

Name:

Date:

Topic: Water Pollution

Period:

Warm Up: Discuss with your partner and come up with your own definition for "water pollution."

List everything you can think you do regularly that might contribute to local water pollution (minimum 3 things).

1) Water pollution harms all of nature and is largely caused by _____. While some types of pollutants are more difficult to address, some can be _____, reduced, and ultimately _____.

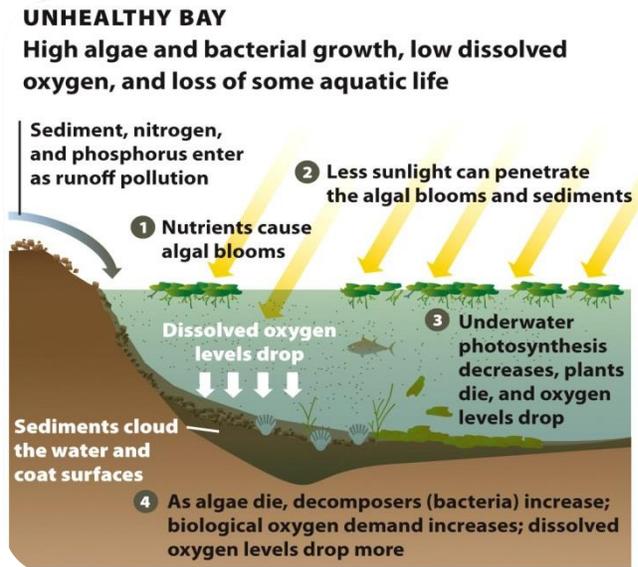
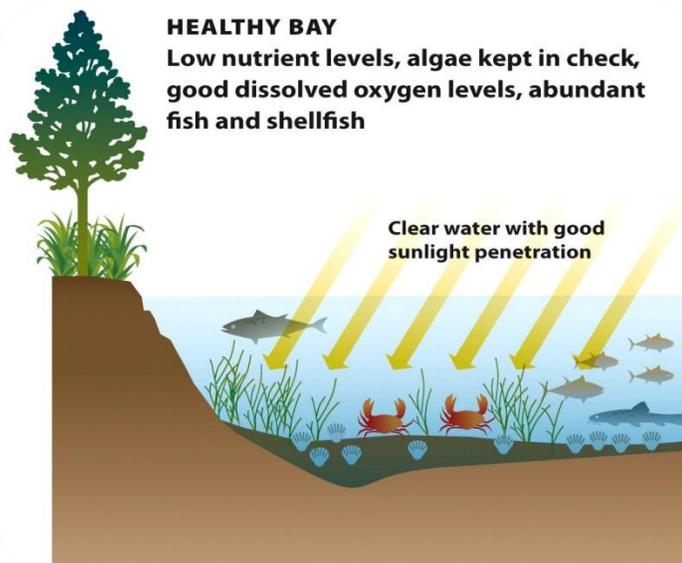
2) **Water pollution:** the _____ of anything that might degrade the _____ of the water.

- Uncovered manholes allow chemicals from city streets to enter the storm drains. Water from storm drains, as well as agricultural and suburban runoff, end up flowing into rivers, streams, lakes, and seas.

3) **Stormwater runoff:** the water from _____ that flows over the surface of the land.

4) **Eutrophication:** the _____ of an ecosystem with chemical nutrients, typically _____ containing _____, phosphorus, or both.

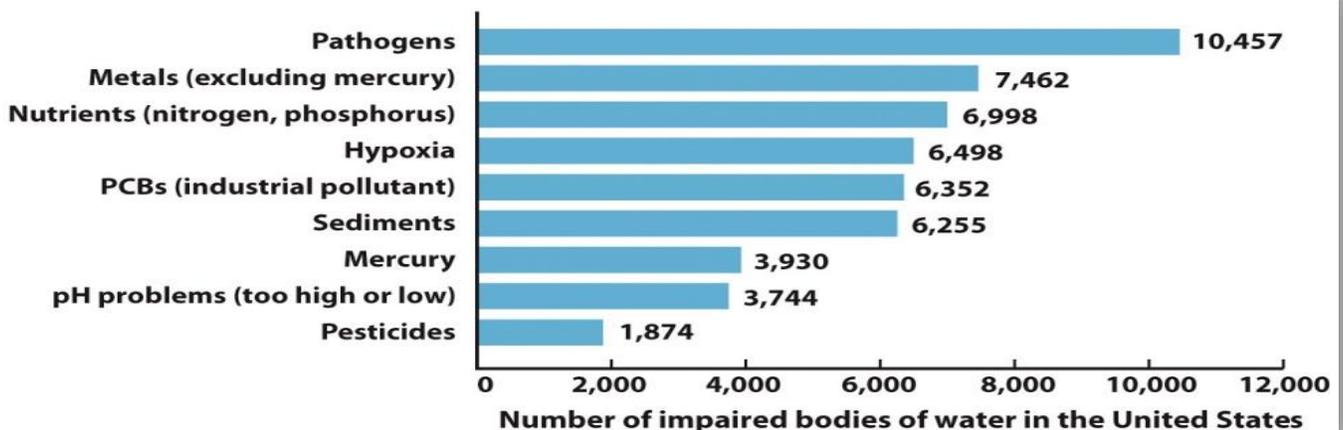
- Runoff pollution _____ waters with excess nutrients.
- The nutrients fuel _____ blooms, preventing sunlight from reaching plants underwater, which die.
- Excess nutrients begin the process of _____. These are contained in fertilizers that, when washed into a waterway, provide a _____ boost to algae.
- As the algae _____, light penetration is reduced and submerged aquatic _____ can no longer photosynthesize.
- Less _____ is produced in the water because as it blooms it stops underwater plants from conducting photosynthesis. With less oxygen in the water, other _____ begin to die and decompose. _____ uses up more of the limited oxygen, leaving the system _____ (without oxygen).



