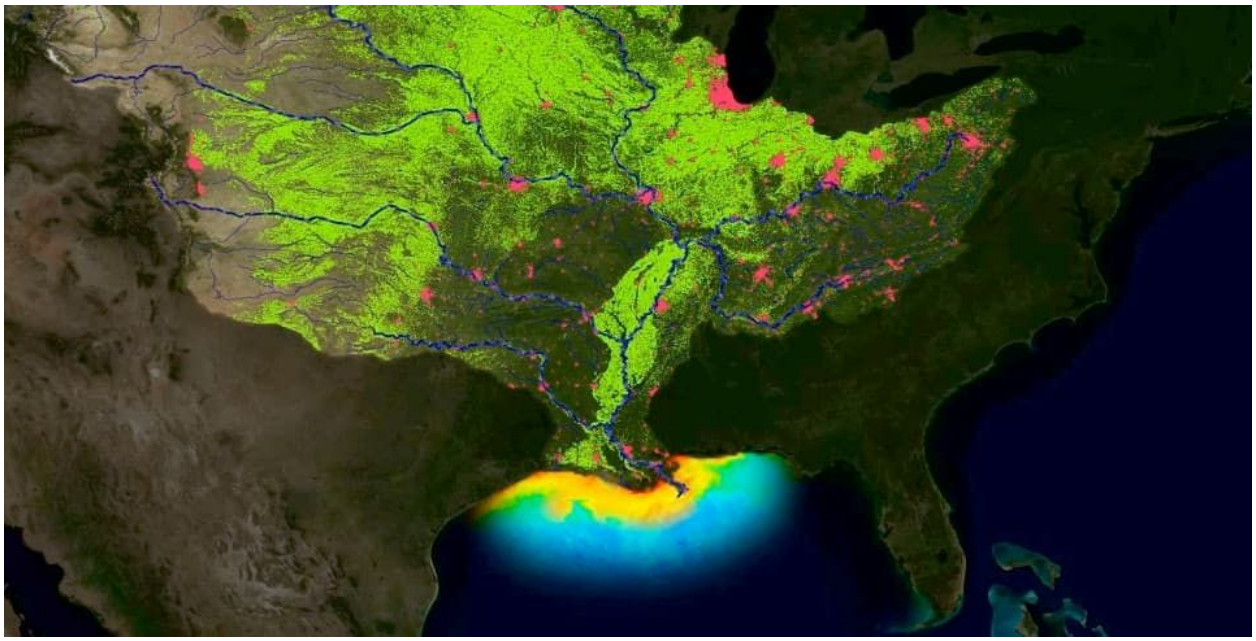
Nutrient Pollution: A Global Issue

By Naomi Nickel

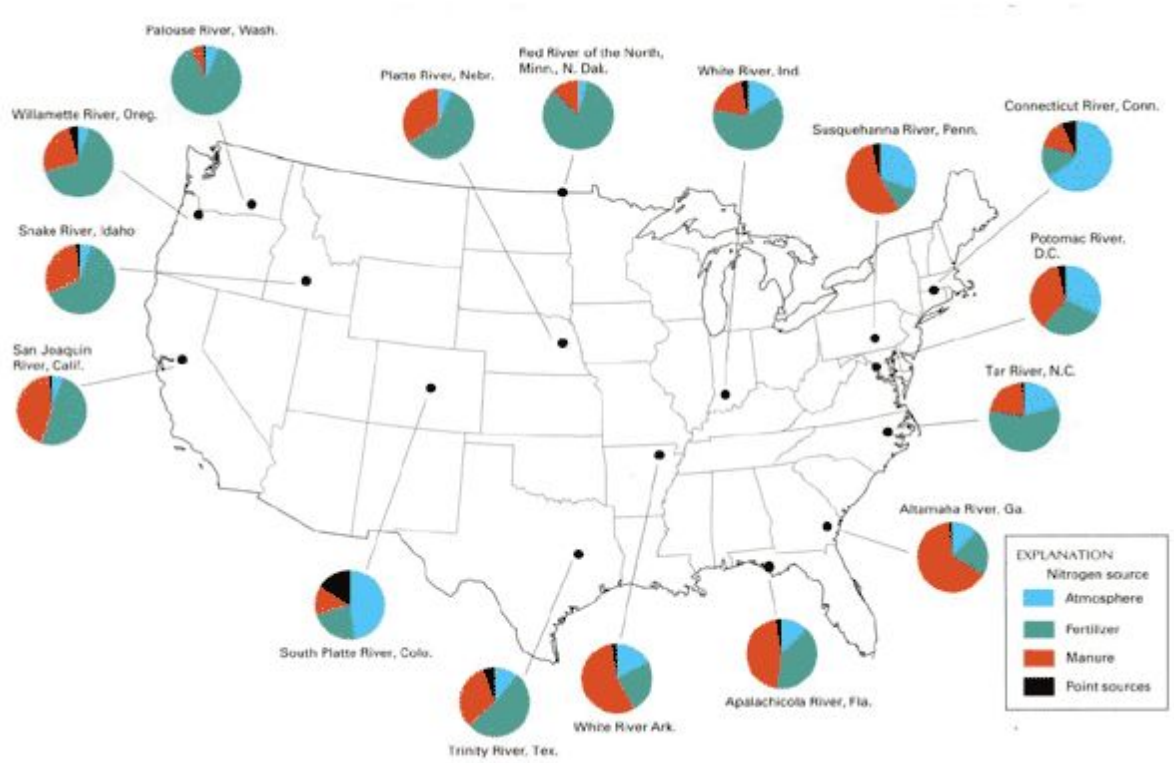
The Mississippi River starts in northern Minnesota, a small stream flowing out of Lake Itasca. As it winds around and heads south, it merges with the Minnesota River and St. Croix River. It picks up speed and grows, joining with more rivers to become a miles wide force of nature by the time it reaches its mouth in the Gulf of Mexico. This beautiful river, a pristine stream at its beginning, is the main cause of nutrient pollution in the Gulf of Mexico, creating a “dead zone” as large as New Jersey at its mouth every year. How does a clean river become so polluted that fish need to flee its deposits to survive?

