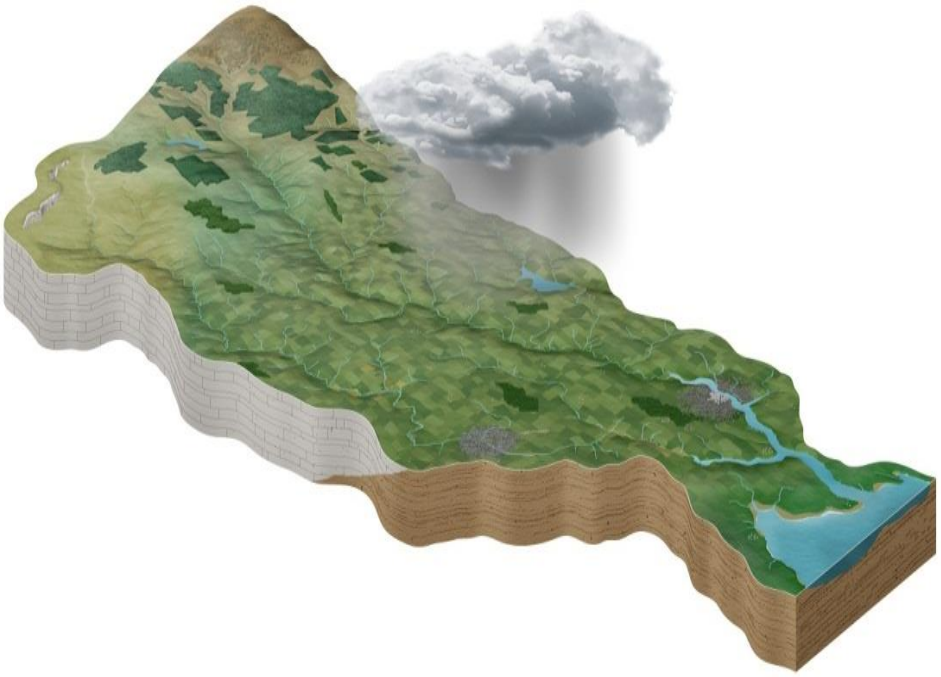
Report series:

Impacts of pressures on water quality

INDUSTRY



Catchment Science & Management Unit

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Preface

This document is part of a report series that summarises the evidence on each of the main significant pressures that impact on water quality. The series currently includes reports on the following key pressures:

- Agriculture
- Urban waste water
- Hydromorphology
- Forestry
- Domestic waste water
- Industry
- Drained peat

This report series is complemented by a sister series of 46 catchment reports which describe the water quality, risk, pressures and other relevant data for each waterbody in each catchment. All reports are available on www.catchments.ie.

An online interative mapping system, where the most up to date data can be viewed, is available at EPA Maps.

Data can be downloaded from the EPA geoportal site at https://gis.epa.ie/GetData.

Impacts of discharges from Industrial facilities on Water Quality

Industry pressures include large facilities licenced by the EPA under Integrated Pollution Control (IPC) and Industrial Emissions (IE) legislation, and smaller industries with Section 4 Discharge to Water licences issued by local authorities under the Local Government Water Pollution Act 1977. Water quality problems at licenced industrial facilities typically arise where the facility is not operated and managed in accordance with good practice. Discharges from industrial facilities have been identified as the ninth most prevalent significant pressure, impacting approximately 5% of all waterbodies '*At risk*' of not achieving their environmental objective under the Water Framework Directive (Table 1 and Figure 1). This is based on the most recent characterisation assessment using data up to 2021.

Table 1: Number of 'At risk' waterbodies with industry as a significant pressure.

Waterbody Type	No. Waterbodies	No. At Risk waterbodies	No. Waterbodies with Industry identified as a significant pressure	% At Risk waterbodies (with Industry identified as a significant pressure)
River	3192	1337	61	5%
Lake	812	142	1	1%
Transitional	196	60		
Coastal	112	16		
Groundwater	514	94	17	18%
Total	**4826**	**1649**	**79**	**5%**

Water quality impacts arising from Industrial facilities

Out of the 79 waterbodies affected by industrial activities, 45 are impacted by facilities licenced by the Local Authorities as Section 4 discharge licenses, while 34 are affected by facilities licensed by the EPA under IE and IPC (see Table 2). Among the 17 groundwater bodies, pressures primarily stem from IE and IPC facilities, whereas for rivers, the predominant impact arises from Section 4 discharges.

