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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

EN EN

Finland

Country staff working document
on the implementation of the Nitrates Directive

Period: 2020-2023

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1. KEY FINDINGS AND RECOMMENDATIONS

Finland 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 Finnish 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 Finland, the utilised agricultural area (UAA) accounts for 7% of the country's total land area, which is lower than the EU average (38%). The livestock density is 0.4 livestock units per hectare (LSU/ha) of UAA, which is lower than the EU average of 0.7 LSU/ha. The gross nitrogen balance is 50 kg/ha UAA, and the gross phosphorus balance is 5 kg/ha UAA ([5]).

Monitoring network

For groundwater, the density of the monitoring network is around 2 stations per 1 000 km^2, which is lower than the EU average (8 stations). Compared to the previous reporting period, the density increased by 262%.

For surface freshwater, the density of the monitoring network density is around 5 stations per 1 000 km^2, which is lower than the EU average (7 stations). Compared to the previous reporting period, the density increased by 935%. The monitoring network includes river and lake/water reservoir stations.

For surface saline waters, the monitoring network includes coastal waters and marine waters. No stations are reported in transitional waters.

(1) Final version was received in December 2024.

(2) Reportnet 3 is an e-Reporting platform for reporting environmental and climate data to the European Environment Agency (EEA).

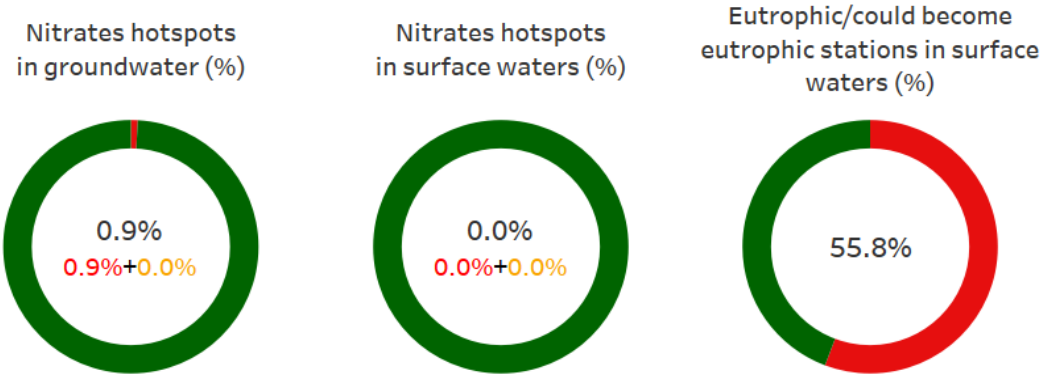
(3) Only monitoring points electronically reported with nitrate concentration or tropic status, which were not removed from the monitoring network were considered for this assessment.

(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.

(5) The EU average is not available due to data gaps.

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**, 99.1% of monitoring points show nitrate concentrations below 50mg/l.

Overall, 0.9% of monitoring points fall into two categories illustrated in Figure 1, i.e. they show nitrate concentrations either ≥ 50 mg/l (0.9%) or between 37.5 and 49.99 mg/l with an increasing trend (0%). Compared to the data reported in the previous reporting period, this represents a decrease of 0.7 percentage points (from 1.6% to 0.9%). The large areas with the highest share are West Finland (1.4%), Helsinki-Uusimaa (0.9%) and South Finland (0.6%).

Compared to the previous reporting period, nitrate concentrations decreased at 23.3% of groundwater monitoring points and increased at 13.4%. Among monitoring points with nitrate concentration ≥ 50 mg/l, all showed a decrease compared to the previous reporting period.

In **surface water**, 100% of monitoring points show nitrate concentrations below 50 mg/l and 44.2% are classified as non-eutrophic.

No monitoring points fall into the two categories illustrated in Figure 1, i.e. none show nitrate concentrations ≥ 50 mg/l or concentrations between 37.5 and 49.99 mg/l with an increasing trend. There is no change compared to the previous reporting period. Less than 1% 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 at 5.1% of surface water monitoring points and increased in 4.3%.

The share of monitoring points reported as eutrophic/could become eutrophic is 55.8% as illustrated in Figure 1. This represents a decrease of 33.0 percentage points compared to the data reported in the previous period (from 88.3% to 55.8%)[6]. The large

(6) However, at the same time the number of monitoring stations increased by more than 700%.

areas with the highest share are Åland (90.9%), Helsinki-Uusimaa (73.7%) and South Finland (68.9%).

Nitrate Vulnerable Zones

In line with Article 3 paragraph 5, Finland applies an action programme with mandatory measures throughout the entire national territory.

Action Programme

Finland did not modify its action programme during this reporting period.

1.2. Recommendations

- Review and where necessary reinforce measures to improve water quality, notably with a view to addressing:
    - eutrophication of surface water bodies including coastal and marine waters
- When preparing the Nitrates Action Programme:
    - 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

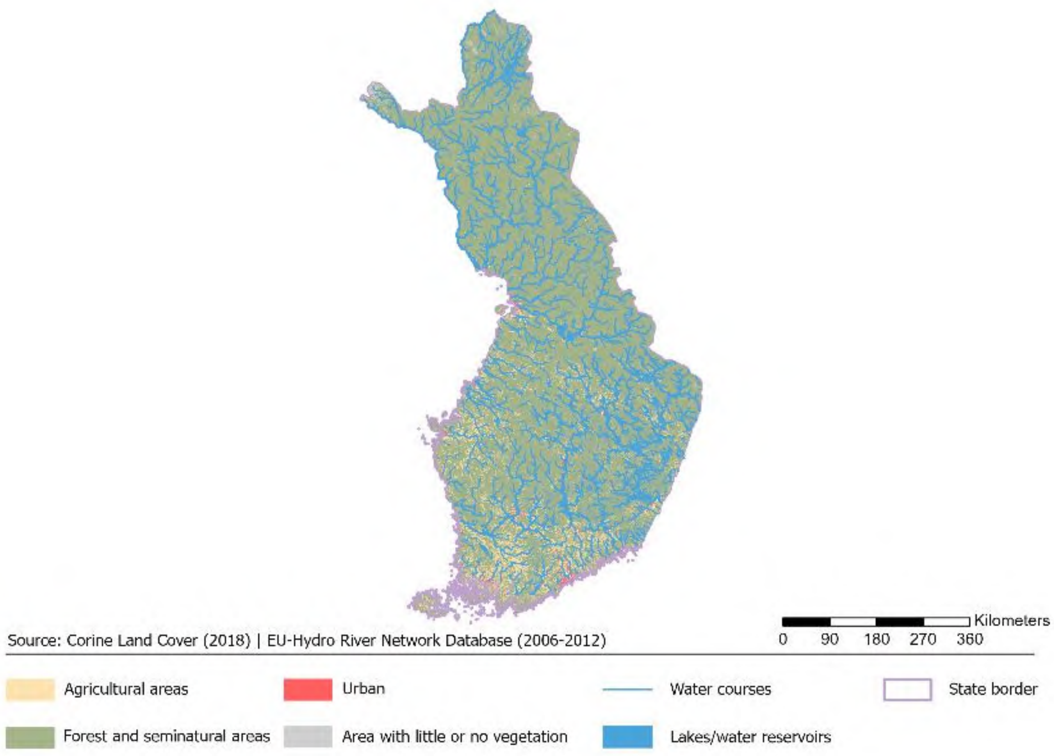
In Finland, animal production accounted for the largest portion of the agricultural sector's total output value at 47.1% in the reporting period 2020-2023. Crop production followed with 39.0%, and other outputs made up 13.9% ([7]). The share of agricultural land used for organic farming increased from 12.1% in the reporting period 2016-2019 to 14.2% in the reporting period 2020-2023 ([8]).

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 Finland along with watercourses and lakes/water reservoirs.

Figure 2 – Land use distribution in Finland



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

The utilised agricultural area (UAA) in Finland covered 2.3 million hectares in 2023, making up 7.4% of the country's total land area. Arable land accounts for 99.2% of UAA, followed by permanent grassland at 0.6% and permanent crops at 0.2%.

Table 1 – Evolution of the utilised agricultural area

	2010	2013	2016	2020	2023
utilised agricultural area (1000 ha)	2,291	2,258	2,194	2,282	2,264
arable land (1000 ha)	2,253	2,223	2,165	2,256	2,247
permanent grassland (1000 ha)	33	31	26	22	14
permanent crops (1000 ha)	5	4	4	4	4
kitchen gardens (1000 ha)	0	NA	NA	0	0

Source: Eurostat (ef_lus_main)

In 2020, the share of the UAA ranged from 19% of in Helsinki-Uusimaa, to 3.0% in North and East Finland.

Figure 3 – Share of utilised agricultural area (UAA) at NUTS2 level in 2020 [9]

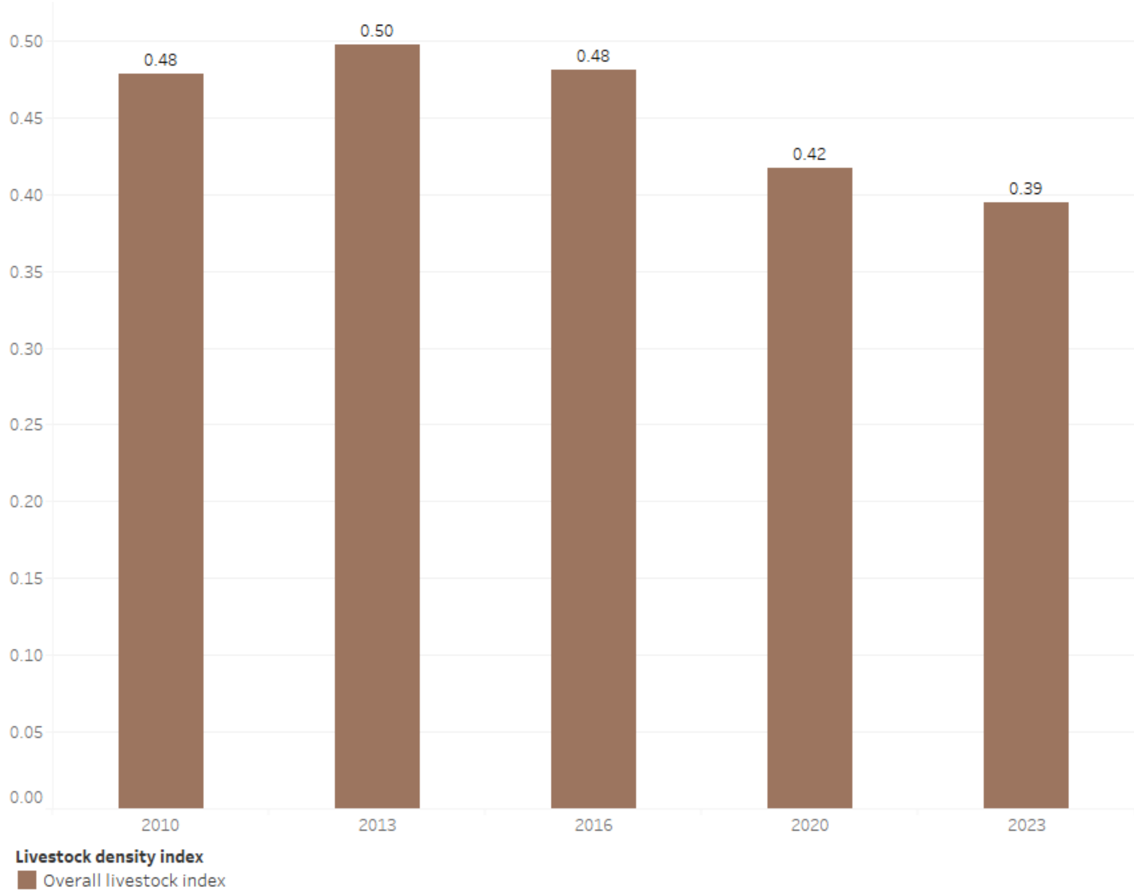
Source: Eurostat (ef_lus_main)

(9) Latest available data.

