Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)

Article 10 Report for Ireland for the Period 2020-2023

Prepared by the

Environmental Protection Agency

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EXECUTIVE SUMMARY

Purpose

This report is prepared in response to Article 10 of the Nitrates Directive (91/676/EEC). The report covers the seventh reporting period from 2020 to 2023. The report is submitted by the Environmental Protection Agency (EPA) and has been produced with assistance from the Department of Agriculture, Food and the Marine (DAFM), Teagasc (the agriculture and food development authority in Ireland) and the Department of Housing, Local Government and Heritage (DHLGH).

The information is presented according to the four sections in Annex V of the Nitrates Directive and comprises:

- A description, with maps, of the evolution of water quality in groundwater and surface waters.
- A statement on the adoption of a Whole Territory Approach with respect to the designation of nitrate vulnerable zones.
- A summary of the principal measures in the Nitrates Action Programme for limiting nitrate inputs from agricultural sources and an account of the implementation of the agricultural Code of Good Practice.
- A summary of agricultural activities, nutrient management, compliance checks and an evaluation of the effectiveness of the Nitrates Action Programme.

Water Quality Monitoring in Ireland

Ireland uses data from the Water Framework Directive (WFD) monitoring programme to satisfy the reporting requirements of Article 10 of the Nitrates Directive. The WFD monitoring programme started in 2007.

The WFD surveillance monitoring network (180 river monitoring stations, 74 lakes, 18 transitional water bodies and 7 coastal water bodies) and the WFD groundwater monitoring network (200 monitoring stations taken from the surveillance and operational network) were previously used for the Article 10 water quality assessment and reporting. For this report, surface water monitoring stations from the WFD operational monitoring network have also been used for the Article 10 reporting and assessment. The monitoring network used in this report uses monitoring stations that are representative of the impact of agriculture on water quality, and allows greater alignment with WFD water quality assessments.

This monitoring network is the same monitoring network that is used by the EPA when it annually reports on water quality in relation to the European Commission Implementing Decision (C/2022/696).

Nitrate Concentrations in Groundwater and Surface Water

The European Commission's Article 11 report for the sixth reporting period (2016-2019) indicated that nitrate concentrations in Irish waters are amongst the lowest in the EU (EU Commission, 2021).

However, based on 4-year average results, this report indicates that groundwater, riverine and transitional water nitrate concentrations have increased since the sixth reporting period. In summary:

Groundwater

- Average nitrate concentrations were greater than 25 mg/l NO_3 at 21.5% of monitoring stations. Two stations had average concentrations greater than 50 mg/l NO_3, down from three stations in the 2016-2019 reporting period.
- There has been a 3% increase in the number of stations with average nitrate concentrations greater than 25 mg/l NO_3 since the 2016-2019 reporting period. Most of the groundwater monitoring stations with average nitrate concentrations greater than 25 mg/l NO_3 are in the south east and along the southern seaboard.
- Seven percent of stations had a strong increase (greater than 5 mg/l NO_3) in average nitrate concentration, with a further 22.5% of stations showing a weak increase (greater than 1 mg/l NO_3) in average nitrate concentration. The largest increases were in the south east.

Rivers

- 32.3% of river stations had average concentrations greater than 10 mg/l NO_3. Thirteen (1.2%) of river stations recorded concentrations greater than 25 mg/l NO_3.
- Since 2016-2019, 16% of rivers had a greater than 1 mg/l NO_3 increase in average annual nitrate concentrations. Most increases have been observed in the east and south east.
- 78% of all river stations were recorded as non-eutrophic in 2020-2023, with 82% of rivers not changing trophic state since 2016-2019. Evidence of increased eutrophication can be seen in parts of the south east (mainly the River Suir catchment) and western midlands (lower River Shannon catchment).

Lakes

- Approximately 90% of lakes had average annual concentrations less than 2 mg/l NO_3. No lakes were found to have annual average concentrations above 10 mg/l NO_3.
- Annual average lake nitrate concentrations showed very little change since 2016-2019.
- 55% of all lakes were non-eutrophic in 2020-2023, and 81% of lakes did not change trophic state since 2016-2019.

Transitional and Coastal Waters

- In 2020-2023, all transitional waters had annual average nitrate concentrations below 25 mg/l NO_3.
- 33% of transitional water bodies had a greater than 1 mg/l NO_3 increase in average annual nitrate concentrations since 2016-2019. The greatest nitrate concentrations increases were in the south east.
- All coastal waters recorded average annual nitrate concentrations below 10 mg/l NO_3 and nitrate concentrations have mostly been stable since the previous reporting period.
- In 2020-2023, 8 of the 63 transitional waters were eutrophic, with a further 33 designated as “could become eutrophic”.
- None of the 38 coastal water bodies were eutrophic in 2020-2023; 9 were designated as “could become eutrophic”.
- The transitional and coastal water bodies in the south east and along the southern seaboard show the greatest signs of eutrophication, with 30 of 45 transitional and coastal water bodies either eutrophic (6 water bodies) or could become eutrophic (24 water bodies).
- Since 2016-2019, most (89%) transitional and coastal water bodies have not changed trophic state.

Agricultural Action Programme and Code of Practice

Ireland's fifth Nitrates Action Programme (NAP), which is produced by the Department of Housing, Local Government and Heritage, came into effect in 2022 and included strengthened and additional measures to build on those measures introduced in the fourth NAP. The EPA's Water Quality in Ireland Report 2016-2021 (EPA, 2022), the EPA's report on catchments that needed reductions in nitrogen concentrations to achieve their water quality objectives (EPA, 2021), along with Teagasc's modelling of the impact (environmental and economic) of a number of farm nitrogen mitigation measures (Teagasc, 2021) helped inform the water quality measures included in the fifth NAP.

In parallel, the Water Action Plan, which is the WFD River Basin Management Plan (RBMP) 2022-27 has prioritised the continuation of existing controls to prevent nutrient losses to water, and has proposed additional measures, such as enhanced industry-led initiatives and schemes to reduce agricultural impacts on water quality.

Forecast of Future Evolution of Water Body Quality

In 2022, the agri-food sector accounted for 9% of all the merchanised goods exported from Ireland and accounted for 6.5% of total employment with primary agriculture, forestry and fishing accounting for 61% of this employment[1].

Agriculture is the most common land use in Ireland, covering approximately 70% of the country, the majority of which is in pasture. Agriculture has been identified by the EPA as the most prevalent significant pressure on water quality, impacting over 1,000 waterbodies or approximately 60% of all waterbodies that are 'At Risk' of not achieving their environmental objective under the WFD (EPA, 2024a). The main water quality problems from farming are loss of excess nutrients and sediment to water. These losses arise from point sources such as farmyards, or from diffuse sources such as spreading of fertilisers and manures. Excess phosphorus and sediment typically cause problems in rivers and lakes, and too much nitrogen is the main issue for estuaries and coastal waters.

The EPA's 2023 Water Quality Indicators Report (EPA, 2024b) found that average nitrate concentrations nationally were the same in 2023 as in 2022 and that there was no sign of an improvement. It also found that nitrogen loads to the marine environment are largely unchanged over the past four years and that the elevated levels of nitrogen in our waters are found mainly in the east, south east and south of the country where they are too high to support good water quality in our estuaries.

Overall, to achieve the WFD objectives, mitigation measures need to be targeted to the water quality issues and physical settings where they occur, i.e. the critical source areas. Within a catchment, the critical source areas for phosphorus and nitrate are likely to occur in different locations: poorly draining soils are the riskiest for diffuse phosphorus losses, while freely draining soils are more important for losses of diffuse nitrate. Therefore, any mitigation measures introduced should be tailored and targeted to the critical source area that is relevant to the pollutant of concern.

There is a good relationship between farming intensity and nitrate concentrations in waters, but there is water quality variability within and between sub-catchments. Detailed research work by Teagasc in the Agricultural Catchments Programme has highlighted that soils, weather and farming practices also have a significant influence on nitrate concentrations at the local scale. This has important implications for selecting the right measures in the right place, at the right times.

[1] https://assets.gov.ie/268151/30229379-b87f-4df3-8980-9051a7eef84c.pdf

An integrated approach to address water quality issues is being undertaken in Ireland. This includes collaboration between the different environmental and agricultural policy makers, researchers and public authorities, with the aim of informing policy.

Progress has been made in understanding better the complexity of the factors affecting nutrient loss to water in the diverse agricultural landscape. By the end of 2021, water quality improved in 117 of 500 water bodies that were prioritised areas for action in the second WFD River Basin Management Plan (RBMP) (EPA, 2022).

A key message relating to achieving the water quality objectives of the Nitrates Directive and WFD has been that getting the right measure in the right place is particularly relevant for the Irish situation. The EPA has developed water body mapping and tools for agriculture to help target the right measure in the right place. These tools facilitate a tailored approach to addressing water quality issues depending on the pollutant of concern and the delivery pathway to the water body.

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ABBREVIATIONS

ACP	Agricultural Catchments Programme
ACRES	Agri – Climate Rural Environment Scheme
AECM	Agri-Environment and Climate Measures
AIM	Animal Identification System
AKIS	Agricultural Knowledge and Innovation Systems
ASSAP	Agricultural Sustainability and Advice Programme
AWNSS	Animal Welfare Nutrient Storage Scheme
CSO	Central Statistics Office
DAFM	Department of Agriculture, Food and the Marine
DES	Dairy Equipment Investment Scheme
DHLGH	Department of Housing, Local Government and Heritage
DII	Dairy Industry Ireland
EIP	European Innovation Partnership
EPA	Environmental Protection Agency
e-PRTR	European Pollutant Release and Transfer Register
FAS	Farm Advisory System
FSCIS	Farm Safety Capital Investment Scheme
GAEC	Good Agricultural and Environmental Conditions
GAP	Good Agricultural Practice
GHG	Green House Gases
GLAS	Green Low-Carbon Agri-Environment Scheme
ICBF	Irish Cattle Breeding Federation
LAWPRO	Local Authority Waters Programme
LESS	Low Emission Slurry Spreading
NAIP	National Agricultural Inspection Programme
NAP	Nitrates Action Programme
OECD	Organisation for Economic Co-operation and Development
OFCIS	Organic Farming Capital Investment Scheme
OSI	Ordinance Survey Ireland
OFS	Organic Farming Scheme
PAA	Priority Areas for Action
PPIS	Pig and Poultry Capital Investment Scheme
RBD	River Basin District
RDP	Rural Development Programme
RBMP	River Basin Management Plan
SCIS	Solar Capital Investment Scheme
S.I.	Statutory Instrument
TCIS	Tillage Capital Investment Scheme
TAMS	Targeted Agricultural Modernisation Scheme
WFCIS	Women Farmer Capital Investment Scheme
WFD	Water Framework Directive
YFCIS	Young Farmer Capital Investment Scheme

1 INTRODUCTION

1.1 Purpose

This report is prepared in response to Article 10 of the Nitrates Directive (91/676/EEC). The report covers the seventh reporting period from 2020 to 2023. The Report contains information, as outlined in Annex V of the Directive, regarding the monitoring of waters against pollution from agricultural sources and the details of, and results from, action programmes drawn up by the State to combat pollution in vulnerable areas.

1.2 Background to the Report

1.2.1 The Nitrates Directive

The objective of the Nitrates Directive, which was adopted in 1991, is the reduction of water pollution caused or induced by nitrates from agricultural sources and the prevention of further such pollution, with the primary emphasis being on the management of livestock manures and other fertilisers.

The Nitrates Directive requires Member States to:

- Monitor waters and identify those that are polluted or are liable to pollution by nitrates from agriculture.
- Establish a code of good agricultural practice to protect waters from such pollution.
- Promote the application by farmers of the code of good agricultural practice.
- Identify the area or areas to which an action programme should be applied to protect waters from pollution by nitrates from agricultural sources.
- Develop and implement action programmes to reduce and prevent such pollution in the identified area: action programmes are to be implemented and updated on a four-year cycle.
- Monitor the effectiveness of the action programmes, and
- Report to the EU Commission on progress.

The Nitrates Directive defines those waters 'polluted or liable to pollution' as:

- Surface freshwaters, such as those used for the abstraction of drinking water, which contain, or could contain, if preventative action is not taken, nitrate concentrations greater than 50 mg/l NO_3.
- Groundwaters which contain, or could contain, if preventative action is not taken, nitrate concentrations greater than 50 mg/l NO_3, and
- Natural freshwater lakes, or other freshwater bodies, estuaries, coastal waters and marine waters which are found to be eutrophic or soon may become eutrophic if preventative action is not taken.

The Directive requires that each Member State submit a report on the implementation of the Nitrates Directive at the end of each four-year programme. This seventh report covers the years 2020-2023. This Directive specifies that the report should include information on water quality monitoring, the nitrates action programmes and an evaluation of measures associated with the action programme.

1.2.2 Previous Reporting Period 2016-2019

Since 2005, the responsibility for reporting under the Nitrates Directive has been assigned to the Environmental Protection Agency (EPA), under the European Communities (Good Agricultural Practice for Protection of Waters) Regulations (as amended), which implement the requirements of the Nitrates Directive in Ireland.

Ireland's Article 10 Report for the sixth reporting period (2016-2019) was submitted in December 2020 by the Environmental Protection Agency and comprised information on the Action Programmes and information compiled by the Environmental Protection Agency on the evaluation of water quality. The sixth report and associated data are available at the Reportnet 2 repository http://cdr.eionet.europa.eu/ie/eu/nid/.

This report and associated data are the seventh report for Ireland, covering the period 2020-2023.

1.3 Water Monitoring in Ireland

Ireland's National Regulations implementing the Water Framework Directive - European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003; as amended in 2014 by S.I. No. 350 of 2014) give the EPA authority to prepare monitoring programmes and for specifying the public authorities responsible for carrying out the monitoring.

The Irish WFD monitoring programme was originally published in 2006 (EPA, 2006), with monitoring starting in 2007. The programme encompasses the three categories of Surveillance, Operational and Investigative monitoring specified in the WFD.

Data from the Surveillance Monitoring Programme for surface water and the Surveillance and Operational Monitoring Programme for groundwater, which are representative of water quality in Irish waters generally, were previously used for Article 10 Nitrates Directive reporting. For previous reports, this included data for 200 groundwater monitoring stations, 180 river monitoring stations, 74 lakes, 18 transitional water bodies and 7 coastal water bodies.

For this report, additional surface water monitoring stations from the WFD operational monitoring network have been included alongside the stations from the surveillance monitoring network. The monitoring network used in this report uses monitoring stations that are representative of the impact of agriculture on water quality, and allows greater alignment with WFD water quality assessments.

This monitoring network is the same monitoring network that is used when reporting on water quality in relation to the European Commission Implementing Decision (C/2022/696) for Ireland to operate a derogation from the limits of the Nitrates Directive.

1.4 Report Structure and Content

1.4.1 Report Structure

This Report has been produced in accordance with the European Commission's Nitrates Directive Article 10 Reporting Guide for Member States', published in 2024. The Report is split into sections as specified in the guidelines, which contain the following information:

- A description, with associated maps, of evolution of quality of freshwaters (surface and groundwater), transitional and marine waters since previous monitoring with respect to nitrates – Chapter 2.
- Description and justification of the designated vulnerable zones (including map), and of the extensions or additions carried out or envisaged – Chapter 3.

- An account of the development, promotion and implementation of the Good Agricultural Practice Regulations, including a summary of national agricultural statistics for the national territory – Chapter 4.
- An account of the principal measures contained in the Action Programme, and a description of the precise way limits are being applied for the annual land application of organic nitrogen compounds – Chapter 5.
- The results of the evaluation of the action programmes – Chapter 6.
- A forecast of the future evolution of water body quality – Chapter 7.

Data reporting sheets and the maps that accompany this report and have been uploaded to the Reportnet 3 repository at https://reportnet.europa.eu/.

The structure and formats of the spatial and non-spatial data tables comply with the specification provided in the EU Reportnet Data Dictionary.

1.4.2 Note on Reporting Period Trend Analysis

The reporting guidelines specify the trend parameters for analysis that compares water quality results from the current period with those reported under the previous period(s). Data for the previous reporting periods (2012-2015 and 2016-19) have been included in this report to enable the trend analysis to be undertaken. A direct comparison of the monitoring stations and water bodies used in the 2016-2019 report has also been included to provide context.

1.5 General Context

The general physical features, water catchments and Article 10 monitoring locations for Ireland are shown on Maps 1-1 to 1-4.

