

Litter and the Natural Environment

Litter can harm the environment in a number of different ways. It is a breeding ground for disease-causing insects and rodents. Its "ugliness" damages the appearance of scenic environments. Open containers such as paper cups or beverage cans can hold rainwater, providing breeding locations for mosquitoes which have been known to cause diseases. Uncollected litter can attract more, flowing into streams, and storm water drainage systems, local bays and estuaries. About 18% of litter, usually traveling through storm water systems, ends up in local streams, rivers, and waterways. About 80% of marine debris comes from land-based sources. Animals may get trapped or poisoned with litter in their habitats. Cigarette butts and filters are a threat to wildlife and have been found in the stomachs of fish, birds and whales, who have mistaken them for food.

It often takes a long time before litter from the environment disappears. List of how long litter affects the environment:

- Paper and paperboard: 6 months
- Cigarette butts: 2–5 years
- Plastic (PET) Soda Bottles: 5–10 years
- Plastic shopping bags: 10–30 years
- Tin Can: 80–100 years
- Aluminum Can: 200–400 years

Cigarette Butts

While most people are aware of the risks involved in smoking, few seem to realise that cigarettes are also bad for the environment.

About 24 billion cigarettes are sold in Australia each year. It is estimated that 7 billion of these cigarettes are littered.



Some of the environmental impacts of cigarette butts:

- When it rains, cigarette butts lying in our streets and gutters are carried via storm water directly into our harbours, beaches and rivers. The chemicals contained in these butts and the butts themselves impact on our water quality and can be deadly to marine life.
- Flicked butts can cause fires. When thrown from a motor vehicle into dried grass, butts can start a grassfire or even a bushfire.
- Cigarette butts can take up to 12 months to break down in freshwater and up to 5 years to break down in seawater.
- Littered butts seriously reduce the aesthetic quality of any environment.
- Butts have been found in the stomachs of young birds, sea turtles and other marine creatures.

Plastic Shopping Bags

Plastic shopping bags have a surprisingly significant environmental impact for something so seemingly innocuous. As well as being an eyesore (next time you are outside, have a look around - you'll be amazed at the number of plastic bags littering our streets and waterways), plastic shopping bags kill large numbers of wildlife each year. In the water, plastic bags can be mistaken for jellyfish by wildlife. This makes plastic bag pollution in marine environments particularly dangerous, as birds, whales, seals and turtles ingest the bags then die from intestinal blockages. Disturbingly, it is claimed that plastic bags are the most common man-made item seen by sailors at sea.

		
Operation to remove plastic from gut of a green turtle.	Green turtle gut contents including blue plastic bag and red balloon.	Freedom for one rehabilitated turtle - how long will it survive?

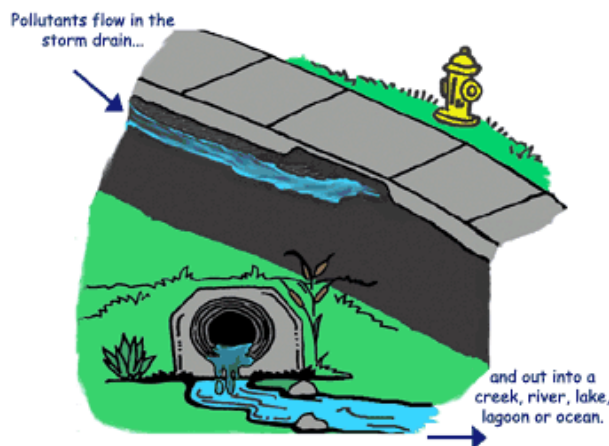
The biggest problem with plastic bags is that they do not readily break down in the environment, with estimates for the time it takes them to decompose ranging from 20 to 1000 years. One of the disquieting facts stemming from this is that plastic bags can become serial killers. Once an animal that had ingested a plastic bag dies, it decays at a much faster rate than the bag. Once the animal has decomposed, the bag is released back into the environment more or less intact, ready to be eaten by another misguided organism. The incredibly slow rate of decay of plastic bags also means that each bag we use compounds the problem, because the bags simply accumulate.





Water Pollution

Water pollution can come from a lot of different places, but the number one reason that our creeks, rivers, lakes and beaches get dirty is from the water and other pollutants that flow into storm drains.

Storm water is the water that runs down the street when it's raining. Storm water enters holes in the gutter called storm drains. Water that flows down the street when it's not raining, like when you wash your car or water your lawn, is called urban runoff.

After storm water and urban runoff flow into the storm drain, it gets sent to the nearest creek, river, lake or ocean so our streets don't flood. That means any pollutant on the street or in urban runoff gets carried to our water bodies and eventually the ocean.



Pollutants That Contaminate Our Water				
				
Leaves and grass clippings	Swimming pool chemicals	Hazardous chemicals	Soaps and detergents	Litter
				
Animal waste	Dirt	Oil and other chemicals from cars	Air pollution from cars	Pesticides and fertilisers

Effects of Water Pollution

The effects of water pollution are numerous. Some water pollution effects are recognized immediately, whereas others don't show up for months or years. Additional effects of water pollution include:

1) The food chain is damaged. When toxins are in the water, the toxins travel from the water the animals drink to humans when the animals' meat is eaten.

