Waste water treatment and industrial outfalls

Scottish Government
Riaghaltas na h-Alba
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Key message

All outfalls, waste water treatment and industrial effluent, are subject to strict environmental control and the volumes discharged are small compared with the receiving sea area. Improvements in data systems and reporting have increased the number of outfalls reported since the 2011 assessment. All Scottish Marine Regions have outfalls of one type or another.

Campbeltown waste water (secondary) treatment plant opened in 2012. © Scottish Water.

What, why and where?

Outfalls to the marine environment fall into three categories:

i. outfalls from waste water treatment (WWT) plants which process waste water from the mains sewerage system;
ii. industrial sites which take waste from manufacturing plants; and
iii. some private WWT systems such as septic tanks.

These categories of outfall also discharge to the riverine freshwater environment which eventually reach the sea. WWT is designed to process waste water whilst protecting the environment and maintaining public health.

All sewerage systems that also collect rainwater (combined sewers) need overflow outlets (combined sewer overflows) that deal with the extra water collected during some rainstorms. Without these safety valves there would be a flooding risk at both the sewerage works and in other properties. Sewage in these overflow discharges is diluted with significant amounts of rainwater.

The Urban Waste Water Treatment Directive 1991 sets out treatment levels for waste water, with discharges into sensitive areas subject to more stringent treatment. Scottish Water has objectives for improving the quality of wastewater treatment works discharges to ensure compliance with environmental directives.

Information on emissions is also reported to the Scottish Environment Protection Agency (SEPA) as a requirement of the Scottish Pollutant Release Inventory (SPRI).

There are more outfalls reported in 2018 than in 2011 (Baxter *et al*., 2011) for both WWT (826>384) and industrial sites (290 >112) (tables 1-3, Figures 1 and 2) due to improvements in data reporting.

Details of the chemicals monitored in the seas, which can be released from both waste water and industrial outfalls, are in the Clean and safe section.

For further information on this topic go to: https://marine.gov.scot/sma/assessment/waste-water-treatment-and-industrial-outfalls

Table 1: Number of outfalls per type of treatment for Waste Water Treatment (public and private combined) (2018). Source: SEPA.

Type of WWT outfall	Number of outfalls
Activities at Premises with Nuclear Authorisation under the Radioactive Substances Act 1993 Fees and Charging (Scotland) Scheme 2004	1
Mineral oil and gas refineries	6
Smaller discharges (<15,000 PE)	749
Thermal power stations and other combustion installations	1
WWT with capacity of greater than or equal to 100,000 PE - Secondary treatment	18
WWT with capacity of greater than or equal to 100,000 PE - Tertiary treatment	1
WWT with capacity of 15,000 to less than 100,000 PE - Secondary treatment	46
WWT with capacity of 15,000 to less than 100,000 PE - Tertiary treatment	4
Total	**826**

Note: In exceptional circumstances (i.e. large storms) Secondary or Tertiary treatment may be bypassed and untreated or only primary treated waste released.

Table 2: Number of industrial activities (small) and marine discharge outfalls (2018) by regulated activity. Source: SEPA.

Regulated activity	Number of outfalls
Abstraction Fish Production	4
Industrial or Commercial: Non-Evaporative Cooling	2
Other Effluent	71
Other Effluent Cooling Water	14
Other Effluent Dewatering of Dry Docks	4
Other Effluent Distilling Effluent	28
Other Effluent Food Processing	19
Other Effluent Landfill Leachate	7
Other Effluent Mine Water	1
Other Effluent Potable Water Treatment and Supply	3
Surface Water (Other) Commercial, Ind & Other	31
Surface Water (Other) Housing	2
Surface Water (Other) Motorways & Major Roads	3
Surface Water (Scottish Water) Commercial, Ind & Other	25
Total	**214**

Table 3: Number of industrial activities (large) and marine discharge outfalls (2018) by Pollutant Release and Transfer Register category. Source: SEPA.

