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PART 1/9

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 from agricultural sources based on Member State reports for the period 2012-2015

{COM(2018) 257 final}

Table 1. Number of stations and station density (stations per 1,000 km^2 of land) of reported groundwater monitoring of annual average nitrate measurements in reporting periods 2008-2011 and 2012-2015, the change (%) between both periods, and the annual average sampling frequency in 2012-2015.

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SECTION I

WATER QUALITY: STATUS AND TRENDS

Monitoring networks

Groundwater

In the reporting period 2012-2015, the total number of groundwater monitoring stations with annual average nitrate measurements in the EU-28 was 34,091 which is an average of 7.8 stations per 1,000 km^2 of land ((*Table 1*, *Figure 1*). The station density varies from 0.6 in Finland to 130 stations per 1,000 km^2 of land in Malta. Compared to the previous reporting period 2008-2011 the overall number of monitoring stations remained nearly the same. Relatively large (<-10%) decreases were seen in Spain, Portugal and Romania, while relative large increases (>+10%) were seen in Estonia, Greece, Finland, Latvia, Poland, Sweden and Slovenia.

The average sampling frequency of groundwater is nearly twice a year, and varies from less than once a year in, Denmark, Latvia, Poland and Sweden to around 5 times a year in Belgium and Croatia (*Figure 2*).

Fresh surface water

In the reporting period 2012-2015, the total number of fresh surface water monitoring stations with annual average nitrate measurements in the EU-28 was 33,042 which is an average of 7.6 stations per 1,000 km^2 of land (*Table 2*, *Figure 3*). The station density varies from 0.5 per 1,000 km^2 in Finland to 34 stations per 1,000 km^2 of land in the United Kingdom. Compared to the previous reporting period 2008-2011, the overall number of monitoring stations increased by 23% (*Table 2*). Relatively large (<-10%) decreases were seen in Germany, Latvia, Malta, Poland and Slovakia, while relative large increases (>+10%) were seen in Cyprus, Czech Republic, Estonia, Greece, Finland, Italy, Lithuania, the Netherlands, Sweden and the United Kingdom.

The average sampling frequency is around four times a year, and varies from almost once a year in Sweden to just over 20 times a year in Ireland (*Figure 4*).

Saline surface water

In the reporting period 2012-2015, the total number of saline surface water monitoring stations with annual average nitrate measurements in the EU-28 was 2,205 (*Table 3*). Compared to the previous reporting period 2008-2011 the overall number of monitoring stations decreased by 29% (*Table 2*). Relatively large (<-10%) decreases were seen in Bulgaria, Denmark, Greece, Spain, France, Poland, Portugal, Romania and Sweden, while relative large increases (>+10%) were seen in Estonia, Finland, Ireland and Malta.

Water Quality- Nitrates concentrations

Groundwater

In the reporting period 2012–2015, the average annual nitrate concentration was equal to or exceeded 50 mg/L at 13.2% of the monitoring stations in the EU-28 (**Error! Reference source not found.**, *Figure 5*). This varied from no exceeding stations in Ireland, or less than 5% in Finland, Sweden, Lithuania, Latvia, Croatia and Estonia, to more than 20% in Spain, Germany and Malta. Overall, at EU-28 level, there is a slight improvement compared to the previous reporting period, in which 14.1% of the monitoring stations were equal to or exceeded an average annual nitrate concentration of 50 mg/L. In this reporting period the average annual nitrate concentration was between 40 and 50 mg/L at 5.7 % of the monitoring station in the EU-28.

The lowest nitrate concentrations are observed in captive and karstic[1] groundwater with around 5% of stations equal to or exceeding 50 mg/L (*Figure 6*). In phreatic groundwater the proportion of stations equal to or exceeding 50 mg/L varied from 13% to 19%, with the highest values observed for groundwater depths of 5 to 15 meter. A similar effect was also observed for the trends (*Figure 8*) with a relatively stable situation for karstic and captive groundwater, and a relatively high proportion of decreasing and increasing trends for phreatic groundwater. The lowest proportion of a stable situation was observed for phreatic groundwater at a depth of 5 to 15 meter.

Maximum nitrate concentrations were equal to or exceeded 50 mg/L in 20.3% of the monitoring stations in the EU-28, varying from 1.1% in Sweden to 75.6% in Malta. There is a slight improvement compared to the previous reporting period, in which 20.9% of the monitoring stations had maximum nitrate concentrations equal to or exceeding 50 mg/L.

Compared to the previous reporting period 2008-2011, 26% of all stations in the EU-28 showed an increasing trend and 32% a decreasing trend (*Figure 8*). Member States with a relatively high proportion (>40%) of stations with increasing trends were Malta, Bulgaria, Estonia and Lithuania.

Fresh surface water

In the reporting period 2012-2015, the average annual nitrate concentration was equal to or exceeded 50 mg/L at 1.8% of the monitoring station in the EU-28 (*Figure 9*). Another 2.0% of the stations had average annual nitrate concentrations between 40 and 50 mg/l and 8.8% between 25 and 40 mg/L. The lowest annual average nitrate concentrations (highest proportion less than 2 mg/L) in fresh surface water were found in Sweden, Ireland and Greece and the highest (highest proportions equal to or exceeding 50 mg/L) in the United Kingdom, Belgium and Malta.

The highest nitrate concentrations are generally observed in rivers (*Figure 10*).

There is a slight improvement compared to the previous reporting period, in which 2.4% of the monitoring stations had annual average nitrate concentrations equal to or exceeding 50 mg/L and 2.4% showed concentrations between 40 and 50 mg/L (**Error! Reference source not found.**).

Compared to the reporting period 2008-2011, in the EU-28, a decreasing trend in annual average nitrates concentrations was observed in 31% of all freshwaters monitoring stations, of which 9% showed a large decreasing trend. 50% of the monitoring stations showed stable concentrations. An increasing trend in annual average nitrates concentrations was observed in 19% of all freshwaters monitoring stations, of which 5% showed a large increasing trend (***Figure 11***).

Saline surface water

In saline waters, nitrate concentrations are lower than in fresh water concentrations, with 0.7% of the stations equal to or exceeding 25 mg/L and 75.7% of the stations below 2 mg, based on annual average values.

There is a slight improvement compared to the previous reporting period, in which 1.8% of the monitoring stations had annual average nitrate concentrations equal to or exceeding 25 mg/L.

Eutrophication

[1] Karsts are formed by the dissolution of soluble rocks, including limestone and dolomite. Natural features of the landscape such as caves and springs are typical of karst regions. Confined groundwater is separated from atmospheric pressure by relatively impermeable material.

The assessment of the trophic status varied widely among Member States, not only regarding the parameters used, but also concerning the methodologies for the definition of trophic status classes. Information on reference conditions[2] is needed to provide a complete picture on eutrophication. The establishment of reference conditions is needed to identify how present day conditions are different from the reference conditions and to set targets for achieving good ecological status of all European waters within the Water Framework Directive. The data delivery on eutrophication varied per Member State and per water type (***Error! Reference source not found.***). Member States are not required to submit data on trends of eutrophication status. The overall comparison between the eutrophication status of the current and previous reporting period is hampered by differences in methods between Member States and also between reporting periods.

Of all reported river monitoring stations in EU-28, 12% and 7% were eutrophic and hypertrophic, respectively, while 31% and 21% were oligotrophic or ultra-oligotrophic respectively (*Figure 12*). The eutrophication state of rivers varied from no eutrophic or hypertrophic stations in Cyprus to 100% hypertrophic rivers in Malta. Of all the Member states that reported on eutrophication the ones with relative low (<10%) proportions of eutrophic or hypertrophic stations were Cyprus, Slovenia, Portugal, Greece, Northern Ireland, Romania, Latvia and Bulgaria. Of all the Member states that reported on eutrophication, the ones with relatively high (>50%) proportions of eutrophic or hypertrophic stations were Austria, Luxemburg, Spain, Lithuania, Czech Republic, Belgium, Croatia and Malta[3].

In general, the trophic status of rivers is slightly better than the status of lakes (*Figure 17*).

Of all reported lakes monitoring stations in EU-28, 18% and 8% were eutrophic and hypertrophic, respectively, while 45% and 1% were oligotrophic or ultra-oligotrophic, respectively (*Figure 13*). Of all the Member states that reported on eutrophication, the eutrophication state of lakes varied from no eutrophic or hypertrophic stations in Malta to 100% hypertrophic lakes in Croatia. Member states with relative low (<10%) proportions of eutrophic or hypertrophic stations were Malta[4], Romania and Austria. Member States with relatively high (>50%) proportions of eutrophic or hypertrophic stations were Bulgaria, Croatia and Poland.