2.2. Livestock density

In Finland the livestock density was 0.39 livestock units per hectare (LSU/ha) of UAA in 2023. The livestock density in Finland increased until 2013 but has since decreased.

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



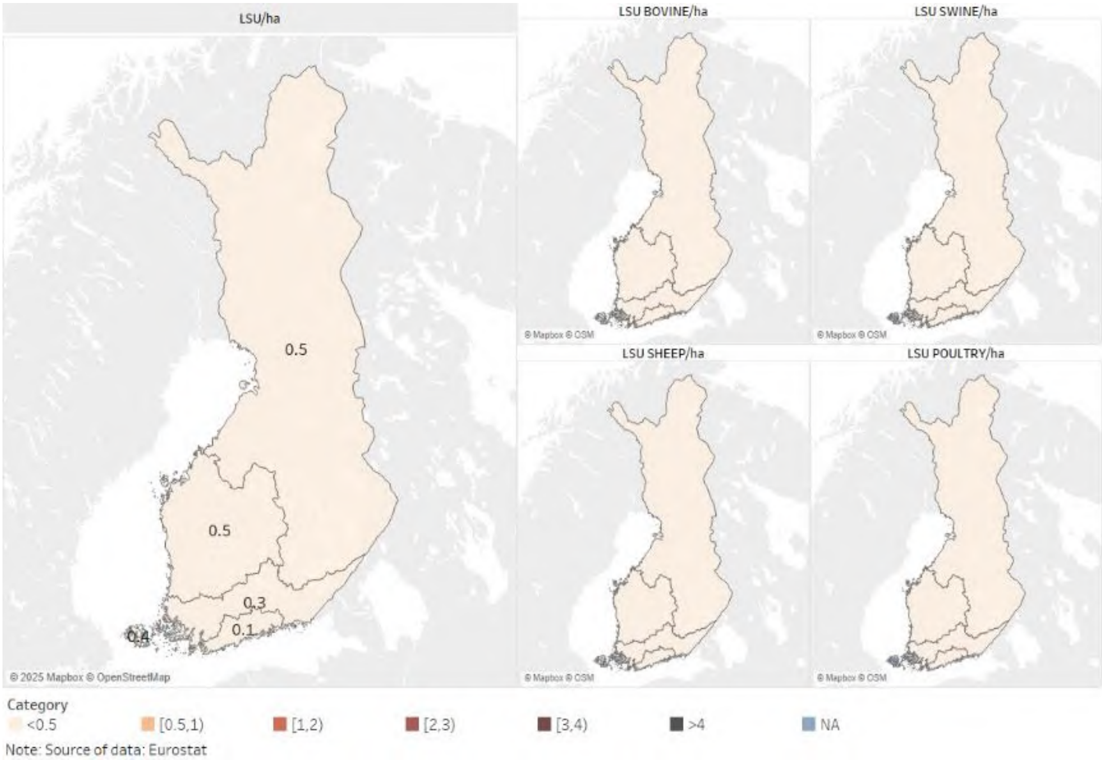
Source: Eurostat (ef_fsi_lskds)

Table 2 – Evolution of the livestock numbers by animal type

	2007	2010	2013	2016	2020	2023
live bovines (Million heads)	0.90	0.91	0.90	0.89	0.84	0.80
of which dairy cows (Million heads)	0.29	0.28	0.28	0.28	0.26	0.24
live pigs (Million heads)	1.43	1.34	1.26	1.20	1.10	0.98
live poultry (Million heads)	NA	9.31	11.98	15.39	13.32	18.70
live sheep (Million heads)	NA	0.13	0.14	0.16	0.14	0.12
live goats (Million heads)	0.01	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 ([10])



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

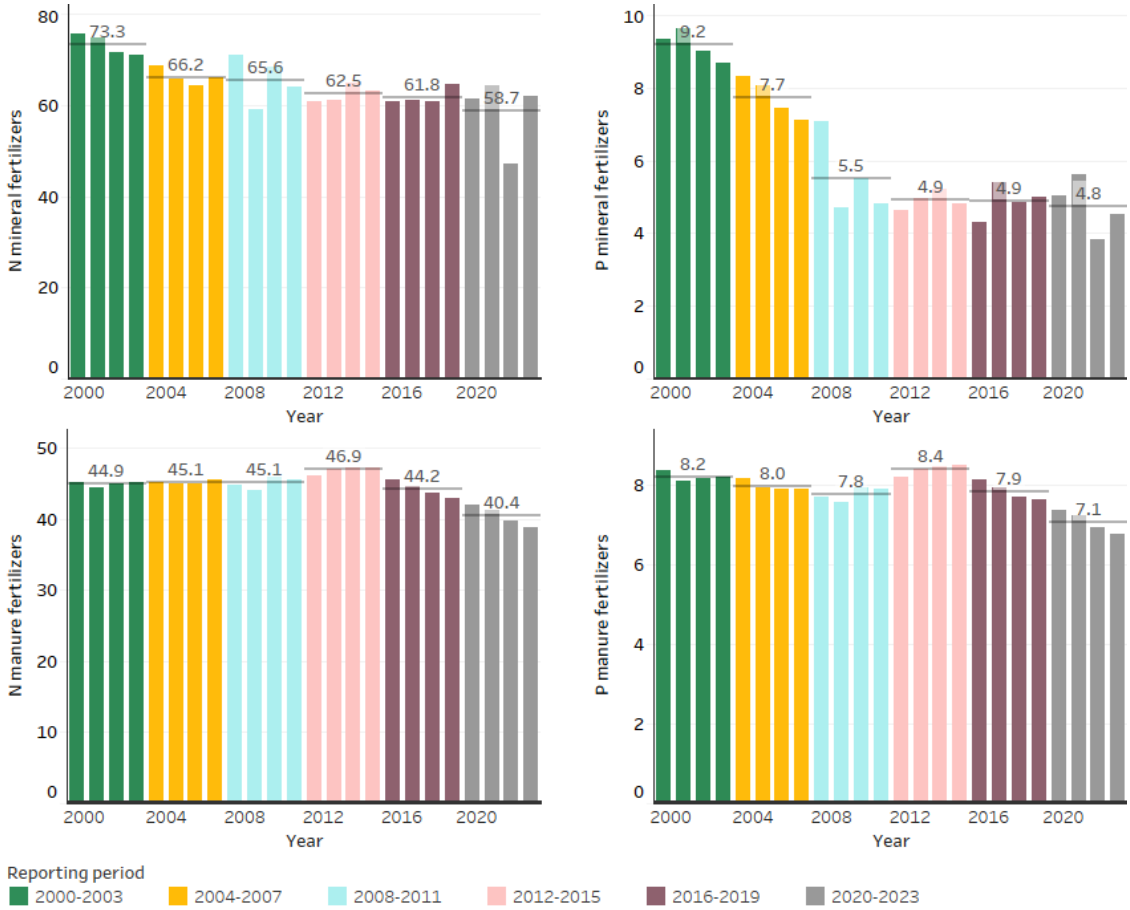
([10]) Latest available data.

2.3. Nitrogen and phosphorus fertiliser use

In Finland, the use of **nitrogen (N) fertilisers** was 58.7 kg/ha UAA for mineral fertilisers and 40.4 kg/ha UAA for manure fertilisers in 2020-2023. The use of mineral fertilisers has decreased by 3.1 kg/ha UAA, and the use of manure fertilisers has decreased by 3.8 kg/ha UAA since the last reporting period.

The use of **phosphorus (P) fertilisers** was 4.8 kg/ha UAA for mineral fertilisers and 7.1 kg/ha UAA for manure fertilisers in 2020-2023. The use of mineral fertilisers decreased by 0.1 kg/ha UAA since the last reporting period and the use of manure fertilisers decreased by 0.8 kg/ha UAA since the last reporting period.

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



Source: Eurostat (aei_pr_gnb)

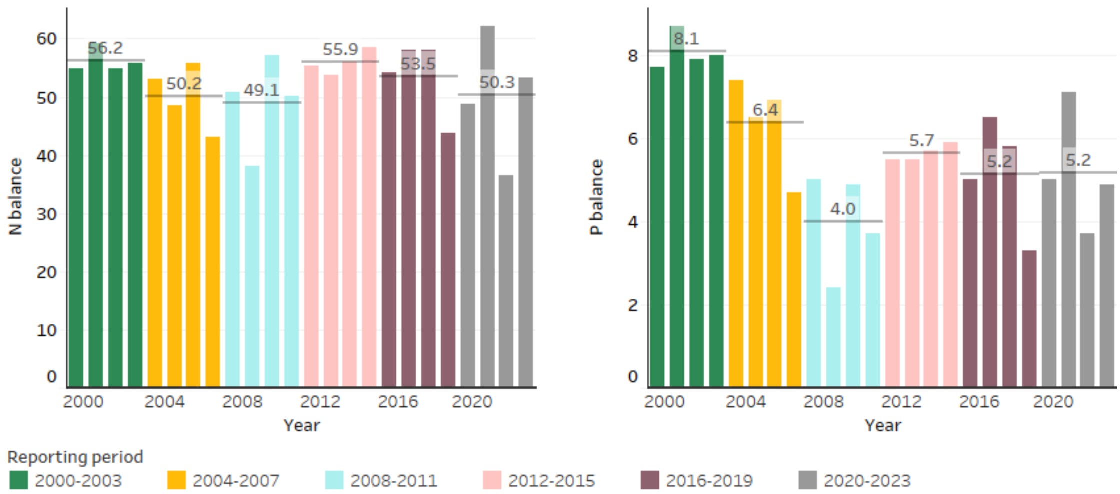
2.4. Nitrogen and phosphorus balance

The nitrogen balance [11]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 Finland, the **gross nitrogen (N) balance** was 50.3 kg/ha UAA in 2020-2023. The nitrogen balance decreased by 3.2 kg/ha UAA since previous reporting.

The **gross phosphorus (P) balance** was 5.2 kg/ha UAA in 2020-2023. The phosphorus balance has remained the same as in the previous reporting.

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



Source: Eurostat (aei_pr_gnb)

2.5. Nitrogen discharge to the environment

Finland provided information that the nitrogen discharge from agriculture to environment was 131.0 kilotonnes during reporting period 2016-2019 and 119.0 kilotonnes during the reporting period 2020-2023. The agricultural sector's contribution to the country's total nitrogen loss increased from 70.8% to 71.3%.