Table 2: Breakdown of authorisation type identified within 'At risk' waterbodies with industry as a significant pressure.

Waterbody Type	IE & IPC	Section 4	Total
River	17	44	61
Lake		1	1
Groundwater	17		17
Total	**34**	**45**	**79**

The activities covered by Section 4 discharges span a variety of sectors such as hotels and resorts, nursing homes, fish farms, and factories. In terms of IE and IPC licensed activities affecting groundwaters, the chemical (8), surface coating (4), and timber treatment (3) sectors are the primary contributors, while the food and drink sector is the predominant IE and IPC pressure category for surface waters, affecting 12 waterbodies.

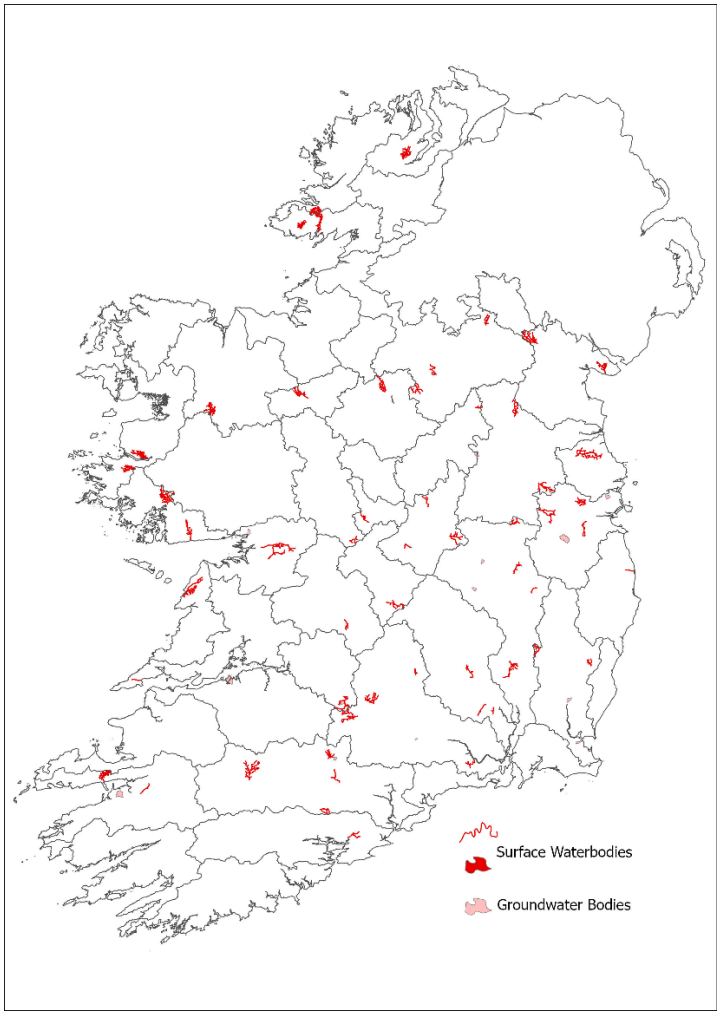

Figure 1: Waterbodies where Industry is a significant pressure (August 2023).

Among the 62 surface waterbodies (rivers and lakes) affected by industry, the most common impacts are from nutrient pollution (53 waterbodies) and organic pollution (38 waterbodies). Other impacts include sediment affecting habitats (3), chemical pollution (1), and microbiological pollution (1). Nutrient and organic pollution stem from discharges of nutrients, including phosphorus (phosphate) and nitrogen (nitrate and ammonium). These nutrient losses contribute to eutrophication, leading to excessive growth of plants and algae in waterbodies. Organic pollution diminishes oxygen levels in water and can pose toxic threats to aquatic life if present in high concentrations.

The EPA have estimated nutrient loads from various sectors, including industry, that can enter waterbodies (Figure 2). While industrial discharges can significantly impact water quality at a local or waterbody scale, the proportion of nitrogen and phosphorus loads contributing at a national scale is small at <3%.

Figure 3 displays the annual average concentrations of phosphate (in blue) and ammonium (in green) in rivers spanning from 2007 to 2023, distinguishing between waterbodies deemed *'At Risk'* due to significant industry pressure and those categorised as *'Not At Risk'*. The dashed lines represent the environmental quality standards for phosphate (0.035 mg/l) and ammonium (0.065 mg/l). Typically, mean concentrations falling below these dashed lines are necessary to maintain good ecological status. Rivers facing significant industry pressure exhibit higher average concentrations of both phosphate (PO_4) and ammonium (NH_3) compared to those considered *Not at risk*.

