Source to Sea

Key points:

- Scotland has over 3,600 Combined Sewer Overflows (CSOs), with only 32% being monitored and only 7% of spills publicly reported.
- Sewage spills can harm ecosystems, reduce water quality, and affect recreational users by increasing contaminants like microplastics, nutrients, and organic matter.
- To improve water quality and meet new legal obligations, actions such as full CSO monitoring, investments in the sewerage network, and nature-based solutions are needed.

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Introduction

Scotland is renowned for its freshwaters. From their source to the sea, they provide a home to iconic species such as the Atlantic Salmon and Freshwater Pearl Mussel, provide drinking water, are used to generate electricity, support game fisheries and are essential to produce food and drinks, such as whisky. As such they are important for our heritage and promote health and well-being by providing opportunities for many recreational activities and aesthetic enjoyment. Their natural capital means that they have considerable economic value.

Sewerage Network in Scotland

The sewerage network comprises sewers and pumping stations that convey sewage from domestic houses and industrial premises. Most newly installed sewerage networks have separate sewer systems for:

- **Foul water** (e.g., from toilets, sinks, washing machines, and industrial processes) which is transported to a wastewater treatment works, and
- **Surface water** (e.g., from rainfall on roofs, roads, etc.) which is conveyed to a Sustainable Urban Drainage System (SUDS) or is discharged directly to a watercourse.

Scotland was ahead of England and Wales in implementing mandatory use of SUDS for all new developments to collect surface water. However, most networks in Scotland are still combined systems where foul and surface water are conveyed in a single pipe to a wastewater treatment works.

The Impact of Combined Sewer Overflows

The volume of water in combined sewerage systems is highly dependent on the amount of run-off from rainfall on roofs, roads, and other hard or waterlogged surfaces. In wet weather, the amount of surface water entering the sewers may overload the capacity of the sewer. To prevent damage to the network and untreated water backing ups into streets and homes, these combined sewers have overflows built in to

relieve pressure on the sewer. Combined Sewer Overflows (CSOs) are typically designed to only operate at high flows, with raw diluted sewage being diverted from the sewer into a nearby watercourse.

There are over 3,600 CSOs in Scotland, however only 32% are monitored to record the duration and frequency of spills, with data made publicly available for only 7% of overflows[1]. In comparison 91%[2] of CSOs in England and 96%[3] of CSOs in Wales are currently monitored.

Scottish Water reported sewer overflows in Scotland spilled over 21,000 times in 2023, for an average of 10 hours per spill event[1]. The total number of spills is likely to be much higher as these statistics only relate to 7% of the overflows that are currently monitored.

Spills of diluted but untreated sewage increase nutrient, organic matter, microplastic, and chemical contaminant concentrations in water bodies. Sewage can also act as a source of persistent chemicals, which do not break down in the environment. As they continue to accumulate, they will eventually reach a threshold of harm. These inputs disturb natural ecosystem functions and reduce water quality. The breakdown of sewage organic matter will reduce dissolved oxygen levels, severely impacting aquatic plant and animal species' biodiversity.

Sanitary items flushed down toilets also litter riverbanks and beds and end up in coastal waters where they litter beaches. All these impacts affect the wildlife living in the water and can cause illness in water users such as anglers, kayakers, and wild swimmers.

Human Rights and Legal Obligations

By 2026, Scotland will have new obligations to uphold the human right to a healthy environment following the incorporation of this right into law under the Human Rights (Scotland) Bill. It is vital that people have the right to access safely managed drinking water services – defined as services that are located on premises, available when needed, and free from contamination; and adequate sanitation – having access to facilities permitting the safe disposal of human waste and maintaining hygienic conditions.

The Scottish Government recognises 'safe and sufficient water' as a substantive feature of the right, and once enshrined in law, public bodies will have additional duties to ensure this is maintained.[4]

Recommendations

We welcome the recent publication by Scottish Water of a near real-time map of spills from monitored overflows[5]. However, despite Scottish Water publishing a route map for Urban Waters in 2021, only 3% of CSOs have been identified as high-priority discharges for improvement by 2027[6].

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[1] Scottish Water - Sewer Overflow Spill Data
[2] UK Government - Event Duration Monitoring Dataset
[3] Welsh Water - Combined Storm Overflows
[4] ERCS and Scottish Environment LINK - The substantive Right to a Healthy Environment
[5] Scottish Water - Overflow Map
[6] Scottish Water - Urban Waters Route Map

To tackle the problem of CSOs and their impact on water quality and the environment, we believe the following actions are required:

1. Implement monitoring of all CSOs and make spillage data available in real time.
2. Progressively phase out the use of CSOs through investments in the Scottish sewerage network to separate foul and surface water, increase capacity, and reduce the reliance on CSOs, prioritising all large and frequently spilling CSOs and those affecting protected areas.
3. In the interim, the outfalls from CSOs should be fitted with screens to prevent sewage-related debris from entering watercourses and coastal waters.
4. Invest in nature-based solutions such as SUDS, rain gardens, and green roofs to reduce reliance on the sewerage network.
5. Ban all avoidable single-use plastics in wet wipes and other sanitary items, such as tampons and their applicators, where suitable alternatives exist, and make reusable sanitary products more accessible.
6. Apply Extended Producer Responsibility (EPR) to all sanitary products (not just those that contain plastic) to cover clean-up costs.
7. Improve labelling and consumer awareness to promote correct disposal. As a minimum, this should include requirements from the EU Single Use Plastics Directive (e.g., a requirement for products to display 'Plastic in Product' and 'Do not flush' labels).
8. Promote the fitting of filters in washing machines to capture microfibres from clothing.

Further information on this issue can be found in the Marine Conservation Society briefings on Storm Overflows[7] and Sewage-Related Debris[8].

[7] Marine Conservation Society - Tackling the environmental impacts of Storm Overflows or Combined Sewer Overflows (CSOs) in Scotland

[8] Marine Conservation Society - Sewage Related Debris

Scottish Environment LINK

Scottish Environment LINK is the forum for Scotland's voluntary environment community, with over 40 member bodies representing a broad spectrum of environmental interests with the common goal of contributing to a more environmentally sustainable society.

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