EUROPEAN
COMMISSION

Brussels, 11.10.2021
SWD(2021) 1001 final

PART 22/38

COMMISSION STAFF WORKING DOCUMENT

Accompanying the document

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019

{COM(2021) 1000 final}

Pressure from Agriculture



Ireland's utilized agricultural area amounts to 4.5 Mha, representing 64.8% of the total land area and has remained stable since 2013. The major outputs of the agricultural industry include in a decreasing order milk (29.3%), cattle (26.4%) and forage plants (14.3%).

Eurostat

Major land use statistics for Ireland

Table 1.Utilized agricultural area (abbreviated as UAA)

Ireland	2005	2007	2010	2013	2016
Utilised agricultural area UAA (1000 ha)	NA	4276	4569	4478	4461
arable land (1000 ha)	NA	466	435	474	460
permanent grass (1000 ha)	NA	3808	4127	4002	3999
permanent crops (1000 ha)	NA	NA	1	2	2
kitchen gardens (1000 ha)	NA	0	0	0	0

Note:
Eurostat (FSS)

Ireland's arable land has decreased by 3% since 2013. Permanent grassland and crops remained stable since 2013.

Animal distribution in Ireland

Ireland's livestock has remained stable since 2010 and it is higher than the EU average of 0.8.

Table 2. Livestock statistics

Ireland	2005	2007	2010	2013	2016
Livestock index	1.47	1.43	1.16	1.20	1.27
dairy cows (10^6 heads)	1.00	1.02	1.01	1.08	1.29
live bovines (10^6 heads)	6.39	6.25	5.92	6.31	6.61
live pigs (10^6 heads)	1.67	1.50	1.50	1.47	1.53
live poultry (10^6 heads)	NA	NA	10.93	12.82	11.05

Note:
Eurostat (FSS)

Nitrogen and phosphorus fertilizers and surplus (kg/ha UUA)

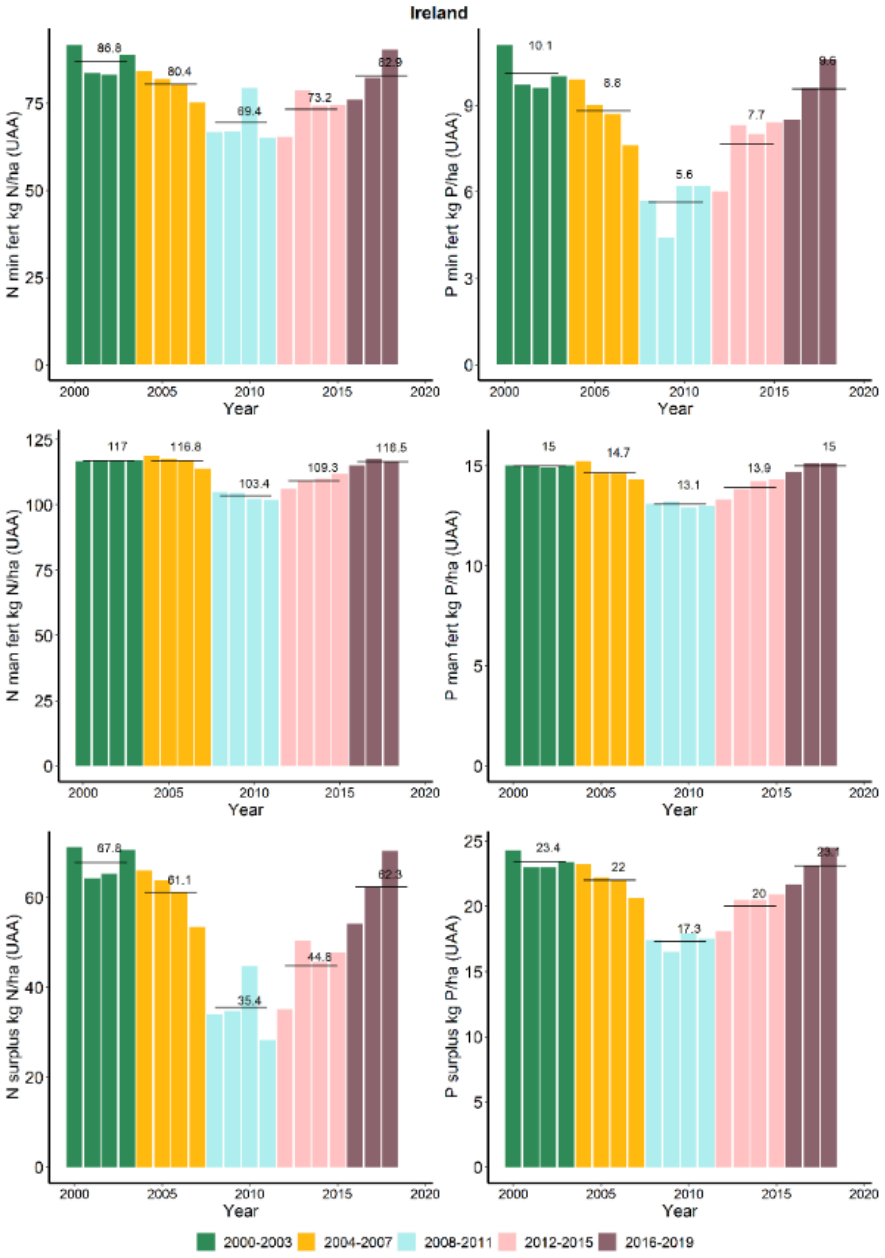


Figure 1. N and P fertilizers and gross surplus (kg/ha)

The N and P fertilizers and gross surpluses are originated from EUROSTAT data for the years 2000-2017. Data provided by Ireland have been used to complete the figure for the year 2018 because of correspondence, for the previous years, with Eurostat statistics.

The consumption of inorganic nitrogen and phosphorus has increased since the last reporting period. The usage of organic nitrogen and phosphorus fertilizer has also increased from the last reporting period. The nitrogen and phosphorus surplus increased from the last reporting period by 39% and 15% respectively. In the plots: N/P min and N/P man are respectively the N/P mineral fertilizers and N/P manure.

