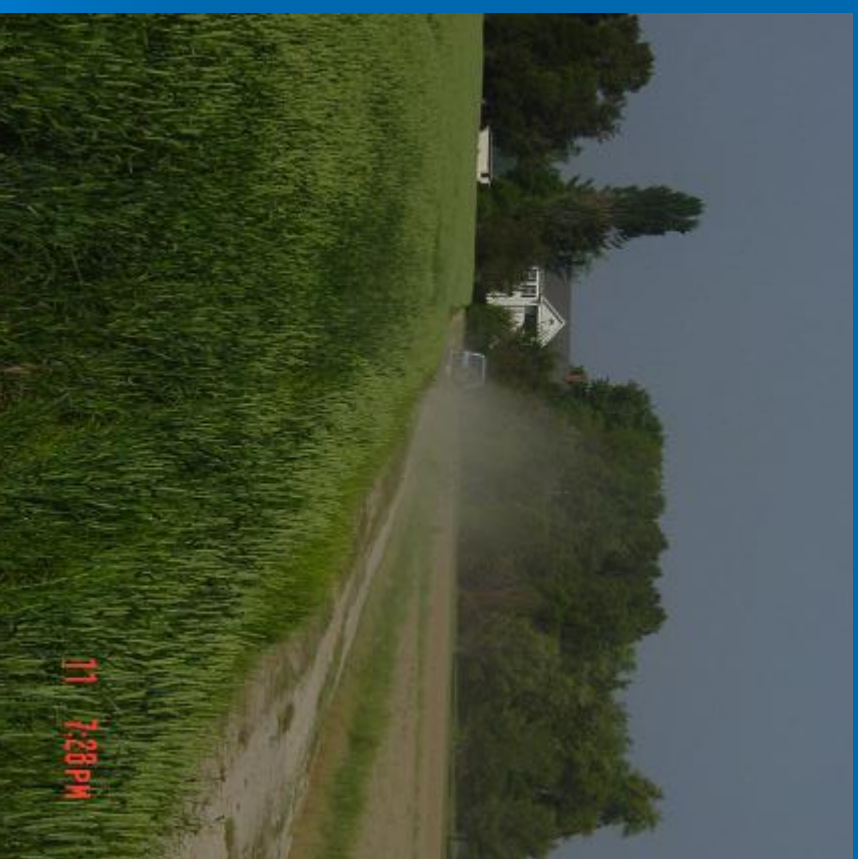
# Sedimentation

- Sedimentation in the Pocomoke River is mainly derived from non-point sources including construction sites, agriculture, and dirt roads.



➤ Limits need to be set on how long land may be exposed and when cover crops should be planted.

➤ Dirt roads should be paved as soon as possible.



# Tannic acid

- Due to the tea color of the Pocumoke River, sedimentation does not appear to be a problem, but it is.



# Waste Water treatment

- Waste Water accounts for 30% of the nutrient flow into the Chesapeake Bay.





# Pocomoke City's new water treatment plant

➤ Pocomoke River Water Treatment plant has recently been upgraded to a 5A class treatment facility.

This will result in a 55% reduction in nitrogen and a 33% reduction in phosphorus.



➤ Snow Hill's town mayor has requested a 6 million dollar grant to update the city's wastewater treatment plant.

➤ They also need funds in order to fix cracked and leaking pipes.



- Fertilizers and pesticides used by home owners collect in storm drains.
- This water remains untreated and goes directly into the Pocomoke River.
- Solution: all storm drain water should be sent directly to the wastewater treatment plant to remove toxins, fertilizers, and chemicals.



# Pfiesteria in the Pocomoke River

- In 1997, 20 to 30 thousand fish died in the Pocomoke River.