For the Water Framework Directive, water quality is assessed at an individual water body scale, and this is aggregated to a sub-catchment and catchment scale to facilitate and prioritise water management.

For this Article 10 report, monitoring data for lakes, transitional and coastal waters are aggregated and assessed at a water body scale. Monitoring data for rivers and groundwater are presented for the individual monitoring station and are not aggregated for the water body.

2 EVALUATION OF WATER QUALITY

2.1 Groundwater

2.1.1 Groundwater Monitoring Network

A total of 195 groundwater stations are included in this report, spanning the 2020-2023 reporting period, which are a subset of the overall WFD Groundwater Monitoring Programme.

Table 2-1 indicates the number of groundwater monitoring stations, and the type of groundwater sampled during each reporting period.

Table 2-1: Number of Groundwater Monitoring Stations in each Reporting Period

	Reporting Period (2012-2015)	Reporting Period (2016-2019)	Reporting Period (2020-2023)	Common sampling points between reporting periods
Phreatic groundwater (0-5m)	25	25	25	25
Phreatic groundwater (5-15m)	88	87	84	84
Phreatic groundwater deep (15-30m)				
Phreatic groundwater (>30m)				
Captive groundwater	-	-	-	-
Karstic groundwater	92	88	86	86
Total	**205**	**200**	**195**	**195**
Notes: Section 2.1.2 provides an explanation of sampling depth.				

Table 2-2 indicates five stations that were included during the 2016-2019 reporting period were not included in the monitoring network for the current reporting period. These stations were removed from the monitoring network due to the closure of abstractions, primarily as part of national water supply rationalisation programmes.

In accordance with the guidance documents, no replacement/alternative stations have been added to the groundwater monitoring programme in 2016-2019 for those five stations because their average concentrations are less than 25 mg/l NO_3. One station (IE_SW_G_0050_3800_0002) had an average concentration of 27.5 mg/l NO_3 in the last reporting period, but the average concentration fell by 11 mg/l NO_3 since 2012-15, with individual sample concentrations dropping below 25 mg/l NO_3. Additionally, the groundwater body already has an existing monitoring station (IE_SW_G_0050_3800_0006), so an alternative has not been included.

2.1.2 Note on Sampling Depth

The following two paragraphs are quoted from the WFD Programme Report (EPA, 2006) to explain why sampling depth reported is an estimate:

"Generally, sampling depth is not considered to be a critical factor when monitoring groundwater in the Republic of Ireland because most of the bedrock aquifers are unconfined and have fissure permeability only. The only aquifers in the Republic of Ireland with an intergranular permeability are the sand and gravels. Consequently, groundwater velocities in most Irish bedrock aquifers are relatively fast (a few metres/day) and mixing of groundwater in the top ~60m readily occurs. The proposed monitoring network uses points with relatively large groundwater abstractions, and these are considered to give representative samples because they are not usually affected by local point source pollution.

In the case of springs, the sampling depth is at the ground surface. In boreholes, pumps are usually located towards the bottom of the boreholes; therefore, the sampling depths are determined by borehole depth. In some instances, screens are installed at the main water entry zones. In the remaining monitoring points, the boreholes are 'open hole', i.e. a liner or screen is not needed. Water can usually be drawn from all bedrock fractures in the borehole, i.e. from the total bedrock length. Therefore, the water sample is generally a composite of water from all fractures and/or conduits throughout the total length of bedrock in the borehole".

Table 2-2: Stations removed from groundwater monitoring programme since 2016-2019

National Station Code of Removed Station	Annual Average Concentration (mg/l NO_3)				Concentration less than 25 mg/l NO_3?	Reason for Removal
	2016	2017	2018	2019		
IE_SH_G_0084_3600_0010	19.78	17.12	17.86	18.75	Yes	Borehole decommissioned.
IE_SW_G_0050_3800_0002	No samples	28.64	24.21	29.53	Yes	Borehole decommissioned. Average concentration decreased by 11 mg/l NO_3 between 12-15 and 16-19. Water body has an existing monitoring point - IE_SW_G_0050_3800_0006.
IE_EA_G_0002_2300_0011	No samples	0.45	0.45	0.45	Yes	Borehole decommissioned.
IE_EA_G_0002_2500_0006	0.8	0.7	0.45	0.91	Yes	Borehole decommissioned.
IE_SE_G_0107_1600_0009	No samples	20.37	22.73	No samples	Yes	Borehole decommissioned.

2.1.3 Nitrate Concentrations in Groundwater

The distribution of average nitrate concentrations for the period 2020-2023 are shown on Map 2-1 and the results are summarised in Table 2-3.

The results for 2020-2023 show that two of the 195 stations had average nitrate concentrations greater than 50 mg/l NO_3 and that 42 (21.5%) had concentrations greater than 25 mg/l NO_3.

- There has been a 3% increase in the number of stations with concentrations greater than 25 mg/l NO_3 since the 2016-2019 reporting period.
- Two stations (1%) had average concentrations greater than 50 mg/l NO_3, whereas three stations had concentrations greater than 50 mg/l NO_3 in the 2016-2019 reporting period.
- Most of the groundwater monitoring stations with average nitrate concentrations greater than 25 mg/l NO_3 are in the south east and along the southern seaboard.

Table 2-3: Quality Classes for Average Nitrate Concentrations (mg/l NO_3) in Groundwater - number (and percentage) of sampling points

Station Type	Number of sampling points mg/l NO_3			
	<25	25-39.99	40-50	>50
Phreatic groundwater (0-5m)	18 (9.5%)	5 (2.5%)	1 (0.5%)	1 (0.5%)[1]
Phreatic groundwater (5-15 m)	69 (35%)	13 (6.5%)	2 (1%)	0
Phreatic groundwater deep (15-30m)				
Phreatic groundwater (>30m)				
Captive groundwater	-	-	-	-
Karstic groundwater	66 (34%)	17 (9%)	2 (1%)	1 (0.5%)[2]
Total (n=195)	**153 (78.5%)**	**35 (18%)**	**5 (2.5%)**	**2 (1%)**
2016-2019 period	163 (81.5%)	32 (16%)	2 (1%)	3 (1.5%)
2012-2015 period	*178 (87%)*	*25 (12%)*	*2 (1%)*	*0*

Notes:
1. Station code: IE_SE_G_0156_1600_0004
2. Station code: IE_SW_G_0082_0500_0017

The distribution of maximum nitrate concentrations for the period 2020-2023 are shown in Map 2-2 and the results summarised in Table 2-4.

The maximum nitrate values show that 71.5% of stations had maximum concentrations lower than 25 mg/l NO_3 and a further 19.5% had maximum concentrations lower than 40 mg/l NO_3. Seven stations had maximum concentrations greater than 50 mg/l NO_3.

Since the last reporting period (2016-2019) there has been a 2.5% decrease in the proportion of stations with maximum concentrations greater than 25 mg/l NO_3 (from 31% to 28.5%) and no change in stations with maximum concentrations greater than 50 mg/l NO_3 class. Further analysis of the trend in concentration values is given in Section 2.1.4.

Table 2-4: Quality Classes for Maximum Nitrate Concentrations (mg/l NO_3) in Groundwater - number (and percentage) of sampling points

Station Type	Number of sampling points mg/l NO_3*			
	<25	25-39.99	40-50	>50
Phreatic groundwater (0-5m)	18 (9%)	3 (1.5%)	2 (1%)	2 (1%)[1]
Phreatic groundwater (5-15 m)	60 (31%)	17 (9%)	5 (2.5%)	2 (1%)[2]
Phreatic groundwater deep (15-30m)				
Phreatic groundwater (>30m)				
Captive groundwater	-	-	-	-
Karstic groundwater	61 (31.5%)	18 (9%)	4 (2%)	3 (1.5%)[3]
Total (n=195)	**139 (71.5%)**	**38 (19.5%)**	**11 (5.5%)**	**7 (3.5%)**
2016-2019 period	138 (69%)	43 (21.5%)	12 (6%)	7 (3.5%)
2012-2015 period	*149 (73%)*	*41 (20%)*	*9 (4%)*	*6 (3%)*

Notes:
1. Station code: IE_SE_G_0156_1600_0004; IE_SH_G_0251_2500_0005
2. Station codes: IE_EA_G_0010_2100_0008; IE_EA_G_0010_2100_0009
3. Station codes: IE_SE_G_0160_0100_0001; IE_SW_G_0082_0500_0017; IE_SE_G_0040_3700_0004

2.1.4 Nitrate Trend Analysis in Groundwater

The trend analysis compares average nitrate concentrations for the current reporting period (2020-2023) against values at corresponding stations from the previous reporting period (2016-2019).

Average nitrate concentration trends at the 195 stations are summarised in Table 2-5. Map 2-3 shows the trend in average nitrate concentrations since 2016-2019.

Table 2-5 shows that 7% of stations (14 stations) had a strong increase in average nitrate concentration with a further 22.5% of stations (44 stations) showing a weak increase in average nitrate concentration. The largest increases have been observed in the south east. There was a decrease in average nitrate concentration at 13.5% of stations, with concentrations stable at 56% of stations. The 14 stations showing a strong increase in average nitrate concentration since 2016-2019 are listed in Table 2-6.

Table 2-5: Trends in Average Groundwater Nitrate Concentrations - number (and percentage) of sampling points

Station Type	Number of sampling points mg/l NO_3*				
	> -5 mg/l NO_3	-5 to -1 mg/l NO_3	-1 to +1 mg/l NO_3	+1 to +5 mg/l NO_3	> +5 mg/l NO_3
Phreatic groundwater (0-5m)	2 (1%)	1 (0.5%)	15 (7.5%)	4 (2%)	3 (1.5%)
Phreatic groundwater (5-15 m)	1 (0.5%)	9 (4.5%)	41 (21%)	26 (13.5%)	7 (3.5%)
Phreatic groundwater deep (15-30m)					
Phreatic groundwater (>30m)					
Captive groundwater	-	-	-	-	-
Karstic groundwater	2 (1%)	12 (6%)	54 (27.5%)	14 (7%)	4 (2%)
Total (n=195)	**5 (2.5%)**	**22 (11%)**	**110 (56%)**	**44 (22.5%)**	**14 (7%)**

In the previous report, there were 15 stations identified as showing strongly increasing trends in average nitrate concentrations since 2012-2015. Of these 15 stations, seven have subsequently shown a decrease in average nitrate concentration and seven have seen an increase in average nitrate concentration, with the concentration remaining stable at one station. Table 2-6 indicates

that three of the seven stations that previously showed a strong increase in concentration continued to show a strong increase in average nitrate concentration in this reporting period.

Table 2-6: Stations Showing a Strong Increase in Average Nitrate Concentrations in Groundwater since 2016-2019

National Station Code	Average Nitrate Concentration (mg/l NO_3)		Concentration Change (mg/l NO_3) at Stations with a Strong Concentration Increase	Was a Strong Concentration Increase Identified in the 2016-2019 Report?
	2016-2019	2020-2023		
IE_SH_G_0205_2500_0013	20.11	31.62	11.51	No
IE_SE_G_0153_1600_0010	14.53	20.02	5.49	No
IE_SE_G_0128_1500_0004	25.91	31.03	5.12	Yes
IE_SE_G_0128_1500_0019	32.14	38.52	6.38	Yes
IE_SE_G_0173_1400_0008	24.47	31.53	7.06	No
IE_SE_G_0163_1500_0001	21.08	28.1	7.02	No
IE_SE_G_0153_1600_0011	21.33	27.91	6.58	No
IE_SE_G_0009_1600_0003	24.69	29.92	5.23	No
IE_SE_G_0131_3700_0002	15.35	26.22	10.87	Yes
IE_EA_G_0010_2100_0008	40.52	49.81	9.29	No
IE_SE_G_0071_3300_0006	23.17	31.56	8.39	No
IE_SH_G_0251_2500_0005	31.55	46.21	14.66	No
IE_EA_G_0010_2100_0009	29.08	40.6	11.52	No
IE_SE_G_0106_1400_0015	10.9	17.04	6.14	No

2.2 Surface Water Monitoring – Lakes and Rivers

2.2.1 Rivers and Lakes Monitoring

The WFD surface water monitoring programme started in 2007. The WFD surveillance monitoring network (180 rivers and 74 lakes) has been used for previous Article 10 reports. For this report, monitoring stations from the WFD operational monitoring network have been included alongside the stations from the surveillance monitoring network. Table 2-7 highlights the changes in monitoring stations used, with water quality presented for 1,085 river monitoring stations and 222 lakes in this report.

As specified in the Article 10 reporting guidance, data are presented for monitoring stations used in 2020-2023, and comparisons made with the monitoring station data reported in 2016-2019. The monitoring network used in this report uses monitoring stations that are representative of the impact of agriculture on water quality and allows greater alignment with WFD water quality assessments. The trend analysis since the previous reporting period has been carried out for all 1,085 river monitoring stations and 222 lakes included in the network to facilitate a like for like comparison of water quality i.e., the respective nitrate concentrations and trophic condition assessment has been carried out for the 2020-2023 reporting period and the 2016-2019 reporting period for each of the 1,085 river monitoring stations and 222 lakes.

Table 2-7: Surface Water Monitoring Network (Rivers and Lakes)

Water bodies	Reporting Period			Common sampling points between reporting periods
	2012-2015	2016-2019	2020-2023	
Rivers	180	180	1,085	173
Lakes	74	74	222	74

Seven river stations were removed since the 2016-2019 reporting period. These have been replaced by other monitoring stations on those rivers and details of the alternative stations are provided in Table 2-8. No lake stations were removed since the 2016-2019 reporting period.

Table 2-8: Stations removed/changed from the rivers monitoring programme since 2016-2019

National Station Code of Removed / Changed Station	Water Type	Trophic State 2016-2019	Concentration Previously Less than 25 mg/l NO_3?	Reason for Removal
RS12S020400	River	Non-eutrophic	Yes	Relocation (replaced by station RS12S020390)
RS14G030300	River	Non-eutrophic	Yes	Relocation (replaced by station RS14B013100)
RS25T030400	River	Non-eutrophic	Yes	Relocation (replaced by station RS25T030450)
RS26B071100	River	Non-eutrophic	Yes	Relocation (replaced by station RS26B071000)
RS18B022600	River	Non-eutrophic	Yes	Relocation (replaced by station RS18B022700)
RS19W011300	River	Could Become Eutrophic	No	Relocation (replaced by station RS19W011000)
RS22G061200	River	Non-eutrophic	Yes	Relocation (replaced by station RS22G061100)

2.2.2 Nitrate Concentrations in Lakes and Rivers

Annual average, winter average and maximum nitrate concentrations for the current and previous reporting periods are summarised for rivers and lakes in Table 2-9. To facilitate a like for like comparison of water quality, Table 2-9 also provides analysis of the previously reported monitoring network i.e. the WFD surveillance monitoring network. Annual average, winter average and maximum nitrate concentrations for 2020-2023 in rivers and lakes for the larger monitoring network are shown on Maps 2-4 to 2-9.

- A third (32.3%) of river stations have average concentrations greater than 10 mg/l NO_3.
- Thirteen (1.2% of) river stations recorded average concentrations greater than 25 mg/l NO_3.
- Winter average concentrations greater than 10 mg/l NO_3 are comparable to annual average concentrations i.e., there is little difference between winter and annual average concentrations in rivers.
- The highest riverine nitrate concentrations are observed in the east, south east and along the southern seaboard.

Approximately 90% of lakes had average concentrations less than 2 mg/l NO_3, with winter average concentrations slightly higher than annual averages. No lakes were found to have annual average concentrations above 10 mg/l NO_3 and only three lakes had winter average nitrate concentrations greater than 10 mg/l NO_3.