[11] Gross nutrient balance (aei_pr_gnb)

3. NITRATE VULNERABLE ZONES

In line with Article paragraph 5, Finland applies an action programme with mandatory measures throughout the entire national territory (whole country approach) since 1998 and is thus exempted from designating NVZ.

4. NITRATES IN GROUNDWATER

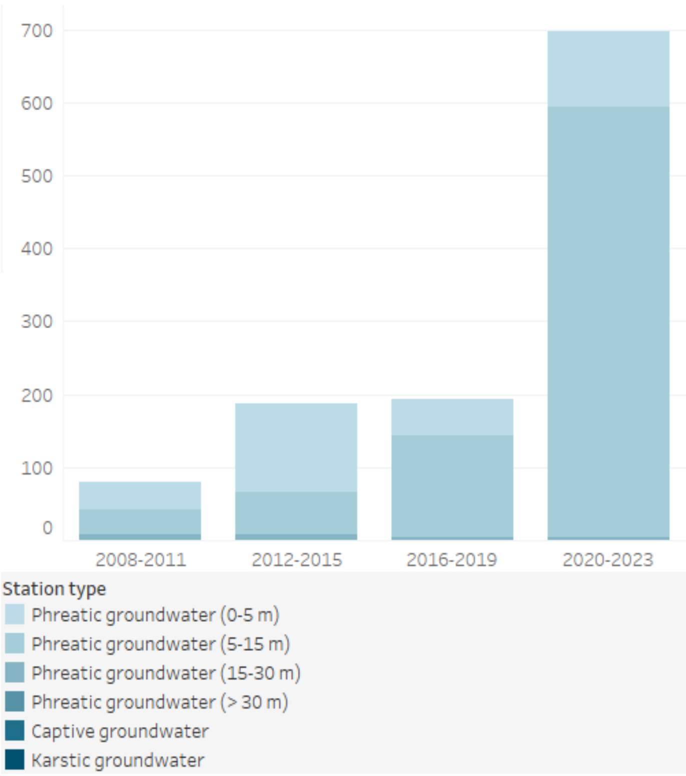
4.1. Monitoring of nitrate concentrations in groundwater

The monitoring of groundwater is carried out by the local Centres for Economic Development, Transport and the Environment (from 1.1.2026 Finnish Supervisory Agency) and coordinated by the Finnish Environment Institute. In addition to the monitoring points describing the impact of agriculture, the reporting process uses monitoring points in a natural or near-natural state (66 in total) to indicate background nitrate concentrations.

During the reporting period 2020-2023 nitrate concentrations were reported at 695 groundwater monitoring points. The station density was 2.1 stations per 1,000 km^2. The EU station density was 7.4 stations per 1 000 km^2.

The overall number of monitoring points increased by 506 (267.7%) compared to the previous reporting period. The change was driven mainly by an increase in phreatic groundwater (5-15 m, and to some extent 0-5 m) monitoring points. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 8 – 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 150 monitoring points, accounting for 21.5% of all points with measurements. The share of monitoring points with trends decreased compared to the previous reporting period, which was 100% 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 (12)

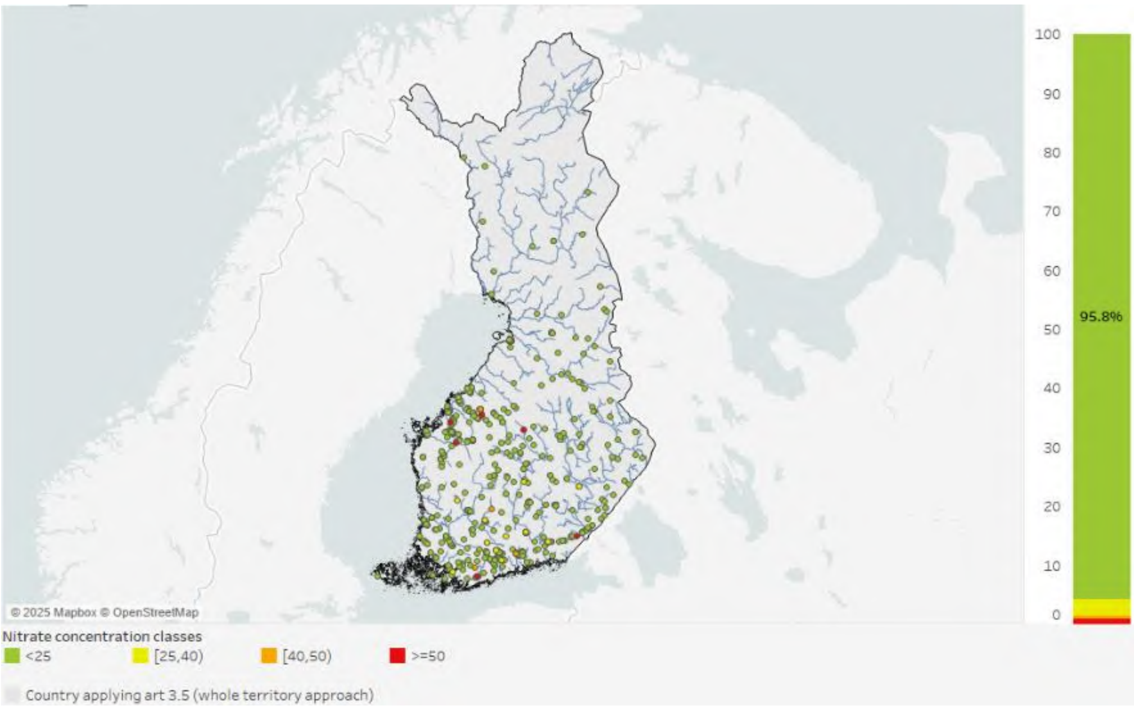
	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Phreatic groundwater (0-5 m)	37	121	49	104	31	121	49	39
Phreatic groundwater (5-15 m)	35	59	140	591	18	59	140	108
Phreatic groundwater (15-30 m)	7	7	4	3	3	7	4	3
Phreatic groundwater (> 30 m)								
Captive groundwater								
Karstic groundwater								
Not specified								
Total	79	187	193	698	52	187	193	150

(12) Finland reported that monitoring was discontinued in 58 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 Finland, 0.9% of groundwater monitoring points showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 0.6% had concentrations between 40-49.99 mg/l, 2.7% showed concentrations between 25-39.99 mg/ and 95.8% 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 9 – 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. In the graph, the percentages below 5% are not labelled.

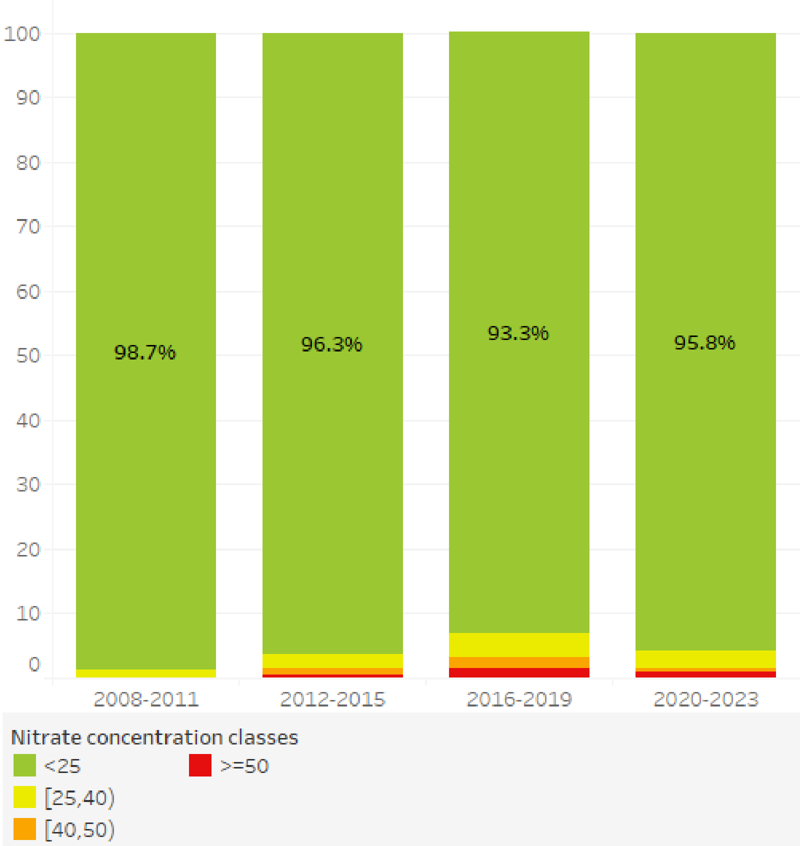
The station type category with the highest share of points with nitrate concentrations equal to or above the drinking water threshold of 50 mg/l was phreatic groundwater at depth 5-15 m with a share of 1.0%, as shown in the table below.

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)	104	14.9%	98.1%	1.9%		
Phreatic groundwater (5-15 m)	591	84.7%	95.4%	2.9%	0.7%	1.0%
Phreatic groundwater (15-30 m)	3	0.4%	100.0%			
Phreatic groundwater (> 30 m)						
Captive groundwater						
Karstic groundwater						
Total	698	100.0%	95.8%	2.7%	0.6%	0.9%

Compared to the previous reporting period, the share of monitoring points with concentration ≥ 50 mg/l decreased from 1.6% to 0.9%. The graph below presents the share of monitoring points per classes of nitrate concentrations in the last four reporting periods.

Figure 10 – Share of monitoring points in groundwater by class of nitrate concentration (13) in the current and previous reporting periods



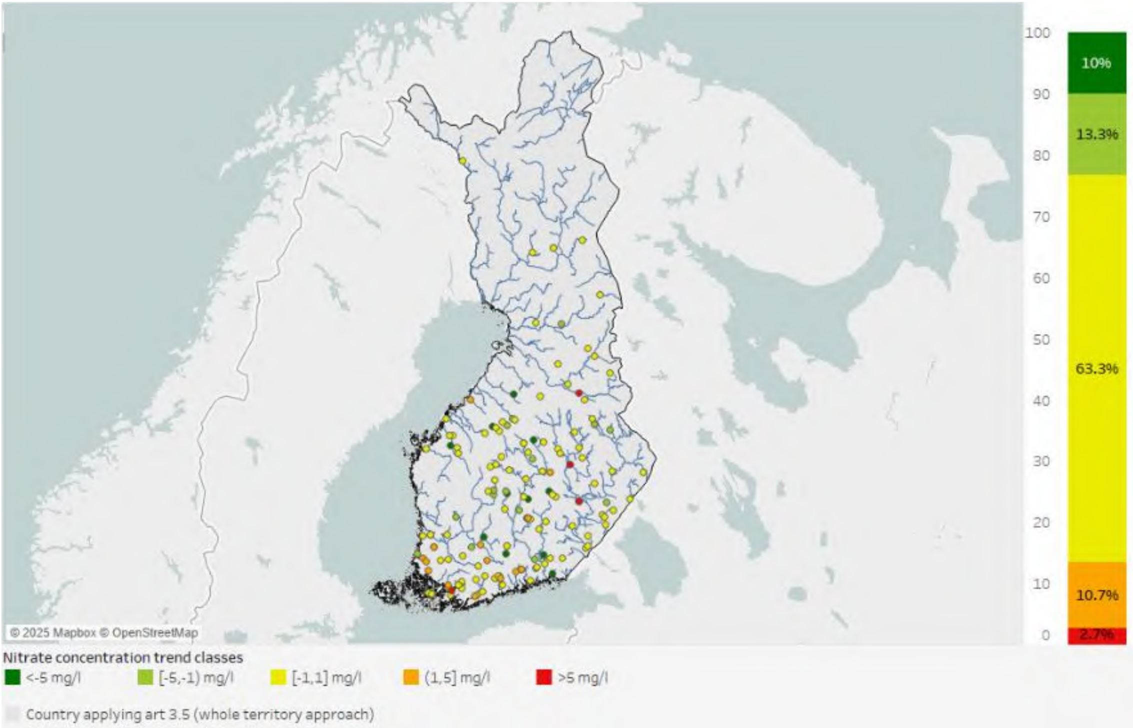
Note: The percentages below 5% are not labelled.

