

A guide to identifying and reporting water pollution

This easy-to-read guide has been created collaboratively between multiple agencies across Pembrokeshire, and the wider West Wales area, to help members of the public spot and identify types of pollution.



What is a pollutant?

Our environment faces many sources of pollution from industry, wastewater, agriculture and other land uses.

But what is a 'pollutant'? It is a substance which has harmful or poisonous effects when it enters the environment.

As we all work towards protecting and improving our waterways, it is important that we are able to identify the differences between pollution and a naturally occurring event. Incorrect reports can use up valuable resources that would be best spent addressing real incidents.

This guide will help you to correctly visually distinguish between pollutants that are causing harm and naturally occurring events, that might also be foul smelling and unsightly but not require urgent attention.

Types of pollutants

Sewage

Silage effluent

Oil

Suspended solids/soil

Detergents

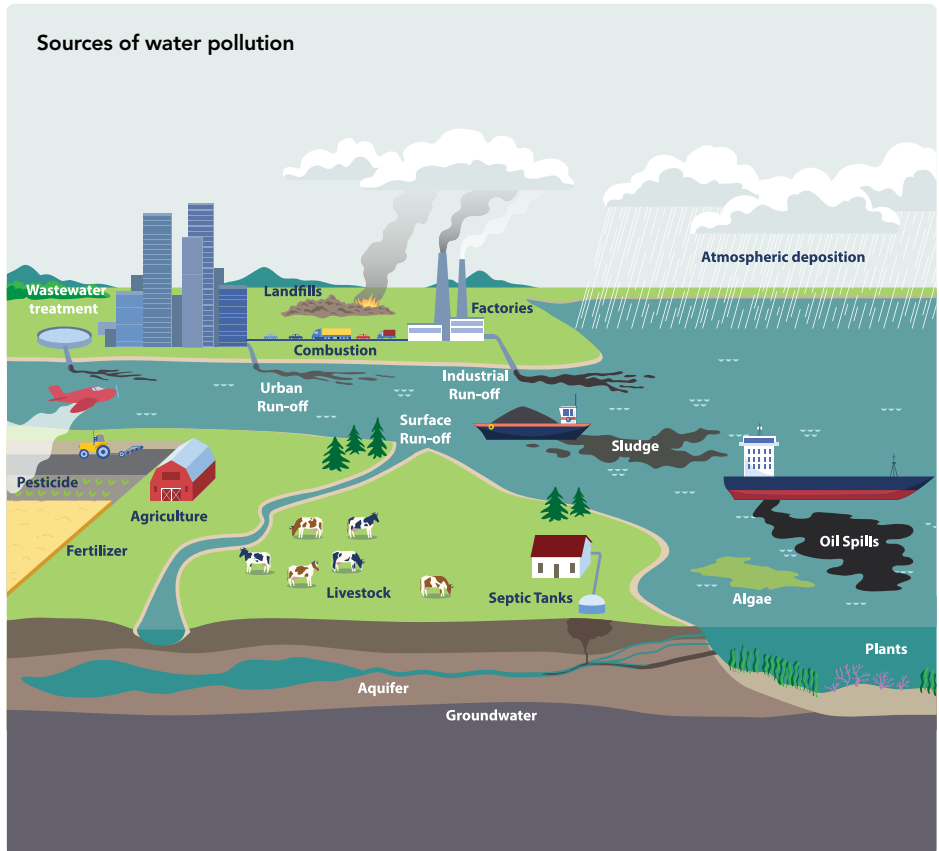
Mine water

Dog fouling

Slurry

Chemical

Sources of water pollution



Sewage

The term 'sewage' is commonly used to bracket all 'wastewater' from domestic homes, schools and businesses. Our wastewater consists of 'blackwater' and 'greywater', although these are created separately ('blackwater' from toilets, 'greywater' from showers, baths and sinks), they are mixed when entering the sewage network. Therefore, most wastewater is a very high proportion of used water with a small amount from toilets.

