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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 States reports for the period 2012-2015

{COM(2018) 257 final}

Member State: France

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	2598	2094
Total fresh surface water stations	3390	2897
Total saline surface water stations	8	3

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

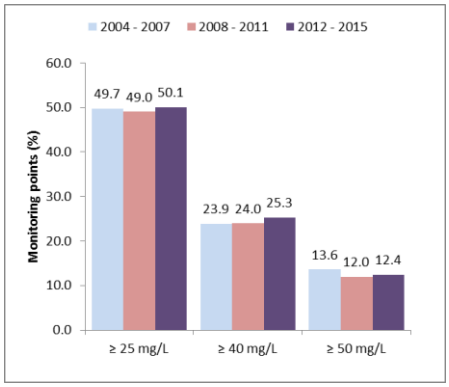

Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

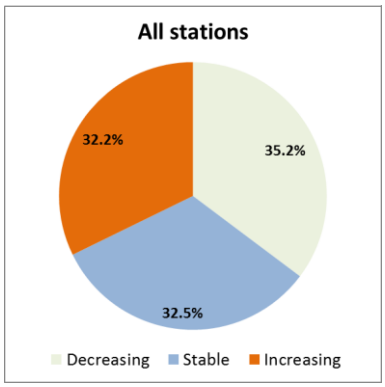

Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

The report presents a comparison between the first (1992-1993) and last campaign (2014-2015). Overall, 49% of the monitoring stations showed an increase in average nitrate concentration while 42% of the stations showed a decrease. In NVZs, 53% of the monitoring stations showed an increase in average nitrate concentration. Outside NVZs, only 20% of the stations showed an increasing trend, while 56% showed a decreasing trend.

The average nitrate concentration in overseas areas of the French territory (Guadeloupe, Reunion, Martinique, French Guiana) was always lower than 40 mg/L.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and February 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

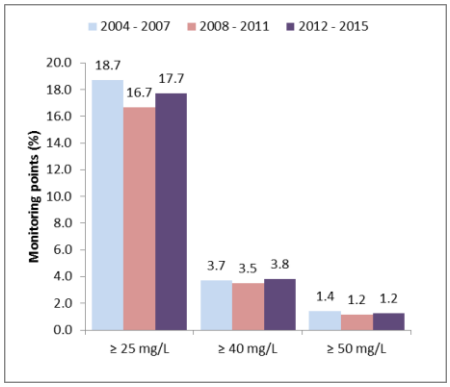

Figure 3. Percentage of fresh surface water stations with average values or equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

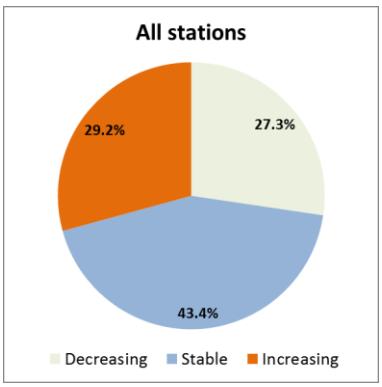

Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

The report presents a comparison between the first (1992-1993) and last campaign (2014-2015). Overall, 44% of the monitoring stations showed an increase in average nitrate concentration while 35% of the stations showed a decrease. In NVZs, 49% of the monitoring stations showed an increase in average nitrate concentration. Outside NVZs, 27% of the stations showed an increasing trend.

The average nitrate concentration in overseas areas of the French territory was lower than 10 mg/L for 99% of the stations.

Eutrophication

Fresh waters

In 2015, France launched a collective scientific exercise that aims to provide an understanding of causes and consequences of eutrophication phenomena. Until the results of this study are available, France retains a threshold of 18 mg nitrate per L (90% percentile) to identify vulnerable zones for eutrophication. The report presents maps for the 90 percentile above 18 mg/L for 2014-2015 and 2010-2011. Most stations above the threshold are located inside NVZs, whereas less than 2.5% of stations are outside NVZs.

The report further presents results of total phosphorus, orthophosphate, BOD5, dissolved oxygen, nitrites, and chlorophyll-a for rivers. The report concludes that eutrophication in fresh waters is only a minor problem, similar to the previous Reporting period.

Saline waters

Eutrophication parameters are measured in several networks such as REPHY (phytoplankton and phytotoxins), CEVA/RCS (opportunistic macroalgae), OSPAR monitoring network, Barcelona convention monitoring network, CEVA/RCO in Loire-Brittany, and RSL (Lagoon monitoring network). The main parameters used to assess eutrophication are phytoplankton (chlorophyll-a, abundance, species composition), macroalgae (blooms,

intertidal, subtidal), and chemo-physical (dissolved oxygen, turbidity). The results of all these networks are presented in the report. The report concludes that the ecological state of French coastal water bodies is generally in good or excellent condition, with the exception of coastal water bodies of the Channel, certain areas in southern Brittany which are evaluated to be in fair condition, and the Mediterranean lagoons.

Main findings of monitoring programmes established in line with Article 5 (6) (5-10 lines)

Water quality monitoring is coordinated by DREAL (directions régionales de l'environnement, de l'aménagement et du logement); the data are provided by water agencies (agricultural monitoring network) and regional health agencies (public drinking water). Since 2010 the monitoring network was adapted under the WFD towards a general surveillance monitoring (RCS) and an operational monitoring (RCO) to assess water bodies that may not meet environmental goals. The ND monitoring includes all possible RCS stations, a selection of RCO stations that are, or may become, polluted by nitrate from agricultural sources, and the existing nitrate monitoring stations that were also monitored in previous campaigns.

Water monitoring is performed once every four years in so-called campaigns. The first campaign covered the period 1992-1993, and the sixth campaign covered 2014-2015. The average annual sampling frequency during the 2014-2015 campaign was 4.3 for groundwater (61% of stations sampled at least 4 times per year) and 9 for surface water (60% of stations sampled at least 6 times per year). The report states that data from previous reporting periods might have changed slightly due to corrections in the database.

Pressure from agriculture

In the last Reporting period, there were little changes (<=2%) in the total agricultural area and pasture and permanent crops area. The use of nitrogen from manures decreased with 3%, and there was a 6% increase in the use of mineral fertilizer nitrogen. Cattle and pig numbers decreased with 3% and 4%, respectively, while poultry numbers remained stable.

The gross national nitrogen surplus decreased from around 70 kg N/ha/yr in the early 1990s to around 50 kg N/ha/year in recent years.

Controls

Three types of controls are used to evaluate the Action Programmes: (i) Cross compliance controls (at least 1% of farmers concerned), (ii) specific compliance checks by water authorities on intercropping and buffer strips, (iii) specific installation checks (ICPE Installation Classée pour la Protection de l'Environnement) for the livestock sector such as effluent management and logbook practices.

Cross compliance sanctions related to the Nitrates Directive varied between 11 and 27% of the controlled farmers for the years 2012 to 2014.

Designation of nitrate vulnerable zones (NVZs)

France's NVZs covered 188,793 km^2, which is 34% of the territory and 68% of the utilised agricultural area. In 2012 and 2015, the NVZs were extended with 7,504 and 29,752 km^2, respectively.

Member State: Germany

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	697	692
Total fresh surface water stations	241	239*
Total saline surface water stations	5	19*

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

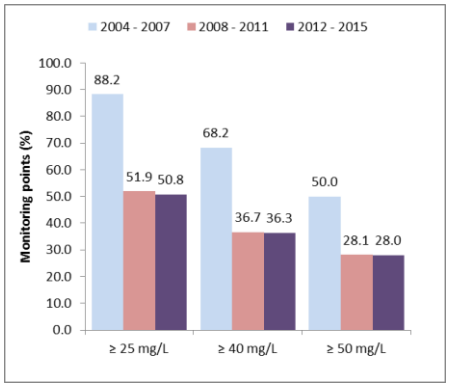

*Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).***

Trends in Nitrates concentration

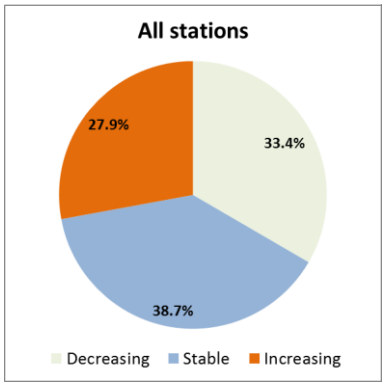

Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between September 2016 and July 2017, RP5: May 2013 and July 2017, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

** Trends in winter average values.*

*** The groundwater monitoring network was redesigned. The data for 2004-2007 are based on a different network than the data for 2008-2011 and 2012-2015.*

Surface water quality

Nitrates concentration

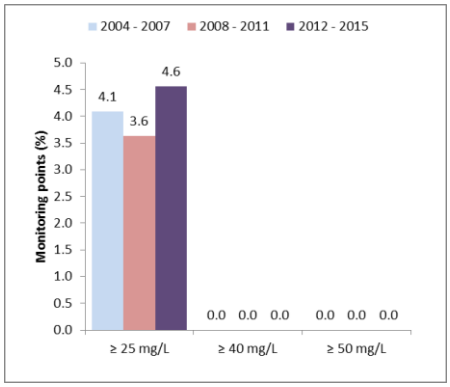

Figure 3. Percentage of fresh surface water stations with annual average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in Nitrates concentration

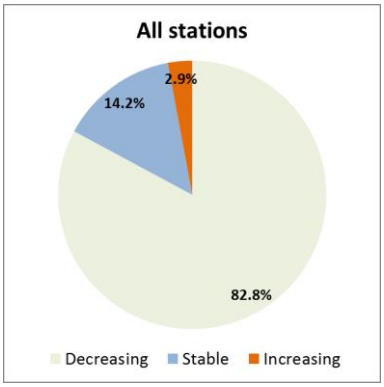

Figure 4. Percentage of stations with decreasing, stable or increasing trends (winter average) in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Figure 3 is based on 239 rivers and 2 lakes with average annual nitrate measurements. Winter average nitrate measurements were available for 25 lakes, showing 48% of the stations with less than 2 mg/L, 44% between 2 and 10 mg/L and 8% between 10 and 25 mg/L. Figure 4 presents the trends of winter average values of 214 rivers and 25 lakes.

Eutrophication

Fresh waters

The eutrophication of surface waters mainly occurs due to excessive phosphorus inputs. Waters are considered eutrophic or under the risk of eutrophication when the values of good ecological status, as defined in Appendix 7 of the surface water ordinance of 20 June 2016 (BGBI, p. 1373), is exceeded. For the measurement of water quality, Germany uses a water type-specific upper phosphorus value, varying from 0.045 to 0.3 mg total P per L for rivers and 0.009 to 0.06 mg total P per L for lakes, as the target value (class II) in a 7-stage water quality classification. The water quality decreases from class I to VII.

For rivers in 2014, 35% of the monitoring stations indicated annual average values below the target value (quality class II) for total phosphorus, 56% of the monitoring stations indicated average concentrations in the range of quality class II-III and 7% of the monitoring stations fell in the range of quality class III. Five monitoring stations of transitional water and the monitoring station established at the Emscher fall in the quality classes III-IV and IV.

When comparing 2011-2014 with 1991-1994, the majority of monitoring stations show either a slight or a clear reduction in contamination. A downward trend can be seen at approximately 91% of the monitoring stations; phosphorus contamination remained steady at approximately 3% of the monitoring stations and increased to a greater or lesser extent at 6 % of stations.

For lakes in 2014, around 36% of monitoring stations indicated an annual average value below the target value (quality class II) for total phosphorus. 45% of the monitoring stations indicated average concentrations in the

range of class II-III and 12% of the monitoring stations were in the range of class III. A single monitoring station indicated worse results (quality class III-IV).

Just under 75% of lakes indicated a decreasing trend of total phosphorus concentrations in the periods 1997-2000 and 2011-2014. 37% of the lakes showed a significant decrease in concentrations of more than 50%. One lake showed no change in concentrations.

Saline waters
The orientation values which are consulted in order to assess the effectiveness of reduction measures were developed on the basis of the procedures provided for under OSPAR and HELCOM. If the nutrients are between the background and orientation value there should be a good ecological status in accordance with the Water Framework Directive (WFD). If the orientation values are exceeded, eutrophication effects in accordance with the Nitrates Directive can be expected and the good ecological status under the WFD would be probably missed.

The second application of the harmonised assessment of the eutrophication status of convention waters was based on data from the period 2001-2005. The third application, based on data from 2006-2014, is currently under execution.
The results of the eutrophication assessment of the German Bight, including Wadden Sea, are reflected in the results of the survey conducted in accordance with Section 5 of the WFD based on data from the 2009-2013/14 period. Of the 16 water bodies in Lower Saxony (including water bodies shared with the Netherlands, Hamburg and Schleswig-Holstein) where the ecological status or ecological potential were assessed for transitional and coastal waters, 3 coastal water bodies indicated a moderate ecological status, 7 water bodies indicated an unsatisfactory ecological status, while 2 water bodies indicated a bad ecological status. In the estuaries, 3 transitional water bodies indicated a moderate ecological potential and one water body indicated an unsatisfactory ecological potential. Of the 13 assessed water bodies in Schleswig-Holstein, 9 indicated a moderate ecological status, 2 indicated an unsatisfactory ecological status, while 2 indicated a bad ecological status. The ecological status was primarily impaired by eutrophication effects.

With respect to the Baltic Sea, the current survey conducted according to Article 5 of the WFD was based on data from 2009-2014. Of the 21 assessed water bodies in Mecklenburg-Western Pomerania, 3 indicated a moderate ecological status, 11 indicated an unsatisfactory ecological status, while 7 indicated a bad ecological status. Of the 24 assessed water bodies in Schleswig-Holstein, 12 indicated a moderate ecological status, 4 indicated an unsatisfactory ecological status, while 8 indicated a bad ecological status. The ecological status was primarily impaired by eutrophication effects.

Main findings of monitoring programmes established in line with Article 5 (6) (5-10 lines)

The monitoring network for groundwater has been revised since the previous report in 2012. The new sites were selected on the following criteria: reflect the shallow groundwater so that its water quality reflects the land use, the distribution of land uses (settlement, forest, grassland, arable and other cropping), represent all regions, the sites should at least have data from 2008 and when possible, the sites that were included in the first to fifth Art. 10 reports, should be included. For ND reporting only the sites mainly affected by grassland, arable and other cropping were used.

The nitrate concentration in watercourses is subject to regular measurement at monitoring stations forming part of the monitoring stations networks of the Länder. Sampling is carried out at these monitoring stations at least 12 times per year and in most instances 26 times per year.

Pressure from agriculture

Agricultural pressure was reported for the years 2010 to 2015, but only completely for 2010 and 2013.When comparing 2013 with the 2010, the total agricultural area remained stable. Manure nitrogen use increased slightly (+2%) and mineral fertilizer nitrogen use increased by 1%. Farm numbers decreased, especially farms

with livestock (-8%). The number of cattle remained stable, while the number of pigs increased by 5%. Pig numbers peaked in 2014. Since then both the number of holdings engaged in pig production and the number of pigs have been declining. Data about poultry in the 2010 are reported to be unreliable, not allowing a correct comparison.

The net nitrogen area-based balance shows a decreasing surplus of around 100 kg/ha in the early 1990s to around 52 kg/ha in 2014. The report also present regional N surpluses which show relative high surpluses in the northwest, up to 100 kg/ha in some individual years of the current Reporting period.

Controls

The measures of the AP are also checked within Cross compliance regulations. Checks are carried out on random and risk oriented basis, often additional after complaints. In 2014 4,112 (1.3% of all farms) on-site checks were carried out, of which 16% showed minor infringements of measures under cross compliance. Major infringements were found on 0.4% of the checked farms.

Designation of nitrate vulnerable zones (NVZs)

Germany adopts a whole territory approach (357,376 km^2).

Member State: Greece

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1078	0
Total fresh surface water stations	479	0
Total saline surface water stations	0	0

Table 1. Number of water monitoring stations

There were no stations with trend values.

Groundwater quality

Nitrates concentration

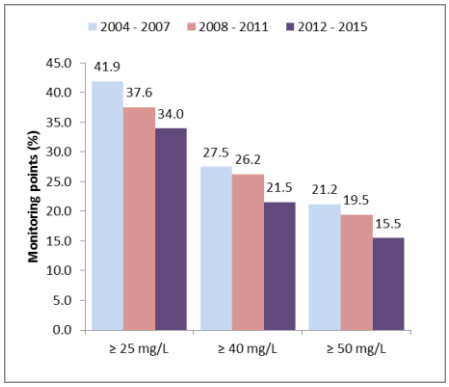

Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between January and February 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

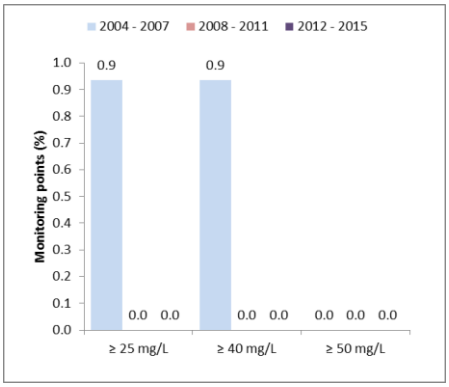

Figure 2. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Eutrophication

Fresh waters

Eutrophication in rivers was assessed using concentrations of NO_3, NH_4, total P and BOD_5. The trophic level of the rivers was assessed using the distinctions between oligo-, meso-, eutrotrophic. Values in the range 0.3-5.0 mg/l N-NO_3, 0.1-0.8 mg/l N-NH_4, 0.1-0.2 mg/l P and 1.0-4.0 mg/l BOD_5 are considered mesotrophic, while values below or above these ranges are considered oligotrophic or eutrophic, respectively.

Eutrophication of lakes was assessed using concentration of total N, total P, and chlorophyll-a. The trophic level of the lakes was assessed using the distinctions between oligo-, meso-, eutrotrophic. Values in the range 0.1-1 mg/l N, 0.01-0.03 mg/l P and 2-10 mg/l chlorophyll-a are considered mesotrophic, while values below or above these ranges are considered oligotrophic or eutrophic, respectively.

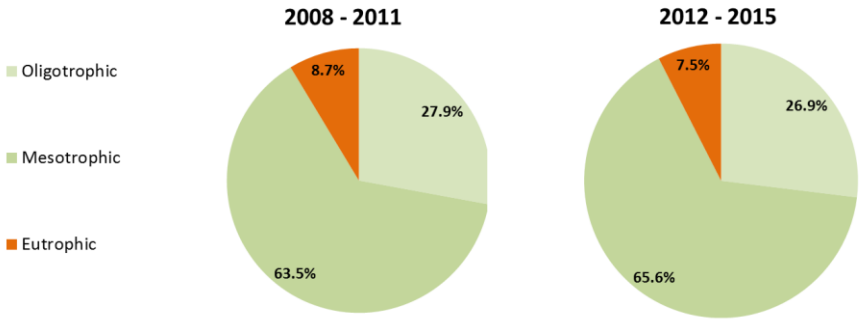

Figure 5. Fresh water eutrophication classification during the previous and current reporting period..
Note that Greece only uses oligotrophic, mesotrophic and eutrophic.

