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Scotland's water industry: overview of regulation and key challenges

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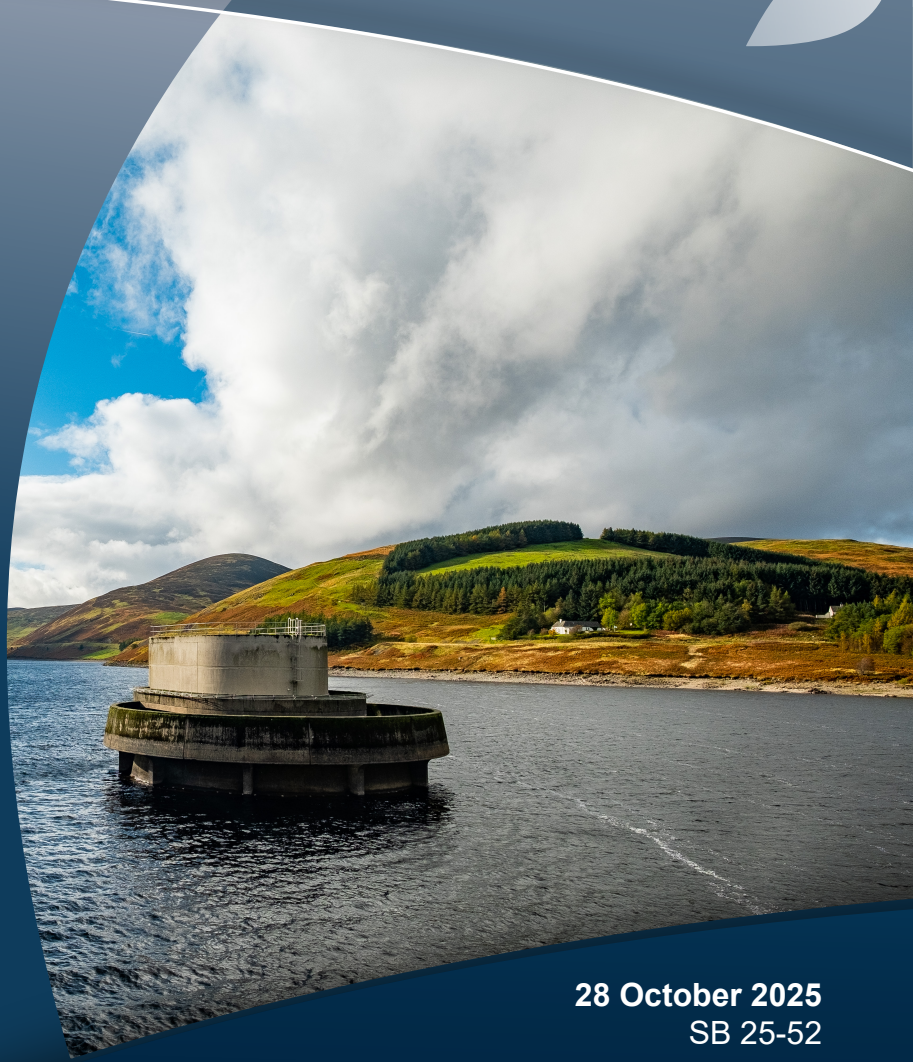
This briefing outlines the governance and regulation of Scotland's water industry, including public and private service provision. It highlights key challenges such as climate change, pollution, and infrastructure pressures.



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Background

- **Scotland's water sector plays a vital role in public health, environmental protection, and economic development**. Over 90% of the population receives water and wastewater services from Scottish Water, a publicly owned company.
- **Water policy in Scotland is largely devolved** and intersects with other policy areas such as agriculture, planning, and energy. The domestic sector has evolved from local provision to a nationally coordinated system, culminating in the establishment of Scottish Water by the Water Industry (Scotland) Act 2002 which replaced three regional water boards (covering north, west and east of Scotland). This historical trajectory informs current governance and regulatory arrangements.

Key challenges for Scotland's water sector

- **Scottish Water's long-term strategy recognises three major pressures: climate change, demographic shifts, and ageing infrastructure.** Coordinated investment and policy reform are essential to address these systemic risks. The Scottish Government is currently reviewing water, wastewater and rainwater drainage policy.
- **Climate change is increasing the frequency of extreme weather, impacting water resource resilience and infrastructure.** Blue-green infrastructure, such as sustainable urban drainage systems (SuDS), is promoted to manage rainwater and reduce flood risk. Legislation and National Planning Framework 4 now requires integration of such infrastructure in development.
- **Catchment-based approaches are vital for protecting water quality** and ensuring sustainable supply. **Water scarcity is an emerging issue, particularly in eastern Scotland**, driven by climate change and population growth. SEPA, Scottish Water and the Scottish Government are developing strategies to manage demand and support vulnerable users.
- **Per capita water use in Scotland is high compared to other European and UK countries due to a perception of abundance and because most people do not pay according to the volume of water they consume**. Consumer education, smart metering, and more efficient appliances may help reduce demand. Policy measures and incentives are being explored to promote sustainable consumption.
- **Awareness of sewage pollution issues may be associated with the rise in participation in outdoor recreation in inland and coastal waters**. Monitoring is being expanded, and investment is targeted at high-risk areas. Data and monitoring transparency and public engagement are increasing, but further action is needed to address outdated infrastructure and pollution risks.
- **Pollutants such as 'forever chemicals' and microplastics in drinking water and water bodies pose new risks** to health and the environment. Making producers of products responsible for pollution they may cause and improved product standards are being considered to manage these risks.

Policy and legislative framework

- **The Scottish Government's Hydro Nation initiative, launched in 2010, aims to maximise the economic and environmental value of Scotland's water resources**. It is underpinned by the Water Resources (Scotland) Act 2013 and supported by research, international collaboration, and stakeholder engagement.

- **Management of Scotland's water resources is underpinned by the EU Water Framework Directive through River Basin Management Plans** (RBMPs). SEPA leads this process, aiming for 81% of water bodies to achieve 'good' status by 2027.

Scottish Water and regulation

- **Scottish Water is publicly owned and the sole provider of household water and wastewater services in Scotland**, regulated by a range of bodies including the Scottish Environment Protection Agency (SEPA), Water Industry Commission for Scotland (WICS) and Drinking Water Quality Regulator (DWQR). **Over 90% of Scotland's population get their water and wastewater services from Scottish Water.** The remainder of Scotland's population which is not served by the public network, mostly in more remote rural areas, are served by small private systems.

- **The Scottish Government and WICS set strategic objectives and funding parameters for Scottish Water through regulatory periods.** Economic regulation seeks to ensure affordability, efficiency, and long-term sustainability of services provided by Scottish Water.

- **Scottish Water operates as a public corporation with subsidiaries for commercial and retail services. It is funded primarily through customer charges and government borrowing**, with economic oversight by WICS. The current regulatory period (2021–27) includes a **customer charge cap of 12.6% above the rate of inflation**, though actual increases have been moderated in recent years in response to cost-of-living pressures.

- **Drinking water standards are derived from EU legislation and implemented in domestic law, regulated by the Drinking Water Regulator (DWQR)**. The regulator monitors compliance, investigates incidents, and advises on investment priorities. Enforcement powers include issuing notices and penalties to ensure public health protection.

- **Domestic charges are largely unmetered and linked to council tax bands, with discounts for low-income households**. Metered households are rare, while non-domestic customers operate in a competitive retail market.

Wastewater treatment and pollution control

- **Scottish Water operates over 1,800 treatment works, with high compliance rates with pollution control regulations**. Pollution control is governed by EU-derived directives implemented in domestic law. These regulations cover discharges, abstractions, and engineering activities which may harm the water environment. **SEPA is the lead regulator for issuing authorisations and monitoring compliance with environmental legislation.**

Private water and wastewater systems

- **Around 3.5% of Scotland's population relies on private water supplies, which face challenges related to quality, resilience, and climate impacts.** Regulation

varies by supply type, with grants available for improvements. Private wastewater systems, including septic tanks, are regulated by SEPA but lack dedicated funding for upgrades and comprehensive data on their location.

Cover image credit: Scottish Water

1. Background

1.1 Why water policy matters in Scotland

Water is used in all aspects of modern life, and is critical to the survival of all life on earth. The way we collect, treat, consume and dispose of water is regulated through laws, cultural practices and everyday habits. These all impact on the wider health of people and the natural environment and can have wide ranging socio-economic impacts.

Water policy in Scotland is mainly devolved. The quality and availability of Scotland's water resources is heavily influenced and impacted by other devolved policy areas such as agriculture, forestry, food, transport, planning and infrastructure.

Devolved responsibility for water can also interact with reserved areas such as aspects of chemicals regulation, health and safety and energy generation.

This briefing sets out the policy, governance and regulation and legal framework regarding the management of Scotland's water resources. It also highlights some key challenges facing Scotland's water sector and wider water policy.

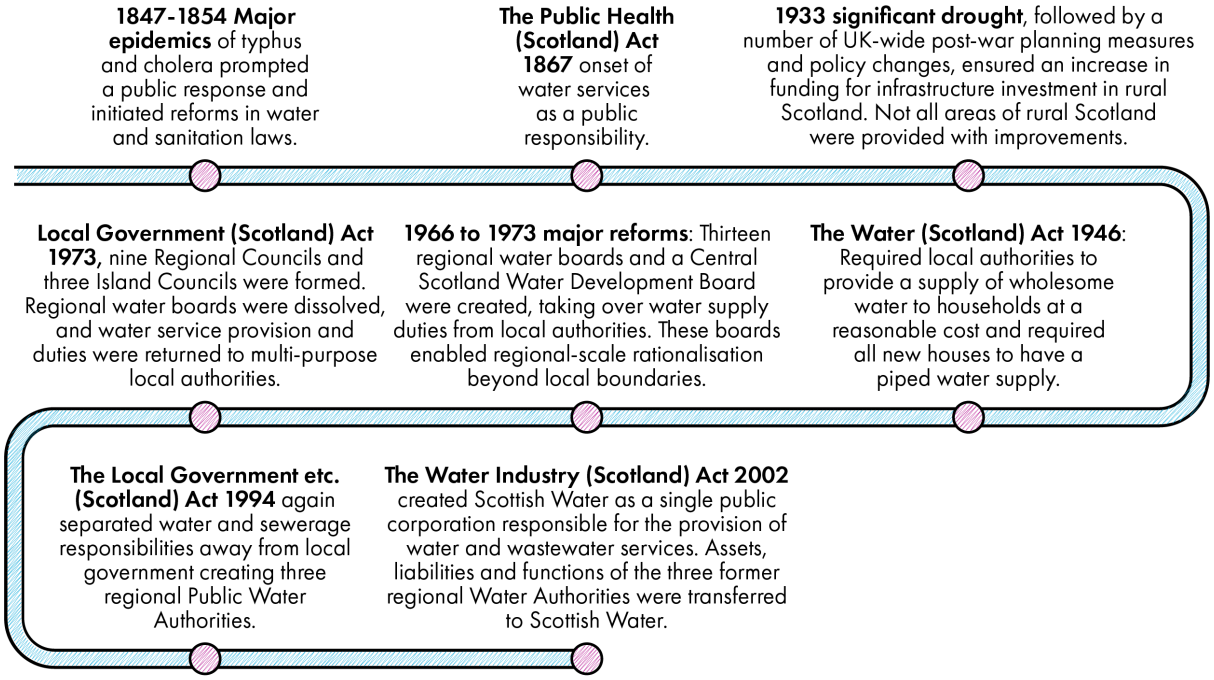
To understand the current structure and governance of Scotland's water sector, it is helpful to first explore how it has evolved over time.

1.2 A brief history of Scotland's water sector

Scottish Water was established by The Water Industry (Scotland) Act 2002. Subsequently, the Water Services etc. (Scotland) Act 2005 amended the 2002 Act to establish the governance and regulatory framework of the water sector as we know it today. Over the years, Scotland's water sector has existed in many different forms, with duties and responsibilities moving between a range of public bodies and institutions.

This historical context helps inform how and why today's sector operates as it does. Key events in the historic development of Scotland's water industry are depicted in **Figure 1** and discussed further below. A summary of key legislation is provided in Annex A.

Figure 1: Key events in the evolution of Scotland's water sector



Source: SPICe

State involvement in water service provision in Scotland was limited before the mid-nineteenth century. [1] Water management was typically considered a local issue, to be addressed at the local level. [2]

Major epidemics of typhus and cholera between 1847-1854 prompted a public response. This marked the start of co-ordinated reforms in water and sanitation laws in Scotland. [1, 2] The Public Health (Scotland) Act 1867 marked the onset of water services as a public responsibility. A significant drought in 1933, followed by a number of UK-wide post-war planning measures and policy changes, ensured an increase in funding for infrastructure investment in rural Scotland. [3] However not all areas of rural Scotland were provided with improvements.

The Water (Scotland) Act 1946 required local authorities 'to provide a supply of wholesome water to every part of their district where a supply of water is required for domestic purposes and can be provided at a reasonable cost'. It promoted the amalgamation of water supplies to improve efficiency and empowered authorities to collaborate. The Act also provided that from May 1946, all new houses were required to have a piped water supply.

From 1966 to 1973 Scotland underwent major water governance reforms. Thirteen regional water boards and a Central Scotland Water Development Board were created, taking over water supply duties from local authorities. These boards enabled regional-scale rationalisation beyond local boundaries. [1]

Following local authority reforms under the Local Government (Scotland) Act 1973, nine Regional Councils and three Island Councils were formed. The regional water boards were dissolved and water service provision and duties were returned to multi-purpose local

authorities. Responsibility for sewerage remained with Local Authorities.

At the time it was considered that water and wastewater services were a core responsibility of local government. The Water Scotland Act 1980 made provisions for the establishment and duties of the water authorities based on the then nine Regional Councils and three Island Councils. However, The Local Government etc. (Scotland) Act 1994 again separated water and sewerage responsibilities away from local government creating three regional Public Water Authorities:

- The North of Scotland Water Authority
- West of Scotland Water Authority
- East of Scotland Water Authority

In 2002 these Public Water Authorities were merged. The Water Industry (Scotland) Act 2002 created Scottish Water as a single public corporation responsible for the provision of water and wastewater (also referred to as 'sewerage') services.

The 2002 Act transferred existing assets, liabilities and functions of the three former regional Water Authorities to Scottish Water.

Building on the historical evolution of Scotland's water governance, the next section explores the strategic direction set by the Scottish Government through the Hydro Nation initiative.

2. Policy Framework: Scotland's Hydro-Nation

In 2010, the Scottish Government launched its ‘Hydro Nation’ initiative. Its purpose was to combine different aspects of the management of Scotland's water resources to bring the maximum benefit to the Scottish economy from Scotland's water resources. [4, 5]

In February 2012, the Scottish Government published 'Scotland The Hydro Nation: Prospectus and Proposals for Legislation'. This consultation informed legislation to underpin the Hydro Nation agenda leading to the Water Resources (Scotland) Act 2013.

The 2013 Act placed a general duty on the Scottish Ministers to take appropriate steps for the purpose of ensuring the development of the value of Scotland's water resources. It also provided for Ministers to direct designated public bodies regarding their involvement in this development and placed a requirement on Ministers to report to the Scottish Parliament on the fulfilment of the duty.

Delivery of the Hydro Nation agenda is also achieved through the following mechanisms:

- **The Hydro Nation Chair** : established by Scottish Water to bring the research and innovation community together to support its Net Zero ambitions and addressing climate change mitigation and adaptation challenges. Following a formal tender process Stirling University was selected to lead the Hydro Nation Chair. Prof Andrew Tyler was appointed at Scotland Hydro Nation Chair in June 2021. It operates independently from the Hydro Nation Scholars programme and Scotland's Centre of Expertise for Waters (CREW).
- **The Hydro Nation Forum :** a group of water experts from industry, academia and public sector established by the Scottish Government to advise Scottish Ministers on the overall direction and focus of the Hydro Nation agenda.
- **The Hydro Nation Scholars programme:** funds PhD research undertaking approved water resource projects hosted within Scottish Universities and Research Institutes. The programme is managed by CREW on behalf of the Scottish Government.
- **The Hydro Nation International Programme:** aims to share knowledge and collaborate with other countries to grow the international water economy.

While Hydro Nation sets the overarching vision, effective water policy also depends on how Scotland's natural water resources are managed and protected.

3. Managing Scotland's water resources

Effective management of Scotland's water resources is essential to ensure their long-term sustainability and resilience. Scotland has more than 125,000 km of rivers, burns and streams, over 30,000 freshwater lochs and over 650 reservoirs. [6, 7]

Groundwater is also a valuable resource used to supply drinking water, agriculture and industry. It is also particularly important to communities in rural Scotland, providing 75% of private drinking water supplies. Groundwater also feeds wetlands and river flows during dry spells and is vital to the maintenance of their rich ecology and biodiversity. [6, 8]

Legislation and strategic planning

The EU Water Framework Directive (Directive 2000/60/EC) underpins the management of Scotland's water resources. It established a framework for the protection and sustainable management of all surface and groundwater bodies across Member States.

Its primary objective is to achieve "good status"—both ecological and chemical—for all water bodies by 2027, through integrated river basin management, pollution control, and ecosystem restoration. The Directive mandates the development of River Basin Management Plans (RBMPs) and Programmes of Measures (PoMs), updated every six years, and promotes cross-border cooperation, public participation, and the use of economic instruments to support water conservation. [9, 10, 11]

In Scotland, the Water Framework Directive was primarily implemented by the Water Environment and Water Services (Scotland) Act 2003 and its amendment of the Sewerage (Scotland) Act 1968.

River Basin Management Planning

Every six years Scotland produces a river basin management plan. This describes the condition of surface waters and groundwaters, the pressures affecting them, and actions planned to alleviate the pressures.

The Water Environment and Water Services (Scotland) Act 2003 introduced a River Basin Management Plan (RBMP) regime. RBMP objectives and action programmes are set on a six-year cycle which aligns with the current regulatory period for economic regulation of Scottish Water (2021-2027).

There are currently two RBMPs in Scotland. One for the Scotland river basin district (RBD) and one prepared jointly with the Environment Agency for the cross-border Solway Tweed RBD. The Scottish Environmental Protection Agency (SEPA) has responsibility for coordinating Scotland's two RBMPs. The Scottish Government, other public bodies, and stakeholders are also responsible for RBMP delivery.

The first RBMP cycle ran from 2009 –2015, and the second series of RBMPs ran from 2015-2021. The central target of RBMPs is for 81% of water bodies to reach 'good' status by 2027.

The next report on Significant Water Management Issues in Scotland is due to be laid by 25 December 2025.

Reservoirs

Scotland's reservoirs are used for a variety of purposes, with a wide range of owners from large national companies such as Scottish Water and energy companies to individuals. They are regulated under the Reservoirs (Scotland) Act 2011 . The Act takes a risk-based approach to the regulation of reservoirs by considering the consequences of an uncontrolled release of water.

Under the Act, all reservoirs that have the capacity to hold 25,000m^3 or more of water above the natural level of the surrounding land are required to be registered with SEPA. Reservoir managers are the operators, users or owners of a reservoir and have ultimate responsibility for its safety.

Scottish Water manages around 300 of Scotland's reservoirs with many of them being sources of drinking water. Scottish Water provides weekly updates on its water resource levels on its website page - Scotland's Water Resource Levels.

Having outlined how Scotland's water resources are managed, the next section examines how water and wastewater services are delivered to the public and regulated.