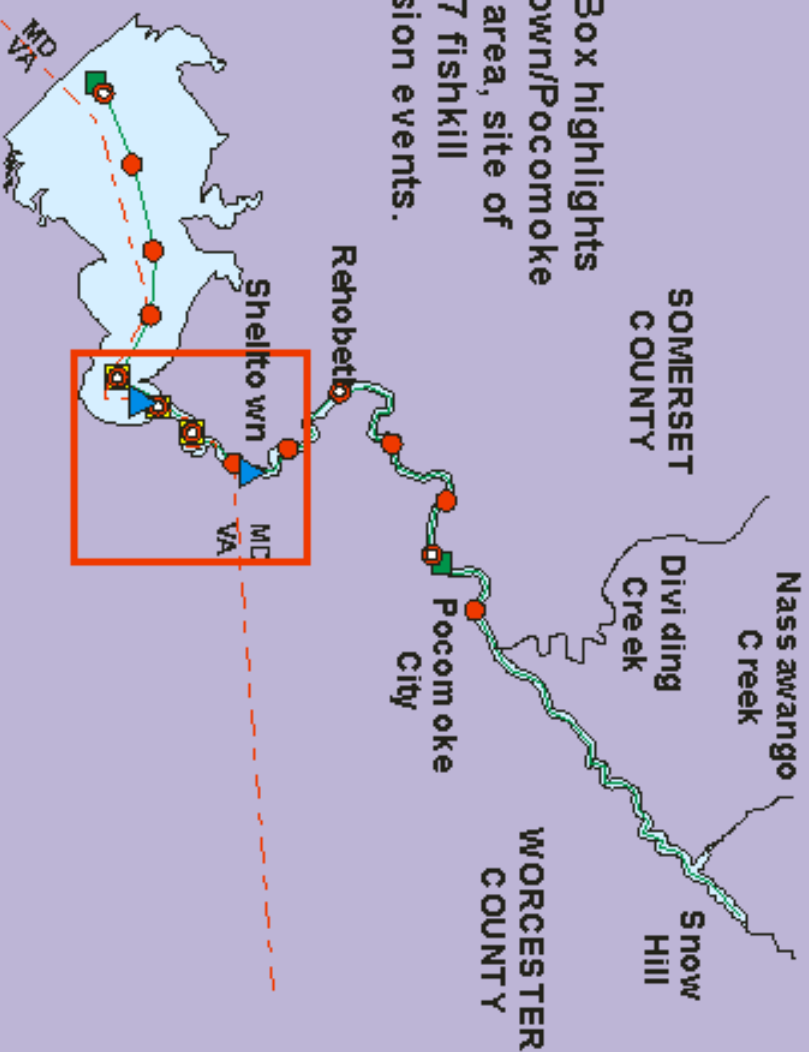
- It has been hypothesized *pfiesteria piscicida* was the culprit.
- *Pfiesteria*, a single-celled microorganism, has a complicated life cycle that includes 24 different stages.



- One toxic stage of pfiesteria may appear when water temperature exceeds 70 degrees, low salinity levels, and the presence of large quantities of fish.
- Pfiesteria is very sensitive to elevated phosphorus levels.
- These conditions were present in the Pocomoke River in 1997.

## ***Pocomoke River Study***

The Red Box highlights  
the Shelton/Pocomoke  
Sound area, site of  
1997 fishkill  
and lesion events.



➤ Some scientists hypothesize the *pfisteria* weakened the fish allowing a fungus to create lesions on the menhaden.

➤ Other scientists hypothesize that the lesions were caused by the *pfisteria* itself.



➤ As a result of pfiesteria, the American Rivers 13<sup>th</sup> Annual Report named the Pocomoke the third most endangered river in the United States.

➤ The Pocomoke River is one of the most widely studied and monitored rivers in the United States.





# Conclusion

- Education is the only hope for both the Pocomoke River and ultimately the Chesapeake Bay.
- Education has to be directed towards everyone, including home owners, farmers, watermen, people involved in the poultry industry, construction workers, students, teachers, etc...

# Delmarva Discovery Center