Livestock unit - LSU /ha

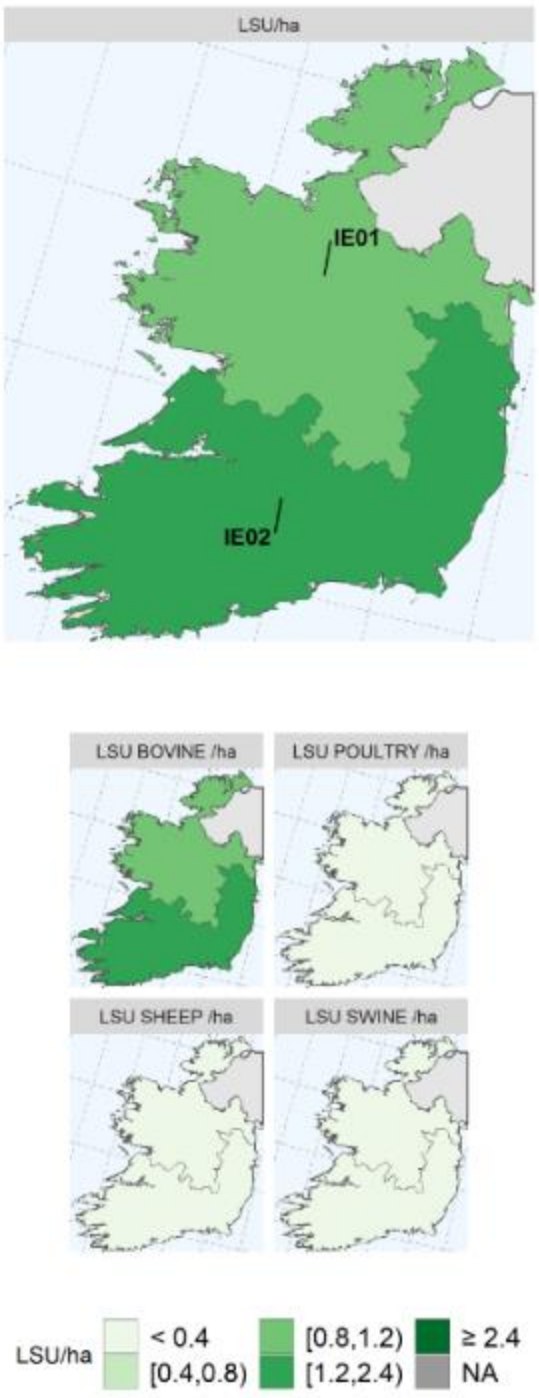


Figure 2. Map of livestock unit distribution, year 2016 (Source: Eurostat, February 2021)

Animal production is concentrated in the south part of Ireland. Animal production is dominated by bovine livestock type (total LSU and LSU by animal type were retrieved individually from EUROSTAT).
In this document, the NUTS-2013 version is used.
(https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/nuts)

Water Quality Monitoring

The water quality monitoring is under the responsibility of the EPA. A total of 200 groundwater stations are included in this report, spanning the 2016-2019 reporting period, which are a subset of the overall WFD Groundwater Monitoring Programme. The surface water monitoring network has remained relatively stable with a few minor amendments to stations based on safety grounds and to make it more representative of Irish rivers and lakes. Monitoring data for the current reporting period were obtained for 122 WFD surveillance monitoring stations for transitional and coastal stations from the WFD National Monitoring Programme.

For groundwater measurements, some stations have same coordinates due to different depths. In this case, the average values cover different measurements in time, but also location. In maps providing the spatial distribution of monitoring points, it is not possible to distinguish stations with the same coordinates: for NO3 concentration, the average value is shown; for trends and trophic status the worst case was considered.

It is noteworthy that in some cases in the bar charts the total value can differ from 100% due to rounding errors.

Groundwater quality monitoring network

Table 3. Number of GW stations with measurements and trends per type

		Number of stations with measurements			Number of stations with Trends		
Station Type	Description	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
0	Phreatic groundwater (shallow): 0-5 m	26	25	25	25	25	25
1a	Phreatic groundwater (deep) 5-15 m	7	7	7	7	7	7
1b	Phreatic groundwater (deep) 15-30 m	12	11	11	12	11	11
1c	Phreatic groundwater (deep) >30 m	71	70	69	68	70	69
2	Captive groundwater	0	0	0	0	0	0
3	Karstic groundwater	95	92	88	92	92	88
9	Not specified	0	0	0	0	0	0
	Total	**211**	**205**	**200**	**204**	**205**	**200**

Surface water quality monitoring network

Table 4. Number of SW stations with measurements, trends and trophic status per type

		Number of stations with measurements			Number of stations with Trends			Number of stations with Trophic status		
Station Type	Description	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
4	River water	178	180	180	148	176	180	178	179	178
5	Lake/reservoir water	74	74	74	61	74	74	74	74	74
6	Transitional water	99	89	95	98	76	83	0	20	18
7	Coastal water	25	28	27	25	23	25	0	5	7
8	Marine water	0	0	0	0	0	0	0	0	0
9	Not specified	0	0	0	0	0	0	0	0	0
	Total	**376**	**371**	**376**	**332**	**349**	**362**	**252**	**278**	**277**

Groundwater Quality

Groundwater average annual nitrate concentration

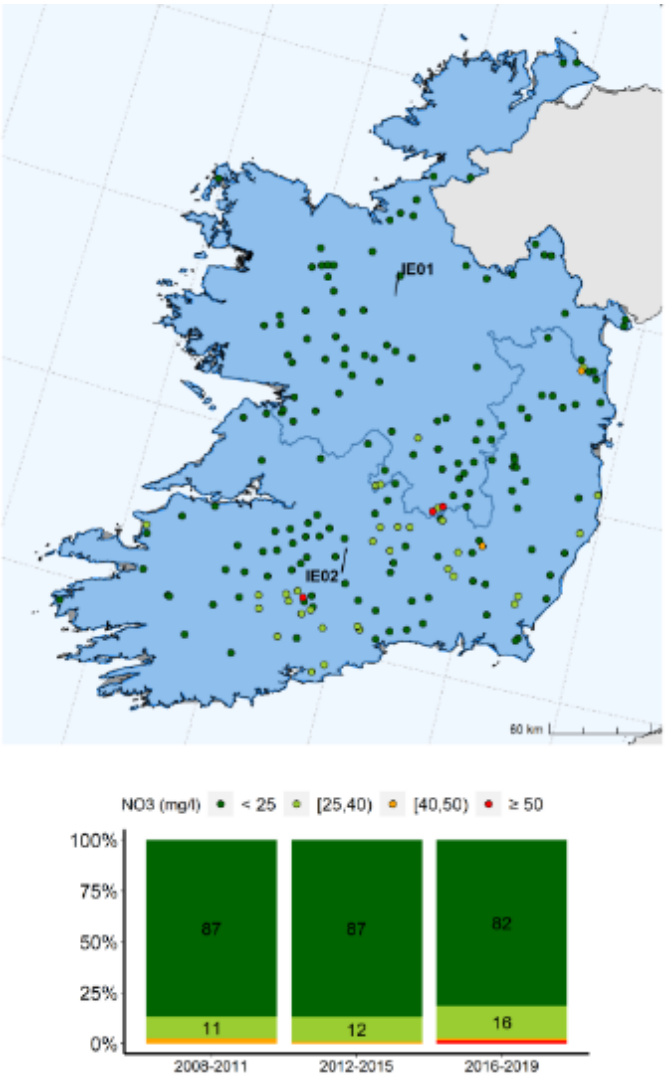


Figure 3. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

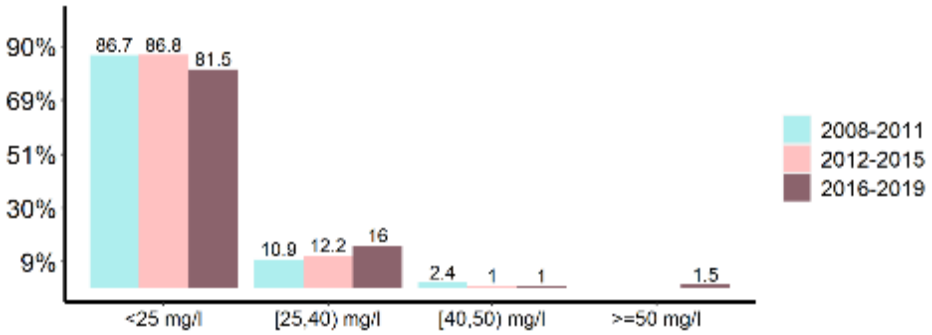


Figure 4. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Groundwater average annual nitrate concentration trend