(13) 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 23.3% of monitoring points and an increase in 13.4%. For the remaining 63.3% 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 its above 5 mg/l.

Figure 11 – Map of trends in average annual mean nitrate concentrations (14) 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.

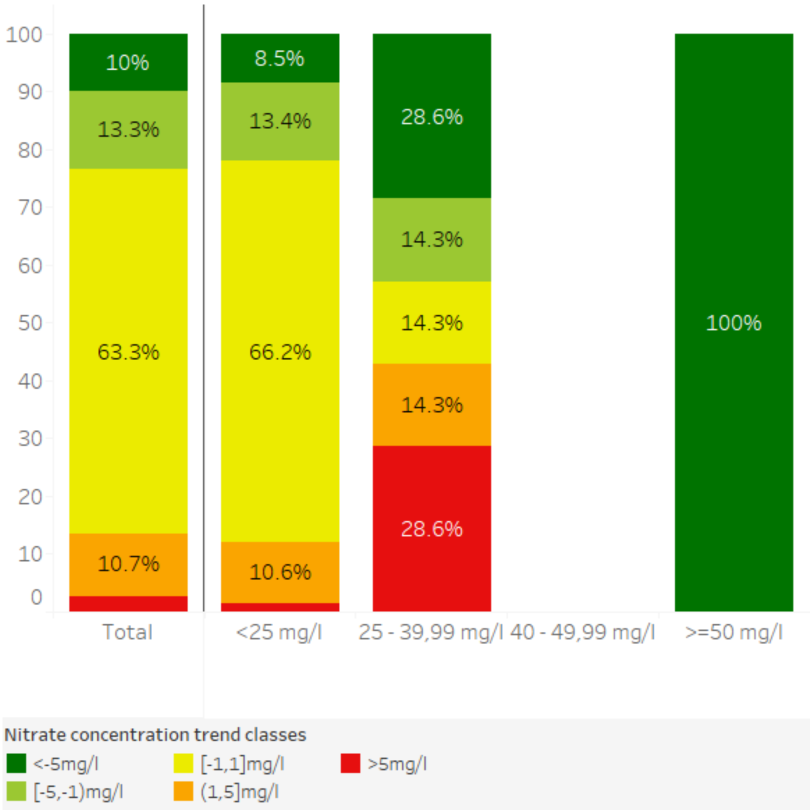
Table 5 – Share of groundwater monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type

	Total Number of Stations	% Total Number of Stations	<-5	[-5,-1)	[-1,1]	(1,5]	>5
Phreatic groundwater (0-5 m)	39	26.0%	5.1%	7.7%	76.9%	5.1%	5.1%
Phreatic groundwater (5-15 m)	108	72.0%	12%	14.8%	59.3%	12%	1.9%
Phreatic groundwater (15-30 m)	3	2.0%		33.3%	33.3%	33.3%	
Phreatic groundwater (>30 m)							
Captive groundwater							
Karstic groundwater							
Total	150	100.0%	10%	13.3%	63.3%	10.7%	2.7%

(14) 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 (above 50 mg/l), there has been a decrease for all stations (100%) 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 12 – 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) [15]

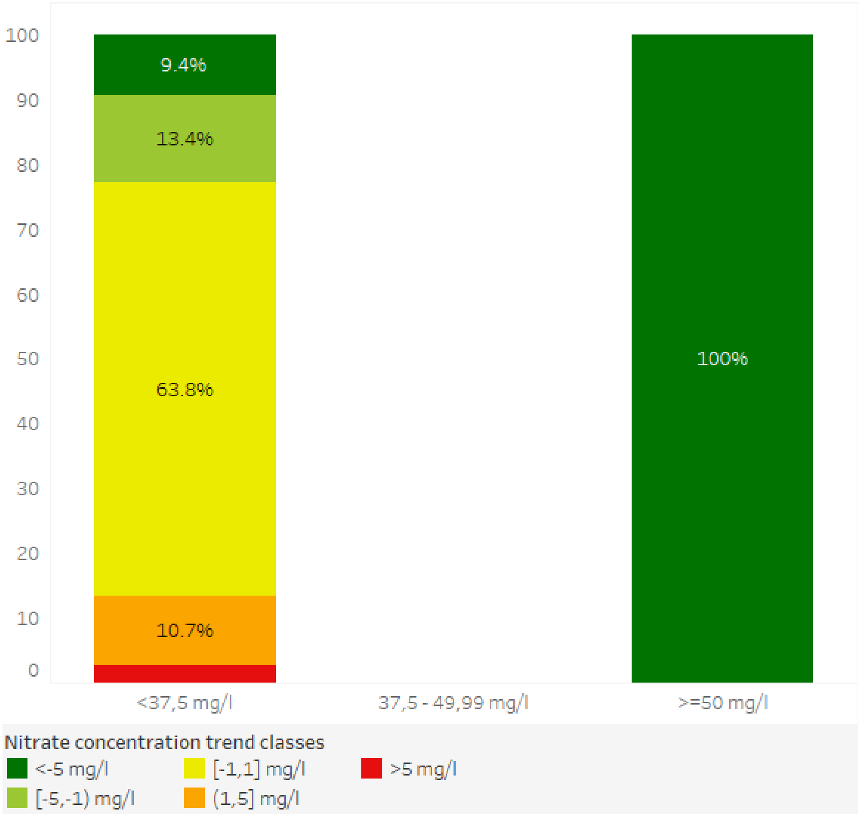


Note: The percentages below 5% are not labelled.

[15] 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. There were no stations with trends and concentrations between 37.5-49.99 mg/l.

Figure 13 – 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) ([16])

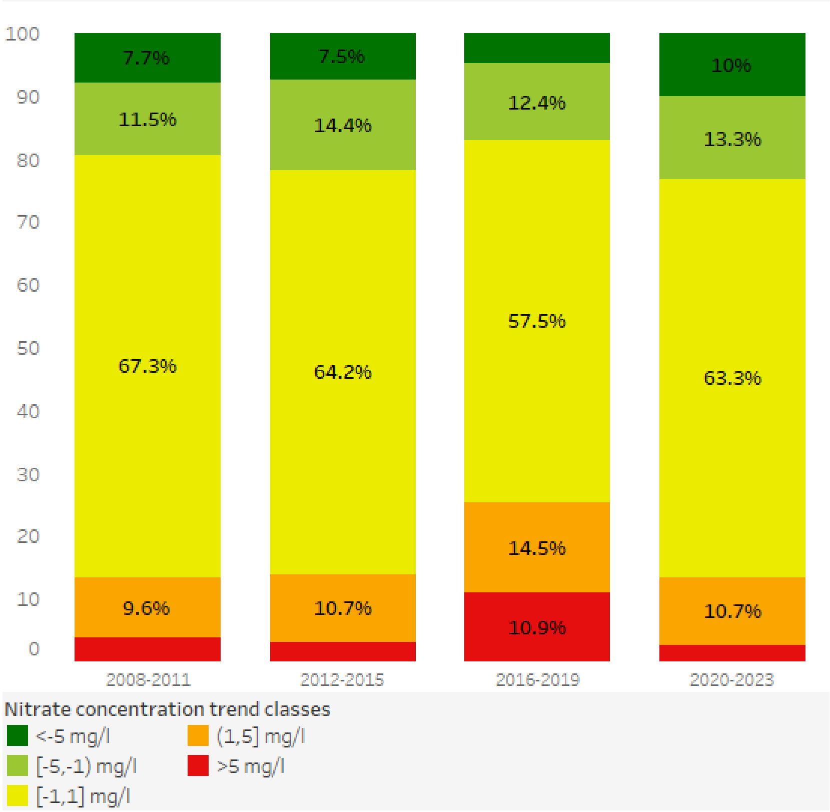


Note: The percentages below 5% are not labelled.

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

Compared to the previous reporting period, there is a higher share of monitoring points with decreasing nitrate concentrations (23.3% in the current reporting period compared to 17.1% in the previous reporting period) and a lower share of monitoring points with increasing nitrate concentrations (13.4% compared to 25.4%). 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 14 – Share of groundwater monitoring points by class of nitrate concentration trend [17] in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

[17] Change in average annual mean nitrate concentrations to 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 mean nitrate concentration is either ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. In Finland there are 6 groundwater nitrate pollution hotspots.

Figure 15 – Groundwater nitrate pollution hotspots

		inside NVZ	outside NVZ	Total
Groundwater	[37.5,50) with incr. trend			
	>=50	6		6
Total		6		6

The large areas with the highest share of hotspots are West Finland (1.4%), Helsinki-Uusimaa (0.9%) and South Finland (0.6%).

Figure 16 – Share of groundwater nitrate pollution hotspots at NUTS2 level

5. NITRATES IN SURFACE WATERS

5.1. Monitoring of nitrate concentrations in surface waters

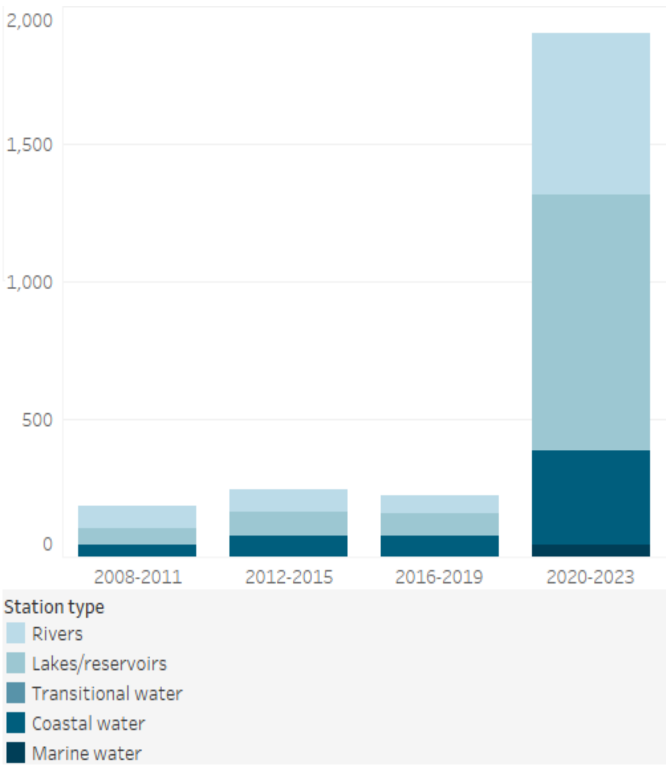
The monitoring network for surface water is managed by the same authorities as for the groundwater monitoring network. The monitoring sites for the period 2020-2023 were expanded compared to the previous periods, including marine water stations in open sea areas. This increase in the number of sites was driven by the Nitrates Directive requirement to assess eutrophication across all surface waters in Finland. Previously, the focus was solely on sites directly affected by agricultural pollution.