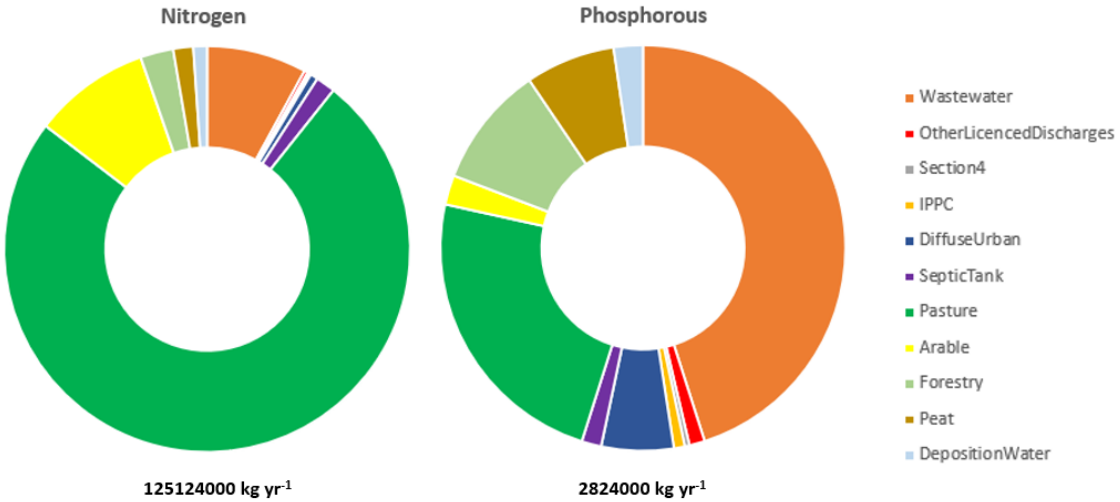

Figure 2: Load apportionment of nitrogen and phosphorous emissions to water (based on data up to 2018). Note that this is at national scale and proportions will differ for rivers and lakes at waterbody, subcatchment and catchment scales. Discharges from industrial facilities are sub-classified here as IPPC, Section 4 and other licenced discharges.

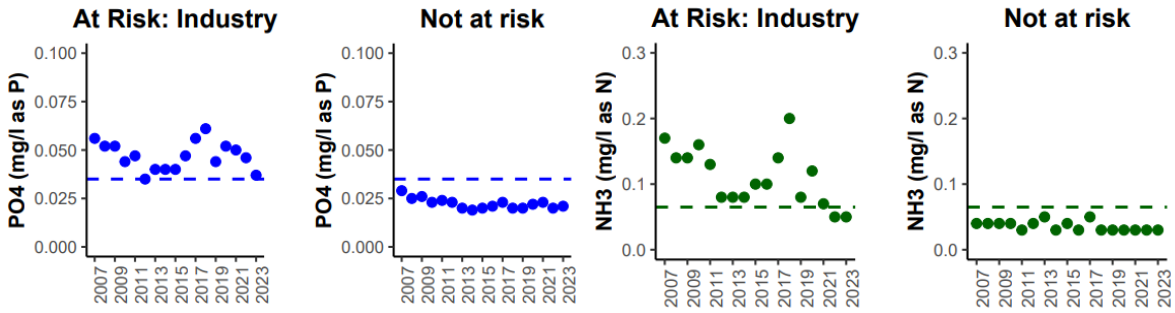

Figure 3: Average annual phosphate (blue) concentrations, and ammonium (green) concentrations in Rivers from 2007-2023 for waterbodies 'At risk' of not achieving their objectives, with Industry as a significant pressure, versus those considered Not at risk. Note that some waterbodies are also impacted by other pressures.

For groundwaters, the most common impacts are due to chemical pollution (15 waterbodies) and nutrient pollution (four waterbodies). The main contaminants are trichloroethane (TCE) and breakdown products, hydrocarbons (TPH, PAH), organics, hexavalent chromium (CrVI) and ammonium.