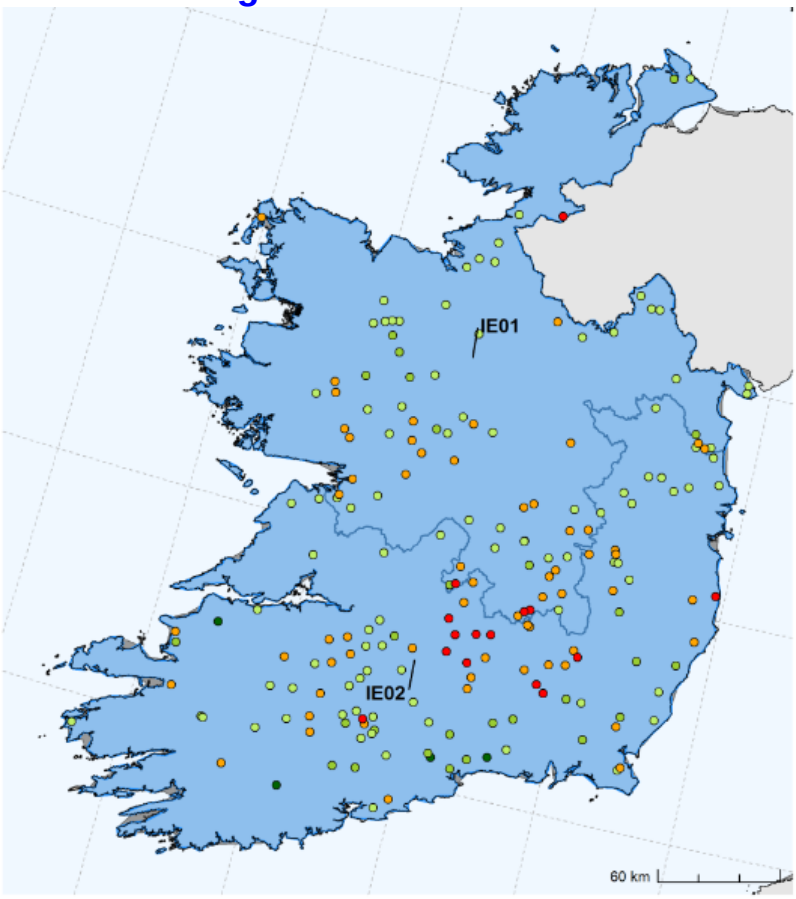


Figure 5. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

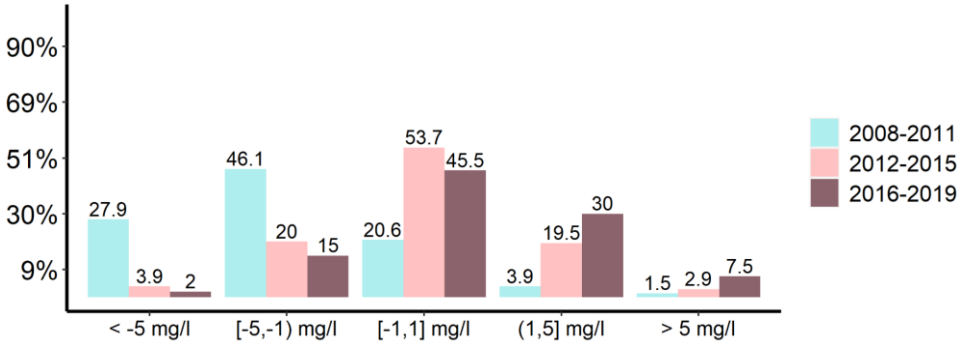
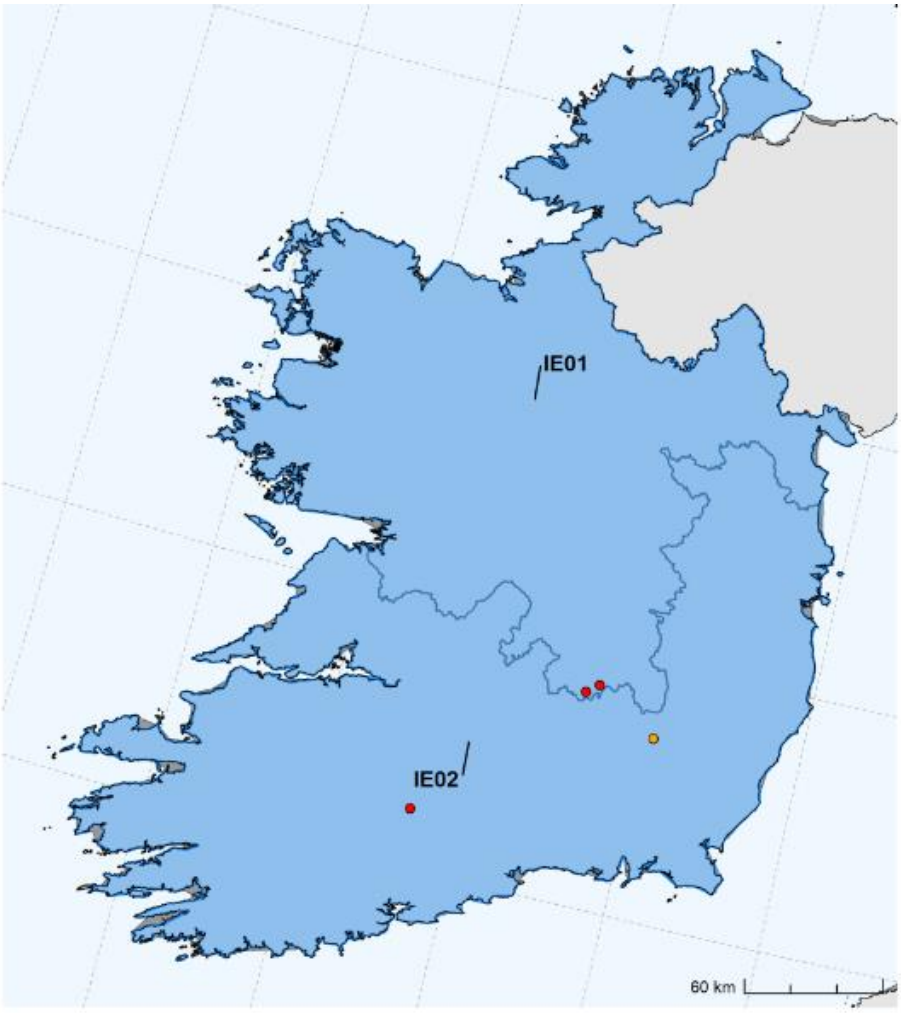


Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Groundwater hotspot

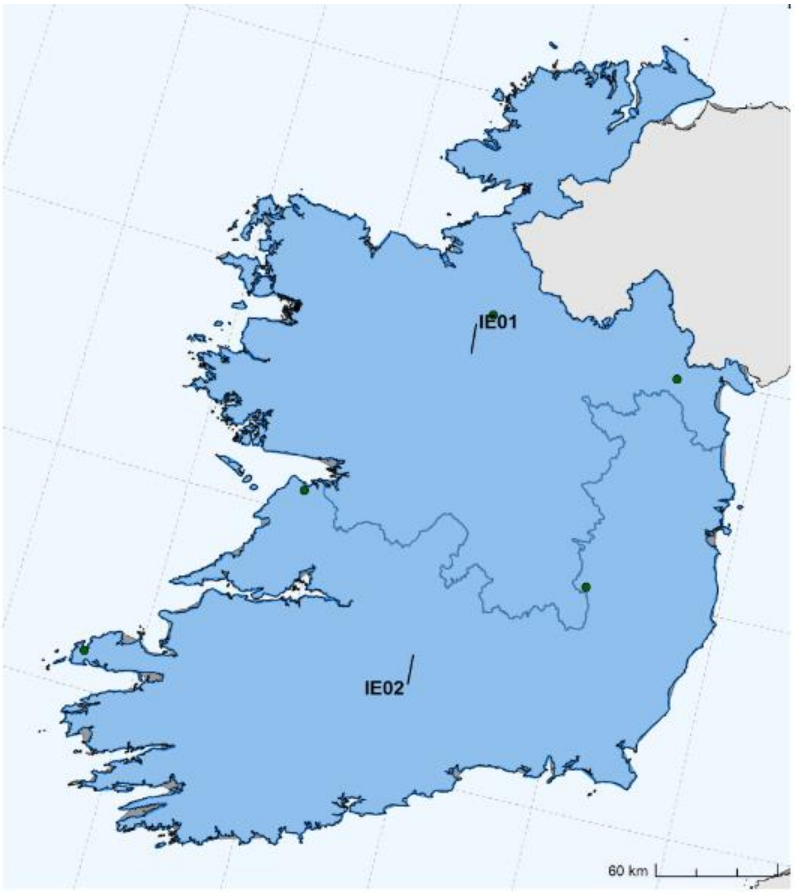


NUTS ID	NUTS NAME	>=40 and < 50 mg/l incr.trend	>=50 mg/l
IE01	Border, Midland and Western	0	2
IE02	Southern and Eastern	1	1
	Total	**1**	**3**

Figure 7. GW hotspot analysis map (top graph) and distribution by NUTS2 (lower graph) of average NO3 annual concentration greater than 40 mg/l.

The hotspot analysis identifies all the GW monitoring stations that have NO3 concentration in the range of 40-50 mg/l with increasing trends and above 50 mg/l. The map shows the spatial distribution of these points, and the table reports the number of stations by NUTS inside and outside NVZ.
Only the NUTS of interest are reported.

Groundwater stations removed



Station Type	Description	Number of removed stations		
		total removed	with measurements	with trends
0	Phreatic groundwater (shallow): 0-5 m	0	0	0
1a	Phreatic groundwater (deep) 5-15 m	0	0	0
1b	Phreatic groundwater (deep) 15-30 m	0	0	0
1c	Phreatic groundwater (deep) >30 m	1	1	1
2	Captive groundwater	0	0	0
3	Karstic groundwater	4	4	4
9	Not specified	0	0	0
	Total	**5**	**5**	**5**

Figure 8. GW removed stations map (top graph) and by groundwater type (lower graph).

The removed stations analysis identifies all the GW monitoring stations that were removed in the current reporting period. The map shows the spatial distribution of these points with the concentrations of the previous reporting period, and the table reports the number of stations with measurements and trends per type.

Surface Water Quality

Surface water average annual nitrate concentration

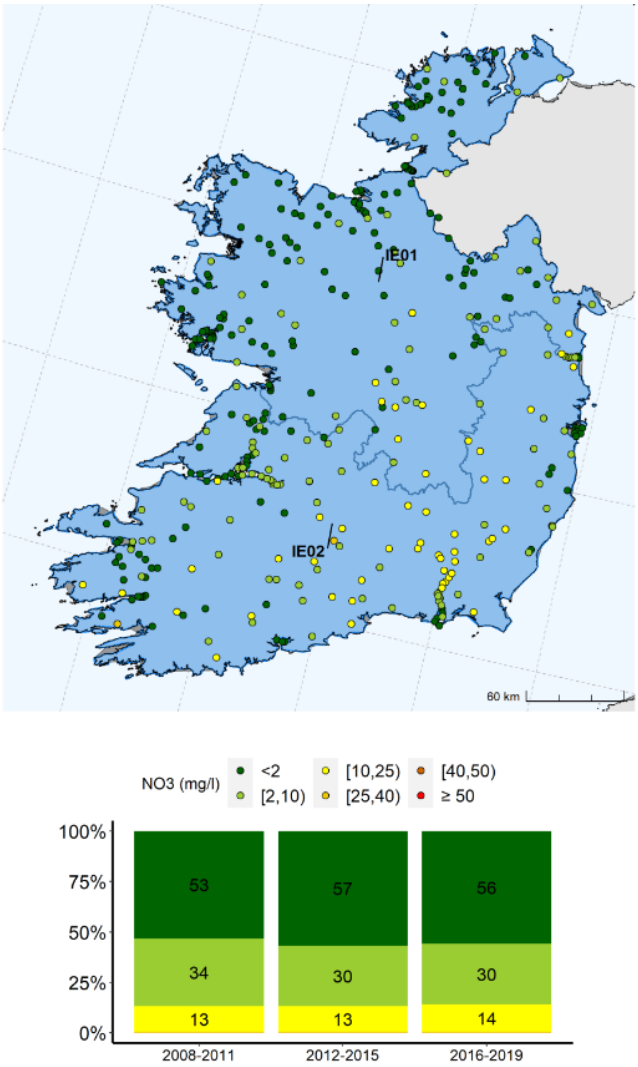


Figure 9. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

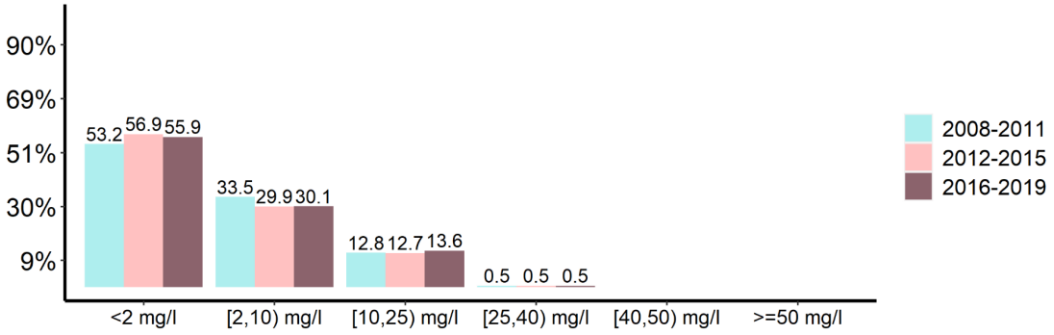


Figure 10. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Surface water average annual nitrate concentration trend