Table 2-9: Quality classes for Nitrate Concentrations in Rivers and Lakes: 2012-2015; 2016-2019; and 2020-2023 – Number of sampling points (and percentage)

Reporting Period	Number of Stations	Quality classes (mg/l NO_3)					
		0-1.99	2-9.99	10-24.99	25-39.99	40-50	>50
Rivers annual average							
2020-2023	1,085	309 (28.4%)	426 (39.3%)	337 (31.1%)	12 (1.1%)	1 (0.1%)	0
2020-2023	173*	56 (32.4%)	73 (42.2%)	42 (24.3%)	2 (1.1%)	0	0
2016-2019	180	59 (32.8%)	77 (42.8%)	42 (23.3%)	2 (1.1%)	0	0
2012-2015	180	59 (32.6%)	81 (44.8%)	39 (21.6%)	2 (1.1%)	0	0
Rivers winter average							
2020-2023	1,085	274 (25.3%)	422 (38.9%)	367 (33.8%)	21 (1.9%)	1 (0.1%)	0
2020-2023	173*	50 (28.9%)	78 (45%)	43 (24.9%)	2 (1.2%)	0	0
2016-2019	180	51 (28.3%)	75 (41.7%)	52 (28.9%)	2 (1.1%)	0	0
2012-2015	180	51 (28.2%)	85 (47.0%)	43 (23.8%)	2 (1.1%)	0	0
Rivers maximum							
2020-2023	1,085	120 (11.1%)	399 (36.8%)	460 (42.4%)	92 (8.5%)	8 (0.7%)	6 (0.5%)
2020-2023	173*	17 (9.8%)	74 (42.8%)	68 (39.3%)	12 (6.9%)	0	2 (1.2%)
2016-2019	180	10 (5.6%)	82 (45.6%)	61 (33.9%)	24 (13.3%)	2 (1.1%)	1 (0.6%)
2012-2015	180	19 (10.5%)	79 (43.7%)	75 (41.4%)	8 (4.4%)	1 (0.6%)	0
Lakes annual average							
2020-2023	222	200 (90.1%)	22 (9.9%)	0	0	0	0
2020-2023	74*	70 (94.6%)	4 (5.4%)	0	0	0	0
2016-2019	74	70 (94.6%)	4 (5.4%)	0	0	0	0
2012-2015	74	71 (96%)	3 (4%)	0	0	0	0
Lakes winter average							
2020-2023	217	188 (86.6%)	26 (12%)	3 (1.4%)	0	0	0
2020-2023	74*	67 (90.5%)	6 (8.2%)	1 (1.3%)	0	0	0
2016-2019	74	68 (91.9%)	6 (8.1%)	0	0	0	0
2012-2015	74	67 (91%)	5 (7%)	0	0	0	0
Lakes maximum							
2020-2023	222	77 (34.7%)	121 (54.5%)	21 (9.4%)	2 (0.9%)	0	1 (0.5%)
2020-2023	74*	16 (21.6%)	47 (63.6%)	9 (12.2%)	1 (1.3%)	0	1 (1.3%)
2016-2019	74	22 (29.7%)	46 (62.2%)	6 (8.1%)	0	0	0
2012-2015	74	23 (31%)	47 (64%)	4 (5%)	0	0	0
* Analysis only using the previously reported Article 10 monitoring programme							

2.2.3 Nitrate Trend Analysis in Lakes and Rivers

Table 2-10 shows the trends in annual average and winter average concentrations in rivers and lakes since the previous reporting cycles. Maps 2-10 to 2-13 show the results of the annual average and winter average nitrate concentrations trend analysis for rivers and lakes since 2016-2019.

Increases in the annual average nitrate concentrations have been observed since 2016-2019, with ~16% of rivers showing an increase in average annual nitrate concentrations. This increase is replicated in the winter average concentration in rivers, with ~19% of rivers showing an increase in winter average concentration. Most of these increases in nitrate concentrations have been observed in the east and south east.

Overall, the data represent an overall net decline in water quality nationally because the respective increases in the average annual and winter average concentrations observed at 16% and 19% of rivers, are higher than the respective decreases of 11% and 16% in average annual and winter average concentrations.

In contrast to the rivers, nitrate concentrations in lakes are stable with very little change since previous reporting periods for annual average and winter average nitrate concentrations.

Table 2-10: Change in River and Lake Nitrate Concentrations since the previous reporting period – Number of sampling points (and percentage)

Reporting Period	Number of Stations	Number of sampling points (% of points)				
		> -5 mg/l NO_3	-5 to -1 mg/l NO_3	-1 to +1 mg/l NO_3	+1 to +5 mg/l NO_3	> +5 mg/l NO_3
Rivers annual average						
2020-2023	1,085	3 (0.3%)	116 (10.7%)	788 (72.6%)	168 (15.5%)	10 (0.9%)
2020-2023	173*	0	8 (4.7%)	153 (88.4%)	12 (6.9%)	0
2016-2019	180	0	6 (3.3%)	139 (77.2%)	33 (18.3%)	2 (1.1%)
2012-2015	180	0	21 (11.9%)	127 (83.0%)	9 (5.1%)	0
Rivers winter average						
2020-2023	1,060	12 (1.1%)	158 (14.9%)	690 (65.1%)	193 (18.2%)	7 (0.7%)
2020-2023	173*	0	17 (9.8%)	143 (82.7%)	13 (7.5%)	0
2016-2019	180	0	4 (2.2%)	126 (70.0%)	48 (18.3%)	2 (1.1%)
2012-2015	180	0	15 (8.5%)	143 (81.3%)	18 (10.2%)	0
Lakes annual average						
2020-2023	222	1 (0.5%)	7 (3.1%)	213 (95.9%)	1 (0.5%)	0
2020-2023	74*	1 (1.4%)	0	73 (98.6%)	0	0
2016-2019	74	0	0	74 (100%)	0	0
2012-2015	74	0	0	74 (100%)	0	0
Lakes winter average						
2020-2023	217	1 (0.5%)	12 (5.5%)	188 (86.6%)	15 (6.9%)	1 (0.5%)
2020-2023	74*	0	1 (1.4%)	68 (91.8%)	4 (5.4%)	1 (1.4%)
2016-2019	74	0	1 (1.4%)	72 (97.3%)	1 (1.4%)	0
2012-2015	74	0	0	73 (99%)	1 (1%)	0
* Analysis using the previously reported Article 10 monitoring programme						

2.2.4 Eutrophication in Lakes and Rivers

In accordance with the Nitrates Directive Article 10 assessment and reporting guidelines, rivers and lakes have been assigned to one of three trophic classes; “Non-eutrophic”; “Could become eutrophic”; and “Eutrophic”. Trophic assessment criteria have been developed for rivers and lakes in Ireland (EPA, 2023).

Table 2-11 summarises the trophic condition assessment criteria for Irish rivers. The trophic status of Irish rivers is based on biological quality elements that are sensitive to nutrient enrichment and nutrient standards. The inputs into the status calculation are the invertebrates as assessed using the EPA’s standard Q-value methodology and orthophosphate concentrations.

The EPA Quality Rating System (Q-value) enables an assessment of the biological response to eutrophication and organic pollution in a predictable manner. The method has been inter-calibrated for the pressure ‘organic enrichment’ at an EU level under the WFD. The biotic index contains five levels of ecological status, as defined by specific assemblages of macro invertebrates.

River phosphorus data has been considered in the assessment, with phosphorus concentrations lower than the Irish Good Status EQS (0.035 mg/l P) reverting to a non-eutrophic designation and concentrations above 0.05 mg/l P being assigned a eutrophic designation.

Table 2-11: Trophic Condition Assessment Criteria for Rivers

WFD Ecological Status	Q-Values	Phosphorus Concentration (mg/l P)	Article 10 Trophic Condition
High	5, 4-5	-	Non-eutrophic
Good	4	-	Non-eutrophic
Moderate	3-4	<0.035	Non-eutrophic
		0.035-0.05	Could become eutrophic
		>0.05	Eutrophic
Poor	3, 2-3	-	Eutrophic
Bad	2, 1-2, 1	-	Eutrophic

The trophic status of lakes is based on the assessment of nutrient standards and biological quality elements that are known to be sensitive to nutrient enrichment i.e. total phosphorus, macrophytes, phytobenthos and phytoplankton.

All biological assessment methods have been intercalibrated for the pressure 'enrichment' at an EU level under the WFD. The scheme is WFD-compliant and incorporates the WFD's normative definitions for ecological status.

Table 2-12 outlines how the trophic status was then assigned based on the lowest class achieved of any of the four individual elements monitored for each lake (referred to as one-out-all-out). For example, if total phosphorus is classified as moderate and all other components are good, then the class is moderate.

Table 2-12: Trophic Condition Assessment Criteria for Lakes (nEQR = normalised Ecological Quality Ratio)

Indicative Trophic Class	Total Phosphorus Concentration (mg/l P)	Phytoplankton (nEQR)	Macrophyte (nEQR)	Phytobenthos (nEQR)	Article 10 Trophic Condition
High	≤ 0.01	≥ 0.8	≥ 0.8	≥ 0.8	Non-eutrophic
Good	> 0.01 and ≤ 0.025	≥ 0.6 and < 0.8	≥ 0.6 and < 0.8	≥ 0.6 and < 0.8	Non-eutrophic
Moderate	> 0. 025 and ≤ 0.05	≥ 0.4 and < 0.6	≥ 0.4 and < 0.6	≥ 0.4 and < 0.6	Could become eutrophic
Poor	> 0. 05 and ≤ 0.075	≥ 0.2 and < 0.4	≥ 0.2 and < 0.4	≥ 0.2 and < 0.4	Eutrophic
Bad	> 0.075	< 0.2	< 0.2	< 0.2	Eutrophic

2.2.5 Trophic Condition of River and Lakes

Biological sampling is undertaken on a three-yearly rolling basis, so every river and lake is sampled at least one year in three. Therefore, rivers and lakes may have been visited more than once in the 2020-2023 reporting period. When this happens, data from the most recent biological sampling is used to determine the biological condition. During the 2020-2023 reporting period, trophic condition was assessed for all 1,085 rivers and 222 lakes included in the Article 10 assessment.

The total number and proportion of river stations in each trophic class are presented in Table 2-13 for the 2016-2019 and 2020-2023 periods.

Table 2-13: Trophic Condition of Rivers

Sampling Period	Stations Sampled	Trophic State – Number and Percentage of Sampling Stations		
		Non-Eutrophic	Could Become Eutrophic	Eutrophic
2020 - 2023	1,085	848 (78%)	80 (7%)	157 (15%)
2020 - 2023	173*	144 (83%)	6 (3%)	23 (14%)
2016 - 2019	178	144 (81%)	5 (3%)	29 (16%)
* Analysis using the previously reported Article 10 monitoring programme				

The trophic state results for rivers for 2020-2023 are shown on Map 2-14. Table 2-13 indicates that 78% of all river stations were recorded as non-eutrophic in 2020-2023. The trend in trophic class is shown in Table 2-14 and Map 2-15.

Overall, Table 2-14 indicates that the riverine eutrophic state has been relatively stable since 2016-2019, with 82% of rivers not changing trophic state. Evidence of increased eutrophication has can be seen in parts of the south east (mainly the River Suir catchment) and western midlands (lower River Shannon catchment).

Table 2-14: Trend in Trophic State for Rivers from 2016-2019 to 2020-2023 - Number of sampling points (and Percentage)

Water bodies	Change in Trophic State – No. of stations (and percentage)				
	Strong decrease	Weak decrease	Stable	Weak increase	Strong increase
1,073	43 (4%)	53 (5%)	887 (82%)	50 (5%)	40 (4%)
173*	10 (6%)	4 (2%)	149 (87%)	4 (2%)	6 (3%)

* Analysis using the previously reported Article 10 monitoring programme

Explanation of classes:

- Strong increase: Non-eutrophic to Eutrophic
- Weak increase: Could become eutrophic to Eutrophic or Non-eutrophic to Could become eutrophic
- Stable: No change in class
- Weak decrease: Eutrophic to Could become eutrophic or Could become eutrophic to Non-eutrophic
- Strong decrease: Eutrophic to Non-eutrophic

The total number and proportion of lakes in each trophic status class are presented in Table 2-15 for the 2016-2019 and 2020-2023 periods. The trophic state results for lakes for 2020-2023 are shown on Map 2-16.

Table 2-15: Trophic Condition of Lakes

Sampling Period	Lakes Sampled	Trophic Status – Number of Lakes (and percentage)		
		Non-Eutrophic	Could Become Eutrophic	Eutrophic
2020 - 2023	222	122 (55%)	67 (30%)	33 (15%)
2020 - 2023	74*	50 (68%)	17 (23%)	7 (9%)
2016 - 2019	74	49 (66%)	19 (26%)	6 (8%)
* Analysis using the previously reported Article 10 monitoring programme				

Table 2-15 indicates that 55% of all lakes were recorded as non-eutrophic in 2020-2023. The trend in trophic status is shown in Table 2-16 and Map 2-17.

Overall, Table 2-16 indicates that the lake eutrophic state has been stable since 2016-2019, with 81% of lakes not changing trophic state.

Table 2-16: Trend in Trophic State for Lakes from 2016-2019 to 2020-2023 - Number of sampling points (and Percentage)

Water bodies	Change in Trophic State – No. of stations (and %)				
	Strong decrease	Weak decrease	Stable	Weak increase	Strong increase
222	0	21 (9%)	178 (81%)	22 (10%)	1 (<1%)
74*	0	7 (9%)	60 (82%)	7 (9%)	0

* Analysis using the previously reported Article 10 monitoring programme

Explanation of classes:

- Strong increase: Non-eutrophic to Eutrophic
- Weak increase: Could become eutrophic to Eutrophic or Non-eutrophic to Could become eutrophic
- Stable: No change in class
- Weak decrease: Eutrophic to Could become eutrophic or Could become eutrophic to Non-eutrophic
- Strong decrease: Eutrophic to Non-eutrophic

2.3 Surface Water Monitoring – Transitional, Coastal and Marine Waters

2.3.1 Monitoring Network for Transitional, Coastal and Marine Waters

Monitoring data for the current reporting period were obtained for transitional and coastal stations included in the WFD National Monitoring Programme. The data have been summarised for the current period 2020-2023 and compared to the previous reporting periods. A breakdown of the numbers and types of monitoring stations is given in Table 2-17.

The WFD surface water monitoring programme started in 2007. Previously, the WFD surveillance monitoring network (relating to 18 transitional and 5 coastal water bodies) has been used for the Article 10 report. For this report, monitoring stations from the WFD operational monitoring network have been included alongside the WFD surveillance monitoring network. Table 2-17 highlights the changes in monitoring stations used, with water quality presented for 64 transitional and 38 coastal water bodies.

As specified in the Article 10 reporting guidance, data are presented for monitoring stations used in 2020-2023, with comparisons made with the data reported in 2016-2019. The monitoring network used in this report uses monitoring stations that are representative of the impact of agriculture on water quality, and allows greater alignment with WFD water quality assessments. The trend analysis since the previous reporting period has been carried out for all 64 transitional and 38 coastal water bodies included in the larger network to facilitate a like for like comparison of water quality i.e., the respective nitrate concentrations and trophic condition assessment has been carried out for the 2020-2023 reporting period and the 2016-2019 reporting period for each of the 64 transitional and 38 coastal water bodies.

Table 2-17: Number of transitional and coastal water bodies (and monitored stations)

Water bodies	Reporting Period			Common sampling points between reporting periods
	2012-2015*	2016-2019*	2020-2023	
Transitional	18 (108)	18 (95)	64	18
Coastal	7 (32)	7 (27)	38	7

* In previous reports, nitrate data from the individual monitoring stations within water bodies were reported. For the 2020-2023 report the data have been aggregated to report at a water body level.

Most transitional and coastal water bodies have several monitoring stations, and the monitoring data are collectively considered to determine the nutrient and biological condition. Data from 102 transitional and 29 coastal individual monitoring stations are no longer being individually reported in this report. These stations are individual monitoring stations, located within water bodies, and the

data are aggregated to inform the overall assessment of nutrient enrichment at the water body scale. Reporting at a water body level offers greater harmonisation with WFD assessments.

The water bodies being monitored by the 102 transitional and 29 coastal individual monitoring stations have not been dropped from the monitoring programme, but instead the aggregated data from these monitoring stations have been assessed and the findings for the respective water bodies have been included in this Article 10 report.

2.3.2 Nitrate Concentrations in Transitional, Coastal and Marine Waters

The average annual, winter average and maximum nitrate concentrations for the transitional and coastal monitoring stations are shown on Maps 2-18 to 2-20 and summarised in Table 2-18. Nitrate is measured as dissolved inorganic nitrogen, which has been converted to nitrate assuming that all measured nitrogen is present as nitrate.