4. Public water and wastewater services

Over 90% of Scotland's population get their water and wastewater services from Scottish Water, Scotland's publicly owned and sole provider of household public water and wastewater services. [12]

This section covers the regulation and governance of public water and wastewater services. However, the remainder of Scotland's population which is not served by the public network, mostly in remote rural areas, are served by small private systems. This is covered in **Section 5.**

4.1 Who oversees Scotland's public water sector

Scottish Ministers are responsible for national governance of the water sector. Key responsibilities include:

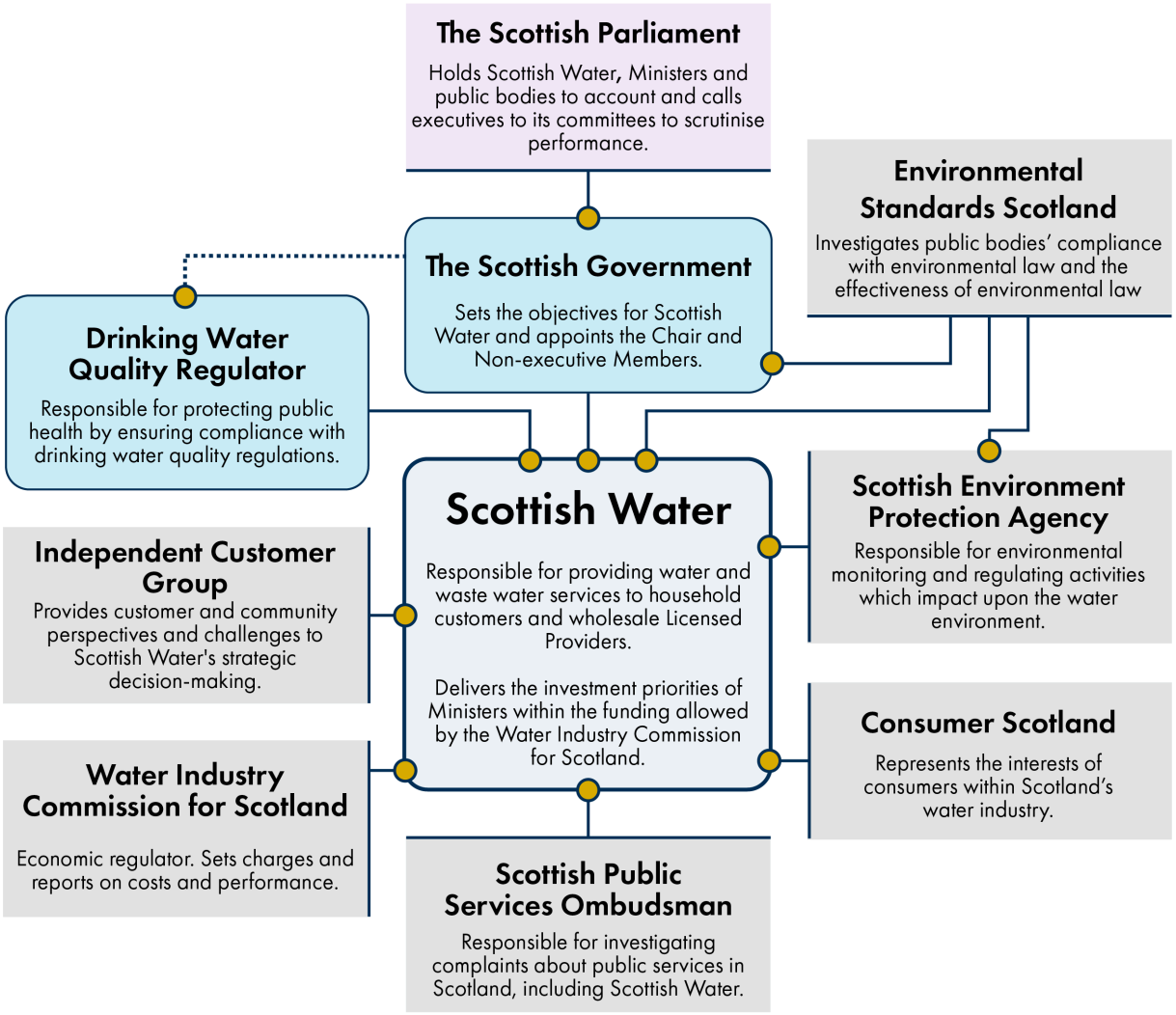
- Setting the objectives for the water industry, as set out in ministerial directions.
- Determining the length of each regulatory period (see further information below).
- Determining the principles that should underpin household customer charges, as set out in the principles of charging statement.
- Providing funding to Scottish Water for capital investment in the form of loans.
- Appointing the chairs and members of the boards of both Scottish Water and the Water Industry Commission for Scotland (WICS).
- Endorsing WICS' terms and conditions, including remuneration of its board members, senior executives and staff. [13]

For Scottish Water, the Scottish Ministers appoint non-executive board members only. Scottish Water appoints executive members.

The Scottish Parliament holds Scottish Water and Scottish Ministers to account on overall performance of the water sector.

The regulatory framework for Scotland's water industry is visualised in **Figure 2** below which sets out the roles and responsibilities of regulatory authorities. Further details of regulatory responsibilities are provided in **Table 1** below.

Figure 2: Regulatory responsibilities of public authorities in Scotland's water sector



Source: SPICe adapted from Scottish Water

Table 1: Stakeholder responsibilities in Scotland's water sector

Stakeholder	Responsibilities
Scottish Water	• Public owned company that provides water and wastewater services in Scotland's household market. • Manages water sources, water storage and the points of discharge of treated wastewater back to the environment. • Acts as the wholesaler of water and wastewater services to licensed providers, who provide retail services to non-household customers. • Provides retail services to households. It is accountable to Scottish Ministers and the Scottish Parliament.
The Water Industry Commission for Scotland (WICS)	The economic regulator of the Scottish water industry. It is responsible for setting charge caps, monitoring Scottish Water's performance and overseeing the orderly functioning of the non-household retail market.
The Drinking Water Quality Regulator for Scotland (DWQR)	Ensures that Scottish Water complies with its duties in respect of public drinking water supplies in Scotland. It does this through monitoring Scottish Water's compliance with drinking water quality standards and advising on future investment priorities in respect of public supplies. It also supervises Local Authorities' enforcement of regulations over private water supplies in Scotland, which serve around 3% of the population.
The Scottish Environment Protection Agency (SEPA)	Environmental regulator in Scotland with a remit that goes beyond the water sector. Within the water sector, it has a wide-ranging role that involves monitoring, reporting and enforcement in relation to the quality of the water environment in Scotland and advising WICS and Scottish Water on future investment priorities. It also has a role in setting regulatory policy and regulations and advising on national policy. It is the lead authority for producing River Basin Management Plans for Scotland.
Consumer Scotland	The statutory, independent body for consumers in Scotland, established by the Scottish Parliament under the Consumer Scotland Act 2020 to advocate on behalf of consumers and represent consumer interests. It works to embed positive consumer outcomes and engagement with consumers across all aspects of service delivery in the water industry, across both the household and non-household markets. This includes affordability of services, how water and wastewater services can contribute to a transition to net zero and how services should be adapted to mitigate the impacts of climate change.
The Scottish Public Sector Ombudsman (SPSO)	Acts as the final stage for handling customer complaints for public sector bodies and departments.
Independent Customer Group	Hosted by Scottish Water and is operationally independent. Its purpose is to ensure customers, communities and the environment are at the heart of Scottish Water's strategy and service delivery, investment priorities reflect customers' expectations of the sector, and the resultant charges are affordable and represent value for money.
Environmental Standards Scotland	Public body responsible for ensuring public authorities, including the Scottish Government, public bodies and local authorities, comply with environmental law. Monitors and takes action to improve the effectiveness of environmental law and its implementation. Has a strategic aim to consider if Scotland is 'keeping pace' with environmental standards in the European Union.

4.2 Planning and funding water investment: the regulatory period

Scottish Ministers determine the length of Scottish Water's investment programme sometimes referred to as the ‘regulatory period’. The current period is set over six-years from 2021 to 2027 and the next regulatory period has also been commissioned to run for a six-year period from 2027-2033.

At the beginning of each regulatory period, Scottish Ministers set out Ministerial objectives

for Scottish Water in line with its legal commitments under the Water Industry (Scotland) Act 2002 (section 56(1)(a),(b)).

This process also initiates the Strategic Review of Charges undertaken by the Water Industry Commission for Scotland which involves setting charge caps for the regulatory period (the maximum amount Scottish Water can legally charge its household customers). Details on how charges are recovered from customers is set out in **Section 4.3.5.**

Key Ministerial objectives for the 2021-27 regulatory period are summarised in **Box 1** below.

Box 1: Key Ministerial Objectives for Scottish Water for the 2021-27 regulatory period

- Take an integrated and collaborative approach to decisions to maximise the impact of resources and to achieve better outcomes for people and communities.
- Maintain or improve current levels of service, engaging to establish appropriate standards for the 2021-27 period and beyond.
- Prepare a strategy to inform the long-term asset replacement needs ensuring asset maintenance is fully integrated in the investment programme.
- Identify and provide new strategic capacity to meet the demand of all new housing development and domestic requirements of commercial and industrial development.
- Align with the Scottish Government's circular economy strategy and assess the potential for resource recovery from sewerage.
- Comply with drinking water quality duties and address failures to ensure compliance with drinking water quality standards, taking steps to improve resilience and remove lead from the network.
- Improve compliance with environmental licences and limit the amount of plastics reaching the water environment through the sewer network.
- Work with stakeholders to transform how rainwater and sewerage are managed to improve flooding and surface water management.
- Maintain and improve the security of its network and systems, to protect them from malicious attack.
- Make substantive progress in the 2021-27 period towards climate change targets.
- Prepare and implement plans to manage its private finance initiative contracts which end in the 2021-27 period. [14]

4.3 Scottish Water: structure, role and

accountability

Scottish Water was established by the Water Industry (Scotland) Act 2002. It is responsible for providing water and wastewater (sewerage) services to household customers and wholesale licensed providers.

Scottish Water exercises statutory water and sewerage functions under the provisions of the Sewerage (Scotland) Act 1968 and the Water (Scotland) Act 1980. As set out above, the 2002 Act requires Scottish Ministers to issue directions to Scottish Water on how to exercise its functions.

Scottish Water is governed by a Board which comprises:

- **Chair and Non-Executive Members**, who are appointed by the Scottish Ministers.
- **Executive Members** including the Chief Executive, who are appointed by Scottish Water.

Scottish Water states that the key role of the Board is to:

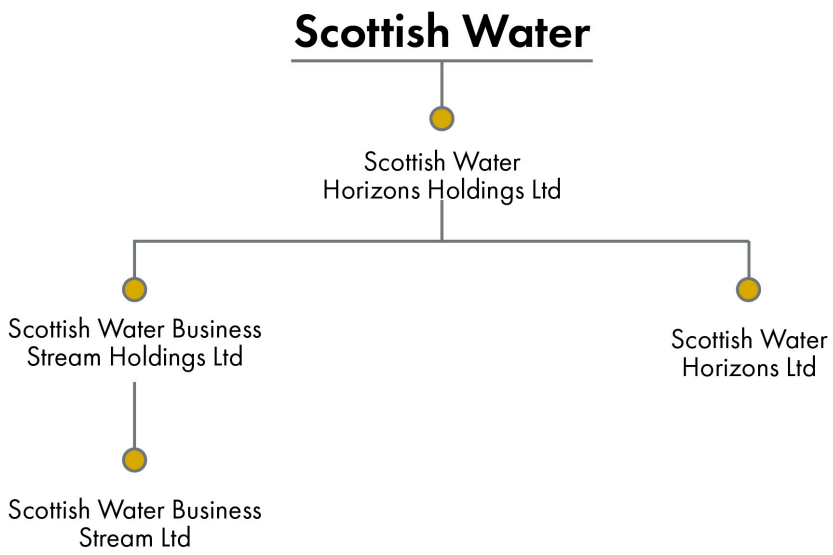
- Provide strategic guidance and direction to Scottish Water.
- Demonstrate high standards of corporate governance.
- Oversee the delivery of Scottish Waters Regulatory outputs.
- Ensure statutory requirements in relation to the use of public funds are complied with.

Scottish Water operates a group business model which is set out in **Figure 3** below.

The Scottish Water Group consists of:

- **Scottish Water** : a public corporation, supplies households with regulated water and wastewater services and wholesale services to Licensed Providers (see **Section 4.3.6**) serving non-domestic customers.
- **Business Stream** : licensed retail subsidiary which supplies water and wastewater services to business customers.
- **Scottish Water Horizons** : Scottish Water Horizons is a commercial subsidiary wholly owned by Scottish Water. In addition to water services its activities include renewable energy, broadband internet infrastructure and food waste recycling.

Figure 3: Organisational structure of Scottish Water and its subsidiaries



Source: SPICe, adapted from Scottish Water

4.3.1 How public water services are funded

Scottish Water has a total revenue of around £1.6bn every year to provide water, sewerage and drainage services. This is required to operate water, wastewater and drainage networks, to maintain its current assets, and to invest in improvements and expansions of the infrastructure to meet new demand. [15]

The Water Industry Commission for Scotland (WICS) explains how Scottish Water's borrowing works:

> " The maximum amount of borrowing available to Scottish Water is set by Scottish Ministers in their Principles of Charging for the industry. To pay for investment, Scottish Water is free to borrow within the public sector allowance that has been granted in the Scottish Government's Budget. Scottish Water and the Scottish Government agree on the timing of this borrowing within the financial year and the duration of the borrowing. Each year, Scottish Water pays interest on this borrowing, and on the maturity of the loan, it repays the principal, currently through refinancing the debt. As such, Scottish Water effectively rolls over maturing debt at prevailing interest rates, and [WICS] refer to the new borrowing in the year less the borrowing repaid in the year as net new borrowing. Scottish Water must comply with public expenditure rules. While it can borrow from any source, it must be able to demonstrate that it is accessing the cheapest source available. This has the effect of ensuring that all medium and longer term borrowing is provided by the Scottish Government."
>
> Water Industry Commission for Scotland, 2024[15]

An overview of Scottish Water's regulated funding and expenditure is shown in **Figure 4** below. 'Regulated' refers to any funding or expenditure covered by economic regulation (see **Section 4.3.2**).

Scottish Water's revenue comes from:

- **Household customer charges:** charges to household customers charged according to property council tax bands (see **Section 4.3.5**). This accounts for around 90% of regulated revenue.
- **Wholesale customer charges:** wholesale charges (e.g. network connections and new infrastructure) to licensed retailers of business customer services.
- **Borrowing:** loans from the Scottish Government for capital investment. The amount that Scottish Water can borrow in a given financial year cannot exceed limits set out in an annual Budget Act. Interest rates are set by the UK Government.
- **Utilisation of cash reserves:** cash held to support its investment programme expenditure. Scottish Water states any large infrastructure organisation that provides an essential service requires access to sufficient cash to maintain its activities and to respond to unforeseen events. Scottish Water's risk policy determines that the regulated business should always have access to approximately four weeks expenditure.
- **Other:** charges for 'secondary services' which is everything else except Scottish Water's main water and waste water services.

In the most recent financial year 2024/25, **Scottish Water's total regulated revenue from customer charges was £1,579 million**, of which £1,154 million (73%) was from household customer charges.

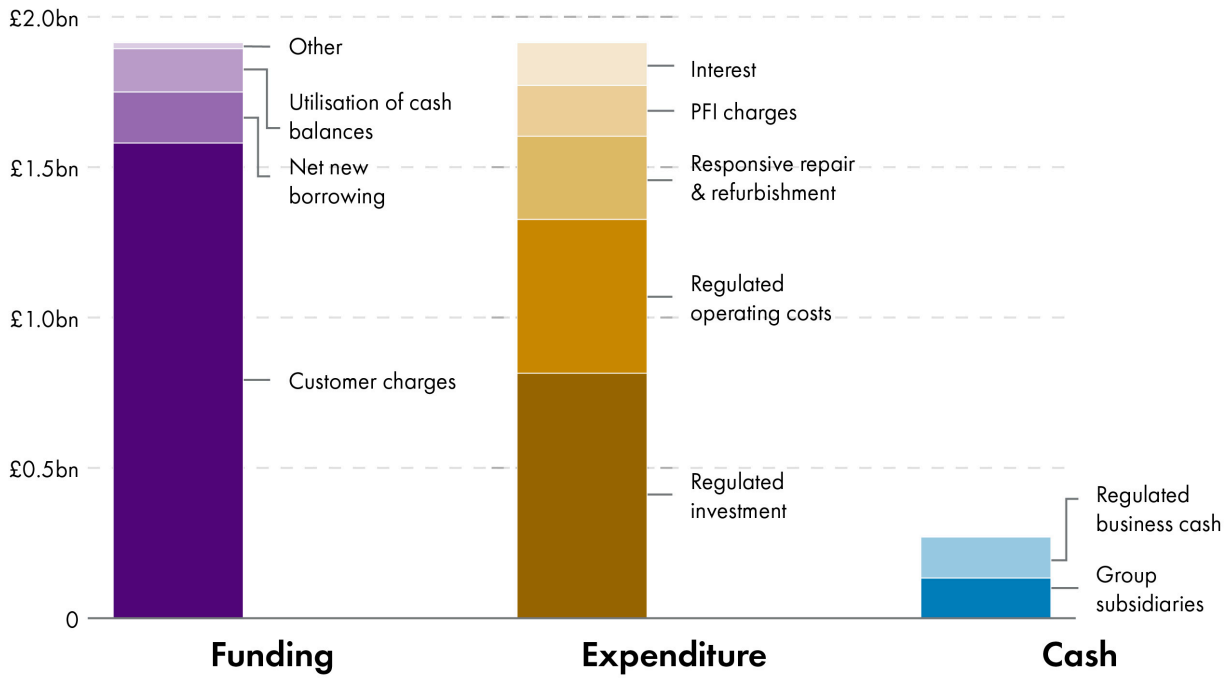
The remainder of total regulated revenue from customer charges is from wholesale customer charges to licensed retailers for business customers. [16] Total funding encompasses utilisation of cash reserves and new borrowing from the Scottish Government for capital investment.

Scottish Water spends money in the following areas to providing essential water and wastewater services:

- **Capital investment:** spending on maintaining, upgrading and building new water sources, treatment plants, pipes, and other equipment required to provide water and wastewater services.
- **Operating expenditure:** spending on ongoing, day-to-day activities required to provide water and wastewater services.
- **Private Finance Initiative (PFI) expenditure:** regular payments to third-party organisations providing wastewater assets and services on behalf of Scottish Water under legacy contracts.
- **Taxation and interest payments** on borrowing. [17]

In 2024/25 total regulated operating costs were £1,364 million leaving a total regulated operating surplus of £215 million. **Total regulated investment was £815 million**. [16]

Figure 4: Scottish Water's regulated revenue and expenditure 2024/25



Source: SPICe. Financial data from Scottish Water, 2025[16]

WICS' Final Determination for the 2021-27 regulatory period set a **charge cap of Consumer Price Index (CPI) plus 12.6%** over the six-year regulatory period. CPI is a measure of inflation. This means that Scottish Water can only charge its household customers 12.6% above the rate of inflation in total over the six-year period. This equates to an annual household charge cap of **CPI plus 2% on average in each year** of the regulatory period.

By the end of the first three years of the regulatory period, Scottish Water had raised charges by CPI minus 4.4%. WICS states that this is 10.5% below the assumed position from the Final Determination, largely because Scottish Water responded to the cost-of-living crisis during 2021 and 2022. As a result of the profiling of charges, WICS expect Scottish Water to have £500m less funding available for investment than was assumed in its Final Determination. [17]

4.3.2 Economic regulation

Because Scottish Water is the only provider of household water services, it does not face competition. Economic regulation therefore seeks to mimic a competitive environment to ensure Scottish Water operates efficiently and in the interests of customers. The rationale for economic regulation is explained further in **Box 2**.

Box 2: Why is there a need for economic regulation of Scottish Water?

The development of the water industry in Scotland has given rise to Scottish Water as a 'natural monopoly'. A ‘natural monopoly’ refers to the situation where there is only one organisation supplying a product in the market, but this is not the result of the organisation's behaviour. Instead, it arises as it is the sensible way to organise the industry and it is in the best interests of customers to do so. This is not unique to Scotland. All household water services in the UK are natural monopolies (households can only get water from the service provider that covers their region).

The behaviour of natural monopolies may work against the customer interest if unchecked. WICS sets out two ways in which this might happen:

- First, if the service is essential and the customer has no choice about where to purchase it, the monopoly has an **incentive to charge an excessive price and to make excessive profits**. This type of behaviour is known as monopoly pricing.
- Second, in the absence of competition the monopoly faces **no incentive to innovate and improve its efficiency over time**. From the point of view of the firm, a failure to innovate and improve efficiency will have little or no implication for the size of the market that it serves or the level of profit that it earns. Compared with a competitive market, the industry will tend to stagnate. [18]

In a competitive market, companies face tight budgetary constraints in that they have to match their costs to the revenue they can win from customers. In the case of Scottish Water as a natural monopoly, regulation seeks to mimic the discipline and pressures of operating in a competitive market.

WICS provides the following explanation of how this works:

> “ The annual process of approving Scottish Water's scheme of charges is a central part of providing this discipline in the Scottish water and sewerage industry. In the approval process the revenues that would be generated by Scottish Water's proposed charges are compared with the revenues that are allowed by the Strategic Review of Charges limits. The Strategic Review of Charges limits, or revenue caps, represent the revenue that an efficiently run Scottish Water would require in order to provide water and sewerage services. If the charges proposed by Scottish Water were to generate more revenue than is allowed by the Strategic Review of Charges revenue cap, this would indicate monopoly pricing. The regulatory process ensures that Scottish Water's charges are consistent with the revenue cap and so do not contain a monopoly pricing element. [18] ”

Water Industry Commission for Scotland

The Water Industry Commission for Scotland (WICS) is the economic regulator of Scottish Water. WICS regulates Scottish Water's domestic customer charges through a process know as the Strategic Review of Charges within the parameters set out in the Ministerial Objectives and Principles of Charging.

WICS engages in a Strategic Review of Charges process following the Commissioning

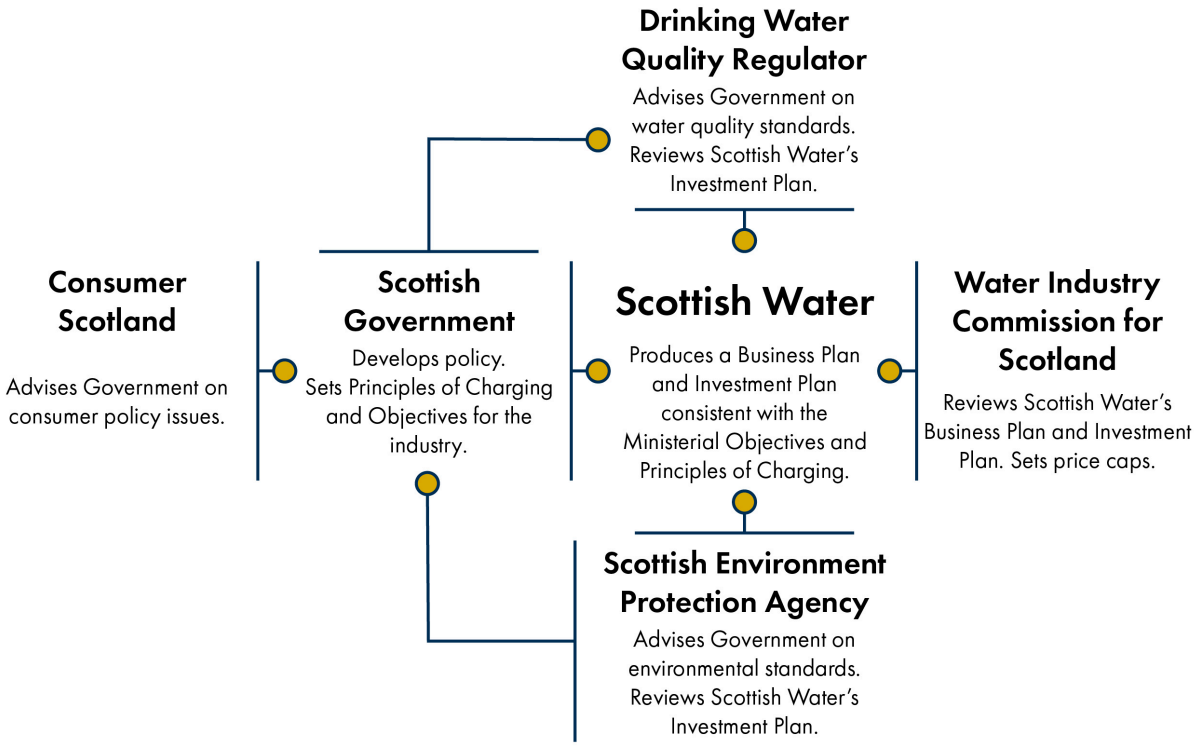
letters from Scottish Ministers. This process is completed with the Final Determination unless Scottish Water chooses to appeal. WICS also has the statutory remit to monitor and report on Scottish Water's performance during the regulatory period.