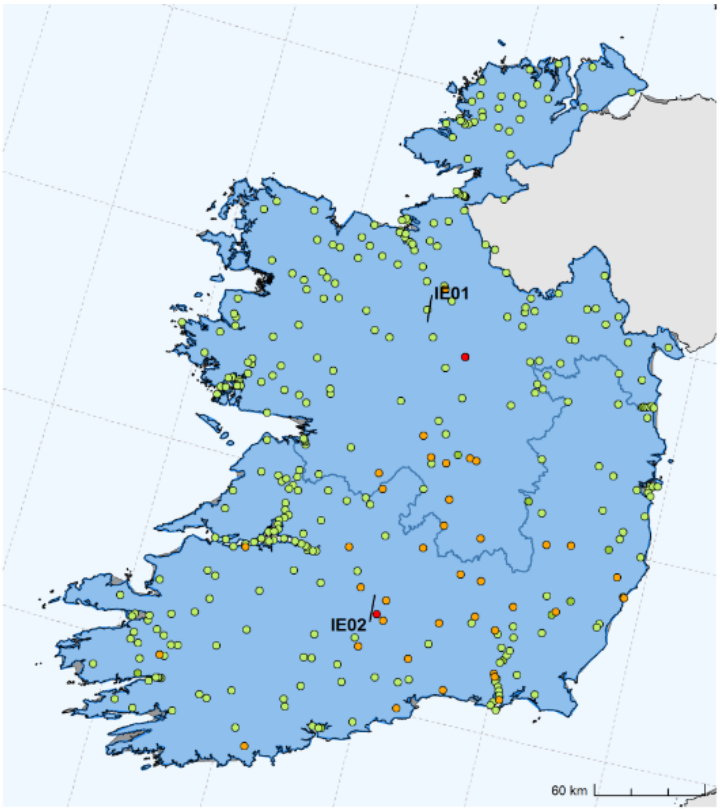


Figure 11. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

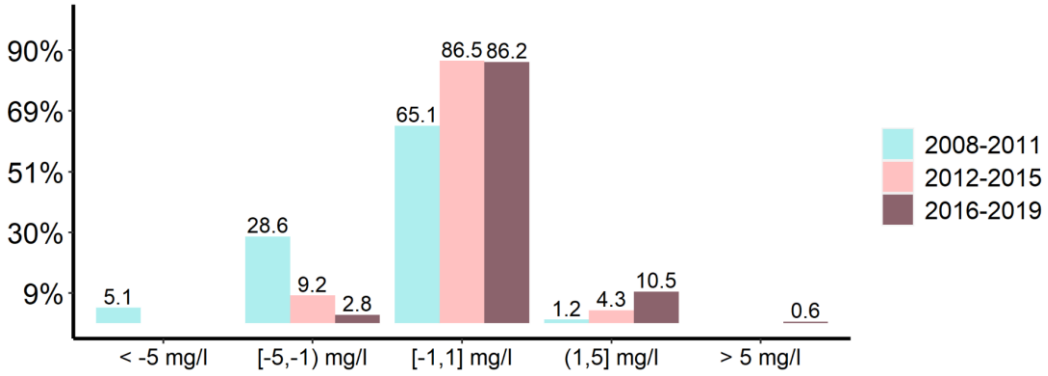


Figure 12. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Surface Water Eutrophication

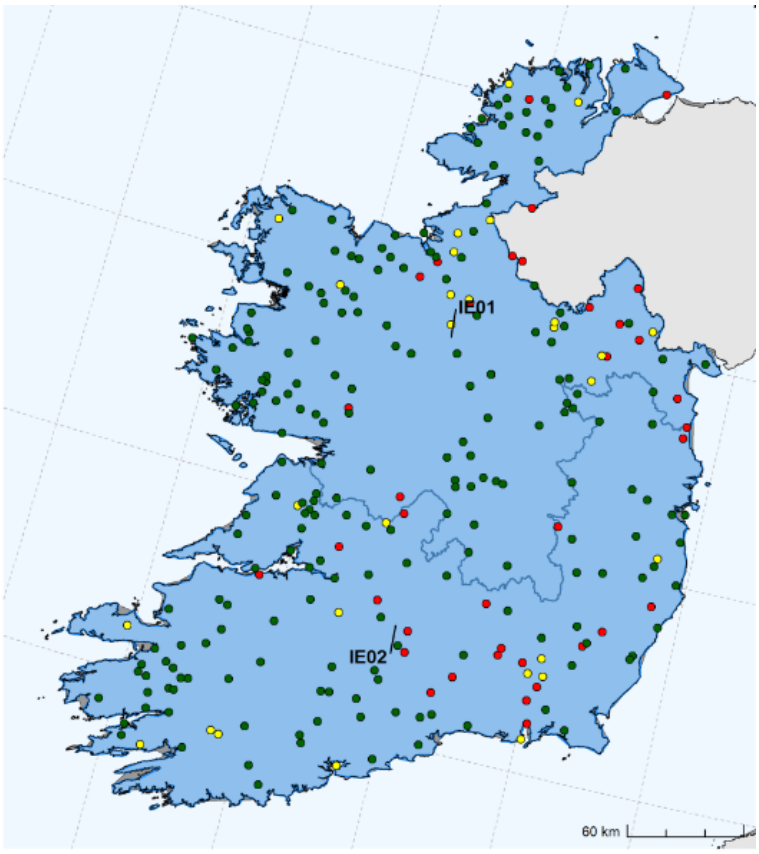


Figure 13. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis).

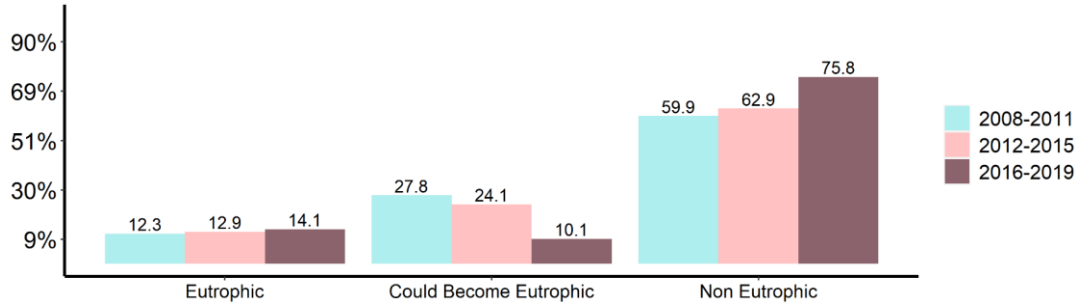
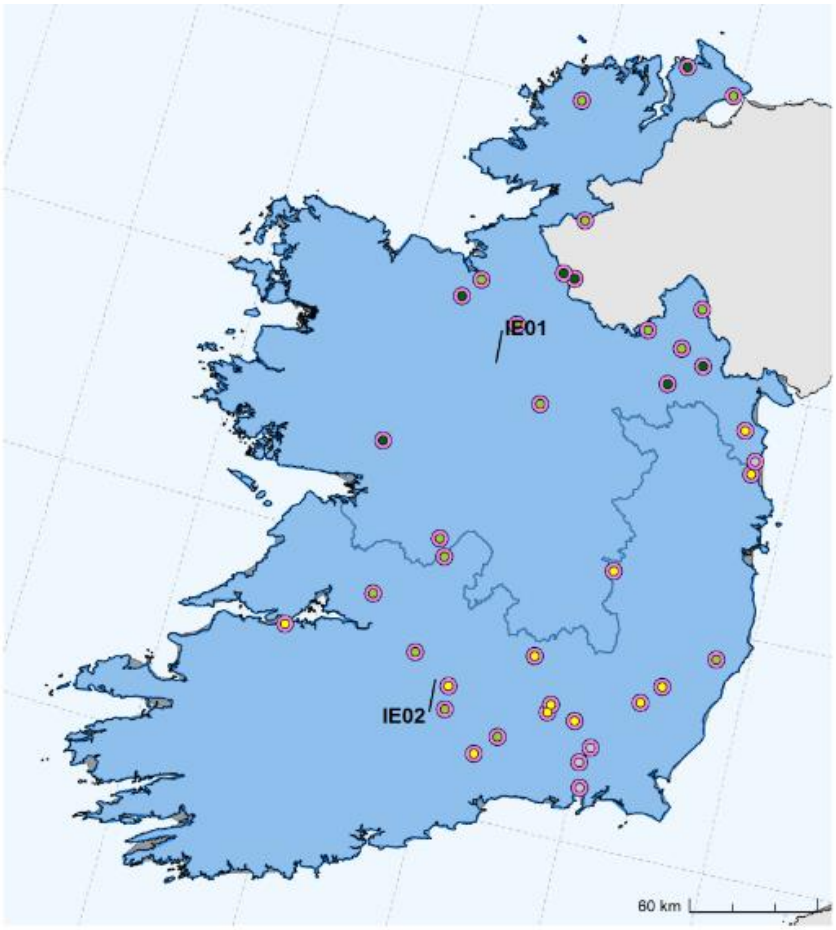