Eutrophication data on transitional, coastal and marine waters were only submitted by a limited number of Member States. For transitional waters, six out of the ten Member States that submitted data, showed a 100% proportion of eutrophic or hypertrophic waters (*Figure 14*). For coastal waters, the proportion of stations with eutrophic or hypertrophic conditions varied from 0% in Slovenia to 100% in Latvia (*Figure 15*). Five out of the ten Member States had more than 50% eutrophic or hypertrophic coastal waters. Marine data on eutrophication were submitted by three Member States (*Figure 16*).

Forecast on water quality

[2] The Water Framework Directive requires the establishment of type-specific reference conditions for surface water body types: "For each surface water body type….type-specific hydromorphological and physico-chemical conditions shall be established representing the values of the hydro-morphological and physicochemical quality elements specified….for that surface water body type at high ecological status….Type-specific biological reference conditions shall be established, representing the values of the biological quality elements…for that surface water body type at high ecological status…."

[3] Malta does not have any rivers or lakes but includes valley systems and standing waters as fresh surface water bodies.

[4] Malta does not have any rivers or lakes but includes valley systems and standing waters as fresh surface water bodies.

The methods applied by Member States to assess future developments in water quality are mostly based on trend analysis, scenario assessments or model simulations, sometimes combined with analyses of past and expected developments in agricultural practices. These predictions, however, are hampered by large uncertainties, due to the large variations in climate and soil conditions and their effects on water quality.

Four Member States and a region (Croatia, Cyprus, Greece, Portugal and Belgium-Flanders,) did not report on the forecast of water quality. Belgium-Flanders and Cyprus mentioned that reliable forecasts are not possible due to the time lag between measures implementation and effect, or due to complicated climates and hydrology.

The results of the other available analyses indicate that 14 Member States or regions (Austria, Bulgaria, Czech Republic, Denmark, France, Germany, Hungary, Luxemburg, the Netherlands, Romania, Slovenia, Sweden, UK-Northern Ireland and UK-Scotland) predict a further decrease in nitrate concentrations in groundwater and surface waters, partly due to the expected effect of changes in agricultural practices driven by the Directive implementation and by several agro-environmental measures included in the Rural Development Programmes. Ten Member States or regions (Belgium-Wallonia, Estonia, Finland, Ireland, Italy, Poland, Slovakia, Spain, UK-England and UK-Wales) did not come to a clear direction about future water quality or predicted increasing or decreasing water quality for different water bodies. Lithuania reported that improvements are unlikely given the current set of measures.

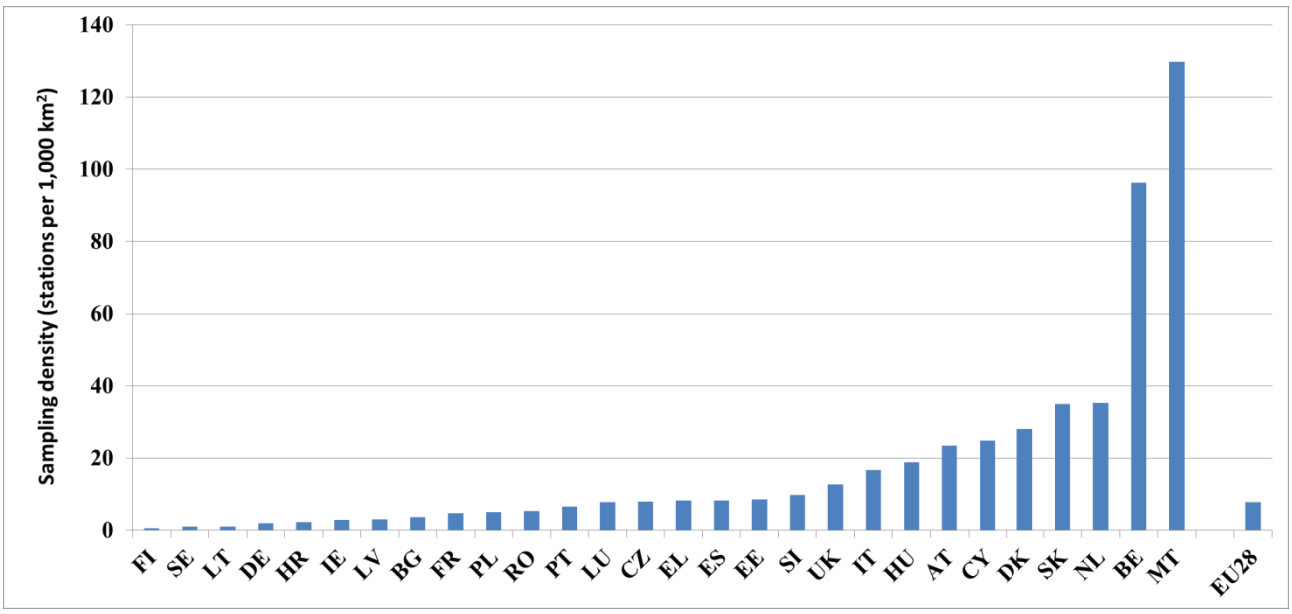

Figure 1. *Groundwater station density (stations per 1,000 km² of land) in reporting period 2012-2015.Stations with data of average annual nitrate measurements.*

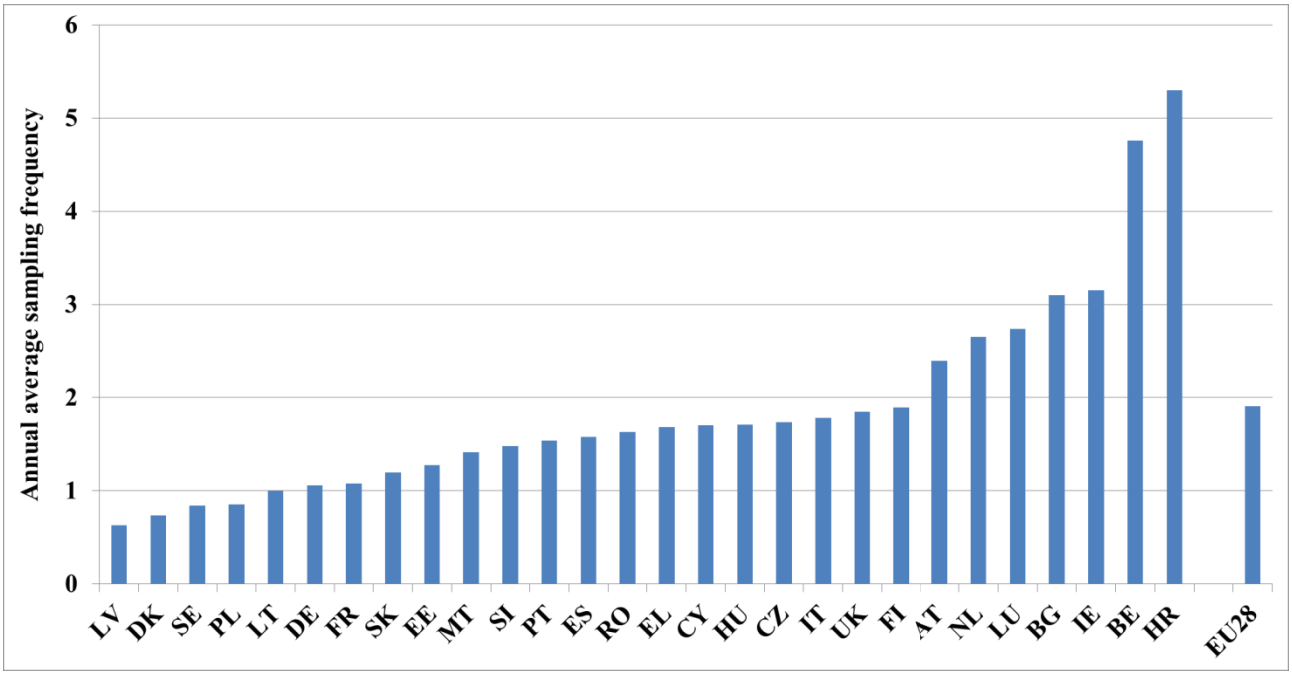

Figure 2. *Average annual groundwater sampling frequency in reporting period 2012-2015. Stations with data of average annual nitrate measurements.*