The issue of nutrient pollution is often overlooked when environmental problems are discussed, though it is incredibly damaging to the ecosystem and economy. After all, most assume that as nutrients are necessary for a healthy ecosystem, the more nutrients present, the better. This dangerous assumption is sadly false. While nutrients are important to maintain healthy ecosystems, nutrients in excess fuels the growth of large algal blooms. These blooms grow quickly in response to extra nutrients, and quickly die and decompose, using precious oxygen to break down. This in turn lowers the oxygen levels in the body of water. If excess nutrients continue to enter the water, more algal blooms grow and die, lowering the oxygen levels enough that the lake becomes hypoxic and very few organisms can survive. In the worst cases, the water body could become a dead zone, with next to nothing able to live in the water. This cycle occurs every year in the Gulf, with a dead zone forming in the spring and growing throughout the summer, until temperatures drop and oxygen availability increases in the fall and the waters again become habitable.



The watershed leading to the Gulf of Mexico dead zone covers much of the continental US.

The main inputs of nitrogen and phosphorus-the two nutrients responsible for eutrophication-are usually deposited through the atmosphere, manure and fertilizer from farms, and other point sources such as CSOs, or combined sewer overflows. CSOs occur in areas that have combined sewer systems. In most developed areas, cities have separate sewers for storm and wastewater. However, in more rural or less developed areas, one sewer system carries both storm and wastewater. If a large storm event occurs, the sewer system often can't hold all the water, and the excess water(including human waste) is deposited into a local body of water. Besides the gross factor, this also floods the water with nutrients that require precious oxygen to break down. Residential areas also contribute to eutrophication with lawn fertilizer runoff and pet waste.



The major inputs of nitrogen in watersheds varies widely based on location.

Eutrophication and hypoxia are also affected by climate change. The warmer the water gets, the less soluble oxygen is in water, thus leading to less dissolved oxygen in the ocean. Warmer waters also leads to higher metabolism in ocean life, resulting in increased oxygen demand and decreased oxygen availability. Higher temperatures also results in stratification of ocean waters, where the cooler, more oxygen rich waters stay at the bottom of the ocean, and the warmer, oxygen poor waters stay at the top of the ocean. Usually as temperatures drop in the fall these waters start to mix again, but as ocean temperatures rise, the waters will mix less and less each year. Many scientists studying nutrient pollution believe that the Mississippi dead zone will only get worse in years to come, as not much time is spent focusing on studying and remedying eutrophication and warmer waters will only worsen the issue.

Though eutrophication is a complicated issue, there are many things we can do to help. Among them are cleaning up pet waste, using less fertilizer, and keeping organic matter out of the streets(where they would runoff into and decompose in storm sewers). Whole neighborhoods following these policies results in healthier local ecosystems. Eating less meat has a wider impact, as it lessens the amount of manure runoff and fertilizers used to grow crops for livestock. You can also support politicians and causes that will work towards a greener future.

To learn more and spread the word about eutrophication and hypoxia, check out these websites!
https://oceanservice.noaa.gov/hazards/hypoxia/
https://www.wri.org/our-work/project/eutrophication-and-hypoxia/sources-eutrophication