Figure 14. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

The Eutrophic status vs average NO3 annual concentration



			Number of stations by classes of concentration						
NUTS ID	NUTS NAME	High trophic status	<2 mg/l	[2,10) mg/l	[10,25) mg/l	[25,40) mg/l	[40,50) mg/l	>=50 mg/l	Unclassified
IE01	Border, Midland and Western	18	7	10	1	0	0	0	0
IE02	Southern and Eastern	17	0	6	11	0	0	0	0
NO_NUTS	SALINE	4	0	0	0	0	0	0	4
	Total	**39**	**7**	**16**	**12**	**0**	**0**	**0**	**4**

Figure 15. The SW monitoring stations with eutrophic status versus the average NO3 annual concentration.

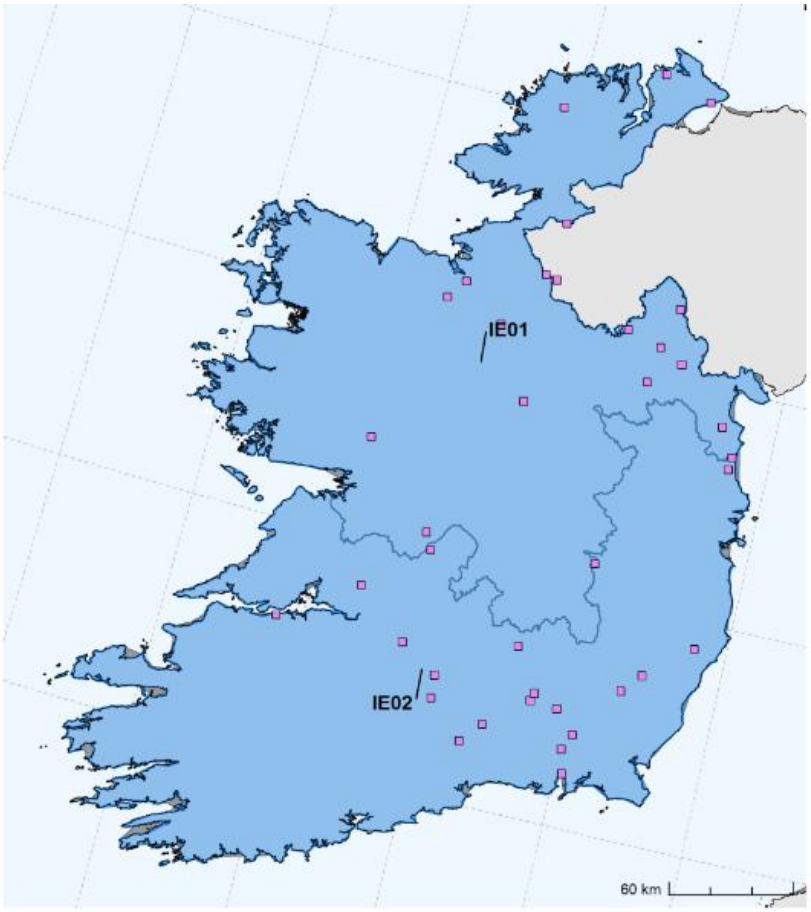
The analysis shows all the SW monitoring stations with the higher trophic status and the corresponding value of NO3 concentration. The map shows the spatial distribution of these points, and the table reports the number of stations with measurements with highest trophic status and the corresponding stations by classes of NO3 concentration. Only the NUTS of interest are reported.

The assessment of trophic condition in Irish rivers is based on biological assessments using a biotic index scheme using aquatic macroinvertebrate communities. 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. In accordance with the Nitrates Directive Article 10 assessment and reporting guidelines, the five classes historically used to indicate trophic condition have been modified to the three classes; "Non-eutrophic"; "Could become eutrophic"; and "Eutrophic".
29 stations on rivers resulted in eutrophic status as well as 6 SW stations on lakes. 4 transitional costal stations in south eastern seaboard resulted also eutrophic.

Table 5. Summary of SW stations by classes of trophic status and type.

		Number of stations with Trophic status		
Station Type	Description	Eutrophic	Could become eutrophic	Non Eutrophic
4	River water	29	5	144
5	Lake/reservoir water	6	19	49
6	Transitional water	4	2	12
7	Coastal water	0	2	5
8	Marine water	0	0	0
9	Not specified	0	0	0
	Total	**39**	**28**	**210**