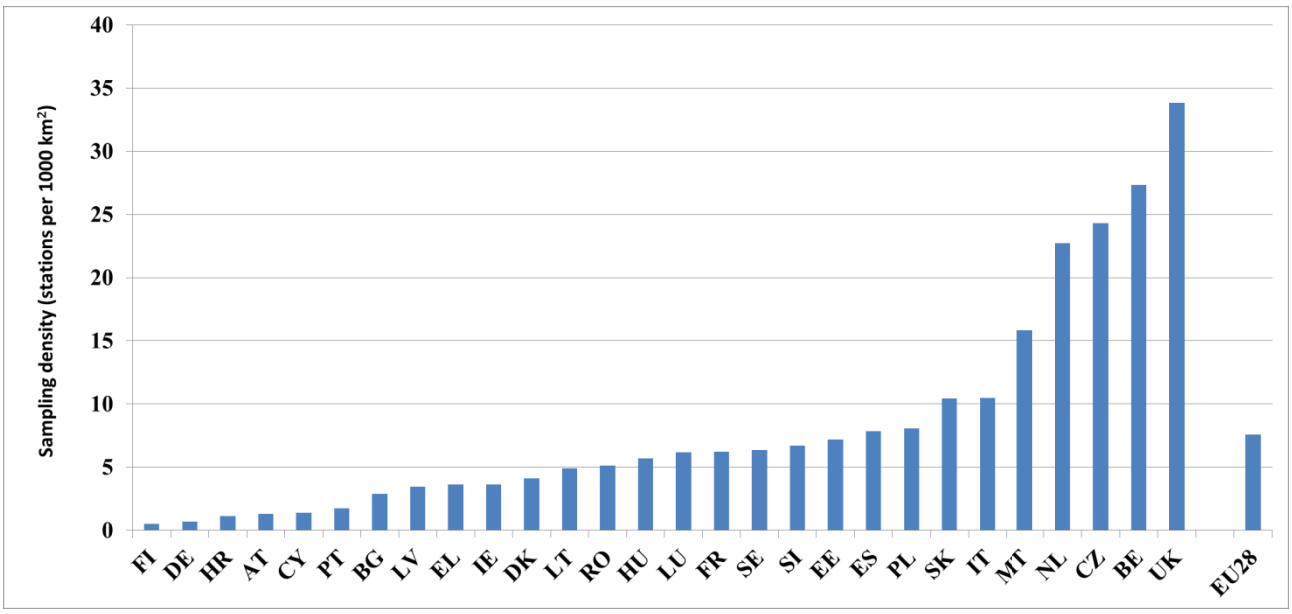

Figure 3. *Surface water station density (stations per 1,000 km² of land) in reporting period 2012-2015. Stations with data of average annual nitrate measurements.*

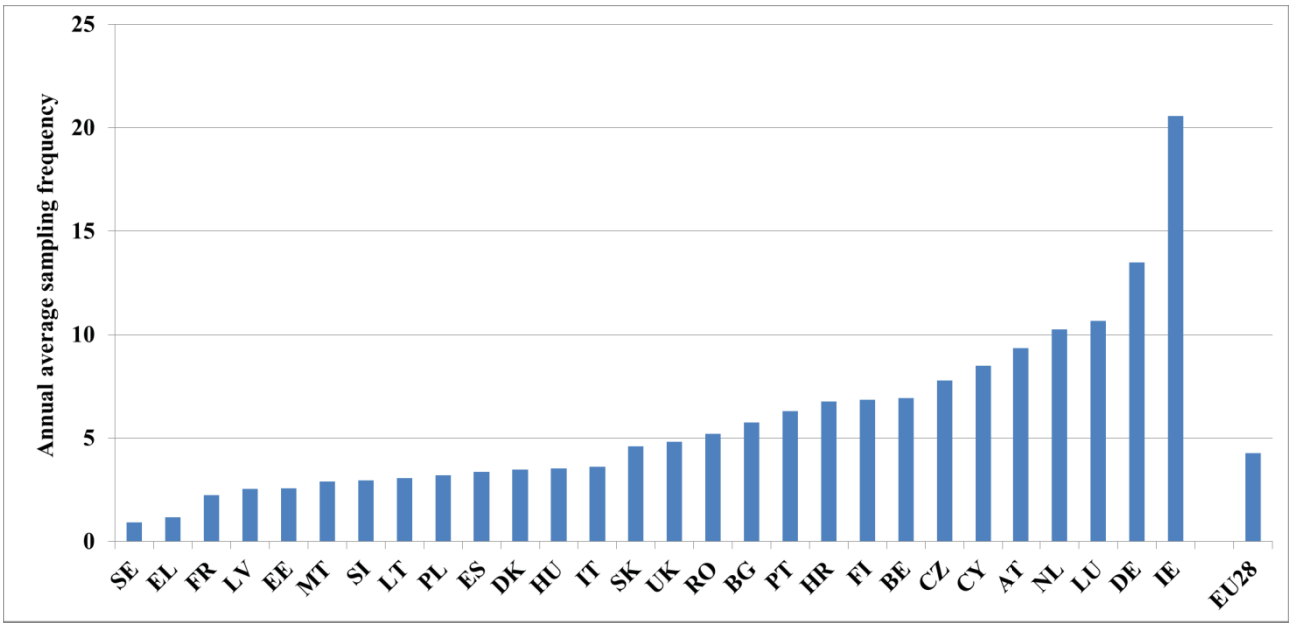

Figure 4. *Annual average fresh surface water sampling frequency in reporting period 2012-2015. Stations with data of average annual nitrate measurements.*

	Number of stations		Stations per 1000 km^2		Change	Samplings per year
MS	2008-2011	2012-2015	2008-2011	2012-2015	(%)	2012-2015
AT	1,965	1,965	23.4	23.4	0.0	2.4
BE	2,974	2,937	97.4	96.2	-1.2	4.8
BG	426	406	3.8	3.7	-4.7	3.1
CY	244	230	26.4	24.9	-5.7	1.7
CZ	611	621	7.7	7.9	1.6	1.7
DE	693	697	1.9	2.0	0.6	1.1
DK	1,254	1,201	29.2	28.0	-4.2	0.7
EE	297	385	6.6	8.5	29.6	1.3
EL	370	1,078	2.8	8.2	191.4	1.7
ES	4,780	4,132	9.6	8.3	-13.6	1.6
FI	79	187	0.2	0.6	136.7	1.9
FR	2,509	2,598	4.6	4.8	3.5	1.1
HR	N.A.	126	N.A.	2.2	N.A	5.3
HU	1,763	1,756	19.0	18.9	-0.4	1.7
IE	211	205	3.0	2.9	-2.8	3.2
IT	5,296	5,035	17.6	16.7	-4.9	1.8
LT	62	65	0.9	1.0	4.8	1.0
LU	20	20	7.7	7.7	0.0	2.7
LV	173	199	2.7	3.1	15.0	0.6
MT	41	41	129.7	129.7	0.0	1.4
NL	1,321	1,318	35.4	35.3	-0.2	2.7
PL	1,258	1,563	4.0	5.0	24.2	0.9
PT	657	580	7.4	6.5	-11.7	1.5
RO	1,805	1,256	7.6	5.3	-30.4	1.6
SE	326	436	0.7	1.0	33.7	0.8
SI	104	198	5.1	9.8	90.4	1.5
SK	1,717	1,717	35.0	35.0	0.0	1.2
UK	3,087	3,139	12.4	12.6	1.7	1.8
EU	34,043	34,091	7.8	7.8	0.1	1.9

Table 1. *Number of stations and station density (stations per 1,000 km^2 of land) of reported groundwater monitoring of annual average nitrate measurements in reporting periods 2008-2011 and 2012-2015, the change (%) between both periods, and the annual average sampling frequency in 2012-2015.*