Sometimes rainwater is carried in the same pipes making the systems 'combined' with wastewater. These networks can have storm overflows, which are relief points needed to prevent sewer flooding into homes in heavy rainfall. These operate automatically and are important but can sometimes cause pollution events in certain conditions.

Identifying sewage pollution

As most sewage in Wales gets moved through pipes and pumps it very rarely looks like how people would imagine. In most of Wales, the public sewerage provider is Dŵr Cymru Welsh Water but some sewage management is privately owned.

Indicators of sewage in water may include:

- An off white/grey/milky looking discharge in the water.
- A noticeable sewage like smell.
- Debris commonly incorrectly flushed down the toilet, such as wet wipes and sanitary products.

Sewage can come from many places including private misconnections – whereby wastewater has been incorrectly plumbed into a surface water drainage system.

Misconceptions of sewage pollution/uncommon occurrences:

- Large solids, i.e. whole faeces – sewage rarely looks like what leaves your toilet.
- Brown thick 'sludge' – sewage is not usually brown as it has a lot of used water in it.
- Brown foam on beaches – this is usually related to a natural cause.



Sewage pollution in a river.

Sewage fungus

Despite its fungus-like appearance, sewage fungus is made up of filamentous bacteria, mainly the species *Sphaerotilus* which grows in response to organic nutrients in the water. The fungus thrives in a low dissolved oxygen (DO) environment. This makes sewage fungus a bio-indicator of organic pollution and a result of reoccurring pollution incidents which have reduced the oxygen concentration in the water but it is not always related to sewage despite its name.

Identifying sewage fungus

Sewage fungus can be caused by high nutrient load, such as slurry, sewage, silage effluent and leachates. Reporting is crucial not only to identify the root cause of the pollution but also to prevent extensive outbreak events.

Sewage fungus is grey in colour and often coats vegetation below the water's surface.



Sewage fungus resulting from a sewage spill.



Sewage fungus resulting from a sewage spill.

Sewage fungus,
but not always
sewage – a symptom
of pollution?



Sewage fungus resulting from a silage effluent.
Image © NRW.

Oil

Oil can end up in our rivers through numerous routes, such as household waste, garden equipment, vehicles, or fuel spillages.

As well as causing direct harm to wildlife through physical contamination, or its toxic effects, the presence of oil in our waterways can block oxygen from entering the water, lowering oxygen available for life in the water. It is important that any signs of oil in our waterways are reported.

Identifying oil pollution

When oil is present in our waterways, it sits on the surface of the water creating a black or rainbow sheen.

Oil pollution is commonly confused with the natural breakdown of organic matter, which can also present itself as an oily sheen. The key difference between the two, is that natural organic breakdown does not have an oil-like smell and breaks up into small pieces when disturbed. However, an oil sheen has a strong smell and breaks up into large clumps, quickly reforming the sheen after any surface disturbance.



Oil spill
Image © West Wales Rivers Trusts

Suspended solids/soil

Whilst a certain amount of sediment is naturally washed off into our rivers, poor land management, such as from engineering works, building developments and agricultural operations can lead to excessive sediment loss into watercourses becoming heavily choked with sediment, known as 'suspended solids'. This sediment damages fish gills, blocks sunlight from reaching in-river plants, preventing photosynthesis, and settles on the riverbed where it smothers gravels, invertebrates and fish eggs that live within them. Sediment can also carry with it any chemical treatments applied to the soils which are lost into the river.

Identifying suspended solids

If you notice your local river is a much browner colour than normal, it is worth reporting. Whilst this might not result in an immediate response, these reports help us to get an idea of ongoing poor land practice.



Sediment pollution.
Image © West Wales Rivers Trusts

Chemical

Inorganic (chemical) fertilizers are also commonly used on agricultural land to increase crop yield. However, if these are also applied incorrectly, they can wash off land or leach out of soils and into watercourses.

