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Subject:	COMMISSION STAFF WORKING DOCUMENT Member State country fiche 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 2020-2023

Delegations will find attached document SWD(2026) 232 final - Part 8/27.

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PART 8/27

COMMISSION STAFF WORKING DOCUMENT

Member State country fiche
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 2020–2023

Estonia

Country staff working document
on the implementation of the Nitrates Directive

Period: 2020-2023

Contents

1. KEY FINDINGS AND RECOMMENDATIONS

Estonia submitted its report under the Nitrates Directive for the period 2020-2023 in September 2024 ([1]) via electronic reporting on Reportnet 3 portal ([2]).

This country staff working document is presented in line with the reporting guidelines and it is based on the data reported by the Member State ([3]), Eurostat and other EU official data sources. The Estonian authorities were consulted for factual correctness. There may be differences with the information presented in their national report ([4]).

The numbers presented below are indicators of the situation in the Member State but need further interpretation to draw specific conclusions. In some cases, changes in the monitoring networks and in methodology for assessing trophic status may complicate comparisons between reporting periods.

1.1. Key findings

Pressures from agriculture

In Estonia, the utilised agricultural area (UAA) accounts for 23% of the country's total land area, which is lower than the EU average (38%). The livestock density is 0.3 livestock units per hectare (LSU/ha) of UAA, which is lower than the EU average of 0.7 LSU/ha. Estonia did not report the gross nitrogen and phosphorus balances to Eurostat for the period 2020-2023.

Monitoring network

For groundwater, the density of the monitoring network is around 8 stations per 1 000 km^2, which is higher than the EU average (8 stations). Compared to the previous reporting period, the density decreased by 1%.

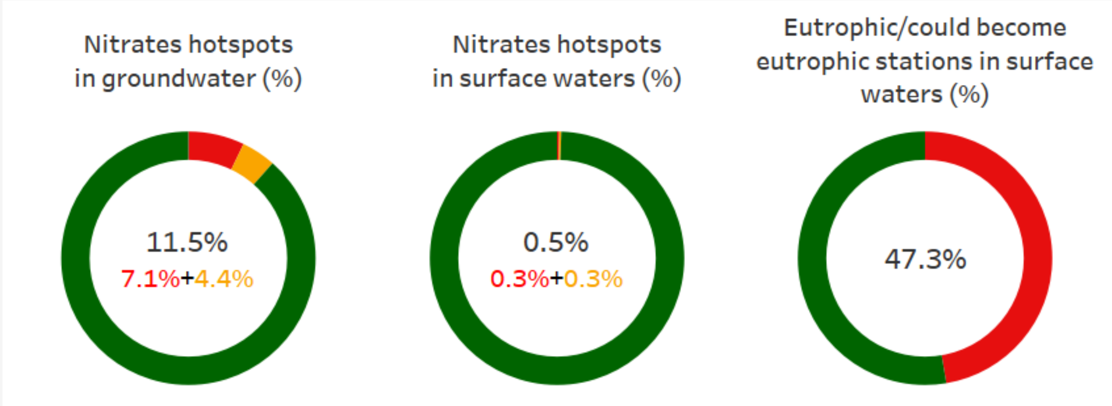
For surface freshwater, the density of the monitoring network is around 7 stations per 1 000 km^2, which is similar to the EU average (7 stations). Compared to the previous reporting period, the density increased by 18%. The monitoring network includes river and lake/water reservoir stations.

For surface saline waters, the monitoring network includes coastal waters and for the first time stations in marine waters.

([1]) Final version was received in March 2025.
([2]) Reportnet 3 is an e-Reporting platform for reporting environmental and climate data to the European Environment Agency (EEA).
([3]) Only monitoring points electronically reported with nitrate concentration or tropic status, which were not removed from the monitoring network were considered for this assessment.
([4]) A uniform data-processing approach is applied to all Member States. In some instances this may not fully correspond to the specific methodology used in the Member State.

Water quality

Figure 1 – Share of monitoring points showing pollution in groundwater and surface waters



Note: The percentage share of **nitrate hotspots** refers to monitoring points with average annual nitrate concentrations ≥ 50 mg/l (red), or between 37.5 and 49.99 mg/l with an increasing trend (orange). This is calculated relative to the total number of points with measurements. The percentage share of monitoring points classified as **eutrophic or could become eutrophic** (red) is calculated relative to the total number of points with trophic status reported.

In groundwater, 92.9% of monitoring points show nitrate concentrations below 50 mg/l.

Overall, 11.5% of monitoring points fall in two categories illustrated in Figure 1, i.e., they show nitrate concentrations ≥ 50 mg/l (7.1%) or between 37.5 and 49.99 mg/l with an increasing trend (4.4%). Compared to the data reported in the previous period, this represents an increase of 3.9 percentage points (from 7.6% to 11.5%).

Compared to the previous reporting period, nitrate concentrations decreased in 10.7% of groundwater monitoring points and increased in 24.6%. Among points with nitrate concentration ≥ 50 mg/l, increases (84.0%) were also more frequent than decreases (8.0%).

In surface water, 99.7% of monitoring points show nitrate concentrations below 50 mg/l and 52.7% are classified as non-eutrophic.

Overall, 0.5% of monitoring points fall in two categories illustrated in Figure 1, i.e. they show nitrate concentrations ≥ 50 mg/l (0.3%) or between 37.5 and 49.99 mg/l with an increasing trend (0.3%). Compared to the data reported in the previous period, this represents an increase of 0.2 percentage points (from 0.3% to 0.5%). 15% of surface water monitoring stations show nitrate concentrations ≥ 10 mg/l, which is relevant for eutrophication.

Compared to the previous reporting period, nitrate concentrations decreased in 11.3% of surface water monitoring points and increased in 30.6%

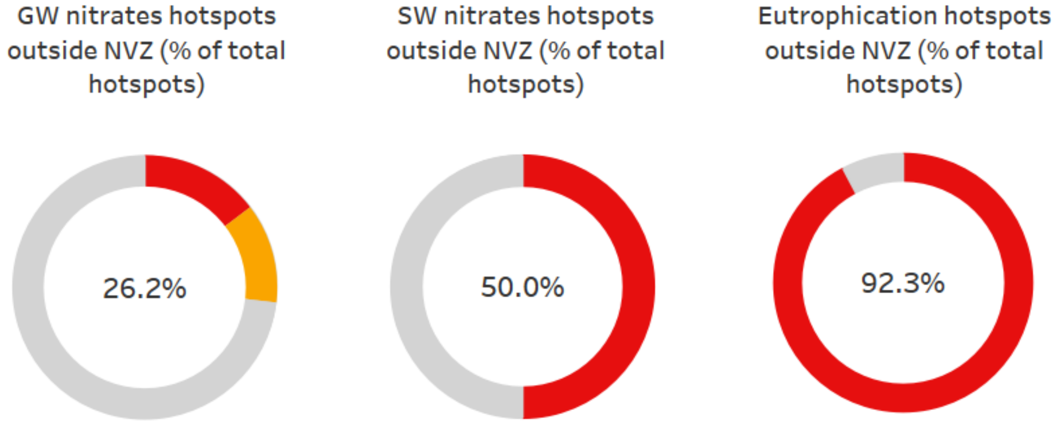
The share of monitoring points reported as eutrophic/could become eutrophic is 47.3% as illustrated in Figure 1. This represents an increase of 3.7 percentage points compared to the data reported in the previous reporting period (from 43.7% to 47.3%).

Nitrate Vulnerable Zones

Estonia did not change the Nitrate Vulnerable Zones (NVZ) during the reporting period. The area of NVZ covers 13.5% of utilised agricultural area.

In Estonia, some monitoring points showing pollution are located outside NVZ. Figure 2 reflects that 26.2% of groundwater monitoring points showing nitrates pollution (11 out of 42), 50.0% of surface water monitoring points showing nitrates pollution (1 out of 2) and 92.3% of eutrophic/could become eutrophic points in surface waters (156 out of 169) are located outside NVZ ([5]).

Figure 2 – Share of monitoring points showing pollution located outside Nitrate Vulnerable Zones (NVZ) relative to the total number of points showing pollution



Note: The percentage share of **nitrate hotspots outside NVZ** refers to monitoring points with average annual nitrate concentrations ≥ 50 mg/l (red), or between 37.5 and 49.99 mg/l with an increasing trend (orange), located outside NVZ. This is calculated relative to the total number of nitrate hotspots. The percentage share of **eutrophication hotspots outside NVZ** (red) is calculated as number of monitoring points classified as eutrophic/could become eutrophic, located outside NVZ, relative to the total number of points reported as eutrophic/could become eutrophic. Hotspots inside NVZ are shown in grey.

Action Programme

Estonia modified its action programme during the reporting period. Amendments addressed the incorporation period for manure on fields, storage facilities for manure and spreading plans for liquid manure.

1.2. Recommendations

- Review and where necessary reinforce measures to improve water quality, notably with a view to addressing:
  - high or increasing nitrate concentrations in groundwaters
  - high or increasing nitrate concentrations in surface waters
  - eutrophication of coastal and marine waters
- Review and where necessary update the designation of Nitrate Vulnerable Zones to ensure that the designated zones include all areas with significant agricultural pressure that drain into:

[5]) 46 of these eutrophic/could become eutrophic monitoring points are located in coastal or marine waters.

    - nitrate pollution hotspots in groundwaters
    - waters that are eutrophic
- Close existing data gaps on nutrient balances in the reporting to Eurostat
- When preparing the Nitrates Action Programme and designating Nitrate Vulnerable Zones:
    - take into account objectives and deadlines of the Water Framework Directive, ensuring coherence with the 4th RBMP
    - consider introducing limitations on phosphorus fertilisation, if not yet implemented
    - ensure the cooperation between competent authorities in different sectors, such as agriculture and water, and with stakeholders
    - consider where measures could be simplified without compromising on results, working with the Commission and the other member States in the light of the findings of the evaluation of the Nitrates Directive
- Promote the dissemination of best practice, scientific knowledge and innovation to:
    - improve the analysis of expected future evolution in water quality and develop gap assessments for the nutrient load reductions required to reach water quality objectives
    - accelerate preparedness and resilience of action programmes and measures in the context of climate change

2. PRESSURES FROM AGRICULTURE

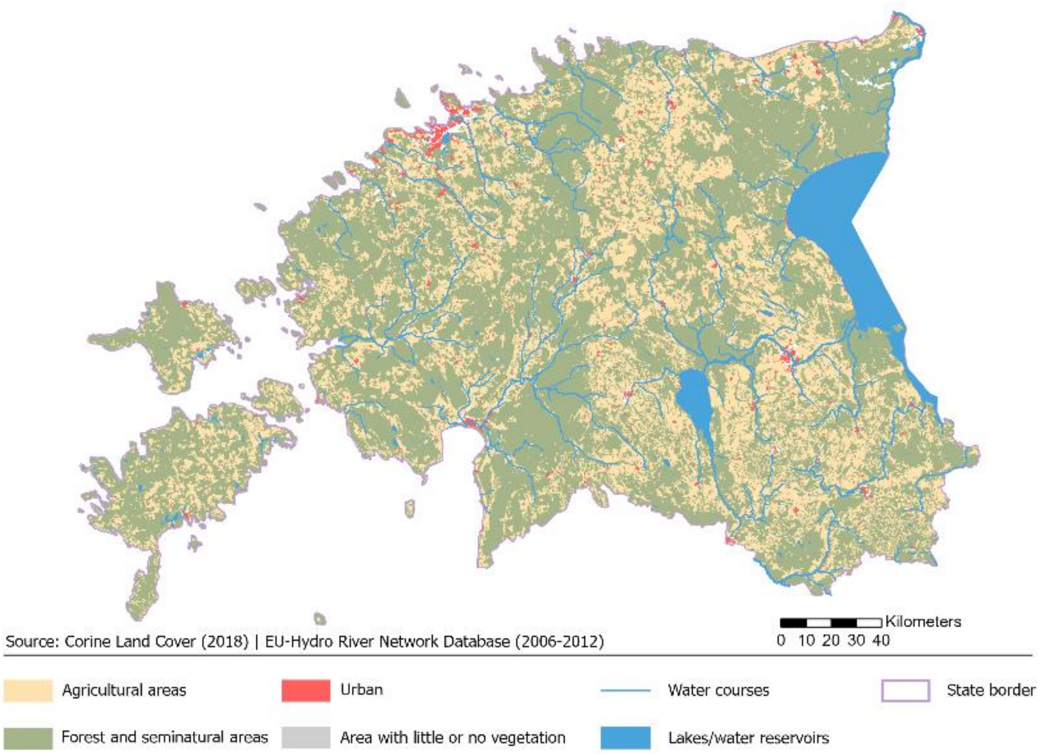
In Estonia, crop production accounted for the largest portion of the agricultural sector's total output value at 47.3% in the reporting period 2020-2023. Animal production followed with 42.7%, and other outputs made up 10.0% ([6]). The share of agricultural land used for organic farming increased from 20.3% in the reporting period 2016-2019 to 22.9% in the reporting period 2020-2023 ([7]).

The risk of diffuse pollution of waters by nutrients from agriculture is primarily dependent on the agricultural pressures in the Member State, expressed in terms of utilised agricultural area (UAA), livestock density, the use of mineral and manure fertilisers, as well as the nitrogen and phosphorus balance. This section describes the evolution of these indicators.

2.1. Land use

The map below presents the distribution of land use in Estonia along with watercourses and lakes/water reservoirs.

Figure 3 – Land use distribution in Estonia



([6]) Source: Eurostat (aact_eaa01)
([7]) Source: Eurostat (ef_m_org)

The utilised agricultural area (UAA) in Estonia covered 1.0 million hectares in 2023, accounting for 22.7% of the country's total land area. Arable land accounts for 72.3% of UAA, followed by permanent grassland at 27.3% and permanent crops at 0.3%.

Table 1 – Evolution of the utilised agricultural area

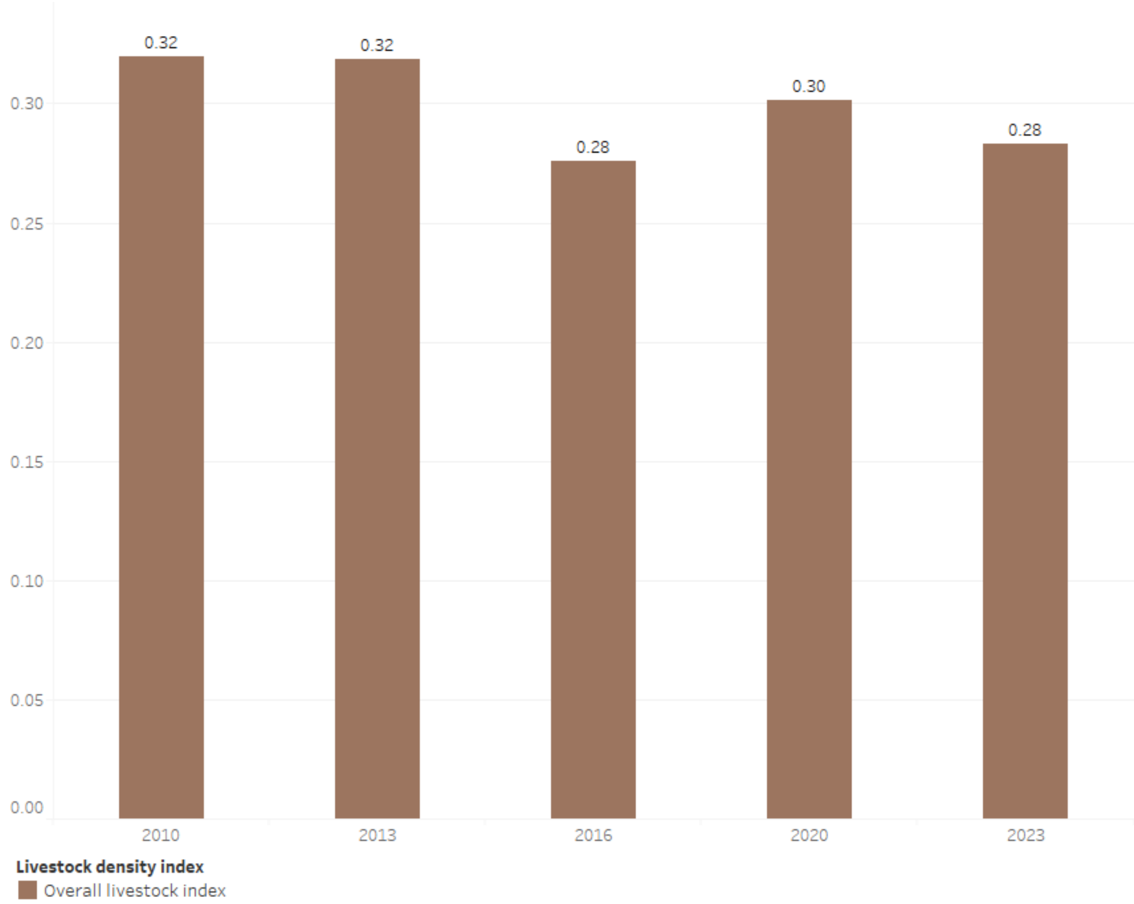
	2010	2013	2016	2020	2023
utilised agricultural area (1000 ha)	941	958	995	975	978
arable land (1000 ha)	640	628	687	693	707
permanent grassland (1000 ha)	296	325	304	278	267
permanent crops (1000 ha)	3	3	3	4	3
kitchen gardens (1000 ha)	2	1	1	1	1

Source: Eurostat (ef_lus_main)

2.2. Livestock density

In Estonia the livestock density was 0.28 livestock units per hectare (LSU/ha) of UAA in 2023. The livestock density has decreased since 2010.

