Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Early insights indicator report

Nitrogen concentrations in selected major rivers

January - December 2025

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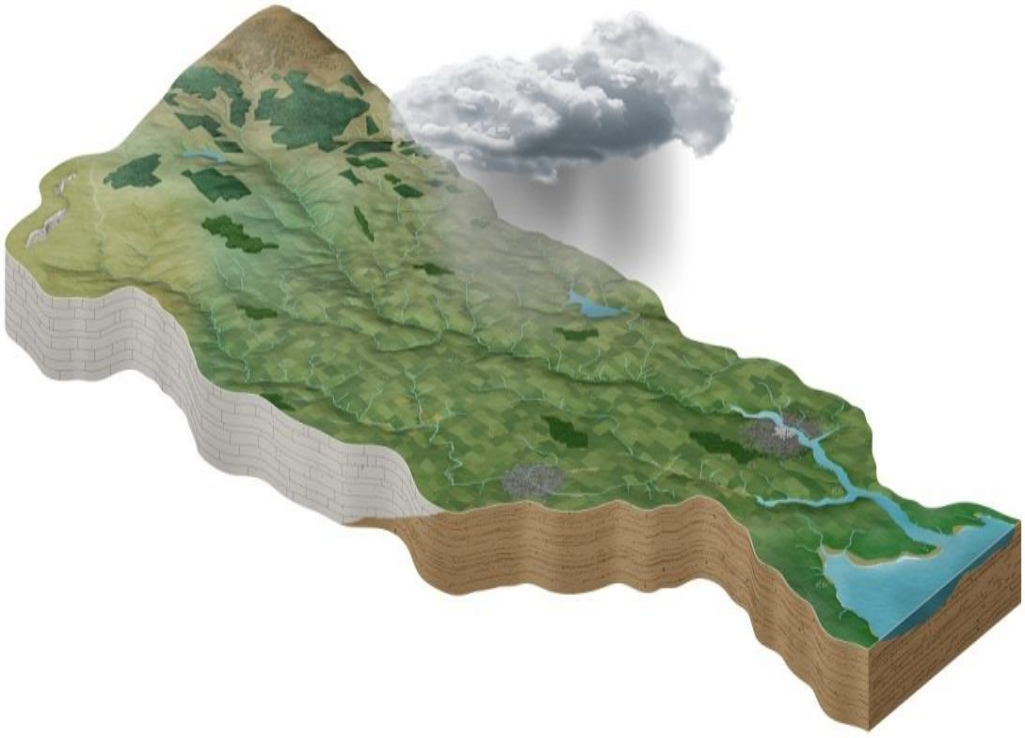

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Early insights nitrogen concentration indicator

Overview

The Early Insights indicator reports were developed to provide six-monthly updates on nitrogen concentrations in Ireland's major rivers. Their purpose is to present the most up-to-date, directly comparable information from a representative set of 20 monitoring sites. Three Early Insights reports have been published to date. The first Early Insights report compared nitrogen levels from January - June 2024 with the same six-month period in previous years[1]. The second report included the data from July to December and compared annual concentrations from 2016 to 2024[2]. The third Early Insights report assessed nitrogen levels for January - June 2025 against the corresponding period in 2024[3]. This report incorporates the most recent data from July to December 2025, enabling an annual comparison for 2025 with previous years.

The background to the selection of the monitoring points used in the Early Insights reports, and an analysis of their representiveness in relation to the full monitoring network, is provided in the first Early Insights report[1]. Map 1 shows the monitoring point locations with their respective catchment areas.

Map 1: Location of the Early Insights nitrogen indicator monitoring stations. Catchment areas associated with each monitoring point are shown in green.