5) In the Chesapeake Bay:

- Fisheries have crashed
- Oyster beds have disappeared
- Algae blooms starve water of O₂
- In the _____ Bay, excess nitrogen, phosphorus, and sediment provide part of the explanation for the bay's decline.
- Without these natural _____, gills get clogged and spawning areas become covered with sediment.

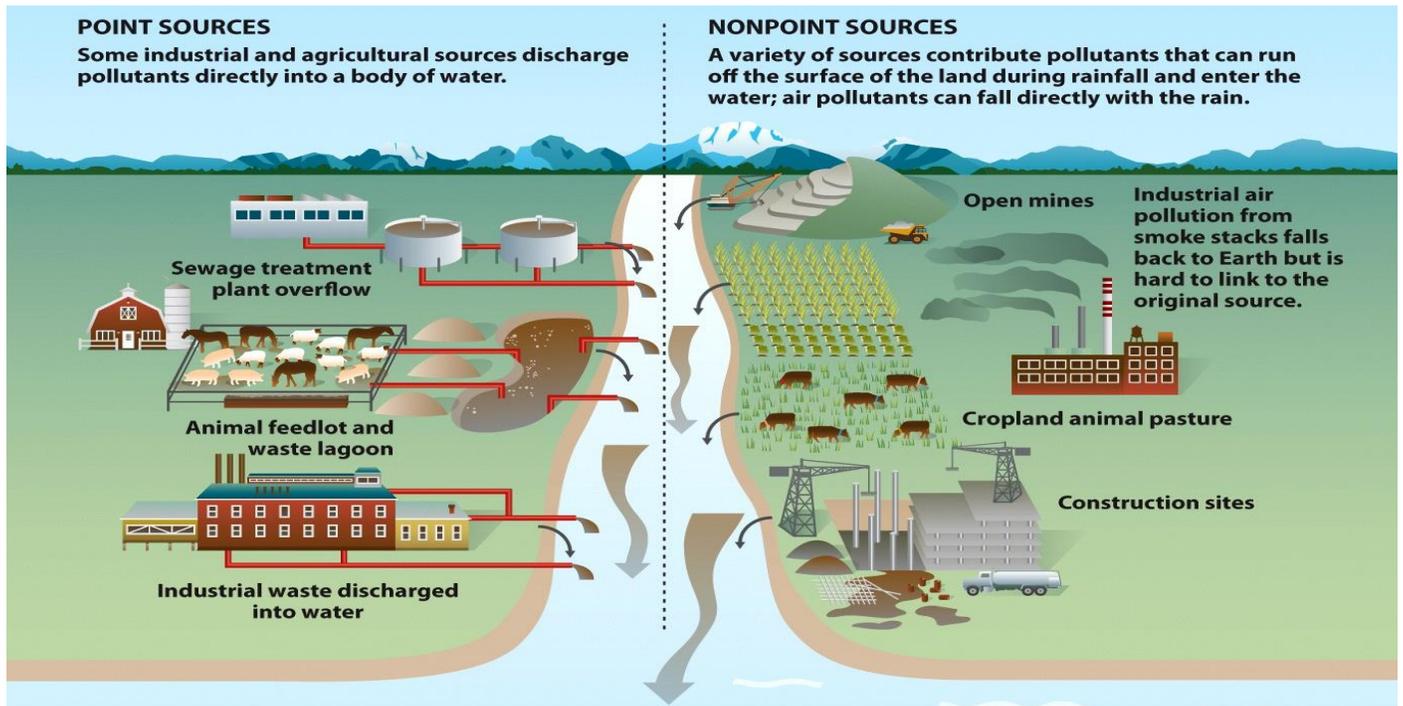
LEADING CAUSES OF IMPAIRED SURFACE WATERS IN THE UNITED STATES (2011)



6) **Watershed:** the _____ surrounding a body of water over which water such as rain could flow and potentially _____ that body of water.