Figure 4 – Evolution of the livestock density (LSU/ha UAA)



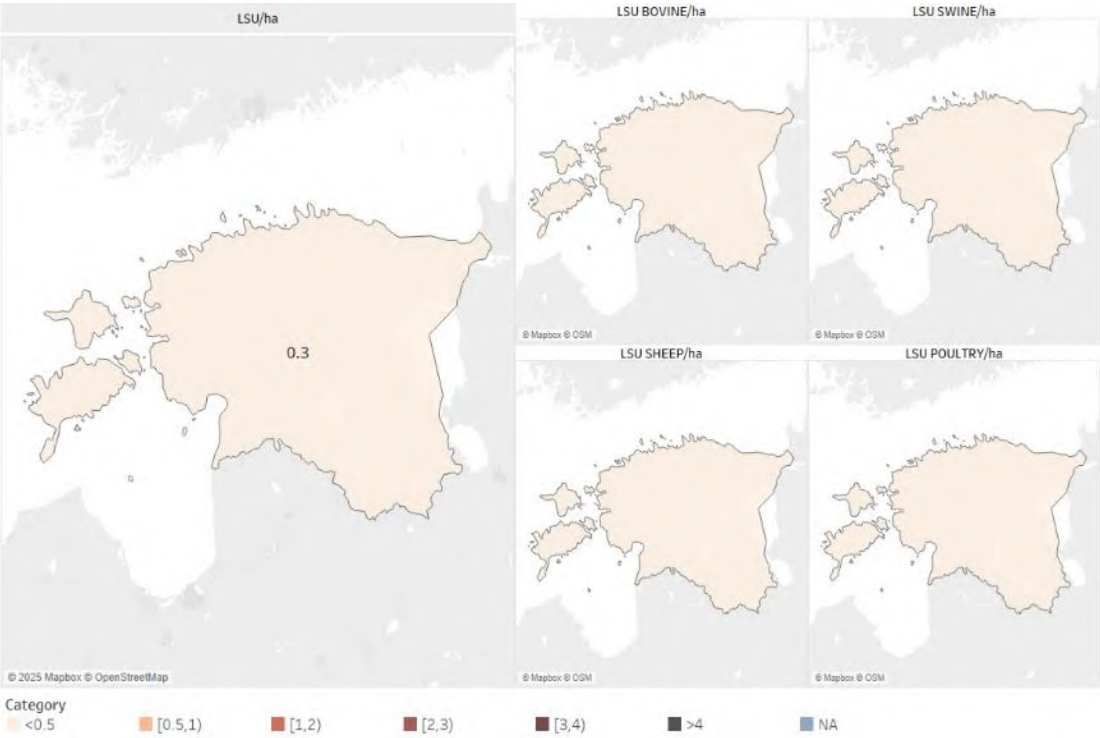
Source: Eurostat (ef_fsi_lskds)

Table 2 – Evolution of the livestock numbers by animal type

	2007	2010	2013	2016	2020	2023
live bovines (Million heads)	0.24	0.24	0.26	0.25	0.25	0.24
of which dairy cows (Million heads)	0.10	0.10	0.10	0.09	0.08	0.08
live pigs (Million heads)	0.37	0.37	0.36	0.27	0.32	0.27
live poultry (Million heads)	NA	1.94	2.10	1.90	2.10	2.13
live sheep (Million heads)	NA	0.08	0.08	0.09	0.07	0.06
live goats (Million heads)	0.00	NA	NA	NA	NA	NA

Source: Eurostat, for live poultry and live sheep data complemented with FAOSTAT

Figure 5 – Livestock density distribution by animal type (LSU/ha UAA) at NUTS2 level in 2020 (8)



Source: Eurostat (Livestock units: ef_lsk_main; Utilised agricultural area: ef_lus_main)

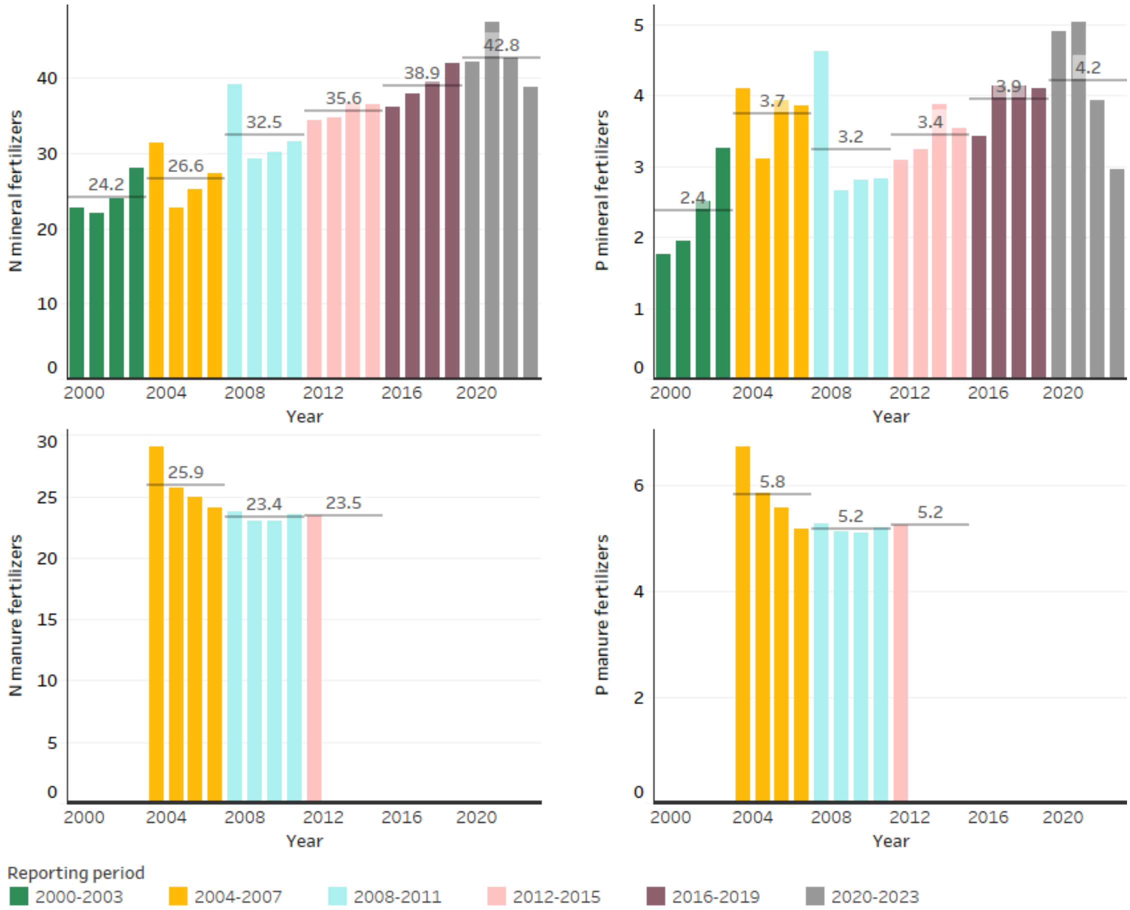
(8) Latest available data.

2.3. Nitrogen and phosphorus fertiliser use

In Estonia, the use of **nitrogen (N) fertilisers** was 42.8 kg/ha UAA for mineral fertilisers in 2020-2023 and 23.5 kg/ha UAA for manure fertilisers in 2012 (9). The use of mineral fertilisers has increased by 3.9 kg/ha UAA. No data on the use of manure fertilisers were reported to Eurostat since 2013 (10).

The use of **phosphorus (P) fertilisers** was 4.2 kg/ha UAA for mineral fertilisers in 20202-2023 and 5.2 kg/ha UAA for manure fertilisers in 2012 (11). The use of mineral fertilisers increased by 0.3 kg/ha UAA since the last reporting period. No data on the use of manure fertilisers were reported to Eurostat since 2013 (12).

Figure 6 – Evolution of nitrogen and phosphorus fertiliser use (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

(9) According to the most recent values reported to Eurostat.
(10) Additional data were included in the national report.
(11) According to the most recent values reported to Eurostat.
(12) Additional data were included in the national report.

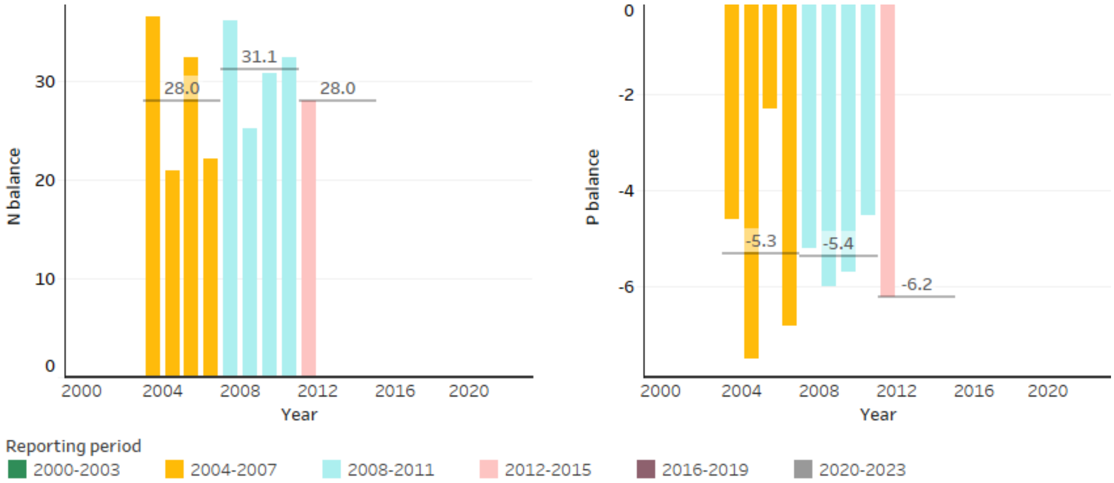
2.4. Nitrogen and phosphorus balance

The nutrient balance ([13]) per hectare of agricultural land (kg/ha UAA) is an indicator of the success that farmers have had in implementing balanced fertilisation and of the resulting nutrient pressure from agriculture. A high surplus (positive balance) indicates a risk of emissions into water and air.

In Estonia, the **gross nitrogen (N) balance** was 28.0 kg/ha UAA in 2012. No data were reported to Eurostat since 2013 ([14]).

The **gross phosphorus (P) balance** was -6.2 kg/ha UAA in 2012. No data were reported to Eurostat since 2013 ([15]).

Figure 7 – Evolution of gross nitrogen and phosphorus balance (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

2.5. Nitrogen discharge to the environment

Estonia provided information that the nitrogen losses from agriculture to environment were 54.7 kilotonnes during the reporting period 2016-2019 and 58.4 kilotonnes during the reporting period 2020-2023. The agricultural sector's contribution to the country's total nitrogen loss increased from 92% to 92.3%.

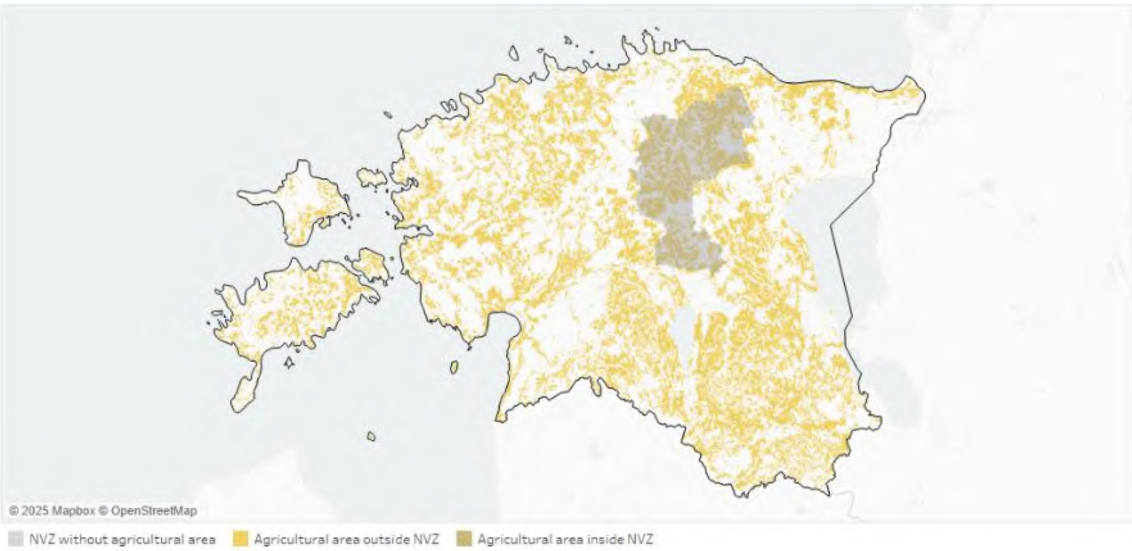
([13]) Gross nutrient balance (aei_pr_gnb)
([14]) Additional data were included in the national report.
([15]) Additional data were included in the national report.

3. NITRATE VULNERABLE ZONES

In line with Article 3 paragraph 2, Estonia designates nitrate vulnerable zones (NVZ) as all known areas of land in its territories which drain into the waters identified as polluted or at risk of being polluted and which contribute to pollution. Action programmes with mandatory measures are implemented in NVZ to reduce and prevent water pollution. The Nitrates Directive requires that the Member State reviews and if necessary, revise or add to the designation of vulnerable zones as appropriate, and at least every four years, to take into account changes and factors unforeseen at the time of the previous designation.

Since the establishment of the NVZ in 2003, its borders have not been changed, and no new areas have been designated. The main reason why the borders of the NVZ have not been changed is that most of the water protection restrictions apply to the whole of Estonia. The map below shows the current NVZ designation relative to the agricultural area. The designated areas cover 7.2% of territory and 13.5% of UAA. In 2023 the Ministry of Climate commissioned a study on amending the NVZ.

Figure 8 – Distribution of the Nitrates Vulnerable Zones (NVZ) and agricultural area



Note: Based on CORINE Land Cover data with simplified detail; some smaller agricultural areas may not appear.

4. NITRATES IN GROUNDWATER

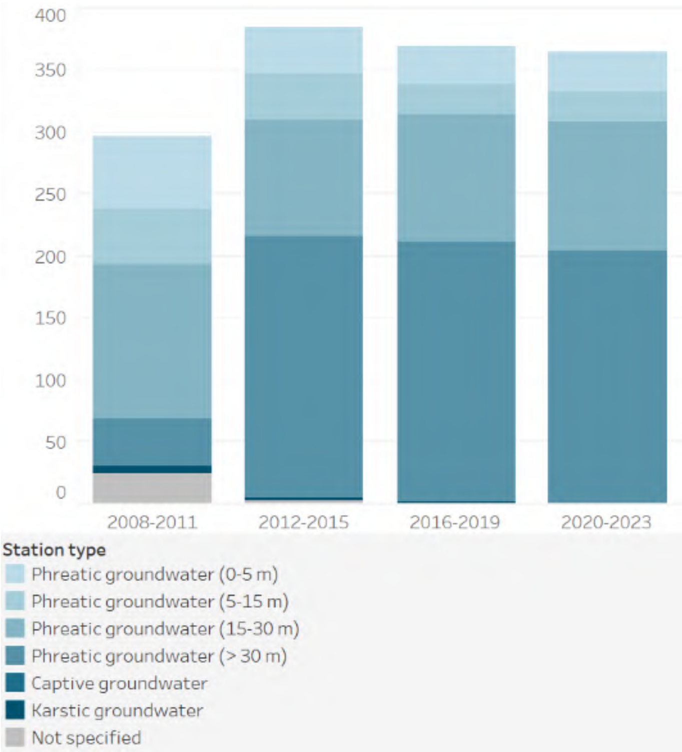
4.1. Monitoring of nitrate concentrations in groundwater

In Estonia, groundwater is monitored under the groundwater monitoring sub-programme of the national environmental monitoring programme established in accordance with the Water Framework Directive. The monitoring of groundwater covers the chemical and quantitative status of all 31 bodies of groundwater in Estonia. Given the higher agricultural pressure in the NVZ, the density of the network is higher in designated NVZ areas where sampling is performed up to four times a year (only once a year for groundwater bodies located outside NVZ areas).