Identifying Chemical Pollution

Although it is not possible to see or smell inorganic fertilizers directly in a watercourse, their presence will encourage algae to grow, creating a bloom which can cause issues such as low dissolved oxygen, algal mats smothering the substrate, or changes in the balance between different species in the water. For this reason, reporting of excessive or unusual algal blooms can be useful to identify chronic problems in a catchment.

If you notice any concerning colour or odour change in rivers, this should be reported.

Mine water pollution

Mining affects fresh water through heavy use of water in processing ore, and through water pollution from discharged mine effluent and mining waste.

Identifying mine water pollution

Mine water pollution is bright and often orange in colour due to the presence of iron in the water.



Mine water pollution.
Image © West Wales Rivers Trusts

Detergents

Detergents are a class of surfactants with cleaning properties when diluted in water. Many bacteria in our waterways feed off these detergents, encouraging bacterial growth and loss of oxygen. Many cleaning products also include “forever chemicals” which are a particularly worrying type of chemical pollution due to their persistence in the environment.

Identifying detergent pollution

Detergents can cause a large amount of foam. Often bright white in colour, with a fragrant smell and present throughout the width of the watercourse at some height from the water level.

Detergent pollution is commonly confused with the natural foam which can be created by natural fatty acids which are released from decaying organic material.

The key difference between the two, is that natural foam is usually lower to the water, has a brown tone, no smell, and only accumulating in sheltered areas or where water is agitated by high wind, turbulent water or waves.



Detergent pollution.



Natural algae foam in a river. © Aethne Cooke

Dog fouling

With dog walkers commonly visiting beaches, not clearing up after their four-legged companion can be a big problem. This pollution is usually left in situ, meaning it will often still be intact when you come across it on the beach.

Identifying dog fouling

This commonly gets misreported as sewage. Sewage effluent will have travelled through the sewage network, mixing and disintegrating by the time it reaches an outflow. Intact faeces are rarely present in sewage discharges.



Dog fouling on sand.
Image ©The Cleddau Project

Slurry

Animal waste from agriculture in the form of slurries and manures are high in nutrients and therefore beneficial to crop growth when applied correctly to the land. This makes them valuable natural fertilisers. However, if it were to enter a river, it can have detrimental effects on water quality.

Slurry pollution can occur through direct output into the watercourse, known as point source pollution, or through diffuse pollution where it runs off from land during rainfall or other unsuitable spreading conditions. Both incidences can be prevented, and it is important that poor practice is reported, as well as visual signs and direct incidents.

Identifying Slurry Pollution

Slurry pollution is usually brown in colour, often associated with foam and has a distinctive smell.



Slurry pollution in a river.
Image © West Wales Rivers Trusts



Slurry pollution in a flowing stream.
Image © Simon Shorten

Non-pollutants

Algal blooms

Algae are naturally occurring microscopic plants which form the base of the food chain and are vital for the natural health of our waters. We commonly see an increase in algal blooms in the spring which can last throughout Summer, due to the increase in temperature and sunlight. However, external factors such as increased nutrients inputs (such as fertiliser) and elevated water temperature can cause an increase of algae creating excessive or persistent algal blooms.

A few types of algae produce toxins. In these algae, toxin production can be stimulated by environmental factors such as light, temperature, salinity, acidity, and nutrient levels. These blooms can cause significant harm to the ecology of the environment. After algal cells die, their breakdown requires a large amount of dissolved oxygen (DO), which gets used up from the water and can affect organisms that live there. Breakdown of the algal cells releases proteins which can form a foam on the water surface when agitated by rough water.

Algal blooms can occur in both marine and freshwater environments.

Algal Bloom vs Sewage

It's easy to mistake algae for sewage, particularly as both can have an unpleasant smell, but if you notice foam on the water's surface or on the beach it's more likely to be the result of an algal bloom breaking down.

Here are some tips to note how to tell the difference:

Algal blooms generally occur in Spring coinciding with higher light levels, and then may reoccur again in Autumn when storms start to stir up fresh nutrients and light levels are still quite high.

Long lines of algal foam can often be seen off headlands lying parallel to the coast.

During high winds and swell, thick mats of foam may be created on the shoreline by wave action.