Table 2-18: Quality classes for Nitrate Concentrations in Transitional and Coastal Waters: 2012-2015; 2016-2019; and 2020-2023 – Number of sampling points (and percentage)

Reporting Period	Number of Stations	Quality classes (mg/l NO_3)						
		0-0.49	0.5-1.99	2-9.99	10-24.99	25-39.99	40-50	>50
Transitional Waters annual average								
2020-2023	64	13 (20%)	14 (22%)	28 (44%)	9 (14%)	0	0	0
2020-2023	18*	3 (17%)	6 (33%)	6 (33%)	3 (17%)	0	0	0
2016-2019	18	4 (22%)	5 (28%)	5 (28%)	4 (22%)	0	0	0
2012-2015	18	3 (17%)	6 (33%)	6 (33%)	3 (17%)	0	0	0
Transitional Waters winter average								
2020-2023	64	9 (14%)	10 (16%)	28 (44%)	17 (26%)	0	0	0
2020-2023	18*	3 (17%)	4 (22%)	6 (33%)	5 (28%)	0	0	0
2016-2019	17	2 (12%)	3 (17%)	8 (47%)	4 (24%)	0	0	0
2012-2015	18	2 (12%)	4 (22%)	8 (44%)	4 (22%)	0	0	0
Transitional Waters maximum								
2020-2023	64	2 (3%)	9 (14%)	16 (25%)	25 (39%)	11 (17%)	1 (2%)	0
2020-2023	18*	0	3 (17%)	8 (44%)	3 (17%)	4 (22%)	0	0
2016-2019	18	1 (6%)	2 (11%)	8 (44%)	5 (28%)	2 (11%)	0	0
2012-2015	18	0	2 (11%)	10 (56%)	6 (33%)	0	0	0
Coastal Waters annual average								
2020-2023	38	32 (84%)	5 (13%)	1 (3%)	0	0	0	0
2020-2023	7*	5 (71%)	2 (29%)	0	0	0	0	0
2016-2019	7	5 (71%)	2 (29%)	0	0	0	0	0
2012-2015	7	5 (71%)	2 (29%)	0	0	0	0	0
Coastal Waters winter average								
2020-2023	36	8 (22%)	23 (64%)	5 (14%)	0	0	0	0
2020-2023	7*	2 (29%)	3 (42%)	2 (29%)	0	0	0	0
2016-2019	7	4 (57%)	2 (29%)	1 (14%)	0	0	0	0
2012-2015	7	2 (29%)	4 (57%)	1 (14%)	0	0	0	0
Coastal Waters maximum								
2020-2023	38	3 (8%)	20 (53%)	12 (31%)	3 (8%)	0	0	0
2020-2023	7*	0	4 (57%)	2 (29%)	1 (14%)	0	0	0
2016-2019	7	1 (14%)	3 (43%)	2 (29%)	0	0	0	1 (14%)
2012-2015	7	0	4 (57%)	3 (43%)	0	0	0	0
* Analysis only using the previously reported Article 10 monitoring programme								

In 2020-2023, all transitional water bodies recorded winter and annual averages below 25 mg/l NO_3 and coastal water bodies recorded winter and annual averages below 10 mg/l NO_3. This was the case during the previous reporting periods. Maps 2-18 and 2-19 respectively show that the highest annual and winter averages are seen in the south east.

2.3.3 Nitrate Trend Analysis in Transitional and Coastal Waters

Table 2-19 shows the trends in annual average and winter average concentrations in transitional and coastal water bodies since the previous reporting cycles. Maps 2-21 to 2-22 show the results of the annual average and winter average nitrate concentrations trend analysis for transitional and coastal water bodies since 2016-2019.

Increases in the annual average nitrate concentrations have been observed since 2016-2019, with 33% of transitional water bodies showing an increase in average annual nitrate concentrations. A greater increase in winter average nitrate concentrations is observed in transitional waters, with 46% of transitional water bodies showing an increase in winter average concentration. Most of the increases in nitrate concentrations have been observed in the east and south east.

Overall, the data represent a net decline in water quality nationally because the respective increases in the average annual and winter average concentrations observed at 33% and 46% of the transitional water bodies, are higher than the respective decreases of 26% and 22% in average annual and winter average concentrations.

Table 2-19: Change in Transitional and Coastal Waters Nitrate Concentrations since the previous reporting period – Number of sampling points (and percentage)

Reporting Period	Number of Stations	Number of sampling points (% of points)				
		> -1 mg/l NO_3	-1 to -0.2 mg/l NO_3	-0.2 to +0.2 mg/l NO_3	+0.2 to +1 mg/l NO_3	> +1 mg/l NO_3
Transitional Waters annual average						
2020-2023	64	5 (8%)	12 (18%)	26 (41%)	17 (27%)	4 (6%)
2020-2023	18*	1 (5%)	3 (17%)	9 (50%)	3 (17%)	2 (11%)
2016-2019	18	0	7 (39%)	7 (39%)	1 (5%)	3 (17%)
2012-2015	18	1 (5%)	9 (50%)	6 (33%)	2 (11%)	0
Transitional Waters winter average						
2020-2023	63	7 (11%)	7 (11%)	20 (32%)	11 (17%)	18 (29%)
2020-2023	17*	1 (6%)	2 (12%)	4 (23%)	2 (12%)	8 (47%)
2016-2019	17	2 (12%)	5 (29%)	5 (29%)	2 (12%)	3 (18%)
2012-2015	18	6 (33%)	4 (22%)	5 (28%)	0	3 (17%)
Coastal Waters annual average						
2020-2023	38	0	6 (16%)	28 (74%)	3 (8%)	1 (2%)
2020-2023	7*	0	2 (28%)	5 (72%)	0	0
2016-2019	7	0	1 (14%)	5 (72%)	1 (14%)	0
2012-2015	7	0	2 (28%)	4 (58%)	1 (14%)	01
Coastal Waters average						
2020-2023	34	1 (3%)	6 (18%)	19 (56%)	6 (18%)	2 (5%)
2020-2023	7*	0	1 (14%)	5 (72%)	0	1 (14%)
2016-2019	7	0	3 (44%)	2 (28%)	2 (28%)	0
2012-2015	7	1 (14%)	3 (44%)	2 (28%)	1 (14%)	0
* Analysis using the previously reported Article 10 monitoring programme						

In contrast to the transitional waters, nitrate concentrations in coastal waters are relatively stable with very little change since previous reporting periods. Ten percent of coastal waters showed an increasing trend in annual average nitrate concentrations, with 16% showing a decreasing trend in annual average nitrate concentrations. A similar pattern is observed in winter average nitrate

concentration, with 23% percent of coastal waters showed an increasing trend in winter average nitrate concentrations and 21% with a decreasing trend in winter average nitrate concentrations.

2.3.4 Eutrophication in Transitional, Coastal and Marine Waters

In accordance with the Nitrates Directive Article 10 assessment and reporting guidelines, transitional and coastal water bodies have been assigned to one of three trophic classes; "Non-eutrophic"; "Could become eutrophic"; and "Eutrophic". Further information on the trophic assessment criteria for transitional and coastal water bodies can be found here.

The trophic assessment method for transitional and coastal waters is based on the following three key criteria:

- Enrichment by nutrients: dissolved inorganic nitrogen (DIN) and molybdate reactive phosphorus (MRP).
- Direct effect of eutrophication i.e. accelerated growth of algae (as chlorophyll and macroalgae accumulations); and
- Indirect effects of eutrophication i.e. undesirable disturbance to the balance of organisms or quality of the water concerned (oxygen conditions).

The physico-chemical parameter values for this assessment such as nutrients, oxygen and chlorophyll are sampled in each water body four times per year - once in winter and three times in summer. Other biological elements, e.g., macroalgal growth, are monitored during the summer at the period of peak growth.

Table 2-20 sets out the key criteria used to evaluate the trophic condition of transitional and coastal waters. The criteria are assessed on a sliding scale based on the median salinity of the waterbody, therefore the pass / fail threshold for each element varies with salinity (please refer to Appendix 2 of the linked methodology document for detail on how the thresholds change with salinity).

Table 2-20: Trophic Condition Assessment Criteria for Transitional and Coastal Waters

Trophic Condition	Nutrient Enrichment		Direct Evidence of Eutrophication Impact	Indirect Evidence of Eutrophication
	Nitrogen Concentration	Phosphorus Concentration	Plant Growth - Chlorophyll & Macroalgae	Oxygen Condition
Eutrophic	Fail	Fail	Fail	Fail
	Fail	Fail	Fail	Pass
	Fail	Pass	Pass	Fail
	Pass	Fail	Fail	Fail
	Pass	Fail	Fail	Pass
Could Become Eutrophic	Pass	Pass	Pass	Fail
	Fail	Pass	Pass	Pass
		Fail	Pass	Pass
Not Eutrophic	Pass	Pass	Pass	Pass

2.3.5 Trophic Condition of Transitional, Coastal and Marine Waters

Trophic condition is assessed at the water body level and has been undertaken for 63 Transitional and 38 Coastal Water Bodies. The trophic state results for Transitional and Coastal Waters for 2020-2023 are shown in Table 2-21 and on Map 2-23. Table 2-21 indicates that 35% of transitional water bodies and 76% of coastal water bodies were recorded as non-eutrophic in 2020-2023.

Map 2-23 highlights that geographically, the transitional and coastal water bodies in the south east and along the southern seaboard show the greatest signs of eutrophic impact. In these areas, two

thirds (30 of 45 water bodies) of the transitional and coastal water bodies are either eutrophic (6 water bodies) or could become eutrophic (24 water bodies).

Table 2-21: Trophic State of Transitional and Coastal Waters in 2020-2023

Sampling Period	Water Bodies	Trophic Status – Number of Water Bodies (and percentage)		
		Non-Eutrophic	Could Become Eutrophic	Eutrophic
Transitional Waters				
2020 - 2023	63	22 (35%)	33 (52%)	8 (13%)
2020 - 2023	18*	12 (67%)	6 (33%)	0
2016 - 2019	18	12 (67%)	2 (11%)	4 (22%)
Coastal Waters				
2020 - 2023	38	29 (76%)	9 (24%)	0
2020 - 2023	7*	6 (86%)	1 (14%)	0
2016 - 2019	7	5 (71%)	2 (29%)	0
* Analysis using the previously reported Article 10 monitoring programme				

Overall, Table 2-22 indicates that the eutrophic state of transitional and coastal water bodies has been stable since 2016-2019, with 89% of transitional and 89% of coastal water bodies not changing trophic state. However, Map 2-24 shows that the southern seaboard is where transitional (3 water bodies) and coastal (3 water bodies) waters have started to show the greatest signs of change to more a more eutrophic state.

Table 2-22: Trend in Trophic State for Transitional and Coastal Waters from 2016-2019 to 2020-2023 - Number of water bodies (and Percentage)

Water bodies	Change in Trophic State – No. of stations (and %)				
	Strong decrease	Weak decrease	Stable	Weak increase	Strong increase
Transitional Waters					
63	0	1 (2%)	56 (89%)	6 (9%)	0
18*	0	0	18 (100%)	0	0
Coastal Waters					
38	0	0	34 (89%)	4 (11%)	0
7*	0	0	7 (100%)	0	0

* Analysis using the previously reported Article 10 monitoring programme

Explanation of classes:

- Strong increase: Non-eutrophic to Eutrophic
- Weak increase: Could become eutrophic to Eutrophic or Non-eutrophic to Could become eutrophic
- Stable: No change in class
- Weak decrease: Eutrophic to Could become eutrophic or Could become eutrophic to Non-eutrophic
- Strong decrease: Eutrophic to Non-eutrophic

3 NITRATE VULNERABLE ZONES

Ireland has adopted a whole territory approach in implementing the Nitrates Directive. This decision was given legal effect in 2003 by the European Communities (Protection of Waters against Pollution from Agricultural Sources) Regulations, 2003 (S.I. No. 213 of 2003). There has been no revision to this decision and the Action Programme is being applied across the whole national territory.

The Nitrates Directive is one of the key directives which form the basic measures that Member States are required to fully implement under the Water Framework Directive. Therefore, the adoption of a whole territory approach to implementation of the Nitrates Directive and the establishment of legally binding limits for the application of nitrogen and phosphorus to agricultural land in Ireland ensures that all Irish farmers are considered in relation to the environmental objectives of the Water Framework Directive.

4 DEVELOPMENT, PROMOTION AND IMPLEMENTATION OF CODE OF GOOD PRACTICE

4.1 Nitrogen Discharges to the Environment

Figures for the annual nitrogen application to land from agricultural sources and nitrogen discharges to water from industrial and wastewater sources are summarised in Table 4.1.

Table 4-1: Total Nitrogen application to land and Discharges to the Environment

	2016-2019 Reporting Period		2020-2023 Reporting Period	
Period Total (thousand tonnes)	3,661		2,815[4]	
Agricultural N (Organic N + Mineral N)[1] (thousand tonnes)	2016	857.42	2020	924.46
	2017	906.47	2021	962.06
	2018	967.59	2022	910.02
	2019	906.35	2023	N/A[4]
Industrial N (not connected with urban)[2] (thousand tonnes)	2016	0.072	2020	0[3]
	2017	0.057	2021	0[3]
	2018	0[3]	2022	0[3]
	2019	0[3]	2023	0[3]
Urban wastewater[2] (thousand tonnes)	2016	5.99	2020	6.81
	2017	5.22	2021	5.94
	2018	5.78	2022	5.79
	2019	6.49	2023	N/A[4]

Notes:
1. Total application of organic and mineral N to agricultural land (these figures are not losses to the environment) – estimate from Central Statistics Office (CSO), Ireland and Department of Agriculture, Food and the Marine figures.
2. Total nitrogen discharge from industrial and urban wastewater treatment plants, based on e-PRTR submissions to the EPA. The figures only relate to those facilities with emissions greater than the e-PRTR thresholds i.e. industrial facilities with emissions above 0.05 (thousand tonnes) and urban wastewater treatment plans with population equivalents of >100,000.
3. No facilities discharging greater than the e-PRTR threshold.
4. Total not available, pending national inventory submissions for 2023.

Industrial data reported in Table 4.1 are based on annual returns to the EPA from licenced facilities under the e-PRTR reporting mechanism. The mass loadings reported and the numbers of wastewater treatment plants for which data was available are indicated in the yearly totals.

Agricultural N represents total application to land of organic and mineral N and does not represent actual losses. These data were obtained from the Department of Agriculture, Food and the Marine (DAFM) and collated by Central Statistics Office (CSO). The Eurostat Nutrient Budget Methodology (Eurostat, 2013) has been applied to the data for reporting on Agricultural N.

4.2 Code of Good Practice

The Nitrates Directive has been implemented in Ireland since 1991 by way of extensive monitoring of nitrate levels in waters, the assessment of the trophic status of waters, the development and dissemination in 1996 of a *Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates* and a range of other measures which operate to protect water quality from pollution by agricultural sources.

Ireland adopted a whole territory approach in 2003 for the purposes of further implementation of the Nitrates Directive. A Nitrates Action Programme (NAP) was finalised in 2005. Elements of this first NAP were given statutory effect by the European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2006. The NAP is required to be reviewed and, where necessary, revised, at least every four years. There have been five NAPs implemented in Ireland since 2006, the second, third, fourth and fifth came into effect in 2010, 2014, 2018 and 2022 respectively. Ireland's fifth NAP is currently going through an interim review, which includes an appropriate assessment. The outcome of this review will inform subsequent updates to the NAP.

4.3 Data Concerning the National Territory of Ireland

Ireland operates a whole of territory approach to the implementation of the Nitrates Directive. Therefore, all farming activity in the country must be according to the Code of Good Agricultural Practice. A summary of agricultural activity in Ireland during the period 2020-2023 is presented in Table 4-2 together with figures for the previous reporting period, where available.