The data based on the results of mandatory monitoring and national water quality monitoring were extracted from the national environmental information management system maintained by the Finnish Environment Institute.

During the reporting period 2020-2023 nitrate concentrations were reported at 1 905 surface water monitoring points. Among these, 30.9% were in rivers, 49.0% were in lakes or reservoirs, and 20.2% were in saline waters. The freshwater monitoring points density was 4.5 stations per 1 000 km^2.

The overall number of monitoring points increased by 1 682 (754.3%) compared to the previous reporting period. There has been a strong increase in surface water monitoring stations, in particular lakes/reservoirs, rivers and coastal water. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 17 – 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 1 853 monitoring points, accounting for 97.3% of all points with measurements ([18]). The share of monitoring points with trends increased compared to the previous reporting period (69.5% 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 ([19])

	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	81	79	68	588	80	79	68	570
Lakes/reservoirs	60	88	79	933	59	86	45	912
Transitional water								
Coastal water	44	75	76	343	44	75	42	336
Marine water				41				35
Total	185	242	223	1,905	183	240	155	1,853

([18]) The Member State can report a monitoring point with trends that was monitored but not reported in the previous reporting period.

([19]) Finland reported that monitoring was discontinued in 28 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.

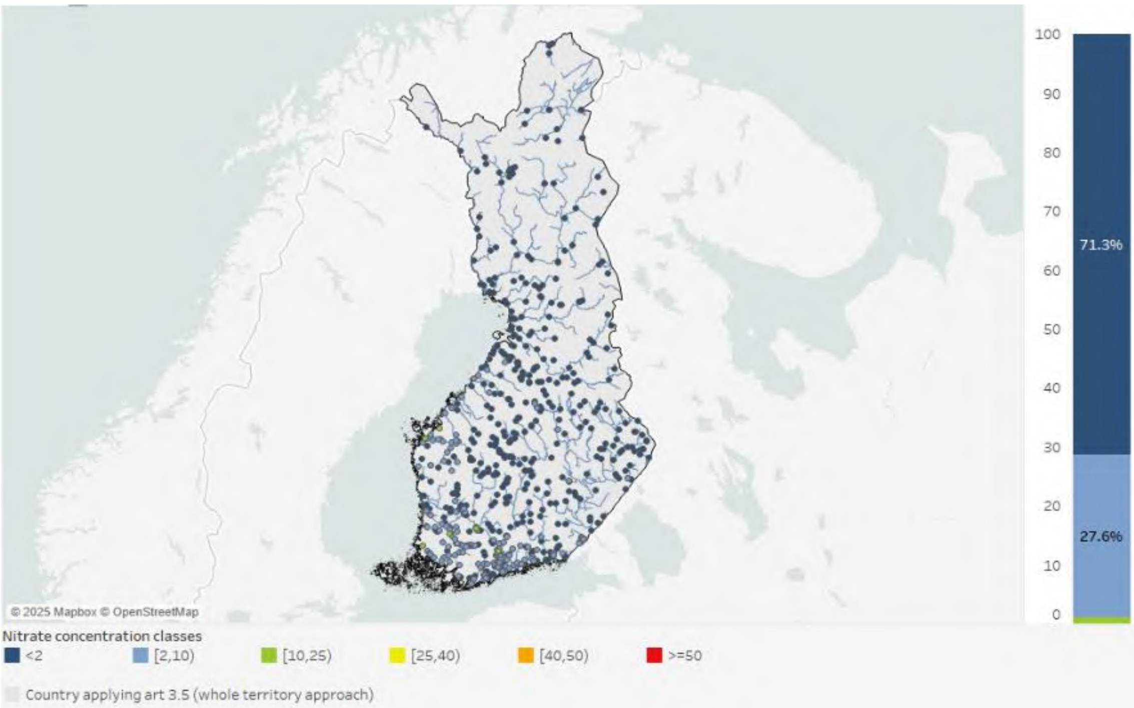
5.2. Nitrate concentrations in surface waters

Rivers

In Finland, no monitoring points in rivers showed average nitrate concentrations above 25 mg/l, whereas 1.2% had concentrations between 10-24.99 mg/l, 27.6% in the class 2-9.99 mg/l and 71.3% 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.

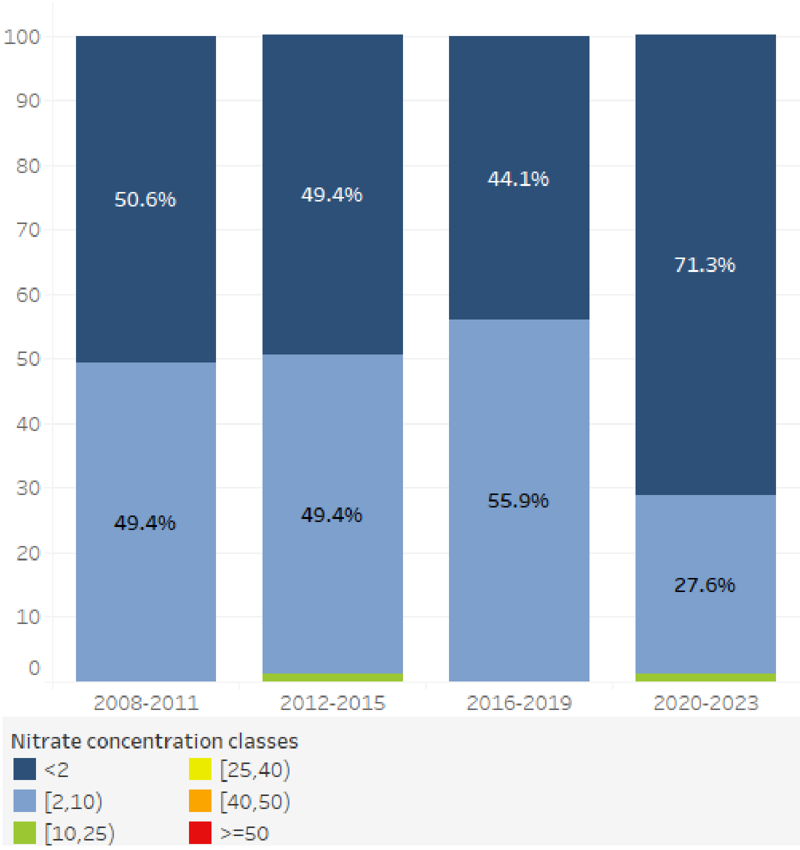
Figure 18 – Map of average annual mean nitrate concentrations in rivers and share of monitoring points by concentration class in the reporting period 2020-2023



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 remained at 0%. The graph below presents the shares of monitoring points according to nitrate concentration class in the last four reporting periods. However, direct comparison is not possible due to the significant changes in the monitoring network.

Figure 19 – Share of monitoring points in rivers by class of nitrate concentration ([20]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

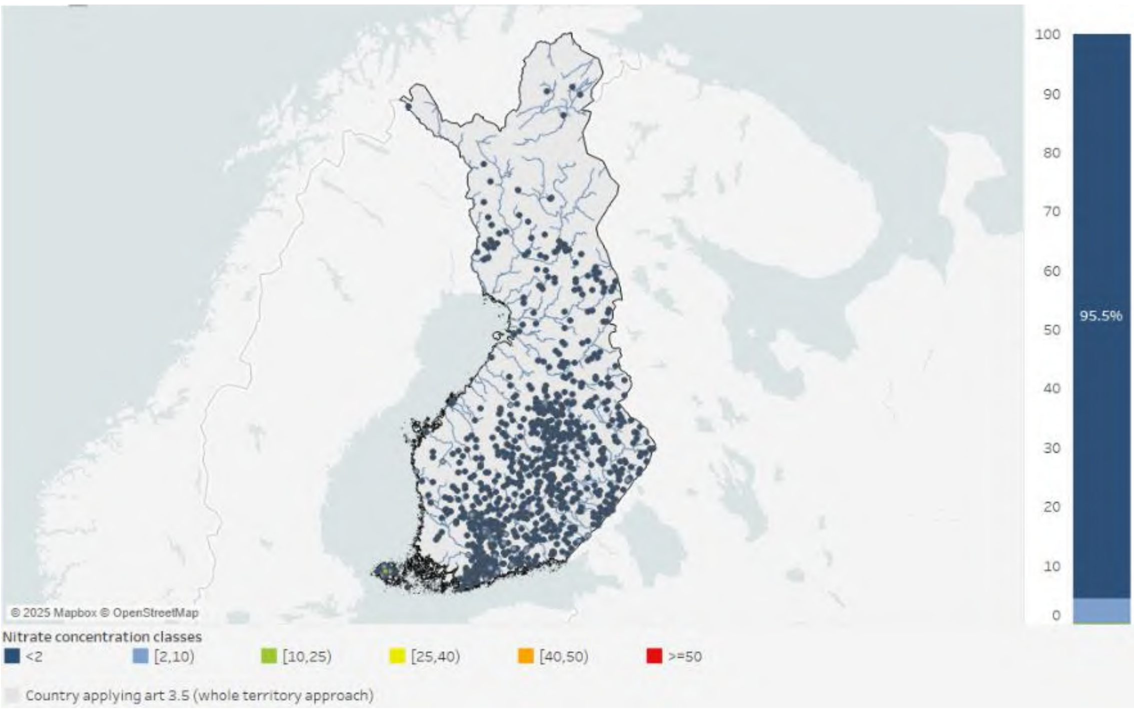
([20]) Average of annual mean values over the reporting period.