Key milestones for the Strategic Review of Charges include:

- **A Commissioning letter from Scottish Ministers** that commences the Strategic Review of Charges process and sets the duration of the regulatory period.
- **A Statement of Objectives and Principles of Charging from Scottish Ministers** that confirms the overall policy objectives for the water industry in Scotland.
- **A methodology from WICS** that sets out how it will set charge caps for the regulatory period.
- **A proposal from Scottish Water for charge caps and investment** for the regulatory period.
- **A draft and Final Determinations of charges** from WICS which sets charge caps for the regulatory period. [15]

The roles of various public bodies in the strategic review process are shown in **Figure 5** below.

Figure 5: Roles and responsibilities of public bodies in the strategic review process.



Source: SPICe, adapted from Scottish Water

Through the Strategic Review of Charges process, WICS set charge caps consistent with the lowest reasonable overall cost incurred by Scottish Water in delivering Scottish Ministers' objectives. WICS states that these caps are "consistent with its assessment of the revenue that Scottish Water requires to cover the efficient cost of providing water and

wastewater services and delivering the investment required". [17]

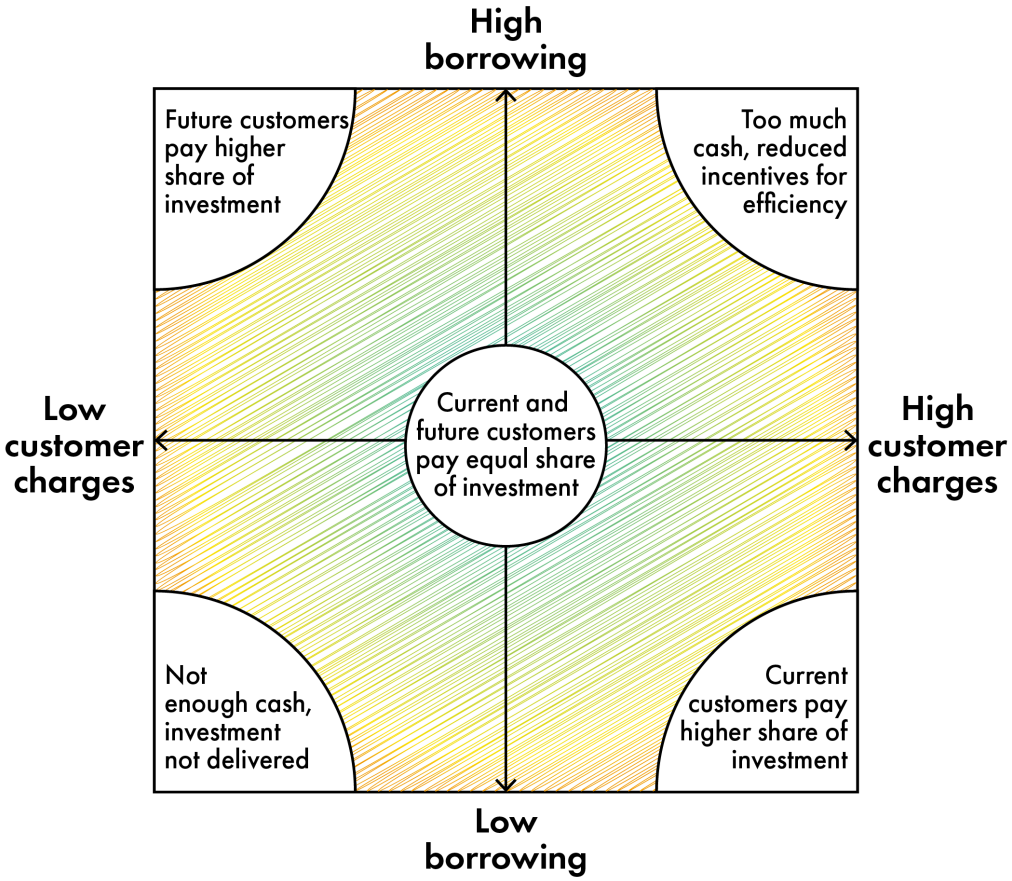
WICS must balance the cost to current and future customers when considering customer charges and borrowing that Scottish Water needs to deliver its services. This is key to ensuring financial sustainability and intergenerational equity.

WICS explains two key challenges associated with this:

- **The use of borrowing:** Only customers or the taxpayer (in the form of Government borrowing) can meet the cost of any new investment Scottish Water undertakes. Borrowing is used to spread costs between current and future customers given the investment and the service improvements it provides for years into the future. While borrowing reduces the need for significant increases in customer charges in any given year, it is not a substitute for raising revenue over the medium to long term. For the water industry to be financially sustainable new borrowing should only be used for incremental expenditure. Ultimately if new borrowing is systematically used to cover the cost of anything other than true increments to Scottish Water's assets, future customers would be left paying for more than their appropriate share of the costs.
- **Charging for asset maintenance:** WICS explains that how and when asset maintenance investment (the investment that Scottish Water undertakes to maintain its existing assets) should be paid for presents two key risks:
    - **under-provisioning for the full replacement costs of assets**, effectively undercharging current customers for the use of the assets and transferring costs to future generations
    - **placing pressures on future charges**, recognising that assets reaching the end of their life incur higher costs associated with their repair, refurbishment and, ultimately, replacement.

These challenges are conceptualised in **Figure 6** below:

Figure 6: conceptual diagram summarising the challenges of balancing Scottish Water investment between customer charges and borrowing



Source: adapted from WICSWater Industry Commission for Scotland, 2024[15]

4.3.3 Public drinking water supplies

Historically, the overarching regulatory framework for drinking water quality in Scotland has been provided by standards set within EU legislation informed by the World Health Organisation.

The EU's Drinking Water Directive (98/83/EC) underpins quality standards for drinking water which have been implemented in domestic law in Scotland. The Directive was introduced in 1998 with the key objective of protecting human health from the adverse effects of any contamination of water intended for human consumption. [19]

The Directive requires that EU Member States must:

- take the **necessary measures to ensure the water does not contain concentrations of microorganisms, parasites or harmful substances** that could be a danger to human health, and meets minimum microbiological and chemical standards
- **ensure the standards** are met when the water comes out of a tap or tanker
- **monitor the water regularly** at agreed sampling points in order to check that the

microbiological, chemical and indicator parameter values are met

- **investigate immediately** when the standards are not met and take the necessary corrective action
- **ban or restrict a water supply** if it is considered to be a potential threat to public health
- **inform the public** when corrective action is taken
- **publish a report every three year**s on drinking water quality.

The 1998 Directive was implemented in the UK through various domestic primary and secondary legislation and remains part of assimilated law (law that was kept from the period of the UK's membership of the EU). There are separate regulations covering public and private drinking water supplies but both are underpinned by the 1998 Directive:

- Public Water Supplies (Scotland) Regulations 2014 (as amended).
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.

The EU updated the 1998 Directive through the recast Drinking Water Directive in December 2020 which came into force in January 2021. The recast Directive was a response by the European Commission to the European Citizens' Initiative 'Right2Water'. Recent developments in EU law and the Scottish Government's alignment with these developments are discussed further in **Section 6.5.**

Drinking Water Quality Regulator

Drinking water quality in Scotland is regulated by the Drinking Water Quality Regulator (DWQR). DWQR is responsible for monitoring water quality and enforcing regulations on behalf of Scottish Ministers. [20] It was established at the same time as Scottish Water under the Water Industry (Scotland) Act 2002.

DWQR enforces the requirements of The Public Water Supplies (Scotland) Regulations 2014 (as amended) to ensure the quality of public drinking water supplies, and takes action where these requirements are not met. It does this by:

- Investigating Scottish Water's response to events and incidents that could affect drinking water quality.
- Receiving, interpreting and presenting data on water quality throughout Scotland.
- Participating in the investment planning process to ensure that any necessary improvements to water quality are delivered.
- Checking that Scottish Water responds appropriately to any concerns from consumers about drinking water quality and that information it publishes on the subject is accurate and appropriate.
- Ensuring future issues that may affect drinking water quality in Scotland are adequately understood, and that any knowledge gaps are filled through research.
- Providing Scottish Ministers with an annual report on the quality of drinking water in

Scotland.

Enforcement powers

The DWQR has three main powers under the Water Industry (Scotland) Act 2002:

- The power to obtain information.
- The power of entry or inspection.
- The power of enforcement.
- Emergency powers to require a water supplier to carry out works to ensure quality of water supplied is safe for public consumption.
- Power to require information from local authorities.

The DWQR can initiate enforcement where non compliance has occurred or is likely to occur. Non compliance may be highlighted in a number of ways, such as:

- By assessment of data and information supplied by Scottish Water.
- During audit or inspection.
- During an investigation following a drinking water quality or supply incident.
- Following a consumer complaint.
- Following notification or awareness of a significant risk to water quality.

The DWQR states that it seeks to secure compliance with legislation through cooperation, discussion and offering advice. This may include **written recommendations**, an **advisory letter** or **'Letters of Commitment'** agreed with Scottish Water detailing delivery projects to make improvements.

Where resolution is not possible using the approach described above then the DWQR may use enforcement options available which are:

- **Information Notice:** allows the DWQR or any authorised person, by notice, in writing to require the provision of water quality data or such documents that are considered to be relevant.
- **Enforcement Notice:** setting out specific actions to be taken by Scottish Water within specified timescales. Failure to complete such actions by the due date is a criminal offence.
- **Emergency Notice:** setting out specific actions to be taken by Scottish Water to reduce or remove the risk. Failure to complete such actions by the due date is a criminal offence.
- **Penalty Notice:** specifying the reason for the notice, the size of the penalty imposed and details of the appeal mechanism. The sum imposed may be up to £17 million but must be appropriate and proportionate to the reason for the failure of a regulatory duty. Scottish Water may appeal to the First-Tier Tribunal should it disagree with the grounds upon which the Penalty notice is served. [21]

The DWQR also supervises local authorities' enforcement of the regulations governing the quality of private water supplies in Scotland and has the power to request information from local authorities as well as from Scottish Water. [21] Private water supplies are discussed further in **Section 5** of this briefing.

4.3.4 Public wastewater treatment

In 2022/23, Scottish households and businesses produced over a billion litres of wastewater every day. [22] The sewer network is designed so that the majority of the wastewater should be collected then treated at a treatment works before it is discharged to the natural environment. Wastewater in Scottish Water's network is treated at 1,838 wastewater treatment works across the country. [23] Scottish Water's wastewater assets include:

- **Sewers and sewage pumping stations:** Underground networks and mechanical stations that transport wastewater from homes and businesses to treatment facilities.
- **Wastewater treatment works:** Facilities that clean and process sewage to remove contaminants before releasing treated water back into the environment.
- **Sludge treatment facilities:** Specialised plants that process the solid by-products of wastewater treatment to reduce volume and recover energy or nutrients.
- **Combined sewer and emergency overflows:** Safety mechanisms that release excess wastewater during heavy rainfall to prevent flooding and system overload.
- **Sea outfalls:** Engineered discharge points that release treated or partially treated wastewater into the sea.

Over the last 20 years, Scottish Water has invested over £2 billion in improving wastewater treatment quality. Wastewater discharge compliance from Scottish Water assets is generally high at around 96% of sites complying with regulatory standards in wastewater discharge licenses.

Despite this investment, Scottish Water has identified ageing assets as a major key long-term challenge. Scottish Water explains that many assets are over 100 years old and reform of legislation for water and wastewater treatment meant a boom in the number of assets which were installed in the 1950s and 1990s. It states that these assets are reaching a point where they need to be upgraded or replaced. [24]

Issues with sewage pollution are often associated with a combination of factors such as ageing assets and the increased frequency of extreme weather with climate change. These issues are explore further in **Section 6** . [23]

Controlling pollution from treatment facilities

Pollution control from wastewater treatment works in Scotland is underpinned by EU Directives that have been transposed into domestic legislation. Two key EU instruments established the regulatory framework for sewage discharge:

- Urban Waste Water Treatment Directive (91/271/EEC)

- Water Framework Directive (2000/60/EC)

These directives aim to protect water bodies from pollution and ensure sustainable water management across the EU. In Scotland, the Urban Waste Water Treatment Directive (UWWTD) is implemented through the Urban Waste Water Treatment (Scotland) Regulations 1994, as amended, and supported by duties under the Sewerage (Scotland) Act 1968.

Additionally, there are a range of regulations which provide a framework for controlling discharges and pollution to the water environment which apply to wastewater treatment works.

Environmental Authorisation Regulations

In Scotland, activities which may have an impact on the water environment will be managed by an integrated system for environmental authorisations under the Environmental Authorisation (Scotland) Regulations 2018 (as amended) or '**EASR**'.

EASR brings together the processes for authorising, enforcing, and managing activities that may impact the environment. **From 1 November 2025** (with some provisions coming into force earlier on 1 June 2025), water, waste management and industrial activities will be regulated under the new EASR regime.

Key regulated activities relevant to the water sector which require authorisations include:

- **Abstraction** of water from the water environment, including for the operation of a hydropower scheme and any associated impoundments. It also covers the construction, extension or operation of any borehole.
- **Discharges** to the water environment of sewage effluent, sewage from overflows, other effluents and water run-off.
- **Engineering** activities that involve the building or engineering works in inland surface waters or wetlands, or in the vicinity of these waters, which have or are likely to have an impact on the water environment.
- **Impoundments** (dam, weir or other structure that can raise the water level of a water body above its natural level). Uses of impoundments include the creation of a new reservoir, flood storage, maintaining or raising water levels within a wetland, raising the water level of a natural loch, estuary or even coastal waters.
- **Pollution control** for activities that may cause the introduction of substances into the water environment.
- **Any other water activity that causes adverse impact.** This applies to other water activities, not otherwise described by another activity, that have, or are likely to have, a significant adverse impact on the water environment.

Existing authorisations will be ‘sunset’ (expire) and migrate into the new regime. These include authorisations issued under the following regulations:

- **The Pollution Prevention and Control (Scotland) Regulations 2012 (or 'PPC regime'),** which implement the Industrial Emissions Directive (IED) (2010/75/EU), provide a regulatory framework for certain industrial activities to ensure a high level of

environmental protection. The regime adopts an integrated approach, considering emissions to air, water (including discharges to sewer), and land collectively.

- **The Water Environment (Controlled Activities) (Scotland) Regulations 2011** (as amended) – more commonly known as the Controlled Activity Regulations (or 'CAR regime') apply regulatory controls over activities which have the potential to be harmful to Scotland's water environment.

In practice, discharges from waste water treatment works and sewer networks must have a licence authorised under the EASR regime. The licence will contain conditions regulating activities at the site and will identify a ‘responsible person’ who must ensure compliance with the conditions of the licence. SEPA is responsible for monitoring and enforcing license conditions.

SEPA has provided guidance on how activities previously authorised and regulated under the regulations listed above will move to EASR. [25]

4.3.5 Domestic customer charges

Domestic customer water and wastewater charges are set by an annual charges scheme which must be approved by the Water Industry Commission for Scotland. This is set out in **Section 4.3.2** . This section sets out how charges are recovered and recent trends in customer charges.

Unmetered charges

Unmetered household charges are collected by local authorities along with council tax. These charges are based on the council tax banding of the customer's home.

Households that receive 100% Council Tax Reduction (CTR) due to their financial circumstances (they do not pay any council tax), are still required to pay water and wastewater charges for the services they have. However, households that receive CTR also qualify for a reduction of up to 35% on the public water and sewerage charges. The amount of the reduction depends on how much CTR the customer is receiving. Local Authorities apply this automatically to customer bills.

If a property connected to the water supply is exempt from council tax, it will usually also be exempt from water and sewerage charges. A property can be exempt from council tax for a number of different reasons such as:

- the owner has died or moved into a care home (there might be a limit on how long the exemption lasts)
- the property is inhabited by full-time students
- the property is inhabited by someone who is severely mentally impaired.

The property is exempt from paying council tax and water and sewerage charges only if everyone in the property is exempt from paying council tax. [26]

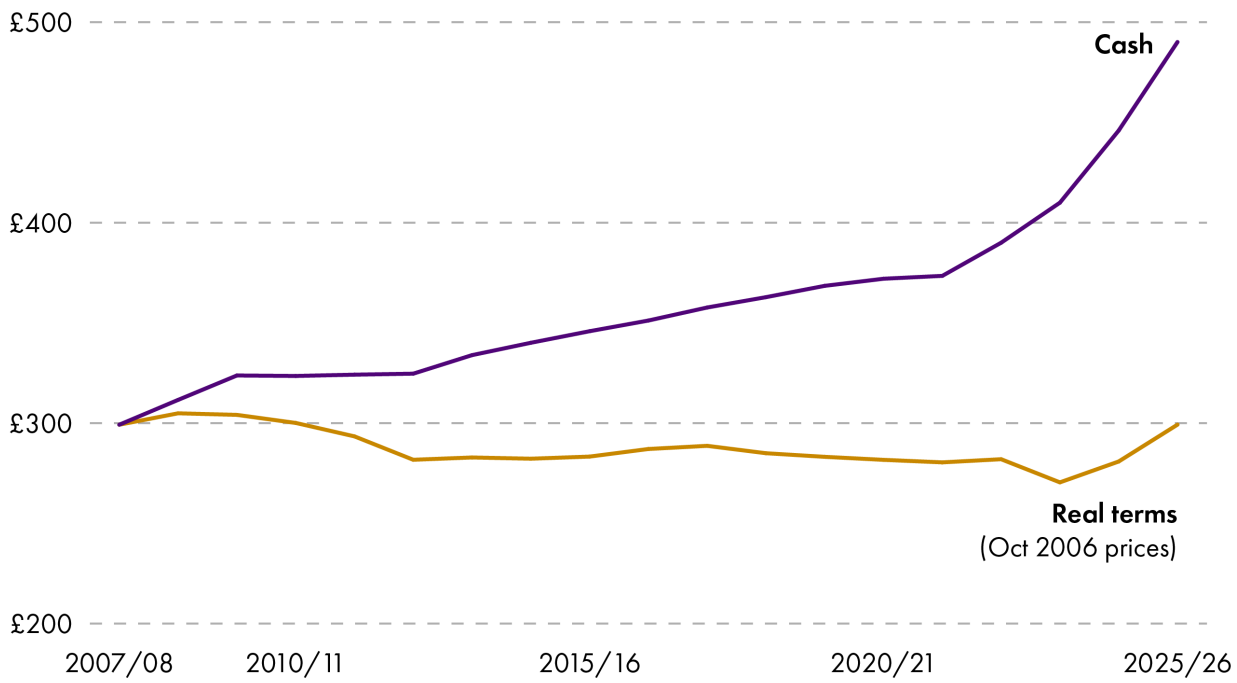
A single occupant who qualifies to pay for council tax can receive a discount on their annual water and sewerage charge as part of their council tax discount up to a maximum

discount of 25%. This includes single parent households and a single non-student adult in a student household.

The average annual household combined water and sewerage bill in 2025/26 is around £474.50 (£1.30 per day), although there is considerable variation between the charges of the lowest and highest council tax bands (charges in 2025/26 range from £400.26 in Band A to £1,200.78 in Band H). [27]

Average household bills over the past decade are shown in **Figures 7 and 8** below. **Figure 7** shows that although combined household water and sewerage charges have steadily increased since 2007/08 in cash terms, the cost to household customers in real terms in 2025/26 is broadly similar to 2007/08.