Saline waters

Not reported.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Surface water monitoring is based on the National Water Monitoring Network and funded by the Operational Programme “Environment and Sustainable Development”. Compared to the previous reference period, the number of monitoring network sites has increased significantly.

Pressure from agriculture

In the current Reporting period, the total agricultural area increased by 6%, compared to the previous Reporting period (Eurostat). The area reported in the art. 10 report is probably not correctly reported. According to the previous Reporting period the total agriculture area was 30,590 km^2. Compared to the previous Reporting period, the use of nitrogen from manures decreased by 12% in the current Reporting period. The annual use of mineral fertilizer N was not reported for the current period. The number of cattle, pigs and sheep and goats decreased by 32%, 78%, 69%, respectively and the number of poultry increased by 47%. The total number of farmers decreased by 23%. In the current Reporting period 15% of the farmers had livestock and the total number decreased by 8%.

The total areas, agricultural areas and the excretion of nitrogen are reported for all the 29 individual NVZs. For 7 NVZs data about the current and previous Reporting period are presented. These 7 NVZs represent 75% of the total area of all NVZ's. The excretion of manure nitrogen has increased in all individual 7 NVZs. The excretion data in some of these NVZs are very uncertain due to the very large variations between Reporting periods.

Controls

Not reported.

Designation of nitrate vulnerable zones (NVZs)

In 1999, 4 NVZs were designated. Between 2008 and 2014 the number of NVZs was expanded to 29 areas. The current NVZs represent 42,260 km^2, of which 12,691 km^2 is agricultural area.

Member State: Hungary

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1756	1736
Total fresh surface water stations	530	313
Total saline surface water stations	Not relevant	Not relevant

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

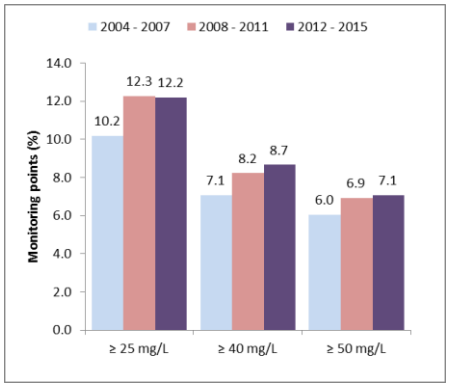

Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

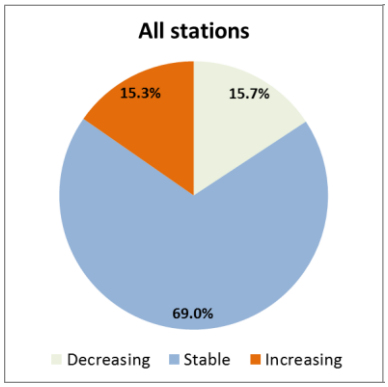

Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Surface water quality

Nitrates concentration

Trends in nitrates concentration

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and January 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

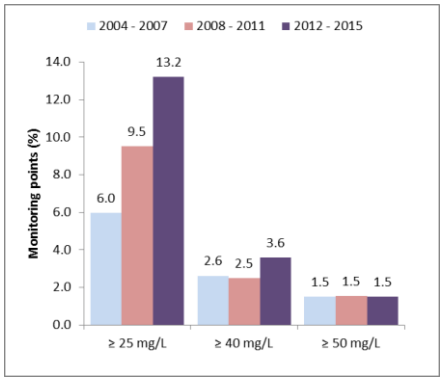

Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

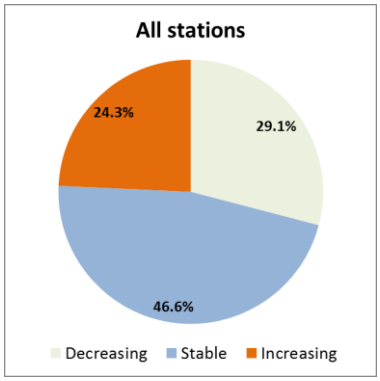

Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

The parameters used to characterize the trophic status for rivers are phytoplankton, phytobenthos, nitrate, total nitrogen, orthophosphate and total phosphorous. The parameters used to characterize the trophic status for lakes are phytoplankton, macrophytes and total phosphorous. The final state is determined by the parameters with the worst classification. The ecological status is converted into three trophic states: non-eutrophic (excellent-good), potentially eutrophic (moderate), and eutrophic (poor-bad).

Description	Eutrophic	Non-eutrophic	Potentially eutrophic
Rivers	36%	23%	40%
Lakes	4%	64%	31%
Fresh surface water	34%	27%	40%

Table 2. Percentage of fresh water eutrophication classification during the current reporting period (extracted from submitted water quality data).

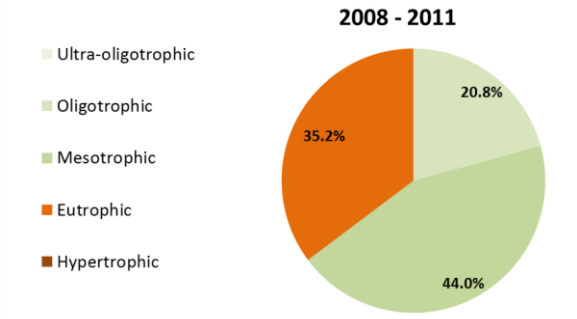

Figure 5. Fresh water eutrophication classification during the previous reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 35%

Saline waters
Not relevant.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring is reported in the National Environmental Protection Information System (OKIR) and surface water protection database (FEVISZ). In the 2012 report the monitoring of sub-surface water was changed in response to comments made by the Commission to decrease the number of sampled deep protected aquifers. The Commission considered the number of unconfined shallow sub-surface water types to be underrepresented. Starting in 2017 the number of monitoring locations for unconfined sub-surface water will increase. The majority of the points is located in Nitrate Vulnerable Zones. The sampling frequency is 1-2 samples per year. Water quality results are presented for the NVZs, for municipal areas within the NVZ, and for the whole territory.

Pressure from agriculture

Compared with the previous reporting period, the total agricultural area decreased by 4%. The number of cattle increased by 18%, while the number of pigs and poultry decreased by 4% and 9%, respectively. The livestock numbers show a slight increase due to the application of Eurostat methodology to account livestock numbers on June 1st and December 1st instead of only December 1st. The total number of farmers decreased by 16% while the number of farmers with livestock increased by 7%. Currently 64% of the farms are livestock farms. The annual use of N from livestock manure increased by 2%. The annual use of mineral N fertiliser increased by 16%. However, the report states that the average fertiliser use is still less than the agronomic crop requirements. The nitrogen balance for Hungary in 2012, 2013 and 2014 was 44, 40 and 29 kg N /ha, respectively.

The national Soil Protection Information and Monitoring System has been sampling soils annually since 1992 at 1,236 locations in the period 15 September to 15 October and analysed for nitrate. The results are presented in five categories (very low, low, medium, high and excessively high). In the top soil (0-30 cm), the annual average proportion of samples with a high (50-100 mg N/kg soil) or excessively high (>100 mg N/kg soil) nitrate content varied from 6 to 32%. In the deepest soil layer (60-90 cm), these fractions with high or excessively high nitrate content ranged from 1 to 3%.

Controls

Administrative controls on the implementation of the Action Programme (AP) measures were carried out on 32% of the arable farms and 9% of the livestock farms in NVZs. The proportion of on-site checks was 8%, both for arable and livestock farms. The percentage of non-compliance varies from 0% to 7% between the AP measures. The highest non-compliance was found for farmers that did not have their soils sampled on time in the new NVZs, due to the associated costs, even despite an intensive information campaign. Soil sampling is required every 5 years on croplands to plan for nutrient management. The second most important non-compliance (3%) are the requirements for manure storage facilities although it is reported to be significantly improved compared to the previous reporting period (data not reported).

Designation of nitrate vulnerable zones (NVZs)

Hungary has designated 65,268 km^2 as Nitrate Vulnerable Zones, which is 70% of the total territory. Between the previous and the present reporting period the size of Nitrate Vulnerable Zones has increased (in 2013) from 42,519 km2 to 65,268 km^2.

Member State: Ireland

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	205	205
Total fresh surface water stations	254	250
Total saline surface water stations	117	99

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

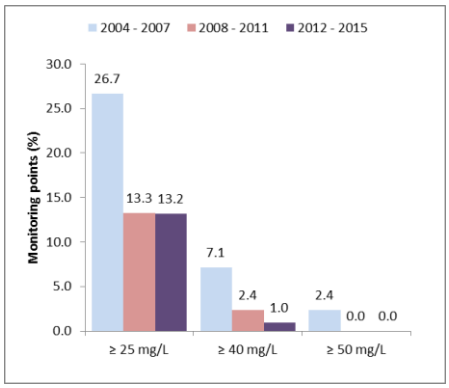

Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

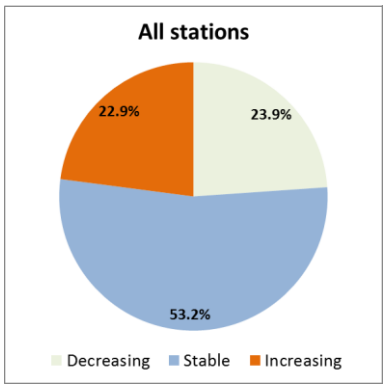

Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.*

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June 2016 and October 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

** Based on only two groundwater stations in Ireland where the nitrate concentration is >=40mg/L*

Surface water quality

Nitrates concentration

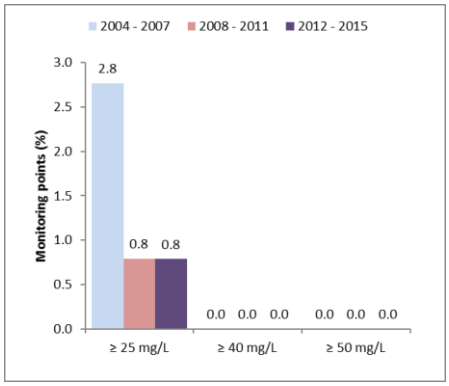

Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

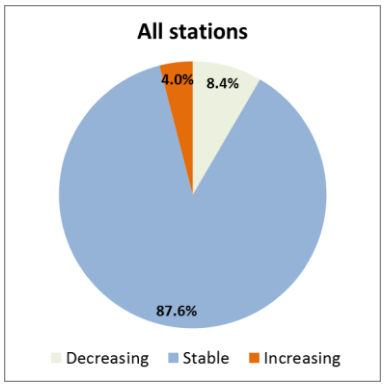

Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

Trophic status in Irish rivers is measured on the basis of biological assessments using a biotic index scheme primarily based on aquatic macro-invertebrate communities. The scheme is WFD-compliant and incorporates the WFD's normative definitions for ecological status. The biotic index contains five levels of ecological status, as defined by specific assemblages of macro invertebrates. The WFD classes High, Good, Moderate, Poor and Bad are re-classed to Ultra-oligotrophic, Oligotrophic, Mesotrophic, Eutrophic and Hypertrophic, respectively.

Eutrophication in lakes is assessed on the basis of a modified OECD scheme, using annual maximum chlorophyll concentrations. It distinguishes the following categories: Oligotrophic, Mesotrophic, Moderately Eutrophic, Strongly Eutrophic, Highly Eutrophic and Hypertrophic. These are re-classed to the ND trophic classes.

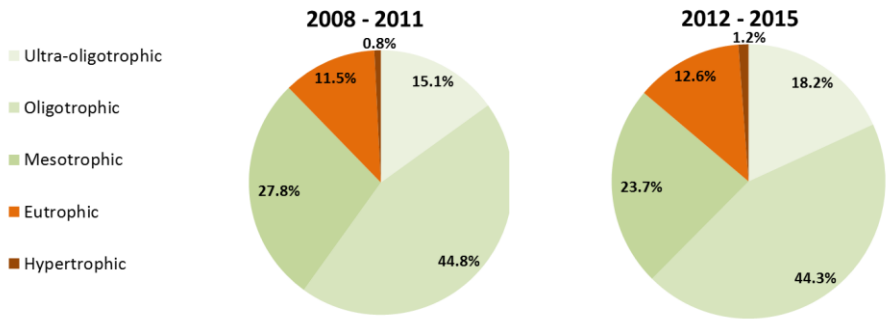

Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 12%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 14%

Saline waters

Ireland does not use the ND Trophic State system for categorisation of transitional and coastal waters and is therefore unable to match the categories reported with the ND trophic states.

Since 2001, the Trophic Status Assessment Scheme (TSAS) has been adopted by Ireland to measure sensitivity to eutrophication in transitional, coastal and marine sites. The system is based on evaluating water quality parameters against a set of criteria which are grouped into the following three categories related to the median salinity of the sample: criteria for nutrient enrichment from nitrogen and phosphorus, criteria for accelerated growth of phytoplankton and macroalgae, and criteria for "undesirable disturbance" measured using oxygen conditions. Using these criteria, water bodies are classified into one of four categories to describe their trophic status and tendency to eutrophication: Eutrophic, Potentially Eutrophic, Intermediate or Unpolluted.

Water type	Unpolluted	Intermediate	Potentially Eutrophic	Eutrophic
Transitional waters	58.8%	23.5%	11.8%	5.9%
Coastal waters	87.5%	12.5%	0.0%	0.0%
Saline waters	**69.0%**	**19.6%**	**7.6%**	**3.8%**

Table 2. Saline water eutrophication classification during the current reporting period.

Main findings of monitoring programmes established in line with Article 5 (6) (5-10 lines)

Ireland implemented a monitoring programme to satisfy the requirements of the Water Framework Directive (WFD) in 2006, including surveillance, operational and investigative monitoring. For the article 10 reporting, data are used from the surface water surveillance network and the groundwater surveillance and operational networks.

Pressure from agriculture

The total agricultural area did not change since the previous Reporting period, but there was a slight increase in permanent grassland (+3%). The annual use of manure nitrogen increased slightly (+2%), while the use of mineral nitrogen also increased (+3%). The number of farms was virtually unchanged and number of animals showed overall increases, i.e. cattle (+4%), sheep (+6%) and pigs (+5%). Poultry numbers were not reported. Nitrogen excretion increased as well for cattle (+2%), sheep (+3%) and poultry (+9%), but remained unchanged for pigs.

The report lists recent developments in agriculture that are considered to be favourable to limit nitrogen losses. These are: grass continues to be the dominant crop in Ireland, the climate and soils ensure grass growth almost right throughout the year in Ireland thereby reducing the potential for nitrogen leaching, and the area in potato (-18%) and maize silage area (-40%) has decreased. On the other hand there are also developments that are considered to be unfavourable to limit nitrogen losses. These are: the area devoted to tillage crops, fruit and horticulture has increased slightly (0.9%), the area devoted to cereal crops has increased, and late harvesting of crops reduces the quality and effectiveness of the green cover being established before the onset of winter (however the Action Programme requires green cover be put in place where a total herbicide is used or arable land is ploughed after 1st July each year).

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Controls

The number of annual farm inspections carried out by local authorities and Department of Agriculture, Food and the Marine (DAFM) in the period 2012–2015 varied between 6,408-7,000 The average number of inspections for this period is 6,645. These inspections are carried out to determine the effectiveness of the measures set out in the National Action Programme (NAP).

In addition to these inspections, 7,700 DAFM inspections (including Green Low-Carbon Agri-Environment Scheme, derogation farm applicants, 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 or 250 kg Nitrogen per hectare limits as appropriate. This is done by checking the total Nitrogen figures from the Animal Identification System (AIM) against the areas declared under the Basic Payment Scheme. Herd owners exceeding these limits are subject to penalties.

Designation of nitrate vulnerable zones (NVZs)

Ireland adopts a whole territory approach (68,900 km^2).

Member State: Italy

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	5035	4134
Total fresh surface water stations	3154	2183
Total saline surface water stations	577	267

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

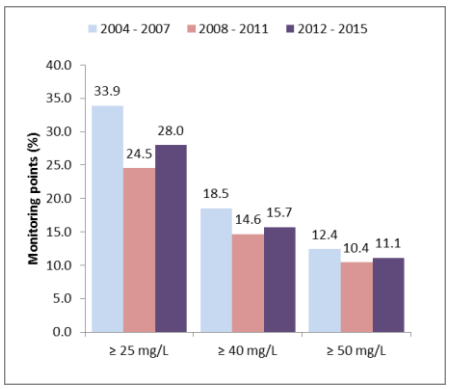


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

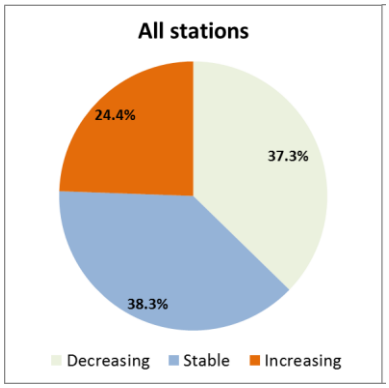


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June 2016 and April 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

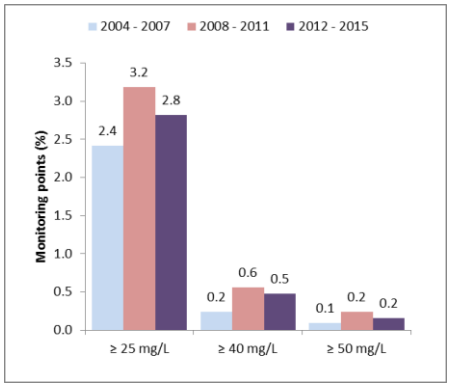


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

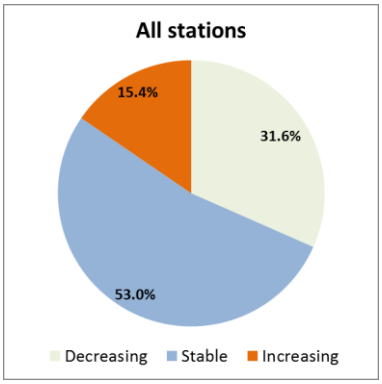


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

Italy reports ND trophic status, using LIMeco for rivers and LTLeco for lakes. Details about the method are not reported.

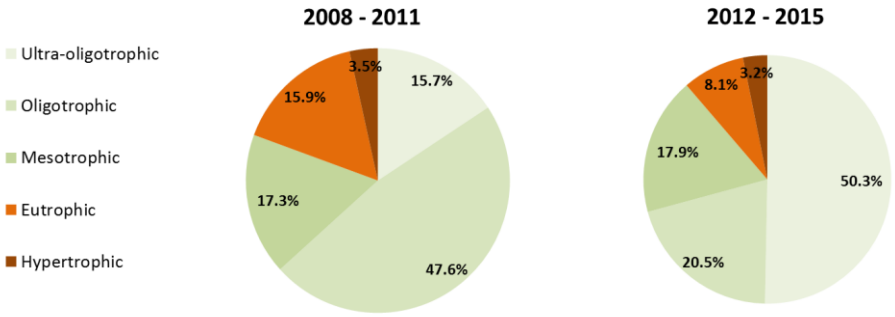


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 19%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 11%

Saline waters

Italy reports ND trophic status, using the TRIX (Trophic Index) index for marine and coastal waters which includes dissolved oxygen and nutrients and chlorophyll-a. For transitional waters dissolved inorganic nitrogen and reactive phosphorus are considered. Details about the method are not reported.