7) **Point Sources:** some industrial and agricultural sources _____ pollutants directly into a body of water

8) **Nonpoint Sources:** a _____ of sources contribute pollutants that can run off the _____ of the land during rainfall and enter the water; also includes air pollutants can fall directly with the rain.



9) Typical pollutants include:

- Industrial _____, raw sewage, garbage, oil, fertilizers/pesticides, _____

10) The Chesapeake watershed covers more than 64,000 square miles and includes regions from six states and the District of Columbia.

- Excess nitrogen can reach _____ in the aquifer, potentially putting _____ of people at risk for contamination.
- Worldwide, _____ pollution is the leading type of water pollution.

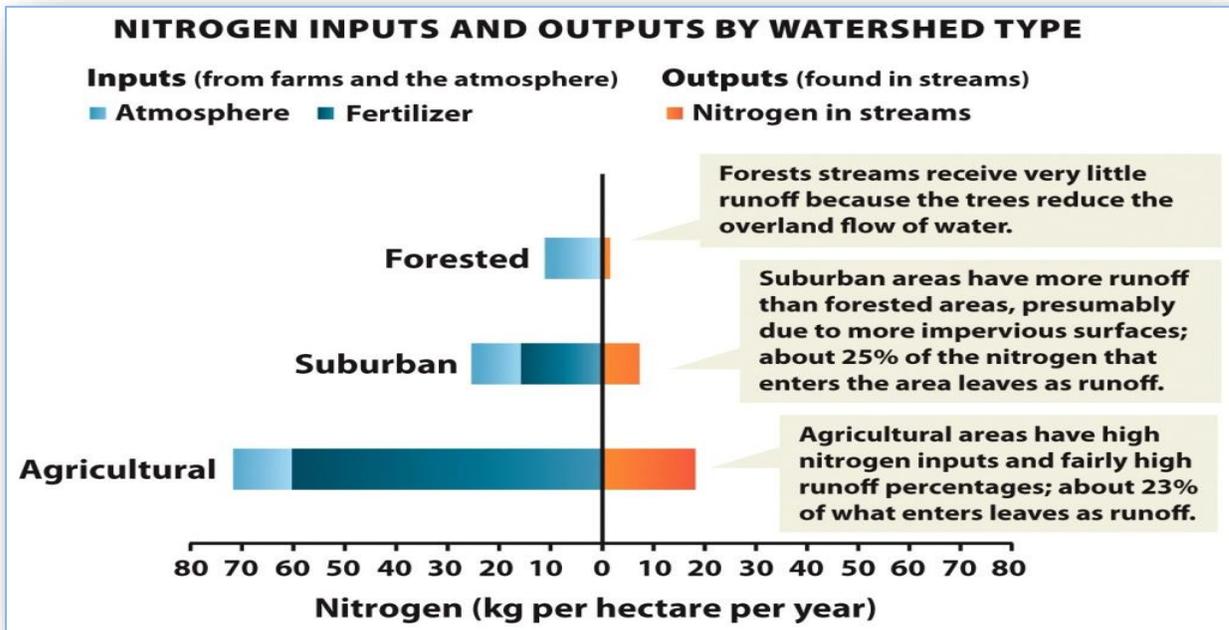
11) Excess nitrogen from any rivers and streams within the _____ will eventually flow to a larger body of water. The Gulf of _____ is one area where excess nutrients have impacted the ecosystem to the point of making a “**dead zone,**” or **hypoxic** area, where most organisms are unable to survive due to lack of oxygen.

- These problems were traced to pollutants that wash off _____ lands, suburban lawns, and city streets to contaminate stormwater _____.

12) **Nitrogen enrichment** is one of the _____ components that can create havoc in an ecological system.

Loss of oysters has been a critical change in the _____ community. (In the Chesapeake Bay)

- **Oysters** are food _____ for other organisms, provide habitat by forming reefs, stabilize the seabed, reduce sediment, filter feed, and reduce _____ and particles that would obscure the water and lead to **eutrophication**.
- Air pollution contributed about the same level of pollutants throughout a test area, but all samples from streams around agricultural sites had the highest levels of _____.