During the reporting period 2020-2023 nitrate concentrations were reported at 365 groundwater monitoring points. The station density was 8.1 stations per 1 000 km^2. Of these monitoring points, 34.8% of monitoring points were located within NVZ and 65.2% outside NVZ.

The overall number of monitoring points decreased by 4 (1.1%) compared to the previous reporting period. The total number of groundwater monitoring points has increased strongly from 2008-2011 to 2012-2015 and has since decreased steadily. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 9 – Evolution of groundwater monitoring network (monitoring points with measurements of nitrates)



In this reporting period, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for 337 monitoring points, accounting for 92.3% of all points with measurements. The share of monitoring points with trends increased compared to the previous reporting period, which was 90.0% in reporting period 2016-2019. The table below presents the number of monitoring points with measurements and trends in the last four reporting periods.

Table 3 – Number of groundwater monitoring points with measurements of nitrates and trends by station type (16)

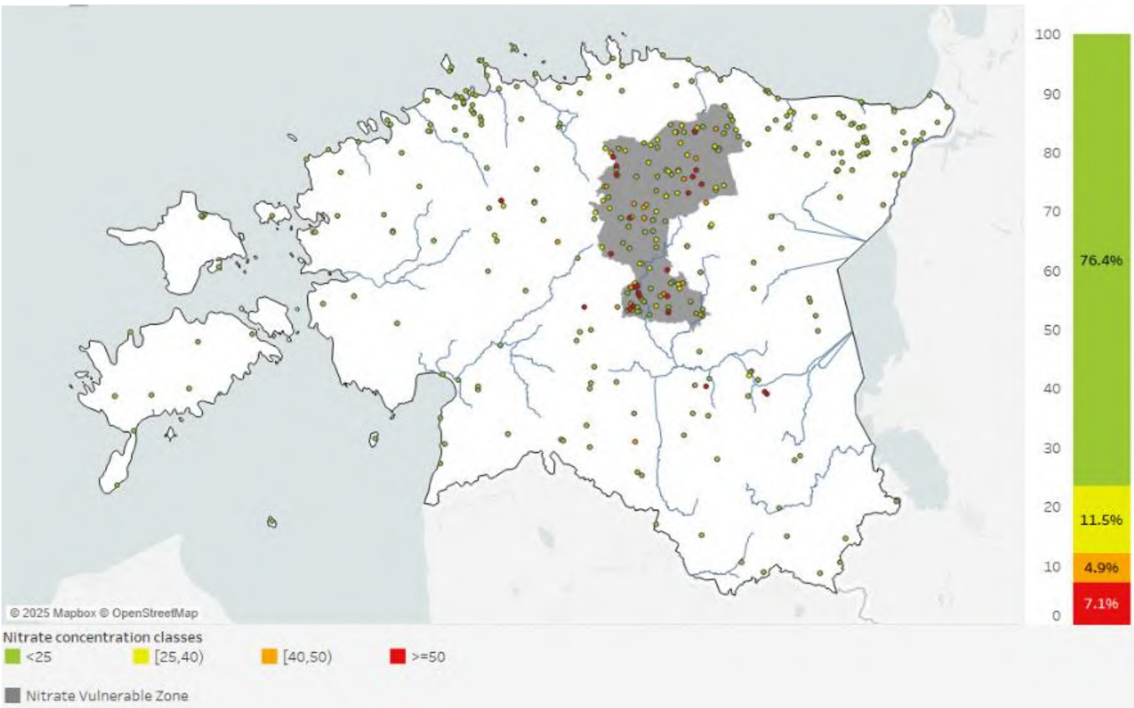
	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Phreatic groundwater (0-5 m)	59	38	31	32	16	24	28	31
Phreatic groundwater (5-15 m)	45	37	24	24		10	22	22
Phreatic groundwater (15-30 m)	124	94	102	105	13	59	92	95
Phreatic groundwater (> 30 m)	38	211	210	204	10	11	188	189
Captive groundwater								
Karstic groundwater	6	2	2		5	2	2	
Not specified	25	3			1	2		
Total	297	385	369	365	45	108	332	337

(16) Estonia reported that monitoring was discontinued in 32 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

4.2. Nitrate concentrations in groundwater

In Estonia, 7.1% of groundwater monitoring points showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 4.9% had concentrations between 40-49.99 mg/l, 11.5% showed concentrations between 25-39.99 mg/ and 76.4% below 25 mg/l. The figure below shows a spatial distribution of the average nitrate concentrations and the shares in corresponding nitrate concentration classes.

Figure 10 – Map of average annual mean nitrate concentrations in groundwater and share of monitoring points by nitrate concentration class in the reporting period 2020-2023



Note: In the map, monitoring points with higher values are plotted on top.

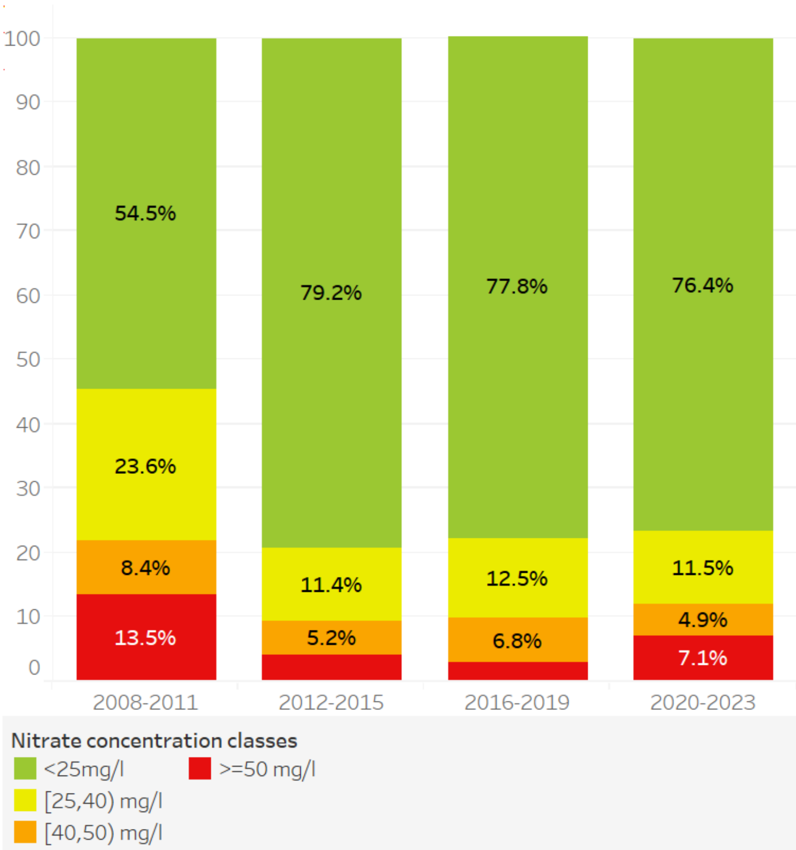
The station type category with the highest share of points with nitrate concentrations equal to or above the drinking water threshold of 50 mg/l was phreatic groundwater at depth 0-5m with a share of 25.0%, as shown in the table below.

Table 4 – Share of groundwater monitoring points by nitrate concentration class (mg/l) in the reporting period 2020-2023, categorised by station type

	Number of stations	% of Total	<25	[25,40)	[40,50)	>=50
Phreatic groundwater (0-5 m)	32	8.8%	28.1%	34.4%	12.5%	25.0%
Phreatic groundwater (5-15 m)	24	6.6%	79.2%	16.7%	4.2%	
Phreatic groundwater (15-30 m)	105	28.8%	58.1%	19.0%	10.5%	12.4%
Phreatic groundwater (> 30 m)	204	55.9%	93.1%	3.4%	1.0%	2.5%
Captive groundwater						
Karstic groundwater						
Total	365	100.0%	76.4%	11.5%	4.9%	7.1%

Compared to the previous reporting period, the share of monitoring points with concentration ≥ 50 mg/l increased from 3.0% to 7.1%. The graph below presents the share of monitoring points per classes of nitrate concentrations in the last four reporting periods.

Figure 11 – Share of monitoring points in groundwater by class of nitrate concentration (17) in the current and previous reporting periods

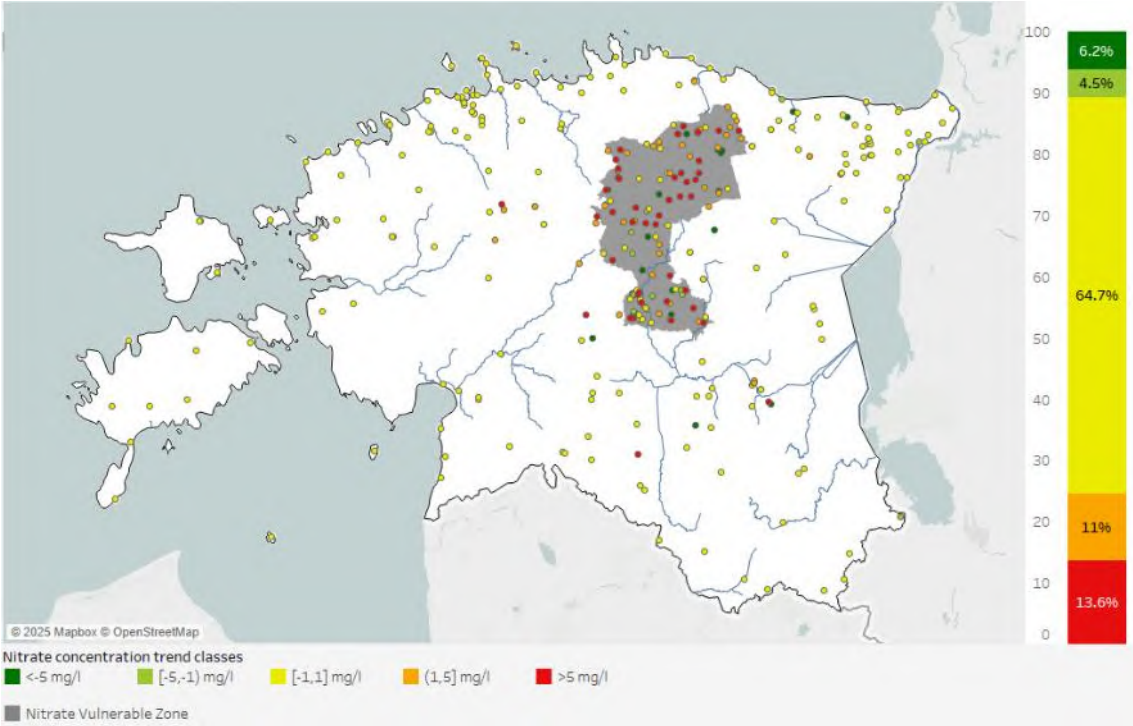


(17) Average of annual mean values over the reporting period.

4.3. Trends in nitrate concentrations in groundwater

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 10.7% of monitoring points and an increase in 24.6%. For the remaining 64.7% there was no significant change. The increase or decrease can be categorised as weak if it is between 1 and 5 mg/l, and as strong if it is above 5mg/l.

Figure 12 – Map of trends in average annual mean nitrate concentrations ([18]) in groundwater between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



Note: In the map, monitoring points with higher values are plotted on top.

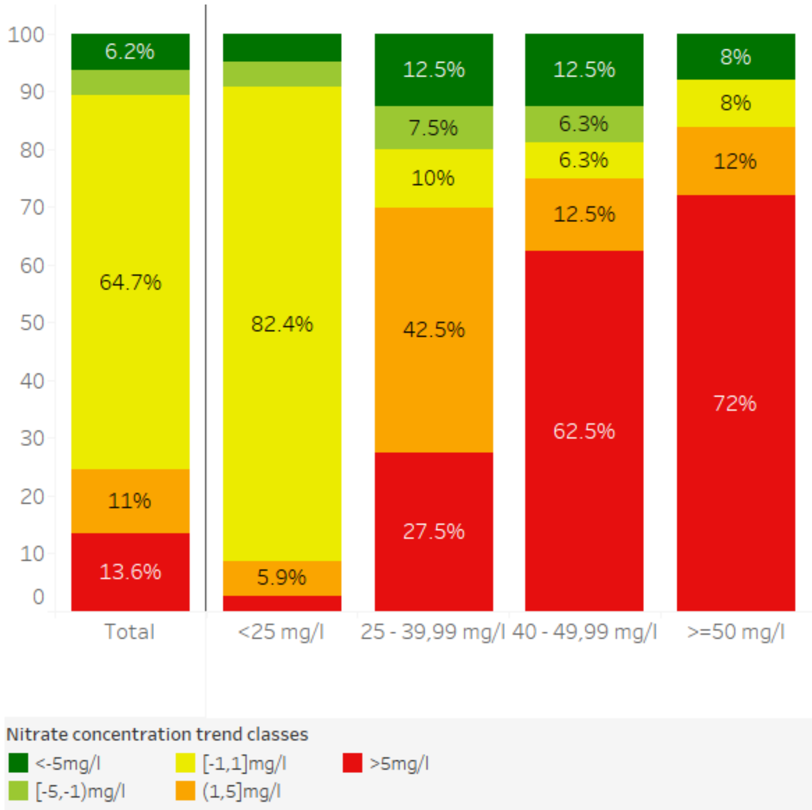
Table 5 – Share of groundwater monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type

	Total Number of Stations	% Total Number of Stations	<-5	[-5,-1)	[-1,1]	(1,5]	>5
Phreatic groundwater (0-5 m)	31	9.2%	6.5%	6.5%	9.7%	38.7%	38.7%
Phreatic groundwater (5-15 m)	22	6.5%	4.5%	9.1%	54.5%	18.2%	13.6%
Phreatic groundwater (15-30 m)	95	28.2%	18.9%	9.5%	33.7%	13.7%	24.2%
Phreatic groundwater (>30 m)	189	56.1%		1.1%	90.5%	4.2%	4.2%
Captive groundwater							
Karstic groundwater							
Total	337	100.0%	6.2%	4.5%	64.7%	11%	13.6%

([18]) The average of annual mean values of nitrate concentrations over the reporting period 2020-2023 compared to the average for the reporting period 2016-2019.

When looking at the trend for waters that are polluted in the current reporting period (equal to or above 50 mg/l), there has been an increase of nitrate concentration for 84.0% and a decrease for 8.0% between the previous and the current reporting periods. The graph below shows the increase (in red and orange) and decreases (in green) per nitrate concentration class.

Figure 13 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, across different nitrate concentration classes (<24.99 mg/l, 25-39.99 mg/l, 40-49.99 mg/l and ≥50mg/l) ([19])

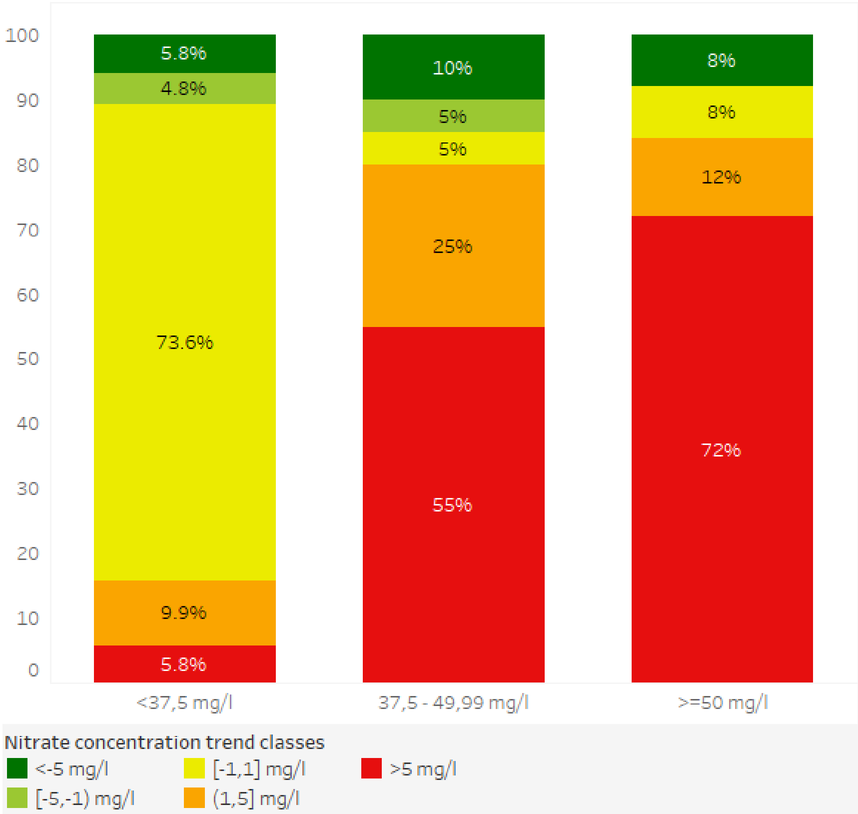


Note: The percentages below 5% are not labelled.