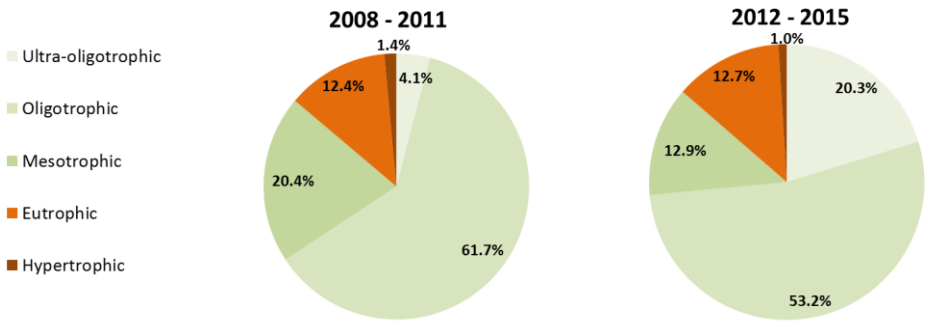


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 13%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 14%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The monitoring results represent the whole territory, but are also presented separately for northern, central and southern Italy. Groundwater is monitored at least twice a year, while surface waters monitoring varies from 4 to 12 samples per year.

It is reported that the method for the assessment of the trophic state is reviewed in order to harmonize the criteria nationwide, and that this review will be concluded in December 2016.

Pressure from agriculture

The provided national data on agriculture were reported per region, but do not always cover the whole territory. The cover varies between agricultural parameters from 55% to 95% of the regions. When comparing the current with the previous Reporting period, the total agricultural area decreased by 2%, the permanent grassland area decreased by 20%, and the permanent crops area increased by 60%. The use of animal manure N decreased by 5%, and the use of mineral fertilizer N increased by 47%. The total number of farmers decreased by 22%. Currently, 16% of the farms have livestock. Catlle and pig numbers were stable, while poultry numbers increased by 2%.

Specific agriculture data for NVZs were not reported.

Controls

The percentage of checked farmers in NVZs in the current Reporting period varies between 0.4 and 31% per region. The percentages of inspected farmers who comply with the Action Program is between 76 and 100%, and for most measures 90% or higher. The lowest compliances are found for “measures to be applied close to water courses” and “measures relating to rotation and maintenance”.

Designation of nitrate vulnerable zones (NVZs)

Nitrate Vulnerable Zones (NVZs) are designated in 18 regions. The area is stated as: “approximately 13.4% of the national territory”. The area of the NVZs has remained largely unchanged in the current period. In the

regions Puglia, Calabria Emilia Romagna, Piemonte, Umbria and Sicilia changes were made that were described in various degrees of detail.

Member State: Latvia

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	199	163
Total fresh surface water stations	222	159
Total saline surface water stations	43	40

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

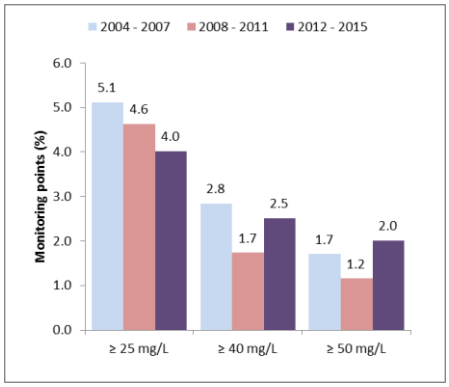


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

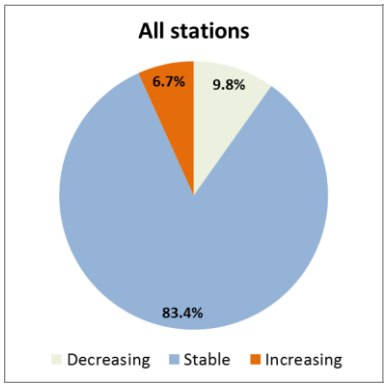


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and January 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

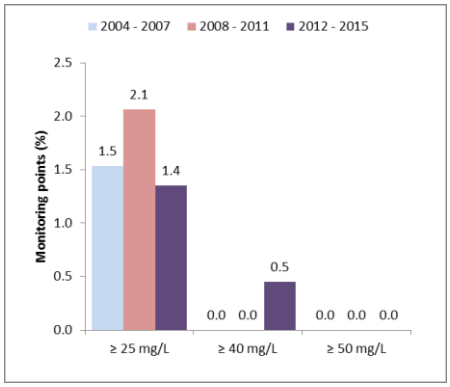


Figure 3. Percentage of fresh surface water stations with yearly average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

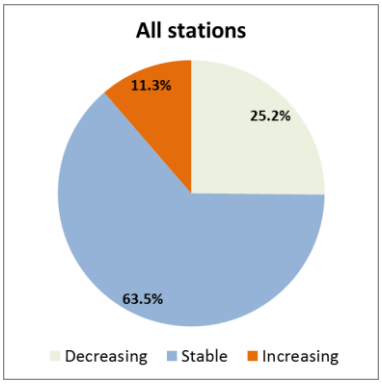


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

The trophic status of rivers has been assessed by three parameters: the annual average phosphate concentrations, total phosphorus concentration and the winter average nitrate concentration. The distinctions between oligo-, meso-, eutro- and hypertrophic are 0.1, 0.5, 1, 2, mg PO_4/L , 0.05, 0.2, 0.5 and 1 mg P/L and 10, 25, 40, 50 mg NO_3/L.

The trophic status of lakes has been assessed by three parameters: total phosphorus, total nitrogen and chlorophyll a concentration. Eutrophication has been assessed by determining the water transparency using Secchi disk. The threshold values for ultra-oligo-, oligo-, meso-, eutro- and hypertrophic are 0.03, 0.055, 0.08, 0.105 mg PO_4/L, 1, 1.5, 2, 2.5 mg N/L , and 10, 21, 40, 60 µg Chlorophyll-a/L.

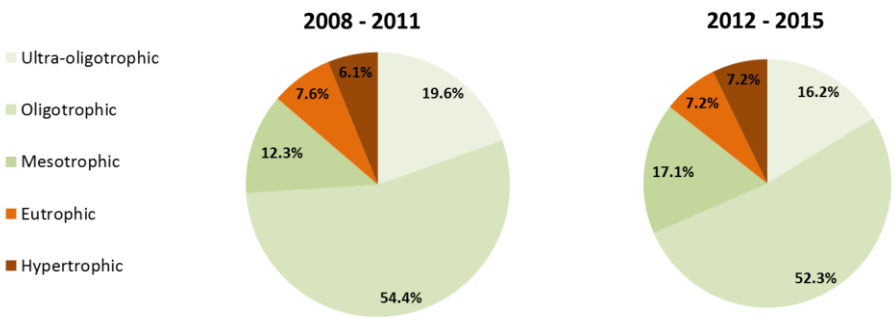


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.
Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 14%
Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 14%

The trophic status has been assessed on the basis of nitrate concentration, phosphate concentration, winter total nitrogen, winter total phosphorous, chlorophyll-a and dissolved oxygen using water type specific threshold values.

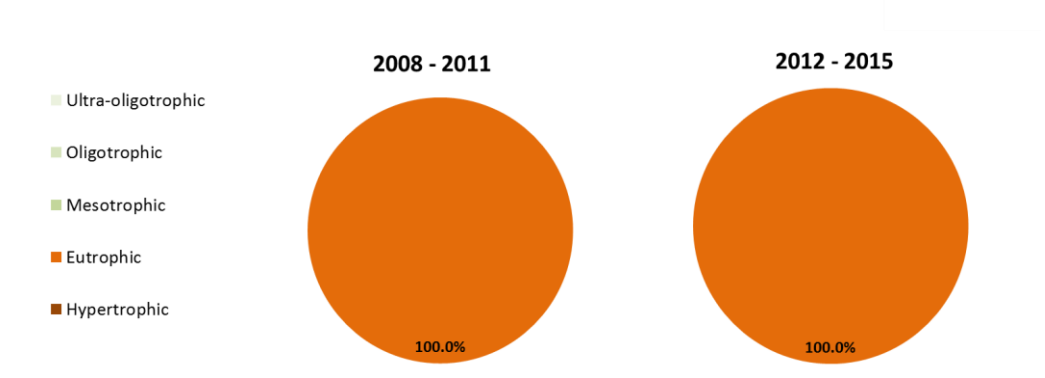


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 100%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 100%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

In the period 2013-2015 the monitoring of fresh surface waters was performed once every month over the course of one year, once every four years. In 2012 the monitoring was carried out with various frequencies. Stations in transitional, coastal and sea water were sampled 1.75-2.75 times a year. The frequency for groundwater is not reported.

Pressure from agriculture

Compared to the previous Reporting period (2008-2011) the total agricultural area decreased by 5% in the current Reporting period (2012-2015). However, the utilised agricultural land increased by 3%. The permanent grassland increased by 1% and is 29% of the total agricultural area. The number of farms with livestock decreased by 20%. Approximately 79% of all farms are small farms with 1 to 5 cows. While the number of pigs and poultry decreased by 14% and 18%, respectively, the number of cattle, sheep and rabbits increased by 8%, 14% and 32%, respectively. The total amount of applied livestock manure increased by 12%. It is reported that in recent years manure processing has increased. According to Rural Support Service data, in 2013 there were 40 biogas plants which used 552,200 tons of manure per year. The mineral fertilizer N use increased by 27%. The use of mineral fertilizers has increased every year since 1995.

Controls

The percentage of farms in the NVZs visited by the State Environmental Service (SES) varied between 4% and 21% per year and visits by the State Plant Protection Service (SPPS) varied between 1.4% and 1.9%. SES is responsible for the implementation and control of national policy on environmental protection. SPPS is entitled to check the compliance of fertiliser use and relevant documents with regulatory provisions. The highest percentages of non-compliance (24%) was found for having no registration as an animal holding. Furthermore, a non-compliance of 9% for requirements on storage of manure was found, and 4-13% holdings

violated rules for cross-compliance in vulnerable zones (no soil analysis, fertiliser plan, or field history). The most common reported violation concern fertilisers spread on water-saturated, frozen or snow-covered soil. A measureable criteria to assess the impact of the programme is the number of analyses of nitrogen content in waste water, made in animal holdings. In the previous and current reporting period there were 1.89 and 1.79 analyses per 100 animal holdings, respectively.

Designation of nitrate vulnerable zones (NVZs)

The area designated in 2009 as a Nitrate Vulnerable Zone is 8,258.7 km^2 which is 12.8% of the national territory. The NVZ has not changed since previous reporting period.

Member State: Lithuania

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	65	65
Total fresh surface water stations	320	217
Total saline surface water stations	16	16

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

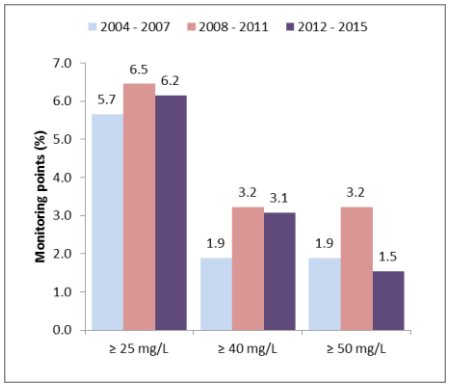


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

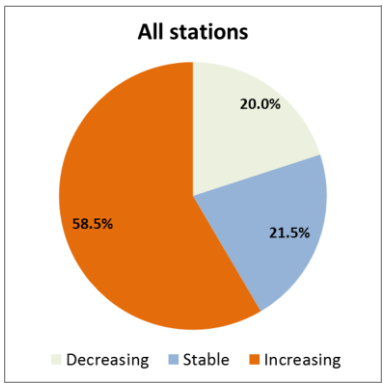


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June and December 2016, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

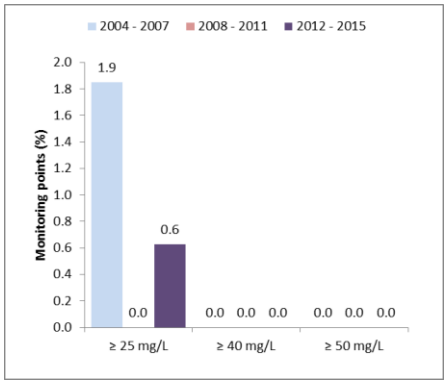


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

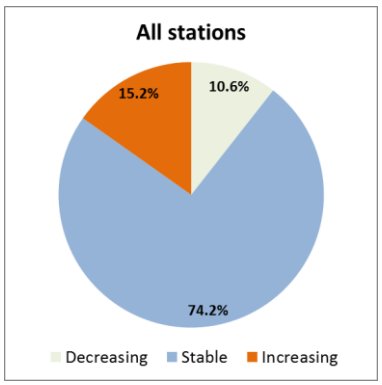


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

In the current reporting period chlorophyll-a concentrations were analysed during the spring and summer season (April to October) in 254 lakes/reservoirs and 3 river sites. The trophic level of the surface waters are assessed using Vinberg's scale by chlorophyll-a concentrations. The eutrophication classes are oligo-, meso-, eutro- and hypertrophic, while the classification of ultra-oligotrophic is not used.

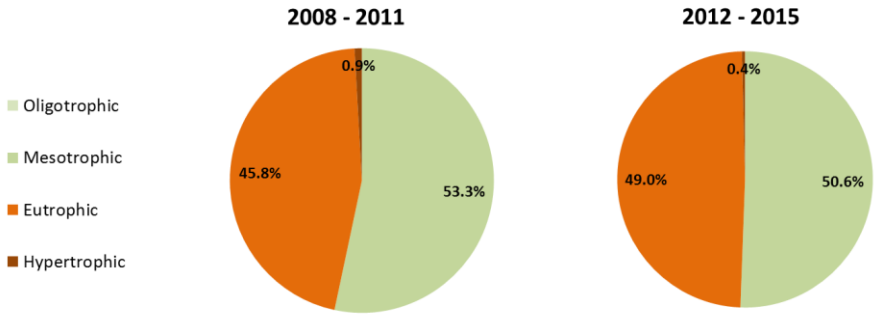


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 47%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 49%

Saline waters

The trophic level of transitional waters was assessed using Vinberg's scale of the trophic level by chlorophyll-a concentrations.

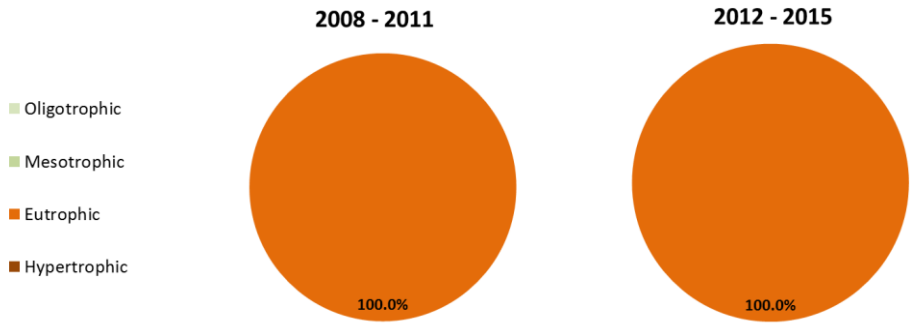


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 100%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 100%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring is part of the 2011-2017 National Environmental Monitoring Programme and is organised by the Environmental Protection Agency. National groundwater monitoring is carried out by the Geological Survey. The river monitoring network has data from 66 locations of which 11 are situated in the areas with intensive agricultural activity which are sampled 12 times a year, and 55 are situated in areas under mixed pressures which are sampled less intensively. The 254 locations in lakes/reservoirs are monitored at various rates: 9 lakes/reservoirs are monitored every year, seven times per year, the others – once in six- or three-year periods, four times per year. River water quality data results in the report are presented for the whole country, and for the locations in areas with intensive agriculture. Water quality is monitored 4 to 10 times per year in transitional, littoral and marine water. The groundwater monitoring network consist of 65 locations on arable land, pastures and grassland with various depths (monitoring frequency is not reported).

Pressure from agriculture

The total agricultural area, and the area available for manure decreased by 26% and 32%, respectively when comparing the current with the previous Reporting period. The numbers of poultry increased by 4% while the number of cattle and pigs decreased by 4% and 15%, respectively. The total number of farms decreased by 42%, but the number of livestock farms decreased only by 2%.

The reported nitrogen excretion shows other data that do not seem to be consistent with the livestock numbers. The annual nitrogen excretion of pigs increased by 66%, while excretion of cattle and poultry decreased by 35% and 42%, respectively. The report does not state that the excretion factors have been changed.

The annual use of N from livestock manure in the country decreased by 11%. Data on the use of mineral N are not available.

Controls

There are 200 thousand farmers in Lithuania, of which 58% have livestock. It is reported that 6% of the farmers are checked annually. Farmers which seek support with the cross compliance requirements are controlled by the National Paying Agency under the Ministry of Agriculture. The percentage of farmers complying with the items of the Action Programme and Code of Good Practice varies between 94 and 100%, with the lowest percentage for the item: “cover crop in winter”. The Implementation of the requirements of the Nitrates Directive are controlled by the Regional Environmental Protection Departments. The number of checks per measure varies between 39 and 1075 per year. The percentage of farmers complying with requirements of the Nitrates directive varies between 62% and 100%, with the lowest percentage for manure management.

Designation of nitrate vulnerable zones (NVZs)

The whole territory (65,300 km^2) has been designated as a Nitrate Vulnerable Zone.

Member State: Luxemburg

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	20	20
Total fresh surface water stations	16	16
Total saline surface water stations	Not relevant	Not relevant

Table 1. Number of water monitoring stations

The fresh surface water stations are located in rivers only.