Pollutant Release and Transfer Register category	Number of outfalls
Energy sector	26
Animal and vegetable products from the food and beverage sector	16
Waste and wastewater management	13
Other activities	12
Chemical industry	4
Paper and wood production and processing	2
Mineral industry	2
Intensive livestock production and aquaculture	1
Total	**76**

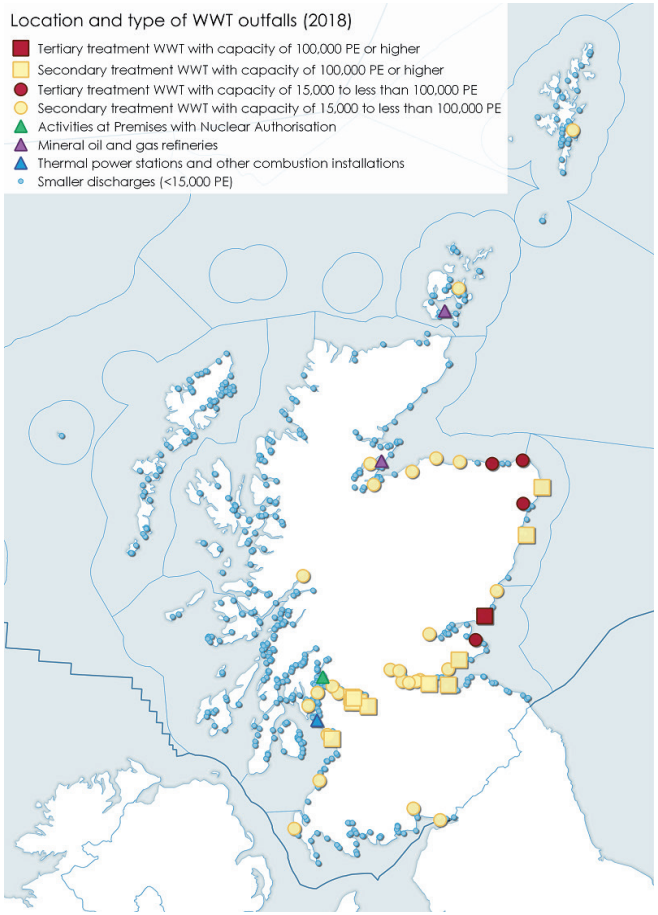


Figure 1:
Locations of Waste Water Treatment (WWT) outfalls (Table 1). Source: SEPA.

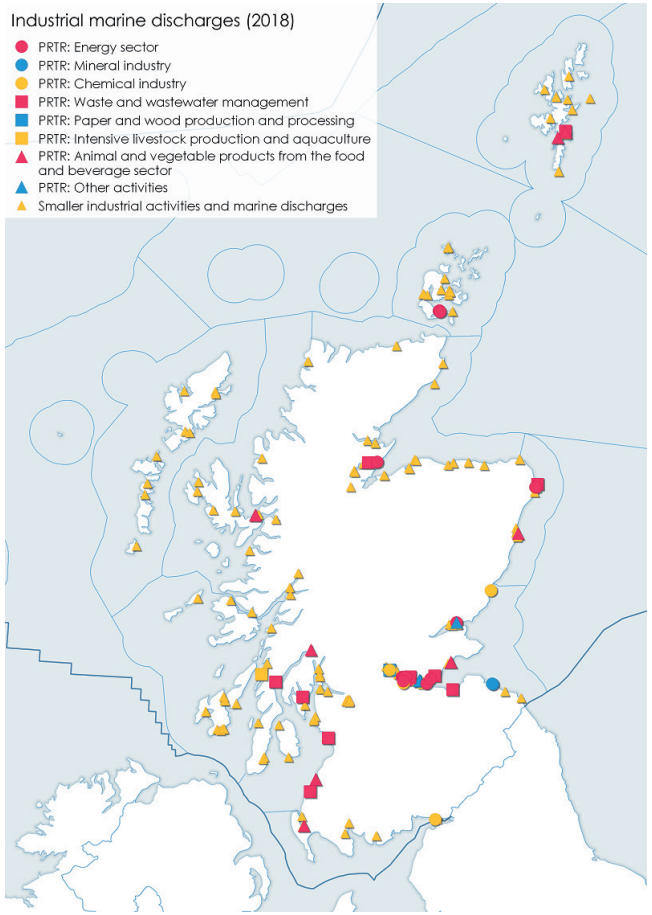


Figure 2:
Locations of industrial outfalls (Tables 2 & 3). Source: SEPA.