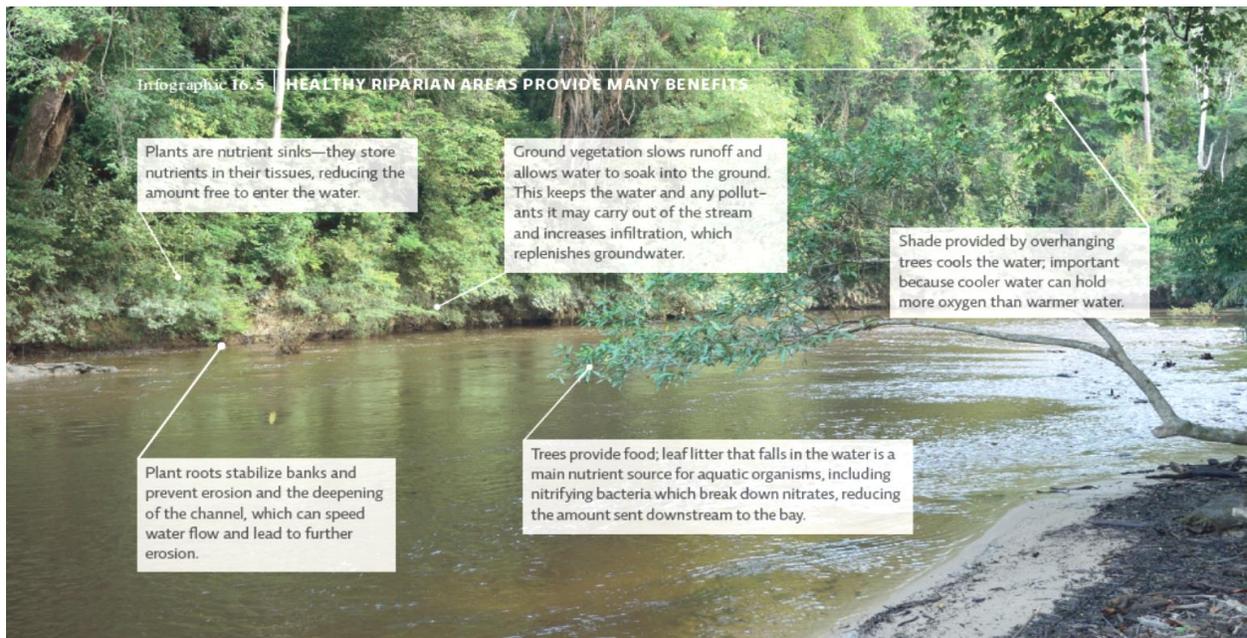


13) It's difficult to believe today, but in _____ there were no laws regulating what could be discharged into our waterways. The Cuyahoga River in Cleveland, Ohio, was burning because of the amount of _____ and _____ in the water.

- Passage of the _____ **Water Act** in 1972 established pollution _____ and set in motion establishment of **best management practices** to reduce pollution entering the bay.
- Clean Water Act: the primary federal law in the United States governing water pollution (1972).

14) Riparian areas (zones): the _____ between land and a river or stream.

- **Riparian areas need to be restored** by planting vegetated buffer zones that slow runoff and give rainwater time to soak into the ground.



15) To reduce nitrogen additions to water from urban and suburban areas, _____ can plant indigenous species of grass that require less _____ and water. Planting water-tolerant plants in low areas also helps by reducing runoff.

16) Stormwater that doesn't _____ into the ground can enter storm drains that flow directly to _____ and streams, or cause floods, especially in heavily built-up urban settings. Anything that increases _____ can help avoid these stormwater problems.

CHECK YOUR UNDERSTANDING

1. Water pollution is:

- found only in surface waters near cities.
- primarily excess nutrients from lawns, farms, and animal feedlots.
- usually from excess carbon being added to the system.
- contaminants or excess nutrients in surface waters and in groundwater.

2. The following items are part of the process of eutrophication.

- Algae quickly reproduce, using up oxygen and blocking sunlight to underwater plants.
- Bacteria consume excess wastes and nutrients, using up oxygen.
- Underwater plants die.
- Excess nutrients enter a body of water.

What is the correct order for the process?

- 1, 2, 3, 4
- 4, 1, 3, 2
- 3, 4, 2, 1
- 2, 4, 1, 3

4. Fertilizer from your lawn and motor oil from the leaky oil pan on your car are examples of:

- nonpoint source pollution.
- point source pollution.
- eutrophication.
- pathogenesis.

5. Three major sources of nitrogen pollution in the Chesapeake, in order from greatest to least, are:

- agriculture, suburban areas, and forests.
- agriculture, rainstorms, and urban areas.
- urban areas, suburban areas, and agriculture.
- logging, agriculture, and urban areas.

6. A watershed includes:

- only the land that would be underwater during a normal rainfall year.
- the surface water and the underground aquifer.
- all the uphill land surrounding a river and its streams that can feed water into that river.
- all the land downhill from a river that could potentially be flooded.