Figure 7. Average unmetered household combined water and sewerage charges in Scotland in cash and real terms 2007/08 to 2025/26



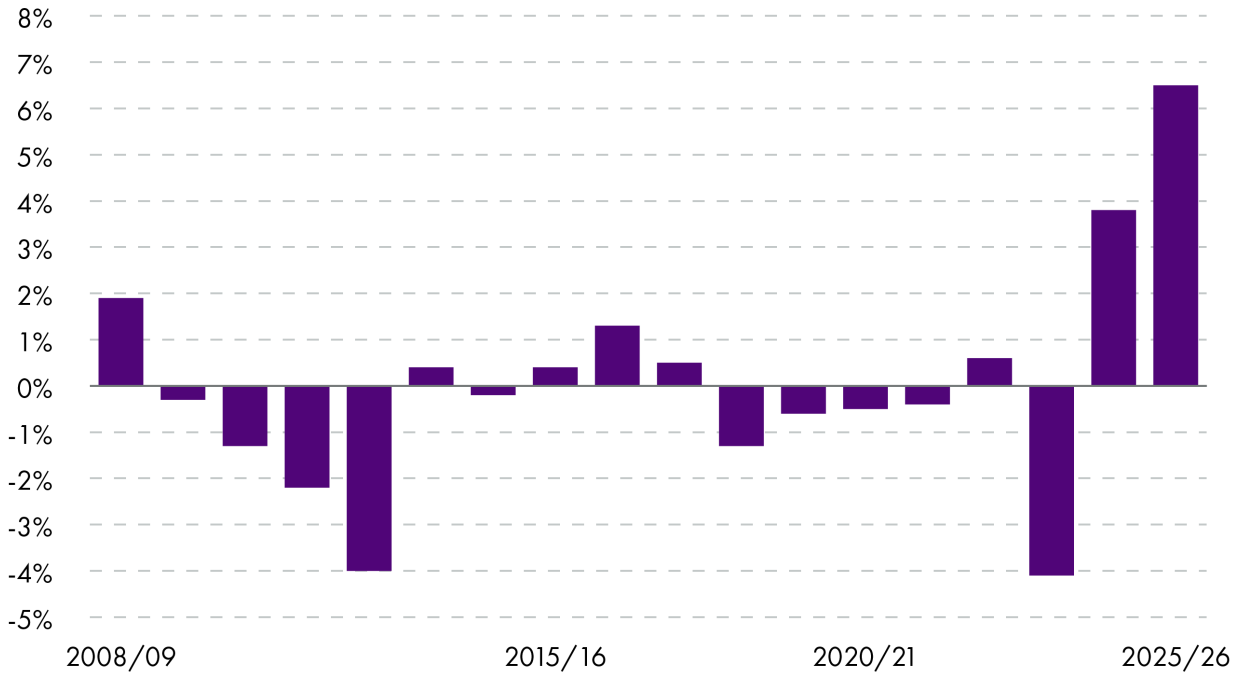
Source: Cash terms average from Scottish Water. Real terms values calculated by SPICe based on October 2006 prices using the Consumer Prices Index including owner occupiers' housing costs (CPIH).

Annual customer charges vary from year-to-year within the regulated cap set by WICS for the regulatory period (see **Section 4.2**). The chart below shows the average percentage increase or decrease in household combined water and sewerage bills for each year compared to how much customers paid the previous year in real terms.

For example, household bills decreased by just over 4% in real terms in 2023/24 compared to the previous year in 2022/23. This was likely due to Scottish Water choosing not to increase customer charges in line with the high inflation rates during this period and in recognition of wider increased household living costs.

In contrast, in 2024/25 and 2025/26, household bills have increased compared to previous years. This increase may be required to ensure funding available for investment recovers to a level assumed in WICS' Final Determination for the 2021-2027 regulatory period (see **Section 4.3.1**).

Figure 8: Annual average real terms year-on-year change (per cent) in unmetered household combined water and sewerage bills in Scotland 2007/08 to 2025/26.



Source: SPICe, based on average unmetered household combined water and sewerage bills provided by Scottish Water. SPICe calculation of percentage year-on-year real terms change based on of the preceding October prices using the Consumer Prices Index including owner occupiers' housing costs (CPIH).

Metered charges

There are fewer than 400 households in Scotland which pay by reference to a water meter. Metered household customers are billed directly by Scottish Water for the water and wastewater services. Metered bills may consist of the following elements, depending on which Scottish Water services the household has:

- **Water and sewer annual fixed charges:** based on the size of the meter serving the house or property. Standard metered household supplies should only require a 15mm or a 20mm water meter unless there are unusually high water-use requirements.
- **Water and sewer volumetric charges:** based on the size of the meter and the volume of water recorded on the meter serving the property.
- **Property drainage charges:** applied if rainwater drains to the public sewer from the property. Charges are based on the Council Tax Band for the home/property. [28]

No discounts or reductions in water, sewage or drainage charges are applied to second homes or homes supplied through a water meter. [29]

4.3.6 Non-domestic customers

Within Scotland, there is retail competition for non-domestic customers for water and wastewater services. Since 1 April 2008, all non-household and public sector customers have been able to choose their retailer.

The Water Services etc. (Scotland) Act 2005 introduced the licensing framework for the water industry in Scotland. It requires that water services and sewerage services providers be licensed and that applications for licences be made to the Water Industry Commission for Scotland.

Scottish Water, as the wholesaler, continues to operate and maintain the water and sewerage network whilst providing wholesale services to licensed retailers. Retailers purchase wholesale water and sewerage services from Scottish Water. They then sell them along with retail services on to non-household customers. Retail services include all customer facing activities such as:

- meter reading
- billing arrangements
- payment collection
- customer enquiries and complaints
- bad debt management.

All retailers are required to comply with the terms and conditions included in licences for water and/or sewerage services and with any associated direction and market codes.

Some retailers provide additional services such as advice on water efficiency and management of wastewater discharges. [30] , [31]

4.3.7 Pipework responsibilities

It is common for MSPs to receive enquiries from constituents regarding the responsibility for maintenance and repair of domestic water pipework. Responsibility depends on the type and location of the pipework in relation to the property boundaries. Responsibility will fall on either the owner/landlord or Scottish Water. Responsibility may be shared by neighbours where pipework supplies multiple properties or crosses property boundaries.

Table 2 below summarises the responsibilities for different pipework elements. Further information is provided in a Scottish Water information sheet - Your guide to water pipework

Table 2: Responsibilities for the maintenance and repair of domestic pipework

Pipework Element	Location / Description	Responsible Party	Notes
Water supply pipe	From property boundary to internal stop valve	Homeowner	Joint responsibility if shared with neighbours; includes pipes beyond boundary in some cases
Shared water supply pipe	One pipe serving multiple properties	Homeowner (jointly)	Common in older/terraced houses; responsibility depends on leak location
Stop valve	Inside property (e.g., under kitchen sink or in garage)	Homeowner	Used to shut off water supply during plumbing work or emergencies
Internal Plumbing	All pipework and plumbing within the home	Homeowner	Includes installation and maintenance; tenants should contact their landlord or Council
Stopcock	At the end of the communication pipe, near property boundary	Scottish Water	Used by Scottish Water to access water supply; may be within property boundary in some cases
Water Meter	Located with the stopcock	Scottish Water	Measures water entering the property; maintained by Scottish Water. Most properties in Scotland are not metered.
Communication pipe	From water main to stopcock	Scottish Water	Connects public supply to property; Scottish Water maintains up to and including the stopcock
Water main	Public water supply pipe in the street or local area	Scottish Water	May vary in size; includes strategic or trunk mains
Road-Located Supply Pipe	Supply pipe located in the road, serving properties fronting main roads	Homeowner	Scottish Water may repair, but costs may be passed to the owner
Leaks on Supply Pipe	Anywhere on the homeowner's supply pipe	Homeowner	Scottish Water may offer subsidised repair or replacement following assessment
Leaks in Rented Property	Internal or supply pipe leaks in rented accommodation	Landlord / Homeowner	Tenants may escalate unresolved issues to Scottish Water or Private Rented Housing Panel

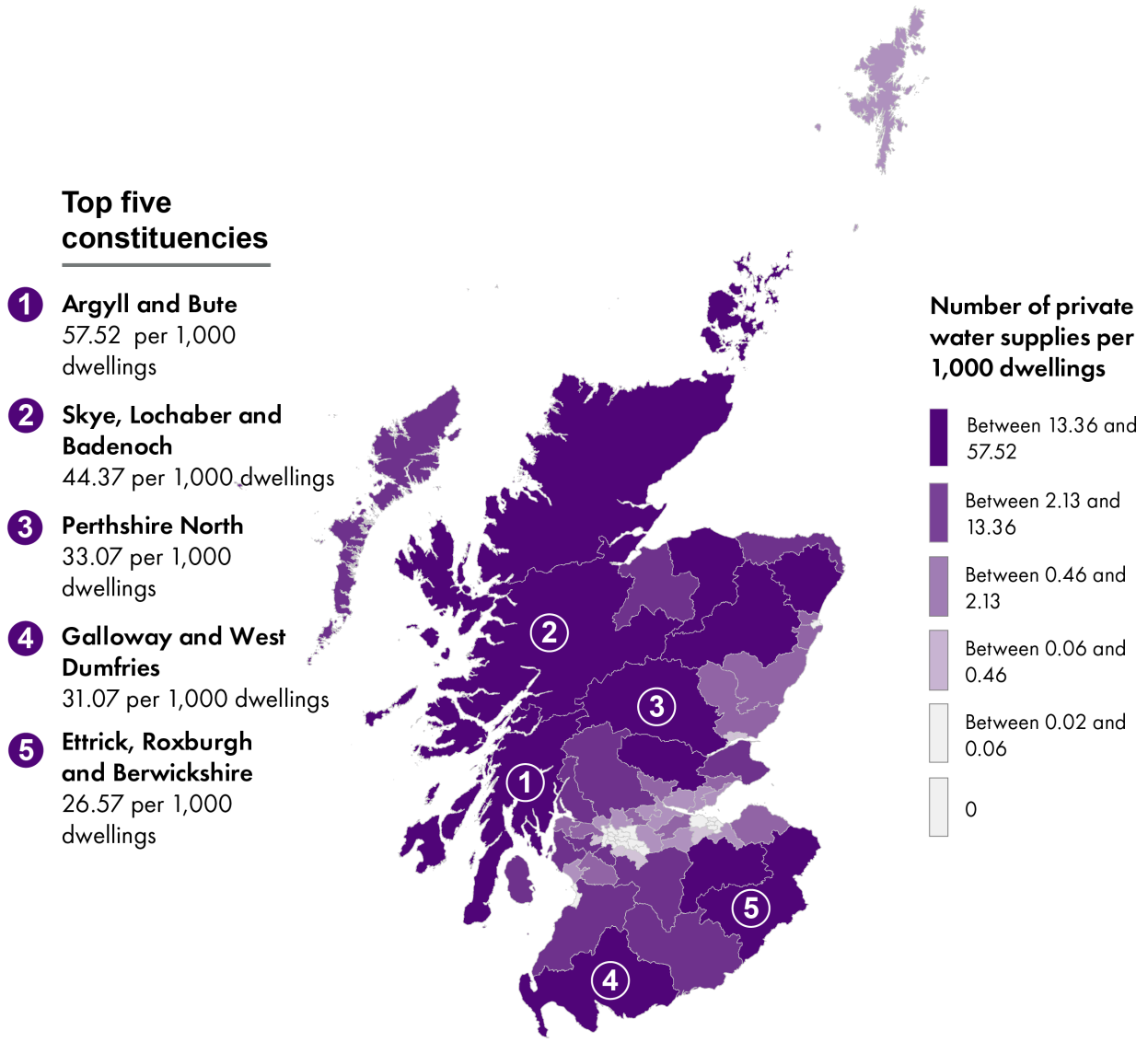
5.0 Private water supplies and wastewater treatment

While most people in Scotland are served by public services provided by Scottish Water, a significant minority depend on private systems, which face distinct challenges.

5.1 Private drinking water supplies

In Scotland, private water supplies (PWS) are defined as drinking water supplies which are not provided by Scottish Water, and are instead the responsibility of the owners and users. [32] Approximately 3.5% of the Scottish population use a PWS for their drinking water. This equates to 23,034 supplies which serve just over 190,000 people. [32] **Figure 9** below shows the estimated concentration of private water supplies in each Scottish Parliament constituency.

Figure 9: Number of private water supplies per 1,000 dwellings by Scottish Parliament constituency.



Source: Drinking Water Quality Regulator

The Drinking Water Quality Regulator (DWQR) state that the figure of 23,034 supplies is an underestimate of the population served, as it does not include the large numbers of people e.g. tourists, who interact with commercial premises that are supplied by private water supplies. [32]

There are two key sets of regulations in place for PWS:

- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 which aim to protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring that the water meets water quality standards.
- The Private Water Supplies (Scotland) Regulations 2006 which implement the

Drinking Water Directive in respect of private water supplies and enhance existing domestic regulatory provision regarding such supplies, to ensure the provision of clean and wholesome drinking water.

PWS in Scotland are split into two categories.

- **Regulated supplies (22.4% of PWS)** (formerly Type A supplies) supply 50 or more people; provide 10 cubic meters or more of water per day; or supply premises that are part of a commercial or public activity. An example of premises served by Regulated supplies include schools, community halls, food premises, holiday lets, B&Bs, hotels and caravan parks.
- **Type B supplies (77.6% of PWS)** are all other domestic supplies, the majority of which serve single properties. [32]

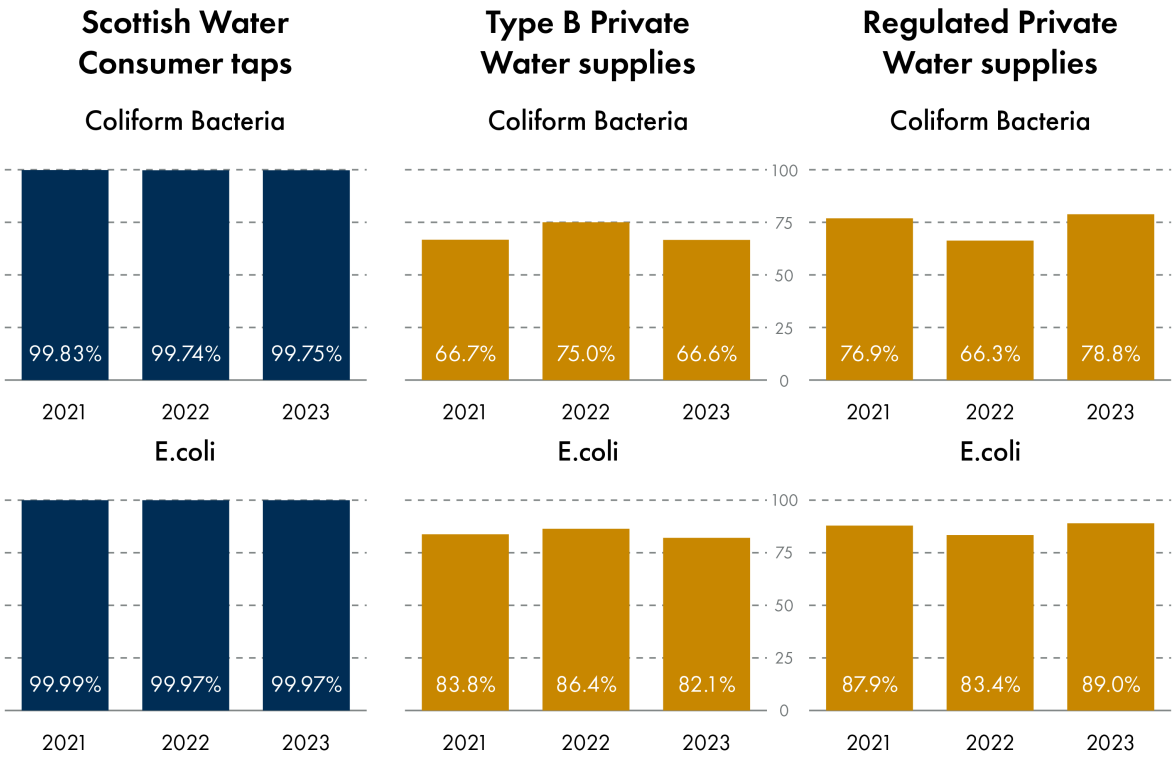
Local authorities are required to test Regulated supplies annually and conduct a risk assessment every five years, under The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.

Local authorities do not have a duty to test or carry out risk assessments on Type B supplies. Owners and users of Type B supplies can request a test from the environmental health department of their local authority for a fee. Local authorities must collect a sample within 28 days of the request. Although risk assessments are not required for Type B supplies under The Private Water Supplies (Scotland) 2006 regulations, local authorities must provide advice and assistance on risk assessments to those responsible.

Scotland's private water supply users are more vulnerable to water scarcity due to a high reliance on small scale groundwater and surface water sources, and limited storage options [32] , Supplies from springs and shallow wells are considered to be more vulnerable than boreholes. [33]

A 2020 report by the Centre for Expertise for Waters (CREW) investigating the impacts of climate change and resilience of private water supplies highlights a growing evidence-base for water quality issues regarding small supplies which are often associated with non-compliances with microbiological and chemical quality standards. [33] **Figure 10** below demonstrates there is typically lower compliance rates with legal water quality standards in private water supplies compared to Scottish Water supplies.

Figure 10: Private Water supply compliance rates with legal drinking water quality standards.



Source: SPICe, data from DWQR

The CREW report further identifies that these water quality problems may be exacerbated by a number of factors related to both water shortage and water quality, including low water table levels due to resuspension of sediments with falling water levels, and decreased dilution of sewage discharged to rivers.

The report made 11 recommendations including:

- extending private water supply risk assessments to address climate change
- improving drought risk indicators and early-warning systems
- developing household water storage and cost-effective connections to mains water.

Owners and users of private water supplies do not pay water charges through their council tax. However, they are required to pay for any testing of their supply that they request through their local authority, as well as all installation and maintenance costs of any collection, distribution and treatment infrastructure they may have. The cost of testing is variable and based on individual local authority pricing. For example, Argyll and Bute Council charges range from £145 for a domestic sample to £266.05 for a compliance sample. [34]

Through The Private Water Supplies (Grants) (Scotland) Regulations 2006, private water supply owners can apply for a grant of up to £800 per property for improvements such as installing treatment systems, replacing lead pipes or installation of new water tanks. The grant cannot be used for ongoing maintenance costs or towards costs for connection to

the mains water network. Local authorities manage the applications process and may be able to provide additional funding in the case of low income. The value of the grant has not changed since its introduction.

The Drinking Water Quality Regulator (DWQR) supervises local authorities' enforcement of the regulations governing the quality of private water supplies in Scotland. It does this by:

- **Providing guidance to local authorities** on the private water supplies regulations and the role of the local authority.
- **Monitoring local authorities' progress** with evaluating and improving the quality of private water supplies.
- **Receiving, interpreting and presenting data** on water quality from private supplies throughout Scotland.

There is no single, comprehensive source of information for private water supply users to access. [35] Advice and information is split across local authorities, the DWQR and the Scottish Government. The DWQR receives information from local authorities on private water supplies. However, there are gaps in the provision of this information (e.g. location) and data collection varies between local authorities.

Additionally there is no requirement to assess the risk of interruption to supply at type B supplies. Therefore there is no comprehensive dataset of PWS users most at risk from interruption of water supply.

Local authorities will have received contacts from some individuals on private water supplies that have experienced interruptions to their supplies, particularly where individuals are seeking emergency water supplies. However some PWS users may meet their water needs independently by purchasing bottled water during supply interruptions without contacting their local authority.

5.2 Private wastewater treatment

Within Scotland, those not on the public sewer network are usually served by private sewage treatment, most commonly a septic tank which offer a base-level of appropriate treatment to protect the water environment. Other small sewage systems offering more sophisticated treatment technology may be in place where required to protect more sensitive water environments.

With regards to wastewater and sewage discharges, a domestic property is a private dwelling including a caravan. Non domestic properties can include cafes, caravan sites, offices, holiday lets and hotels.

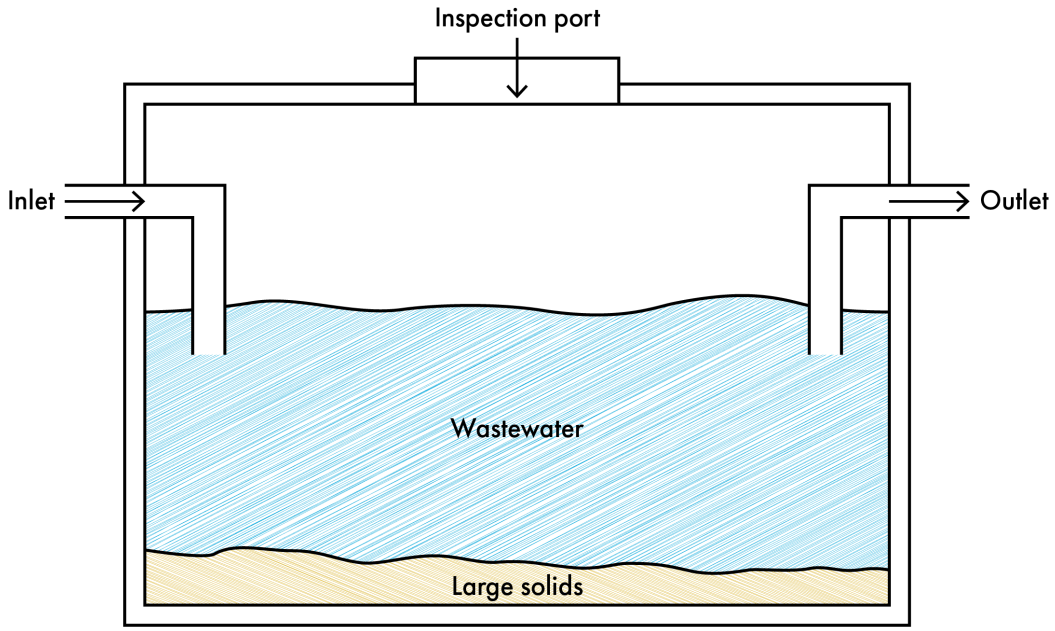
5.2.1 Septic tanks

Septic tanks are a type of small sewage system broadly known as a 'settlement system'. Septic tanks are typically underground structures that work by using gravity to settle and separate solids from liquids (see **Figure 11** below).

Solids that build up over time are required to be removed (a process referred to as 'de-

sludging') by a specialist contractor. Liquids drain away from the tank via a soak-away. Effluent from septic tanks are sometimes discharged to surface waters. Septic tanks may be installed subject to planning permission, building control and SEPA authorisation.