2) Diseases can spread via polluted water. Infectious diseases such as typhoid and cholera can be contracted from drinking contaminated water. This is called microbial water pollution. The human heart and kidneys can be adversely affected if polluted water is consumed regularly. Other health problems associated with polluted water are poor blood circulation, skin lesions, vomiting, and damage to the nervous system. In fact, the effects of water pollution are said to be the leading cause of death for humans across the globe.

3) Acid rain contains sulphate particles, which can harm fish or plant life in lakes and rivers.

4) Pollutants in the water will alter the overall chemistry of the water, causing changes in acidity, temperature and conductivity. These factors all have an effect on the marine life.

5) Marine food sources are contaminated or eliminated by water pollution.

6) Altered water temperatures (due to human actions) can kill the marine life and affect the delicate ecological balance in bodies of water, especially lakes and rivers.

What Can I Do To Help?

- Always place waste in the most appropriate place. If there are no rubbish bins, take it home with you. It is best to reuse and recycle, never litter.
- Never sweep grass, leaves or other waste into gutters as they degrade to form a rich nutrient source for algal blooms. Never hose paths as it will only wash your waste into the drainage system.
- Wash cars on the grass, never on the road or hard paths where it will wash detergents into the drainage system.
- Always dispose of unwanted chemicals responsibly; never pour them into gutters or drains. Petrol, paints, thinners, pharmaceutical drugs, and garden pesticides and herbicides are poisonous to wildlife. Your local council can advise you of the best way to dispose of these.
- Prevent oil from leaking from your car as it could end up in the sea.
- Use a calico or jute bag when you are shopping, or choose cardboard boxes instead of plastic bags whenever possible. Reuse plastic bags by taking them back to the store, where they will be recycled into items such as flower pots.
- Use washing detergents which contain no phosphates, to prevent excessive amounts of these entering the drainage system. Also avoid excessive use of chemical fertilisers as runoff from these into the waterways can cause algal blooms.
- Never pour waste fats and oils down the sink, but rather throw them out with other household garbage.
- Always take a poop-bag when walking your dog. Don't leave its droppings in the gutter or on the footpath as they will wash into the drainage system and contaminate the water.

Greenhouse Effect

Light from the sun warms land, water, and air. In turn, the warmed-up land, water, and air give off heat, which rises up toward the sky. Gases in the Earth's atmosphere capture some of that heat and prevent it from escaping into space. This heat trap keeps the ground, oceans and air at fairly stable, predictable temperatures -- warm enough to allow thousands of plant and animal species (including humans, like us) to thrive.

Without heat trapping, the earth's surface would be about 60 degrees Fahrenheit colder than it is now. The earth's overall temperature has changed often across the eras -- the long periods of time we use to measure the Earth's age.

For the past 10,000 years, the earth has had relatively stable temperatures. But, for the past 100 years or so, scientists have noticed the Earth seems to be warming up more than usual. This phenomenon is called global warming.

What is the greenhouse effect?

You now know the Earth's surface and atmosphere stay warm when gases in the air trap heat from the sun. Have you ever been inside a greenhouse, the all-glass buildings where plants are grown? They're very warm, because the glass walls allow the sun's rays in but prevent the heat from getting out.

Think of the earth as being inside a giant greenhouse. The gases act like a greenhouse's glass walls -- they keep heat from escaping into space, and the earth stays warm.

The greenhouse gases

The main gases that cause the greenhouse effect are:

- water vapor
- carbon dioxide, or CO₂
- methane
- nitrous oxide

Some "greenhouse gases" occur naturally in the Earth's atmosphere. But scientists measuring the gases say the amount of gases in the atmosphere has increased in the past few decades. For instance, the amount of CO₂ in the atmosphere is 30% greater than what it was 150 years ago. Scientists believe CO₂ levels will rise another 30% during the next 50 years.

The increase in greenhouse gases is expected to raise the average global temperature of the planet by 2 to 9 degrees Fahrenheit over the next 50 to 100 years.

Most of the increase is due to human activities, like:

- burning gasoline to drive cars and trucks
- burning oil, coal or wood to produce electricity
- for heating, cooling, and other purposes burning forests to clear land

All these activities, and many others, release greenhouse gases into the atmosphere. With greater amounts of greenhouse gases in the air, more heat will be trapped, and the Earth will get warmer...and warmer...and warmer.

What might happen if the Earth heats up?

If Earth gets hotter, some of the following things might occur:

- New coastlines would have to be drawn on maps! Because water expands as it is heated, and because oceans absorb more heat than land, sea levels around the world would rise. Cities on coasts would flood.
- Temperate places that now receive frequent rain and snowfall might become hotter and drier. Inland lakes and rivers would shrink. Forest fires could occur more often.

Frequent periods of drought would make it hard to raise crops for food. There would be less water available for drinking, showers, irrigation, even swimming pools!