Contribution to the economy

In economic terms, waste water treatment and industrial outfalls do not generate economic value in their own right and their contribution, in terms of GVA or employment, is therefore not included in the Scottish Annual Business Survey. There is no direct information on employment in waste water treatment as Scottish Water, who run the vast majority of public waste water treatment works, only publish total employment numbers. At the end of March 2019 Scottish Water directly employed 4,276 people and a further 404 temporary agency workers.

In 2019 £7.1M of SEPA's income was generated by licences issued for disposal in coastal waters. This is across about 738 discharge licences to coastal and transitional waters. There may be multiple outfalls per license and some of the outfalls are not operational.

Table 4: SEPA income generated by coastal licences (2019).

	Total Charge	Number of discharge licences
Coastal waters	£5.9 million	694
Transitional waters	£1.2 million	44
Total	£7.1 million	738

Between 2010/11 and 2018/19, Scottish Water invested £197M in activity, including new and improved waste water treatment plants and collection systems, to comply with the Urban

Waste Water Treatment Directive requirement. During the same period a further £38M was invested in activity, including improved treatment facilities and collection systems to meet Bathing Waters Directive requirements.

Examples of socio-economic effects

- Allows industries to function by providing a service.
- Employment.
- Provides clean seas for other activities e.g. bathing, aquaculture, public health.
- Mitigates risk of flooding.
- Provision of infrastructure.
- Potential pollution especially if systems fail.
- Possible obstruction on seabed.
- Release of pathogens including some that can have adverse health consequences for marine wildlife and for human health.

Pressures on the environment

An OSPAR agreed list of marine pressures is used to help assessments of human activities in the marine environment. The marine pressure list has been adapted for use in Scotland via work on the Feature Activity Sensitivity Tool (FeAST). Waste water treatment and industrial outfall activities can be associated with 19 marine pressures – please read the pressure descriptions and benchmarks for further detail.

Forward look

Planning for the 2021-2027 period is underway with more investment needs being identified, which will lead to upgraded treatment works and improved overflows which will benefit coastal waters. There are also requirements in various directives, for example urban waste water treatment directive, bathing waters directive and shellfish directives, to ensure minimal impact and a sustainable co-existence with other existing marine activities such as aquaculture, fishing and bathing.

SEPA is currently preparing for the publication of the third River Basin Management Plans, due at the end of 2021, that will set out the aims and objectives to protect and improve the water environment from 2021 to 2027. Scottish Water is working with SEPA to plan and phase investments so that they can manage their resources to ensure they can fulfil their obligations by 2027.

Economic trend assessment

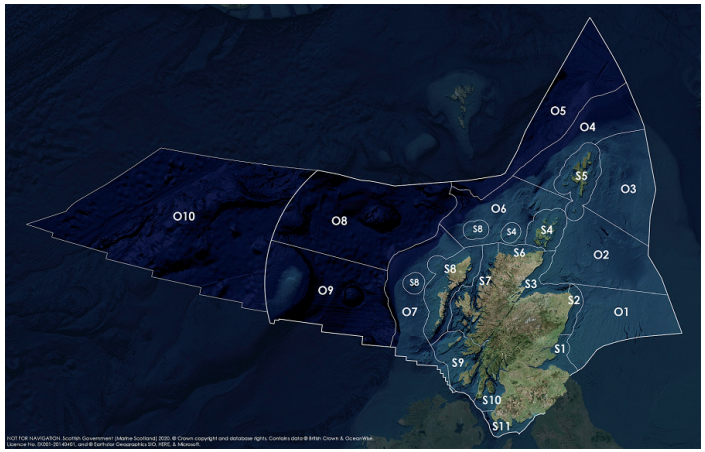
Trend assessments are not applicable to waste water treatment and industrial outfalls. While information on outfalls is available by type and location they do not generate economic value in their own right.