	Number of stations		Stations per 1000 km^2		Change	Samplings per year
MS	2008-2011	2012-2015	2008-2011	2012-2015	(%)	2012-2015
AT	109	108	1.3	1.3	-1	9.3
BE	858	835	28.1	27.4	-3	6.9
BG	305	318	2.8	2.9	4	5.8
CY	10	13	1.1	1.4	30	8.5
CZ	571	1,917	7.2	24.3	236	7.8
DE	303	241	0.8	0.7	-20	13.5
DK	161	177	3.8	4.1	10	3.5
EE	145	324	3.2	7.2	123	2.6
EL	105	479	0.8	3.6	356	1.2
ES	3,730	3,903	7.5	7.8	5	3.4
FI	141	167	0.4	0.5	18	6.9
FR	3,331	3,390	6.1	6.2	2	2.2
HR	N.A.	64	N.A.	1.1	N.A	6.8
HU	525	530	5.6	5.7	1	3.5
IE	252	254	3.6	3.6	1	20.6
IT	2,513	3,154	8.3	10.5	26	3.6
LT	291	320	4.5	4.9	10	3.1
LU	16	16	6.2	6.2	0	10.7
LV	339	222	5.3	3.4	-35	2.5
MT	7	5	22.2	15.8	-29	2.9
NL	457	850	12.2	22.7	86	10.3
PL	2,807	2,526	9.0	8.1	-10	3.2
PT	146	154	1.6	1.7	5	6.3
RO	1,114	1,224	4.7	5.1	10	5.2
SE	187	2,792	0.4	6.4	1393	0.9
SI	139	136	6.9	6.7	-2	3.0
SK	852	512	17.4	10.4	-40	4.6
UK	7,777	8,411	29.7	33.8	14	4.8
EU	26,791	33,042	6.1	7.6	23	4.3

Table 2. *Number of stations and station density (stations per 1,000 km^2 of land) of reported fresh surface water monitoring of annual average nitrate measurements in reporting periods 2008-2011 and 2012-2015, the change (%) between both periods, and the annual average sampling frequency in 2012-2015.*

MS	2008-2011	2012-2015	Change (%)
AT	N.A.	N.A.	N.A.
BE	10	10	0.0
BG	7	6	-14.3
CY	0	16	N.A.
CZ	N.A.	N.A.	N.A.
DE	5	5	0
DK	70	44	-37
EE	23	26	13
EL	11	0	-100
ES	631	250	-60
FI	44	75	70
FR	21	8	-62
HR	N.A.	0	N.A.
HU	N.A.	N.A.	N.A.
IE	104	117	13
IT	584	577	-1
LT	17	16	-6
LU	N.A.	N.A.	N.A.
LV	45	43	-4
MT	31	49	58
NL	43	39	-9
PL	46	19	-59
PT	55	6	-89
RO	54	35	-35
SE	233	184	-21
SI	5	5	0
SK	N.A.	N.A.	N.A.
UK	1065	675	-37
EU	3104	2205	-29

Table 3. Number of stations of reported saline surface water monitoring of annual average nitrate measurements in reporting periods 2008-2011 and 2012-2015, and the change (%) between both periods.

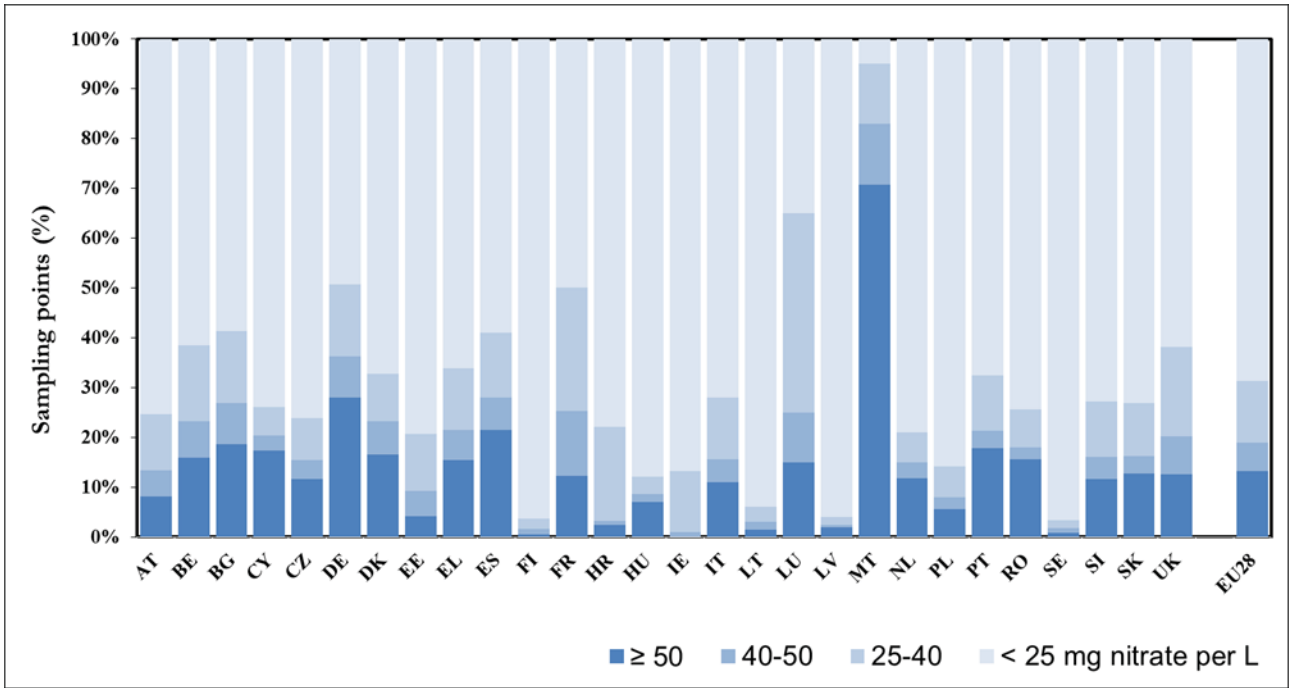

Figure 5. *Frequency diagram of annual average nitrate concentrations in groundwater, at all depths.*

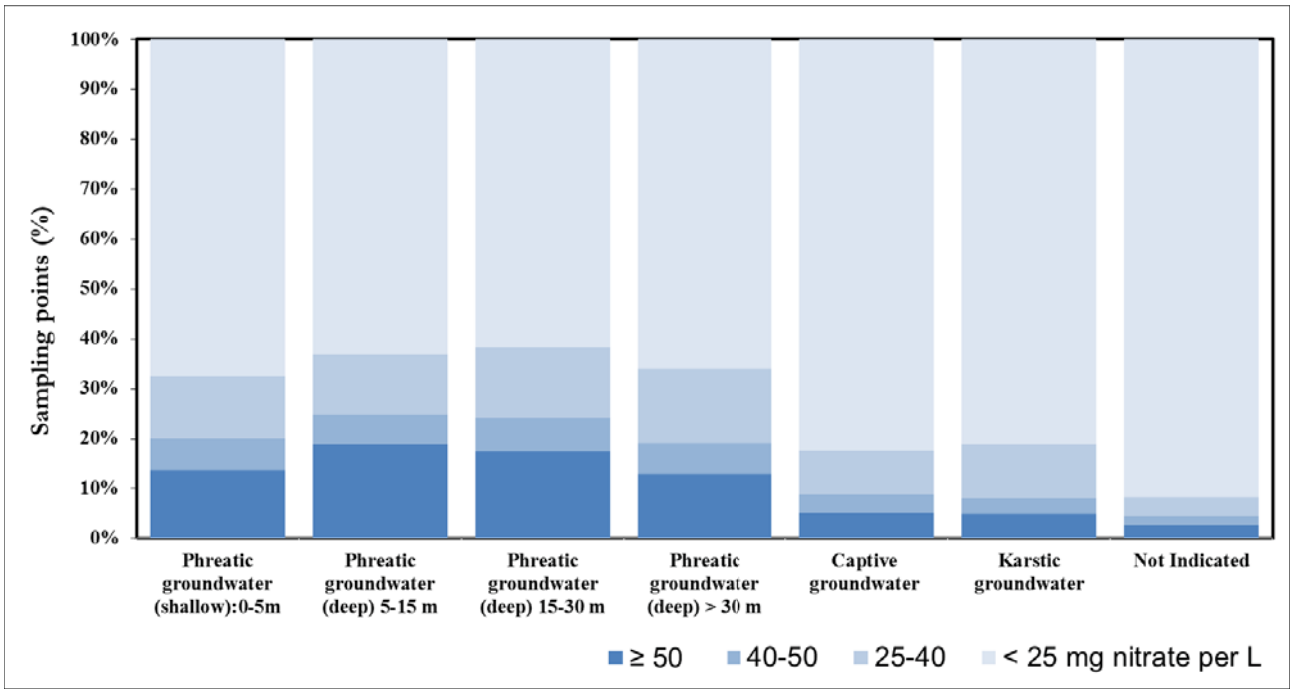

Figure 6. *Frequency diagram of annual average nitrate concentrations in groundwater at different depths, aggregated over all Member States.*