Lakes/water reservoirs

In Finland, no monitoring points in lakes/water reservoirs showed average nitrate concentrations above 25 mg/l, whereas 0.1% had concentrations between 10-24.99 mg/l, 4.4% in the class 2-9.99 mg/l and 95.5% 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 20 – 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



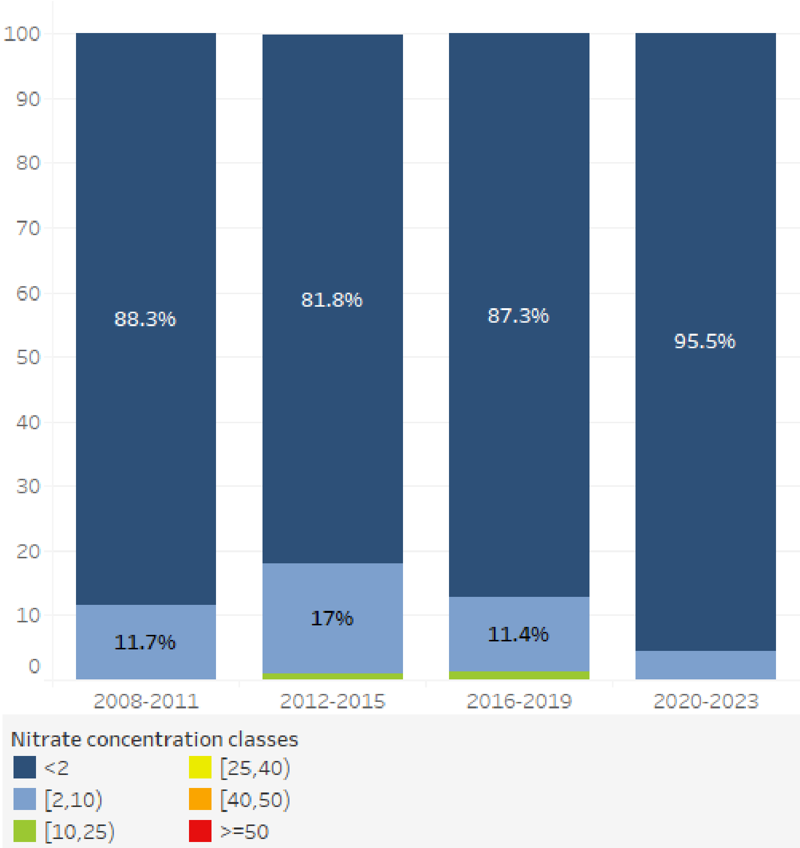
Note: In the map, monitoring points with higher values are plotted on top. In the graph, the percentages below 5% are not labelled.

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	588	38.7%	71.3%	27.6%	1.2%			
Lakes/reservoirs	933	61.3%	95.5%	4.4%	0.1%			
Total	1,521	100.0%	86.1%	13.3%	0.5%			

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 class of nitrate concentration in the last four reporting periods. However, direct comparison is not possible due to the significant changes in the monitoring network between the periods.

Figure 21 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration ([21]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

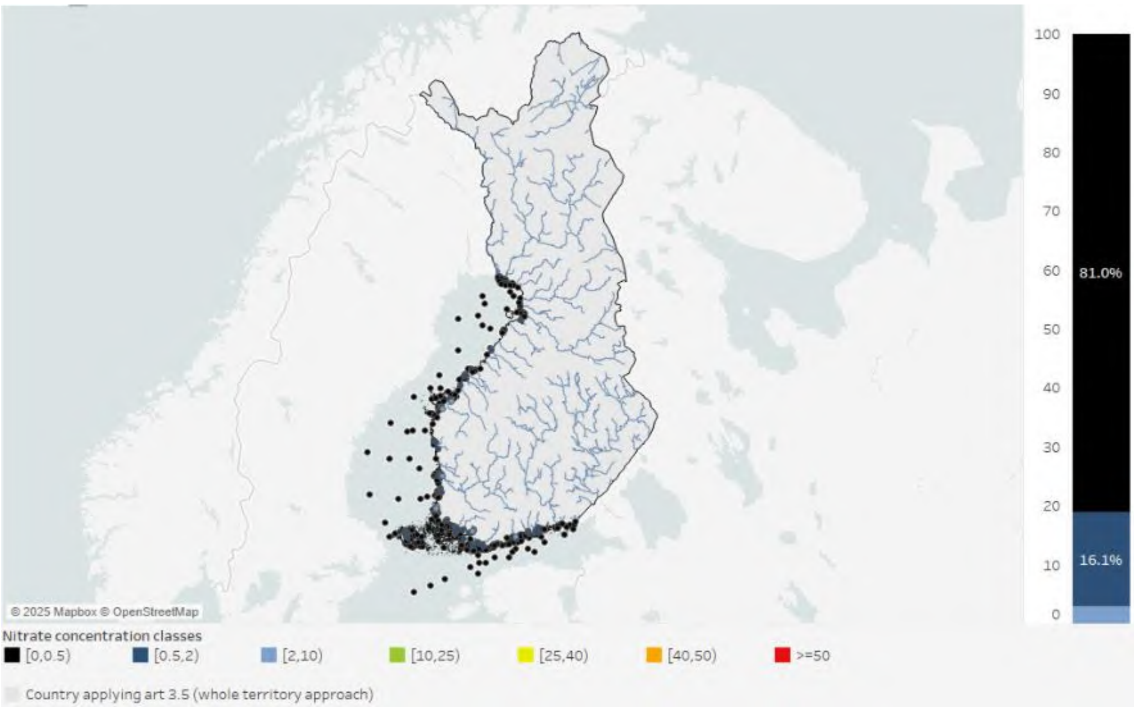
([21]) Average of annual mean values over the reporting period.

Saline waters ([22])

No points in saline waters monitoring points showed average nitrate concentrations ≥ 10 mg/l, 2.9% showed concentrations between 2-9.99 mg/l and 16.1% between 0.5-2 mg/l and 81.0% 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 22 – 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 Finland, there are no transitional water bodies.

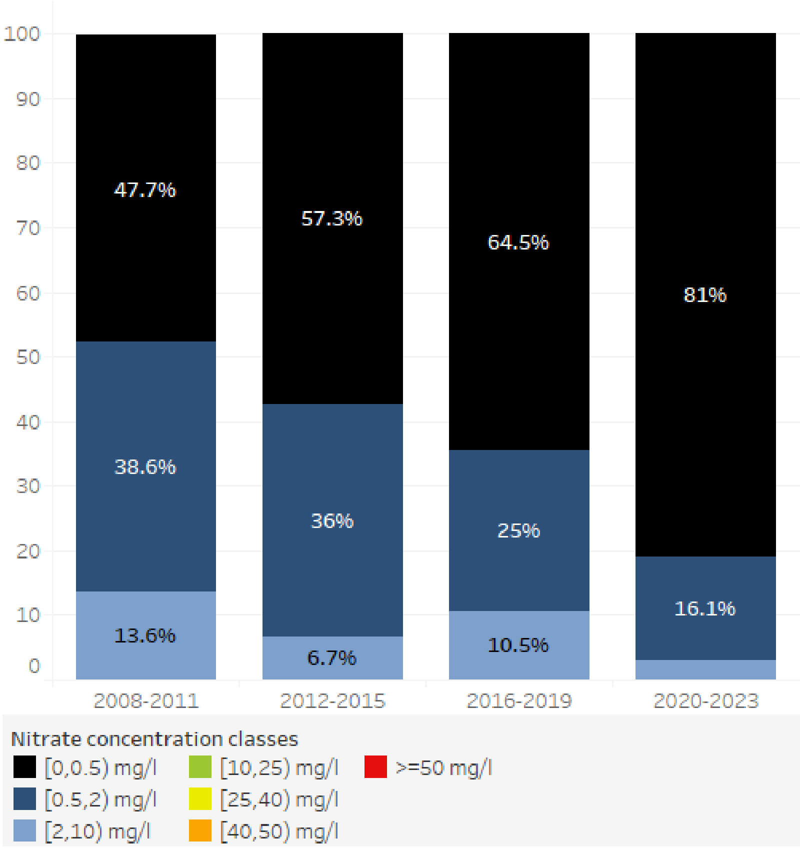
Table 8 – Share of saline water monitoring points by nitrate concentration class (mg/l) in the reporting period 2020-2023, categorised by station type

	Number of stations	% of Total	<0.5	[0.5,2)	[2,10)	[10,25)	[25,40)	[40,50)	>=50
Transitional water									
Coastal water	343	89.3%	78.7%	18.1%	3.2%				
Marine water	41	10.7%	100.0%						
Total	384	100.0%	81.0%	16.1%	2.9%				

([22]) This includes coastal, marine and transitional waters.

The graph below presents the shares of monitoring points per class of nitrate concentration in the last four reporting periods. However, direct comparison between last two reporting periods is not possible due to the significant changes in the monitoring network.

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



Note: The percentages below 5% are not labelled.

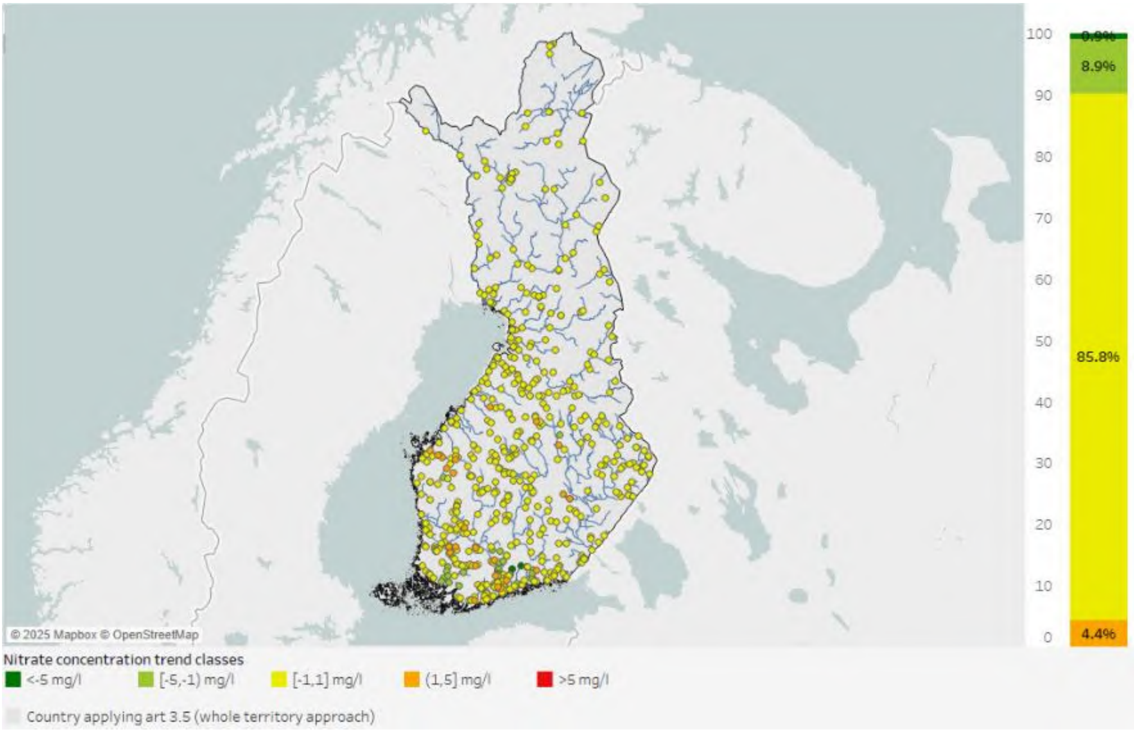
([23]) Average of annual mean values over the reporting period.

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 9.8% of monitoring points and an increase in 4.4%. For the remaining 85.8% 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 its above 5 mg/l.