Groundwater quality

Nitrates concentration

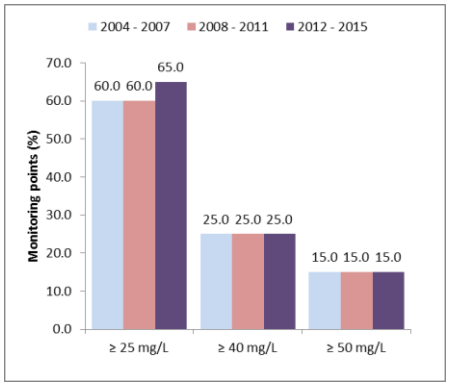


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

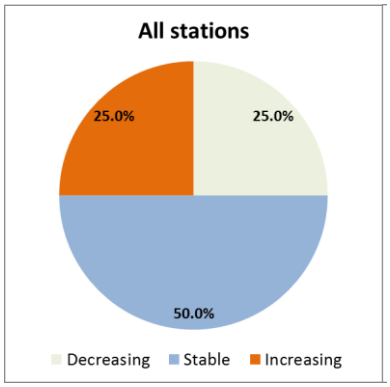


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: July 2016, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

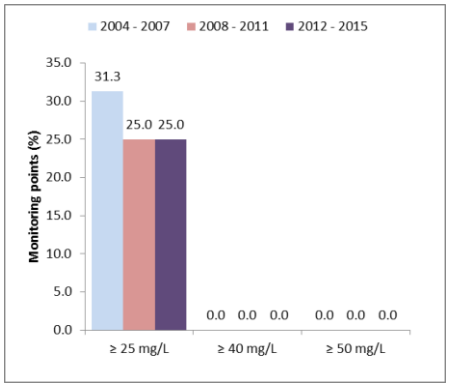


Figure 3. Percentage of fresh surface water stations (rivers only) with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

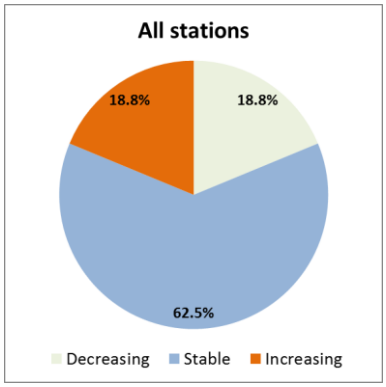


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water (rivers only) nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

Eutrophication evaluation is based on nitrate, orthophosphate, total phosphorus and chlorophyll, with the same classification criteria for all surface waters. Except for chlorophyll, for which no data were available, each parameter is evaluated, and the final assessment of eutrophication is based on the worst scoring parameter for the remaining 3 parameters and on the scores for the parameters macrophytes and diatoms. The classes very weak-low-moderate-high-very high are converted to the ND classification.

The actual method will be changed following a recent study. From 2016 onwards, the parameters macrophytes and diatoms will be officially included in the evaluation method, while chlorophyll will be excluded.

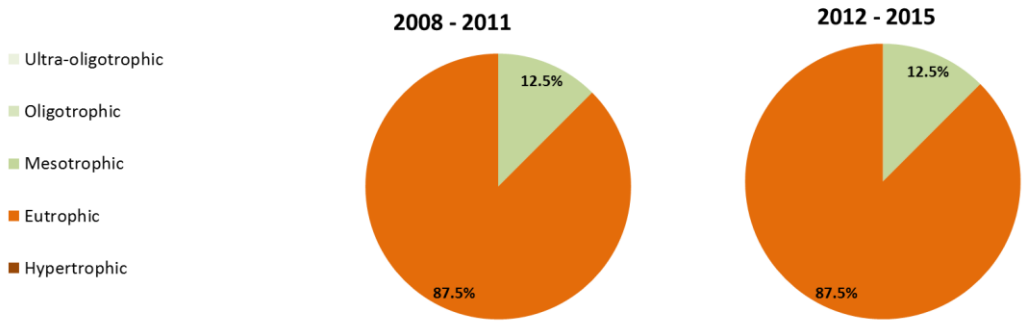


Figure 5. Fresh water eutrophication classification during the previous and current reporting period. (rivers only).

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 87.5%

Aggregated values for 2012-2015, Eutrophic and Hyper-trophic:87.5%

Saline waters

Not relevant.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Surface waters are monitored in two networks, i.e. for the purpose of assessing nitrate pollution and eutrophication and for the purpose of WFD. The sampling frequency varies from 12 to 13 times a year.

In 2015, a study on eutrophication was conducted which identified monitoring stations that best reflect the pressures from agriculture. The monitoring network will be adapted based on the findings of this study. The study showed that the stations that will not be retained in the future monitoring network are under too much pressure from effluent treatment plants and their catchment areas do not represent high agricultural pressure. The number of monitoring stations will also increase.

Based on another study the groundwater monitoring network will also be adapted with the aim to streamline as far as possible with the WFD monitoring network.

Pressure from agriculture

Agricultural areas and the use of organic and mineral nitrogen did not change. The main changes in agriculture were a decreasing number of farms (-7%) and an increasing number of pigs (+10%) and poultry (+26%). Nitrogen excretion was stable for cattle, decreased for pigs (-6%) and other animals (-3%), and increased for poultry (+35%).

Nitrogen surpluses, at field level, showed a small decrease, due to lower mineral fertilizer use. The modelled nitrogen discharge to the aquatic environment increased by 4%. The report states that the increase is on a lower level caused by increasing livestock numbers, but the main reason has been attributed to slightly higher rainfall in the last Reporting period.

Controls

Controls are carried out in the framework of Cross Compliance controls. On site controls are carried out on a random basis and risk analysis basis (5 to 6% of the farms). The report does not present an overview of infringements.

Designation of nitrate vulnerable zones (NVZs)

Luxemburg adopts a whole territory approach (2,586 km^2).

Member State: Malta

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	41	41
Total fresh surface water stations	5	0
Total saline surface water stations	49	0

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

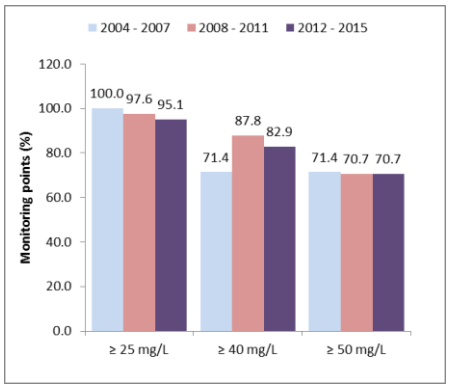


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

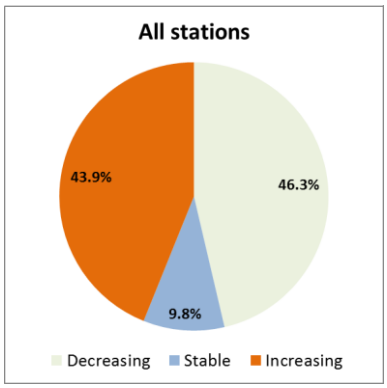


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and March 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

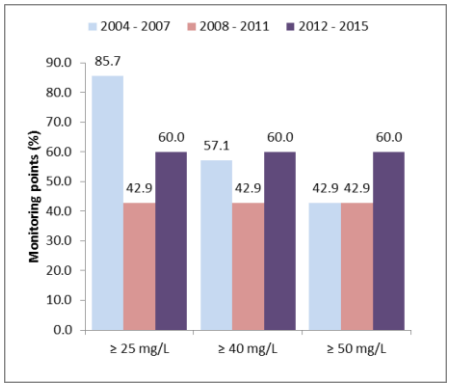


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Similar to Malta's first Nitrate cycle results, very high nitrate values were registered in the three watercourses of valley systems that are surrounded by intense agricultural activity. Average monthly nitrate concentrations and winter averages exceeded 100 mg/L in all three sampling stations. Winter average nitrate concentrations measured in standing waters were between 2 and 10 mg/L.

Eutrophication

Fresh waters

The report states that no eutrophication method was applied to inland surface and transitional waters due to the fact that to date no suitable method has been identified. However, the French (Seq-eaux) categories for nitrate, with values above 40 mg/L considered as eutrophic, were used as an indication of potential eutrophication status in these waters.

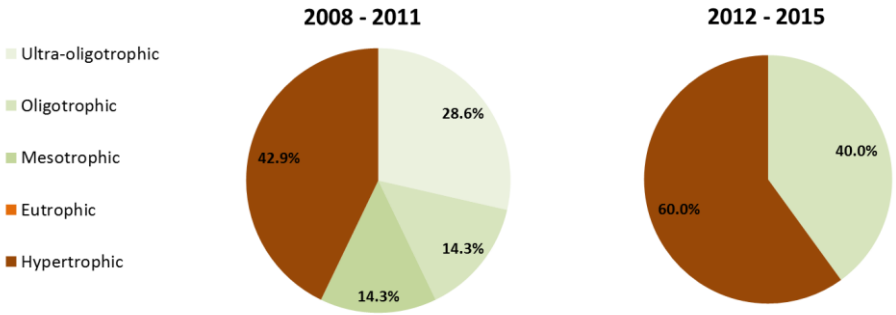


Figure 4. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 43%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 60%

Saline waters

The trophic state of the 5 transitional waters were assessed using only nitrate concentrations and applying the French (Seq-eaux) categories for transitional water bodies. The trophic state of the coastal waters is assessed using the trophic index method (TRIX) for Mediterranean coastal waters. The TRIX is a combination of four parameters (chlorophyll-a, dissolved inorganic nitrogen, total phosphorus, and the absolute percentage of deviation of oxygen from the oxygen saturation value). However, the classification of Maltese coastal waters on the basis of the TRIX index does not tally with the results of the baseline survey monitoring results for phytoplankton abundance and composition which results indicate that generally coastal waters are oligotrophic in nature, with the Grand harbour area being the only exception. On the other hand, the application of the TRIX index resulted in medium to high trophic states within most monitored stations. These results highlight the need for further work to refine the assessment of eutrophication in Maltese coastal waters.

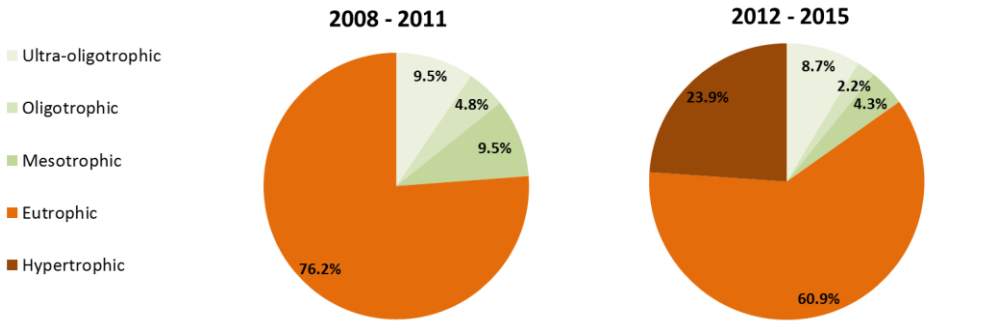


Figure 5. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 76%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 85%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Groundwater samples are collected twice-yearly. The results for all inland surface waters and transitional waters are based on monthly replicate samples from February 2012 to January 2013. Two monitoring programs in coastal water were executed: monitoring of three enclosed coastal waters influenced by agricultural activities (monthly sampling between February 2012 and January 2013) and monitoring of 26 additional locations around the Maltese Islands (monthly sampling between May 2012 and July 2013).

Pressure from agriculture

Compared to the previous Reporting period, the total agricultural area increased by 2% in the current Reporting period. The annual use of mineral fertilizer N did not change. The number of farms decreased by 20% and the number of farms with livestock by 31%. The number of cattle, pigs and poultry decreased by 36%, 60% and 94%, respectively. The nitrogen excretion of cattle, pigs and poultry decreased by 20%, 8% and 2%. Data about the use of N from livestock manure were not available for the current and the previous Reporting period.

Controls

The proportion of farms visited in the current Reporting period was 9% per year. The report presents the percentage of visited farmers that comply with the measures in the Action Programme for the years 2006 and 2007, and for the current Reporting period. Compared to 2006 and 2007, compliance has increased for storage and manure collection and rational fertilizer use. Current compliance varies from 88% (manure collection capacity and rational fertiliser use) to 100%. The report states that the majority of farmers finds it difficult to maintain appropriate records due to low level of education.

Designation of nitrate vulnerable zones (NVZs)

Malta adopts a whole territory approach (316 km^2).

Member State: Netherlands

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1318	1229
Total fresh surface water stations	850	171
Total saline surface water stations	39	33

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

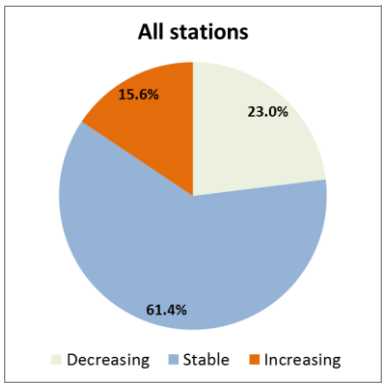
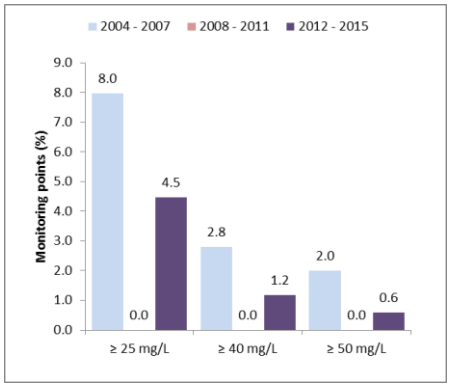
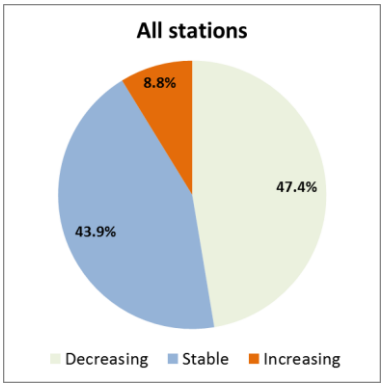


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Nitrates concentration



Trends in nitrates concentration



Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June 2016 and June 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

In the previous report, eutrophication was characterised on the OECD methodology, which was however found to be not appropriate for shallow lowland waters, typically found in the Netherlands. In the present report, eutrophication is assessed according to the Water Framework Directive (WFD). Each parameter is evaluated using water type dependent classification criteria. There are different quality criteria for 9 types of lakes and 12 types of rivers. Waters in which biological quality elements (including phytoplankton and phytobenthos) score less than 'good' are 'eutrophic', irrespective of the score for N or P. Waters in which the score of the biological quality elements is 'good' and N and P are both below 'good' are 'potentially eutrophic. Waters in which the score for both the biology and one of the nutrients is 'good' are 'not eutrophic'. Assessment of the eutrophication of the waters according to the WFD system was only reported for the period 2011-2013.

The Netherlands prefer the classification 'eutrophic', 'potential eutrophic' and 'non-eutrophic' to identify the level of eutrophication both for fresh and saline fresh waters.

Fresh waters

Eutrophication in rivers and lakes is assessed with various biological quality parameters (phytoplankton in lakes, and phytobenthos in rivers, and if not present other water flora in rivers), as well as the chemical parameters (concentrations of total nitrogen and total phosphorus).

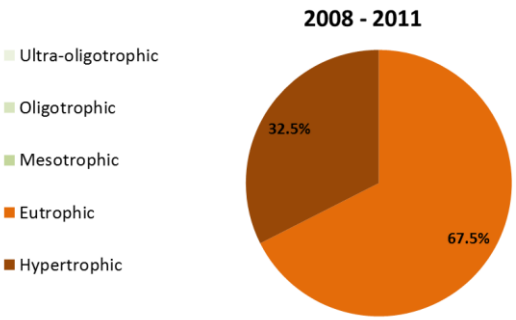


Figure 5. Fresh water eutrophication classification during the previous reporting period. Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 100%

Ir
p

There was little or no change in the average chlorophyll-a and phosphorus concentration in the fresh WFD waters during the summer season (the season in which eutrophication phenomena may occur) in 2012-2014, compared to the period 2008-2011. The summer average total nitrogen concentration has improved slightly.

Saline waters

Eutrophication in coastal and transitional water is also assessed according to the WFD methodology, using phytoplankton and dissolved inorganic nitrogen.

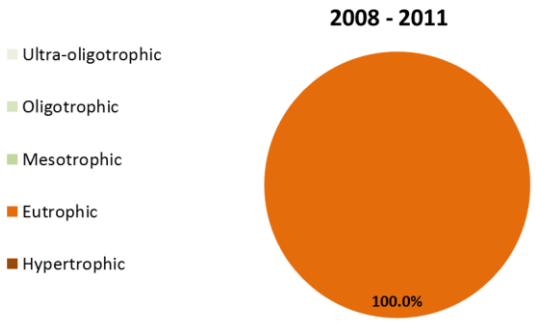


Figure 6. Saline water eutrophication classification during the previous reporting period.
Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 100%

In the saline waters 13% is assessed as eutrophic, while 81% is potentially eutrophic. The eutrophication effects are very limited in the biology (less than 10%), but the nutrient concentrations (dissolved nitrogen) are too high in more than 80% of these waters.

Based on the water quality parameters, the situation for the transitional, coastal and marine waters virtually remained unchanged in 2012-2014 compared to 2008-2011.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring for the Nitrate directive is organised by several organisations and reported under the co-ordination of the National Institute for Public Health and the Environment (RIVM), also using information from drinking water companies. Water monitoring programmes (Regulation on the status of surface waters and Regulation on the status of groundwater) have been adapted to the requirements of the Water Framework Directive in 2006.

The report presents the data from the control and operational monitoring sites. Root zone leaching is monitored at farms in all soil type regions by sampling the upper metre of groundwater or soil moisture (groundwater level > 5m) 1-2 times a year, or in case of artificially drained farms by sampling tile drain water 3-4 time per year. Shallow groundwaters under sandy soils are sampled every year whereas under clay and peat they are sampled every two years. Deep wells are sampled every four years. The frequency of sampling drinking water wells varies from once a week to once a year.

Surface waters are generally sampled every month. At sea the frequency of water sampling is once a month in winter and twice a month in summer.

Pressure from agriculture

In the current Reporting period, the total agricultural area decreased by 3% to 18,430 km^2, compared to the previous Reporting period. The area of permanent pasture decreased by 6%. The area of perennial crops is small and stable (190 km^2).

The number of farms has decreased by 9%. Cattle numbers increased (3%), but their nitrogen excretion increased by 1%, while the excretion per cow decreased by 4%. Poultry and pigs numbers increased by 3% and 1%, respectively, while their excretion decreased both by 5% . Total excretion decreased by 1%.

Overall the amount of nitrogen from animal manure applied to agricultural land decreased by 4%, and the use of mineral nitrogen fertilizer decreased by 7%.

The gross nitrogen balance (OECD/Eurostat) decreased from 161 kg/ha in the previous Reporting period to 148 kg/ha for the current Reporting period. The nitrogen leaching and run-off from in rural areas decreased from 54 to 42 kt per year between 2010 and 2013.

Controls

The Netherlands Enterprise Agency (RVO) checks farms on the basis of register data for the various calendar years. Each year, compliance with the primary nutrient standards and accountability for manure production are checked. The two main target groups are farmers and manure transporters. In 2012, the RVO changed its enforcement approach, focusing more on the result and the effect of the investigations and less on the numbers. The RVO checked the farms in the sample on the basis of register data for compliance with the application standards and accountability for manure production. Where the information was incomplete, additional information was requested to the farm.