Figure 11: Example illustration of a simple septic tank private sewage system.



Source: Adapted from Centre of Expertise for Waters (CREW), 2022[36]

There are a variety of settlement tanks available on the UK market. Some provide basic treatment of small solids (septic tanks and baffled reactors) through limited biological processes.

The treatment system (or combination of treatment systems) installed must treat wastewater to a satisfactory level established by SEPA. Depending on type of system, it can provide:

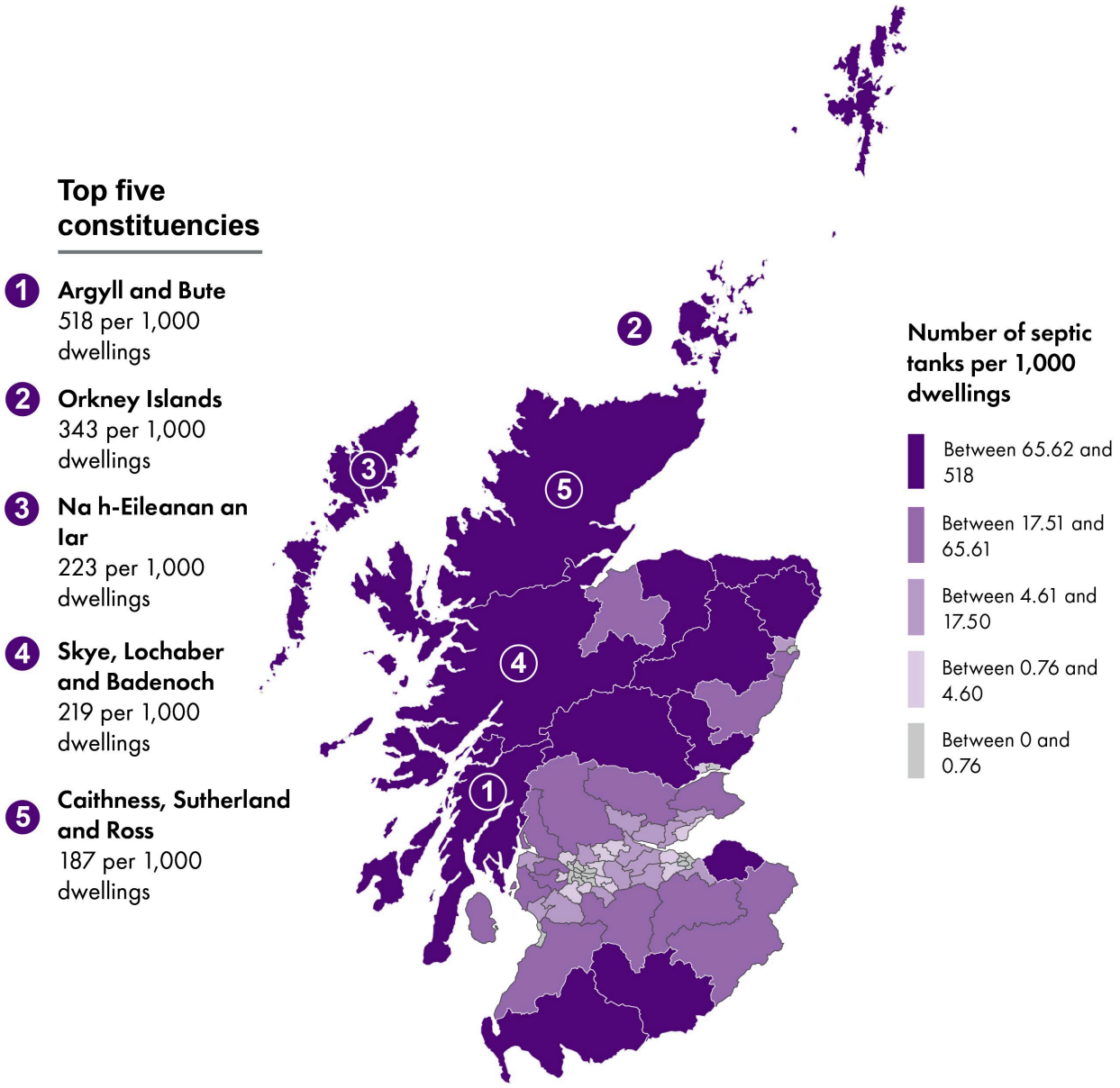
- **Primary treatment of wastewater** – which removes solids that will either settle or float.
- **Secondary or biological treatment of wastewater** – which, by the action of microorganisms, removes organic materials that will not settle or which are dissolved in the wastewater.
- **Tertiary treatment of wastewater** - which achieves further refinement of the effluent by either mechanical, chemical or biological means. [37]

The exact number of private septic tanks in Scotland is unknown. A 2022 report by CREW used modelling to estimate the total number of unique Private Sewage System locations. It estimated a total of around 169,000 serving 173,000 properties. [36]

A map of the known concentration of septic tanks according to available SEPA data by Scottish Parliament constituency is shown in the map in **Figure 12** below. Note that the data in the map below is not complete because not all household discharges are currently

authorised, meaning that SEPA does not have a complete record of all small-scale sewage discharges.

Figure 12: Estimated number of septic tanks per 1,000 dwellings by Scottish Parliament constituency.



Source: SEPA

The quality of treatment that occurs by a septic tank is largely dependent on the management and maintenance of the infrastructure. For example, as sewage sludge builds up in a septic tank, if the excess sludge is not removed, then the ability for settlement is diminished. Non-wastewater items (e.g. wet wipes, sanitary products, grease, fats and oils) may cause the system to be clogged. [37] The cost of de-sludging of septic tanks in Scotland can differ due to location, size of tank and whether or not it is considered a scheduled visit.

Under the Sewerage (Scotland) Act 1968 (s.10), Scottish Water has a duty to empty a septic tank when requested to do so by the property owner if "reasonably practical" and

can recover the cost of this service through charges. [38] In 2025/26, standard charges that apply to a single household, serving up to 5 houses and up to a capacity of 9m^3 are £245.60 for a scheduled visit, £340.90 for unscheduled or £492.00 (or actual cost if this is more) for an urgent response visit. [39] Additional charges can apply to business owned septic tanks and those with tanks larger than 9m^3.

Scottish Water's ability to empty a tank is dependent on household location and providing that the property meets access requirements. In addition to Scottish Water, there are a number of private companies that offer services to empty tanks. The price for these services is again dependent on location and local competition.

Scottish Water provides a septic tank emptying service to a number of islands including some very small islands with few inhabitants. This requires careful scheduling to provide this service. For some of Scotland's islands, and some mainland remote rural areas, it may be impractical and/or cost prohibitive for Scottish Water or other private companies to offer de-sludging services.

Pollution issues

A recent study has identified community septic tanks within Scotland to be a pathway for emerging contaminants entering river courses. The study highlights no or limited removal of emerging contaminants within Scottish Water owned and operated community septic tanks.

However, it found that the risk to receiving rivers was "generally low, indicating small risk for the environment" but that alternative technological or non-technological approaches to reduce emerging contaminants pollution may be needed where septic tank discharges have low dilution. [40] The potential risks and concerns relating to emerging contaminants is discussed in **Section 6.4** of this report.

SEPA has stated that every year it receives hundreds of enquiries and complaints about small-scale private sewage treatment systems. Most complaints are about "ponding", when wastewater or sewage forms puddles on the ground, or about sewage related solids in rivers or being washed up on beaches.

SEPA has also stated that many of the problems caused by private sewage treatment systems are because systems are not looked after properly or maintained. [41] SEPA's response to these problems is to provide advice on any remedial action required, with potential use of enforcement tools such as fixed monetary penalties "to change behaviours of those who persistently fail to comply, and where improvements are necessary to limit localised environmental harm or nuisance". [41] Details of SEPA's approach to complaints regarding septic tanks can be found in its service level statement for small-scale private sewage treatment systems.

Enforcement may be challenging where the impact on a water body is the cumulative effect of multiple private wastewater discharges and/or wider pollution sources within a catchment. This makes it difficult to identify and attribute the pollution to a single source for enforcement action. [42] Unlike private water supplies, there is currently no grant funding available to households for upgrades to private wastewater systems.

5.2.2 Regulation of private sewage systems

As with public wastewater treatment, private sewage system discharges are regulated by SEPA. Any sewage discharge to the water environment must be authorised by SEPA.

Up until 1 November 2025, this has been regulated under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (the 'CAR regulations'). Section 37 of the CAR regulations requires SEPA to maintain a public register of authorisations. Registration of a septic tank or other small sewage treatment systems has a one off fee of £190. [43]

As with the wider regulation of activities impacting on the water environment, regulation in this area will fall under the EASR regime from 1 November 2025 (see **Section 4.3.4**), with CAR registrations automatically migrating over into the new system. Standard conditions apply to different scales and types of discharge which are similar to those in place under the CAR regime.

Conveyancers check whether a septic tank is registered as part of the house purchase process (see **Section 6.3.4** regarding house purchases), but otherwise voluntary registration is slow. SEPA receives around 2,500 registrations for private sewage systems per year. SEPA reports that approximately 75,000 private sewage systems are authorised in Scotland as of April 2023, including those vested in Scottish Water. This accounts for approximately 44% of the number of Private Sewage Systems estimated by CREW. [36]

5.2.3 Connecting to the public network

Under the Water (Scotland) Act 1980 (s.6) and Sewerage (Scotland) Act 1968 (s.1), Scottish Water is required to provide every property within its area with a domestic water and wastewater connection, provided it is practical at ‘reasonable cost’ to do so. [44]

Households currently on a private water supply or private sewerage system can contact Scottish Water to connect to the public mains water network. However, this may not always be feasible or may be too expensive for the owner due to the distances of some properties from the mains water supply/sewer network. [45]

In June 2022, the Scottish Government announced £20 million of funding to be allocated during the remainder of Session 6 of the Scottish Parliament to a pilot project to extend the public water networks to connect with households reliant on private water supplies. The project is working with the assistance of Scottish Water, Aberdeenshire Council and Consumer Scotland.

This Scottish Government states the project will examine "communities that are in close proximity of existing water mains and that have experienced loss of water due to water scarcity". [46]

Reasonable Cost Contribution

There is no current strategic plan for connecting private water supplies or wastewater to Scottish Water's network. Requests are managed on a case-by-case basis.

Scottish Water may pay a ‘Reasonable Cost Contribution’ for connecting new local

network infrastructure to existing network assets. Calculations for reasonable cost contributions are determined by regulations under the Sewerage (Scotland) Act 1968 and the Water (Scotland) Act 1980 (as amended) - the most recent being The Provision of Water and Sewerage Services (Reasonable Cost) (Scotland) Regulations 2015. This only applies in instances where infrastructure is being vested with (adopted by) Scottish Water.

The Reasonable Cost Contribution regulations provide for the maximum Scottish Water contribution to assets that can be vested. Customers pay the non-vestable assets (i.e. connection pipes and sewers). Where the costs of the vestable assets is beyond the Reasonable Cost Contribution, and the customer is prepared to pay the cost differential, the connection will proceed.

Connection costs are reviewed every year through Scottish Water's scheme of charges, however there is no maximum cap on what it may cost a customer. Costs are dependent on the length and complexity of the connection, and this is particularly relevant in instances when there are non-standard connections. Reasonable Cost Contributions do not typically apply to single domestic property connections. [47]

Access to private land for connecting to the public network (servitude)

Connections to Scottish Water's main supply network can be complicated when service pipes need to cross private land owned by a neighbour.

On this point, Scottish Water's guide to connecting to its network states:

> " Should you need to lay your pipework across land which is not in your ownership, to gain a connection to our network, you must obtain permission from the owner of the affected land prior to commencing work. We will request a copy of this documentation for our reference and review."
>
> Scottish Water, n.d.[48]

Access to private land for connecting to the public network (servitude) In some cases, there can be existing legal rights (known as servitudes) which can be relevant to a person's water supply.

A servitude relates to how land and property is used. In simple terms, it imposes a legal obligation on one property for the benefit of a neighbouring property. For example, one recognised type of servitude allows one owner to lead a pipe over another person's land. Another type of servitude gives a property owner the right to access a neighbour's land, such as for repairing a pipe.

Properly created, servitudes survive changes of ownership of the affected land or property.

Servitudes can be created in writing in the official ownership documents relating to land or property, that is, the title deeds (also sometimes referred to as the title documents). However, they can also be formed by:

- **Prescription** – broadly, this the acquisition of a right through use – legislation says that the use must be for twenty years, "openly", "peaceably" and "without judicial interruption " (that is, where someone starts court proceedings challenging the existence of right).
- **Implication** – this depends on the facts and circumstances but sometimes servitudes can be implied by law when land is subdivided (so part is sold or transferred to a new

owner) and the servitude right is regarded as necessary for the reasonable enjoyment of one piece of land – the courts are much more reluctant to recognise an implied servitude when it is meant to benefit the land the original owner keeps, rather than the part that is sold or transferred .

6.0 Key challenges for Scotland's water sector

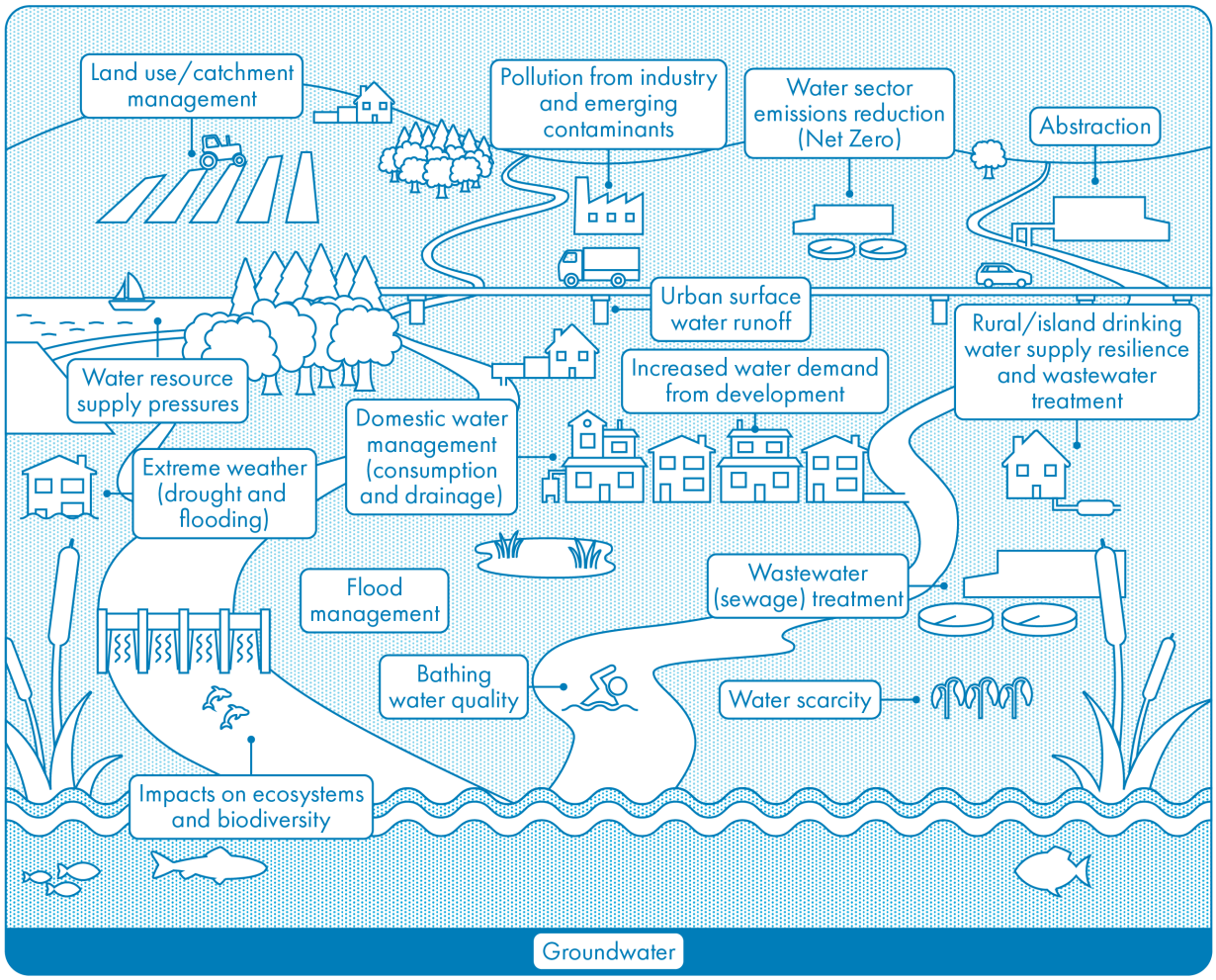
Previous sections have outlined how public and private water systems are regulated and highlighted some issues facing both public and private systems which are linked to broader pressures on Scotland's water sector.

Scottish Water has identified three key challenges in its long-term strategy :

- **The Climate Crisis:** Extreme weather events, including heatwaves, droughts, storms, and floods, are becoming more frequent and severe. These events put increasing pressure on water and wastewater systems.
- **Population Change:** Scotland's growing and shifting population creates new demands on the network. The increase in single-person households further adds to this pressure.
- **Ageing Assets:** Many Scottish Water assets (treatment works and pipes) have been in use for over a century. They now require upgrades or replacements to meet modern demands and improve environmental conditions. [24]

These key challenges are summarised in **Figure 13** and further discussed in the sections below.

Figure 13: Key pressures on Scotland's water sector



Source: adapted from DEFRA, Indpendent Water Commission, 2025[49]

6.1 Climate change and water resilience

Climate change is leading to more frequent and severe weather events such as storms, floods and droughts which can disrupt water supply and damage infrastructure. It has been identified as a key challenge facing Scotland's water sector.

Ministerial Directions (provided by Scottish Ministers to Scottish Water) for the 2021-27 period had a particular focus in relation to climate change adaptation and mitigation. These included:

- Identifying the impacts of climate change on Scottish Water's assets.
- Preparing and implementing plans for adaptation measures necessary to protect its services.
- Making substantive progress in the 2021-27 period towards the climate change targets set and ensuring an appropriate trajectory to meet or exceed those targets.
- Working with customers, communities and the wider industry to support measures that reduce water use in homes and businesses and help ensure that only appropriate items are flushed down the toilet or put down the sink. [50]

The Water Industry Commission for Scotland explains what this mitigation and adaptation challenge means for Scottish Water:

- **Mitigation challenge:** Scottish Ministers set Scotland an ambitious target to achieve net zero emissions of all greenhouse gases by 2045. Scottish Water has a target to reach that goal five years earlier by 2040. This target of net zero emissions by 2040 applies both to operational emissions and to all emissions associated with the capital investment programme. Given the asset-intensive nature of the industry, Scottish Water can play a key role in contributing to carbon emission reduction in Scotland. There are significant opportunities for Scottish Water to reduce emissions, for example, by using its vast land estate for carbon sequestration (e.g. peatland restoration, tree planting) and developing more sustainable energy sources as a byproduct of its activities (e.g. heat capture from wastewater treatment processes).
- **Adaptation challenge:** Climate change is bringing weather patterns that place increasing and significant pressure on the water industry and the essential services it provides. Increasing temperatures are impacting the quality and quantity of the water that can be taken from the environment for drinking water. Intense periods of rain increase the risk of flooding, impacting homes, businesses and essential services. This means there is a need to consider the drainage of towns and cities to address flooding and reduce the knock-on economic impacts. The extent of the climate change adaptation challenges facing the water industry has also been identified by the Climate Change Committee, which highlights that further work is required. The industry must consider how it will evolve to address the impacts of climate change including how this will impact future investment and customer charges. [15]

These challenges are the main drivers for the Scottish Government's commitment (in the 2023-24 Programme for Government) to review water industry policy to "assess how water, sewerage and drainage services can adapt to the impacts of climate change to avoid water scarcity through future legislation". [51]

The Scottish Government's Water, Wastewater and Drainage Policy Consultation which ran from November 2023 to February 2024 explains how climate change is impacting Scotland now. It highlights increasing frequency of extreme flooding and drought and the long-term threat of sea-level rise on coastal infrastructure. [52]

The Scottish Government identifies how this extreme weather has the potential to impact water availability and water quality. It sets out four key areas of focus for adaptation to these impacts:

- Reducing water consumption.
- Separating rainwater from wastewater systems.
- Investing in blue-green infrastructure (e.g., rain gardens, wetlands).
- Improving catchment management to protect water sources.

Correspondingly, Scottish Water has published a long-term strategy and climate change adaptation plan. Its climate change adaptation plan identifies the following key risks with climate change:

- **Warmer, drier summers** that can lead to drought and deteriorating raw water quality.

- **Wetter winters** that cause flooding.
- **Variable rainfall patterns** that impact environmental performance.
- **More frequent storms** that disrupt assets and services.
- **Sea level rise and coastal erosion** that floods or damages assets. [23]

One of the most visible impacts of climate change is increased rainfall intensity, which places strain on urban drainage systems and requires innovative solutions.

6.1.1 Rainwater drainage and blue-green infrastructure

The Scottish Government's 2024 Water, Wastewater and Drainage Policy Consultation explains that rainwater drainage in Scotland is primarily routed through combined sewage systems which handle both sewage and rainwater. However, increasing frequency of high intensity rainfall events leads to overflows in these systems (see **Section 6.3** of this briefing on sewage pollution).