([19]) Nitrate concentration classes as per the Nitrates Directive report.

To better align the water quality assessment with the thresholds defined under the Groundwater Directive, trends were also calculated for the water quality class with nitrate concentrations between 37.5-49.99 mg/l. When looking at the trend in this concentration category, there has been an increase of nitrate concentration for 80.0% and a decrease for 15.0% of monitoring points.

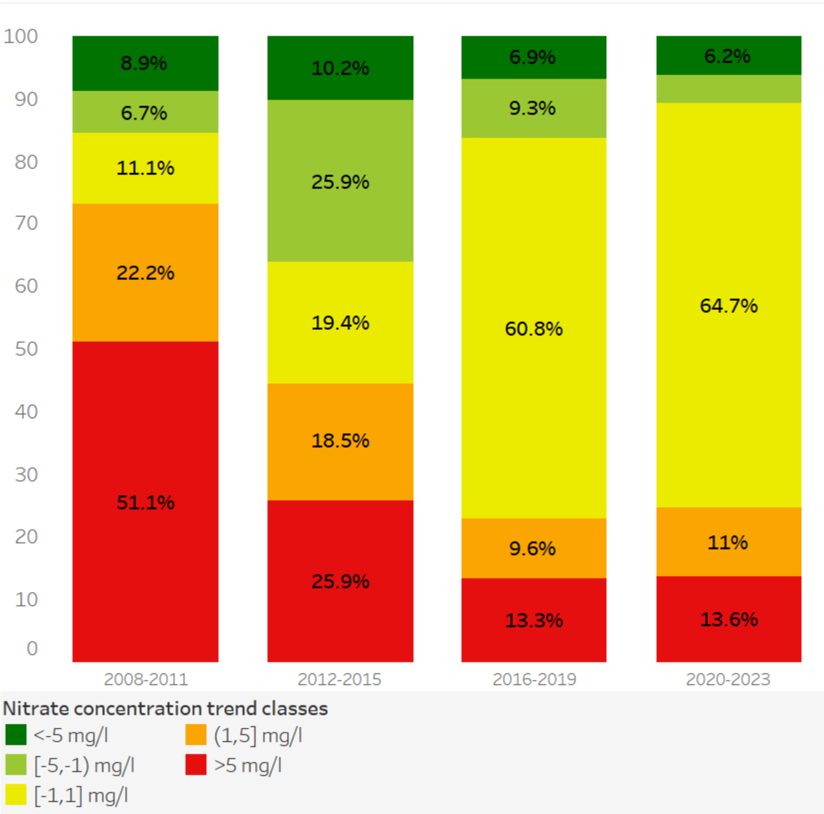
Figure 14 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, in different nitrate concentration classes (<37.5 mg/l, 37.5-49.99 mg/l and ≥50mg/l) ([20])



([20]) Nitrate concentration classes as in the Water Framework Directive guidance on GW status and trend assessment as division of nitrates quality standard (50mg/l and 75 % of this value [37.5 mg/l]).

Compared to the previous reporting period, there is a lower share of monitoring points with decreasing nitrate concentrations (10.7% in the current reporting period compared to 16.2% in the previous reporting period) and a higher share of monitoring points with increasing nitrate concentrations (24.6% compared to 22.9%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 15 – Share of groundwater monitoring points by class of nitrate concentration trend [21] in the current and previous reporting periods

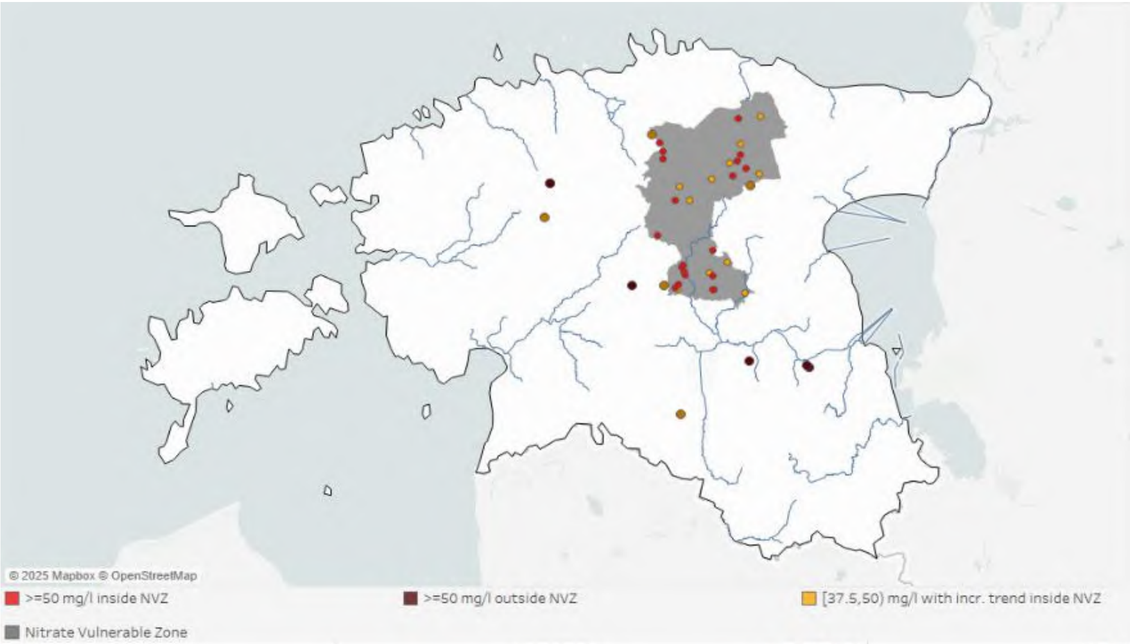


[21] Change in average annual mean nitrate concentrations compared to the previous reporting period.

4.4. Nitrate pollution hotspots in groundwater

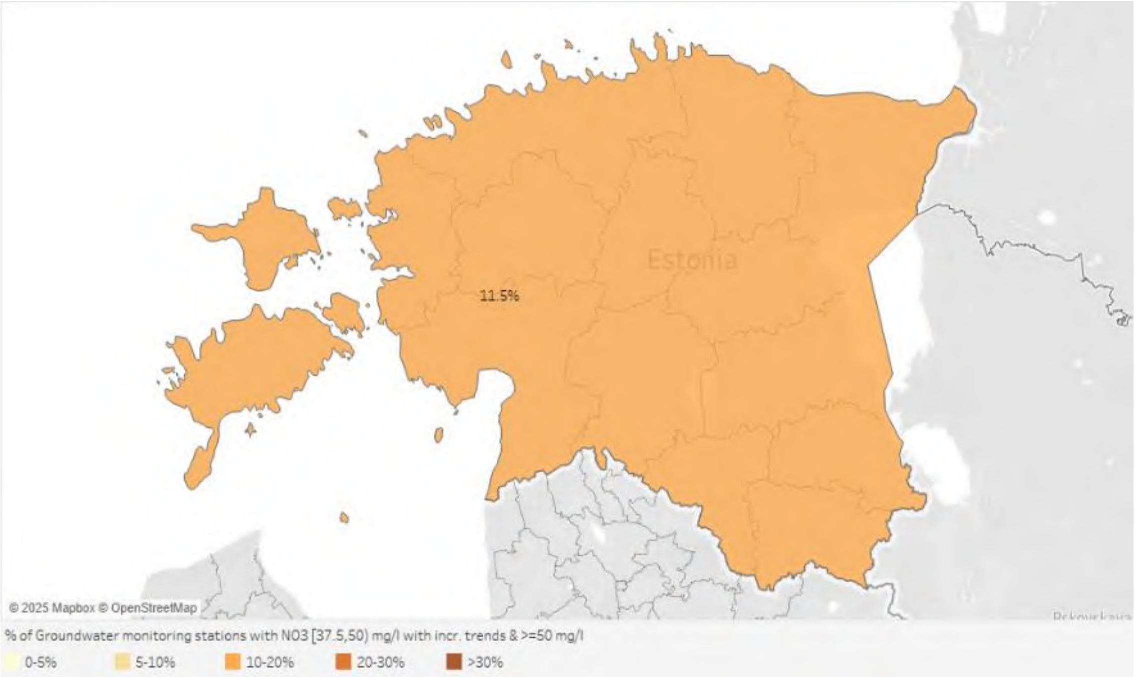
A nitrate pollution hotspot in groundwater is defined here as a monitoring point where the average annual nitrate concentration is either ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. In Estonia there are 42 groundwater nitrate pollution hotspots, of which 11 are outside NVZ, accounting for 26.2% of all groundwater nitrate pollution hotspots.

Figure 16 – Groundwater nitrate pollution hotspots (map) and their distribution inside and outside Nitrate Vulnerable Zones (table)



		inside NVZ	outside NVZ	Total
Groundwater	[37.5,50) with incr. trend	11	5	16
	>=50	20	6	26
Total		31	11	42

Figure 17 – Share of groundwater nitrate pollution hotspots at NUTS2 level



5. NITRATES IN SURFACE WATERS

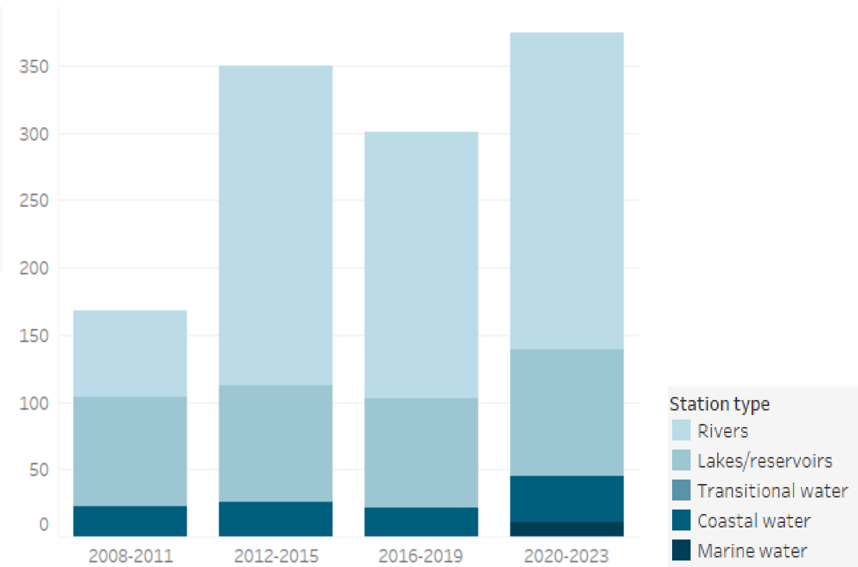
5.1. Monitoring of nitrate concentrations in surface waters

Status monitoring, conducted on a rotational basis by the Environmental Agency once every six years, is carried out on all major flowing and standing surface water bodies as well as coastal waters. This surveillance monitoring, as defined by the Water Framework Directive (WFD), determines the ecological and/or chemical status of the water bodies. Trends, on the other hand, are estimated annually at continuous monitoring stations, where sampling frequencies range from one to twelve times per year. For lakes, status monitoring is performed every six years for bodies larger than 50 hectares, with the exception of two main lakes (Lake Peipus and Lake Võrtsjärv) which are monitored annually. Additionally, a selection of small lakes is included in continuous monitoring programs. Coastal water bodies are subject to either continuous or status monitoring, depending on their vulnerability to nitrate pollution. Marine waters have been monitored for the first time during this reporting period (2020-2023), meaning no trends could be calculated. Monitoring in small lakes and coastal waters occurs only during the vegetation period.

During the reporting period 2020-2023 nitrate concentrations were reported at 375 surface water monitoring points. Among these, 62.9% were in rivers, 25.1% were in lakes or reservoirs, and 12.0% were in saline waters. The freshwater monitoring points density was 7.3 stations per 1 000 km^2. Of these monitoring points, 5.2% freshwater monitoring points were located within NVZ and 94.8% outside NVZ.

The overall number of monitoring points increased by 74 (24.6%) compared to the previous reporting period. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 18 – Evolution of surface water monitoring network (monitoring points with measurements of nitrates)



In this reporting period, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for 160 monitoring points, accounting for 42.7% of all points with measurements. The share of monitoring points with trends decreased compared to the previous reporting period (50.5% in reporting period 2016-2019). The table below presents the number of monitoring points and the number of monitoring points with trends in the last four reporting periods.

Table 6 – Number of surface water monitoring points with measurements of nitrates and trends per type (22)

	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Rivers	64	238	198	236	60	111	110	100
Lakes/reservoirs	81	86	82	94	5	5	26	40
Transitional water								
Coastal water	23	26	21	34	9	22	16	20
Marine water				11				
Total	168	350	301	375	74	138	152	160

(22) Estonia reported that monitoring was discontinued in 147 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

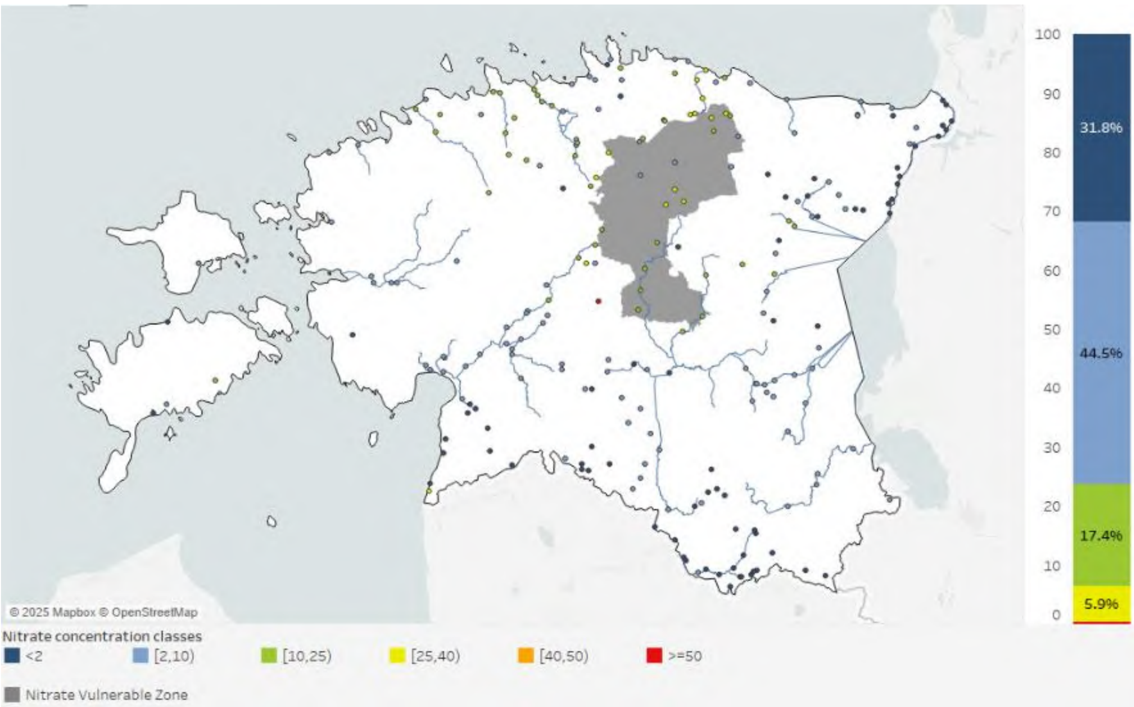
5.2. Nitrate concentrations in surface waters

Rivers

In Estonia, 0.4% of monitoring points in rivers showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 0% had concentrations between 40-49.99 mg/l, 5.9% showed concentrations between 25-39.99 mg/, 17.4% in the class 10-24.99 mg/l, 44.5% in the class 2-9.99 mg/l and 31.8% below 2 mg/l.

It is relevant to look at the distribution in nitrate concentration classes below 25 mg/l for surface water as there can be a risk of eutrophication in lower concentration classes.