[1] Early-insights-indicator-report---Nitrogen-concentrations-in-selected-major-rivers-January-June-2024.pdf
[2] Early insights indicator report: Nitrogen concentrations in selected major rivers, January-December 2024 | Environmental Protection Agency
[3] Early insights indicator report: Nitrogen concentrations in selected major rivers, January-June 2025 | Environmental Protection Agency

Early insight nitrogen concentration data at representative sites

Figure 1 presents average annual nitrogen concentrations at 20 representative sites from 2016 to 2025. The data underpinning the figure are available on the EPA website. Results show a 10% increase in annual nitrogen concentrations between 2024 and 2025, consistent with the early indication of elevated levels from the January - June 2025 data. While the Early Insights indicator (green) provides a conservative estimate of national nitrogen concentrations (grey), the full national dataset is also expected to show an increase in nitrogen levels for 2025. The annual indicator report for 2025, incorporating the comprehensive national network, will be published later in the year.

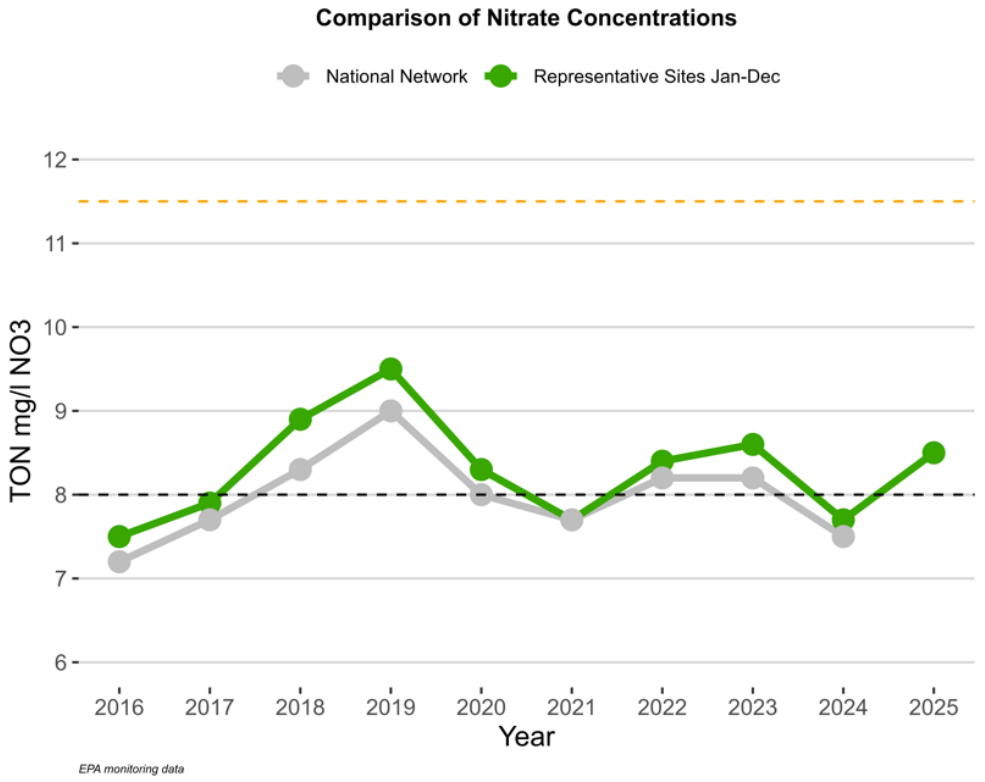


Figure 1: Early Insight average nitrogen concentrations (green) from 2016 to 2025 at 20 representative sites located around the country. Annual nitrate concentrations for the whole monitoring network (grey), and the levels to maintain good water quality in rivers (black dash) and in marine waters (orange dash) are also shown.

Factors influencing changes in nitrogen concentrations

Year on year, nitrogen levels fluctuate due to a combination of factors, including source loading, agricultural land management and weather patterns. Source loading means inputs of nitrogen to the environment, the vast majority of which comes from chemical and organic fertilisers from farming. Different factors may be dominant in different catchments, depending on its physical characteristics. Rainfall and river flow influence nitrogen transport to watercourses, and the resulting in-stream concentrations, respectively: periods of high rainfall may increase nitrogen losses through leaching, or reduce concentrations through dilution, depending on catchment soil properties and underlying geology; while higher river flows can also dilute the concentrations. A hydrogeological lag, reflecting the time required for nitrogen to move through soils and groundwater, means that land management in any given year contributes to river nitrogen losses observed in the subsequent years.