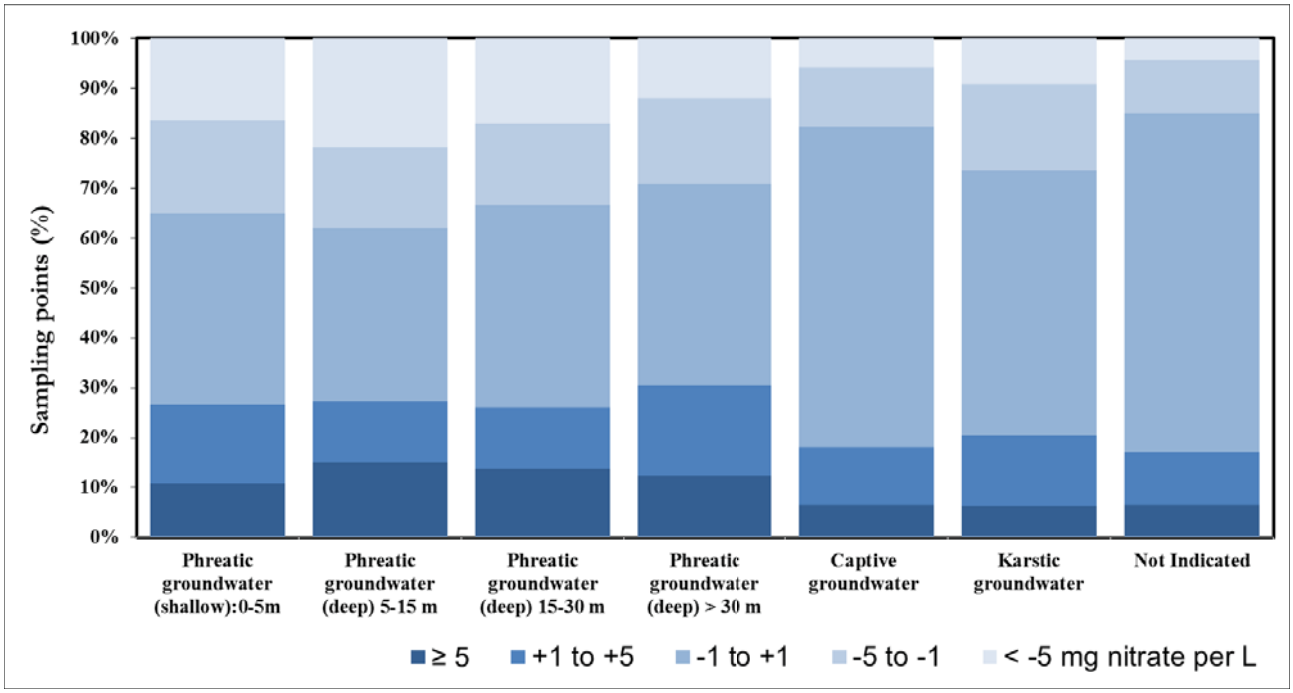

Figure 7. *Frequency diagram of trends in annual average nitrate concentrations in groundwater at different depths, aggregated over all Member States.*

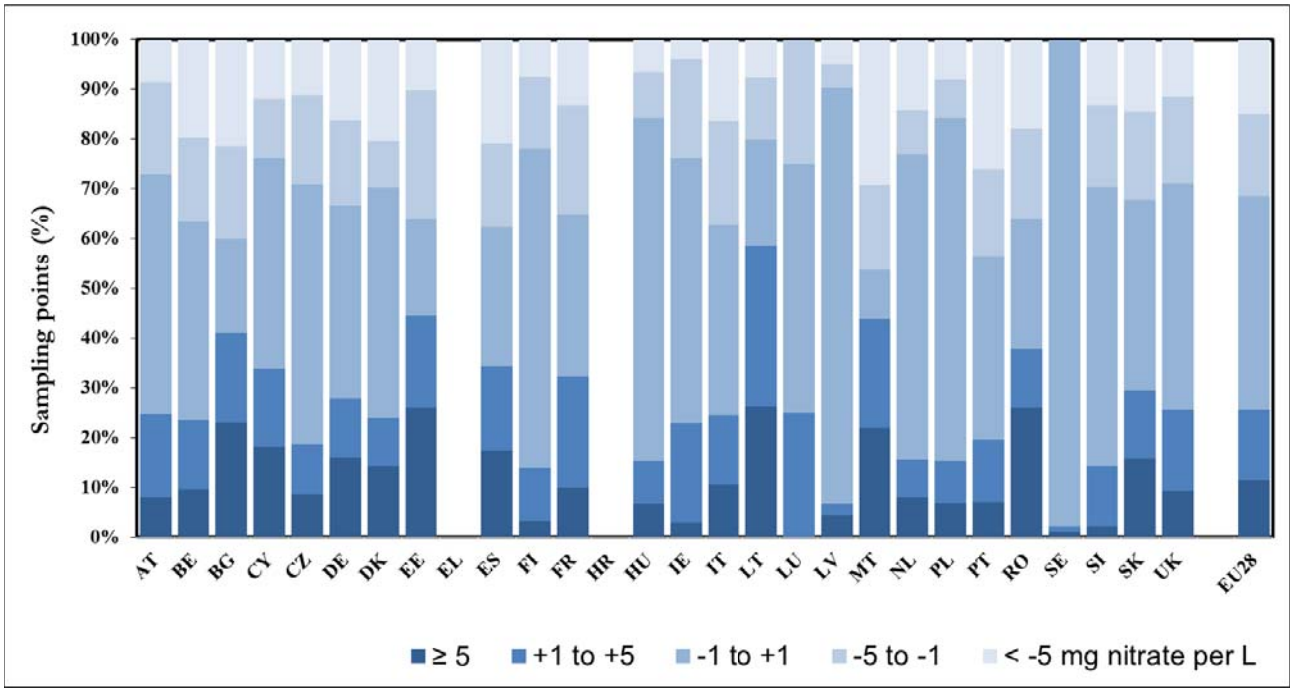

Figure 8. *Frequency diagram of trends in annual average nitrate concentrations in groundwater.*

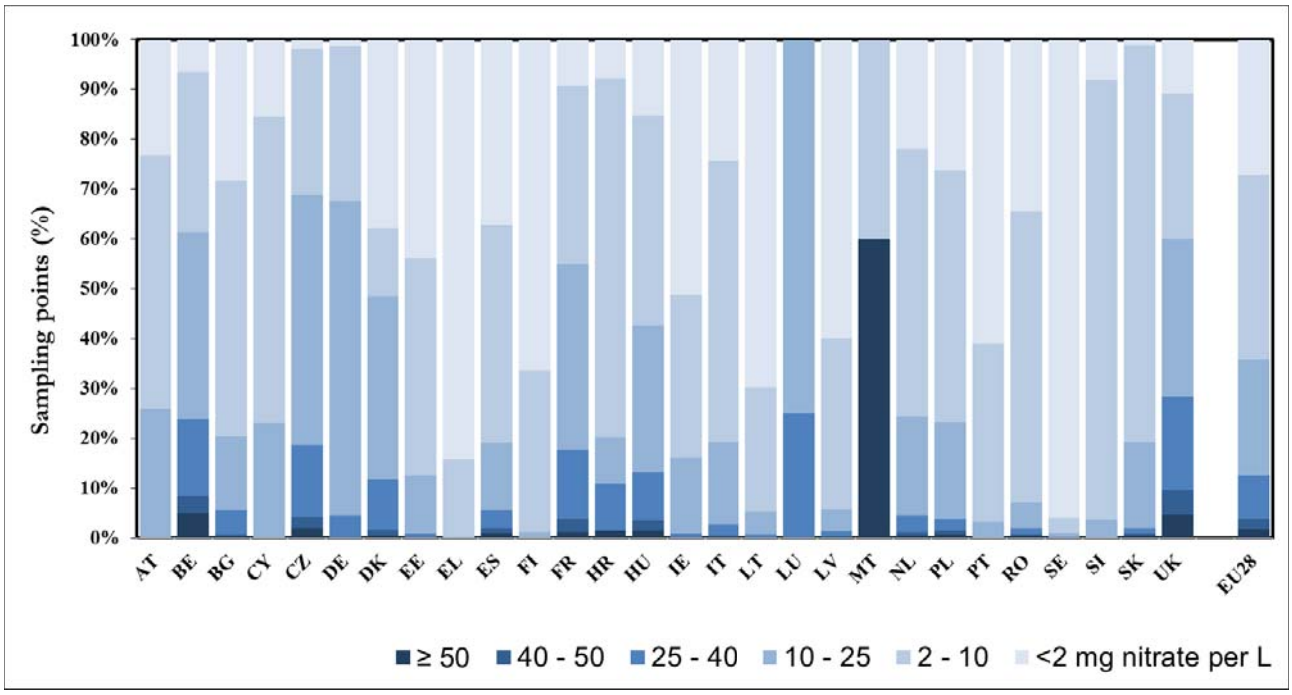

Figure 9. *Frequency diagram of annual average nitrate concentrations in fresh surface waters (rivers and lakes).*