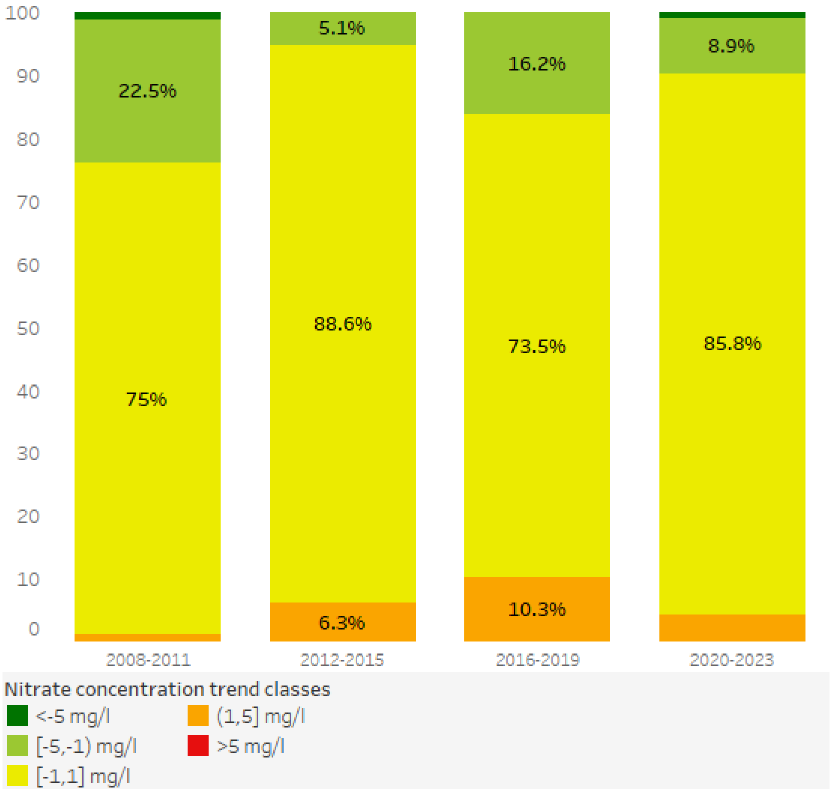
Figure 24 – Map of trends in average annual mean nitrate concentrations in rivers between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



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

Compared to the previous reporting period, there is a lower share of monitoring points with decreasing nitrate concentrations (9.8% in the current reporting period compared to 16.2% in the previous reporting period compared) but also a lower share of monitoring points with increasing nitrate concentrations (4.4% compared to 10.3%). 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 25 – Share of monitoring points in rivers by class of nitrate concentration trend ([24]) in the current and previous reporting periods



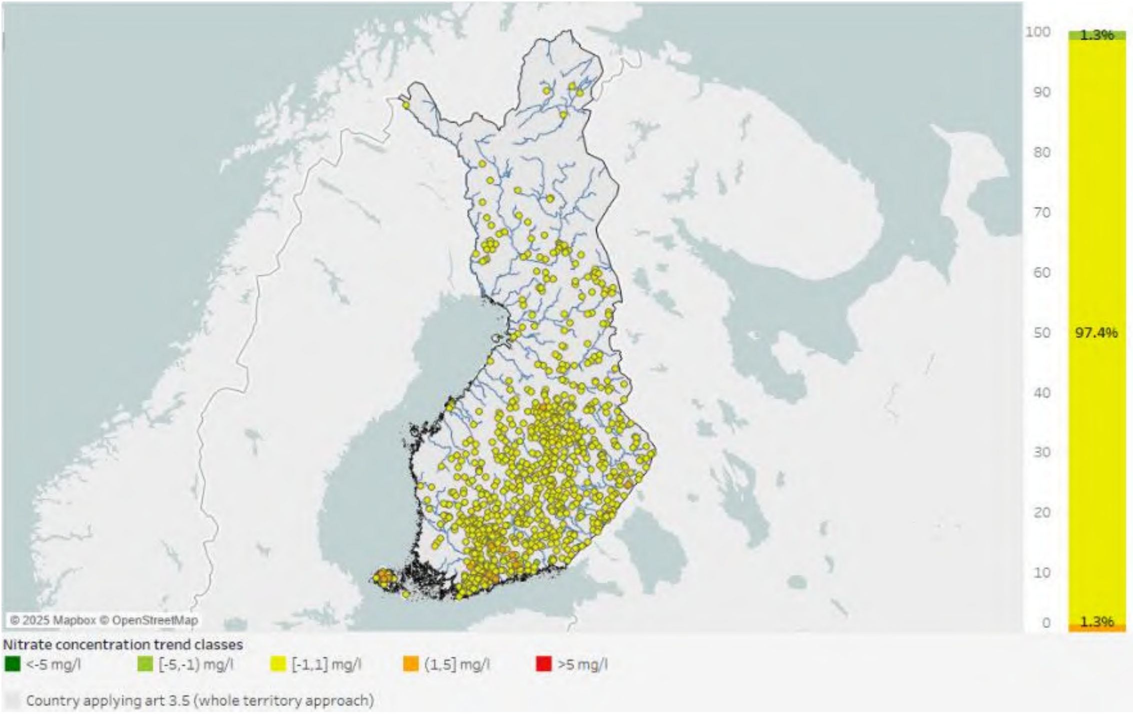
Note: The percentages below 5% are not labelled.

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

Lakes and water reservoirs

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 1.3% of monitoring points and an increase in 1.3%. For the remaining 97.4% 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 its above 5 mg/l.

Figure 26 – 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



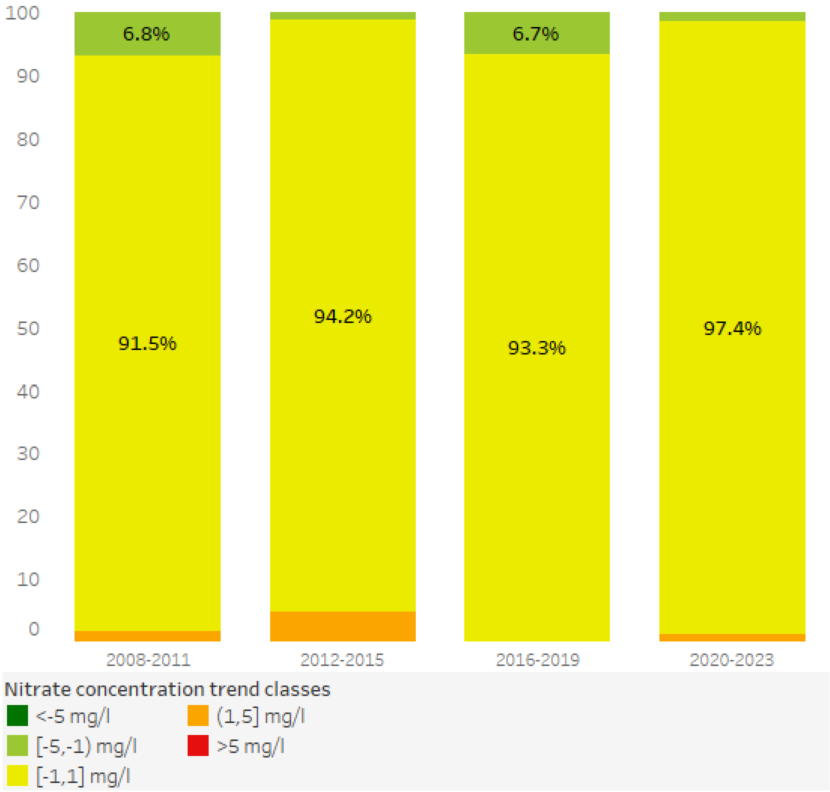
Note: In the map, monitoring points with higher values are plotted on top.

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	570	38.5%	0.9%	8.9%	85.8%	4.4%	
Lake/Reservoir	912	61.5%		1.3%	97.4%	1.3%	
Total	1,482	100.0%	0.3%	4.3%	92.9%	2.5%	

Compared to the previous reporting period, there is lower share of monitoring points with decreasing nitrate concentrations (1.3% in the current reporting period compared to 6.7% in the previous reporting period) and but a higher share of monitoring points with increasing nitrate concentrations (1.3% 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 27 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration trend [25] in the current and previous reporting periods



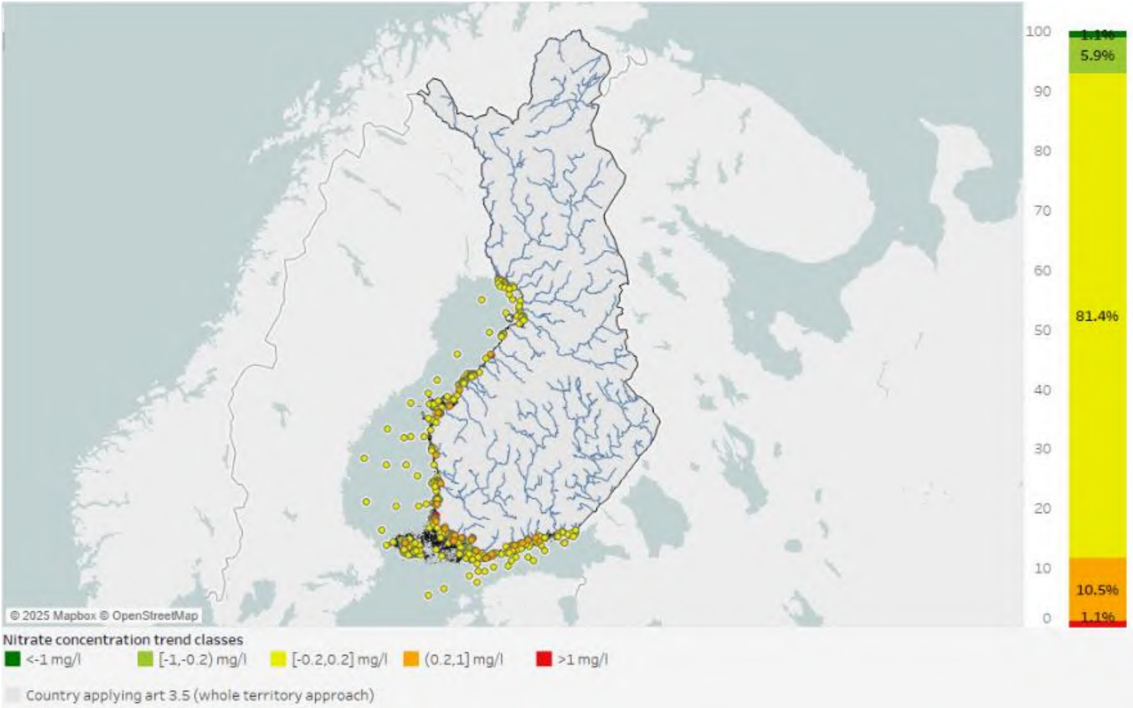
Note: The percentages below 5% are not labelled.

[25] Change in average annual mean nitrate concentrations to previous reporting period.

Saline waters

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 7.0% of monitoring points and an increase in 11.6%. For the remaining 81.4% 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 its above 1 mg/l.