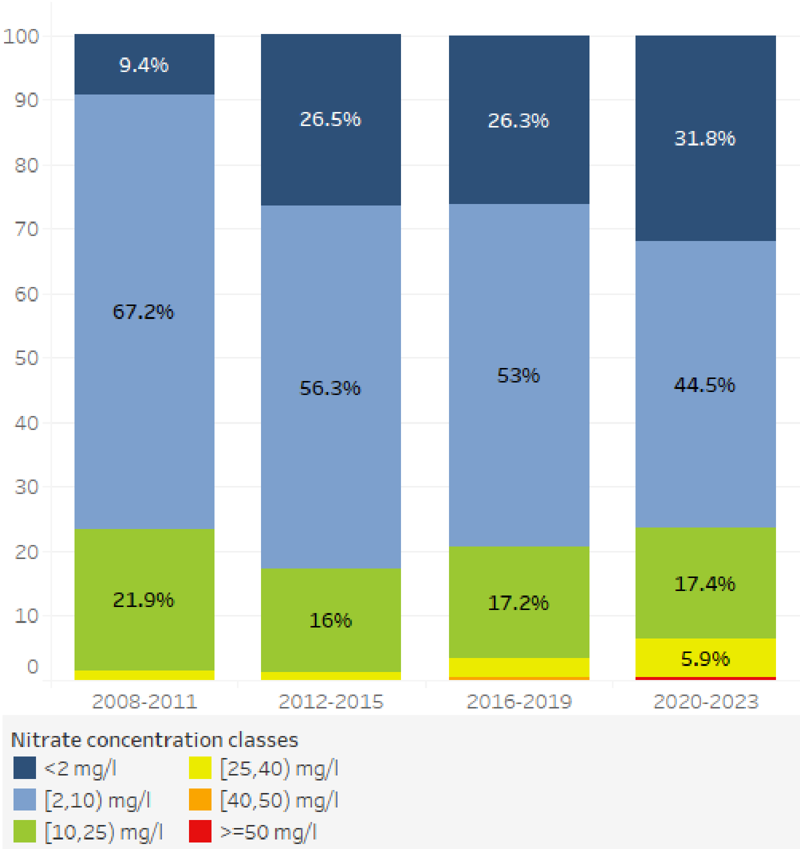
Figure 19 – Map of average annual mean nitrate concentrations in rivers and share of monitoring points by concentration class in the reporting period 2020-2023



Note: In the map, monitoring points with higher values are plotted on top. In the graph, the percentages below 5% are not labelled.

Compared to the previous reporting period, the share of monitoring points in rivers with concentrations ≥ 50 mg/l increased from 0% to 0.4%. The graph below presents the shares of monitoring points per classes of nitrate concentration in last four reporting periods.

Figure 20 – Share of monitoring points in rivers by class of nitrate concentration ([23]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

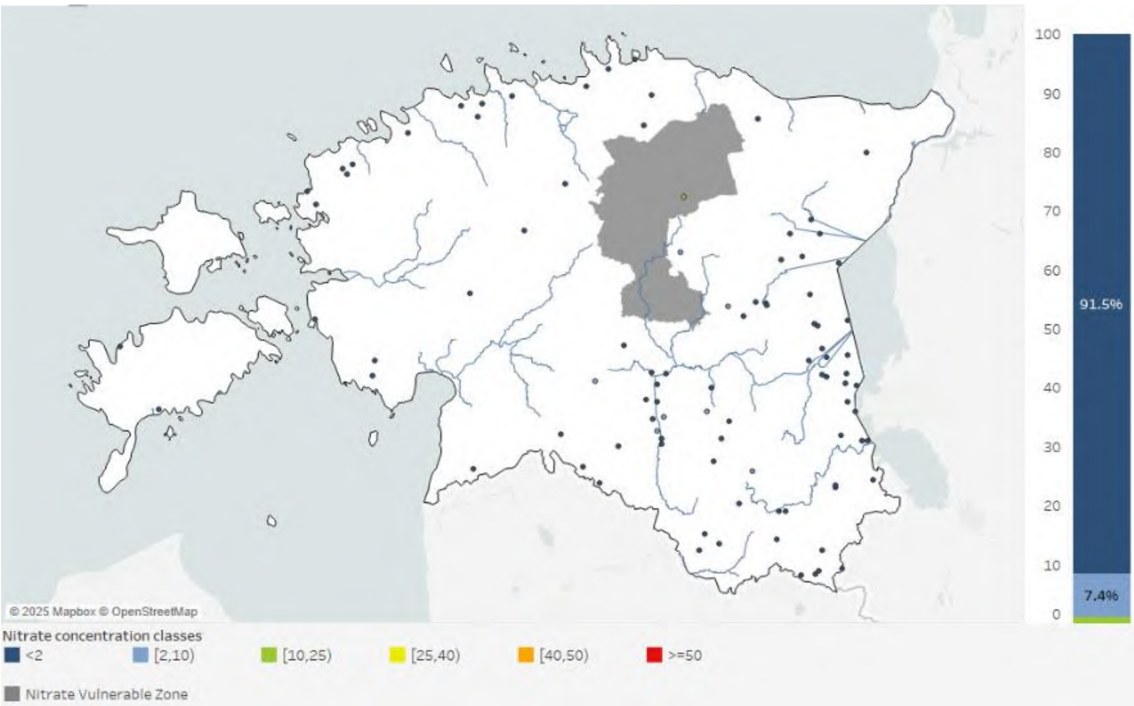
([23]) Average of annual mean values over the reporting period.

Lakes/water reservoirs

In Estonia, none of the freshwater monitoring points in lakes/water reservoirs showed average nitrate concentration equal to or above the drinking water threshold of 50 mg/l, and at or above 25 mg/l, whereas 1.1% had concentrations between 10-24.99 mg/l, 7.4% in the class 2-9.99 mg/l and 91.5% below 2 mg/l.

It is relevant to look at the distribution in nitrate concentration classes below 25 mg/l for surface water as there can be a risk of eutrophication in lower concentration classes.

Figure 21 – Map of average annual mean nitrate concentrations in lakes/water reservoirs and share of monitoring points by concentration class in the reporting period 2020-2023



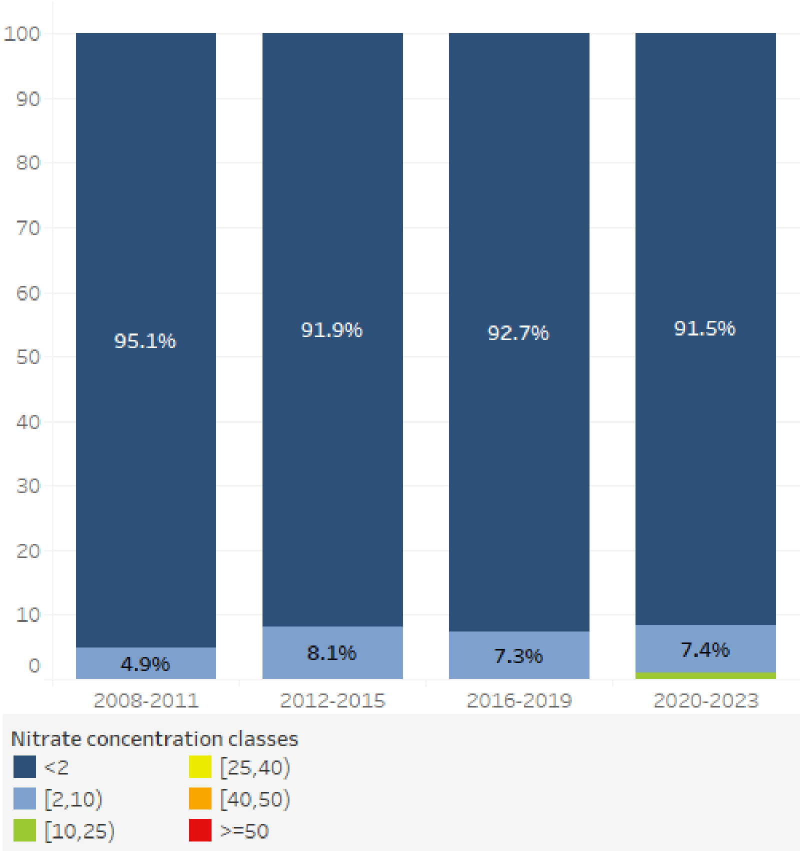
Note: In the map, monitoring points with higher values are plotted on top. In the graph, the percentages below 5% are not labelled.

Table 7 – Share of freshwater monitoring points by nitrate concentration class (mg/l) in reporting period 2020-2023, categorised by station type

	Number of stations	% of Total	<2	[2,10)	[10,25)	[25,40)	[40,50)	>=50
Rivers	236	71.5%	31.8%	44.5%	17.4%	5.9%		0.4%
Lakes/reservoirs	94	28.5%	91.5%	7.4%	1.1%			
Total	330	100.0%	48.8%	33.9%	12.7%	4.2%		0.3%

Compared to the previous reporting period, the share of monitoring points in lakes/water reservoirs with concentration ≥ 50 mg/l remained at 0%. The graph below presents the shares of monitoring points per classes of nitrate concentration in last four reporting periods.

Figure 22 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration ([24]) in the current and previous reporting periods



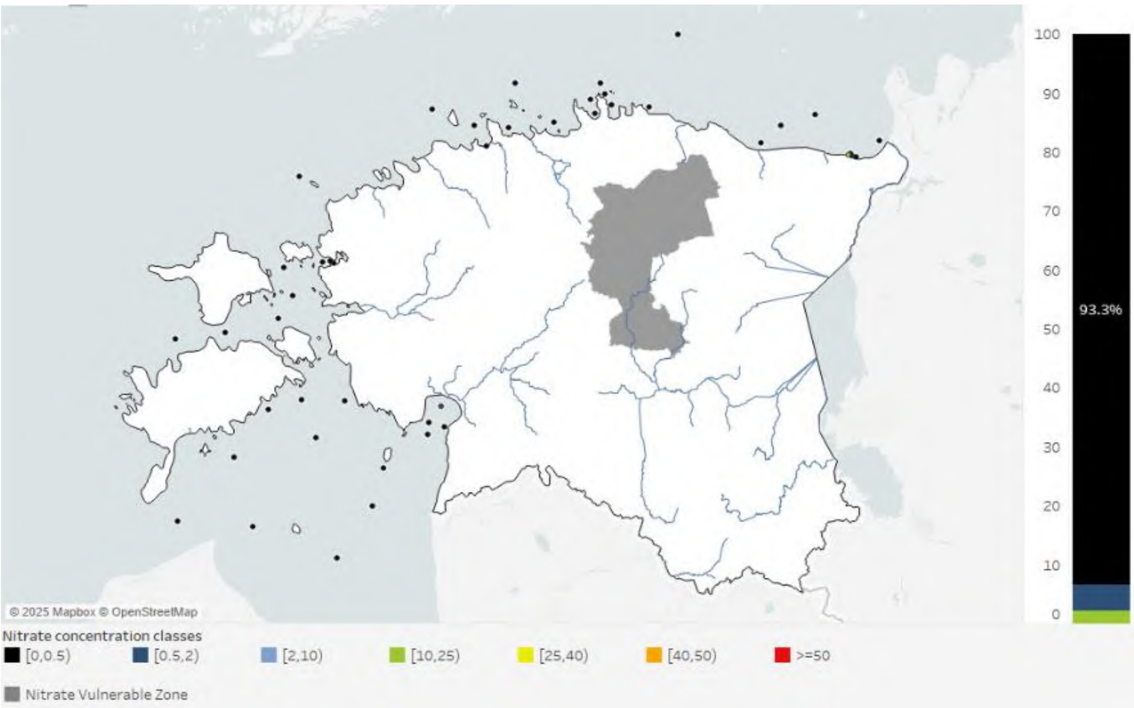
([24]) Average of annual mean values over the reporting period.

Saline waters (25)

No points in saline waters monitoring points showed average nitrate concentrations ≥ 25 mg/l, 2.2% showed concentrations between 10-24.99 mg/l, 0% in the class 2-9.99 mg/l and 4.4% between 0.5-2 mg/l and 93.3% below 0.5 mg/l.

It is relevant to look in detail at very low nitrate concentrations, also below 0.5 mg/l and between 0.5 mg/l and 2 mg/l, because saline waters tend to have very low concentrations and some saline waters can become eutrophic even at concentrations below 2 mg/l.

Figure 23 – Map of average annual mean nitrate concentrations in saline waters and share of monitoring points by concentration class in reporting period 2020-2023



Note: In the map, monitoring points with higher values are plotted on top. In the graph, the percentages below 5% are not labelled.

It is also relevant to look separately at transitional waters as they typically show higher nitrate concentrations. In Estonia, no transitional waters were monitored.

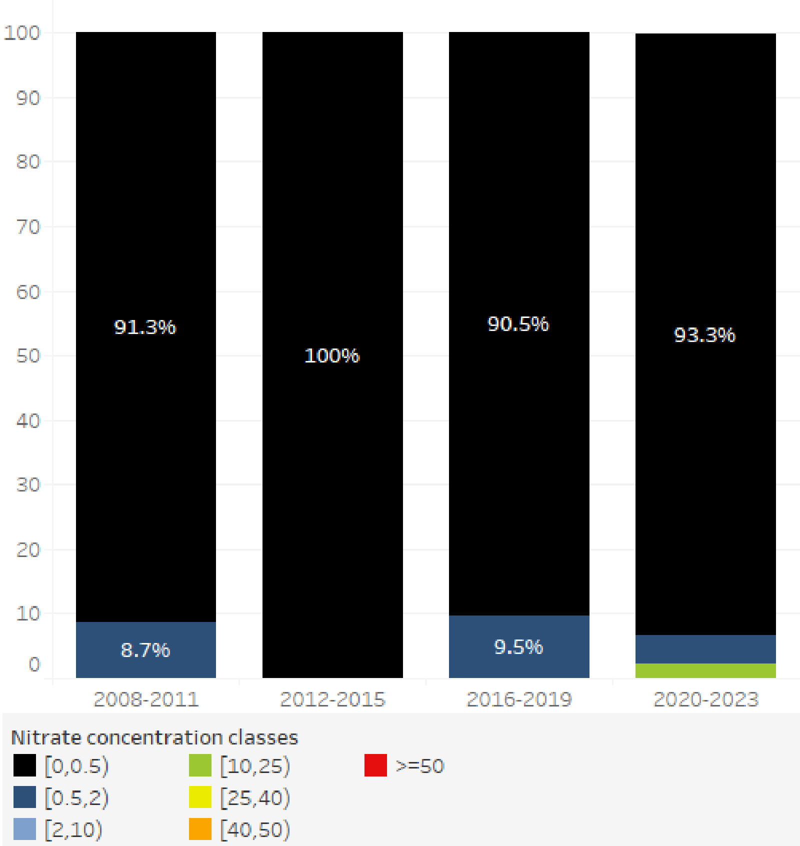
Table 8 – Share of saline water monitoring points by nitrate concentration class (mg/l) in the reporting period 2020-2023, categorised by station type

	Number of stations	% of Total	<0.5	[0.5,2)	[2,10)	[10,25)	[25,40)	[40,50)	>=50
Transitional water									
Coastal water	34	75.6%	91.2%	5.9%		2.9%			
Marine water	11	24.4%	100.0%						
Total	45	100.0%	93.3%	4.4%		2.2%			

(25) This includes coastal, marine and transitional waters.

The graph below presents the shares of monitoring points per classes of nitrate concentration in the last four reporting periods.

Figure 24 – Share of monitoring points in saline waters by class of nitrate concentration ([26]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

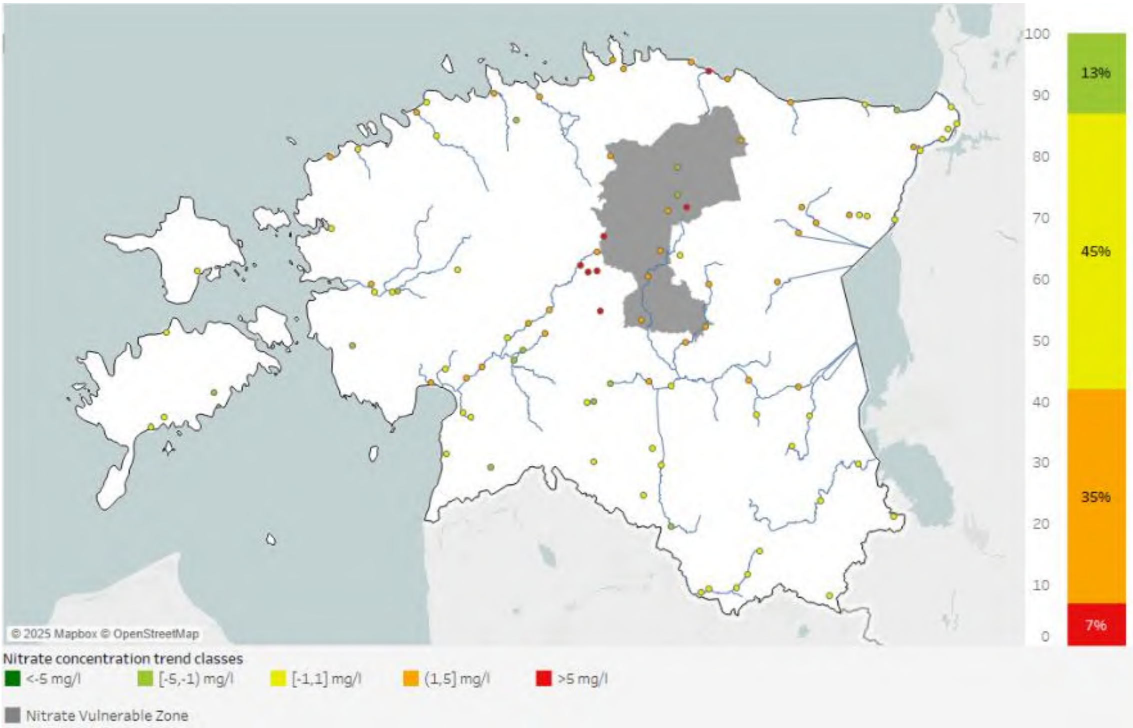
([26]) Average of annual mean values over the reporting period.