Urbanisation and its associated increase in hard surfaces (e.g. paved driveways, roads) also reduces natural water absorption. For example, research in Edinburgh found that the city lost an average over 15 football pitches of vegetated land per year to urban creep, between 1990 and 2015. [53]

Blue-green infrastructure (BGI) is identified as one proposed solution to help absorb and slow down water before entering the sewer system. BGI is an approach to urban planning and design that integrates both natural and engineered (or 'grey') features to manage water and enhance the environment.

- **Blue infrastructure** is water environment features within the natural and built environments that provide a range of ecosystem services. Blue features include rivers, lochs, wetlands, canals, other water courses, ponds, coastal and marine areas including beaches, porous paving, sustainable urban drainage systems and rain gardens.
- **Green infrastructure** is features or spaces within the natural and built environments that provide a range of ecosystem services. [54]

Requirements for the consideration of BGI in the planning process are set out in Policy 20 of National Planning Framework 4. This includes requirements for audits and strategies to protect, enhance and connect BGI assets in Local Development Plans. It also places emphasis on support for development proposals which incorporate well-designed BGI with arrangements for long-term funding and maintenance. [54]

The Scottish Government's strategy for improving surface water management in Scotland - 'Water-Resilient Places: A Policy Framework for Surface Water Management and Blue-Green Infrastructure' (February 2021) [55] - set out 21 recommendations including:

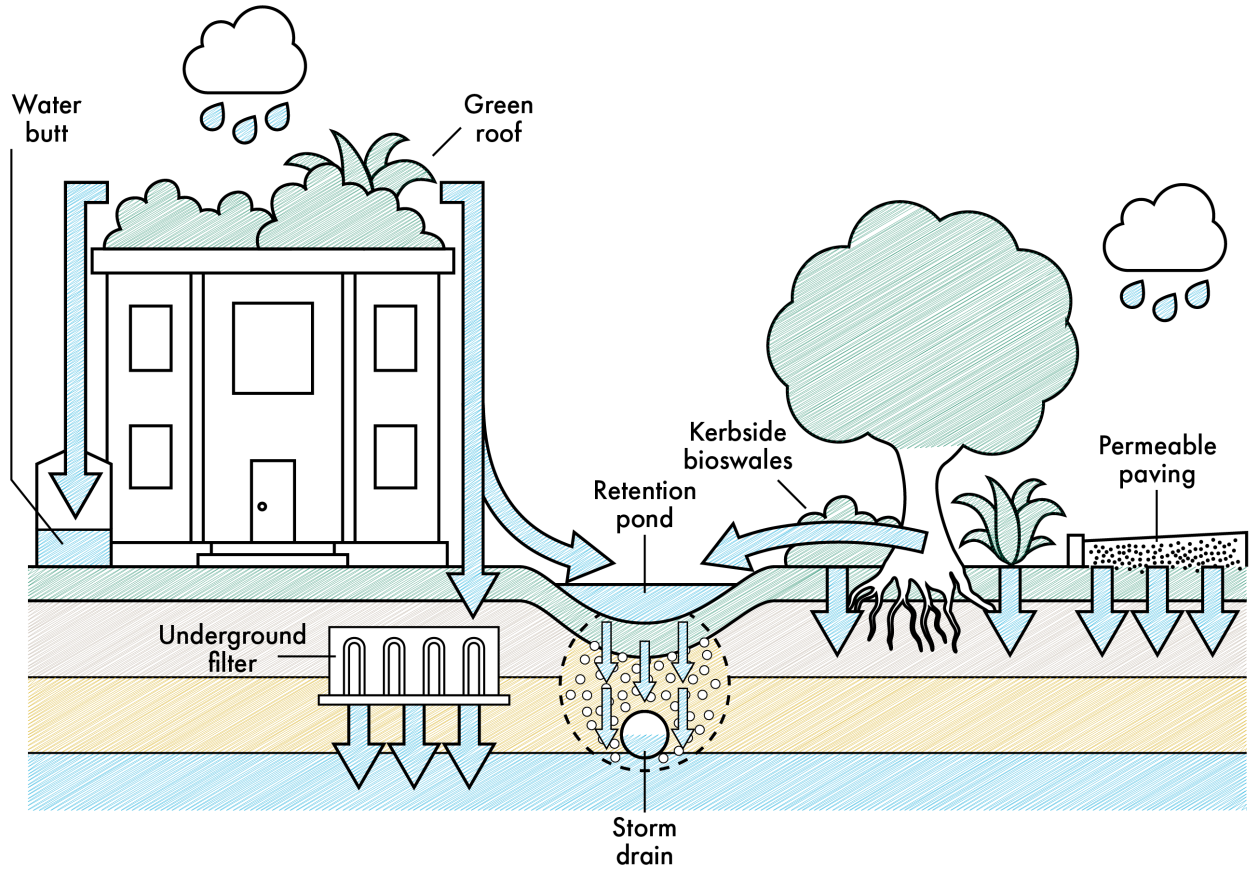
- Establishing a national vision and strategy for blue-green cities.
- Aligning planning and investment with climate and water resilience goals.
- Improving coordination and measurement of success in flood risk management.

- Prioritising blue-green infrastructure in new developments and retrofitting existing areas.
- Creating strategic partnerships and governance structures.
- Developing a financial framework involving both public and private sectors.

Sustainable Urban Drainage Systems (SuDS) are one such approach to blue-green infrastructure aimed at managing rainwater drainage (**see Figure 14**). SuDS can include a number of different components, from large to small scale features, for example:

- **Swales:** vegetated drainage channels or troughs with a shallow gradient to reduce flows provide storage, conveyance of surface water, infiltration and settlement of pollutants.
- **Permeable pavements:** pavements and hard surfaces that allow infiltration or temporary water storage.
- **Rain gardens or filter strips:** vegetated strips which accept run-off providing vegetative filtering, settlement of particulate pollutants and infiltration.
- **Green roofs and living walls:** vegetated roofs and walls of buildings that reduce run-off and peak flows. [56]

Figure 14: Illustrative example of SuDS systems



Source: adapted from MMRS

The Water Environment and Water Services (Scotland) Act 2003 introduced an obligation to use SuDS when dealing with surface water drainage in all new developments, except single dwellings that drain to the water environment unless they discharge to coastal waters.

Scottish Water is responsible for SuDS that deal with the run-off from roofs and any paved ground surface within the property boundary and need to be designed to Scottish Water's specifications as set out in its manual 'Sewers for Scotland v4.0'.

However, not all SuDS systems are the responsibility of Scottish Water. The various parties involved, primarily local authorities and developers, also have to take responsibility and develop approaches for allocating responsibilities for their long-term maintenance, and work in partnership. [57]

A 2018 ClimateXChange report explored issues with the monitoring and maintenance of SuDS systems. It recommended the need for more formalised performance-based monitoring of SuDS, dedicated maintenance budgets and improved collaboration between stakeholders. [58]

The Scottish Government's Water, Wastewater and Drainage consultation proposes the following improvements to SuDS policy:

- **Shifting from single SuDS ponds to strategic networks** that serve wider areas.
- **Plan and build SuDS in partnership** with Local Authorities, Scottish Water, developers, landowners, communities and other partners.
- **Ensure SuDS are operated and maintained** so they continue to work properly over the long term.
- **Ensure that the drainage of rainwater separately from wastewater is seen as a vital service** that is planned for.
- **Consider how to bring blue-green infrastructure into existing communities** by making the best of existing greenspace.
- **Take opportunities to bring in new blue-green infrastructure and reduce hard surfaces** (e.g. rain gardens at the street scale, replacing paved areas with permeable surfaces). [52]

Research by Consumer Scotland has found that nature-based solutions like blue-green infrastructure offer significant environmental, social, and economic benefits, including flood mitigation and improved public health. However, these spaces are under threat from urbanisation, and access remains unequal—particularly for those in deprived areas or with poorer health.

The report highlights the crucial role of consumers in supporting and maintaining these spaces, and stresses the need for inclusive planning to ensure fairer outcomes in Scotland's transition to net zero.

Consumer Scotland made a series of recommendations under two themes:

- **Consumer Engagement & Action:** engage consumers to co-design blue-green infrastructure, improve public understanding of nature-based solutions through place-

based messaging, and incentivise household or community-level actions to counter urban creep.

- **Policy & Planning Integration** *:* Strengthen planning frameworks and legislation with clear targets for implementation, expand funding for collaborative blue-green projects, and support better measurement of their environmental, health, and social benefits. [53]

Beyond urban areas, managing water at the catchment level is essential to protect water quality and ensure long-term sustainability.

6.1.2 Catchment management

A catchment is the area of land drained by a river and its tributaries and can include ground water sources such as boreholes and springs. The catchment area may include hill slopes and floodplains, lochs, forests, agricultural fields, industrial development and urban areas. [59] Water resource availability and water quality may be influenced both human (e.g. forestry, agriculture, renewables) and natural (e.g. erosion, rainfall) catchment-based processes. [60 , 52]

A 2020 report published by CREW identified that catchments in Scotland are experiencing increased winter flows and decreased spring/summer flows considered to be linked to climate change, with significant regional variability - especially between eastern and western regions. These changes are projected to impact catchment hydrology and water availability. [60]

The Scottish Government notes that these impacts may make water more difficult and expensive to treat so that it is safe to drink. It identifies the need to monitor and manage catchments at a national level and across sectors to identify key areas of concern and minimise the risk of new and existing pollutants reaching drinking water sources. [52]

River Basin Management Plans (see **Section 3**) are the main way that catchments are currently managed in Scotland. There are other catchment management initiatives in Scotland which work alongside River Basin Management Plans to ensure that a catchment's water resources are used in a sustainable way (see **Box 3** below).

Box 3. Case Study of catchment management: The Dee Catchment Partnership

The Dee Catchment Partnership in Scotland is a collaborative initiative focused on the sustainable management and restoration of the River Dee and its surrounding catchment in Aberdeenshire.

The partnership aims to protect and enhance the River Dee, which is vital for the region's rural economy, biodiversity, water supply, recreation, and tourism. It supports nature and climate recovery, contributing to sustainable livelihoods in the area. [61]

It brings together around 16 organisations representing the interests of everyone involved with the River Dee including:

- statutory agencies
- research institutions
- organisations and interest groups
- land managers helping to protect water quality
- individual householders looking after their septic tanks and taking steps to save water. [62]

Key activities of the Dee Catchment Partnership includes:

- **River and Floodplain Restoration:** The partnership restores natural river flows and reconnects rivers with their floodplains to reduce flooding and enhance habitats.
- **Woodland and Peatland Projects:** It plants native trees and restores peatlands to improve biodiversity, water quality, and carbon storage.
- **Biodiversity and Habitat Enhancement:** Conservation efforts target species like salmon and freshwater mussels while creating pollinator-friendly habitats.
- **Community Engagement and Education:** Public involvement is encouraged through nature diaries, events, and educational programs about river conservation.
- **Research and Monitoring:** Ongoing scientific monitoring informs restoration strategies and contributes to international environmental research networks. [63]

Catchment management also plays a critical role in addressing water scarcity, a growing concern in parts of Scotland due to climate change and population shifts.

6.2 Water scarcity

Water scarcity occurs when demand for water exceeds the amount of water available to a given population. The severity of water scarcity can vary both in time and spatial extent

(localised, regional or national). [64]

Although Scotland has long been viewed as a nation with plentiful water supplies, a changing climate is now leading to an increased number of water scarcity events across the country. Forecasts indicate that by 2050, more than half of Scotland's population could be at greater risk of water shortages [52] , with some areas affected more than others.

The frequency of extreme drought is expected to rise from an average of one event every 20 years (baseline period of 1981-2001), to one event every three years from 2021-2040. [65]

Droughts can have substantial impacts on water availability for human consumption as well as industry and natural environments. River catchments are placed under additional pressure from water abstractors and ultimately limiting the amount of water available to users. Lower summer flows may also reduce the ability for rivers to dilute pollutants with the possibility of increased wastewater treatment costs. [66]

Water sensitive habitats such as wetlands are particularly vulnerable to extreme episodes of water scarcity. Channels can become narrower and shallower and flow velocities decrease, impacting the suitability of habitat space.

Over longer periods of time lower levels of rainfall may cause:

- a lowering of water tables
- an increased deficit of moisture in soils.

This can lead to less run-off into rivers as well as a greater need to irrigate crops. Dry soils can also increase the risk of flash floods if heavy rainfall follows dry periods. [66]

Demand for water in Scotland is expected to rise due to population growth and drier summers. Additionally, cooling systems for data centres and technologies such as hydrogen production may also increase demand on Scotland's water resources. For example:

- **Hydrogen production:** a 2022 feasibility study estimated that delivery of the Scottish Government's 2045 hydrogen production target will require raw water supplies of 116 million litres per day. This is equivalent to 6% of total current raw water abstraction and 13% of total drinking water consumption in Scotland. [67]
- **Data centres:** there are currently 16 data centres in Scotland and this number is set to increase. Freedom of information data sought by the BBC has revealed that the volume of tap water used by Scotland's data centres has quadrupled since 2021. [68]

A demographic shift - from western parts of Scotland to eastern regions which are drier- is expected to create additional pressures on water supplies. Scottish Water forecasts it will have an overall deficit of 240 million litres a day, between the amount of water people want and what it can supply, by 2050 unless it takes steps to reduce demand and considers new supply options. [24]

The map below shows average water scarcity in Scotland's river catchments from 1991 to 2024 from a dataset using SEPA's water scarcity warnings [69] . These warnings categorise

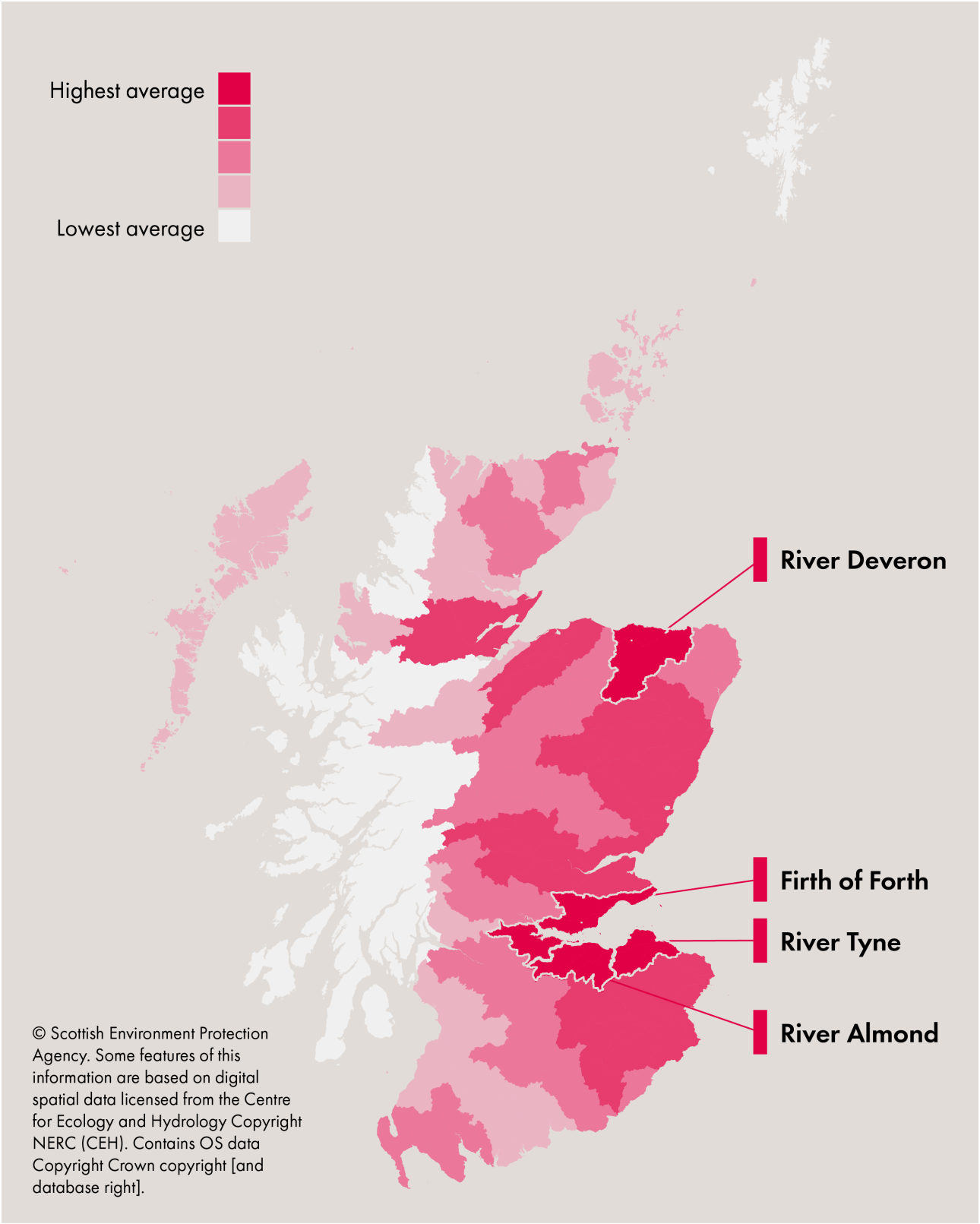
water scarcity on a five-point scale:

- Normal conditions
- Early warning
- Alert
- Moderate scarcity
- Significant scarcity

The darker shades in the chart below show river catchments which have higher average water scarcity over the period.

Figure 15: Map of average water scarcity by river catchment areas from 1991 to 2024.

SEPA categorises water scarcity on a five-point scale - Normal conditions, early warning, alert, moderate scarcity and significant scarcity. Note: water scarcity data availability and quality varies across Scotland, with rural and island Scotland most affected. Full details of data and caveats are provided in Peters et al., (2025). [70]



Source: SPICe, data fromPeters, 2025[70]

A contributing factor is household growth:

- By 2043, Scotland is projected to have 2.7 million households, a 10% increase from 2018.
- More single-occupancy and smaller family units mean more individual water users.
- More households equal more network connections and more water demand. [71]

Scotland's private water supply users can be more vulnerable to water scarcity events. This is due to a high reliance on small scale groundwater and surface water sources, and limited storage options. [32]

To support water abstractors and private water supply users, SEPA publish seasonal 'water situation' reports in the autumn and winter to summarise how weather conditions have impacted water resources across Scotland. Weekly water scarcity reports are published between May and September and are available on SEPA's website. [72]

To improve long-term resilience, the Scottish Government provides funding to local authorities to deliver the Private Water Supply Grant Scheme which offers up to £800 to eligible households and businesses to improve their existing private water supply.

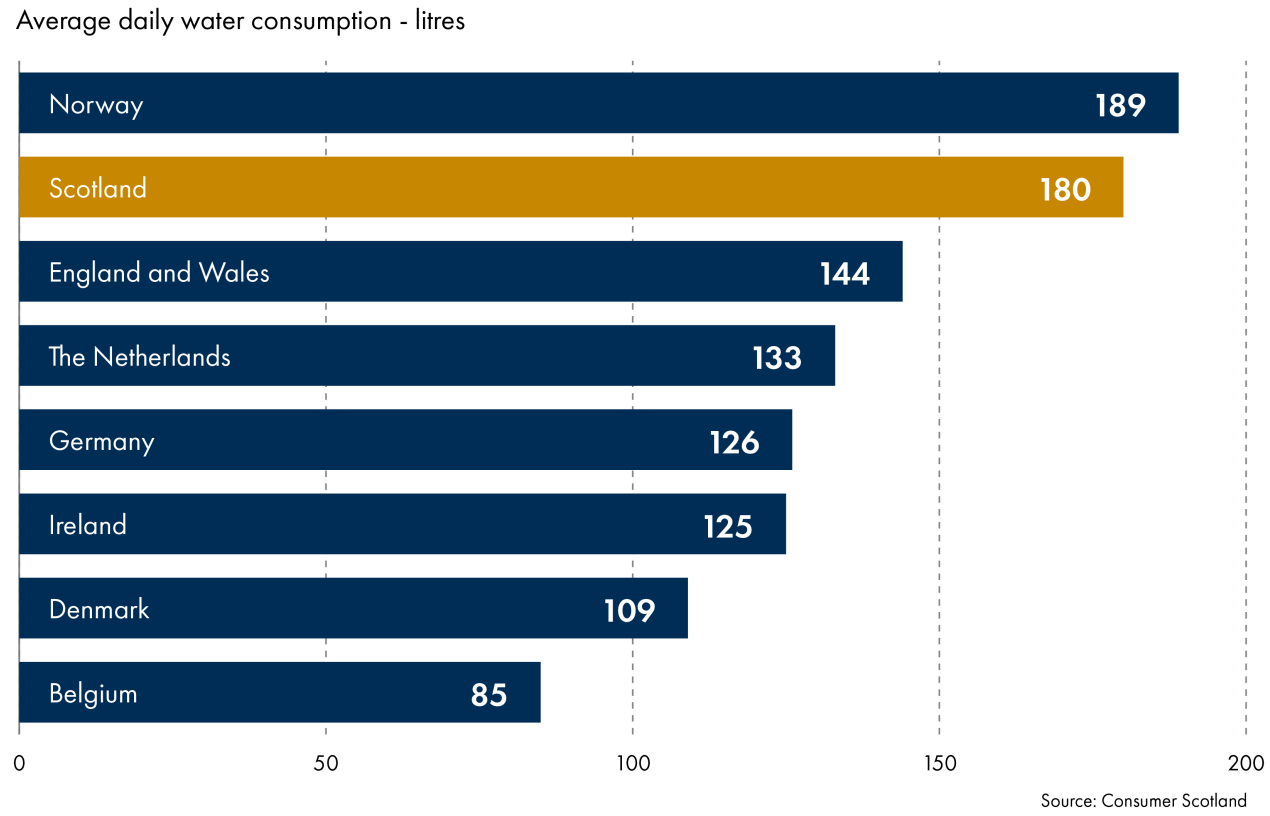
Additionally, Scotland's National Water Scarcity plan sets out how water resources will be managed prior to and during periods of prolonged dry weather. The plan sets out how SEPA will work with other water users and key organisations such as Scottish Water to better manage water resources during periods of low rainfall. [73] SEPA sets out its strategic approach to regulating the water environment in its Framework for Water. [74]

Reducing water demand is a key strategy to mitigate scarcity, and requires both infrastructure improvements and changes in consumer behaviour.