In addition to the randomised checks via a random sample, farms were also checked if they met one of the following three criteria: farms applying for derogation, but not meeting one or more of the conditions for derogation, farms with land and manure delivery in the application period, or farms with several business lines.

In 2012, 384 farms were selected at random to check their compliance with regulations. There was one infringement of the application standards for phosphate and for livestock manure. The number of fines in 2012 is lower than the average number of nine fines in the previous three years, although nine cases from 2012 are still in progress.

In addition to the checks via random sample, 755 farms which met the specific risk criteria were investigated. Of the 755 farms, a fine had been imposed on 149 farms. In total, 241 infringements were found, with infringements of several standards per farm in several cases. The violations were exceedance of application standards for nitrogen (22), phosphorus (117), animal manure (85), and violation of reporting obligations (17).

Designation of nitrate vulnerable zones (NVZs)

The Netherlands adopts a whole territory approach (33,680 km^2).

Member State: Poland

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1563	1063
Total fresh surface water stations	2526	1656
Total saline surface water stations	19	7

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

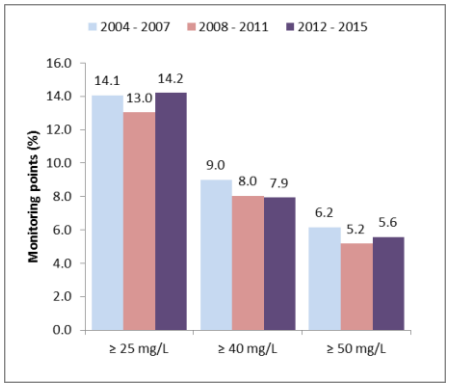


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

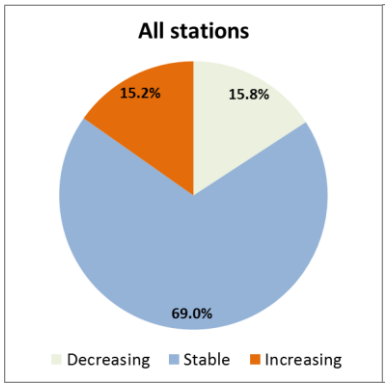
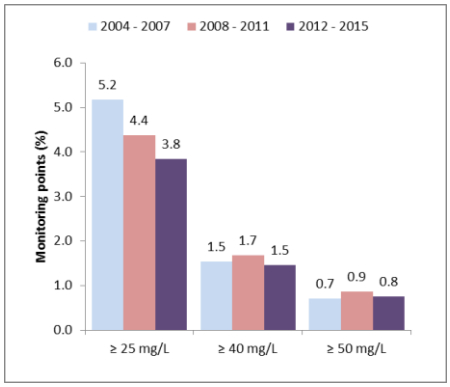
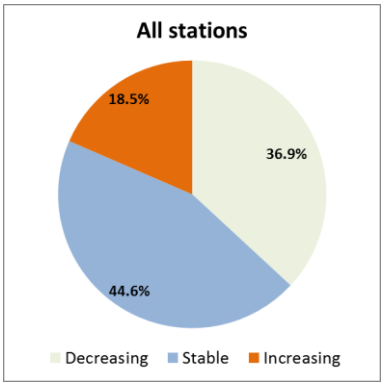


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Nitrates concentration



Trends in nitrates concentration



Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between October and December 2016, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

The assessment of surface water eutrophication was carried out based on guidelines presented in the Regulation of the Minister of the Environment of 23 December 2002 on the criteria for designation of waters vulnerable to pollution with nitrogen compounds from agricultural sources. The relevant parameters are total phosphorus, total nitrogen, nitrate and chlorophyll-a, and for lakes also transparency (Secchi-disc). The classification is initially either eutrophic or non-eutrophic. Additionally, an analysis is performed to assess the ND trophic state, based on the French method (Seq-eaux) for rivers and on the OECD method for lake waters, as referred to in the ND reporting guidelines.

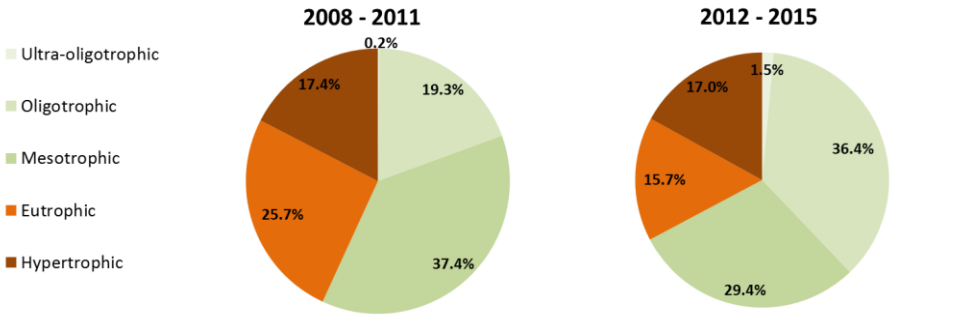


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 43%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 33%

Saline waters

Eutrophication assessment of transitional and coastal waters follows the same methods as described above for fresh waters, but with other threshold values.

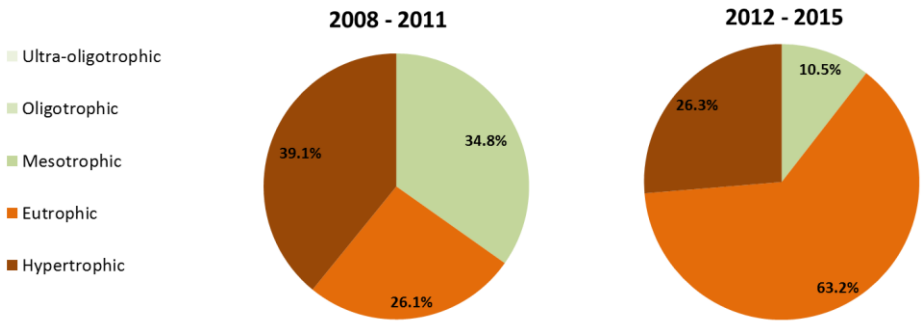


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 65%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 89%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring is a part of The State Environmental Monitoring organized by the Inspection of Environmental Protection. Groundwater and surface water quality data from State Environmental Monitoring are reported for the whole territory, and for each NVZ.

Pressure from agriculture

The total agricultural decreased by 6% in the current Reporting period compared to the previous Reporting period. The number of farms decreased by 39%. In the current reporting period, there were 1.43 million farms. Over 50% were farms with an area between 1 and 5 ha. Larger farms with an area between 5 and 50 ha represented 44%, while the largest farms with an area of over 50 hectares represented 2.2%.The permanent grassland area is 21% of the total agricultural area and decreased by 4%. The area with perennial crops is 3% of the total agricultural land and remained constant. The area of agricultural land available for manure application was not reported. There were no significant changes in the number of cattle, while there was a reduction in the number of pigs (-31%) and poultry (-13%). The use of animal manure N increased by 7%, while the use of mineral N decreased by 8%.

In total, the N excretion in NVZs from cattle, pigs, poultry and other was 20, 20, 3 and 0.01 kt N, respectively in the current Reporting period. The permanent grassland area and perennial crops were 12.3% and 1.1% of the agricultural land, respectively within the NVZs.

Controls

The percentage of farms visited per year varied per NVZ, from 0 to 9.5% by the Agency for Restructuring and Modernisation of Agriculture (ARiMR) and from 0.1 to 3.3 % by the Voivodship Inspectorate for Environmental Protection (WIOŚ). The compliance on manure collection and storage was reported to vary from 68 to 100%. Compliance on other measures was not reported.

The measurable criteria to evaluate the impact of the Action Programs is the share of farmland without crops in winter, which varies between 14 and 59% among NVZs. Buffer zones of 20 m are present on 5 to 91% of the agricultural area in the NVZs. No analyses of animal effluents or other criteria are reported. A comparison with the previous period is not possible due to many missing data.

Designation of nitrate vulnerable zones (NVZs)

In the current reporting period Poland has a total NVZ area of 21,308 km^2, which represents 6.8% of the total territory (Previous reporting period: 4,605 km^2) and 14.6% of the utilised agricultural area. The report states that in the draft of the Water Law there is a proposal to apply a whole territory approach.

Member State: Portugal

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	580	553
Total fresh surface water stations	154	143
Total saline surface water stations	6	2

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

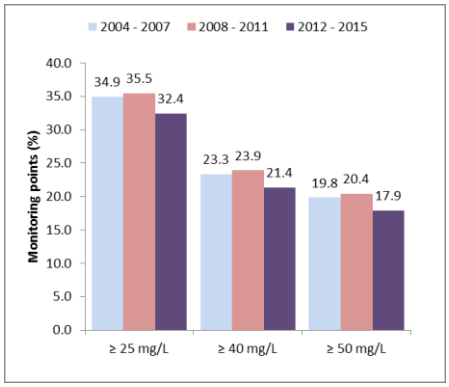


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

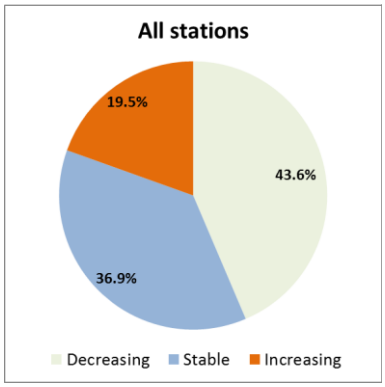


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June 2016 and January 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

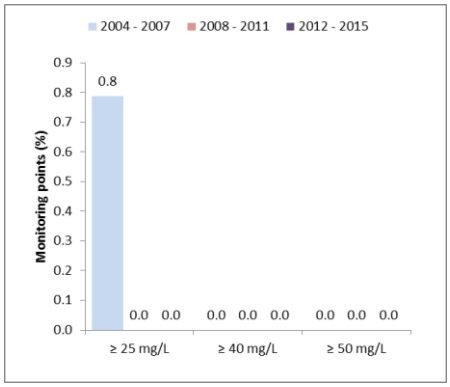


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

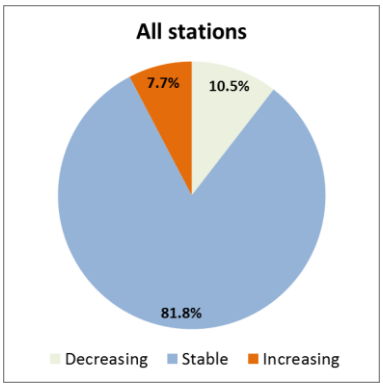


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

The parameters used to characterize the trophic status for rivers on the mainland of Portugal and on the Azores were total nitrogen and total phosphorus. For rivers 2 classes were used on the mainland (northern group and southern group) and 2 classes on the Azores (deep lakes, shallow lakes). The parameters used to characterize the trophic status for reservoirs on the mainland and Azores were chlorophyll-a, total nitrogen and total phosphorus. Three tropic levels were distinguished for all waters: oligotrophic, mesotrophic and eutrophic.

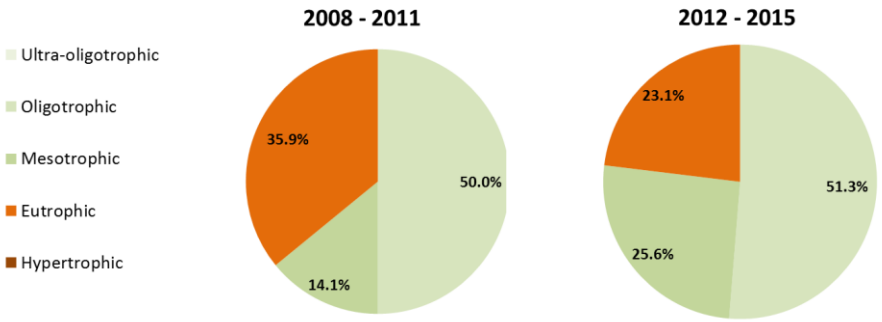


Figure 5. Fresh water eutrophication classification during the previous and current reporting period. Note that Portugal only use three classes (oligotrophic, mesotrophic and eutrophic)

Saline waters

The parameter used to characterize the trophic status for coastal and transitional waters is nitrate. All stations had average nitrate concentrations below 2 mg/L. The Eutrophication status itself was not reported.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring is organized by the Portuguese Environmental Agency and commissioned by the Directorate-General of Agriculture and Rural Development.

Pressure from agriculture

The agricultural land area has decreased slightly by 0.7% in the current Reporting period (2012-2015) compared to the previous Reporting period (2008-2011) while the areas with permanent grassland and perennial crops increased by 2 and 3%, respectively; they represent 50% and 19% of the agricultural land area, respectively.

The number of farms has decreased between the current and the previous reporting period with 13%. The number of cattle has remained constant, while the number of pigs and other farm animals decreased by 5 and 4%, respectively. The number of poultry has not been reported for the current reporting period. The nitrogen balance for Portugal has been reported for NVZs in the mainland and the Azores. The N surplus varied between NVZs from 0 to 108 kg/ha.

Controls

The percentage of farms visited varied between 1% and 10% per NVZ on the mainland of Portugal, and varied between 20 and 100% per NVZ on the Azores, except the São Brás NVZ with zero visits on in total 3 farms. For each NVZ the application of the Action Programme (AP) has been monitored and the results have been reported. The percentage of farmers per NVZ who respect the rules contained in the AP has been reported to be 100% on the mainland in most cases, while on the Azores a compliance of 7 to 100% per NVZ was reported.

The measurable criteria for assessing the impact of the programmes in the field have been reported for each NVZ, but not completely. Not reported, except for one NVZ on the mainland, and for the NVZs on the Azores, are the number of analyses of nitrogen in livestock manure, the percentage of arable land which was uncultivated, and the distance of crops from water courses.

In the mainland of Portugal the control of the Action Programme focused on 1% of farms larger than 2 ha or 0.5 ha with horticulture and/or vegetable crops. The percentage of controls with failures to comply, and a brief description of the observed failures have been reported. For the NVZ Esposende-Vila do Conde and Tejo the percentage of failures varied between 0% and 21% per measure, while in the other NVZs the percentage was reported as zero, except a failure of 72% in Litoral Centro (mostly due to the lack of implementation of soil and water analyses).

Designation of nitrate vulnerable zones (NVZs)

In Portugal, nine areas (Decree No. 164/2010) in the mainland have been designated as vulnerable to leaching of nitrates from agricultural sources in terms of groundwater. There are eight vulnerable areas in the Azores due to the trophic status of some Lakes. The NVZs on the mainland of Portugal vary in size between 31 km^2 and 2416 km^2. The NVZs on the Azores vary between 0.19 km^2 and 19 km^2.

In the Reporting period of 2008-2011 the boundaries of NVZ Aveiro and Mira were extended by merging them to the Litoral Centro. The boundaries of the NVZ Elvas-Vila Boim were also expanded, integrating the aquifer system of Elvas-Campo Maior. This period also saw the definition of two new NVZs, Estarreja-Murtosa and Estremoz-Cano.

The total area of NVZs is 4,047 km^2 which is 4.4% of the total territory of Portugal.

Member State: Romania

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1256	849
Total fresh surface water stations	1224	931
Total saline surface water stations	35	31

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

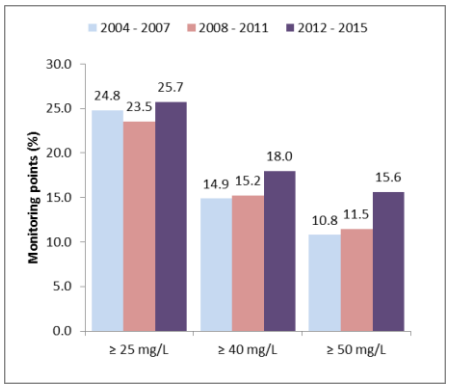


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

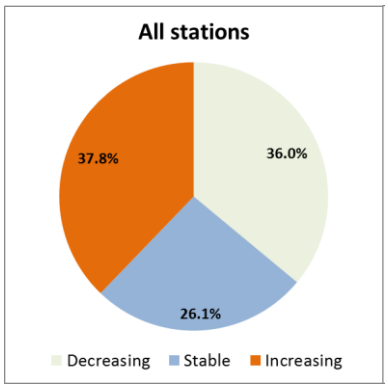


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and January 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

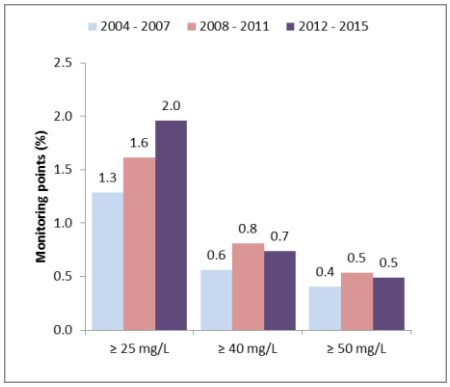


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

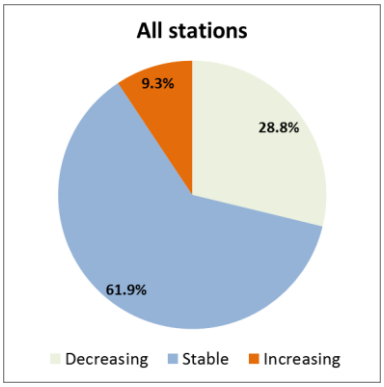


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Several ecological status classes (5 classes: high, good, moderate, poor and bad) and ecological potential classes (4 classes: maximum and good, moderate, poor and bad) have been defined taking into account the categories of water bodies (rivers, lakes, transitional waters, coastal waters) and the typology of the water bodies (19 types of water courses, 9 types of natural lakes, 7 types of reservoirs, 2 types of transitional waters and 2 types of coastal waters), with typology specific criteria. The ND trophic status classes have been correlated with the ecological status/ecological potential classes as follows: ultra-oligotrophic - high/maximum (class I); oligotrophic – good/good (class II); meso-trophic - moderate/moderate (class III); eutrophic - poor/poor (class IV); hypertrophic - bad/bad (class V).

Fresh waters

The parameters for rivers indicating eutrophication (limits between high/good ecological status or maximum/good ecological potential and good/moderate ecological status/potential; range depending on the typology of the water bodies) were: nitrates (0.7-2.7, 1.4-5.5 mg/L N), nitrites (0.35 mg/L N), total nitrogen, phosphates (0.035-0.13, 0.075-0.27 mg/L P) and total phosphorus (0.0030-0.32, 0.22-0.66 mg/L P), the dissolved oxygen (8-10, 6-8, mg/L) and the organic substances (measured by CBO_5), as well as chlorophyll a (ranges are for different water types).