5.3. Trends in nitrate concentrations in surface waters

Rivers

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 13.0% of monitoring points and an increase in 42.0%. For the remaining 45.0% there was no significant change. The increase or decrease can be categorised as weak if it is between 1 and 5 mg/l, and as strong if it is above 5 mg/l.

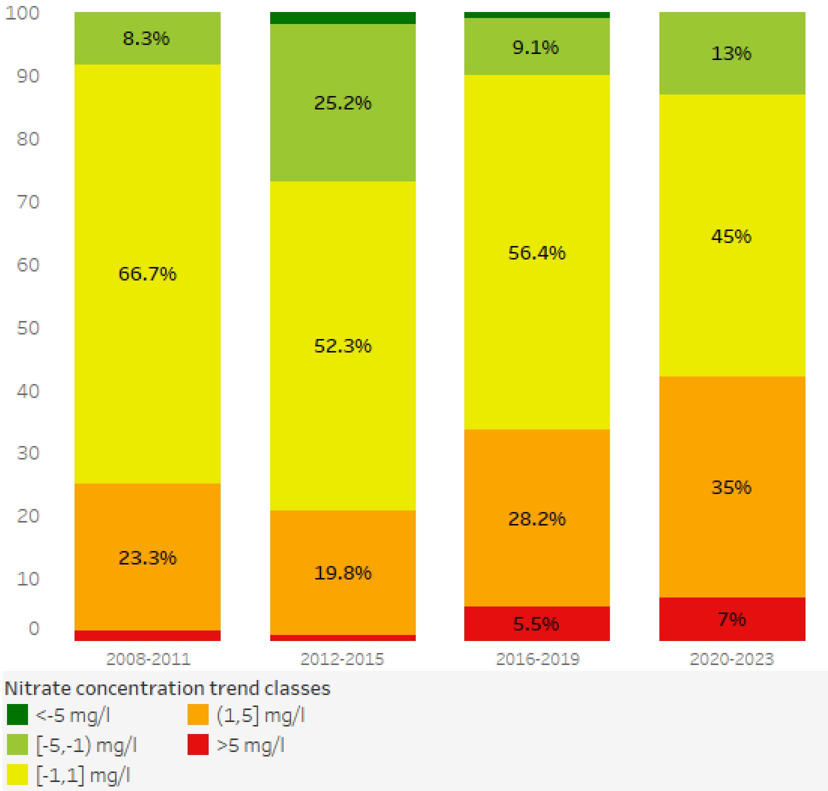
Figure 25 – Map of trends in average annual mean nitrate concentrations in rivers between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



Note: In the map, monitoring points with higher values are plotted on top.

Compared to the previous reporting period, there is a higher share of monitoring points with decreasing nitrate concentrations (13.0% in the current reporting period compared to 10.0% in the previous reporting period) but also a higher share of monitoring points with increasing nitrate concentrations (42.0% compared to 33.7%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 26 – Share of monitoring points in rivers by class of nitrate concentration trend (27) in the current and previous reporting periods



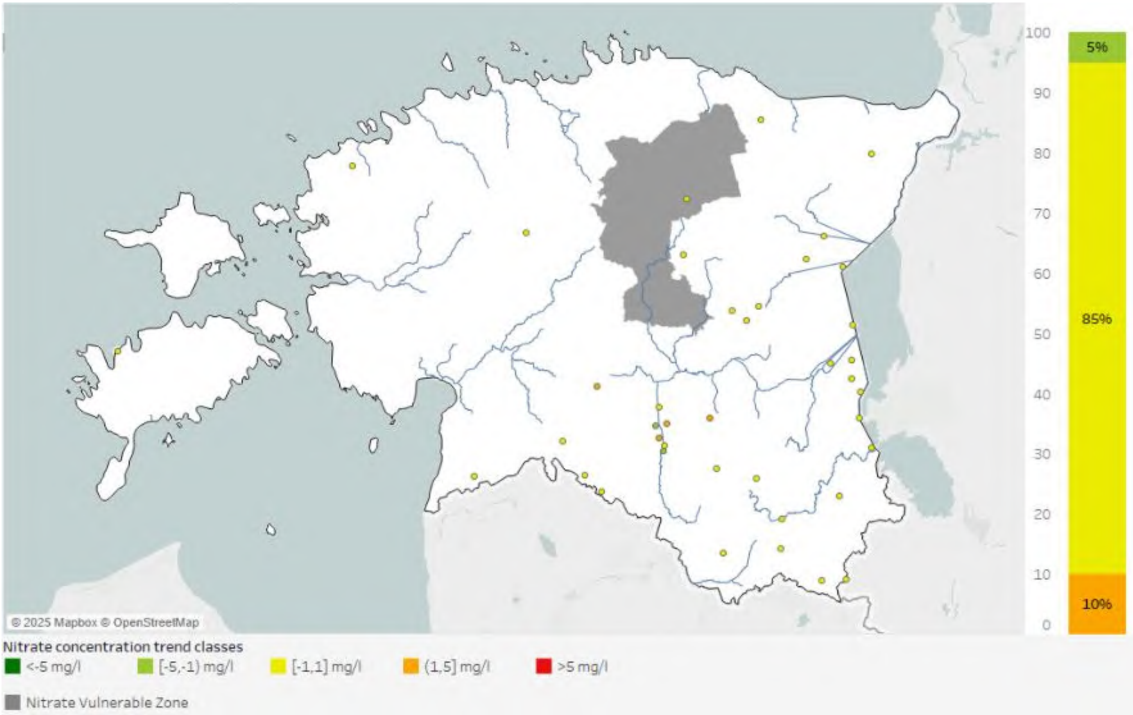
Note: The percentages below 5% are not labelled.

(27) Change in average annual mean nitrate concentrations compared to the previous reporting period.

Lakes and water reservoirs

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 5.0% of monitoring points and an increase in 10.0%. For the remaining 85.0% there was no significant change. The increase or decrease can be categorised as weak if it is between 1 and 5 mg/l, and as strong if it is above 5 mg/l.

Figure 27 – Map of trends in average annual mean nitrate concentrations in lakes/water reservoirs between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



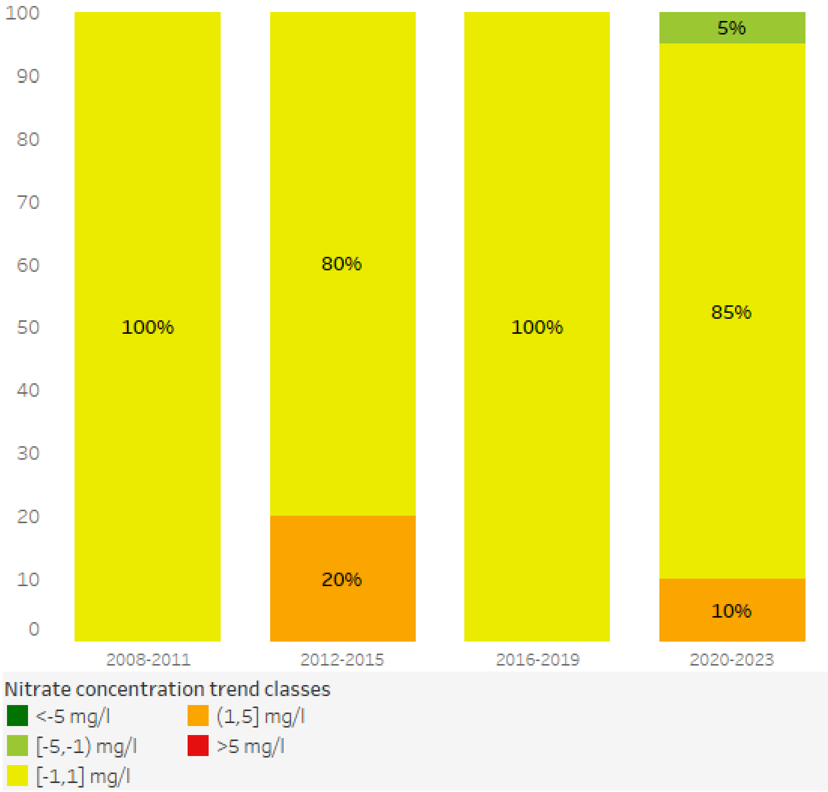
Note: In the map, monitoring points with higher values are plotted on top

Table 9 – Share of freshwater monitoring points by trend class (mg/l), categorised by station type

	Total Number of Stations	% Total Number of Stations	<-5	[-5,-1)	[-1,1]	(1,5]	>5
River	100	71.4%		13%	45%	35%	7%
Lake/Reservoir	40	28.6%		5%	85%	10%	
Total	140	100.0%		10.7%	56.4%	27.9%	5%

Compared to the previous reporting period, there is higher share of monitoring points with decreasing nitrate concentrations (5%% in the current reporting period compared to 0% in the previous reporting period) but also a higher share of monitoring points with increasing nitrate concentrations (10.0% compared to 0%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 28 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration trend [28] in the current and previous reporting periods

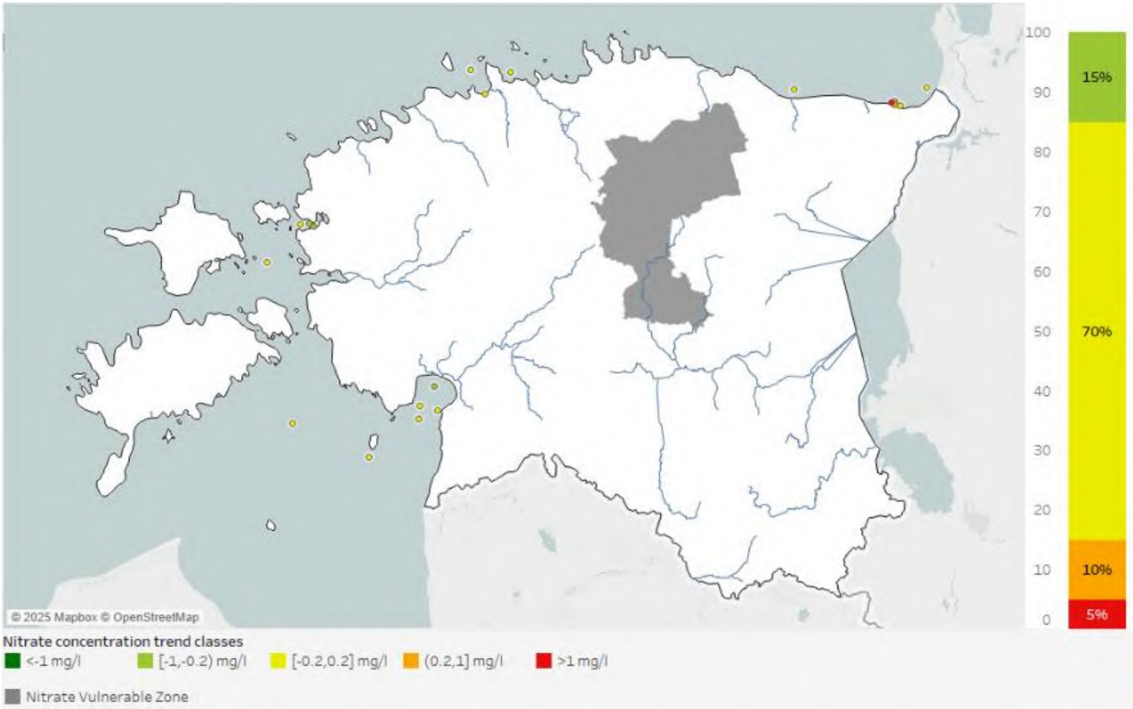


(28) Change in average annual mean nitrate concentrations compared to the previous reporting period.

Saline waters

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 15.0% of monitoring points and an increase in 15.0%. For the remaining 70.0% there was no significant change. The increase or decrease can be categorised as weak if it is between 0.2 and 1 mg/l, and as strong if it is above 1 mg/l.

Figure 29 – Map of trends in average annual mean nitrate concentrations in saline waters between periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



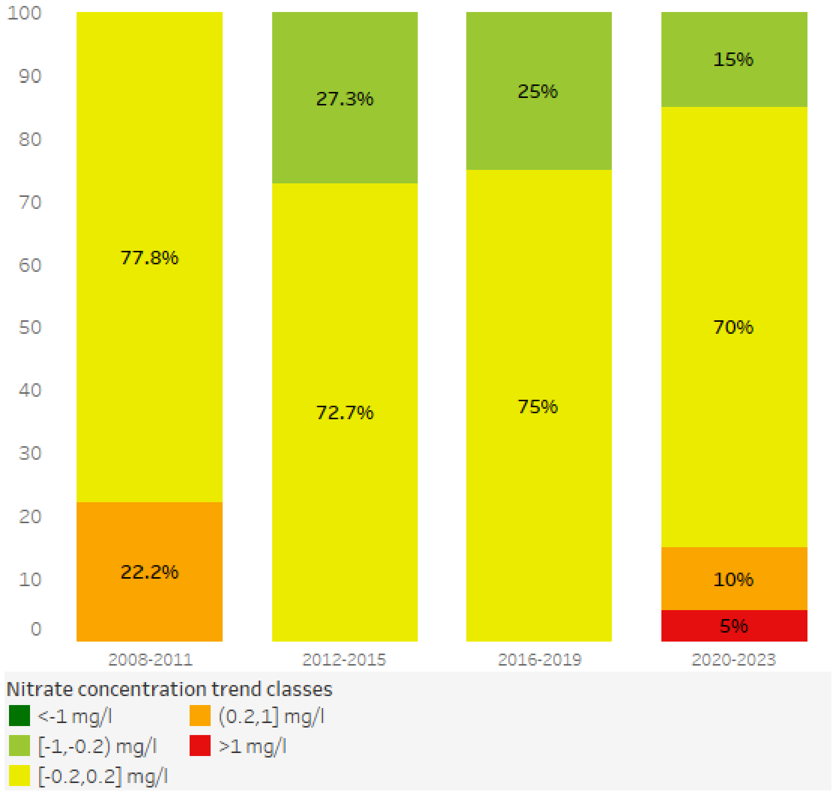
Note: In the map, monitoring points with higher values are plotted on top

Table 10 – Share of saline water monitoring points by trend class (mg/l), categorised by station type

	Total Number of Stations	% Total Number of Stations	<-1	[-1,-0.2)	[-0.2,0.2]	(0.2,1]	>1
Transitional water							
Coastal water	20	100.0%		15%	70%	10%	5%
Marine water							
Total	20	100.0%		15%	70%	10%	5%

Compared to the previous reporting period, there is lower share of monitoring points with decrease of nitrate concentrations (15.0% in the current reporting period compared to 25.0% in the previous reporting period) and a higher share of monitoring points with increase of nitrate concentrations (15.0% compared to 0%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 30 – Share of monitoring points in saline waters by classes of nitrate concentrations ([29]) in the current and previous reporting periods

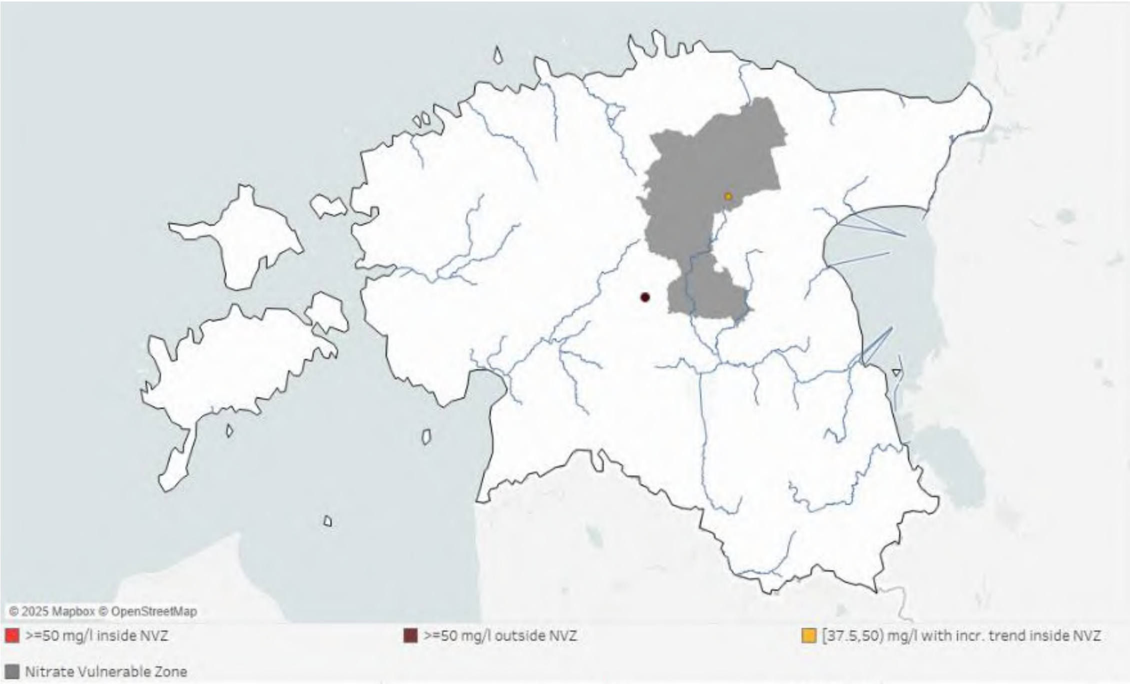


([29]) Change in average annual mean nitrate concentrations compared to the previous reporting period.