Some of the key factors influencing nitrogen concentrations for 2024 and 2025 were as follows:

- Fertiliser nitrogen sales increased by 10.6% in 2024 compared with 2023[4], followed by a further 12.5% increase in 2025, as reported by the Department of Agriculture, Food and the Marine. While fertiliser sales are not necessarily directly correlated with losses of nitrogen to the environment, because of the influences of farm practice and farm soil type for example, they are nevertheless an indicator of increases in source loading and are a factor in increases in nitrogen concentrations in waters.
- Between 2023 and 2024, CSO Livestock Survey data indicates a 3.3% reduction in the national herd[5]; results are not yet available for 2025. Decreases in animal numbers are associated with decreases in the source loading.
- Overall, 2025 was wetter than 2024, with above-average rainfall nationally, while rainfall in 2024 was broadly average[6]. Annual river flows were higher in 2025 in most catchments, compared to 2024. Flows were lower during the first half of 2025 than during the same period in 2024 but were higher in the second half of 2025 compared with 2024[7].

  The weather patterns in 2024 and 2025 were mixed, with relatively normal nutrient transport conditions in 2024 and the potential for increased nutrient transport in the latter part of 2025, which may increase nutrient levels in 2026 and beyond.

Early Insights nitrogen concentrations in catchments requiring nitrogen load reductions

This Early Insights report presents the most current information available at the 20 representative monitoring stations. Separately, the EPA has published reports identifying the catchments that require nitrogen load reductions to achieve water quality objectives. Those reports are based on three years of nitrogen concentration data from representative monitoring sites, with the most recent assessment covering the period from 2022 to 2024[8]. The data for 2025 presented in this Early Insights report are newly available and have not been included in previous EPA assessments or publications.

Figure 2 and Map 2 show the nitrogen levels in the catchments which require[8] or have previously required[9] nitrogen load reductions to achieve water quality objectives (purple colour); these are primarily located in the east, south and south-east of the country. Also shown are catchments where nitrogen concentrations are consistently below levels that impact on ecological health (cream colour); these are primarily located in the west and northwest of the country.

Catchment nitrogen levels are markedly higher in the east, south and southeast, compared to catchments in the west and northwest, reflecting differences in farm practices, soil types and climate conditions. In both groups of catchments, nitrogen levels have increased in 2025, relative to 2024. This highlights the role of nationally applicable factors influencing nitrogen levels, such as climate and fertiliser price for example, as well as more locally relevant factors such as farm practice.

[4] Fertiliser Sales 2024 - Central Statistics Office
[5] Livestock Survey December 2024 - Central Statistics Office
[6] Annual Climate Statement for 2025 - Met Éireann - The Irish Meteorological Service
[7] Hydrology Summary Bulletin - December 2025 | Environmental Protection Agency
[8] Evidence-based targeting of agricultural measures to reduce nitrogen in catchments to achieve water quality objectives | Environmental Protection Agency
[9] Assessment of the catchments that need reductions in nitrogen concentrations to achieve water quality objectives | Environmental Protection Agency