Surface Water quality hotspot

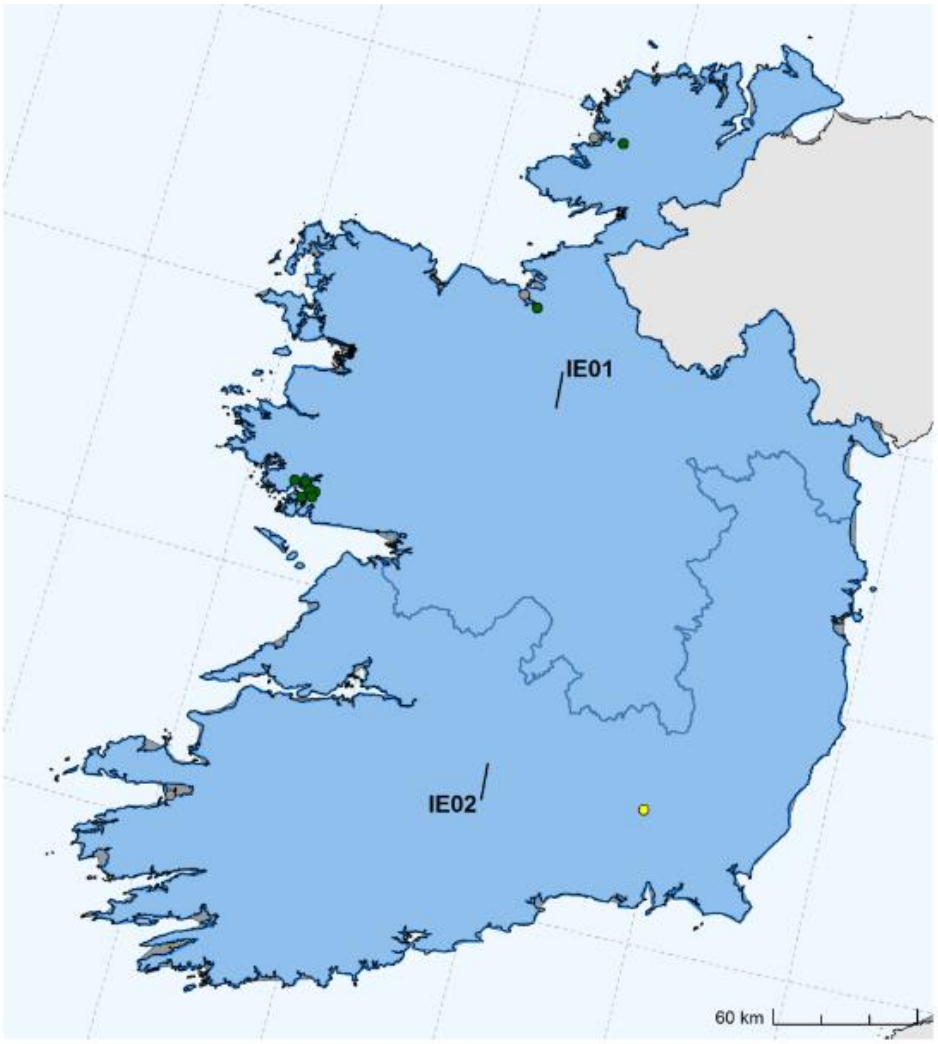


NUTS ID	NUTS NAME	High trophic status	>=40 and < 50 mg/l incr.trend	>=50 mg/l
IE01	Border, Midland and Western	18	0	0
IE02	Southern and Eastern	17	0	0
NO_NUTS	SALINE	4	0	0
	Total	**39**	**0**	**0**

Figure 16. SW hotspot analysis map (top graph) and distribution by NUTS2 (lower graph) of average NO3 annual concentration greater than 40 mg/l and trophic status.

The hotspot analysis identifies all the SW monitoring stations that have high eutrophic status, NO3 concentration in the range of 40-50 mg/l with increasing trends and above 50 mg/l are not present. The map shows the spatial distribution of these points, and the table reports the number of stations by NUTS inside and outside NVZ. Only the NUTS of interest are reported.

Surface Water Stations Removed



Station Type	Description	Number of removed stations			
		total removed	with measurements	with trends	with trophic status
4	River water	0	0	0	0
5	Lake/reservoir water	0	0	0	0
6	Transitional water	8	6	5	1
7	Coastal water	4	3	3	1
8	Marine water	0	0	0	0
9	Not specified	0	0	0	0
	Total	**12**	**9**	**8**	**2**

Figure 17. SW removed stations map (top graph) and distribution by NUTS2 (lower graph).

The removed stations analysis identifies all the SW monitoring stations that were removed in the current reporting period. The map shows the spatial distribution of these points with the concentrations of the previous reporting period, and the table reports the number of stations with measurements and trends per type.

Measures in the Action Programme

The Code of Good Agricultural Practice was developed in 1996. In 2003, Ireland adopted a whole territory approach in the context of the Nitrates Directive. A National 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 was revised starting in 2010 at least every four years. The last revision of the NAP was carried out in 2018 and further amendments were published in 2020. Several measures introduced in the last 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 2016-2019 reporting period but are included for reference and consideration. In the following table the details of AP are reported.

In addition, 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.

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

Table 6. Details of Action Programme

Measure	General details in Action Programme
Period of prohibition of fertiliser application	• Period of prohibition are zone-specific and are listed in section 5.2.1, paragraph 1, of the MS report
Restrictions for application on sloped soils	• Organic fertilisers cannot be applied when the ground slopes steeply and, taking into account factors such as proximity to waters, soil condition, ground cover and rainfall, there is significant risk of causing water pollution (section 5.2.1, paragraph 6, ot the MS report)
Restrictions for application on soaked, frozen, or snow-covered soils	• Provisions on application of fertilisers on water-saturated, flooded, frozen and snow-covered ground are listed in section 5.2.1, paragraph 4, of the MS report
Restrictions for application near watercourses (buffer strips)	• Chemical fertiliser must not be applied to land within 2 metres of a surface watercourse. • Details listed in section 5.2.1, paragraph 7, of the MS report
Effluent storage works	• Storage facilities characteristics are listed in section 5.2.1, paragraph 2, of the MS report
Capacity of manure storage	• See paragraph 2 of section 5.2.1, MS report
Rational fertilisation (e.g., splitting fertilisation, limitations)	• See section 5.2.1, paragraphs 3 and 5, of the MS report • Soil tests are considered valid for a period of four years.
Crop rotation, permanent crop enhancement	• P build up annual maximum fertilization rates were included • Maximum fertilisation rates of available nitrogen and phosphorus for grassland, tillage, vegetable and fruit crops are set out in the Regulations
Vegetation cover in rainy periods, winter	• Winter coverage of soils conditions are listed in section 5.2.1, paragraph 9, of the MS report
Fertilisation plans, spreading records	• Soil tests are considered valid for a period of four years.
Other measures	• Provisions on procedure for land application of fertilizers, both chemical and livestock manure: section 5.2.1, paragraph 8, of the MS report • Other preventive measures for all holdings are listed in section 5.2.1, paragraphs 10 and 11, of the MS report (e.g. 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)
Dates for application limits 170 kg N/ha/year:	• In 2020 several AP measures were extended to include all farms stocked at or above 170 kg organic N per hectare (section 5.2.1, paragraph 11, of the MS repor)

Controls

As part of the controls under the Good Agricultural Practice Regulations, the Department of Agriculture, Food and the Marine (DAFM) carries out checks on the application rates of all herd owners with livestock on an annual basis. Herd owners in breach of the 170/250 kg per hectare limit incur penalties. The average number of penalties issued for the 2016-2018 period was 1,810 per annum. In 2018 and 2019 55% and 73% of the inspections were non-compliances due to insufficient storage for livestock manure.

Designation of NVZ

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.

Forecast of Water Quality

Ireland provided a water quality analysis for understanding better the complexity of the factors affecting nutrient loss to water in the diverse agricultural landscape. There have been some encouraging signs with water quality improvement in 152 of 726 water bodies that were prioritised areas for action in the WFD River Basin Management Plan (RBMP) 2018-21 (EPA, 2020). This reflects the positive efforts of local authorities, other public bodies, local communities and landholders. However, it is explained that 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 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. In the context of the development of new CAP knowledge transfer mechanisms will be developed to link research and findings to the advisory and farming communities.