The parameters for natural lakes and reservoirs indicating eutrophication were: nitrates (0.4-1.6, 0.8-3.3 mg/L N), nitrites (0.35 mg/L N), total nitrogen, phosphates (0.015-0.12, 0.06-0.25 mg/L P) and total phosphorus (0.02-0.18, 0.04-0.38 mg/L P), the dissolved oxygen (8-10, 6-8, mg/L) and the organic substances (measured by CBO_5), as well as transparency (Secchi disk) and chlorophyll a. The final assessment is based on the one out-all out principle, meaning that the worse situation/class is used, considering all parameters assessed.

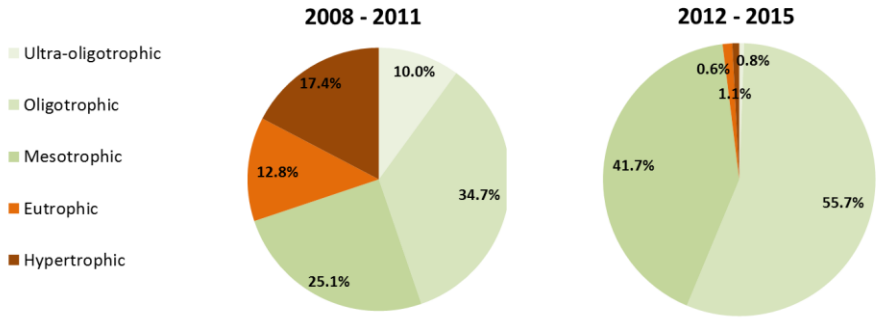


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 30%

Aggregated values for 2012-2015, Eutrophic and Hyper-trophic: 2%

Saline waters

Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2012-2015, Eutrophic and Hyper-trophic: 54%

The parameters indicating eutrophication process were: nitrates, nitrites, total nitrogen, phosphates and total phosphorus, the dissolved oxygen and chlorophyll a. For transitional waters the limit values between high/good status (0.012 mg/L $P\text{-}PO_4$, < 1 mg/L $N\text{-}NO_3$, 0.012 mg/L $N\text{-}NO_2$, 9 mg/L O_2, 2.6 ug/l chlorophyll) and good/moderate status (0.03 mg/L $P\text{-}PO_4$, 1-1.5 mg/L $N\text{-}NO_3$, 0.03 mg/L $N\text{-}NO_2$, 6.2 mg/L O_2, 3.9 ug/l chlorophyll). For coastal waters the limit values were similar with transitional waters, except for phosphate and nitrite (high/good and good/moderate: 0.03 mg/L $P\text{-}PO_4$, 0.03 mg/L $N\text{-}NO_2$).

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The Romanian Waters National Administration manages the monitoring of the surface water and groundwater. The quality of the Black Sea is monitored by the laboratory of Dobrogea Water Basin Administration - Coast together with the National Institute for Marine Research and Development.

Groundwater is sampled once or twice per year. Surface water is monitored 4 to 26 times a year. On the monitoring points that are relevant for agricultural pressures, the sampling frequency is 12 times a year.

Pressure from agriculture

Compared to the previous Reporting period (2008-2011) the total agricultural area remained stable in the current reporting period (2012-2015). Overall, the agricultural indicators were fairly stable. The area of permanent pasture decreased with 4%, while the area of perennial crops increased with 3%. Cattle numbers increased by 2% as did their nitrogen excretion. Poultry decreased by 2% and pigs decreased by 4%, as did their excretion. The number of sheep and goats increased by 8%. Overall the use of N from livestock manure increased by 3% and the use of mineral fertilizer N did not change.

Controls

There were 3,563,765 farmers, of which 75% had livestock. The proportion of farms visited in the current Reporting period was 10% per year. The percentage of visited farmers who comply with each measure referred to in the Action Programme and the Code of Good Agricultural Practices was between 74.5% and 99.7%. The lowest compliances were observed for rational fertilisation use, and for the limitation on the use of nitrogen from livestock manure.

Data are also reported about the livestock holdings with more than 100 livestock units (varying between 701 to 912 farms in the current Reporting period), which are subject to the environmental permit release procedure. The number of inspections varied from 1.2 to 2.1 times per year per farm. The number of warnings varied between 16 and 46 per year, and the number of fines between 41 and 54 per year.

Designation of nitrate vulnerable zones (NVZs)

Upon the first designation, the NVZs covered 7% of the Romanian territory. In 2008, NVZs were revised and the area was extended to 58% of the Romanian territory. Since 2013, Romania applies the whole territory approach (283,391 km^2).

Member State: Slovakia

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	1717	1544
Total fresh surface water stations	512	378
Total saline surface water stations	Not relevant	Not relevant

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

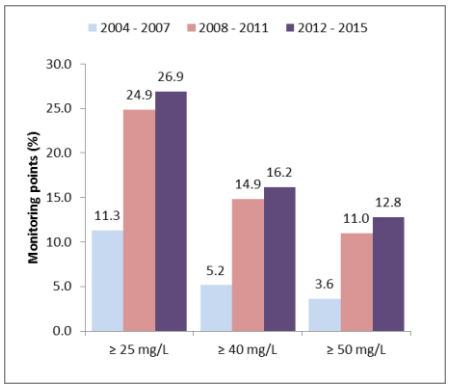


*Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths.**

Trends in nitrates concentration

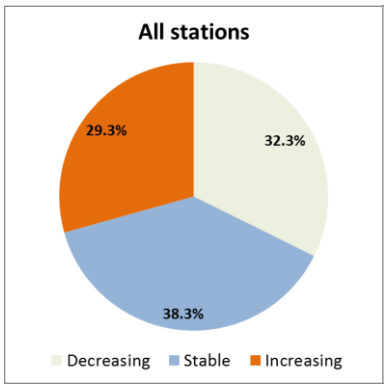


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June and December 2016, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

** A major change in the monitoring network took place between the periods 2004-2007 and 2008-2011 consisting of establishing more monitoring stations in NVZ areas.*

Surface water quality

Nitrates concentration

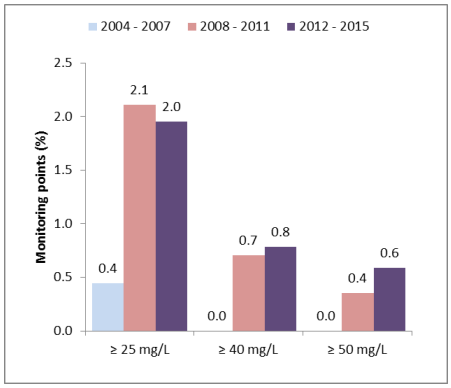


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

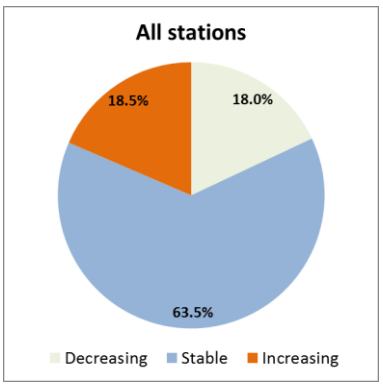


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

Surface water eutrophication has been evaluated by two methodologies: the new Slovak methodology and the French methodology, which was also used in previous reporting period. To maintain the possibility of trend assessment also the data using the French methodology are used. The French methodology assesses data by using one set of criteria for the whole country, using peak summer concentrations of chlorophyll-a, and average summer concentrations of nitrates, phosphates and total phosphorus.

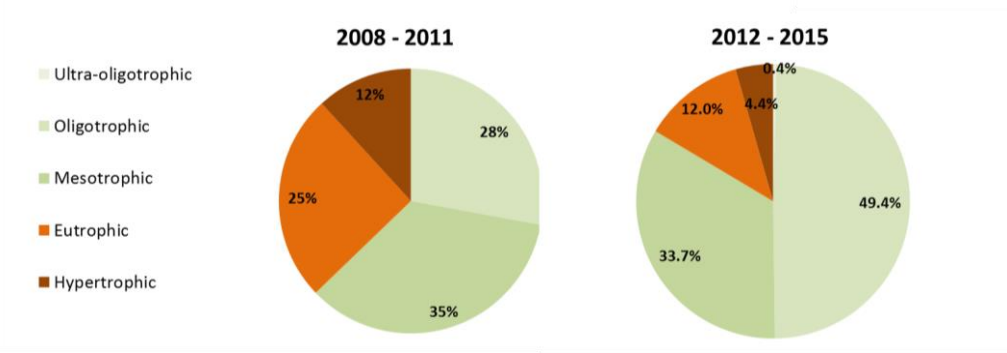


Figure 5. Fresh water eutrophication classification during the previous and current reporting period (old method).

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 37%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 16%

The new Slovak methodology for eutrophication assessment (used the first time in the current Reporting period) is based on the European principles introduced in Guidance document No 23 (Eutrophication Assessment in the context of European Water Policies). The methodology is type specific, limit values for phytoplankton (abundance, biomass), phytobenthos (CEE, IPS indices) and macrophytes (IBMR index) are used per type of water body.

The results of the new method (rivers) show that there were 61% evaluated sites with no manifestation or risk of eutrophication, 29% of the sites monitored were found to be at risk of eutrophication, and eutrophication was manifest at 10%.

Saline waters
Not relevant.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Monitoring data for groundwater in and outside NVZs originate from the Water Research Institute, the Slovak Hydrometeorological Institute and from water companies. The sampling rate varies between 1 and 39 during the reporting period. The number of surface water monitoring sites is smaller compared to the previous period because the current period extents only over 3 years. The current reporting period is three years (2012-2014) while the previous report was four years (2008-2011). In 2016, the 'new' EU Member States, including Slovakia, were required to submit their report by 30 June and no longer by 31 October. Slovakia is therefore making its report four months earlier and could not include data for 2015 in the evaluation.

Pressure from agriculture

The total agricultural area remained stable between 2012 and 2014. Modest changes in the number of livestock occurred in the current Reporting period (2012-2015) compared to the previous Reporting period (2008-2011): a slight decline in the numbers of cattle, pigs and poultry (-1%, -8% and -5%, respectively) and a rise in sheep & goats (4%). When comparing the number of livestock in the current Reporting period to the numbers in 1990, there is a decrease in the numbers of cattle, pigs, poultry and sheep & goats (-70%, -75%, -29%, -29% respectively).

The use of mineral N increased by 28% between both reporting periods. The current consumption of nitrogen (-50%) and phosphorus (-88%) is lower compared to 1990. The annual use of N from livestock manure increased by 5% between 2012 and 2014.

In NVZs the decline in the numbers of cattle, pigs and poultry between 2012 and 2014 represented -3%, -7% and -9%, respectively. Increase of sheep & goats numbers in NVZs was 3%. The changes in animal numbers did not correspond with the changes in nitrogen excretion. The excretion of cattle and sheep & goats did not change, while the excretion of pigs and poultry increased by 10%.

Controls

The number of farms covered by the Farming Programme (Action Programme) in the current Reporting period is 1633, of which 686 have livestock. The proportion of farmers where checks on compliance with the Farming Programme were conducted was 52% per year in the previous Reporting period. In the current Reporting period administrative checks were performed for 100% of the farms and physical checks on 10% (other than cross-compliance checks). The percentage of the visited farmers who comply with each measure referred to in the Farming Programme was close to 100%. Lower compliance was reported for "storage and manure collection capacity" (90%) and "other" (88%). Implementation of the Action Programme is evaluated by a number of indicators: nitrogen balance, and the proportion of land not sown. The nitrogen content in manure or the distance of crops to watercourses are not assessed. The percentage of arable land left bare in winter was 49% in 2011 and 50% in 2014.

Designation of nitrate vulnerable zones (NVZs)

On 1 January 2005 the designated vulnerable areas have been established. The total area is 13,685 km^2, which is 28% of the national territory and 55% of the agricultural area.

Member State: Slovenia

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	198	98
Total fresh surface water stations	136	116
Total saline surface water stations	5	5

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

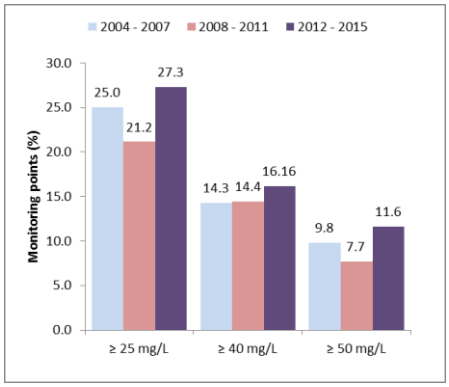


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

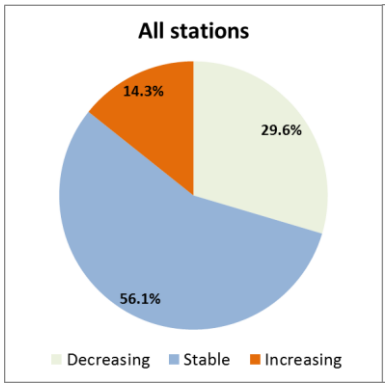


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: June 2016, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

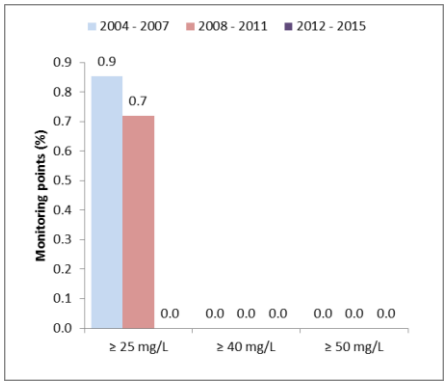


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

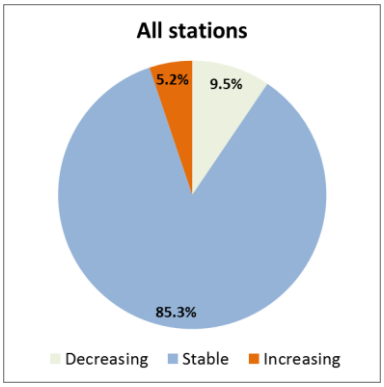


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Eutrophication is assessed according to the Water Framework Directive (WFD) methodology. The report presents a one-to-one conversion table from the classification used under this methodology to the classification used by the Nitrates Directive.

Fresh waters

Eutrophication in rivers is assessed according to the WFD methodology, using the biological quality parameters phytobenthos and macrophytes, as well as the chemical parameters nitrate and total phosphate. Each parameter is evaluated, using water type dependent classification criteria. The final assessment of eutrophication is based on the worst scoring parameter.

The trophic state of lakes is based on phytoplankton, according to the WFD methodology.

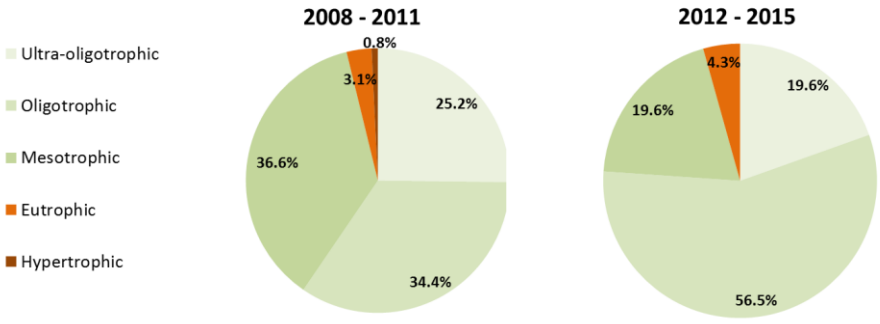


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 4%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 4%

Saline waters

The trophic state of coastal waters is based on phytoplankton (WFD). The trophic status of marine waters is not assessed.

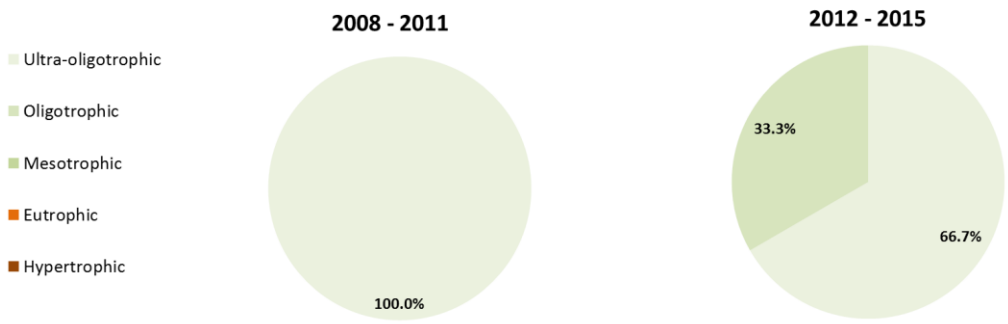


Figure 6. Saline water eutrophication classification during the previous and current reporting period (coastal waters only, at three sites).

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 0%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 0%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water monitoring programmes (Regulation on the status of surface waters and Regulation on the status of groundwater) have been adapted to the requirements of the Water Framework Directive in 2006. The report presents the data from the control and operational monitoring sites. For the current reporting period, the size of groundwater monitoring network was almost doubled as compared to previous reporting period?. Samples are taken once or twice a year for groundwater and 4 to 12 times a year for surface water. Two borders stations were sampled every two weeks.

Pressure from agriculture

Overall, the trends in the agriculture were fairly stable. The total agricultural area remained stable (+1%). The area of permanent pasture decreased with 4%, while the area of perennial crops increased with 3%. Cattle numbers did not change, but their nitrogen excretion increased by 9%. The number of poultry increased by 10% while, pigs number decreased by 27%, and consequently their excretion changed by -32% and +2%, respectively. As the calculation method for excretion changed, the comparison between current and previous periods should be assessed with caution. Overall the organic nitrogen applied to agricultural land did not change, and neither did the use of mineral nitrogen.

The gross nitrogen balance (OECD) was 57 kg/ha for the 2012-2014 period, which represents a slight increase as compared to 49 kg/ha in the period 2008-2011. However, the long term trend from 1992 onwards shows a small decrease.

Controls

There are 72,377 farmers, of which 57,749 have livestock. The proportion of farms visited in the current reporting period was 6.5% per year. Furthermore, all farms are inspected administratively for cross compliance. The report does not include results (compliance or infringement).

Waste water (industrial livestock breeding plants) sampling increased slightly to 2.63 samples per farm per year. The proportion of fields without crop cover (excluding specific winter cover/catch crops) increased slightly to 44%.

Designation of nitrate vulnerable zones (NVZs)

Slovenia adopts a whole territory approach (20,273 km^2).

Member State: Spain

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	4132	3035
Total fresh surface water stations	3903	2916
Total saline surface water stations	250	373

Table 1. Number of water monitoring stations

Table 1 shows the number of stations with nitrate measurements. The eutrophication status of fresh surface waters was measured at 442 locations, of which 437 were also used for nitrate and 5 locations were only used for eutrophication. The eutrophication status of saline surface waters was measured at 473 locations, of which 250 were also used for nitrate and 223 locations were only used for eutrophication.