5.4. Nitrate pollution hotspots in surface waters

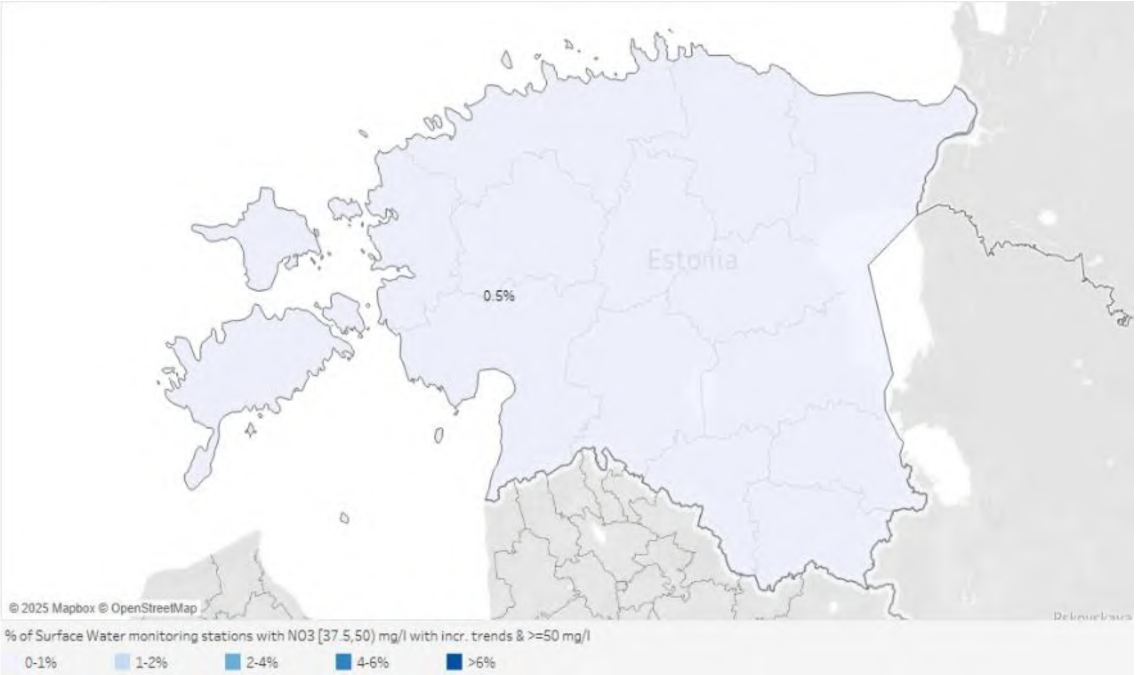
A nitrate pollution hotspot is defined here as a monitoring point where the average annual nitrate concentration is ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. There are 2 surface water nitrate pollution hotspots, of which 1 is outside NVZ, accounting for 50.0% of all surface water nitrate pollution hotspots in the country.

Figure 31 – Surface water nitrate pollution hotspots (map) and their distribution inside and outside Nitrates Vulnerable Zones (table)



		inside NVZ	outside NVZ	Total
Rivers	[37.5,50) with incr. trend	1		1
	>=50		1	1
Lakes/reservoirs	[37.5,50) with incr. trend			
	>=50			
Total		1	1	2

Figure 32 – Share of surface water nitrate pollution hotspots at NUTS2 level



6. EUTROPHICATION OF SURFACE WATERS

6.1. Monitoring of trophic status in surface waters

The monitoring network is managed by the Estonian Environment Agency. When assessing the eutrophication of rivers and lakes, an assessment of the period was made at a monitoring site only if at least four measurements were made there during the period.

During the reporting period 2020-2023 trophic status was reported at 357 monitoring points. Among these, 62.2% were in rivers, 24.9% were in lakes or reservoirs, and 12.9% were in saline waters. The station density of monitoring points, where trophic status was assessed equals to 6.9 stations per 1 000 km^2. Of these monitoring points, 5.1% of freshwater monitoring points were located within NVZ and 94.9% outside NVZ.

The overall number of freshwater monitoring points increased by 30 (10.7%), and number of saline water monitoring points increased by 4 (9.5%) compared to the previous reporting period. In 2020-2023 marine waters were for the first time in the past four reporting periods assessed for their trophic status.

Figure 33 – Evolution in surface water monitoring network (number of points with trophic status reported)

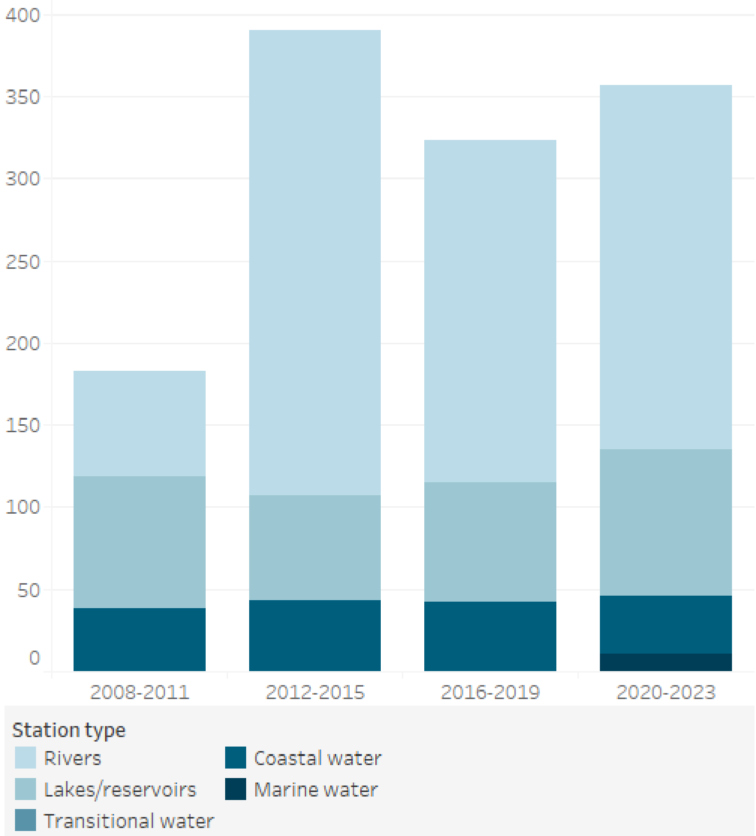


Table 11 – Number of monitoring points reporting trophic status by station type (30)

Station type	Stations With Trophic Status 2008-2011	2012-2015	2016-2019	2020-2023
Rivers	64	283	208	222
Lakes/reservoirs	81	64	73	89
Transitional water				
Coastal water	38	43	42	35
Marine water				11
Total	183	390	323	357

6.2. Methodology for the assessment of trophic status

In Estonia, river eutrophication is primarily evaluated using total nitrogen and total phosphorus concentrations because the small size of most rivers makes phytoplankton and chlorophyll-a measurement unrepresentative for water quality assessments. In the report Estonia states that future assessments may incorporate Phytobenthos and large aquatic plants. Lake, coastal and marine water eutrophication is determined by analysing mean concentrations of total nitrogen, total phosphorus, and chlorophyll-a over the monitoring period and calculated as an average of the three indicators.

Estonia reported that the parameters and limit values used in the eutrophication assessment for the Nitrates Directive align with those of the Water Framework Directive.

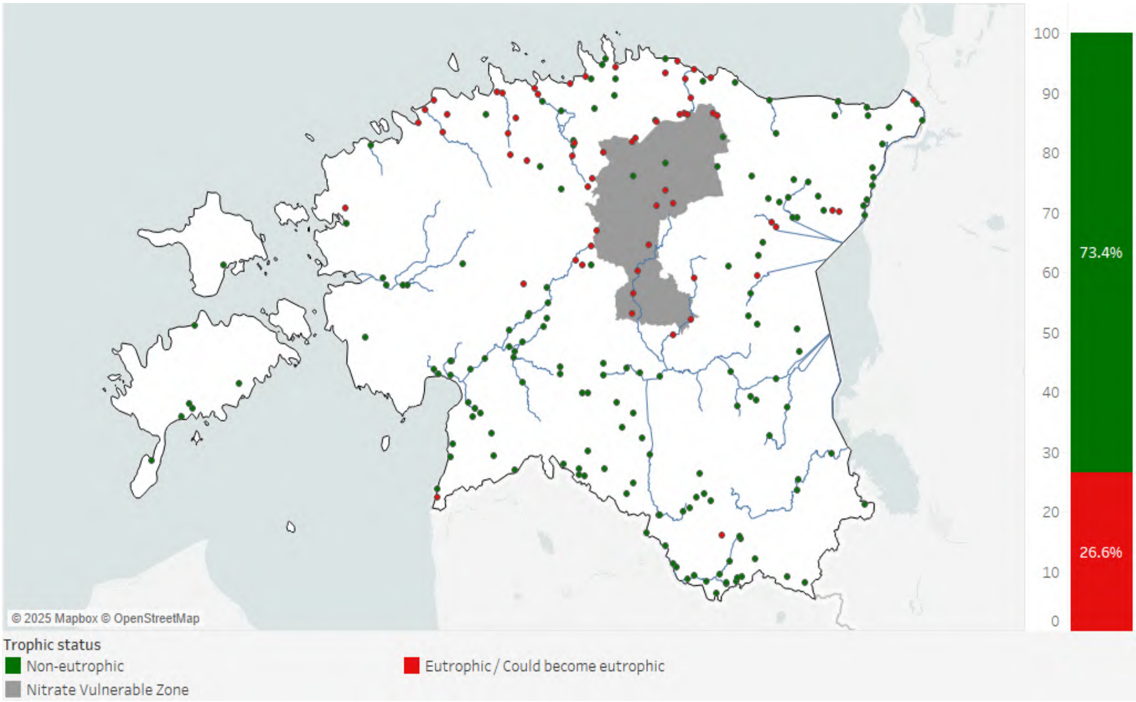
(30) Estonia reported that monitoring was discontinued in 158 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

6.3. Eutrophication of surface waters

Rivers

26.6% of monitoring points in rivers were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

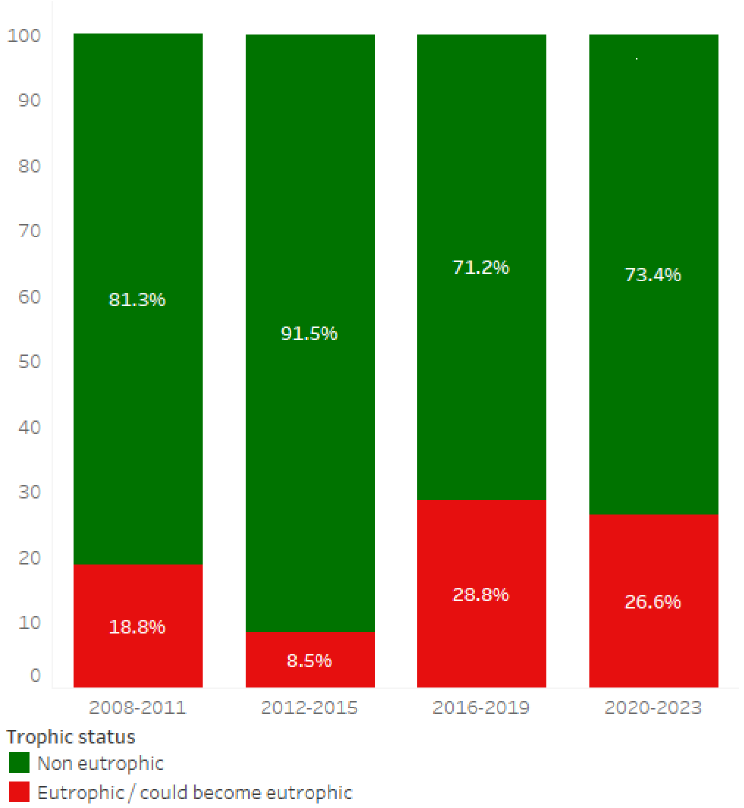
Figure 34 – Map of trophic status in rivers and share of monitoring points by trophic class in the reporting period 2020-2023



Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points decreased from 28.8% to 26.6%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods.

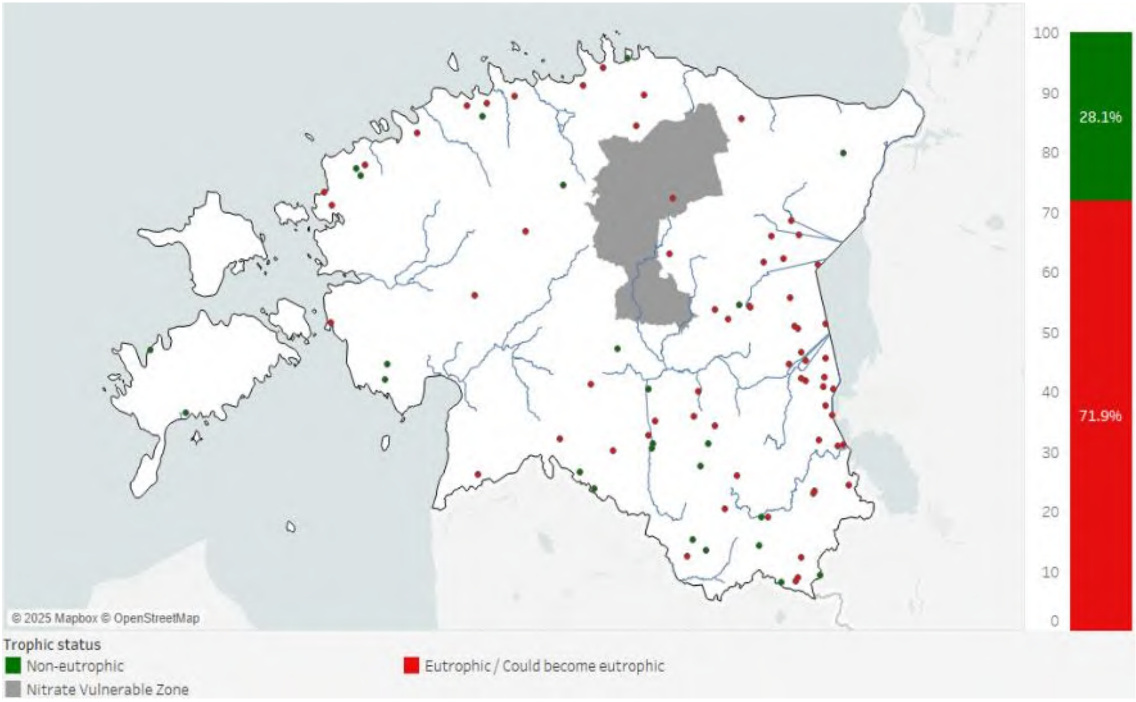
Figure 35 – Share of monitoring points in rivers by class of trophic status in the current and previous reporting periods



Lakes and water reservoirs

71.9% of monitoring points in lakes/water reservoirs were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

Figure 36 – Map of trophic status in lakes/water reservoirs and share of monitoring points by trophic class in the reporting period 2020-2023



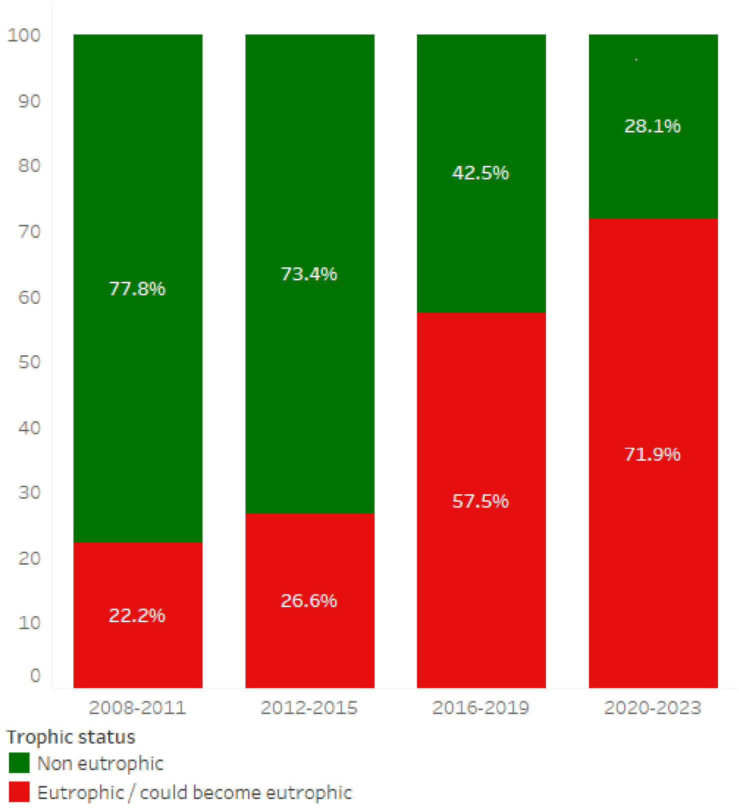
Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

Table 12 – Share of freshwater monitoring points by class of trophic status, categorised by station type

Station type	Number of Stations	% of Total	Non-eutrophic	Eutrophic/could become eutrophic
Rivers	222	71.4%	73.4%	26.6%
Lakes/reservoirs	89	28.6%	28.1%	71.9%
Total	311	100.0%	60.5%	39.5%

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points increased from 57.5% to 71.9%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods.