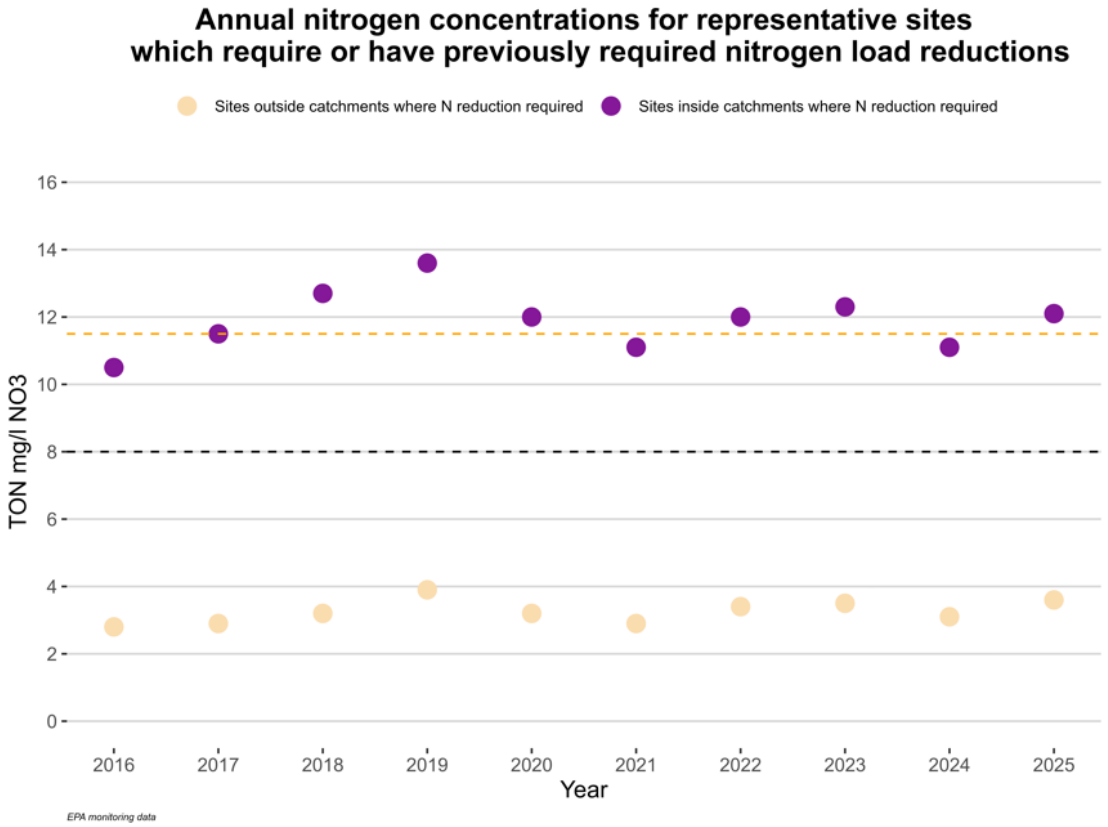


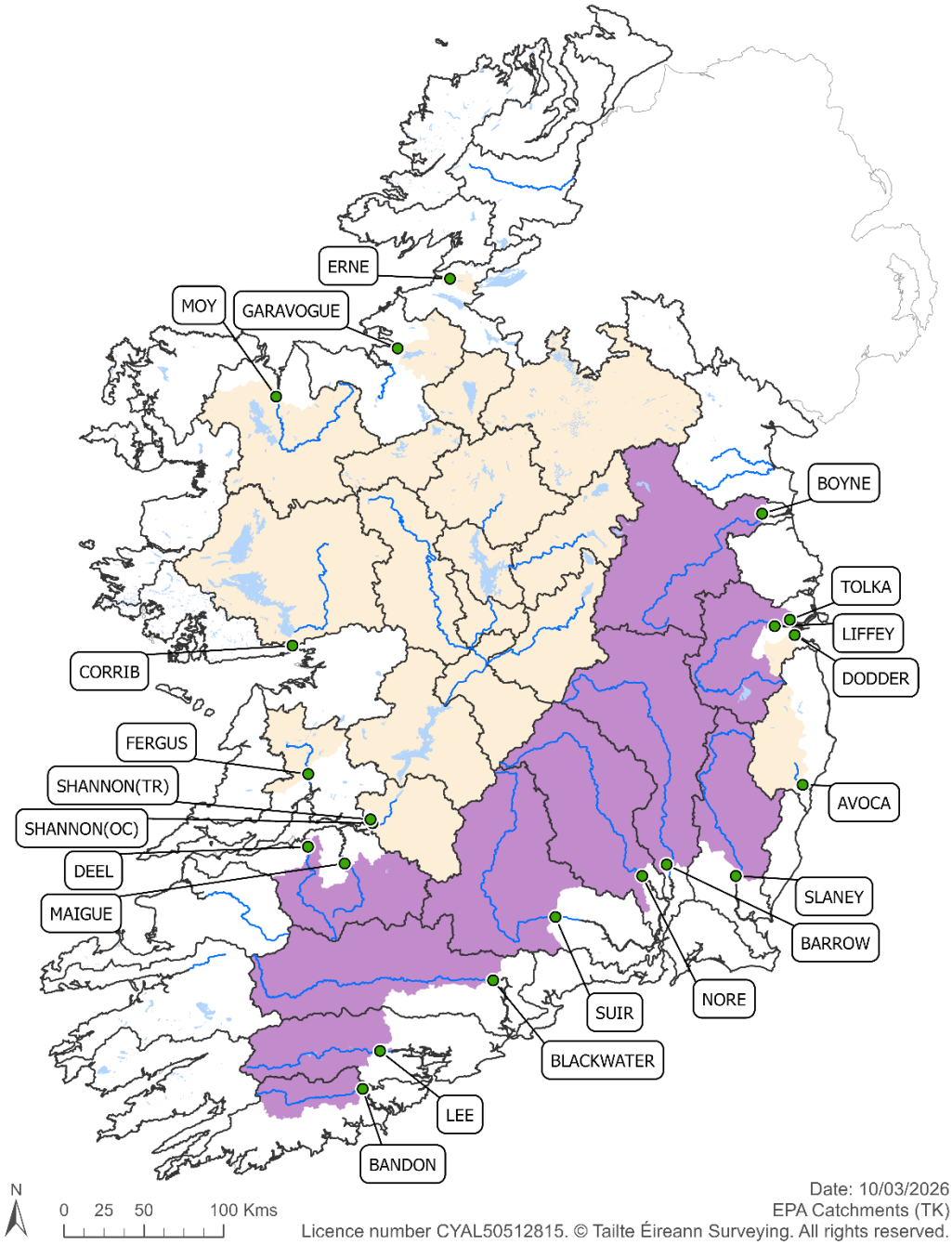
Figure 2: Early Insight annual nitrogen concentrations from 2016 to 2025 at 20 representative sites located around the country, categorised by catchment type. The estuarine standard of 11.5 mg/l NO3 (2.6 mg/l as N), and the guideline value to support healthy river systems of 8 mg/l as NO3 (1.8 mg/l as N) are included.

Further information

The EPA undertakes a full assessment of the overall quality and ecological status of Ireland's waters every three years. The latest full assessment was published in October 2025 on the EPA website[10]. The EPA also publishes water indicator data for over 1000 monitoring points from the national water monitoring network, on an annual basis – the latest report on nitrogen and phosphorus concentrations in Irish waters 2024 was published in July 2025[11].

In August 2025, the EPA published evidence to further support the targeting of agricultural measures to protect and improve water quality[8]. This report included an update to the Farm and Landscape measures for Agriculture (FLAG) map - previously called the Targeting Agricultural Measures map. The FLAG map highlights where the highest risk areas are, and the types of local actions that are needed to maintain or improve water quality. A link to the FLAG map is provided here https://gis.epa.ie/EPAMaps/agriculture.

[10] Water Quality in Ireland 2019-2024 | Environmental Protection Agency
[11] https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/water-quality-monitoring-report-on-nitrogen-and-phosphorus-concentrations-in-irish-waters-2024.php



Map 2: Location of the Early Insights nitrogen indicator monitoring stations and their associated catchment areas. Catchments previously identified as requiring nitrogen load reductions are shown in purple[8,9]; these are primarily located in the east, south and south-east of the country. Catchments where nitrogen concentrations are consistently below levels that impact on ecological health are shown in cream. Areas in white are located outside the catchments that are monitored by the 20 representative stations.

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