6.2.1 Reducing water consumption

Water use in Scotland is higher than in other countries in the UK and Europe with similar climates, with the average person using around 180 litres of tap water every day. This can be compared to around 144 litres in England, 133 litres in the Netherlands, 126 litres in Germany and 109 litres in Denmark (see **Figure 16** below). [75]

Figure 16: Average daily water consumption in Scotland compared to selected UK and European countries with a similar climate.



Source: adapted from Consumer Scotland

This high consumption has been associated with a cultural assumption in Scotland of abundant supply, and because only a small number of Scottish households have water meters – which can contribute to a lack of awareness of water use. [76] Steps to encourage consumers in Scotland to use water more efficiently can help reduce some pressures on the water environment.

A 2023 report by Consumer Scotland identifies the need to reduce water consumption in Scotland. It notes:

> " A cultural shift towards a common acceptance of the value, and the finite nature, of water in Scotland is necessary for consumers to be engaged in a move towards more sustainable consumption of water."
>
> Ashworth, 2023[75]

Research commissioned by Consumer Scotland found that, while most consumers (77%) in Scotland are concerned about climate change, only around one in five (19%) are concerned about how much water is used in their home. This indicates that individuals concerned about the environment do not connect actions to conserve water with climate change. [75]

Based on its research, Consumer Scotland has made a series of recommendations including:

- **The Scottish Government and water stakeholders should deliver unified public messaging** on practical water-saving habits, dispel myths about water abundance

due to rainfall, and enhance consumer education on using water and energy-efficient appliances.

- **Scottish Government should fund partnerships between Scottish Water and advice agencies** to deliver integrated guidance that helps households improve water and energy efficiency through a whole-home approach.
- **The Scottish Government should explore how to maximise the impact of the upcoming UK-wide water efficiency labelling** by ensuring labels are clear, accessible, and help consumers make informed, sustainable choices.
- **The Scottish Government should explore raising the priority of water efficiency in housing** by reviewing building standards and legislation to require minimum standards for installing and retrofitting water-efficient appliances.
- **Scottish Water should maintain its role as a credible 'messenger' in water conservation** by upholding ethical standards, continuing public education on water use, and investing in leak reduction, especially in areas at risk from water shortages or population growth. [75]

The Scottish Government's 2024 Water, Wastewater and Drainage consultation outlines several practical and policy-based measures to help reduce water consumption in Scotland. These include:

- **Behavioural change:** such as encouraging shorter showers, using watering cans instead of garden hoses, installing water butts to collect rainwater, avoiding unnecessary water use such as running taps while brushing teeth.
- **Efficient appliances and fixtures:** encouraging the use of water-efficient appliances such as dishwashers, washing machines, low-flow toilets etc.
- **Water-efficient building design:** Designing and constructing new homes and communities with built-in water efficiency features and incorporating sustainable water systems in urban planning.
- **Public awareness and monitoring:** providing households with information on their water usage to raise awareness and encourage conservation. Educating the public on how to reduce water use.
- **Emergency planning:** pre-consulted emergency plans during critical periods (e.g. hosepipe bans) that can be implemented quickly during droughts, avoiding current 21-day consultation delay.
- **Policy and incentives:** incentivising water-saving behaviours among households and businesses such as pricing structures or rebates that reward lower water usage or penalise excessive consumption.

Scottish Water encourages water saving measures through its 'Water is Always Worth Saving' campaign which provides advice to consumers on how to reduce water consumption. Scottish Water's long-term strategy also sets out how it is deploying smart meters to monitor water usage for domestic and business customers. This includes:

- **A three-year Domestic Smart Monitoring trial** in north-west Dundee to help households track and reduce their water usage through smart meters. The project will

install around 1,500 monitors, provide daily usage data to residents, and gather feedback to shape future water efficiency efforts across Scotland. [77]

- **A smart metering pilot for 3,000 business customers** in Inverness and Orkney, enabling near real-time water usage tracking, billing, and early leak detection. The pilot demonstrated the potential to reduce water demand by 80 million litres per day, as shown when one smart meter helped detect and fix a major leak, saving over a million litres of water and £1,000 in charges. [24]

Scottish Water's long-term strategy also identifies the following long-term outcomes to reduce water consumption:

- **Reduce the amount of water lost through leakage** by 20% to 380 million litres per day, focusing on the areas where it benefits people and the environment the most.
- **Improve the resilience of treatment works and pipes**, and improve planned maintenance and operational response to reduce the amount of water which is lost and the impact on the environment in the event of a burst.
- **Accelerate the replacement of water mains pipes** that are more likely to burst due to their material.
- **Reduce the amount of water abstracted and treated** every day by 240 million litres.
- **Consider localised solutions to reduce demand** and maximise the water available from existing sources in areas at risk of water scarcity, before developing new sources.
- **Improve connectivity of existing systems** to increase flexibility to move water around and improve resilience in times of drought, particularly in Edinburgh, Fife and Dundee. [24]

6.2.2 Hosepipe bans and other emergency measures

In severe cases of water scarcity, Scottish Water may propose to Ministers that they make a water shortage supply Order (under Part 7 of the Water Resources (Scotland) Act 2013) if Scottish Water believes that there is either a “serious”, or a “threat of a serious” deficiency of water supplies in an area.

These Orders permit Scottish Water to carry out various actions such as to gain access to land to abstract from an alternative source or to impose water saving measures on organisations or individuals if deemed necessary, including hosepipe bans.

To begin the process, Scottish Water must publish a public notice of a proposal, after which, there is a period of 14 days when representations can be made about the proposal. Scottish Ministers are then required to consider any representations and advice received from SEPA before making their decision to make an order. If Scottish Ministers decide to go ahead, the order comes into effect three days after notice of the order has been published.

These powers have never been used, so it is not clear how long the process would take in practice.

Scottish Government officials have informed SPICe that the whole process could take more than a month when considering the time required to review any public representations, advice from SEPA, and the preparation of advice to Ministers.

The process for introducing hosepipe bans and other emergency measures is different in England and Wales (see **Box 4 below**).

Box 4: Procedure for introducing hosepipe bans in England and Wales

Water companies in England and Wales have the power to impose hosepipe bans and can do so more quickly than in Scotland.

Section 76 of the Water Industry Act 1991, provides powers to water companies in England and Wales to ban the use of hosepipes (known as 'Temporary Use Bans' or TUBs) for a variety of uses if it thinks that it is experiencing, or may experience, a serious shortage of water. TUBs can also provide exceptions for specific uses or persons (e.g. people with a disability).

A hosepipe ban can take immediate effect as soon as the water company has given notice in at least two newspapers circulating in the area and on its website. There is a requirement for the notice to provide details on how to make a representation.

Water companies are required to set out how they will implement hosepipe bans in drought plans which are published every five years and subject to public consultation. Hosepipe bans are enforceable by the water companies and can lead to a fine of up to £1,000.

If dry conditions continue, water companies can impose more serious interventions using a non-essential use ban (NEUB). NEUBs specifically target businesses and bans activities such as watering outdoor plants, filling or maintaining non-domestic swimming pools and cleaning windows and vehicles. [78]

During conditions of significant water scarcity, SEPA may also use emergency provisions to introduce temporary suspensions of water abstractions to protect the water environment. This applies to water abstraction licenses holders under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) until 1 November 2025 and from that point will be governed under the Environmental Authorisations (Scotland) Amendment Regulations 2018 (as amended) or 'EASR' which have equivalent provisions (see **Section 4.3.4**).

As with CAR (Regulation 18 of the 2011 regulations), the EASR regime also provides for "accelerated applications" in emergency situations, which could be used to authorise temporary abstractions from alternative sources. These actions would typically apply to agriculture and other industry businesses which rely on water abstractions as part of their operations. The powers may also be used to enable Scottish Water to maintain or supplement public water supplies as required in drought contingency plans. [73]

These powers may only be used in emergency situations as defined under the Civil Contingencies Act 2004 which includes any event or situation that threatens serious damage to human welfare or the environment. The Scottish Government has stated that "action is most likely to be needed when water shortage has become widespread and

severe and key water supplies have to be protected". [79]

During periods of water scarcity when private water supplies run dry, local authorities can request Scottish Water to provide assistance through provision of bottled water to domestic private water supply users. Under the Water (Scotland) Act 1980 (S. 76D), local authorities are responsible for any charges payable to Scottish Water which may be recovered from the household owner.

However, in practice, the Scottish Government has funded an Emergency Bottled Water Scheme in collaboration with Scottish Water and local authorities. The amount of water provided is considered a temporary solution until owners can find an alternative supply.

6.3 Sewage pollution

Across the UK pollution of water courses from sewage is a topic of increasing public concern. Since the COVID-19 pandemic, outdoor or 'wild' swimming has increased in popularity, with an increase of up to three times the number of people estimated to be taking part in the activity between 2019 and 2021. [80] This has raised awareness and public expectation over the quality of inland and coastal waters.

This section explores current sewage pollution issues. The regulation for controlling pollution from wastewater treatment systems is covered in **Sections 4.3.4** and **5.2.2.**

6.3.1 Impact on water bodies

Assessment and monitoring of the condition of water bodies is key to understanding if sewage pollution is contributing to poor water quality and risk to human health and the water environment.

The Water Framework Directive established a range of water designations for assessing and monitoring water quality to protect water bodies from pollution sources, including sewage discharges. SEPA is the responsible authority for much of this monitoring and assessment. Progress in relation to these designations is summarised below.

- **River Basin Management Planning:** SEPA considers that the wastewater measure in the third River Basin Management Plan (RBMP3) is broadly on track. [81] RBMP3, published in 2021, reports 48 water bodies at less than good status due to the impact from wastewater (or sewage) discharges. This accounts for 1.3% of total number of downgraded water bodies in Scotland (i.e. water bodies at less than good status). Forty-two of these required action and SEPA will report on the progress of those actions in the draft fourth River Basin Management Plan in 2026.

- **Shellfish Water Protected Areas classification (SWPAs):** SWPFAs are designated to safeguard waters for the growth and production of shellfish by reducing pollution from sources including sewage discharges, ultimately ensuring the safety and quality of shellfish for human consumption. The Water Environment (Shellfish Water Protected Areas: Designation) (Scotland) Order 2013 identifies 84 coastal SWPAs in Scotland. SEPA is the responsible authority for assessing and classifying each shellfish protected area. According to the latest SWPAs classification, there are currently no SWPAs at insufficient status and therefore no sewage pressures or

measures have been identified for SWPAs. As outlined in the RBMP3, SEPA are also continuing to investigate and address pressures which may be contributing to priority production areas failing to achieve a consistent Food Standards Scotland (FSS) “A” classification. According to SEPA, there is insufficient evidence at this stage to report on the significance of sewage pressures in these catchments. [81]

- **Designated Bathing Waters:** There are 86 designated bathing waters in Scotland as classified under the Bathing Waters (Scotland) Regulations 2008. Each of Scotland's designated bathing waters has a bathing water profile, which is intended to provide useful information to the public. SEPA monitors Scotland's designated bathing waters throughout the bathing water season from 1 June to 15 September and the results are made available at the beaches and online. Bathing Waters can be impacted by a range of catchment derived pressures (such as livestock, or wild fowl), including sewage. Where sewage is determined to be a significant contributory factor to a Bathing Water being at less than sufficient status, investment is required to mitigate that impact, using the RBMP process described above. In 2025, Scotland achieved the highest ever number of bathing waters rated “Excellent” for water quality; 50 compared with 17 a decade ago, with 97% of sites now achieving sufficient or better quality. This process has ensured Scottish Water investment has been targeted at areas where it will have the greatest impact. Improvements in water quality have been achieved at locations that had long-term issues, such as Irvine and Ayr, following projects to upgrade sewage systems, install new treatment and investigate mis-connections (i.e. where domestic sewage has been incorrectly connected to surface water drainage systems). [81]

6.3.2 Sewage overflows

The majority of Scottish Water's sewer infrastructure is combined sewers. [22] These combine wastewater from homes and businesses with surface water that has drained from impermeable surfaces such as roofs, gutters, roads and paved areas.

The total amount of water reaching the wastewater treatment works is therefore greater than that produced by homes and businesses alone. When periods of heavy rainfall occur, more water can enter combined sewers than they have capacity for.

To mitigate the risk of sewer flooding in homes and businesses, overflows in the sewer network and at the treatment plants are engineered into the system. However, the release of untreated sewage into the natural environment can have a negative impact on the local environment as well as cause risks to public health. [82]

There are considered to be three main types of overflows in Scotland, which can be defined as:

- **Combined sewage overflows (CSOs)**: discharge directly from combined sewers to surface waters. Can be located along the sewer network, pumping stations, or on an inlet to a wastewater treatment works. CSOs are designed to operate intermittently and only in response to rainfall events. Less than 1% of the effluent from CSOs is from toilets and if functioning correctly, the level of dilution with rainwater should not cause environmental harm. The vast majority of CSO wastewater is 'greywater' from sinks, showers, baths, washing machines or dishwashers and other appliances

in homes and businesses. [83] However, greywater will often be contaminated with human intestinal bacteria and viruses as well as organic debris such as skin particles and hair. Greywater will also contain residues of soaps, detergents and other cosmetic products that often contain nutrients that help bacteria develop. [84]

- **Settled storm sewage overflows (SSSOs):** Apply a settled level of treatment to wastewater in either storm tanks or primary tanks before it is discharges. They can be located either along the sewer network or at the sewage treatment works. SSSOs are designed to operate intermittently and only in response to rainfall events.
- **Emergency overflows (EOs):** are not designed to operate in the case of heavy rainfall and are instead designed to operate in the case of mechanical and/or electrical failure of pumps, screens, flow control devices or blockages in the downstream sewer. Any spill should be infrequent and would be considered an environmental pollution incident that requires reporting.

SEPA's guidance (WAT-RM-07) on sewer overflows states that licences should define:

- The acceptable spill setting which determines the storm water storage capacity and size of the downstream sewer.
- The level of treatment required which determines the level of screening, storage etc. to be provided prior to discharge.
- The requirements for recording of intermittent discharge events and in-sewer flow monitoring.
- The descriptive conditions which cover environmental standards such as "deposition of solids".

The overall duty to monitor and enforce the CAR regime, including monitoring compliance with any conditions of an authorisation granted, falls on SEPA (which is also the case for the new EASR framework). SEPA has issued civil penalities for breaches in CAR licence conditions. For example, in December 2025, SEPA issued a £6,000 civil penalty to Scottish Water for breach of a CAR licence for discharging untreated sewage into a river in Dunfermline. SEPA investigated following a report from a member of the public in July 2022. [85]

Environmental Standards Scotland 2024 report on impacts of storm overflows

In September 2024, Environmental Standards Scotland (ESS) published a report on the impacts of storm overflows on the water environment and the effectiveness of legislation and policy. [22] The report explains some of the challenges associated with sewage overflows:

> “ Storm overflows are intended to spill by design. Scottish Water notes that an increasing number spill with a high frequency including a number that spill more than once per day on average. This can be due to hydraulic overloading from increased flows since the sewer was originally designed (e.g. climate change, network issues such as siltation and infiltration, housing/business growth or paving over of permeable areas) and blockages caused by unflushable items that the public put into sewers and the deterioration and collapse of sewers. Climate change is also expected to contribute to more frequent and/or higher volume discharges in the future due to projected increased frequency of intense, heavy rainfall.”
>
> Environmental Standards Scotland, 2024[22]

Key findings from ESS's report include:

- Scottish Water and SEPA have identified 12 storm overflows which are at risk of operating in dry weather.
- ESS's analysis suggests that this is an underestimate.
- ESS's analysis of the frequency and duration of spills combined with rainfall data indicates that there are “likely to be other overflows which operate in dry conditions”.
- ESS's report gave one specific example of a CSO at the Ardnadam sewage pumping station in Dunoon which:
  - Spilled 207 times in 2023, for a total duration of 187 days over 277 individual days.
  - 31 of these CSO spills occurred on days where that day and the previous day were dry (i.e. had less than 0.25 mm of rain) in the five-kilometre locality of the overflow.
  - Although there is no data on compliance for 2023, the CSO was part of a licence which received an excellent compliance assessment in 2019.

The report outlines eight key findings and makes six recommendations to the Scottish Government, SEPA and Scottish Water. [22]

One recommendation was for SEPA, along with the Scottish Government and Scottish Water to make data in relation to wastewater spills, compliance with licences and environmental pollution incidents available to the public.

The intention is to provide a comprehensive and accessible picture of the scale of spills from CSOs. This was to address public concern regarding the limited monitoring of sewer overflows and their impact on the Scottish water environment. [86]

The Scottish Government and Scottish Water have responded to the ESS report. [87, 88] The Scottish Government accepted ESS's recommendation to review the existing guidance on the definition of exceptional circumstances in which it is permissible for storm overflows to spill. Scottish Water also committed to improving the monitoring of storm overflows and improving the availability of data on storm overflows.

Scottish Water action on overflows

Scottish Water's 'Improving Urban Water Routemap' published in 2021, outlines an additional £500m investment in response to concerns over limited monitoring of overflows and the impact on the environment. [89] Scottish Water is currently running a programme to install new Event Duration Monitors (EDMs) on overflows across Scotland, and has recently launched an interactive online map that provides near real time data on Scottish Water monitored sewage overflows.

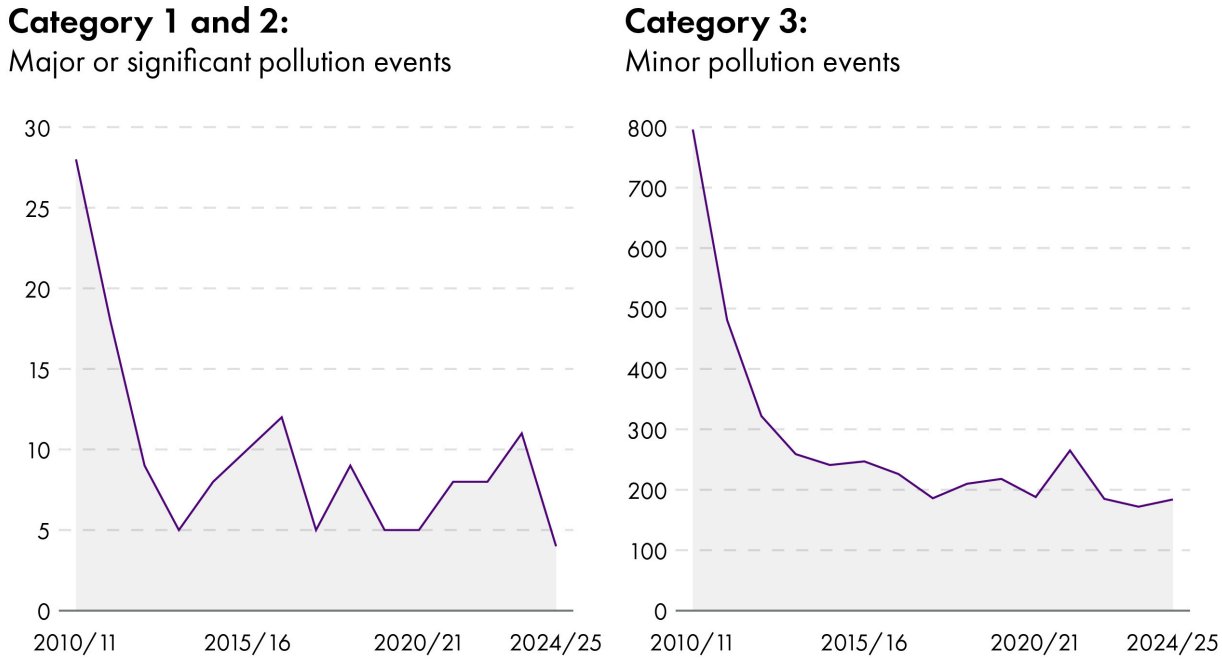
Scottish Water has installed 1,000 new EDMs in 2024 and has committed to installing 700 more in 2025. After completion of these installations, 48% of overflows in Scotland will be monitored. This can be compared with 100% in England and 99.5% in Wales. [90]

Scottish Water provides annual figures on Environmental Pollution Incidents (EPIs) from its assets in its annual reports. In relation to sewage discharge, an EPI is an unlicensed or non-compliant discharge from the waste water network into the water environment.

In 2024/25 there were four Category 1 (major) and Category 2 (significant) and 184 Category 3 (minor) EPIs associated with wastewater treatment. Trends in EPIs between 2010/11 and 2024/25 are shown in **Figure 17** below.

The charts show that there was a significant improvement in reducing pollution incidents after 2010/11 with a broadly stable trend since. There has been greater variability in Category 1 and 2 (major or significant) incidents compared to Category 3 (minor) incidents.

Figure 17: Environmental Pollution Incidents associated with wastewater treatment 2010/11 to 2024/25.