Summary

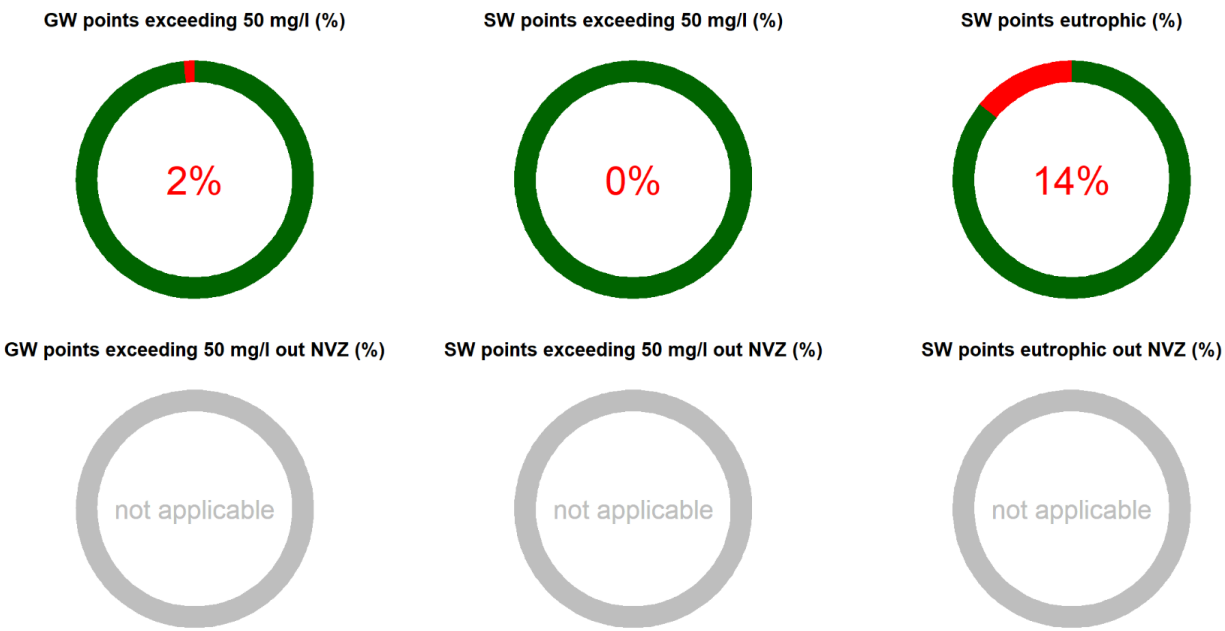


Figure 18. The summary plot for the period 2016-2019

This plot provides in the first row the percentage of stations exceeding 50 mg/l with respect to the total stations with measures and the percentage of eutrophic SW stations with respect to the total for which the trophic status is reported. In the second row, the percentage of stations exceeding 50 mg/l that are outside NVZ with respect to the total of stations exceeding 50 mg/, and the percentage of SW eutrophic stations that are outside NVZ with respect to the total that are eutrophic.

Long term analysis

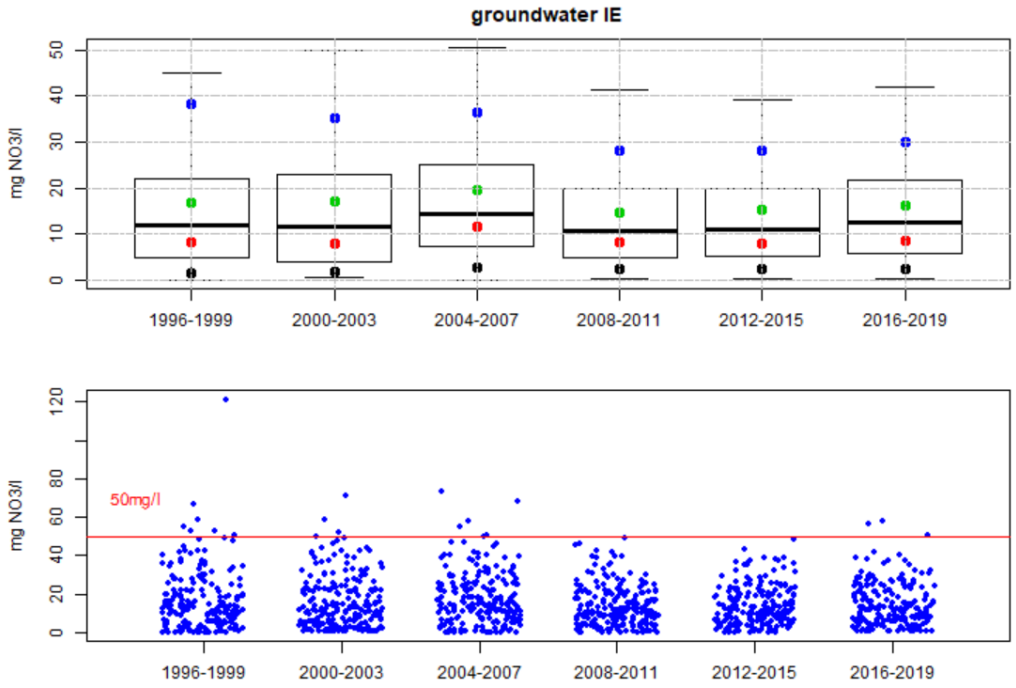


Figure 19. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for groundwater stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

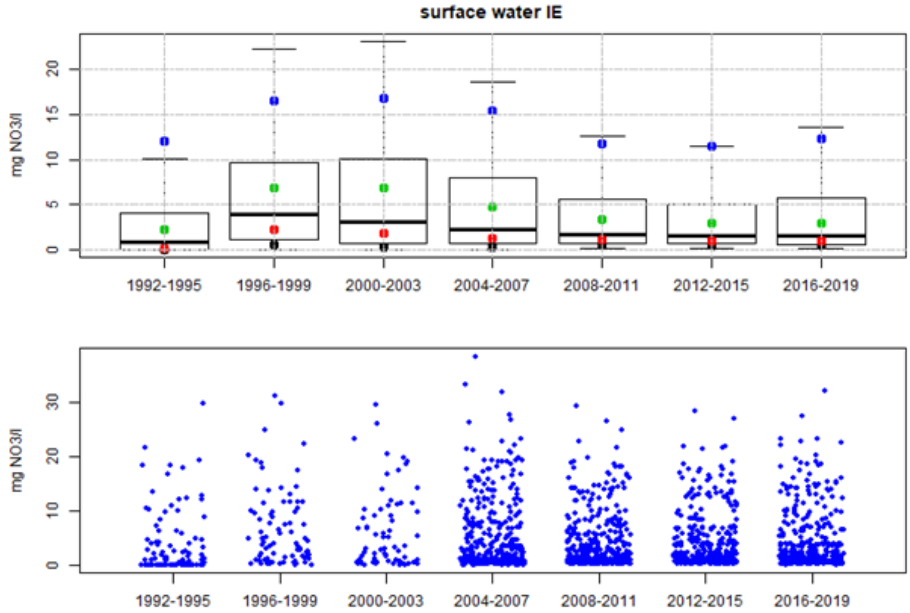


Figure 20. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for surface water stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

Conclusions and recommendations

Livestock pressure in Irelands is above the EU average. The surplus of nitrogen is about the EU average, while the surplus of phosphorus is among the highest in the EU.

The network of monitoring stations is sufficiently elaborated. The groundwater quality is generally good, with a number of monitoring stations have an increasing trend. Surface waters also have a low nitrate concentrations and the number of waters that are eutrophic remains limited.

The last revision of the action programme dates from 2018.

The Commission encourages Ireland to review its action programme in relation to the high nutrients phosphorus surplus and to continue to follow-up hotspots area's that show increasing nitrate concentrations.