

Watershed Experience Trailer: Pollution

Note:

When walking a class through the trailer, it makes sense to start here with the big picture.

Objectives: The Student Will Understand:

- Know what a watershed is
- Know what nonpoint source pollution is
- Describe five types of nonpoint source pollution
- Discover how pollutants affect the water and life in it
- Explore how nonpoint source pollution gets into the water supply



Point Source vs. Non-point source

There are two types of pollutions, point and non-point source pollutions. Point source pollution is pollution that flows directly and completely from a specific point, such as an industrial or sewage plant or storm drain. In the 1970s the government started to regulate point source pollution and

now requires permits for sources of point source pollution. The owner of the point source pollution can be fined if they produce too much pollution.

Examples of the point source pollution on the model include the industrial plant (has the parking lot) and Sewer (large circles next to the river). Point these out but do not add pollution to each of these for this experiment. An easy way to remember is if you can 'point to it', then it's probably Point Source Pollution.

The other type of pollution is non-point source pollution, which is pollution that is created by many different human and other activities all over the watershed and is then carried into the waterbody during rainfall. For example, one dog pooping in a back yard is not so bad, but imagine how much poop all the dogs in Tarrant County would make in one day.

How about in one week? How about in one year? What if all of that went into the lake? Non-point source pollution is not regulated and probably comes from everyone standing in the Watershed Experience Trailer today. Everyone lives in a watershed. Everyone lives downstream from someone else.

For today's lesson, we will discuss examples of five different common types of Non- Point Source Pollution. With you will need to answer the question on Worksheet A and the complete an essay on how one of the pollutants affects the waterbody and the life in it.

The 5 types of Non-Point Source Pollution

1. Oil from leaking cars can kill organisms, such as frogs, fish, worms, crayfish and insects, and can harm others when oil covers their feathers, gills, fur or skin. Oil can also cut off oxygen flow or kill plants in the area. Oil can be biomagnified, which means that one creature eats the oil, then another eats 4 of the first creature and have four times the amount of oil. Then another creature eats three of the second creature and has 3 times the amount of oil as the second creature and 12 times the amount of oil of the first creature.
2. Dirt from yards, construction site, deforested sites and farmland can harm water in multiple ways. First, with the dirt travels nutrients, manure, bacteria and other substances, some good and some bad. The dirt can also enter the waterbody and make the water more turbid and cloudy, reducing visibility, raising the temperature of the water and killing off aquatic plants. Over time the soil settles on the bottom of the water body and start to decrease the depth. Since soil is rarely eaten, it is usually not biomagnified.
3. Paint and other household items can either harm or kill wildlife. While most interior paint is non-toxic, exterior paint can contain mercury.
4. The nitrogen and phosphates in fertilizers help plants grow, which is why people will add them to their yards. But extra fertilizer can get into a waterbody and cause algae and plants to grow

to an unnatural level. This is called a “bloom” and the overgrowth of algae can block sunlight to the lower levels of the water and may produce toxins. When the algae use up all the extra nutrients, it will begin to die off, sink to the bottom and decay, which will use up the dissolved oxygen in the water. Since the fertilizers are used by the plants, they are not biomagnified.

5. Manure can be used as a form of fertilizer and contains nitrogen and phosphates. Therefore, manure can cause some of the same effects as the fertilizer listed above. In addition to the nutrients, cow manure can contain harmful bacteria, including E coli, Salmonella and Staphylococcus. These can cause anything from skin infections to food poisoning and even death. Cows walking around in the water can also increase turbidity, which can reduce visibility in water. Manure is not biomagnified in the water.

Best Management Practices

Best Management Practices (BMPs) are activities, systems and procedures to help reduce NPS. They will not eliminate all the NPS in a watershed, but they can greatly reduce it. Most BMPs are pollutants and site specific, since no one BMP will deal with all types of pollution. BMPs not only help reduce NPS, but also help retain water in the watershed. When it rains in an urban area, water can quickly rush into drainage and waterways, resulting in flooding and damage to the plant and animals living in the area. BMPs can help slow the movement of water, reducing flood and helping some water stay in the watershed, where it can help plants and organisms. This can also help people.

For example, both Houston and New Orleans are now below sea level partly because so much water has been drained from the area the ground is sinking and reducing in size. During summer droughts, soils begins to shrink and crack due to the lack of water and can damage the foundations of homes across Texas.

Lesson adapted from Meadows Center for the Environment EnviroScape lesson plans.