Sewage or storm overflows have an origin such as a pipe or outfall rather than dispersed and can sometimes cause a grey discolouration of the water.

Sewage discharges can contain fats and oils causing waves to flatten around it and sometimes attract sea bird flocks.

Presence of sewage can also be indicated by the presence of personal products such as wet wipes, cotton buds and sanitary products, incorrectly flushed down the toilet.

Identifying algae

Freshwater algae

During excessive algal growth, or algal bloom the water becomes less clear and may look green, blue-green, red, or brown, depending on the type of algae. Scums can form during calm weather when several bloom forming species rise to the surface. This can look like paint, mousse or small clumps.

A harmful algal bloom (HAB) occurs when toxin-producing algae grow excessively in a body of water.

Cyanobacteria or 'blue-green algae' (pictured below) is one type of harmful blooming algae, due to its production of toxins. These toxins can kill wild animals, livestock and pets.

They can also harm people, producing rashes after skin contact and illnesses if swallowed.



Blue-green algae (cyanobacteria).



Freshwater algae.

Marine algae

When algae accumulate at the coast, often in early summer, they produce clouds of frog-spawn like colonies which look a little like oil drops in the water. When they start to breakdown their appearance, and smell, may be mistaken for sewage as it takes on a creamy-brown foam appearance on the water's surface, usually near cliffs or headlands. Waves often align the foam into thin layers or lines along the coast. In some cases, the blooms can form thick blankets alongside the shoreline creating the 'sea foam' we often see on our beaches.



Sea foam.



Sea foam. Image © Sue Burton.

Debris breakdown

Seaweed

Although it is naturally occurring, rotting seaweed is often mistaken for sewage, particularly as it can have the smell of bad eggs or rotten vegetables. This is due to the decomposing matter, which can be especially pungent in warm weather. High winds can increase the amount of seaweed washed up on the beaches.



Seaweed spread along the coast.

Leaf-litter

Leaf-litter falling into our waterways and breaking down is a fundamental part of river ecosystems, frequently used as a food source. However, further into the decaying process the leaf-litter floating on the water surface, can build a stagnant smell often be mistaken for pollution. It also releases proteins which can form a foam on the surface when whipped up by water movement.



Leaf-litter.

Land drains

There are many pipes and land drains that aren't connected to a sewage system. These have often been put in place to re-direct rainwater off our roads and away from our houses quickly to the nearest watercourse. With the increase in non-permeable surfaces in our infrastructure, more measures like this have been put in place to take flood water from urban areas and rural land into watercourses.

It's important to note that these land drain may collect contaminants as the water travels across surfaces such as roads. So, while not a direct pollution source this water still contributes to health of our waterways. If you notice a strong colouration or smell in any discharge from these pipes, it is worth reporting in case a pollutant has somehow entered the system.



Land drain.

How to report an incident

Natural Resources Wales

Natural Resources Wales (NRW) are the governing body responsible for ensuring that regulations and laws are met by landowners, businesses and individuals. All pollutant incidences listed above as well as signs of poor practices and maintenance should be reported immediately to NRW.

Reports can be submitted via:

Online form:

www.smartsurvey.co.uk/s/NU2VYV/

24/7 freephone reporting line:

0300 065 3000

To enable a sufficient response to your report, please provide the following details where possible:

- Where is/was the incident taking place?
Please provide a grid reference if possible, for example, NT 252 735. Otherwise, you should provide accurate descriptions of the location
- What is/was happening?
- Who is/was responsible for the incident?
- When did the incident take place/is it ongoing?
- A photo of the incident.

Dŵr Cymru Welsh Water

Welsh Water have a reporting line for specific incidents related to their assets only.

Online form:

dwrcymru.com/riverpollution

24/7 freephone reporting line:

0800 085 3968

Welsh Water attend all incidents reported to them; accurate locations and photographs are very useful.

Don't forget!



Take clear photographs of the incident.



If you are unsure, still always report it!

Thank you for caring for your local waterways!