Groundwater quality

Nitrates concentration

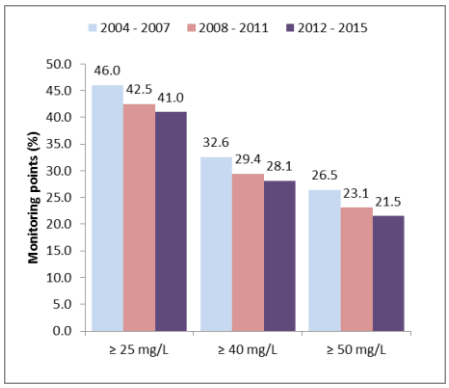


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

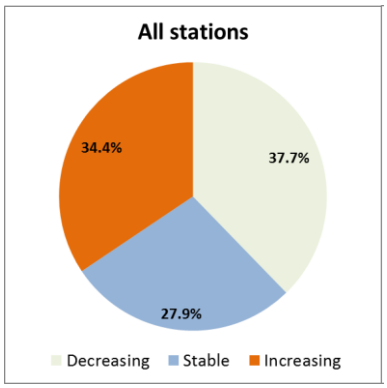


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between August 2016 and April 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

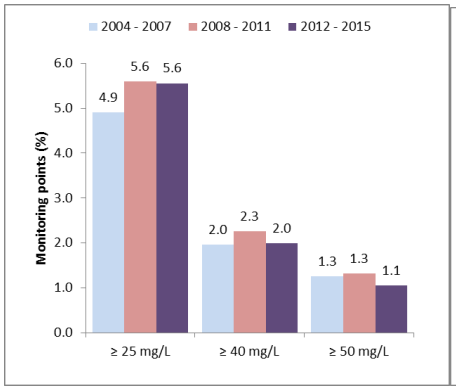


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

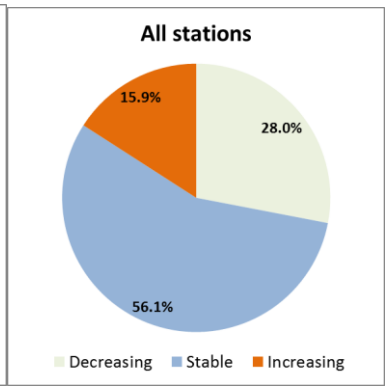


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

To calculate the trophic level in fresh and marine water, the OECD classification of 1982 for chlorophyll-a is used. For the classes ultraoligotrophic-oligotrophic-mesotrophic-eutrophic-hypertrophic the average threshold values are <1, 1-2.5, 2.5-8, 8-25, and >25 µg chlorophyll-a /L, respectively.

Fresh waters

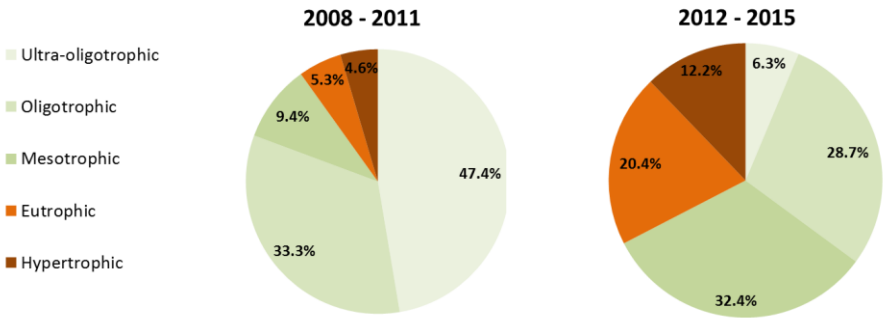


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 10%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 33%

Saline waters

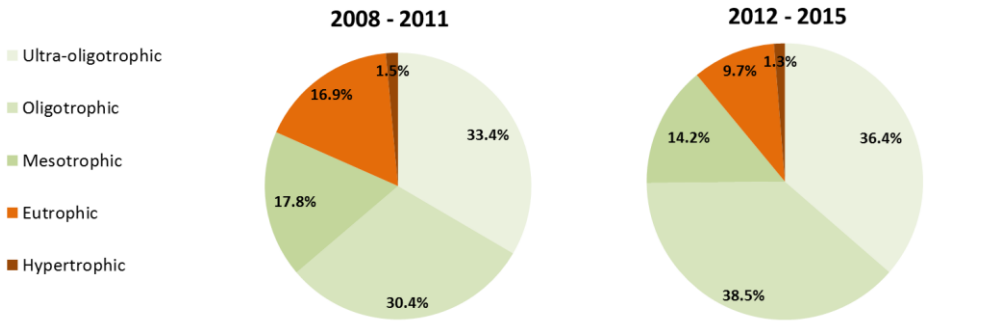


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 18%

Aggregated values for 2012-2015, Eutrophic and Hyper-trophic: 11%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

Water management and agricultural policies are shared between the state and Autonomous Communities (CCAA). The sampling and water monitoring, is done by CCAA's (intracommunity basins) and the state (inter basins). The demarcation between intra and intercommunity basins is given in hydrological plans which are royal decrees. The reporting is done by the state. All monitoring locations have been included in the Program Monitoring and Control of the Water Framework Directive.

Pressure from agriculture

The national nitrogen balance was 15.8 kg/ha for the period 2012-2013, which is slightly higher than the previous reporting period (2008-2011) when it was 13.7 kg/ha. On the longer term, in the period between 2000 and 2013, th**e**re was a decrease of the nitrogen balance from 23 to 14 kg/ha. According to the report submitted by Spain, this long term improvement is explained by a lower use of mineral N fertilisers, a lower number of livestock, as well as the growth of organic farming.

All other indicators such as agricultural areas, animal numbers and excretion data are presented for the NVZ areas within a specific CCAA. The data are incomplete and show a large variation between reporting periods. Considering only the CCAAs with reliable data for both reporting periods (Aragon, Baleares, Castilla La Mancha, Estremadura, La Rioja, Murcia, Navarra and Valencia), the average nitrogen excretion increased by 29% for cattle, decreased by 14% for pigs and increased by 23% for poultry.

Controls

Inspections in most NVZs have been reported per CCAA. No or hardly any data are available for the Canary Islands and Castilla y León. The proportion of visited farms varied from 1 to 4%. The proportion of compliance varied from 72 to 100%, but was mostly above 90%. There are some typical regional differences, e.g. for Madrid the compliance was 77% for all measures, while Navarra showed 100% compliance for all measures. Averaged over all regions, all measures scored between 90 and 100%, with no extreme low or high compliances.

Designation of nitrate vulnerable zones (NVZs)

Spain has 80,702 km^2 of NVZ, which is 16% of the national territory and 35% of the agricultural area. In the current reporting period (2012-2015) changes were made in the regions Aragon, Catalonia, Madrid, and Pais Vasco. Compared to the previous period (81,699 km^2), the area had decreased by 997 km^2.

Member State: Sweden

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	436	99
Total fresh surface water stations	2792	45
Total saline surface water stations	184	0

Table 1. Number of water monitoring stations

There are 35 stations for which the locations were not disclosed as they are drinking water intake locations. It is assumed that these locations are not located inside a NVZ.

Groundwater quality

Nitrates concentration

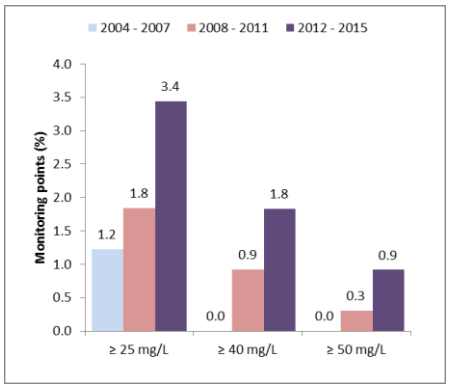


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

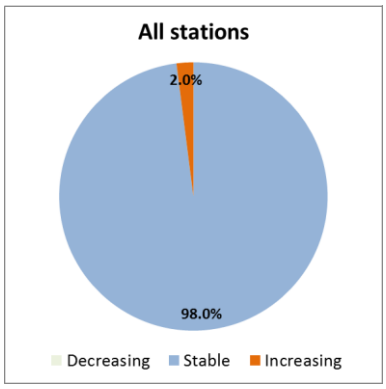


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between June 2016 and March 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

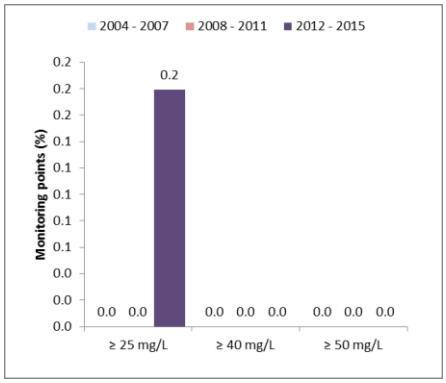


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

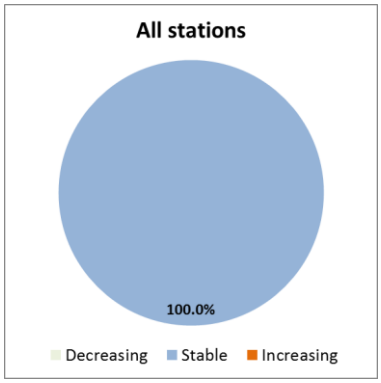


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Fresh waters

The trophic level of surface waters, rivers and lakes, is classified using total P concentrations in five different classes: oligotrophic, mesotrophic, slightly eutrophic, strongly eutrophic and hypertrophic. The report does not state which methodology is used by Sweden for the re-classification into Nitrate Directive trophic states.

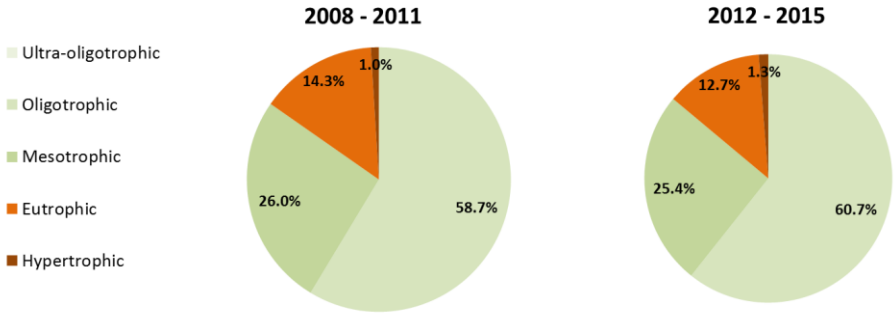


Figure 5. Fresh water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 15%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 14%

Saline waters

The trophic level of transitional waters was assessed by an expert assessment on the basis of various classifications according to: the Swedish Environmental Protection Agency, the Water Framework Directive, and to international assessments (HELCOM, OSPAR). The HELCOM and OSPAR classification is based on nitrate,

phosphate, chlorophyll and oxygen. The Report summarizes the current eutrophication status, as shown in Table 2.

Area	Status
Skagerak deep-sea areas	Good
Skagerak coastal areas	Moderate
Kattegat deep-sea areas	Moderate
Kattegat coastal areas	Moderate
Baltic Proper	Unsatisfactory
Southern part of the Gulf of Bothnia	Good
Northern part of the Gulf of Bothnia	Good

Table 2. Weighted expert assessment of eutrophication levels of saline waters based on the status classifications available both nationally and internationally (exact period was not reported).

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The Department for Environment Analysis (SLU) is the data host for freshwater (lakes and watercourses), the Geological survey of Sweden (SGU) is the host for groundwater and Swedish Meteorological and the Hydrological Institute (SMHI) for coastal and marine waters.

Since 2007, investigations of lake water quality have been carried out annually as part of the national environmental monitoring programme involving cyclical sampling of lakes. The programme covers approximately 4,800 lakes and one sixth of them are sampled every year. In addition, there are approximately 280 regional supplementary lakes that have been added according to the same principle and are therefore included in the evaluation together with the national programme. Results on rivers are reported from a total of 186 stations. The watercourses have been sampled at least 12 times a year.

The report states that groundwater monitoring is based on 80 stations that are sampled several times a year, and larger (but unreported) number of stations which are sampled once every six years. Around a third of the stations are considered to be located in close proximity of agricultural land.

Pressure from agriculture

Statistical data about animal numbers and livestock manure are given for 2009 and 2013 only. The total agricultural area remained constant. The number of cattle and pigs decreased by 3% and 8%, respectively. The numbers of poultry and sheep increased by 33% and 7%, respectively. The amount of nitrogen from manure increased by 4%. The annual use of mineral N fertilizer decreased by 1%.

Between 2009 and 2014 the area of the Nitrate Vulnerable Zones (NVZ) increased by 40% while the total use of livestock manure in the NVZ is 20% higher than outside the NVZ. The proportion of agricultural land in the current NVZ comprises 50% of the agricultural holdings, 60% of the large livestock holdings (>10 livestock units), 72% of the total agricultural land, 73% of arable land, 62% of the pasture, 60% of cattle, 90% of pigs, 84% of poultry and 65% of the sheep.

Controls

The implementation of the Action Programme (AP) is evaluated on the basis of monitoring of cross-compliance, and on the basis of agricultural statistics of nitrogen fertilisation, storage capacity, difference between input and output of nitrogen, and trend analysis of agriculture-affected watercourses. The management requirements for cross compliance include the provisions for the Nitrate Directive. The total numbers of controls are approximately 554 per year. The number of non-conformities for manure management, livestock density and application of manure were 4%, 1%, and 6%, respectively.

Designation of nitrate vulnerable zones (NVZs)

Sweden has currently designated 94,742 km^2 as NVZ, which is 23% of the national territory. NVZs were first designated in 1995, and have been adjusted four times. The size of the NVZs were extended in 2002, 2003 and 2013 (also some areas ceased to be a NVZ). A further addition applies from 1 April 2016 (2,484 km^2).

Member State: United Kingdom

United Kingdom - England

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	2522	2163
Total fresh surface water stations	6460	4226
Total saline water stations	424	391

Table 1 Number of water monitoring stations

Groundwater quality

Nitrates concentration

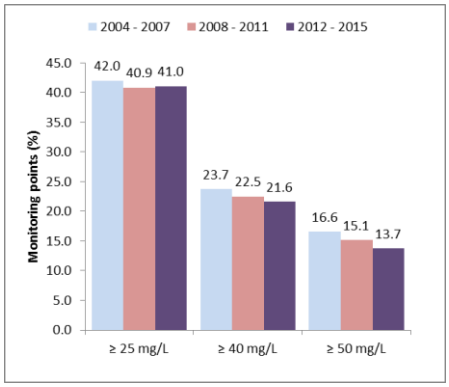


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

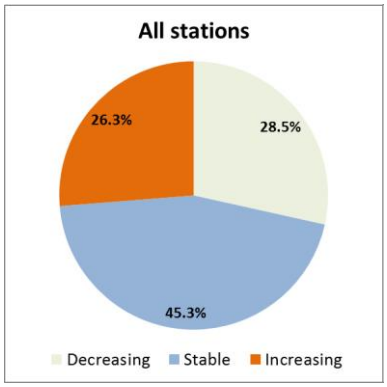


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between September 2016 and May 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

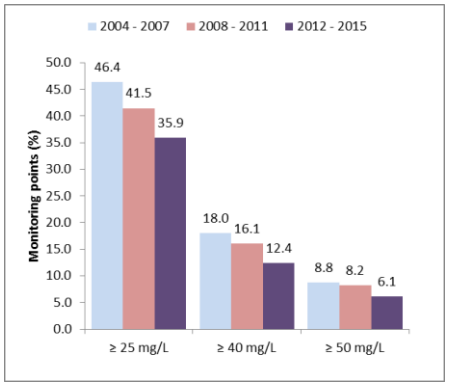


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

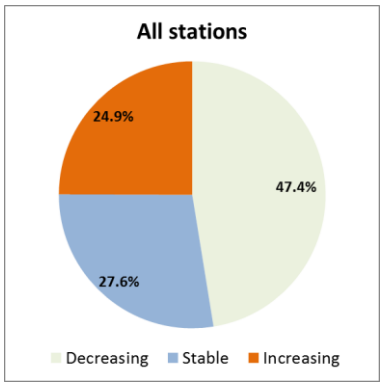


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

The assessment of the trophic status of rivers, lakes, and transitional and coastal water is based on orthophosphate and chlorophyll-a. The report presents tables and maps of averages and trends of the eutrophication parameters but does not assign an eutrophication status to the water bodies.

% of points (mg PO_4/L)	<=0.1	>0.1 to <=0.5	>0.5 to <=1	>1 to <=2	>2
Rivers and lakes annual average	48.4%	41.1%	6.6%	2.8%	1.1%
Transitional/coastal/marine annual average	81.4%	15.8%	2.4%	0.2%	0.2%
% of points (µg chlorophyll-a/L)	**<=2**	**>2 to <=8**	**>8 to <=25**	**>25 to <=75**	**>75**
Rivers and lakes summer average	3%	51%	32%	13%	2%
Transitional/coastal/marine Summer average	7%	67%	17%	8%	1%

Table 2. Orthophosphate concentrations (upper table, mg PO_4/L) and chlorophyll-a mean summer concentrations (lower table, µg/L) for the current Reporting period.

The trends between the previous and current Reporting period show predominantly stable water quality for orthophosphate, but an increasing concentration of chlorophyll-a.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The majority of sites are monitored as part of a regular monitoring programme with frequent sampling with the major supply sites being sampled most frequently. Further details are not reported.

Pressure from agriculture

Compared to the previous reporting period the total agricultural area in the current reporting period increased by 1%. The annual use of N from animal manure mineral fertilizer N was not reported (only aggregated data for fertilizer use in England and Wales). The mineral fertilizer use on grass and arable land decreased by 6% and 1%, respectively, between 2015 and 2011. The farm numbers changed by less than 1% when comparing the current and previous Reporting period. The number of cattle decreased by 4%, while the number of pigs and poultry increased by 6% and 4%, respectively. Nitrogen excretion changed accordingly for the different types of animals. It is reported that in addition to livestock manure, digestate (agricultural and food-based feedstocks) and compost (food waste and green compost) are increasingly being applied to agricultural land. According to different surveys, 92 kt N of digestate (2013) and 192 kt N of compost (2012) was applied to agricultural land in England and Wales, compared to 305 kt N from animal manures (England only).

In the NVZs the annual use of N from animal manure decreased by 5% and cattle numbers decreased by 9%. The changes in number of pigs (+4%) and poultry (+6%) were comparable to the whole territory.

Controls

In the previous Reporting period, 4% of the farmers concerned were visited for a full assessment of all measures, compared to 2.4% in the current Reporting period. Additionally, during this Reporting period 1.8% of the farmers in NVZ were checked for farm record keeping only. In the current Reporting period, 77% of the farmers complied with all measures, which is less than 95% in the previous Reporting period. Compliance is above 96% except for record keeping (70%). The impact of the Action Program is assessed by comparing practices in NVZs with England as a total. While inputs are similar, the percentage of farmers with a nutrient management plan using a recognised method is 47% in NVZs and 36% in the whole territory.