Change since the second river basin management cycle (2016-2021)

The number of *At Risk* waterbodies with industry as a significant pressure in an assessment in 2021 has decreased from an assessment carried out in 2015 (reduction from 99 waterbodies to 79 waterbodies). Of the 99 *At Risk* waterbodies that identified industry as a significant pressure in the 2015 assessment, 93 of these had not achieved their environmental objective in 2021, with environmental objectives now met in six waterbodies.

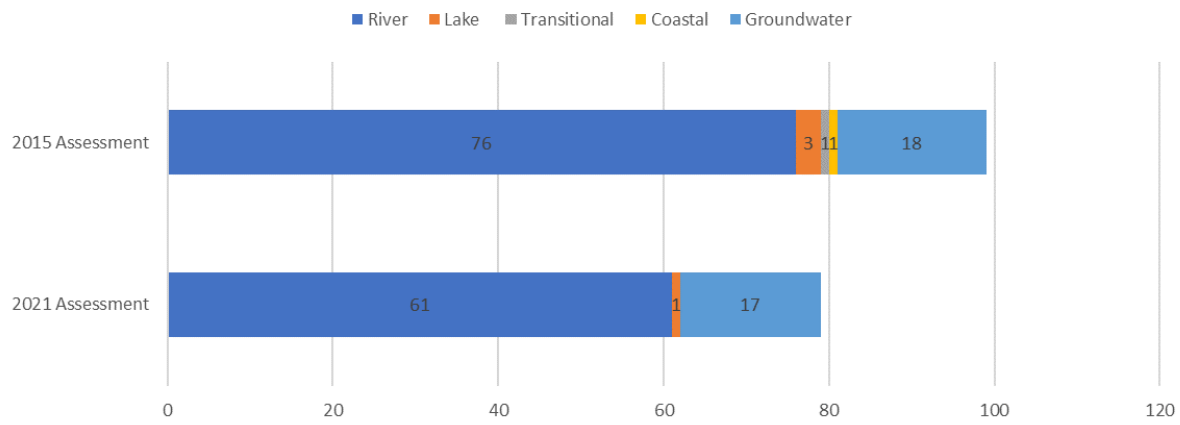

Figure 4: Change in Industry Pressures between the end of the first cycle in 2015 and the end of the second cycle in 2021.

What is being done?

IPC and IE licensed sites

IPC & IE licensed sites are subject to enforcement by the EPA. Industrial sites that are significant pressures on water quality are prioritised for enforcement action. The enforcement strategy involves identifying the source of the pressure, establishing a corrective action plan within a specified timeframe, and gathering evidence to monitor progress. Site inspections are carried out to examine key infrastructure on site, discharges to water and water quality in the receiving water. Industrial sites contribute to surface water pollution through issues such as insufficient effluent treatment, leakage and damage to on-site drainage networks, substandard hardstanding areas, misconnections, and spills. Corrective actions taken to date include upgrades to waste water treatment plants, drainage upgrade programmes and integrity testing of underground pipework and resurfacing of yard areas. Sites with contaminated groundwater represent long-term contaminated land projects, requiring site investigations, development of remediation plans, implementation of corrective actions, and ongoing soil and groundwater monitoring.

Section 4 licences

Discharge licences are issued and enforced by local authorities under Section 4 of the Water Pollution Act, in respect of the discharge of trade effluent to surface water or groundwater. Monitoring and inspection activities are carried out by local authorities to ensure that all Section 4 discharges are compliant with the licence emission limit values.

The EPA has a supervisory role in relation to the performance by local authorities of their statutory environmental protection duties. Under the EPA's Local Authority Performance Framework, discharge licences are one of the National Enforcement Priorities (NEPs) which focus on delivering positive environmental outcomes for water quality. Each local authority submits an annual data return (RMCEI inspections and enforcement data) and NEP progress report to the EPA detailing activities related to monitoring, inspections, follow-up actions and resolutions/outcomes associated with Section 4 discharges. The EPA carries out audits of local authorities to assess progress against the NEPs and to offer advice and support to help improve statutory performance, if required. The EPA publishes an annual report on local authority environmental enforcement performance. See Local Authority Environmental Enforcement Performance (epa.ie)

Find out more

See how the impacts of pressures on waters are assessed, including discharges from industrial facilities, at www.catchments.ie/download/water-framework-directive-guidance-on-characterisation-methodology-v5-0-2024.

You can view the individual waterbodies where Industry is a significant pressure on EPA Maps.

You can access formal compliance & enforcement correspondence for industrial sites regulated by the EPA through LEAP, the EPA's Licence and Enforcement Access Portal.