- Plants and animals unable to take the heat may go extinct, and be replaced by heat-tolerant species.
- Hurricanes, tornadoes and other storms caused by changes in heat and water evaporation might occur more frequently and be more intense.

Global warming: It is more than just a game of up-and-down on a thermometer.

There's a lot of debate going on about global warming. Some scientists say it's nature's way - something that has happened in the past and will likely occur again. Other say global warming is occurring faster because of human beings and that human beings can stop it, or slow it, if they so choose.

One thing is certain: We do not yet know enough about how Earth works to accurately predict what the increase in greenhouse gases caused by humans will do to the planet. The relationships among land, water, air, plants and animals do not follow a simple pattern, where one action automatically leads to the same result.

For instance, an increase in carbon dioxide (the main greenhouse gas) may warm the Earth, and with the greater warmth more trees might grow. Trees absorb carbon dioxide to make wood and grow larger. With more CO₂ captured in trees and less CO₂ in the atmosphere to hold in heat, the Earth would cool down. Right? On the other hand, trees are also very good at trapping the sun's heat. So with more trees, the Earth would get warmer. Right?

We really don't know for sure. After all, the Earth is a big place -- a place that's worthy of your attention and study. Perhaps someday you'll unlock yet another of Earth's secrets.

YOU can help slow global warming!

Just because we're not absolutely certain of how more greenhouse gases will affect the Earth doesn't mean we should sit back and do nothing. Besides increasing greenhouse gases, burning too much gasoline and other fossil fuels creates air pollution and wastes energy. Who wants to breathe bad air, or always look up at a dirty sky?

You can help slow global warming by:

- Walking, riding your bicycle, or taking the bus instead of always going by car.
- Not wasting electricity (turn off the lights, the radio, the TV and the computer when you're not using them).
- Reducing, reusing or recycling all kinds of items, from soda pop cans to clothes, to save energy and raw materials.
- Planting trees to help absorb excess CO₂, and to provide shade and windbreaks to keep buildings at more even temperatures so they will require less energy for heating or cooling.

Air Pollution

Air pollution occurs when the air contains gases, dust, fumes or odour in harmful amounts. That is, amounts which could be harmful to the health or comfort of humans and animals or which could cause damage to plants and materials.

The substances that cause air pollution are called pollutants. Pollutants that are pumped into our atmosphere and directly pollute the air are called primary pollutants. Primary pollutant examples include carbon monoxide from car exhausts and sulphur dioxide from the combustion of coal.

Further pollution can arise if primary pollutants in the atmosphere undergo chemical reactions. The resulting compounds are called secondary pollutants. Photochemical smog is an example of this.

The table below gives you more detailed information about air pollutants, their sources and how they affect you.

Pollutant	Source	Human Health Effects
Particles (API) - Air Particle Index	<ul style="list-style-type: none">Internal combustion engines (e.g., cars and trucks);Industry (e.g., factories);Burning wood;Cigarette smoke; andBushfires.	Long term exposure is linked to: <ul style="list-style-type: none">Lung Cancer;Heart Disease;Lung Disease;Asthma Attacks; andOther health problems.
Nitrogen Dioxide (NO₂)	<ul style="list-style-type: none">Motor Vehicles are the biggest contributors;Other combustion processes;	Exposure to high levels of NO ₂ may lead to: <ul style="list-style-type: none">Lung damage; orRespiratory Disease. It has also been linked to: <ul style="list-style-type: none">Increased hospital admissions for asthma and respiratory problems;Increased mortality.
Ozone (O₃)	Formed by various complex chemical reactions involving the exposure of the oxides of nitrogen and some hydro-carbons. Ozone is the main ingredient of photochemical smog in summer	Ozone effects the <ul style="list-style-type: none">lining of the lungs;lining of the respiratory tract; andcauses eye irritation.

and early autumn.

Ozone also damages plants, buildings and other materials.

Carbon Monoxide (CO)	Motor vehicle exhaust and burning of materials such as coal, oil and wood. It is also released from industrial processes and waste incineration	When inhaled Carbon Monoxide enters the bloodstream and disrupts the supply of oxygen to the body's tissues. A range of health effects may result depending on the extent of exposure.
Lead (Pb)	<p>Is largely derived from the combustion of lead additives in motor fuels as well as lead smelting.</p> <p>Lead pollution from vehicle emissions is declining due to the introduction of unleaded fuels and reductions in lead levels in leaded fuel.</p> <p>Other atmospheric sources of lead include waste incineration and renovation of old houses (from leaded paint).</p>	<p>Lead retards learning in children and the development of their nervous system;</p> <p>Lead affects almost every organ in the body, whether it is inhaled or ingested. Young children are particularly susceptible;</p>
Hydro-carbons (HC) - chemical compounds composed of Hydrogen and Carbon atoms	Most fuel combustion processes result in the release of hydrocarbons to the environment. The largest fuel sources are natural gas and petrol. Note that hydrocarbons can enter the environment both as evaporative emissions from vehicle fuel systems, or in exhaust emissions. They are also a component of the smoke from wood fires.	Exposure can cause headaches or nausea, while some compounds may cause cancer. Some may also damage plants.



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