Designation of nitrate vulnerable zones (NVZs)

In the current Reporting period England had designated 74,666 km^2, which is 58% of the total territory and 62% of the agricultural area. A review of the NVZs was completed during the current Reporting period. The area of NVZs was changed from 2013; the total designated area is 8% smaller than the designated area in the previous Reporting period (81,106 km^2).

United Kingdom - Scotland

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	314	289
Total fresh surface water stations	431	209
Total saline water stations	39	39

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

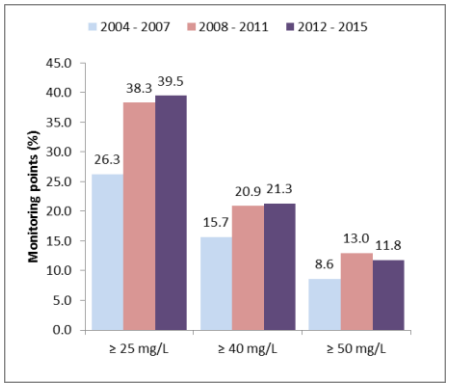


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

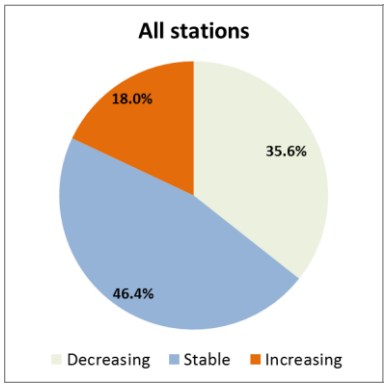


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and May 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

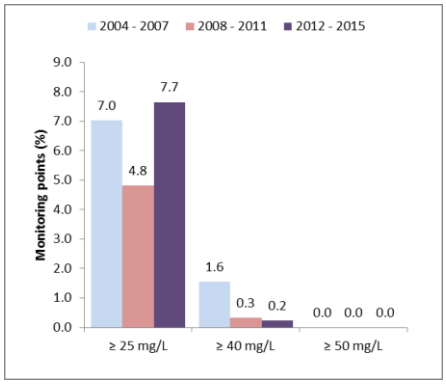


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

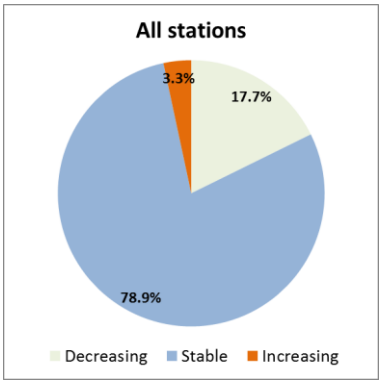


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

The assessment of the trophic status is based on orthophosphate, chlorophyll-a and (not specified) bio-indicators. This accords with the UK approach for identifying waters as “eutrophic, or which may become eutrophic”, as set out in the guidance document “UK Supplement to Agreed Criteria for identifying Sensitive Areas (Eutrophic) & Polluted Waters Eutrophic” (Anon.).
On the basis of the assessment one water body in Scotland (Montrose basin), situated within a NVZ, has been identified as eutrophic or likely to become eutrophic.

	2008-2011	2012-2015
Rivers and lakes	0	0
Transitional/coastal/marine	1	1
Total	**1**	**1**

Table 2. Number of water bodies identified as eutrophic or likely to become eutrophic during the previous and current reporting period.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The report does not present details about the organisation of the monitoring network.

Pressure from agriculture

Compared to the previous Reporting period , in the current Reporting period the total agricultural area decreased by 12% whereas the areas available for manure decreased by 1%. The annual use of N from animal manure decreased by 1% while the use of mineral N increased by 13%. The farm numbers decreased by 2%, but the number of farms with livestock increased by 28%. Cattle numbers were stable, whereas sheep, pigs and poultry numbers decreased by 2%, 16% and 2%, respectively. Nitrogen excretion by animal category for the whole of Scotland was only reported for the current Reporting period.

Agricultural pressures inside NVZs are only reported for the current Reporting period.

Controls

In Scotland 1% of the farmers in the NVZs are visited each year, resulting in 382 inspections in this Reporting period. Overall, 86% of the farms complied with all requirements. The individual measure with the lowest compliance (94%) was the maximum N use.

Designation of nitrate vulnerable zones (NVZs)

In Scotland the four current NVZs (11,256 km^2) cover 14% of the total land area and 17% of the agricultural land. A review in 2013 has resulted in a new NVZ and addition of a new area to an existing NVZ (designated from 1 January 2016), and removal of some areas (5 February 2015). As these changes did not come into force until February 2015, these are not included in the report.

United Kingdom - Wales

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	247	167
Total fresh surface water stations	1182	791
Total saline water stations	188	97

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

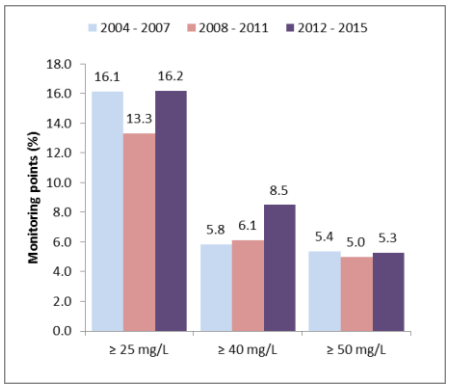


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

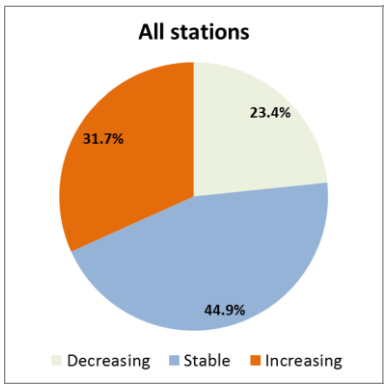


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and May 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

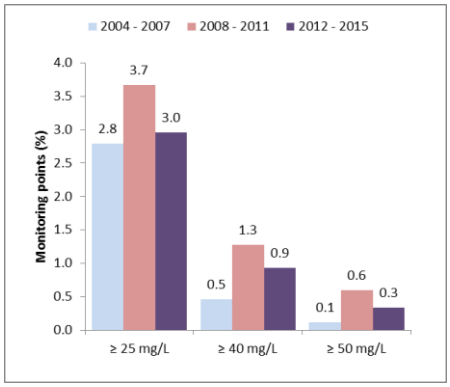


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

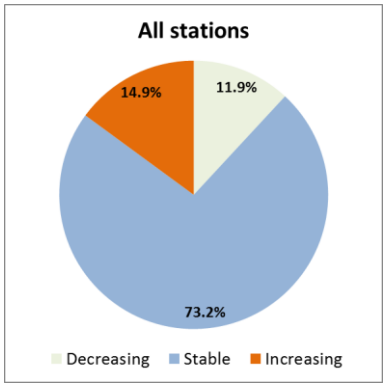


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

The assessment of the trophic status of rivers, lakes, and transitional and coastal water is based on orthophosphate and chlorophyll-a. The report presents tables and maps of averages and trends of the eutrophication parameters but does not assign an eutrophication status to the water bodies.

% of points (mg PO_4/L)	**0 to 0.1**	**>0.1 to 0.5**	**>0.5 to 1**	**>1 to 2**	**>2**
Rivers and lakes annual average	90	9	0.6	0.2	0.1
Transitional/coastal/marine annual average	97	3	0	0	0
% of points (µg chlorophyll-a/L)	**0 to 2**	**>2 to 8**	**>8 to 25**	**>25 to 75**	**>75**
Rivers and lakes summer average	11	67	21	1	0.5
Transitional/coastal/marine Summer average	26	58	13	3	0

Table 2. Orthophosphate concentrations (upper table; mg PO_4/L) and Chlorophyll-a mean summer concentrations (lower table; µg/L) for the current Reporting period.

The trends between the previous and current Reporting period show predominantly stable water quality for orthophosphate, and a significant proportion of stations with stable or increasing concentrations of chlorophyll-a.

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The organisation and frequency of the sampling are not reported except that the sampling frequency is stated as “variable, with the major water supply sites being sampled most frequently”.

Pressure from agriculture

Compared to the previous reporting period the total agricultural area in the current reporting period increased by 7%. The farm numbers increased by 5%. The number of cattle decreased by 2%, while the number of pigs and poultry increased by 7% and 2%, respectively.

Nitrogen excretion was not reported. The annual use of N from animal manure and mineral fertilizer N was not reported (only aggregated data for fertilizer use in England and Wales). Fertilizer N application to grass decreased from around 100 kg/ha in 2000 to around 60 kg/ha in 2008, and remained fairly stable since then.

It is reported that in addition to livestock manure, digestate (agricultural and food-based feedstocks) and compost (food waste and green compost) are increasingly being applied to agricultural land. According to different surveys, 92 kt N of digestate (2013) and 192 kt N of compost (2012) was applied to agricultural land in England and Wales.

Inside NVZs, on averagecattle numbers increased by 27%, pig numbers decreased by 35% and poultry increased by 131% compared to the previous Reporting period.

Controls

In Wales, 4% to 6% of the 800 farms were visited annually in the NVZ in the current Reporting period. The measure with the lowest compliance was record keeping (93%) and compliance with other measures was near to 100%.

Designation of nitrate vulnerable zones (NVZs)

In 2013, following a review of the water quality, the NVZ area increased from 444 km^2 to 479 km^2. The current NVZs cover 2.3% of the total land area and 2.5% of the agricultural land. A further review is underway and new NVZs are expected in 2017.

United Kingdom - Northern Ireland

Water quality

Water monitoring stations

Description	Stations with measurements	Stations with trends
Total groundwater stations	56	35
Total fresh surface water stations	338	322
Total saline water stations	24	24

Table 1. Number of water monitoring stations

Groundwater quality

Nitrates concentration

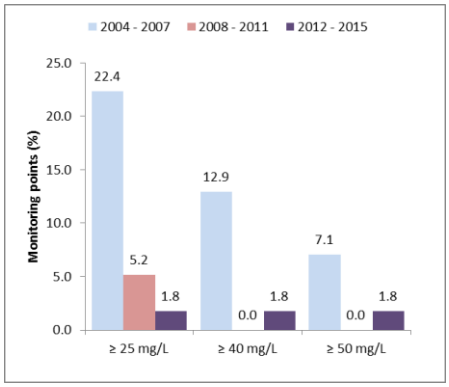


Figure 1. Percentage of groundwater stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L during the current and previous reporting periods. Results are presented for all groundwater stations (at different depths).

Trends in nitrates concentration

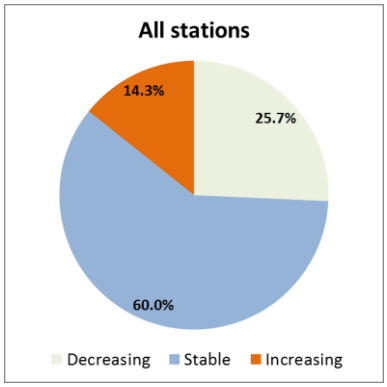


Figure 2. Percentage of stations with decreasing, stable or increasing trends in average groundwater nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Water quality data are based on data submitted by the Member States through EIONET (RP6: submission between July 2016 and May 2017, RP5: May 2013, RP4: September 2009). Average nitrate concentrations for each Reporting Period were calculated from the annual averages and weighted according to the number of annual measurements. Other information is taken from the MS article 10 report.

Surface water quality

Nitrates concentration

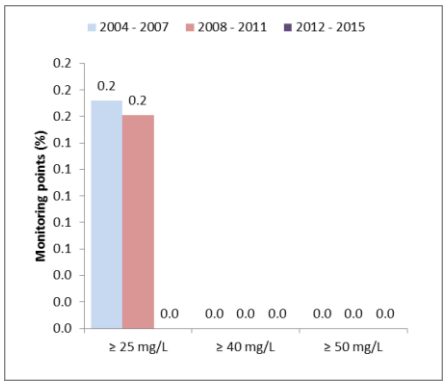


Figure 3. Percentage of fresh surface water stations with average values equal to or exceeding 25, 40 or 50 mg nitrate per L on average during 2012-2015 and the previous reporting periods.

Trends in nitrates concentration

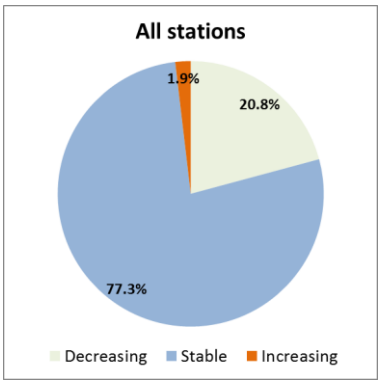


Figure 4. Percentage of stations with decreasing, stable or increasing trends in fresh surface water nitrate concentrations between the reporting periods 2008-2011 and 2012-2015.

Eutrophication

Eutrophic waters are identified using Water Framework Directive (WFD) nutrient standards and Biological Quality Element (BQE) classification tools which are known to be sensitive to nutrient enrichment. The WFD status is converted one-to-one to Nitrates Directive trophic status.

Fresh waters

The assessment of the trophic status of rivers is based on soluble reactive phosphorus. The status of lakes is based on the lowest trophic class for total phosphorus or chlorophyll-a.

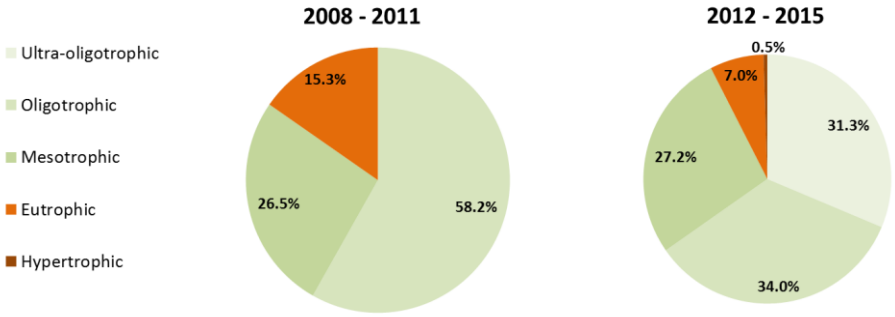


Figure 5. Fresh water eutrophication classification during the previous (rivers only) and current (rivers and lakes) reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 15%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 7%

Saline waters

The assessment of the trophic status of transitional and coastal water is based on dissolved inorganic nitrogen, dissolved oxygen, chlorophyll-a and macroalgae.

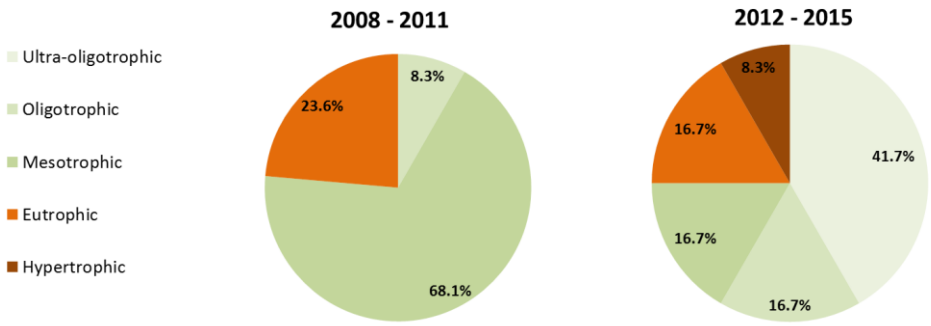


Figure 6. Saline water eutrophication classification during the previous and current reporting period.

Aggregated values for 2008-2011, Eutrophic and Hypertrophic: 24%

Aggregated values for 2012-2015, Eutrophic and Hypertrophic: 25%

Main findings of monitoring programmes in line with Article 5 (6) of the Directive

The Department of Agriculture, Environment and Rural Affairs (DAERA) has responsibility for monitoring water quality which includes providing monitoring data collected from surface waters and groundwater across Northern Ireland. In 2009, the surface freshwater monitoring network was revised to include broadening of the monitoring coverage in Northern Ireland under the Water Framework Directive (WFD) for the period 2009 - 2014. The proposal aimed to reduce the numbers of monitored sites from 579 to 528 whilst continuing to fulfil monitoring obligations under Water Framework Directive (WFD), Freshwater Fish Directive (FFD) and Nitrates Directive (ND). Further financial constraints, however, have led to additional revisions of the surface freshwater monitoring network. In 2010, the new monitoring approach incorporated monthly sampling at a reduced number of core sites (258) with the remainder of sites (270) monitored for 2 years within the 6-year River Basin Management Plans (RBMPs) cycle on a rolling programme basis (2009 - 2014). The average number of monthly samples analysed for nutrients reduced from 579 to an average of 348 in each year. Due to further current resources and budgetary constraints, changes to the monitoring program were implemented in 2015 for the second 6-year cycle of the River Basin Management Plan (RBMP: 2015 - 2021). Although WFD surveillance stations (monitoring sites) will continue to be sampled monthly, the remainder of the stations is sampled on a quarterly basis, i.e. 4 samples per year. In 2015, the average number of monthly samples analysed for nutrients was 157, while 368 stations were monitored quarterly.

The monitoring of the transitional and coastal marine water bodies has also undergone a change from a network of localised eutrophication monitoring points which were associated with known pressures and specific areas of concern to a network of monitoring sites to provide adequate coverage of all Northern Ireland transitional and coastal marine water bodies. Northern Ireland marine waters (both transitional and coastal) are now assessed for nutrient and ecological status using the WFD classification tools. The nutrient tool is based on the Oslo/Paris convention (OSPAR) criteria.

Regional monitoring of groundwater across Northern Ireland began in 2000. A major review of the groundwater monitoring network was undertaken in 2007 to ensure that the requirements of the WFD would be met. There were no major changes in the current Reporting period.

Pressure from agriculture

Compared to the previous Reporting period the total agricultural area did not change in the current Reporting period. The annual use of N from animal manure increased by 1% and also the use of mineral N increased by 4%. Cattle numbers did not change, while the number of sheep, pigs and poultry increased by 2%, 18% and 14%, respectively. Nitrogen excretion changed accordingly. Farm numbers increased by 2%.

Controls

Controls are carried out as part of the Cross compliance regulations and additional specific checks on compliance with the Nitrate Action Programme (NAP). The percentage of farms visited each year varied between 1.3% and 2.1% in the current Reporting period. Compliance with land application restrictions is above 94% except for Nitrogen fertilizer entering a waterway or groundwater (79%) and livestock manure storage requirements (82%).

The nitrogen efficiency for agriculture in Northern Ireland is used as measurable criterion for the impact of the NAP. The N efficiency is 23.2% in the current Reporting period, 0.3% higher compared to the previous Reporting period.

Designation of nitrate vulnerable zones (NVZs)

Northern Ireland applies a whole territory approach (13,500 km^2).