Source: SPICe, data from Scottish Water

6.3.3 Sewer flooding

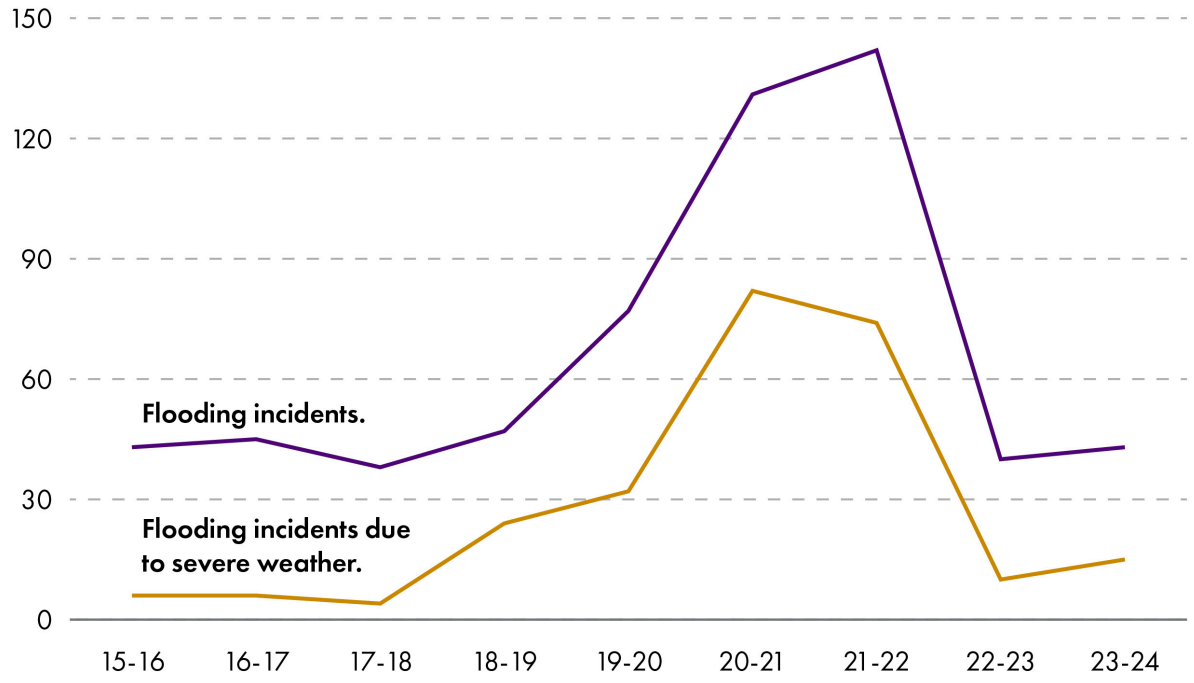
Sewer flooding can be caused when a drain or sewer becomes full due to heavy rainfall and overflows either inside a property or outside in the garden, street or other public areas. Drains and sewers can also become full when something blocks them and they become choked. [91]

Scottish Water's Climate Change adaptation plan states that 2,300 properties are currently at risk of sewer flooding across Scotland and that without adaptation measures, this is projected to increase by 60 per cent (around 4,800 properties) by 2050. [23]

Scottish Water reports on the number of properties impacted by sewer flooding in its annual report and accounts. In 2023/24, there were 43 incidents of sewer flooding. Trends in sewer flooding are shown in **Figure 18** below.

The chart shows a broadly similar trend in the total number of sewer flooding incidents and those attributed to severe weather. The number of incidents rose between 2017/18 peaking in 2020/21 and 2021/22 before decreasing sharply in 2022/23.

Figure 18: Incidents of sewer flooding 2015/16 to 2023/24



Source: Scottish Water

Scottish Water's sewer flooding guide identifies two types of sewer flooding:

- **Internal:** Where wastewater has entered a property.
- **External:** Where wastewater has flooded a garden (within a property boundary) or roads or paths but not entered a property.

Scottish Water's guidance on sewer flooding explains that responsibility for sewer flooding depends on where the flooding has occurred. If the issue is with the private pipework, usually within the boundary of the property, the property owner is responsible. The

property owners building insurance policy will normally cover the costs of damage and repairs depending on their insurance cover.

If the flooding occurs due to issues with the public network beyond the property boundary then Scottish Water is responsible. Scottish Water notes that it is only liable where it is proven to have acted negligently and may not be liable for damage from sewer flooding caused by blockages from inappropriate items being flushed down the toilet or fat, oil and grease being put down the kitchen sink.

Scottish Water may provide a payment equal to the property owner's annual wastewater charge or reimburse insurance excess if internal flooding of the property is caused by wastewater from Scottish Water's sewers but:

- is not due to general surface water flooding of the area
- a defect in the property owners private drains or a result of the property owners actions. [92]

Scottish Water's long-term strategy sets a long-term outcome to have "no customers experiencing repeat sewer flooding in their homes by 2050". It also identifies the need for improved management of rainwater drainage which will require "partnership working between Scottish Water, local authorities, roads authorities and SEPA to develop integrated approaches". [23] , [24]

Qualitative research by Consumer Scotland has found that consumers recognise the need for individual behaviour change to reduce sewer system strain, highlighting the role of consumer habits, misinformation, and lack of awareness in contributing to sewer blockages and pollution. It identified consumer support for solutions such as:

- **Raising public awareness** about the impact of disposing of inappropriate items down sinks and toilets.
- **Introducing public disposal points for fats, oils, and grease**, similar to bottle banks.

Consumer Scotland further recommends actions including:

- **Improving product labelling** to reduce confusion around terms like “biodegradable” and “flushable.”
- **Supporting behaviour change campaigns** such as Scottish Water's “Nature Calls" campaign.
- **Implementing legislation banning wet wipes** containing plastic.
- **Encouraging collaboration among policymakers, industry, and consumer bodies** to develop universal standards and promote eco-friendly alternatives. [93]

In 2023, Scottish Water launched it's 'Nature Calls' Campaign to raise awareness among its customers about sewer blockages caused by wet wipes and other items that should not be flushed. Common items which cause sewer blockages include:

- wipes

- nappies
- plasters / bandages
- cotton buds / cotton pads
- contact lenses
- period products
- condoms.

The Scottish Government has committed to banning wet wipes containing plastic and is working towards a UK-wide approach to implement this. [94]

6.3.4 Historic and untreated sewage outfalls

Historic untreated discharges can also be found across Scotland. This is where, due to the remote nature of properties, they have not been connected to the public sewerage network or had private sewage treatment systems installed. In these properties, raw sewage is directly discharged to the water environment

Untreated sewage discharges are primarily from single houses or small developments and largely discharge directly to coastal/transitional waters. Some village settlements with no mains sewerage have a mix of septic tank and untreated outfalls. [95]

SEPA considers that untreated sewage discharges are unacceptable, mainly due to the discharge of sewage solids, including plastic items and will not authorise new untreated discharges. [96] However, SEPA acknowledges that resolving issues with untreated discharges can be challenging as it can be prohibitively expensive or technically difficult for some individuals to connect to public infrastructure or upgrade private systems.

Some of these discharges may be localised, with low-scale impact on the water environment. However, even small discharges can impact communities' enjoyment of coastal environments.

Additionally, SEPA has informed SPICe that it is aware of at least 12 Scottish Water discharges of untreated sewage from communities that are each over 1000 population equivalent (pe)[i]. [81] This equates to a total of ~46,000pe. SEPA states that this level of treatment is not appropriate and it will seek investment by Scottish Water to upgrade these discharges at the earliest opportunity.

SEPA is normally made aware of untreated sewage discharges during complaints or house sales. It is at this time that improvements are sought. Upgrades or registration of untreated sewage discharges are reliant on due diligence during house sales.

During the conveyancing process, a contract is formed between the buyer and seller of property called the ‘missives.’ In drafting the missives, most Scottish solicitors use the Scottish Standard Clauses, but solicitors can amend or remove certain clauses by mutual

i Population Equivalent or 'PE' is a standardised unit measure of the maximum organic load a sewage treatment plant can process, expressed in terms of a fixed population's contribution to sewage.

agreement between buyer and seller.

If clause 11.4 of the Scottish Standard Clauses is included unaltered in the missives, the seller must provide proof that any private sewerage system is registered or licensed with SEPA or another appropriate authority. If such consent is missing, the seller would typically be expected to obtain registration and/or seek retrospective consent. [97]

A petition lodged in the Scottish Parliament in November 2022 called on the Scottish Parliament to urge the Scottish Government to review the process for allowing raw sewage discharge from homes into Scottish coastal waters. [98]

On 4 June 2025, the Citizen Participation and Public Petitions Committee agreed to close the petition in recognition of SEPA's view- supported by the Scottish Government - that the time spent handling queries and investigations into untreated discharges is disproportionate to the low risk of harm that the issue presents to the water environment. [99]

6.4 Emerging pollution risks: forever chemicals, microplastics and more

Emerging contaminants are a diverse group of pollutants increasingly present in the environment including:

- **Pharmaceuticals** (prescription and over-the-counter drugs).
- **Personal care products** (fragrances, lotions, and cosmetics).
- **Per-and polyfluoroalkyl substances (PFAS)** - also known as 'forever chemicals'.
- **Endocrine disruptors** - chemicals that interfere with the hormone systems of certain species (e.g. aquatic animals).
- **Microplastics**. [100]

There is a growing body of research that identifies emerging contaminants as posing risks to the environment and human health:

- **Environmental impacts** include harm to wildlife (reproductivity, survival), water contamination, toxicity and mortality, ecosystem imbalance (algal blooms, oxygen depletion, biodiversity decline), microplastic pollution.
- **Human health impacts** include hormonal disruption, neurological damage (diseases such as Alzheimer's), cancer risk, immune system impacts, heart and metabolic disease, respiratory problems. [100]

PFAS is a class of synthetic chemicals which have been produced since the 1940s and have been linked to detrimental impacts on childhood development, cancers and immune system disorders. [101] Endocrine-disrupting chemicals have also been linked to cancer, reduced fertility and obesity.

A new standard for PFAS was introduced for Scottish drinking water in January 2023 due to increasing awareness of the potential occurrence of 'emerging contaminants' in the environment, and the Scottish Government's commitment to keep pace with EU law. [101] . Drinking water providers must ensure that the standards for PFAS are adhered to and have established a monitoring protocol. [101]

In October 2024, Environmental Standards Scotland published a scoping report on the risks to Scotland's soils. [102] The report noted a lack of primary research studies which assess the risk of contamination associated with sewage sludge spreading in Scotland. Sewage sludge is a residue left after wastewater treatment which is used to fertilise agricultural land.

The report also identified a lack of research and monitoring of persistent organic pollutants (such as PFAS) associated with sewage sludge. ESS recommended that the Scottish Government, in association with the wider public sector, commission research to address identified gaps in the evidence base.

Other manufacturing and industrial sectors have a role to play in managing the risk of emerging contaminants and pollutants which may cause harm if they enter the water environment. These risks may be managed under other regulatory regimes - notably in relation to chemicals regulation, but also under waste and circular economy policy frameworks. For example:

- **UK REACH :** a regulatory regime that applies to the majority of chemical substances that are manufactured in or imported into Great Britain (GB) (England, Scotland, Wales). REACH stands for 'registration, evaluation, authorisation and restriction of chemicals'. In the UK, the Competent Authority is the Health and Safety Executive, working with the Environment Agency and other government departments (including SEPA and Scottish local authorities for devolved and enforcement aspects).

- **Extended Producer Responsibility (EPR) regulations:** are regulations which seek to ensure that producers bear responsibility for the environmental impacts of products they place on the market, and are incentivised to reduce these impacts along the entire lifecycle, including at the post-consumer stage. [103] , [104] The recast EU Waste Water Treatment Directive requires Member States to introduce EPR for pharmaceutical and cosmetic companies with obligations to cover the cost of advanced wastewater treatment to remove micropollutants from their products that end up in wastewater (see **Section 6.5** below). [105] There are currently no UK EPR regulations for chemicals. UK-wide producer responsibility schemes are currently in place for packaging waste, Waste Electrical and Electronic Equipment (WEEE) and End of Life Vehicles.

- **Persistent Organic Pollutants (POPs):** POPs are toxic chemicals that resist degradation, accumulate in living organisms, travel long distances in the environment, and pose serious risks to human health and ecosystems. The UK is a party to the Stockholm Convention, and is required to ban or restrict the production and use, and import and export, of POPs. The Convention also requires stockpiles containing POPs to be identified and managed, and waste containing POPs to be disposed of so that the POPs are destroyed or irreversibly transformed. [106]

As new pollutants emerge, aligning with evolving EU standards may offer a pathway to strengthen environmental protections and public health safeguards. However, this

presents regulatory and investment challenges.

6.5 Keeping pace with EU law

Following the UK's departure from the EU there is no longer a requirement to continue to comply with EU law. However, Scottish Ministers outlined their desire to keep pace with EU legislation where appropriate.

Part 1 (section 1(1)) of the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021 confers a power on Scottish Ministers to allow them to make regulations (secondary legislation) with the effect of continuing to keep Scots law aligned with EU law in some areas of devolved policy. This is known as the 'keeping pace' power. This power is time limited and due to expire in 2027. [107] As water and the environment are largely devolved areas, the 'keeping pace' power can be applied to legal developments in the water sector.

The EU has revised ('recast') some of its key legal instruments concerning the management of water and wastewater since the UK left the EU. These are summarised below:

- **The recast Drinking Water Directive (adopted December 2020, entered into force January 2021):** The recast Directive is the EU's main law on drinking water and concerns access to and quality of drinking water for human consumption. Key features of the recast Directive are:
    - Reinforced water quality standards.
    - Tackling emerging pollutants such as endocrine disruptors, PFAS and microplastics.
    - A preventive approach favouring actions to reduce pollution at source by introducing the risk-based approach to catchment management, supply chains and domestic water distribution systems.
    - Ensuring better access to water, particularly for vulnerable and marginalised groups.
    - Promotion of use of tap water in public spaces to reduce plastic bottle consumption.
    - Measures to reduce water leakages and increase transparency of the sector. [108]
- **The recast Urban Wastewater Treatment Directive (adopted November 2024, entered into force January 2025)**: the Directive aims to protect the quality of Europe's water and drive innovation. Key requirements include:
    - Collect and treat wastewater in all urban areas of more than 1,000 inhabitants.
    - Measures to reduce the pollution from storm water overflows and pollution coming from separately collected urban runoff.
    - Removal of more nutrients that otherwise cause harmful eutrophication with

tertiary treatment (phased implementation with deadlines to 2045).

- Remove micropollutants with quaternary treatment, financed through extended producer responsibility by the sectors responsible for the pollution.
- Make treatment plants energy-neutral and reduce their greenhouse gas emissions by 2045.
- Monitor wastewater for health parameters such as SARS-Covid and antimicrobial resistance.

In October 2022, Scottish Ministers used the keeping pace power to align with some, but not all of the requirements of the EU's recast Drinking Water Directive through the Public Water Supplies (Scotland) Amendment Regulations 2022 which amend the Public Water Supplies (Scotland) Regulations 2014.

The Scottish Government has set out its intention to review its approach to further alignment with the recast Drinking Water Directive and Urban Wastewater Treatment Directive. [109] Some aspects of the recast EU Directives such as the use of extended producer responsibility to remove micropollutants such as pharmaceutical products may require a UK-wide approach in practice. This may be desirable to limit complexity for industry compliance, a complex intersection of devolved and reserved powers, or due to market access principles established by the UK Internal Market Act 2020.

However, it is possible for Scotland to lead innovation in exploring solutions and alternatives to more harmful pharmaceuticals. An example is the 'One Health Breakthrough Partnership' led by NHS Highland in partnership with regional and national stakeholders across the water, environment, and healthcare sectors to address pharmaceutical pollution. This work aims to "develop sustainable 'up-stream' solutions to minimise pharmaceuticals entering wastewater and surface water" to reduce the environmental impact of healthcare practices. [110]

Annex A: Key legislation

The legal framework for Scotland's water sector is composed of several UK and Scottish Acts which establish powers and duties of the Scottish Ministers and public bodies and regulatory authorities. Ministers and regulatory authorities exercise powers set out in the Acts through a range of Regulations and Order making powers. Key primary legislation and regulations are listed in chronological order in the table below.

Legislation	Summary
The Sewerage (Scotland) Act 1968	Defines powers and duties associated with sewerage, surface water and trade effluent in Scotland. Has been extensively amended since introduction.
The Water (Scotland) Act 1980	Defines most of the powers and duties associated with supplying drinking water in Scotland. Has been heavily amended since introduction.
The Urban Waste Water Treatment (Scotland) Regulations 1994	Provides requirements for how wastewater is collected and treated.
Water Industry (Scotland) Act 2002	Defines the structure of the Scottish water industry following the merging of the three previously existing authorities. Set up Scottish Water, the Drinking Water Quality Regulator (DWQR) and the Customer Consultation Panels.
Water Environment and Water Services (Scotland) Act 2003	Makes provision for protection of the water environment and amends the Sewerage (Scotland) Act 1968 and the Water (Scotland) Act 1980 in relation to the provision of water and sewerage services. Introduced the regulation of controlled activities to protect the water environment (see **Sections** 4.3.4 and 5.2.2) and amended the 1968 Act to include Sustainable Urban Drainage Systems (see **Section 6.1.1**).
The Water Services etc.(Scotland) Act 2005	Introduced the concept of the regulatory period, made modifications to the Water Industry Commission for Scotland (WICS) with the aim of improving economic regulation. Improved customer representation and retail competition for non-domestic customers.
The Private Water Supplies (Scotland) Regulations 2006	The main regulations for governing the quality of water supplied by private supplies. Specify the standards of drinking water quality to be met by private water supplies.
The Private Water Supplies (Grants) (Scotland) Regulations 2006	Provides powers and duties on Scottish Ministers and local authorities to provide grants to eligible persons to improve their private water supply or to provide themselves with a private water supply.
Water Environment (Controlled Activities) (Scotland) Regulations 2011	Provide a regulatory framework for controlling activities which could have an adverse effect on Scotland's water environment.
The Pollution Prevention and Control (Scotland) Regulations 2012	Apply an integrated environmental approach to the regulation of certain industrial activities to control pollution to air, water (including discharges to sewer) and land.
The Water Resources (Scotland) Act 2013	Makes it a statutory duty for Ministers to take reasonable steps as they consider appropriate for the purpose of ensuring the development of Scotland's water resources.
The Public Water Supplies (Scotland) Regulations 2014 (as amended)	Implement drinking water standards necessary to deliver the requirements of Council Directive 98/83/EC on the quality of water intended for human consumption (“the Drinking Water Directive”) with the aim to protect human health from the adverse effects of any contamination of water supplied by Scottish Water for human consumption.
The Provision of Water and Sewerage Services (Reasonable Cost) (Scotland) Regulations 2015	Set out the maximum that Scottish Water will pay to developers for extensions to connect to public water and sewerage infrastructure network.
The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017	Govern the quality of water supplies to private water supplies which are subject to the provisions of European Council Directive 98/83/EC.
The Environmental Authorisations (Scotland) Regulations 2018	Bring together all the permissioning arrangements for Scottish Environment Protection Agency's (SEPA's) four main regulatory regimes (water, waste, radioactive substances and Pollution Prevention and Control) into an integrated structure and under a single standardised procedure.
The Water and Sewerage Services to Dwellings (Collection of Unmetered Charges by Local Authority) (Scotland) Order 2020	Makes each local authority responsible for the collection of unmetered charges payable for water and sewerage services which are provided by Scottish Water. Also provides for charges based on council tax bands.
The Public Water Supplies (Scotland) Amendment Regulations	Amended the Public Water Supplies (Scotland) Regulations 2014 to take on the revised standards in the recast EU Drinking Water Directive.

Legislation	Summary
2022	
The Environmental Authorisations (Scotland) Amendment Regulations 2025	Amends the The Environmental Authorisations (Scotland) Regulations 2018 to extend the scope of regulatory regime for environmental authorisations from radioactive substances to to the regulation of water, waste, industrial and other emissions activities. Replaces the replace the existing separate regimes for the environmental regulation of those activities (see **Section 4.3.4**).

Annex B: SEPA Environmental Pollution Event Categories (Water)

Impact Categories	Category 1	Category 2	Category 3	Category 4
Length of Watercourse/ Area of Waterbody Impacted	**Major Pollution Event** • Environmental damage to ecosystem over a length greater than 1 km or an area greater than 1 km².	**Significant Pollution Event** • Environmental damage to ecosystem over a length less than 1 km or an area of less than 1 km².	**Minor Pollution Event** • Localised and limited environmental damage to ecosystem.	**Other Environmental Event** • All other Events which are likely to be seen by SEPA as Pollution Events
Environmental Impact	• Fish kill in excess of 100 and/or; • Contamination >10 x EQS[ii]	• Fish kill in excess of 10 -100 and/or; • Contamination >2 x EQS	• Fish kill less than 10 and/or; • Contamination >EQS	• Inability to locate or substantiate reported event and; • Minor impairment of STW process.
Amenity Impact	• Extensive visible pollution or littering of watercourse and/or; • Any loss or closure of a designated Bathing/Shellfish Water or Drinking Water source.	• Significant visible pollution or littering of watercourse and/ or; • Significant reduction in amenity value i.e. Urgent notification of downstream abstractors.	• Minor visible pollution or littering of watercourse and/or; • Reduction in amenity value i.e. Routine (non-urgent) notification of downstream abstractors.	• No visible evidence of pollution and; • No amenity impact.
Economic Impact	Extensive damage to and/ or closure of agricultural or other commercial activities.	Significant damage to agricultural or other commercial activities.	Agricultural or other commercial activities affected.	No damage to agricultural or other commercial activities.

ii The Water Framework Directive requires environmental quality standards (EQS) for polluting substances. If these standards are exceeded, they could result in adverse effects to ecosystems. Further detailed information on SEPA's EQS for surface waters is available in Supporting Guidance (WAT-SG-53) Environmental Quality Standards and Standards for Discharges to Surface Waters

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