Table 4-2: Agricultural Statistics for Ireland

	2016 - 2019 Reporting Period		2020 – 2023 Reporting Period	
Total land area (km²)[1]	70,273		70,273	
Agricultural land (km²)[1]	2016	44,612	2020	45,116
	2017	44,895	2021	43,374
	2018	45,163	2022	43,479
	2019	45,244	2023	41,892
Agricultural land available for application of manure (km²)[1,2]	2016	39,288	2020	40,398
	2017	39,693	2021	38,900
	2018	39,922	2022	37,454
	2019	40,029	2023	33,685
Grassland area (km²)[1]	2016	40,954	2020	41,520
	2017	41,239	2021	39,749
	2018	41,492	2022	39,664
	2019	41,677	2023	38,168
Perennial crops (km²)[1]	**Fruit crops**		**Fruit crops**	
	2016	8	2020	8
	2017	8	2021	8
	2018	8	2022	9
	2019	8	2023	9

Annual use of organic N from livestock manure (thousand tonnes)[3]	2016 518.3	2020 544.9
	2017 537.4	2021 562.9
	2018 559.1	2022 566.8
	2019 n/a	2023 n/a
Annual use of organic N other than livestock manure (thousand tonnes)	n/a	n/a
Annual use of mineral N (thousand tonnes N)[1]	2016 339.1	2020 379.5
	2017 369.1	2021 399.2
	2018 408.5	2022 343.2
	2019 367.4	2023 N/A
Number of farmers[1]	2016 137,500	2020 130,216
Number of farmers with livestock[1]	Total number of farms (000s) with:	Total number of farms (000s) with:
	Year - 2016	Year - 2020
	Specialist beef 78.8 Specialist dairy 16.1 Specialist sheep 15.1 Specialist tillage 4.7 Mixed grazing livestock 11.6 Mixed crops and livestock 2.1 Mixed field crops 8.2 Other 1.3	Specialist beef 74.2 Specialist dairy 15.3 Specialist sheep 17.4 Specialist tillage 4.4 Mixed grazing livestock 8.6 Mixed crops and livestock 1.6 Mixed field crops 11.6 Other 1.4

Livestock numbers (million heads, in June)[1]		
Cattle	2016 7.2	2020 7.3
	2017 7.4	2021 7.4
	2018 7.3	2022 7.4
	2019 7.2	2023 7.3
Sheep	2016 5.2	2020 5.5
	2017 5.2	2021 5.6
	2018 5.1	2022 6.0
	2019 5.1	2023 5.7
Pigs	2016 1.6	2020 1.6
	2017 1.6	2021 1.7
	2018 1.6	2022 1.6
	2019 1.6	2023 1.7
Poultry	2016 n/a	2020 n/a
	2017 n/a	2021 n/a

	2018	n/a	2022	n/a
	2019	n/a	2023	n/a
Other:	2016	0.1	2020	0.1
Horses, ponies, mules, jennets, asses, goats, farmed deer	2017	0.1	2021	0.1
	2018	0.1	2022	0.1
	2019	0.1	2023	0.1

Notes:

[1] Central Statistics Office (CSO), Ireland from Crops and Livestock Survey Final

[2] Estimated from the area allocation to grassland and crop production, but excludes rough grazing

[3] According to Eurostat Nutrient Budget Methodology

n/a = not available

5 PRINCIPAL MEASURES UNDER NATIONAL ACTION PROGRAMME

5.1 Agricultural Activities, Development and Nitrogen Assessment

Statistics summarising agricultural activity in Ireland during the current and previous reporting periods are presented in Table 5.1.

Table 5-1: Summary of Agricultural Activities

	Previous Reporting period 2016 - 2019	Current Reporting period 2020 - 2023
Total land area (km^2)[1]	70,273	70,273
Agricultural area (km^2)[1]	2016 44,612	2020 45,116
	2017 44,895	2021 43,374
	2018 45,163	2022 43,479
	2019 45,244	2023 41,892
Agricultural area available for application of manure (km^2)[1,2]	2016 39,288	2020 40,398
	2017 39,693	2021 38,900
	2018 39,922	2022 37,454
	2019 40,029	2023 33,685
Evolution in farming practices		
Grassland area (km^2)[1]	2016 40,954	2020 41,520
	2017 41,239	2021 39,749
	2018 41,492	2022 39,664
	2019 41,677	2023 38,168
Perennial crops (km^2)[1]	Fruit crops	Fruit crops
	2016 8	2020 8
	2017 8	2021 8
	2018 8	2022 9
	2019 8	2023 9
Manure N excretion per animal category[3] (000 tonnes/year)		
Cattle	2016 458.9	2020 480.9
	2017 476	2021 497.7
	2018 498.1	2022 501.5
	2019 478.9	2023 n/a
Sheep and goats	2016 31.4	2020 34.8
	2017 33.4	2021 35.7
	2018 33	2022 36.7
	2019 31.9	2023 n/a
Pigs	2016 13.1	2020 13.7
	2017 13.4	2021 14.2

	2018	13.1	2022	13.4
	2019	13.4	2023	n/a
Poultry	2016	9.4	2020	10.5
	2017	9.5	2021	10.7
	2018	9.6	2022	10.5
	2019	10	2023	n/a
Other: *Horses, ponies, mules, jennets, asses, farmed deer*	2016	5.5	2020	5.0
	2017	5.1	2021	4.6
	2018	5.0	2022	4.6
	2019	4.8	2023	n/a
Notes: [1] Central Statistics Office (CSO), Ireland from Crops and Livestock Survey Final [2] Estimated from the area allocated to grassland and crop production but excludes rough grazing. [3] According to Eurostat Nutrient Budget Methodology n/a = not available				

5.1.1 Principal Evolution Observed in Crops

Changes Favourable to Limit Nitrogen Losses

- Total grassland area decreased to an average of 3,977,525 ha in the current period compared to 4,134,050 ha in the 2016-2019 period[2].
- Mild winters and cool summers with rainfall relatively evenly distributed throughout the year and moist soils ensure grass growth, and nitrogen uptake, almost right throughout the year in Ireland.
- The land area used for potato cultivation has continued to reduce, albeit with less of a reduction from the previous periods, from an average of 8,775 ha in the 2016-2019 period to average of 8,625 ha in the current period 2020-2023.
- The total area devoted to cereal crops has had a slight increase from an average of 270,700 ha in the 2016-2019 period to average of 275,925 ha in the current period 2020-2023.
- There is a slight increase in the area devoted to tillage crops, fruit and horticulture from 361,275 in the 2016-2019 period to an average of 369,025 ha in the current period 2020-2023, which is a change from the previous period where there was a decrease in the area.
- The NAP requires green cover be put in place where a total herbicide is used, or arable land is ploughed after 1st July each year. The fifth NAP has introduced a new requirement to shallow cultivate between 75 and 80% of cereal land within 14 days of harvest in the counties identified as needing nitrogen reductions.

Changes Unfavourable to Limit Nitrogen Losses

- The area devoted to maize silage increased from 14,300 in the 2016-2019 period to average of 16,100 ha in the current period 2020-2023. There was an annual increase of 24% in maize production from 2022 to 2023. Maize is used for forage to be fed to animals indoors and there is a risk that reduced maximum stocking levels could further increase maize production to be fed indoors

[2] Central Statistics Office (CSO), Ireland. This includes pasture, hay, grass silage and rough grazing in use, Central Statistics Office, Ireland

- Average annual sales of mineral N decreased from 327,827 tonnes in the 2016-2019 period to average of 335,611 tonnes in the period 2020-2023 with an average of 280,569 tonnes sold in 2023.
- The late harvest of crops reduces the quality and effectiveness of green cover being established (by sowing a winter crop or via natural regeneration/shallow cultivation) before the onset of winter.
- There was both extremely wet and extremely dry weather during the current period 2020-2023. Annual average temperatures have been overall increasing since 2016 with the highest average temperature of 11˚C in 2023[3]. There were also unprecedented rainfall levels in 2023 with some stations recording 2023 as the wettest year on record.

5.2 Action Programme

In Ireland, the Nitrates Action Programme is given legal effect by the European Communities (Good Agricultural Practice for Protection of Waters) Regulations, as amended. The Nitrates Action Programme (NAP) is required to be reviewed and, where necessary, revised, at least every four years. The dates of publication and revisions to Ireland's NAPs are listed in Table 5-2. Details of Commission Decisions and approval periods allowing Ireland to operate a derogation from the limits of the Nitrates Directive to an annual maximum of 250 kg organic N per hectare are also provided in Table 5-2.

The current Article 10 reporting period 2020-2023 spans the fourth and fifth NAPs. Statutory Instrument S.I. 605 of 2017 and amendments giving effect to the fourth NAP was revoked and replaced by S.I. 113 of 2022 on 11 March 2022 which gives legal effect to Ireland's fifth NAP.

On 2 August 2022, the amending S.I. 393 of 2022 gave legal effect to the Commission Implementing Decision approving Ireland to operate a derogation from the limits of the Nitrates Directive, thereby replacing the revoked S.I. No. 65 of 2018. This approval also expires on 31st December 2025.

Table 5-2 provides details on amendments to the current NAP that have taken place since the fifth NAP commenced in March 2022. Subsequent amendments include the strengthening of agricultural measures to improve water quality.

Table 5-2: Revisions Nitrates Action Programme

Nitrates Action Programme	Date of effect	National Statutory Instrument *	Purpose and effect
NAP 1	01/02/2006	S.I. No. 788 of 2005	Primary Legislation
	01/08/2006	S.I. No. 378 of 2006	Primary Legislation
	19/07/2007	S.I. No. 526 of 2007	Amendment for clarification
	31/03/2009	S.I. No. 101 of 2009	Amendment approving derogation
NAP 2	28/12/2010	S.I. No. 610 of 2010	Primary Legislation including derogation
	29/03/2011	S.I. No. 125 of 2011	Amendment clarification
NAP 3	31/01/2014	S.I. No. 31 of 2014	Primary Legislation
	18/03/2014	S.I. No. 134 of 2014	Amendment approving derogation
	17/10/2014	S.I. No. 463 of 2014	Amendment clarification

[3] Annual Climate Statement for 2023 - Met Éireann - The Irish Meteorological Service

NAP 4	02/01/2018	S.I. No. 605 of 2017	Primary Legislation
	13/03/2018	S.I. No. 65 of 2018	Amendment approving derogation
	14/02/2020	S.I. No. 40 of 2020	Amendment to derogation
	26/06/2020	S.I. No. 225 of 2020	Amendment data sharing
	20/11/2020	S.I. No. 529 of 2020	Amendment additional measures
	04/01/2022	S.I. No. 749 of 2021	Amendment clarification
NAP 5	11/03/2022	S.I. No. 113 of 2022	Primary Legislation
	02/08/2022	S.I. No. 393 of 2022	Amendment to derogation
	30/12/2022	S.I. No. 716 of 2022	Amendment additional measures
	24/02/2023	S.I. No. 62 of 2023	Amendment clarification

Derogation approval period	**Date of effect**	**Implementing Decision**	**Expiration date**
NAP 1	22/10/2007	C(2007)5095	17 July 2010
NAP 2	24/02/2011	C(2011)1032	31 Dec 2013
NAP 3	27/02/2014	C(2014) 1194	31 Dec 2017
NAP 4	08/02/2018	C(2018) 626	31 Dec 2021
NAP 5	29/04/2022	C(2022) 696	31 Dec 2025

*Irish Statute Book available at: www.irishstatutebook.ie

5.2.1 Introduced or Modified Elements of Action Programme

The fifth NAP was developed following a scientific review, public consultation and discussion with the Commission. The measures included in the fourth NAP, as reported in the 2016-2019 report, that have been continued through NAP 5 are listed below, alongside introduced or modified elements adopted under NAP 5. Several measures introduced in the fifth NAP are to be implemented on a phased basis to allow time to make necessary changes on the holdings. Consequently, they fall outside of the 2020-2023 reporting period but are included for reference and consideration.

1. Periods of Prohibition of Application

NAP 4 and 5

The country is divided into three zones for the purposes of the Regulations. These zones are related to the length of the growing season, weather, soil types etc. in each zone (see S.I. 113 of 2022).

- Chemical fertiliser may not be applied between the 15th September and 26th/29th January / 14th February (the end of the prohibited period varies depending on Zone) – see Table 5-3.
- Organic fertilisers (other than farmyard manure) may not be applied between the 1st October and the 12th/15th/31st January.
- Farmyard manure may not be applied between 1st November and the 12th/15th/31st January.
- On dairy holdings, the application of soiled water is prohibited at the riskiest time of year to reduce the loss of nutrients to water. Soiled water storage capacity requirements have been increased in line with the new closed periods - see Table 5-3.

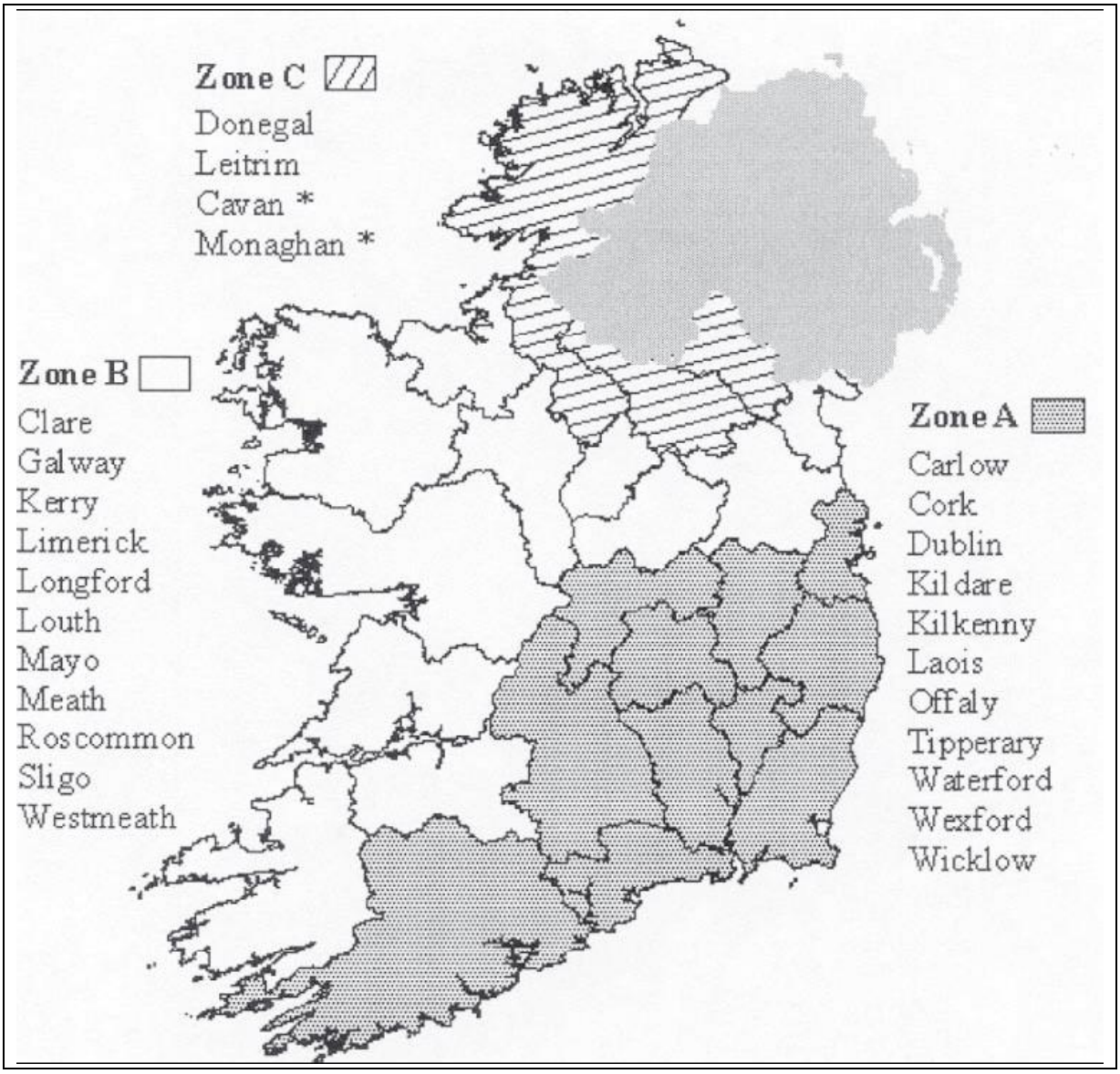

Figure 5.1: Zones Governing the Application of Regulations

Table 5-3: Prohibited Application Periods in National Zones

Zone	Storage Period	Prohibited Application Periods (effective from January 2023)			
		Chemical Fertilisers (Nitrogen and Phosphorous)	**Organic Fertilisers** (other than FYM)	**Farmyard Manure** (FYM)	**Soiled Water** (on holdings producing milk in all Zones)
A	16 Weeks	15th Sept–26th Jan	1st Oct–12th Jan	1st Nov–12th Jan	10th – 31st Dec in 2023 1st – 31st Dec in 2024* (*except for Winter Milk Producers where the full month closed period becomes effective from Dec 2025)
B	18 Weeks	15th Sept–29th Jan	1st Oct–15th Jan	1st Nov–15th Jan	
C (Donegal, Leitrim)	20 Weeks	15th Sept–14th Feb	1st Oct–31st Jan	1st Nov–31st Jan	
C (Cavan, Monaghan)	22 Weeks	15th Sept–14th Feb	1st Oct–31st Jan	1st Nov–31st Jan	

2. Livestock Excretion Rates

- Three new excretion rate bands are being introduced for the dairy cow. Each dairy herd will be assigned to one of the three band's each year, based on the herd's average annual milk yield per cow as set out in Table 5-4.
- Banding dairy cows' excretion rate based on milk yield reflects the scientific research that shows increasing milk yield also increases the dairy cow's nutrient excretion rate.