Status and trend assessment legend

Status assessment (for Clean and safe, Healthy and biologically diverse assessments)		Trend assessment (for Clean and safe, Healthy and biologically diverse and Productive assessments)	
	Many concerns		No / little change
	Some concerns		Increasing
	Few or no concerns		Decreasing
	Few or no concerns, but some local concerns		No trend discernible
	Few or no concerns, but many local concerns		All trends
	Some concerns, but many local concerns	**Confidence assessment**	
	Lack of evidence / robust assessment criteria	**Symbol**	**Confidence rating**
	Lack of regional evidence / robust assessment criteria, but no or few concerns for some local areas		Low
	Lack of regional evidence / robust assessment criteria, but some concerns for some local areas		Medium
	Lack of regional evidence / robust assessment criteria, but many concerns for some local areas		High

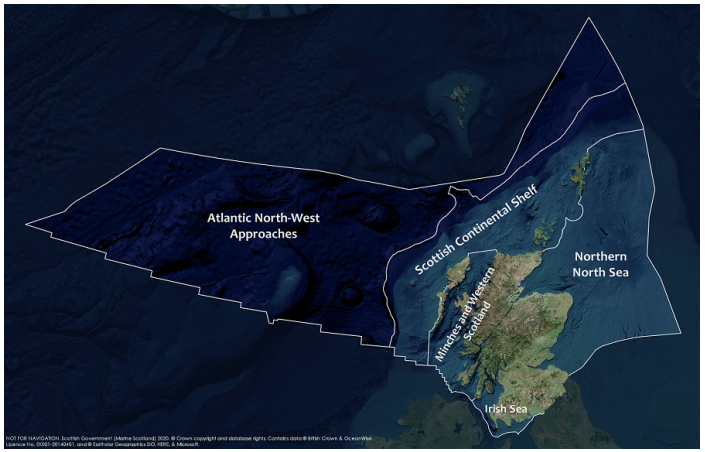
Overal confidence

Assessment regions

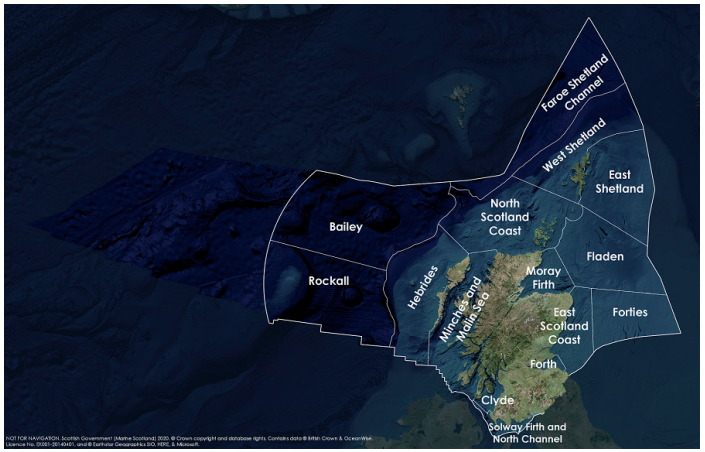


The Scottish Marine Regions (SMRs; S1 – S11) and the Scottish Offshore Marine Regions (OMRs, O1 – O10)

Key: S1, Forth and Tay; S2, North East; S3, Moray Firth; S4 Orkney Islands, S5, Shetland Isles; S6, North Coast; S7, West Highlands; S8, Outer Hebrides; S9, Argyll; S10, Clyde; S11, Solway; O1, Long Forties, O2, Fladen and Moray Firth Offshore; O3, East Shetland Shelf; O4, North and West Shetland Shelf; O5, Faroe-Shetland Channel; O6, North Scotland Shelf; O7, Hebrides Shelf; O8, Bailey; O9, Rockall; O10, Hatton.



Biogeographic, Charting Progress 2 (CP2) Regions. These have been used as the assessment areas for hazardous substances.



Scottish Sea Areas as used in Scotland's Marine Atlas 2011. These are sub divisions of the biogeographic, or Charting Progress 2 (CP2), Regions.

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NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba

JNCC
Joint Nature Conservation Committee

SEPA
Scottish Environment Protection Agency

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