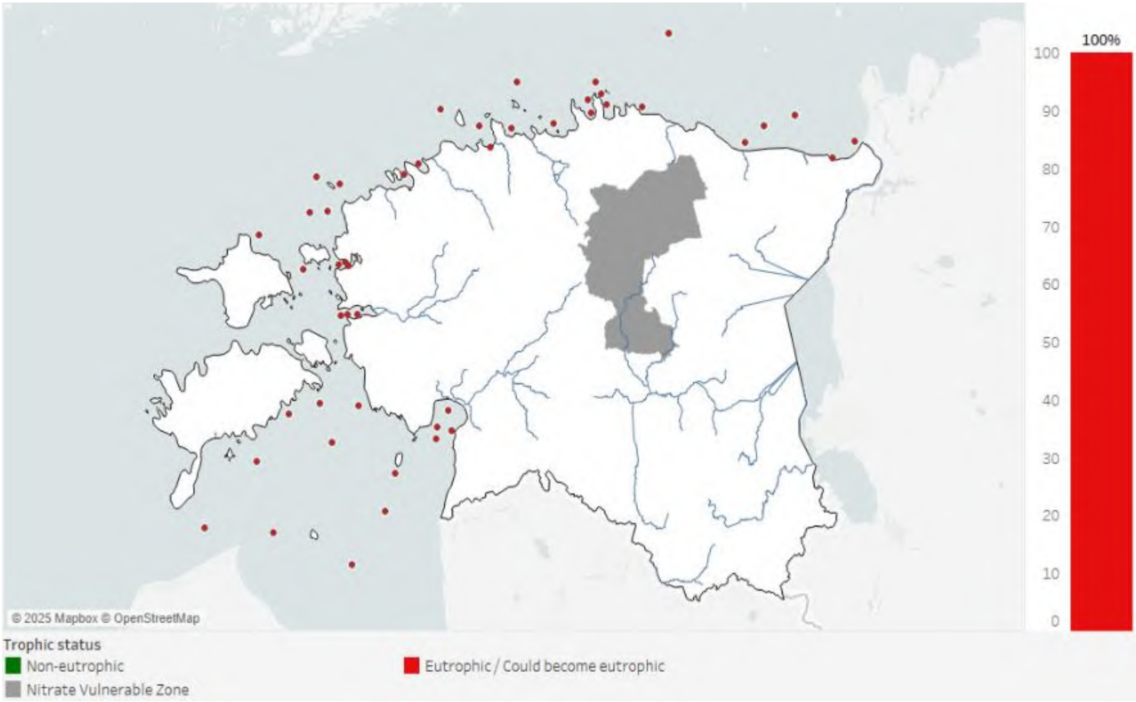
Figure 37 – Share of monitoring points in lakes/water reservoirs by class of trophic status in the current and previous reporting periods



Saline waters

100% of saline water monitoring points were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

Figure 38 – Map of trophic status in saline waters and share of monitoring points by trophic class in the reporting period 2020-2023



Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

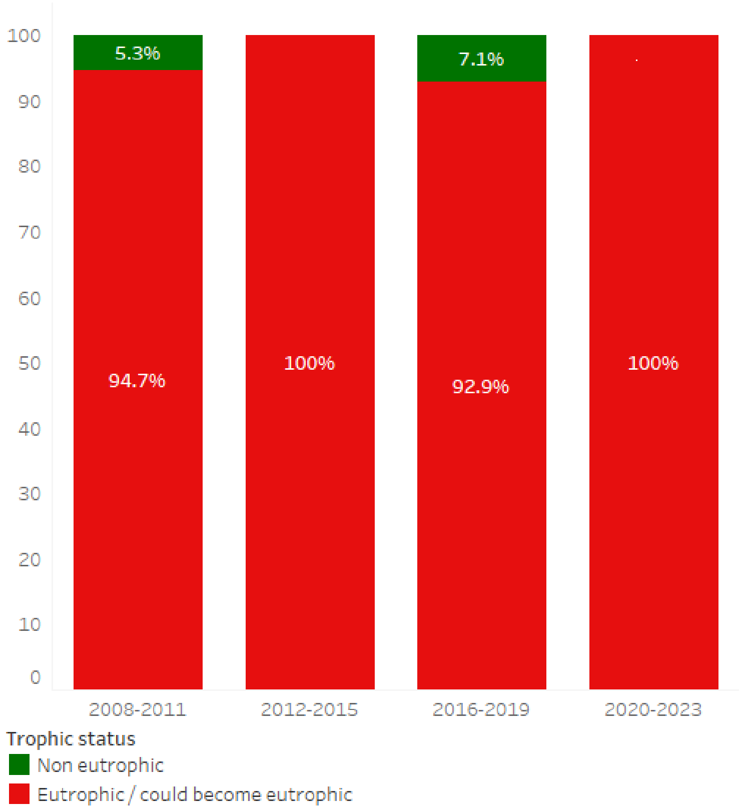
It is relevant to look separately at different types of saline waters (transitional, coastal and marine). In Estonia, no transitional water was assessed for trophic status and 100% of both coastal and marine water monitoring points were eutrophic/could become eutrophic, as shown in the table below.

Table 13 – Share of saline water monitoring points by class of trophic status, categorised by station type

Station type	Number of Stations	% of Total	Non-eutrophic	Eutrophic/could become eutrophic
Transitional water				
Coastal water	35	76.1%		100.0%
Marine water	11	23.9%		100.0%
Total	46	100.0%		100.0%

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in saline waters increased from 92.9% to 100%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods.

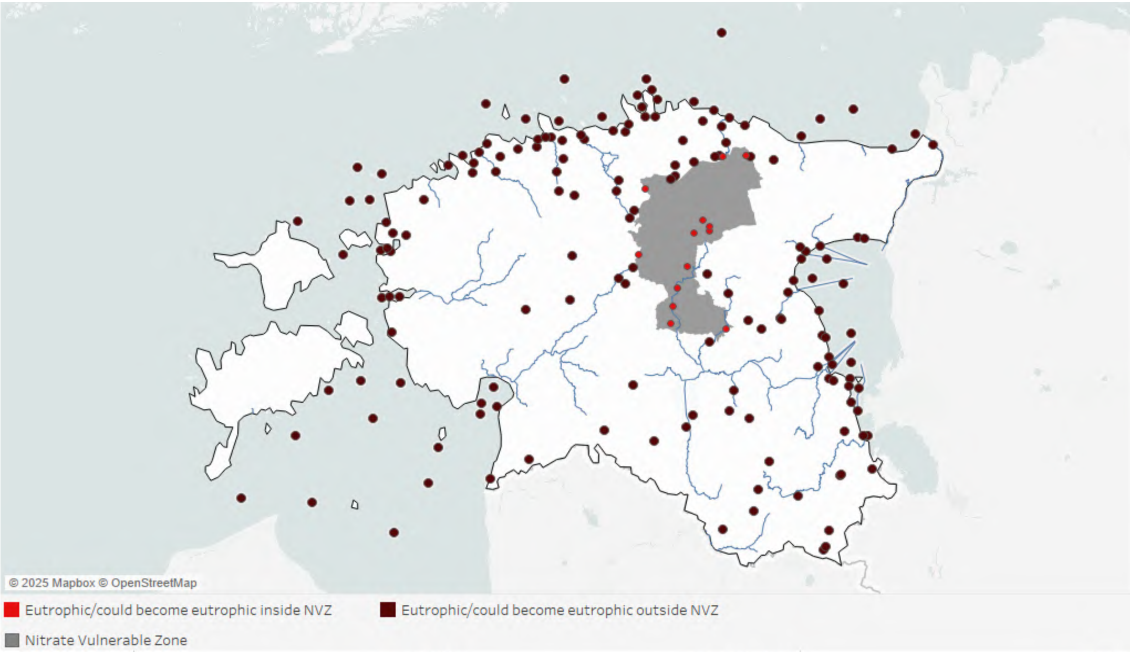
Figure 39 – Share of monitoring points in saline waters by class of trophic status in the current and previous reporting periods



6.4. Eutrophication hotspots in surface waters

A eutrophication hotspot in surface waters is defined here as a monitoring point with trophic status evaluated as "eutrophic" or "could become eutrophic". Overall, there are 169 surface water monitoring points which were reported eutrophic/could become eutrophic, of which 156 are outside NVZ, accounting for 92.3% of all eutrophication hotspots in the country. (31)

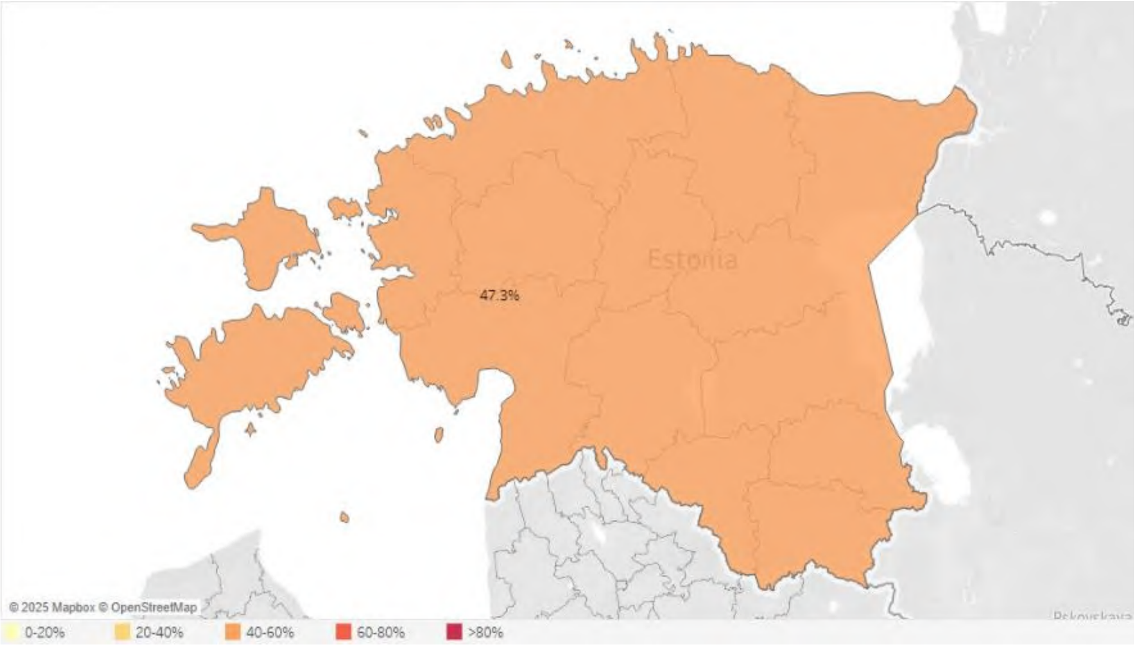
Figure 40 – Eutrophic/could become eutrophic monitoring points (map) and their distribution inside and outside Nitrate Vulnerable Zones (table)



	inside NVZ	outside NVZ	Total
Rivers	12	47	59
Lakes	1	63	64
Coastal water		35	35
Marine water		11	11
Total	13	156	169

31) 46 of these eutrophic/could become eutrophic monitoring points are located in coastal or marine waters.

Figure 41 – Share of eutrophic/could become eutrophic monitoring points at NUTS2 level



7. NITRATES ACTION PROGRAMME

The Nitrates Directive mandates the establishment of a code of good agricultural practice that shall be implemented by farmers on a voluntary basis and promoted through training and information for farmers. Action programmes with mandatory requirements for farms should be established and enforced in NVZ or across the entire territory with mandatory measures applicable to all farms in those areas. These requirements primarily focus on implementing good practices for the handling of fertilisers and manure on farms to minimise the risk of nutrient leaching and run-off from fields. Annex II and III of the Directive set the types of measures to be included. The directive leaves wide discretion to Member States to design the measures in line with local circumstances. Compliance with the action programme measures is monitored by public authorities.

The action programmes contain measures concerning fertiliser application (periods when land application of different types of fertilisers is prohibited, land application on steeply sloping ground, prohibition of land application on water-saturated, flooded, frozen or snow-covered ground, the conditions for land application of fertiliser near water courses, balanced fertilisation and the amount of livestock manure that can be applied to the land), and the capacity of storage vessels for livestock manure. They may also include additional measures in relation to fertilizer planning and record keeping, land use management, including the use of crop rotation systems, minimum vegetation cover during sensitive periods, irrigation systems and other relevant measures complementing the nitrates action programme.

7.1. Measures in the action programme and code of good agricultural practices

The Nitrates Directive and its requirements have been transposed into Estonian law by the Water Act (VeeS) and its implementing acts. The mandatory measures set out in Articles 4 and 5 and in Annexes II and III of the Directive are legally binding through national law. The Water Act was last amended in 2025. The code of good agricultural practice and the action programme are not legally binding documents and rather serve as supplementary policy documents.

The first edition of the code of good agricultural practices was published in 2001 before Estonia’s accession in 2004 and later updated in 2006. The third edition within the meaning of the Nitrates Directive has been integrated into the Water Act in 2019. Water act includes a provision indicating which sections of the Act provide for the good agricultural practice measures set out in the Nitrates Directive.

The Water Act of 2019 establishes mandatory requirements for water protection from agricultural pressures, including requirements for the use of fertilisers, manure and slurry, which are mandatory both in and outside the NVZ. Additional water protection requirements and restrictions on agricultural activities in the NVZ are also laid down in the Water Act and its implementing regulation.

The main amendments to the nitrate action programme in the reporting period 2020-2023 included a faster mandatory incorporation of manure on fields without crops and covered land in the period between 1 November and 30 November, an extension of the requirement to have a mandatory manure storage facility, the limitation of temporary storage of solid manure next to buildings and the repeal of a mandatory spreading plan for liquid manure for an amount corresponding to 400 or more livestock units.

A consolidated overview of the action programme currently in force is provided in a separate document ([32]).

7.2. Controls

The Environmental Board (KeA-Keskkonnaamet) is the main body responsible for agri-environmental inspections in Estonia.

In the period 2020-2023 a total of 393 on-site inspections were carried out in the Pandivere and Adavere–Põltsamaa NVZ, including conditionality controls under the CAP, representing 35 % of the farmers in the NVZ.

Based on the results of those inspections, non-compliances with the action programme concerned the watertightness of the manure storage facility (2.8 %), the absence of manure storage (2.0%), failure to comply with the ban on cultivation of land in the water protection zone (2.0 %) and not leak-proofed silos (1.3 %).

The Estonian national report on the period 2020-2023 does not make further reference to the causes of non-compliance or difficulties in the implementation of the measures of the action programme.

([32]) https://environment.ec.europa.eu/publications/summaries-national-nitrates-action-programmes_en

8. WATER QUALITY OUTLOOK

The Estonian report lacks a model-based forecasting system to predict groundwater and surface water quality trends, relying instead on agricultural projections and climate scenarios with only broad estimates. While climate change (warmer winters, increased rainfall) and rising agricultural inputs (nitrogen fertilizers, livestock waste) suggest worsening of nitrate leaching, some improvements in fertilizer practices (precision application, reduced mineral use) offer partial mitigation. Monitoring data shows mixed trends: groundwater nitrate concentrations in vulnerable zones are rising, while surface water nitrate levels show minor declines in rivers but persistent eutrophication in lakes and coastal areas.

The forecast for 2024-2027 shows increasing nitrate concentrations especially for groundwater bodies within the NVZ with no clear pathway to recovery. Surface waters are likely to face rising nitrate concentrations as well. The phosphorus concentration can be expected to decrease slightly due to improved wastewater management.

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