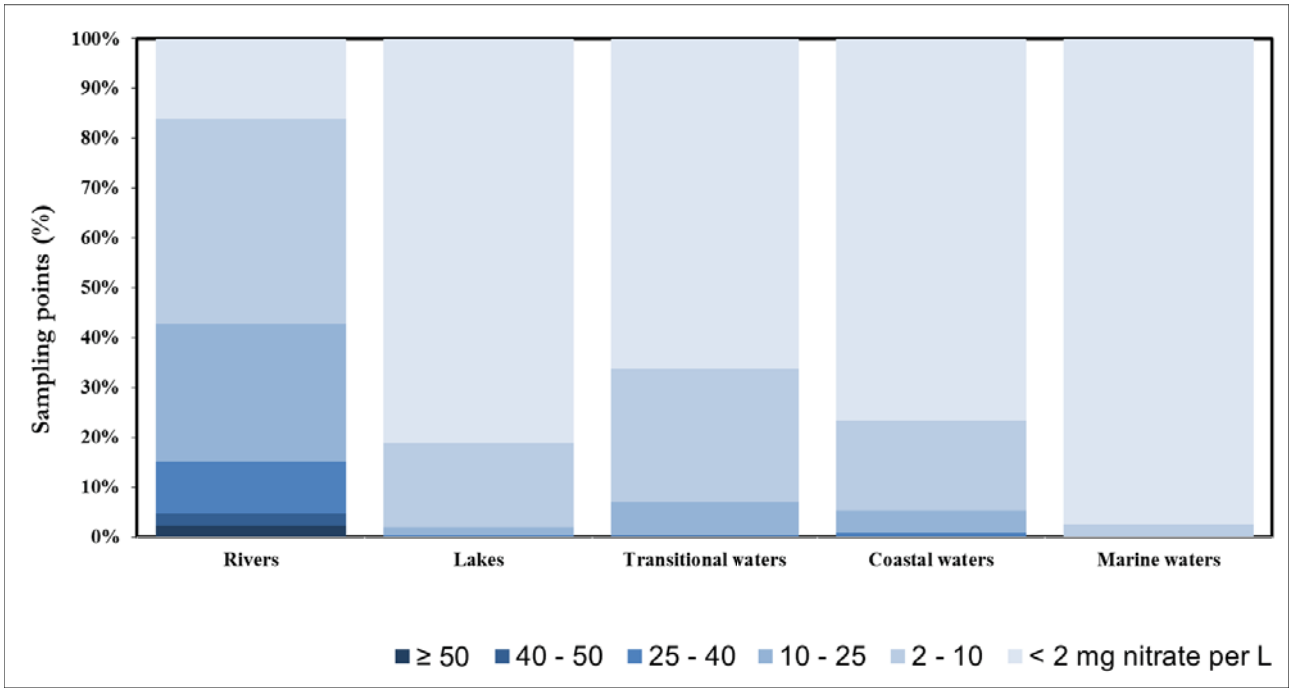

Figure 10. *Frequency diagram of annual average nitrate concentrations in different surface waters, aggregated over all Member States.*

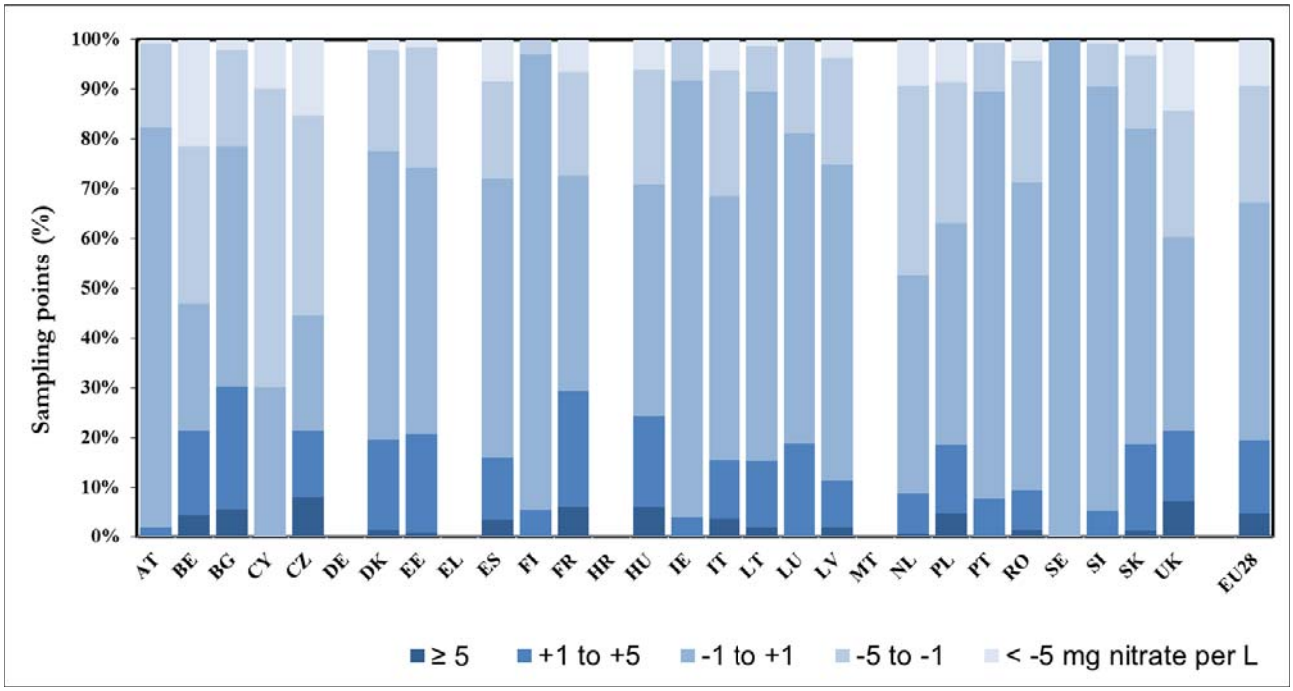

Figure 11*. Frequency diagram of trends in annual average nitrate concentrations in fresh surface water (rivers and lakes).*