Table 5-4: Annual dairy cow nutrient excretion rates from 1st January 2023

Band	Herd Average Milk Yield	N Excretion Rate (kg/cow/year)	P Excretion Rate (kg/cow/year)
1	<=4,500 kg	**80**	12
2	4,501-6,500 kg	**92**	13.6
3	>6,501 kg	**106**	15.8

- The excretion rate band for each dairy herd is calculated based on the total volume of milk delivered to the milk purchaser(s) divided by the average number of dairy cows on the holding. In confirming their assigned band for 2023 each dairy farmer can select one of the following options to calculate their average milk yield:
  - **Option 1:** Select the rolling average for the three preceding years (2020, 2021, 2022), or
  - **Option 2:** Select the most recent preceding year (2022), or
  - **Option 3:** Select to use the herd's 2023 average milk yield. This option is only available in 2023, as a once-off transitional measure.
- A dairy farmer must confirm their dairy cow band annually to the Department of Agriculture, Food and the Marine. Farmers can submit this via a specifically developed application for banding calculations on the Irish Cattle Breeding Federation (ICBF) website (www.icbf.com).

3. Capacity of manure storage, and requirement regarding construction and tightness

NAP 4 and 5

- Storage facilities for livestock manure and other organic fertilisers, soiled water and

effluents from dungsteads, farmyard manure pits or silage pits must be maintained free of structural defect and be maintained and managed in such manner as is necessary to prevent run-off or seepage, directly or indirectly, into groundwater or surface water, of such substances.

- Storage facilities built after the introduction of the Regulations must be designed, sited, constructed, maintained and managed to prevent run-off or seepage, directly or indirectly, into groundwater or surface water and must comply with such construction specifications for those facilities as may be approved from time to time by the Minister for Agriculture, Food and the Marine.
- In the case of holdings with pigs the required storage capacity is adequate capacity to store all such manure for a period of at least 26 weeks (at least 16/18/20/22 weeks is adequate in the case of holdings with less than 100 pigs).
- In the case of holdings with poultry the required storage capacity is adequate capacity to store all such manure for a period of at least 26 weeks (at least 16/18/20/22 weeks is adequate in the case of holdings with less than 2,000 poultry places).
- In the case of holdings with sheep, deer and goats the required storage capacity is adequate capacity to store all such manure for a period of at least six weeks.
- In the case of holdings with cattle the required storage capacity is adequate capacity to store all such manure for a period of at least 16/18/20/22 weeks (depending on the zone that the holding is in).
- Reduced storage capacity is acceptable in certain circumstances (e.g. where grazing livestock are being out-wintered in accordance with the conditions set out in the Regulations).
- The storage capacity for soiled water must equal or exceed the capacity required to store all soiled water likely to arise on the holding during a period of 15 days.
- From 1st December 2023, a minimum of 21 days storage capacity shall be in place on the holding and from 1st December 2024, a minimum of 31 days storage capacity shall be in place on the holding except for winter/liquid milk producers where this storage must be in place by 1st December 2025.

4. Rational fertilisation

NAP 4 and 5

- For Grassland there is a 10% reduction to the maximum chemical nitrogen allowance that was permitted under the previous Regulations, S.I. No. 605 of 2017 (as amended). The current maximum application rates are set out in Table 5-5.

Table 5-5: Annual maximum fertilisation rates of nitrogen on grassland

Grassland stocking rate (kg N/ha/year)	Maximum Chemical Nitrogen (kg/ha)
≤130	114
131-170	185
171-210	254
211-250	225
>250	225

- An occupier of a holding must take all such reasonable steps as are necessary for the purposes of preventing or minimising the application to land of fertilisers in excess of crop requirement.

- The amounts of available nitrogen or available phosphorus applied may not exceed the maximum fertilisation rates set out in the Regulations.
- In the absence of a soil test for phosphorus index 4 must be assumed (maximum rates of P that can be used in such circumstances are maintenance levels of P).The availability of nitrogen and phosphorus in chemical and organic fertilisers is specified in the Regulations (e.g. nitrogen and phosphorus in chemical fertilisers and phosphorus in organic fertilisers is deemed to be 100% available).
- Soil Tests are compulsory from January 2023 for holdings with a grassland stocking rate above 130 kg N/ha. Soil tests are also required for all sown arable land from January 2023.
- Soil tests are considered valid for a period of four years. The absence of a valid soil test Index 3 must be assumed except in a case where a soil test indicates that soil to be at phosphorus index 4.
- An occupier of a holding located in an area where soils have an organic matter content of 20% an above, as defined on the Teagasc-EPA Indicative Soils map, shall ensure that the soil test undertaken includes organic matter determination. The phosphorus fertilisation rate for soils with more than 20% organic matter shall not exceed the amounts permitted for Index 3 soils.
- Increased phosphorus build-up on grassland on farms with grassland stocking rates of 130 kg nitrogen per hectare and above may be permitted at defined rates provided that certain conditions are met which include: soil analysis results are provided, the occupier participate in related training programme, a FAS advisor's services are engaged in the development of a detailed farm nutrient plan. P build up annual maximum fertilization rates were included in Schedule 2 (13B) of the Regulations.
- On commonage, the maximum permitted stocking rate is 50kg N/ha with no chemical fertiliser permitted.

5. Provisions on application of fertilisers on water-saturated, flooded, frozen and snow-covered ground

NAP 4 and 5

Chemical or organic fertilisers cannot be applied when:

- The land is waterlogged.
- The land is flooded or likely to flood.
- The land is snow-covered or frozen.
- Heavy rain is forecast within 48 hours.

6. Limitation of total fertilisation, by types of crops

NAP 4 and 5

- Maximum fertilisation rates of available nitrogen and phosphorus for grassland, tillage, vegetable and fruit crops are set out in the Regulations.

7. Provisions on fertilisation on slopes

NAP 4 and 5

- Chemical or organic fertilisers cannot be applied when the ground slopes steeply and there is a risk of water pollution having regard to factors such as surface runoff pathways, the presence of land drains, the absence of hedgerows to mitigate surface flow, soil condition and ground cover.

8. Provisions on application of fertilizers near watercourses

NAP 4 and 5

- For holdings applying chemical fertiliser to land a 3m buffer strip from any surface waters is required. For tillage ground a 3m buffer strip (no cultivation) from a watercourse is required. For late harvested crops, a minimum buffer of 6m is required where the field slopes towards a watercourse.
- In the case of organic fertiliser or soiled water; site-specific and risk-based approach to be used by Local Authorities in setting setback distances around drinking water abstraction points, following assessment of conditions.
- Organic fertiliser or soiled water cannot be applied to land within 200/100/25 metres of any water supply for human consumption (varies depending on amount of water being supplied or the number of people being served).
- Organic fertiliser or soiled water cannot be applied to land within 20 metres of a lake shoreline.
- Organic fertiliser or soiled water cannot be applied to land within 15 metres of exposed cavernous or karstified limestone features.
- Organic fertiliser or soiled water cannot be applied to land within 5 metres of any other surface watercourse (there are exceptions, e.g. the buffer strip is 3 metres in the case of an open drain).

9. Provisions on procedure for land application of fertilizers, both chemical and livestock manure

NAP 4 and 5

- An occupier of a holding must have regard to weather forecasts issued by Met Éireann when applying fertilisers.
- Organic fertilisers must be applied in as accurate and uniform a manner as is practically possible.
- Organic fertilisers may not be applied with an upward facing splash plate or by use of a sludge irrigator.
- Organic fertilisers cannot be applied from a road or passageway adjacent to the land.
- Soiled water may not be applied at rates that exceed 50,000 litres/ha in any 42-day period or by irrigation at a rate exceeding 5 mm/hour (except in extreme vulnerability areas where the maximum rates allowed are much lower).

10. Winter coverage of soils

NAP 4 and 5

- Arable land ploughed between 1st July and 30th November must have a green cover from a sown crop within 14 days of ploughing.
- Grassland ploughed between 1st July and 15th October must have a green cover from a sown crop within 14 days of ploughing.
- Grassland may not be ploughed between 16th October and 30th November.
- Where a non-selective herbicide is used on arable land or grassland between 1st July and 30th November, there must be green cover from a sown crop or from natural regeneration within six weeks of application of the herbicide.
- Where green cover is provided to comply with the rules concerning ploughing or use of a non-selective herbicide, it must not be removed by ploughing or by use of a non-selective herbicide before 1st December, unless a crop is sown within two weeks of removing it.

NAP 4 and 5

- When a non-selective herbicide is applied to land after 15th October, the land area required to for the emergence within 6 weeks of the application of green cover shall be reduced to 75% of the relevant cereal area where a contract is in place for seed crops or crops producing grain destined for human consumption which prohibits the application of a non-selective herbicide preharvest.

11. Green Cover on Tillage Ground

NAP 5

- To reduce potential losses of nutrients post-harvest, shallow cultivation or sowing of a crop must be completed post-harvest in certain counties.
- Shallow cultivation or sowing of a crop post-harvest is required in counties Carlow, Cork, Dublin, Kildare, Kilkenny, Laois, Louth, Meath, Offaly, Tipperary, Waterford, Westmeath, Wexford, and Wicklow.
- Other counties are exempt from the requirement to undertake this action.
- The shallow cultivation or the sowing of a crop must be undertaken within 10 days of the chopping or baling of straw post-harvest.
- In all cases, where shallow cultivation or sowing of a crop is required it must take place within 14 days of harvesting (apart from where weather dictates the requirement should not apply).
- This measure has been targeted to ensure its effectiveness is maximized while ensuring the minimum impact on biodiversity. As part of this, a minimum of 20% and a maximum of 25% of cereal land on each holding must not be subject to shallow cultivation post-harvest to preserve food sources for farmland birds.
- A crop may still be established on this land as normal.

12. Other preventive measures for all holdings

NAP 4 and 5

- Certain records must be maintained.
- Farmyard manure may not be stored in a field, during the permitted application period, within certain specified distances from water sources.
- Silage bales may not be stored outside of farmyards within 20 metres of a watercourse or drinking water abstraction point in the absence of adequate facilities for the collection and storage of any effluent arising.
- In the absence of adequate facilities for the collection and storage of any effluent that may arise, silage bales can only be stored a maximum of two bales high. Supplementary feeding points shall not be located within 20m of waters and shall not be located on bare rock.
- The soil sampling area permitted for the taking of a soil sample for the analysis of phosphorus or organic matter content is 5 hectares (in the previous Nitrates Action Programme a maximum sample area of 8 ha was allowed).

NAP 4 and 5

- No cultivation shall take place within 2m of a watercourse identified on the modern 1:5000 scale Ordinance Survey Ireland (OSI) mapping or better, except in the case of grassland establishment or the sowing of grass crops.
- There shall be no direct runoff of soiled waters to waters resulting from the poaching of land on the holding.

- There shall be no direct runoff of soiled water from farm roadways to waters from 1st January 2021. The occupier of a holding shall comply with any specification from farm roadways specified by the Minister for Agriculture, Food and the Marine pursuant to this requirement.
- As set out in Table 5-6, a phased approach applies to the introduction of requirements for Low Emission Slurry Spreading (LESS) for all farms above a grassland stocking rate of 100 kg N/ha.
- On holdings with a grassland stocking rate of 130 kg N/ha or above, a maximum crude protein content of 15% is permitted in concentrate feedstuff fed to dairy cows and other bovines aged two years old and over between 15th April and 30th September.

13. Other preventive measures for holdings at 170 kg nitrogen per hectare or above

NAP 4 and 5

- The European Commission Implementing Decision (EU) 2022/696 granting Ireland's current Nitrates Derogation, required Ireland to undertake a two-year review of water quality in 2023. As part of the interim review, a reduction in the maximum permitted limit of Nitrogen to be applied on the holdings of beneficiaries in receipt of a Nitrates Derogation came into effect from 1st January 2024. The interim review concluded that in water bodies where the assessment showed average water quality concentrations above a threshold of 50 mg/l NO_3, or increasing trends, or eutrophic water bodies or water bodies that could become eutrophic, the derogation application limit of 250kg N/ha was reduced to 220kg N/ha.
- The required use of low emission slurry spreading equipment has been phased in since 2019 for holdings in derogation, and 2021 for non-derogated holdings.
- As set out in Table 5-6, a phased approach applies to the introduction of requirements for Low Emission Slurry Spreading (LESS) for all farms above a grassland stocking rate of 100 kg N/ha. From January 2023, Low Emission Slurry Spreading equipment must also be used for all applications of pig slurry. It must also be used when applying livestock manure to arable land, or the livestock manure must be incorporated into the soil within 24 hours.

Table 5-6: Phased introduction of Low Emission Slurry Spreading (LESS) Requirement

Effective From	LESS Mandatory for those with grassland stocked at
January 2023	> 150 kg N/ha
January 2024	>130 kg N/ha
January 2025	>100 kg N/ha

- A maximum crude protein content of 15% in concentrate feed for grazing livestock must not be exceeded between April 15th and September 30th. This information must be included in feed concentrate records farmers submit annually.
- Completion of Farm Advisory Service training in nutrient use efficiency and grassland management is required for derogated holdings from 2020 and 2021.
- Grass reseeding on derogated grassland farms must include a minimum clover content not exceeding 50% of the sward mixture.
- Hedgerow maintenance to support biodiversity on derogated farms is required from 2020.
- In the case of holdings with grassland stocking rates of 170 kgs nitrogen per hectare from livestock manure or above, bovine livestock shall not be permitted to drink directly from waters from 1st January 2021 onwards.
- A fence shall be places at least 1.5m from the top of the riverbank or water's edge to

exclude livestock shall be in place by 1st January 2021.

- In the case of holdings required to exclude bovine livestock from watercourses, supplementary drinking points may not be located within 20m of surface waters from 1st January 2021. A whole farm liming programme is required to correct soil pH from 1st January 2020 on derogated holdings, and 1st January 2021 for non-derogated holdings.

6 EVALUATION OF ACTION PROGRAMMES

6.1 Agricultural Inspections

Table 6-1: Summary of Agricultural Inspections

	Previous Reporting period 2016-2019	Current Reporting period 2020-2023
Number of farmers concerned[1]	2016 137,500 (72,500 main occupation)	2020 130,216 (69,456 main occupation)
Farmers with livestock[1]	Total number of farms (000s) with: Year - 2016 Specialist beef 78.3 Specialist dairy 16.1 Specialist sheep 15.1 Specialist tillage 4.7 Mixed grazing livestock 11.6 Mixed crops and livestock 2.1 Mixed field crops 8.2 Other 1.3	Total number of farms (000s) with: Year – 2020 Specialist beef 74.2 Specialist dairy 15.3 Specialist sheep 17.4 Specialist tillage 4.4 Mixed grazing livestock 8.6 Mixed crops and livestock 1.6 Mixed field crops 11.6 Other 1.4
Percentage of farmers visited each year[2]	• 1% (DAFM only)[2] • 1% (DAFM on behalf of competent authority, i.e. Local Authority) • 5% of derogation farm applicants (DAFM)	• 1% (DAFM only)[2] • 1% (DAFM on behalf of competent authority, i.e. Local Authority) • 5% of derogation farm applicants, increasing to 10% as of fifth NAP review 2022 (DAFM)

Notes:

[1] Based on Farm Structure Survey 2016 and 2020 (Farmer=Farm holder)
https://www.cso.ie/en/releasesandpublications/ep/p-coa/censusofagriculture2020-preliminaryresults/kf/

[2] Inspections carried out by DAFM in the context of cross-compliance arrangements under the Single Payment Scheme; the frequency of inspections is based on the Recommended Minimum Criteria for Environmental Inspections Plan.

As part of the controls under the Good Agricultural Practice Regulations, DAFM carries out checks on the application rates of all herdowners with livestock on an annual basis. Herdowners in breach of the 170/250 kg per hectare limit incur penalties.

- **Previous Reporting period 2016 – 2019**

  The average number of penalties issued for the 2016-2019 period was 1,810 per annum.

- **Current Reporting period 2020 – 2023**

  The average number of penalties issued for the 2020-2023 period was 2,381 for the years 2020-2022 inclusive as 2023 has not yet been finalsied and therefore figures are not yet available for 2023.

