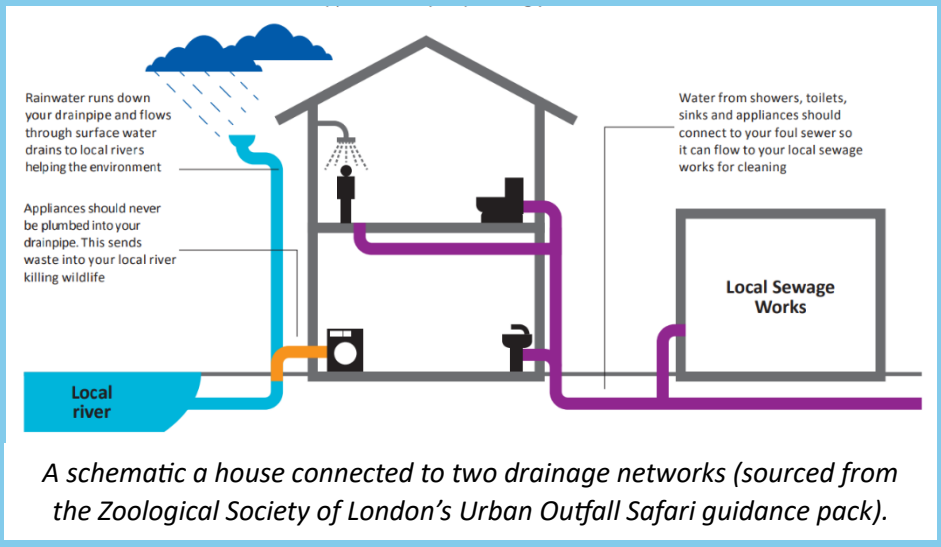
Birmingham River Champion's Urban Outfall Safari overview

This document synthesises (and slightly adapts) the Zoological Society of London's Urban Outfall Safari guidance pack, which you should check out if you would like to find out more!

Water pollutants move from land to rivers via different pathways, a key one in urban environments being surface water drainage networks. For regions served by **two drainage networks**, one set of pipes conveys foul waste to a sewage treatment works, and the other sends surface water (rainfall runoff) to the nearest river via an **outfall**. These outfalls are visible discharge points that are generally **over 20cm** in diameter. 'Misconnection' occurs when household appliances and washing facilities (e.g., washing machines, dishwashers, toilets) are incorrectly plumbed into the surface water drains and their wastewater ends up in rivers via outfalls. Misconnections can also include cross-connections between foul and surface water drains.



A schematic a house connected to two drainage networks (sourced from the Zoological Society of London's Urban Outfall Safari guidance pack).

Additionally, surface water outfalls convey pollution to our rivers *via* other means. Blockages in the foul sewers, caused for example by a build-up of fat or wet wipes, can also pollute rivers by causing foul wastewater to back up in the sewers and drain into the surface water network and then to rivers. Also, in regions (typically older residential areas) that are only served by a **single drainage network,** foul and rainfall runoff water share the same pipes and both are transferred to local sewage treatment works. However, such systems can become overwhelmed during heavy rainfall, which is when **'combined sewage overflows'** discharge a mix of the two water types into river environments. This may lead to similar impacts as misconnections, including contributing to elevated phosphate and ammonia levels. Moreover, when surface water drains are polluting, evidence such grey ('sewage') fungus, sanitary products and discoloured water can be seen at outfalls:

Grey fungus (tufty growth on riverbed):

Plumes of discoloured water:

Surface scum:

Sewage 'rag' debris (e.g., sanitary products)

The 'Urban Outfall Safari' citizen science method allows volunteers to characterise how outfalls are polluting river environments. The technique provides a rapid assessment using a easily interpretable survey form that can be performed from the riverbank (i.e., **no water access required**). The survey should be undertaken during **lower flow conditions** as floods can wash away evidence of pollution and mask background misconnection issues. Therefore **48 hours of no or only light rain** in the catchment is needed before conducting any survey work.

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