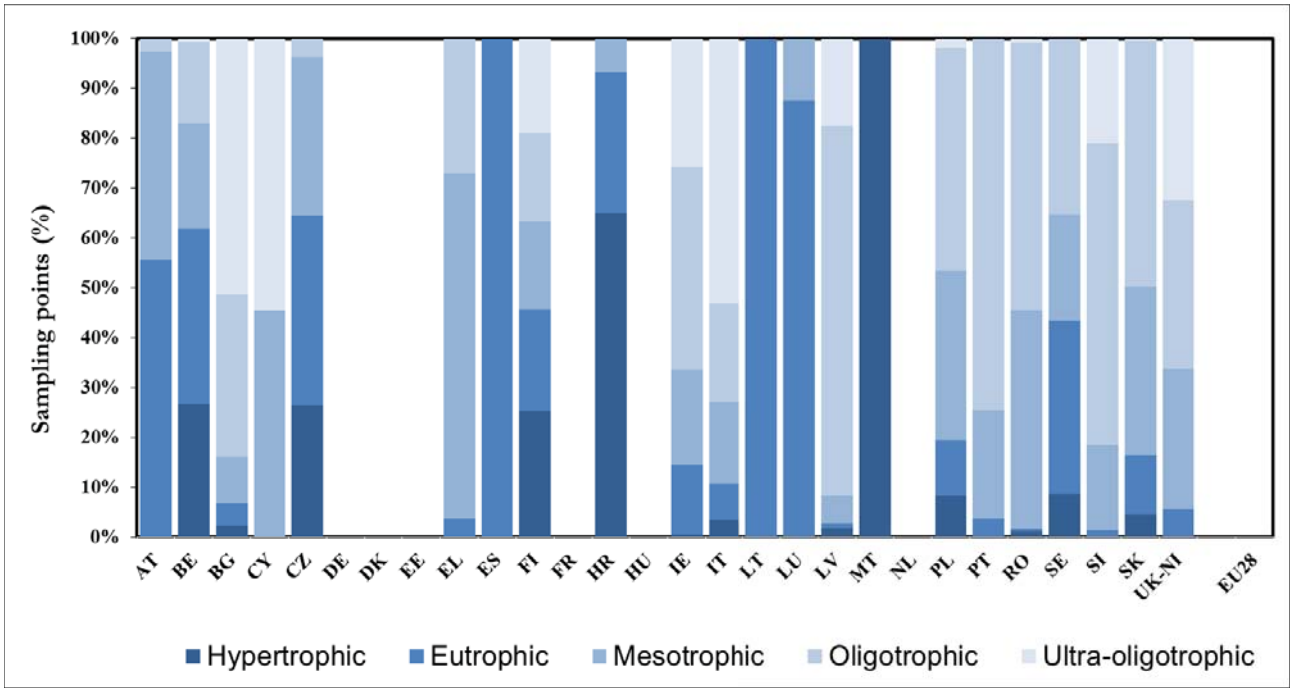

Figure 12. *Frequency diagram of the trophic status of rivers in reporting period 2012-2015.*

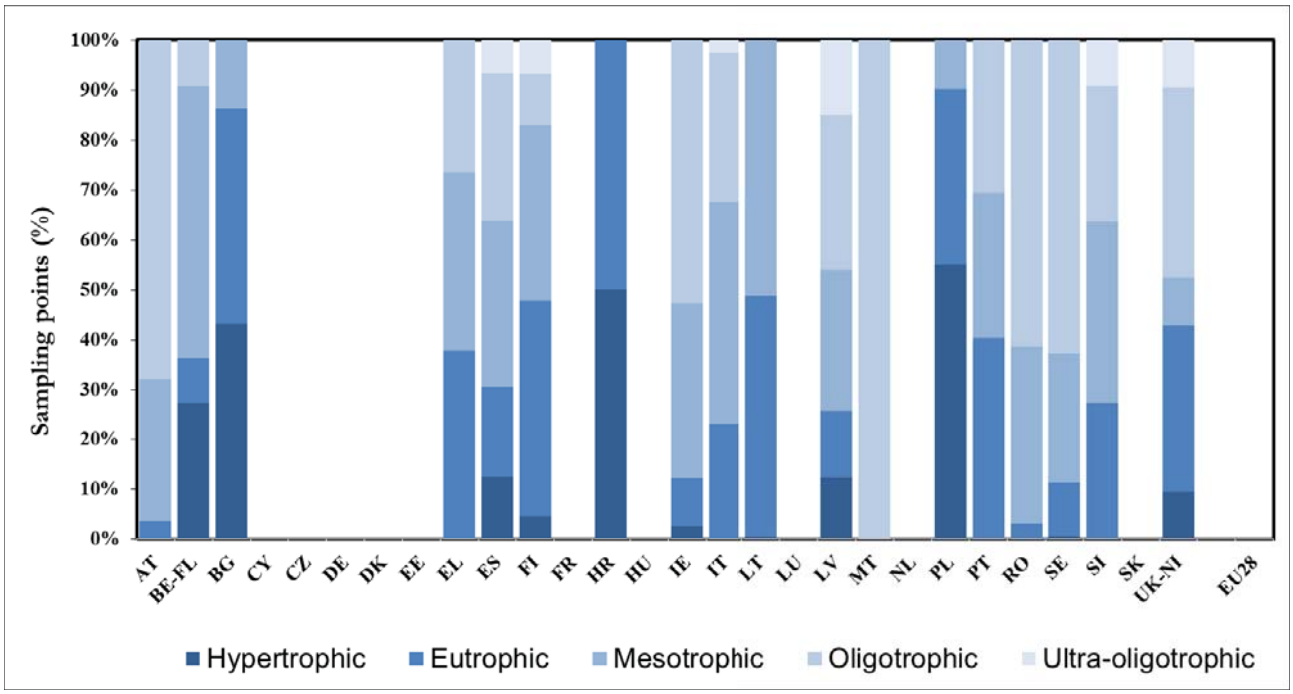

Figure 13. *Frequency diagram of the trophic status of lakes in reporting period 2012-2015.*

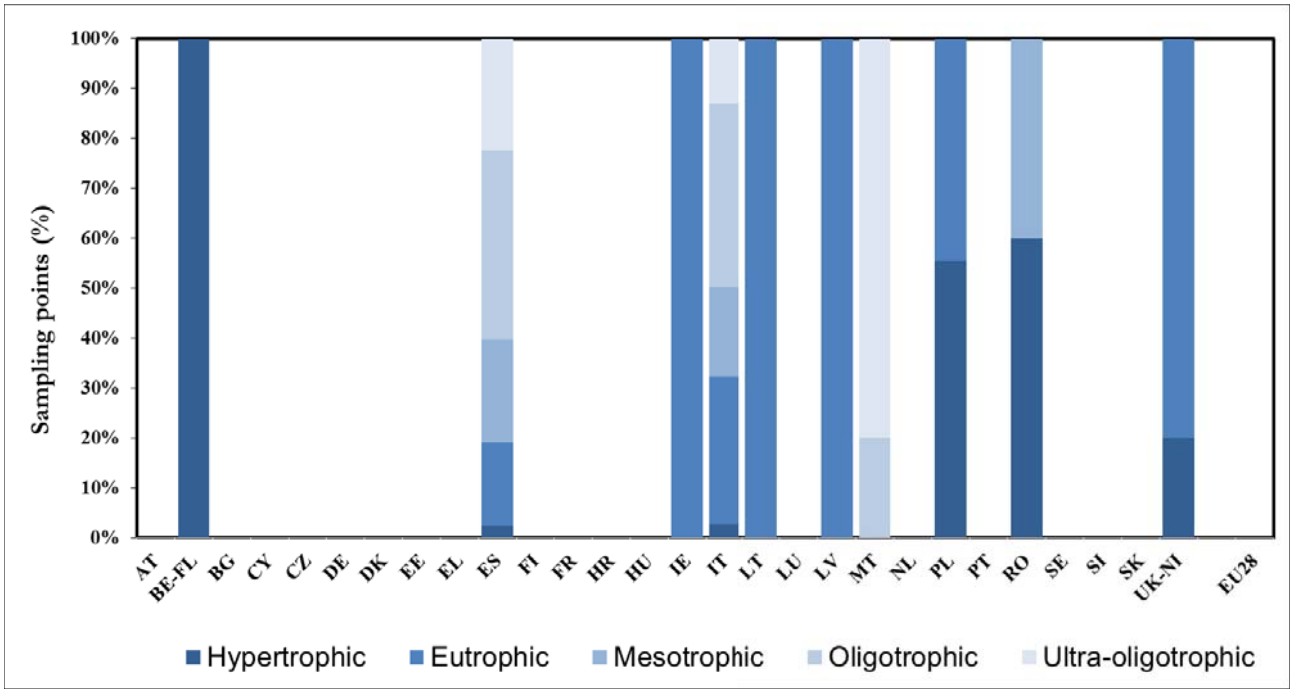

Figure 14. *Frequency diagram of trophic status classes of transitional waters in reporting period 2012-2015.*