Recording of animal manure movements was moved from paper-based system to an online system in 2021 and this may explain some of the increases in penalties which are likely down to increased detection.

Regarding inspections for compliance with the Nitrates Derogation terms and conditions, the following information is currently available.

- 2017 - 93% compliance.
- 2018 - 97% compliance (55% of non-compliances due to insufficient storage for livestock manures).
- 2019 - 93% compliance (73% of non-compliances due to insufficient storage for livestock manures).
- 2020 – 93% compliance.
- 2021 – 87.5% compliance.
- 2022 – 88% compliance.
- 2023 – N/A (to be processed and evaluated in 2024)

Reasons provided by farmers for non-compliance

- There can be a lack of up-to-date knowledge and understanding around new measures and their purpose and therefore a reluctance to engage.
- Some farmers indicate that they did not get the correct up to date advice from their advisors.
- Financial constraints limit farm improvement in some cases e.g. upgrading or expanding slurry storage facilities.
- Lack of clarity for the future of the nitrates derogation also limits farm improvements in some cases, farmers can be reluctant to invest in the future if they are Nitrates Derogation applicants currently without assurance of the Nitrates Derogation post 2025.

Proposals to improve compliance

- Further collaboration between government departments and agencies to allow for better targeting of measures e.g. data sharing.
- Enhanced industry support in meeting environmental targets should be enhanced e.g. via the Agricultural Sustainability and Advice Programme (ASSAP). In 2023 the 'Farming for Water' EIP was launched with €60 million in funding for water quality. This is a collaborative approach between Department of Agriculture, Food and the Marine (DAFM) and the Department of Housing, Local Government and Heritage (DHLGH) with DAFM providing €50 million for farmer payments, with the objective of involving 15,000 farmers in priority areas nationally, and DHLGH providing €10 million for administrative support.
- Further development of Agricultural Knowledge and Innovation Systems (AKIS) facilitate timely, relevant and practical knowledge transfer.
- Continuing professional development of the advisory service will be enhanced and updated to reflect the AKIS activity and ensure that legislation and measures are understood. In 2023 Teagasc launched a 'Better Farming for Water Campaign' to continue awareness raising and

have outlined eight actions for change that farmers can take on their farms which will lead to improvements in water quality[4].

- The fifth NAP includes a National Agricultural Inspection Programme being put in place by local authorities and the EPA with the aim of undertaking 4,500 inspections annually.
- The continued support of results-based schemes will have a demonstrable benefit but need to be simple to understand and easy to implement.

6.2 Measurable criteria for assessing impact of the programmes on practices in the field

- All nitrates derogation applicants must submit a nutrient management plan to the Department of Agriculture, Food and the Marine. This must be based on soil test results and agricultural practice and are checked on inspection.
- In addition, all farmers in the Agri-environment scheme ACRES must take soil samples if applying chemical or organic fertiliser. Under the Nitrates Regulations, all farmers with a grassland stocking rate above 130 kg N/ha must take soil samples and all arable land must be soil sampled, without soil samples no chemical P can be applied.
- Soils must be tested at least every four years and the Nutrient Management Plan updated to reflect the soil test results. A maximum of 5 ha per soil test is permissible.
- The obligatory use of low emission slurry spreading (LESS) equipment has been phased in for all farms in nitrates derogation and all farms with a grassland stocking rate of 130 kg N/ha or above since 2023 and from 2024 onwards this requirement is for all farmers at a grassland stocking rate of 100 kg N/ha or above. All pig slurry must also be spread using LESS.
- No cropland is permitted to be bare during the winter. Cover crops or post-harvest stubble is required to remain in place. In the 5th Nitrates Action Programme, a requirement for shallow cultivation after harvest was introduced in areas where tillage land is dominant so that establishment of a green cover could take place to take up residual nitrogen at vulnerable periods.
- No land is permitted to be cultivated at a distance less than 3m from watercourses. For late harvested crops, a minimum uncultivated buffer of 6m is required to protect any intersecting watercourses.

6.3 Difference between input and output of nitrogen (mineral + organic) for farms

Table 6-2 presents the national Irish nutrient budgets that have been calculated by DAFM and previously submitted to Eurostat[5].

Table 6-2: National Nitrogen Budget

	Previous period 2016-2019	Current period 2020-2023*	
National Gross Surplus	45	N/A	kg/ha/yr
National Net Surplus	22	N/A	kg/ha/yr

*Nutrient budgets have not been updated since the previous reporting period.

[4] 2024 - Better Farming for Water Campaign Launched - Teagasc | Agriculture and Food Development Authority

[5] https://ec.europa.eu/eurostat/web/main/data/database

6.4 Individual cost-effectiveness studies carried out on certain practices (beyond the minima of the code of practice)

No representative national data is currently available on the cost-effectiveness of practices beyond the minima of the code of practice.

6.5 Objectives of the Action Programme

The objective of the Nitrates Action Programme is to protect waters against pollution caused by agricultural sources and assist in meeting Ireland's WFD targets and Nitrates Directive objectives. The set of measures in the regulations provides a basic level of protection against possible adverse impacts to waters arising from the agricultural expansion targets set under Ireland's agri-food strategy. The measures included have been based on best practice in agriculture to support water quality and each iteration of the Nitrates Action Programme is reviewed and updated with additional measures where necessary. The fifth NAP is the most robust NAP to date.

National WFD water monitoring, in conjunction with the monitoring results within agricultural catchments under the Agricultural Catchments Programme (ACP), allow for an assessment of the impact of measures in the NAP and inform further development of measures to address known areas of concern.

6.6 Agricultural Catchments Programme

EU Member States are required to monitor the effectiveness of their Nitrates Regulations, under Article 5 (6) of the EU Nitrates Directive. Ireland has a goal of restoring all waters to 'good' status by 2027, and of reducing agricultural greenhouse gas emissions by 25% by 2030. The Agricultural Catchments Programme (ACP) is building a comprehensive understanding of how agronomic and climate drivers influence nutrient loss and gaseous emissions. The ACP publishes and disseminates its findings, which assess the effectiveness of – and feeds into – national policy.

Ireland monitors the implementation of the Nitrates Regulations in part through the Agricultural Catchments Programme (ACP) tasked with monitoring the effectiveness of Ireland's measures since 2008. The ACP has been delivered by Teagasc (the Agricultural and Food Development Authority) since its inception and funded by the Department of Food, Agriculture and the Marine (DAFM). The cycles of the ACP have been as follows: 2008-2011, 2012-2015, 2016-2019 and 2020 - 2023. The fifth cycle of the ACP was approved in 2023 for a further four-year period, 2024-2027.

Phase 5 of the programme will also collect data on greenhouse gas emissions, ammonia emissions and soil carbon sequestration, as well as extending the current baseline monitoring of water quality.

The programme is a collaboration with over 300 farmers in six small river catchments in Ireland. The programme has taken a whole catchment approach to evaluate the efficacy of the Good Agricultural Practice (GAP) package of measures introduced under the NAP. An extensive monitoring programme of nutrient sources and hydro-chemo-metrics have been designed similarly across all six catchments to understand how nutrients are lost from agricultural sources, how they can be mobilised and transferred via different hydrological pathways, how they are delivered to water and where there may be a negative impact on water quality and aquatic ecology.

The ACP disseminates the findings of the programme widely to magnify their impact on policy and practice in agri-environmental management. The programme integrates the bio-physical and the socio-economic data to better understand the wider impact of the GAP measures at farm and catchment scale across the six catchments that constitute the study area. These catchments include derogated holdings, as required by the European Commission under Ireland's approval to operate under a nitrate's derogation. Measurements, modelling and socio-economic studies are being used to evaluate the efficacy, cost effectiveness and economic impact of the measures. Modifications to

national measures will be identified where evidence indicates that water quality targets may not be achieved.

The ACP also explores farmer attitudes to implementation of nitrates regulations, adoption of nutrient management practices, the provision of ecosystem services, and the economic impacts of efficient nutrient management. The main objectives of the ACP can be thus summarised as follows:

- To establish extended baseline information and comparative data on agriculture in relation to both the Nitrates and Water Framework Directives.
- To provide an evaluation of the NAP measures and the derogation in terms of water quality and farming practices.
- To provide a basis for a scientific review of NAP measures with a view to adopting modifications where necessary.
- To achieve a greater understanding of the factors that determines a farmer's understanding and implementation of the NAP.
- To provide national focal points for knowledge and technology transfer and education for all stakeholders in relation to diffuse nutrient loss from agriculture to water.
- To advise on any specific monitoring requirements deemed necessary for the purposes of the Water Framework Directive.

Main findings of the ACP to date

A comprehensive description of ACP findings has been included in Ireland's Derogation Report for 2022, which was submitted to the European Commission in 2023. To summarise:

- Ireland's landscape is heterogeneous in terms of factors controlling N and P transfer pathways, transformation processes and timing of delivery.
- The influence of soil type, subsoil and geology on nutrient loss to water can sometimes override source pressures. At the meso-scale catchment (*ca*. 10 km^2) the link between nutrients source pressures and nutrients monitored in the stream water is not always clear.
- Weather changes can override temporal trends of agronomic pressures and are different for different physical settings. Therefore, both long-term and short-term weather patterns need to be considered when managing nutrients on farms.
- In certain circumstances sediment can have a greater impact on key indicators of water quality than N and P.
- Farm specific information can help refine regional data when identifying appropriate measures.
- The ACP uses high temporal resolution water quality data from meso-scale catchments together with spatially high-resolution national data.
- Overall, evidence from the ACP indicates that supporting farmers, through technical advice, to make better decisions regarding how they manage nutrient applications is likely to be the single area with the greatest potential to improve outcomes for water quality on Irish farms.

Scientific Evaluation of Agricultural Measures

Recent results from the Agricultural Catchments Programme (ACP) have indicated that the hydrological lag time for water quality improvement can be significantly lower than the 5-20 years previously reported in the 2012-2015 Article 10 report. However, the biogeochemical lag time can be longer than the hydrological lag time and the ACP continues to assess and evaluate the various

controls being implemented under the Good Agricultural Practice Regulations and will refine and significantly improve how these controls are implemented at a farm scale.

Interrelationship between the ACP findings and the Nitrates Regulations

In Ireland, the influence of the Nitrates Regulations and the derogation have been assessed at a small catchment scale by detailed water quality monitoring of surface water and groundwater in agricultural catchments with different physical settings. Ireland has a large variety of soil types and geology. The heterogeneous physical settings largely influence the nutrient transfer pathways and the associated transformation processes along these pathways.

At the scale of the ACP catchments the local physical settings can override the influence of the source pressure causing a poor link between nutrients leaving the root zone and nutrients monitored in the receiving waters. The ACP catchments show that at the meso-scale, the percentage of land in derogation within these small catchments was not always reflected in the water quality of the receiving waters. Therefore, the next phase of the ACP will use high temporal resolution water quality data from meso-scale catchments together with spatially high-resolution national data to scale-up from the meso-scale to the regional and national scale.

Future Scientific Evaluation of Agricultural Measures

The current phase of the ACP will facilitate the recruitment of new researchers, technicians and technologists to conduct new experiments and support the on-going and extended data collection and research. This phase of the programme will include new farm-scale experiments (including on farms outside the ACP) and monitoring of N and P concentrations in soil solutions and groundwater on derogation and non-derogation farms on similar physical settings. These farms will be selected based on the derogation history and current derogation situation as well as on the soil type and location in the landscape. A catchment modeller will further test scenarios of intensification of farming and weather. Above baseline mitigation measures will be tested and evaluated. These temporal data-rich meso-scale catchments (*ca*. 10 km^2) can be used to scale-up to regional and national scale using the spatially rich national data set provided by the EPA. An important part of the programme is the inclusion of monitoring and research on greenhouse gas (GHG) emission and carbon sequestration. This will give a comprehensive insight to intensified agriculture on both water quality and GHG emission in representative areas of Ireland.

6.7 Measures that support the National Action Programme

Agricultural Sustainability and Advice Programme (ASSAP)

Launched in 2018, the ASSAP programme is a government/industry collaborative initiative established to operate a free support and advisory service, with 30 advisors under voluntary participation. The number of advisors has since increased to 50. Local Authority Catchment Assessment Teams are working primarily in ~500 areas (there were originally 190 areas for action in the 2nd WFD planning cycle) that have been identified for priority action in the Water Action Plan. These teams connect with the ASSAP advisors when agriculture is identified as a significant pressure on water quality. The programme is designed to work closely with the farming and wider communities in these catchments providing them with a free and confidential advisory service facilitating a far more targeted approach in terms of delivering the right measures in the right place.

Directed research

In addition to the Teagasc core research programme, PhD projects funded by the Teagasc Walsh programme enhance and strengthen the ACP. DAFM, through the Research Stimulus Fund, and EPA through its research programme, have co-funded a significant range of projects related to agriculture and water quality.

Several research projects that were co-funded by the Irish Government and the EU involved working with farmers and other local stakeholders to improve water quality in their catchments. These include European Innovation Partnership (EIP) projects, such as Mulkear EIP, Duncannon EIP and Duhallow EIP, which supported local farmers to work collaboratively with other stakeholders to develop catchment-sensitive farming practices to improve local water quality. There were 23 European Innovation Partnership agri-operational groups funded by DAFM that were initiated in 2019. Several of the projects focus directly on water quality, others which have co-benefits including water quality.

In 2021 an additional 6 EIP projects were funded for 1 year and these include Owentaraglin River EIP, Lough Sheelin Catchment – Riparian Zone Enhancement EIP, The Deel Spatially Targeted Buffers EIP, Culdaff Riparian Buffer Zones EIP, Ballymoney Catchment EIP and Carrickrobin Enhancement EIP.

Since 2019, DAFM have funded several projects that are relevant to nutrient management and water quality, and these include:

- SENSUS – Sensing Nutrients for Agronomic Advice and Sustainability Measures
- FaSTEN – Farm Sustainability Tools for Efficient Nutrient management
- PASTURE-NUE – A multidisciplinary approach to increase the nitrogen use efficiency of pasture-based systems
- Multi4More – Transforming pasture-based livestock systems through improved design of multi species mixtures under reduced-nitrogen regimes
- REWET – Facilitating water table management on carbon rich soils
- FAMOSOS – Farm Monitoring via Real-Time Soil Sensing
- D-TECT – Geospatial drainage status detection mapping of organic rich soils for NIR and policy support needs
- Measures4Water – Monitoring and evaluating targeted mitigation approaches to improve water quality.

Since 2020, 33 new EPA funded research projects relevant to the water area have been completed, including several on the impacts and management of agriculture in relation to water quality. These include:

- Research 312 - ESManage: Incorporation of Ecosystem Services Values in the Integrated Management of Irish Freshwater Resources.
- Research 330 - COSAINT: Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications.
- Research 389 - ESDecide: Evaluating the Multiple Values of Nature – from an Ecosystem Services Framework to Application for Integrated Freshwater Resources Management.
- Research 396 - DiffuseTools Project: Catchment Models and Management Tools for Diffuse Contaminants (Sediment, Phosphorus and Pesticides).
- Research 440 - Advances in Sustainable Nutrient Recovery for Management of Nitrogen Rich Residue Streams.

Agri-Environment Measures

Building upon the Green Low Carbon Agri-Environment Scheme (GLAS), the current Agri – Climate Rural Environment Scheme (ACRES) offers voluntary agri-environment measures under Pillar II of the CAP 2023 – 2027 designed to encourage farmers to farm in a way that benefits the landscape, biodiversity and water quality. ACRES is the largest scheme to date with a budget of €1.5bn and over

50,000 participating farmers. The aim of the scheme is to deliver significant long-term environmental improvement through participation by a significant number of farmers on the most appropriate land, with each making a strong improvement on their farm.

Using a habitats-based approach, delivered through both multi-functional prescription and results-based actions, ACRES aims to contribute significantly to achieving improved biodiversity, climate, air and water quality outcomes. These will be achieved through two approaches under the scheme:

- an ACRES General approach offering a range of measures for individual farmers (both targeted and general); and
- an ACRES Co-operation approach, available to farmers in defined high priority geographical areas, who opt to undertake measures, as well as bespoke farm, and landscape actions. Farmers participating in this approach will have the assistance of a Local Co-operation Project (CP) Team, who will assist with implementation of the scheme at local level.

The Targeted Agricultural Modernisation Scheme (TAMS)

A suite of ten measures are available under TAMS III. Seven of these measures including: Animal Welfare, Nutrient Storage Scheme (AWNSS); the Young Farmer Capital Investment Scheme (YFCIS); the Organic Farming Capital Investment Scheme (OFCIS); the Dairy Equipment Investment Scheme (DES); the Low-Emissions Slurry Spreader Scheme (LESS); the Tillage Capital Investment Scheme (TCIS); and the Pig and Poultry Capital Investment Scheme (PPIS) – were previously available under TAMS II. The Women Farmer Capital Investment Scheme (WFCIS), the Farm Safety Capital Investment Scheme (FSCIS) and the Solar Capital Investment Scheme (SCIS) are new additions to TAMS III.

The measures provide grants for capital investment in physical assets to assist the Irish agriculture sector to respond to a range of policy challenges. For example, Low Emission Slurry Spreading Equipment is essential to contributing to meeting the challenges of reducing our environmental footprint.

There are a range of new improvements to the TAMS scheme including increased grant aid rates, investment ceilings, new investments, and new support categories. This includes enhanced grant-rate of 60% compared to a lower rate of 40% in TAMS II in respect of investments under the Low Emission Slurry Spreading Equipment, Organic Capital Investments and Farm Safety Investments.

The scheme will consist of a €90,000 ceiling for individuals, joint ventures and companies, while a higher ceiling will be in place for DAFM-registered farm partnerships. The ceiling for reinvestment will be reset per holding for the duration of the new scheme, meaning that every farmer who benefitted under TAMS II can reapply in full under TAMS II.

LIFE

Ireland has several LIFE projects whereby the farming communities of the focal regions are engaged for the purpose of improving water quality. In 2019, a LIFE-IP Waters of Life programme was approved with the objective to restore high ecological status water bodies in Ireland.

In 2021, the Lough Carra LIFE project was approved with the objective to improve the water quality, restore the marl lake habitat, and raise the conservation status of other habitats and species within the catchment.

DAFM is providing financial and staff resources to support these two projects.

The new LIFE Regulation 2021-2027 entered into force on 17 May 2021 and applies retroactively from 1 January 2021. The financial envelope for the programme under the new regulation is €5.432 billion, which represents a significant increase compared to the €3.46 billion available to the programme under the previous regulation.

Organic Farming Scheme

OFS requires strict adherence to organic production methods; the number of applicants and organic farm holdings has increased as a result of this support. Our current Organic Farming scheme under the Rural Development Programme (RDP) has almost doubled the amount of land in Ireland under organic production to 72,000 ha representing approximately 1,886 producers.

Farm Advisory System

- The Farm Advisory System (FAS) continues to advise farmers on land and farm management. The advice must cover at least the statutory management requirements (including advice on compliance with Nitrates Directive) and the Good Agricultural and Environmental Conditions (GAEC).
- Teagasc provide a national information-based programme to all 130,000 farmers through a range of media channels and public events. They also are in contact with some 60,000 farmers and rural dwellers each year, of which approximately 43,000 avail of their intensive on-farm consultancy service. Some 300 advisers and specialists, located at 50 centres throughout Ireland, help farmers to maximise profit while respecting the environment and to encourage sustainable farming. The agricultural Consultants Association have 280 agricultural and environmental professionals providing advice to over 55,000 farmers annually.

6.8 Other developments that may impact positively on water quality

Enforcement

- In addition to the cross-compliance inspections outlined, a further 1,600 risk-based nitrates inspections are carried out by DAFM on behalf of Local Authorities. An additional 10% of nitrates derogation applicants are also inspected annually. Approximately 6,500 inspections (including for agri-environment and climate measures (AECM), eligibility etc.) also take place annually and any nitrates breaches noted on these farms in the course of these inspections are cross reported for penalty purposes.
- DAFM also carry out administrative checks on all herd owners to establish if they are adhering to the 170, 220 or 250 kgs Nitrogen per hectare limits as appropriate. Total Nitrogen figures from the Departments Animal Identification System (AIM) and the areas declared under the Single Payment Scheme are used to identify herd owners exceeding these limits are subject to penalties.
- In 2022, the EPA was assigned an expanded role to oversee local authority agricultural inspections under the fifth NAP. The EPA, in consultation with local authorities and other relevant bodies, has developed a National Agricultural Inspection Programme (NAIP) for the period 2023 to 2025. The aim of the NAIP is to improve water quality by improving the level of compliance with the Good Agricultural Practice (GAP) Regulations. This includes achieving consistency in dealing with non-compliances such as use of enforcement actions and cross reporting to Department of Agriculture, Food and Marine. The NAIP will increase the number of inspections carried out each year with the aim of completing inspections of 4,500 farms by 2025.

Other Developments

Farming for Water European Innovation Partnership

In March 2024, The Department of Agriculture Food and Marine in collaboration with the Department of Housing, Local Government and Heritage launched a €60 million European Innovation Partnership (EIP-AGRI) “Farming for Water” project aimed at implementing commitments

at local, catchment and national level in partnership with the agri-food industry to improve water quality.

The project measures will be designed and implemented in collaboration with farmers and will be targeted specifically to reduce losses of nutrients, sediment, and pesticides from agricultural lands, i.e. 'breaking the pathway from point source'. The project will focus on areas needing the most attention to protect water quality.

The EIP is co-funded by the European Commission and the Irish Government as part of Ireland's Rural Development Programme and will be continued under the CAP Strategic Plan.

In this case, the Department of Agriculture, Food and the Marine will fund farmer actions, while the Department of Housing, Local Government and Heritage will fund the Operational Group's administrative costs.

The Department of Agriculture, Food and the Marine will support the project through the provision of funding of €50 million for participating farmers, co-funded by the National Exchequer and the EU, with the objective of involving 15,000 farmers in priority areas nationally. The Department of Housing, Local Government and Heritage will provide the administrative support for the project to the value of €10 million.

In developing the EIP, an operational group has been established by the Local Authority Waters Programme (LAWPRO), in partnership with Teagasc, Dairy Industry Ireland (DII) and Bord Bia, and with the support of other stakeholders, to work in partnership with farmers in the implementation of a number of targeted actions at farm level.

This project is a key component in Ireland's ongoing efforts to improve water quality and the sustainability of our agricultural practices at a national level. It is just one part of a greater collection of measures to support those efforts. This includes a national multi-actor Water Quality Advisory Campaign, led by Teagasc as well as committing to increased compliance and enforcement obligations across government Departments and Local Authorities.

This EIP initiative involves a range of stakeholders (farmers, advisors, researchers, NGOs) coming together in what are termed 'Operational Groups' to trial innovative solutions that the Group themselves have developed.

Farming for Water EIP – Eligibility

Access to the project will be prioritised and farmers will be approached to make applications. Farmers within certain areas will be invited to participate by farm advisors or agents working on behalf of the project. This is because the project will focus on areas needing most attention to protect water quality. The project will work with the ASSAP (Agricultural Sustainability Support and Advisory Programme).

Farmers located in the following areas will be potentially eligible to access funding through the EIP. Some of these areas are located within Priority Areas for Action (PAAs) which are areas in which water bodies are at risk of not achieving good or high quality.

- Tier 1 – Farms in cycle 2 or cycle 3 PAAs which are areas that have been already assessed by ASSAP.
- Tier 2 – Farms in cycle 3 PAAs or within a catchment with a community led water quality initiative identified as having a nutrient/sediment/pesticide issue prioritised by the EPA/Local Authority
- Tier 3 – Farms in cycle 3 PAAs or within a catchment with a community led water quality initiative, in catchments not identified as having a nutrient/sediment/pesticide issue not prioritised by the EPA.
- Tier 4 – Other farms outside of the above.

It is important to note that measures available for the EIP are for measures not covered by regulatory requirements – double funding is not permitted.

Available measures

There will be measures available that focus on farmyard issues and land management issues in relation to improving water quality – the aim is to 'break the pathway'. Below are some of the measures available:

- Hedgerow establishment
- Additional fencing for bovine exclusion from water bodies
- Alternative Water Supply – Pasture Pump/Solar Pump/Water Trough
- Riparian Buffer Zones
- Tree planting
- Small Scale Ponds
- Earthen bund
- Sediment Traps
- Watercourse crossing/bridges
- Gateway relocation
- Multi Species Swards
- Pesticide mitigation measures

6.9 WFD Implementation

The Water Action Plan 2022-27 sets out key objectives in relation to nutrient losses to water, including:

- Reducing excessive agricultural nitrate losses from high-risk free draining soils to groundwater in agriculturally intensive areas (reduce N losses by up to 50% to water).
- Reduction / elimination of point source pollution from farms.
- Reducing phosphate and sediment losses from poorly draining soils through overland flow to surface waters.

Through the Nitrates (and National) Action Programmes, measures have been initiated to address water quality issues arising from farming. These include expansion of the Agriculture Sustainability Support and Advisory Programme (ASSAP), industry led initiatives to reduce agriculture impacts on water quality, programmes to reduce the use of chemical nitrogen fertiliser through to 2030, completing a review of the impacts of the nitrates derogation on water quality, and working with nitrates derogation farmers to improve environmental outcomes on their farms.

Additional measures, such as bringing in tighter controls on nitrogen and phosphorus inputs by, establishing a chemical fertiliser register for farmers. stipulating tighter controls on the use of chemical nitrogen fertilisers and increased resources assigned to and carrying out farm inspections are some of the measures introduced to address water quality issues. Incorporate an industry-led initiative to reduce agricultural impacts on water quality.

The EPA continues to monitor water quality to inform WFD characterisation and has developed a structured management system to capture information on the pressures and impacts on the water environment. Part of this catchment characterisation assessment work includes the ability to undertake nutrient source load apportionment, and this has allowed areas to be identified within catchments and sub-catchments that have source pressures and are susceptible to nutrient loss to the water environment. These "critical source areas" are typically not in the same location for nitrogen and phosphorus but help identify which areas and farm holdings could be targeted for further detailed farm assessments and specific actions i.e. the right measure in the right place. The

LAWPRO and ASSAP teams use these critical source area maps to target relevant actions. This has included and assessment and production of sub-catchment maps that identify what reductions in nutrient load loss would be required in each sub-catchment to meet the environmental objectives of the water bodies in that sub-catchment.

The characterisation approach, together with selection and successful implementation of measures and management strategies involves integration of datasets and knowledge at a national scale. The EPA continues to work with the various public authorities to help coordinate and provide a platform for delivery of the Water Action Plan. Information, articles, and data are captured and made publicly available on www.catchments.ie.

7 FORECAST OF FUTURE EVOLUTION OF WATER QUALITY

Agriculture covers approximately 70% of the land area of Ireland and Water Framework Directive (WFD) characterisation indicates agriculture has also been identified as the most prevalent significant pressure, impacting over 1,000 waterbodies or approximately 60% of all waterbodies that are 'At Risk' of not achieving their environmental objective under the WFD. The main problems for farming are loss of excess nutrients and sediment to water. Excess ammonium may also be a problem in some water bodies. These losses arise from point sources such as farmyards, or from diffuse sources such as spreading of fertilisers and manures. Excess phosphorus and sediment typically cause problems in rivers and lakes, and too much nitrogen is the main issue for estuaries and coastal waters.

There has been an overall decline in water quality in Ireland since the 2016-2019 Article 10 report, with nitrate concentrations increasing in groundwater, rivers, and transitional waters. There has also been spatial variation, with the highest nitrate concentrations and greatest concentration increases mainly happening in the east and south east. The south east is also the area that has seen the greatest change trophic impact, with most transitional waters in the region are eutrophic or could become eutrophic.

An integrated approach to address water quality issues is being undertaken in Ireland. This includes collaboration between the different environmental and agricultural policy makers, researchers, and public authorities, with the aim of informing policy so that the right measures can be undertaken in the right place, at the right time. The aim is to tailor measures to each farm and type of farming, thereby maximising the environmental benefit as efficiently as possible.

Water Quality Analysis to Inform Policy

The EPA national datasets and analysis highlight that there is a good relationship between farming intensity and nitrate concentrations in waters at the catchment scale, but that there is water quality variability within and between sub-catchments. The variability can largely be explained by the soil type and farming practice. Of most concern are the elevated nitrate concentrations in rivers and our groundwaters in the south east. This in turn is resulting in increased nitrogen loads to our transitional and coastal waters in this region. The main source of nitrate is intensive agricultural practices in this area.

Elevated phosphorus concentrations are also a key driver of eutrophication, particularly in freshwaters, but the highest phosphorus concentrations are generally found in areas with poorly draining soils and are not necessarily a result of agricultural intensity. This is borne out in the river and lake trophic assessment which show eutrophication in many areas with low intensity agricultural practices.

Overall, to achieve the WFD objectives, mitigation measures need to be targeted to the water quality issues and physical settings where they occur, i.e. the critical source areas. Within a catchment, the critical source areas for phosphorus and nitrate are likely to occur in different locations: poorly draining soils are the riskiest for diffuse phosphorus losses, while freely draining soils are more important for losses of diffuse nitrate. Therefore, any mitigation measures introduced should be tailored and targeted to the critical source area that is relevant to the pollutant of concern.

This has important implications for selecting the right measure for the right place. Ireland's heterogeneous landscape means that measures need to be targeted to achieve the best environmental outcomes. Ireland is adopting a collaborative approach between the different stakeholders to identify these measures and will seek to implement them using a range of policy instruments including the Nitrates Action Programme, the Good Agricultural Practice Regulations, the WFD RBMP / Water Action Plan, and climate action policies.

Funding from the Common Agricultural Policy 2023 - 2027 incorporates measures based on research output that are known to benefit water quality. A key learning point to date has been that the right measure in the right place is particularly relevant for the Irish situation. Knowledge transfer mechanisms are supported alongside the Farm Advisory Support services to link research and findings between the academic, advisory, and farming communities. DAFM will continue to support a number and range of research projects examining the potential of innovative technologies, materials, and approaches to further reduce pressure from agriculture on the environment.

Increasingly agencies and government departments are engaging, consulting, and sharing data where policy areas overlap to streamline policy and maximise co-benefits in a unified and rational way. In June 2024, DAFM published the Second Annual Report of Food Vision 2030, which is an important element of Ireland's Programme for Government commitment. The proposed reduction in mineral fertiliser use has a significant co-benefit to water quality, with a focus on maximising grass in the livestock diet to be achieved by better use of manures (using LESS), clover and soil and grass management.

Evolution of Agricultural Policy

The agri-food sector is Ireland's largest indigenous exporting industry, contributing 6.7% (€18.98bn) of Modified Gross National Income (GNI*) and accounting for 9% of all merchandise exports in 2022. The Gross Value Added at Factor Cost in the agri-food sector has grown from €11.3 bn in 2013 to €18.3 bn in 2022, or 63% growth over the ten-year period.

The agri-food sector also makes a significant contribution to employment in rural and coastal areas, accounting for 6.5% of total employment or some 164,900 jobs in 2022. Regionally it accounts for a larger proportion of employment, as high as 14% of total employment in the Border region. The Irish agri-food export sector is marketed using the green and sustainable image. Therefore, from an economic perspective, the agri-food sector wants to ensure that improvements in water quality and other environmental targets are reached.

Nitrates Action Programme Development

The development of the fourth and fifth NAPs had to balance forecast change relating to the ambitious targets of the Irish agri-food sector arising from the abolition of dairy quotas in 2015 with the overall goal of improving water quality. In 2022, the fifth Nitrates Action Programme (NAP) was informed by the findings of the EPA Water Quality in Ireland Report and other EPA and Teagasc assessments, which indicated that nutrient concentrations in our waters were too high in some catchments with no evidence of nutrient concentrations reducing nationally. This highlighted that not enough had been done to prevent deterioration of water quality.

The fifth NAP introduced several significant new measures on a phased basis to allow farmers time to make the necessary changes on holdings. The measures include *inter alia* an extension of the dates for the closed period regarding slurry and soiled water management, an introduction of three new excretion rate bands for dairy cows and a 10% reduction of chemical nitrogen applied nationally to be increased to a 15% reduction nationally after the midterm interim review of the programme.

The fifth Nitrates Action Programme also includes measures not included in the GAP Regulations 2022 including the development of a database for all Chemical Fertiliser Sales established by (DAFM) in 2023. Furthermore, to improve compliance and enforcement, the EPA have developed a National Agricultural Inspection Programme for local authorities. These inspections will be more targeted and risk-based with a stronger focus on compliance and follow-up enforcement. In line with this measure, DAFM have also increased the annual inspection rate for Nitrates Derogation inspections from 5 to 10%.

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