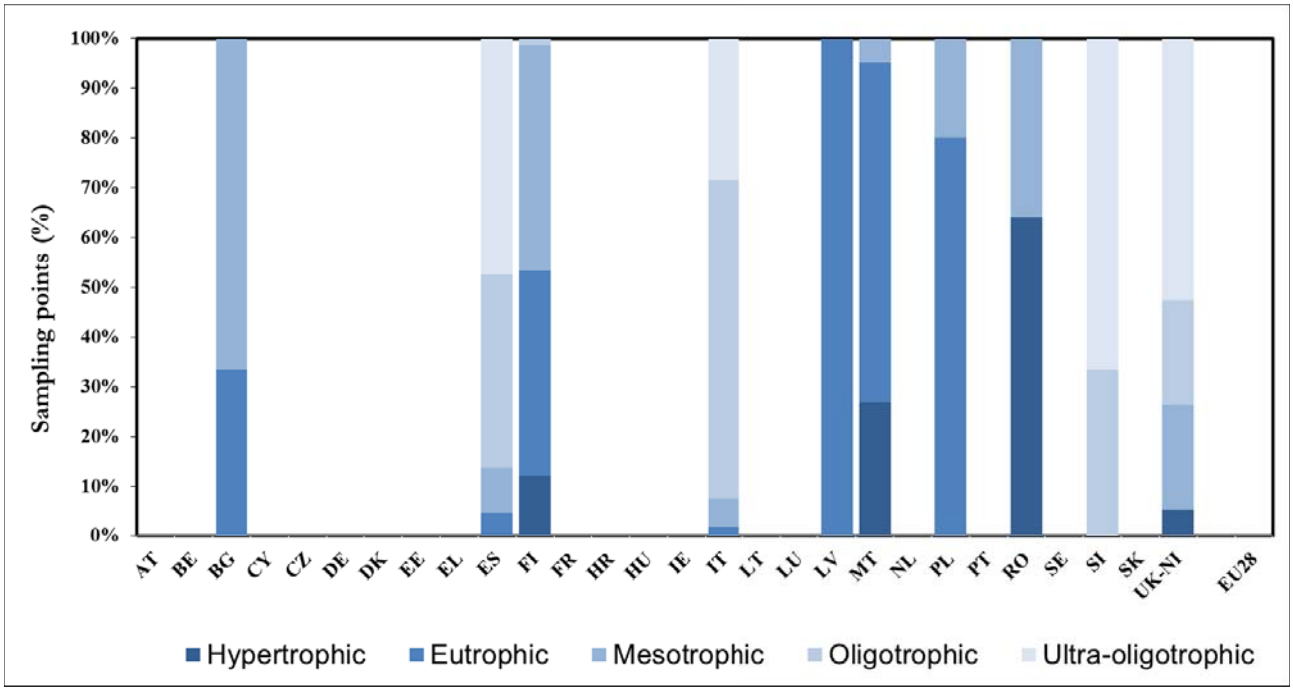

Figure 15. *Frequency diagram of trophic status classes of coastal waters in reporting period 2012-2015.*

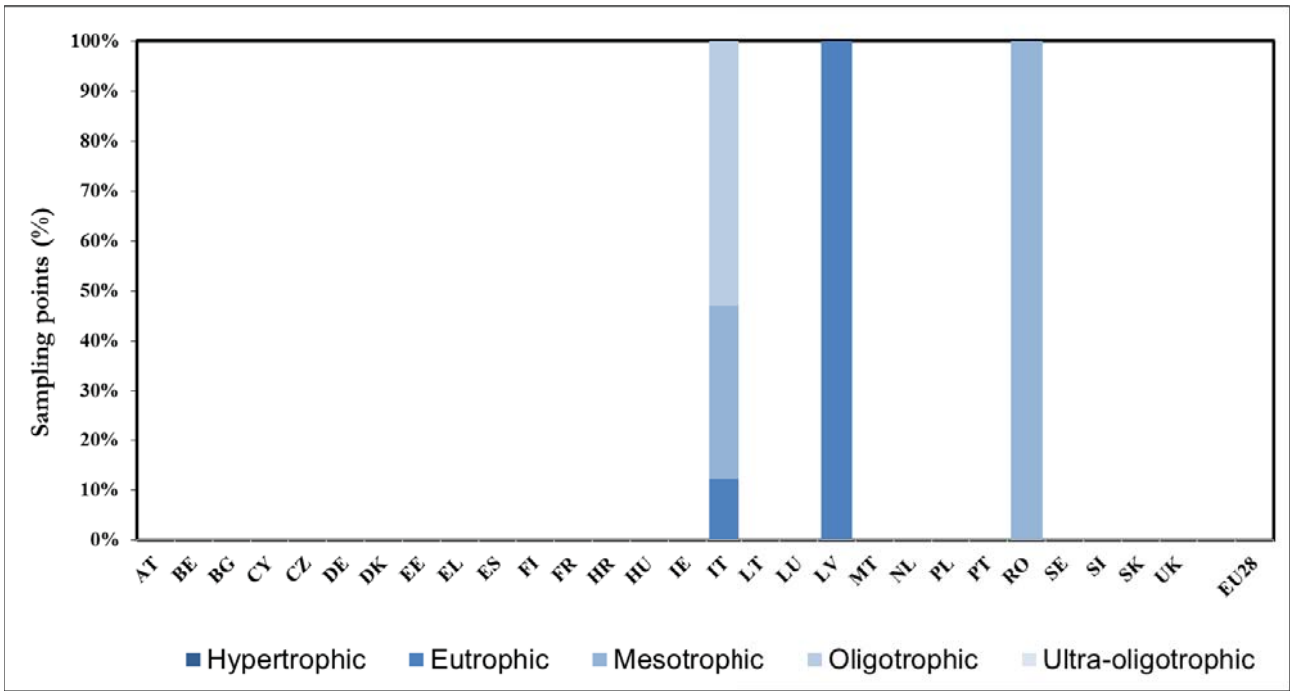

Figure 16. *Frequency diagram of trophic status classes of marine waters in reporting period 2012-2015.*

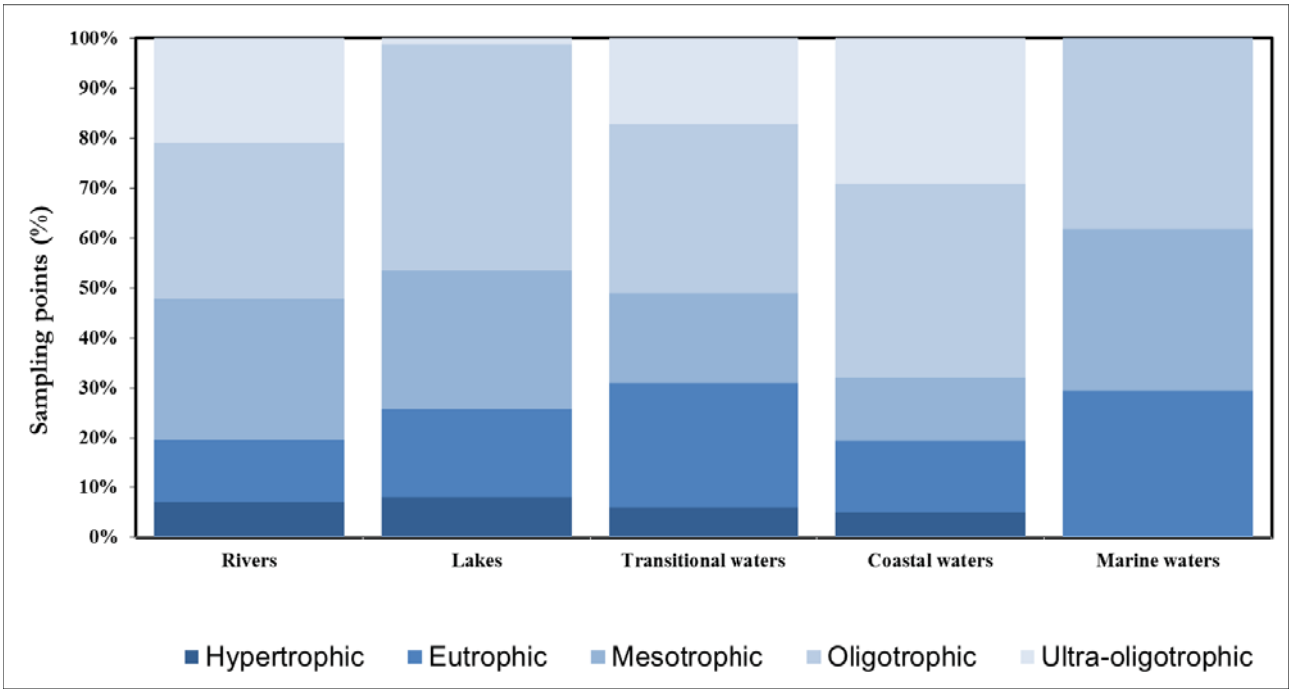

Figure 17. *Frequency diagram of trophic status classes of different water types in reporting period 2012-2015. Note that the number of underlying Member States is different per water type (Annex 2).*