Figure 28 – 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



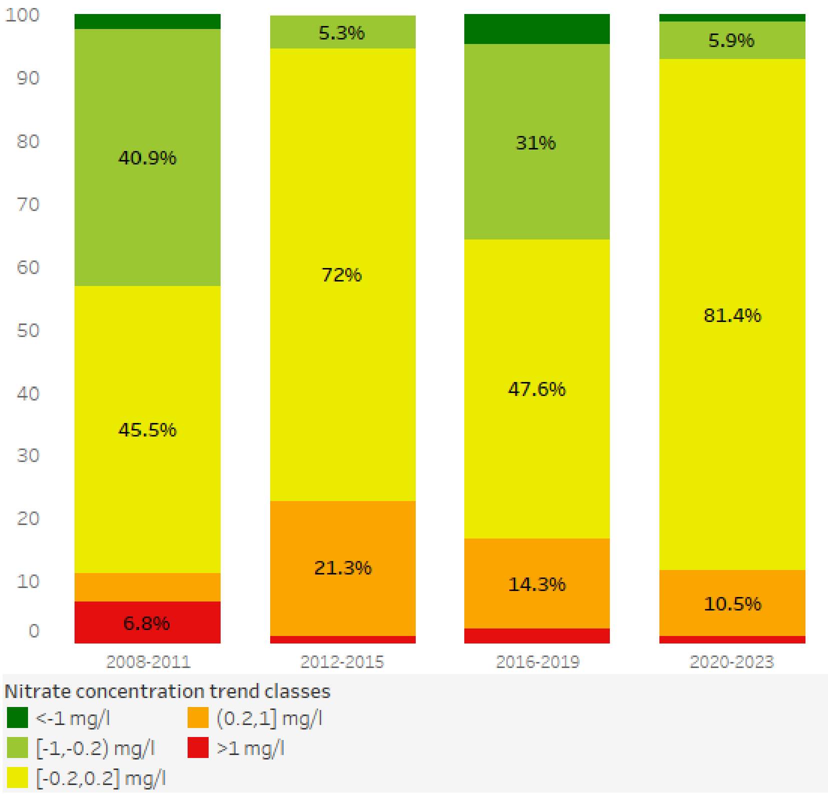
Note: In the map, monitoring points with higher values are plotted on top.

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	336	90.6%	1.2%	6.5%	79.5%	11.6%	1.2%
Marine water	35	9.4%			100%		
Total	371	100.0%	1.1%	5.9%	81.4%	10.5%	1.1%

Compared to the previous reporting period, there is lower share of monitoring points with decrease of nitrate concentrations (7.0% in the current reporting period compared to 35.8% in the previous reporting period) but also a lower share of monitoring points with increase of nitrate concentrations (11.6% compared to 16.7%). 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 29 – Share of monitoring points in saline waters by classes of nitrate concentrations ([26]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

([26]) Change in average annual mean nitrate concentrations to 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 mean nitrate concentration is ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. There are no such surface water nitrate pollution hotspots.

6. EUTROPHICATION OF SURFACE WATERS

6.1. Monitoring of trophic status in surface waters

The eutrophication monitoring network was managed by the Finnish Environment Institute (SYKE) and the ELY Centres. The level of eutrophication in surface waters was assessed using the ecological status classification from the Water Framework Directive (WFD), following guidelines from the Commission.

During the reporting period 2020-2023 trophic status was reported at 1 935 monitoring points. Among these, 32.5% were in rivers, 48.3% were in lakes or reservoirs, and 19.3% were in saline waters. The station density of monitoring points, where trophic status was assessed equals to 4.6 stations per 1 000 km^2.

The overall number of freshwater monitoring points increased by 1 415 (962.6%), and number of saline water monitoring points increased by 297 (390.8%) compared to the previous reporting period. This change was driven by a strong increase in monitoring stations in lakes/reservoirs, rivers and coastal water, and to some lesser extent marine water.

Figure 30 – Evolution in surface water monitoring network (number of points with trophic status reported)

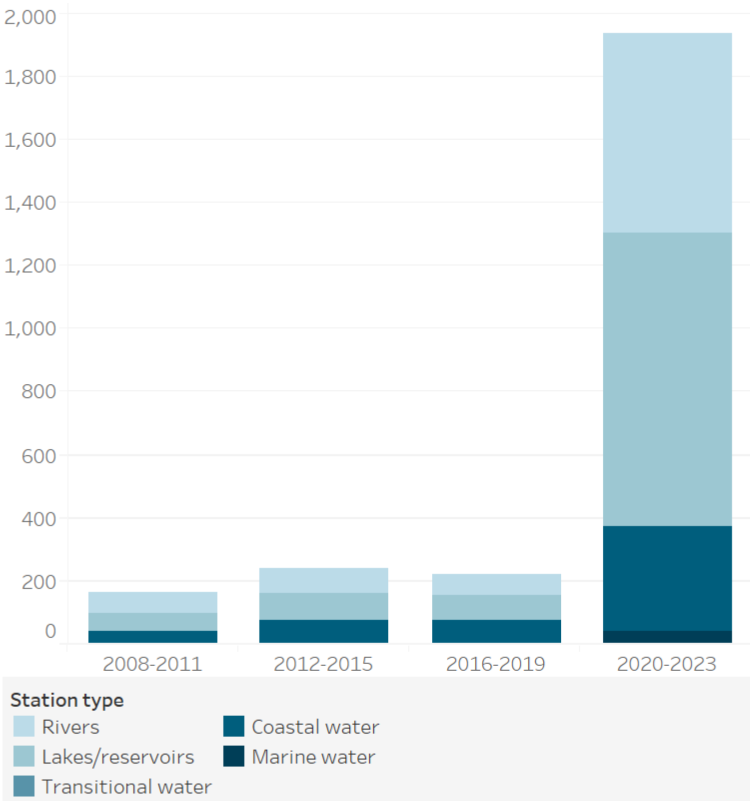


Table 11 – Number of monitoring points reporting trophic status by station type [27]

Station type	Stations With Trophic Status 2008-2011	2012-2015	2016-2019	2020-2023
Rivers	62	79	68	628
Lakes/reservoirs	59	88	79	934
Transitional water				
Coastal water	43	75	76	332
Marine water				41
Total	164	242	223	1,935

6.2. Methodology for the assessment of trophic status

For this reporting period, the classification considered biological quality elements alongside physico-chemical and hydromorphological factors. For rivers, the assessment focuses on total nitrogen and phosphorus concentrations and the ecological quality ratio for surface algae. In lakes, it includes total nitrogen and phosphorus, phytoplankton, fish, and lakebed benthos. In coastal waters, the classification is based on phytoplankton, macroalgae, and benthos for biological elements, and total nitrogen, total phosphorus concentrations, and water clarity for physico-chemical conditions, with a particular emphasis on nutrient concentrations.

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

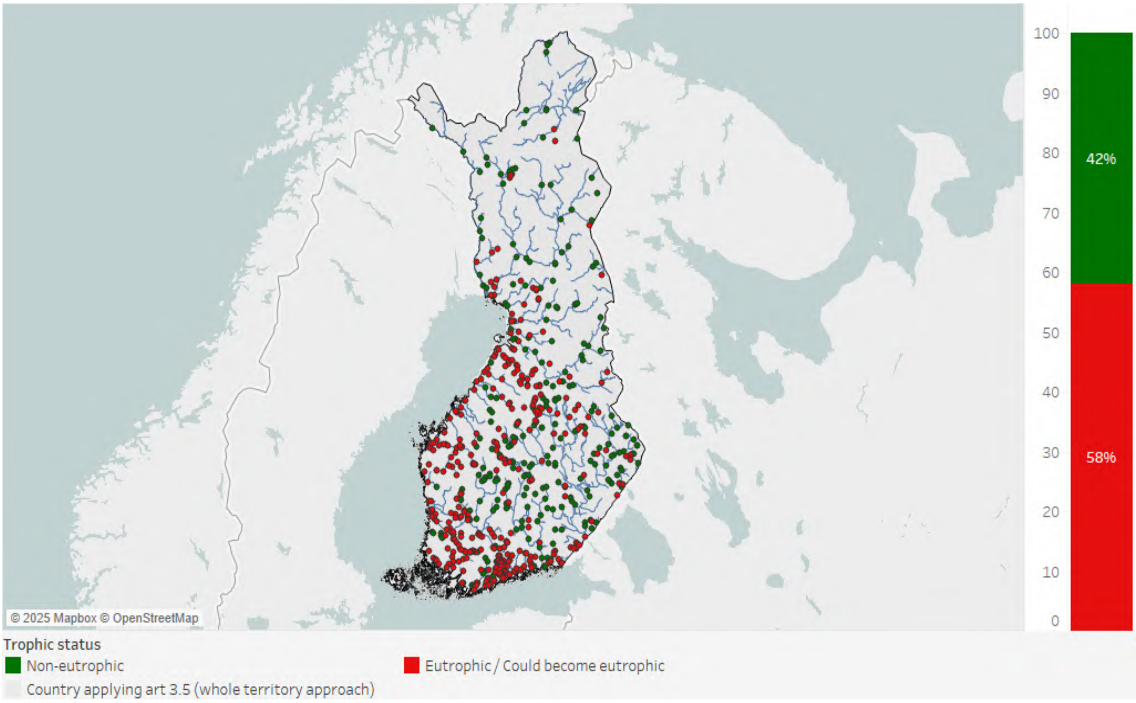
(27) Finland reported that monitoring was discontinued in 28 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

6.3. Eutrophication of surface waters

Rivers

58.0% 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.

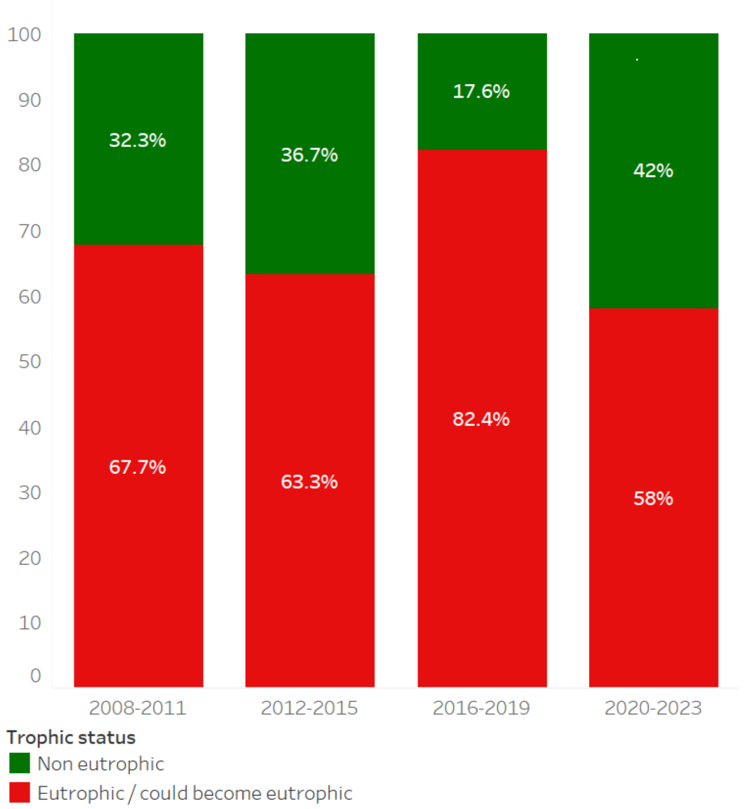
Figure 31 – Map of trophic status in rivers and share of monitoring points by trophic class in the reporting period 2020-2023



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

Compared to the data reported in the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in rivers decreased from 82.4% to 58.0%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. However, due to the significant changes in the monitoring network, it is not possible to directly compare with previous periods.

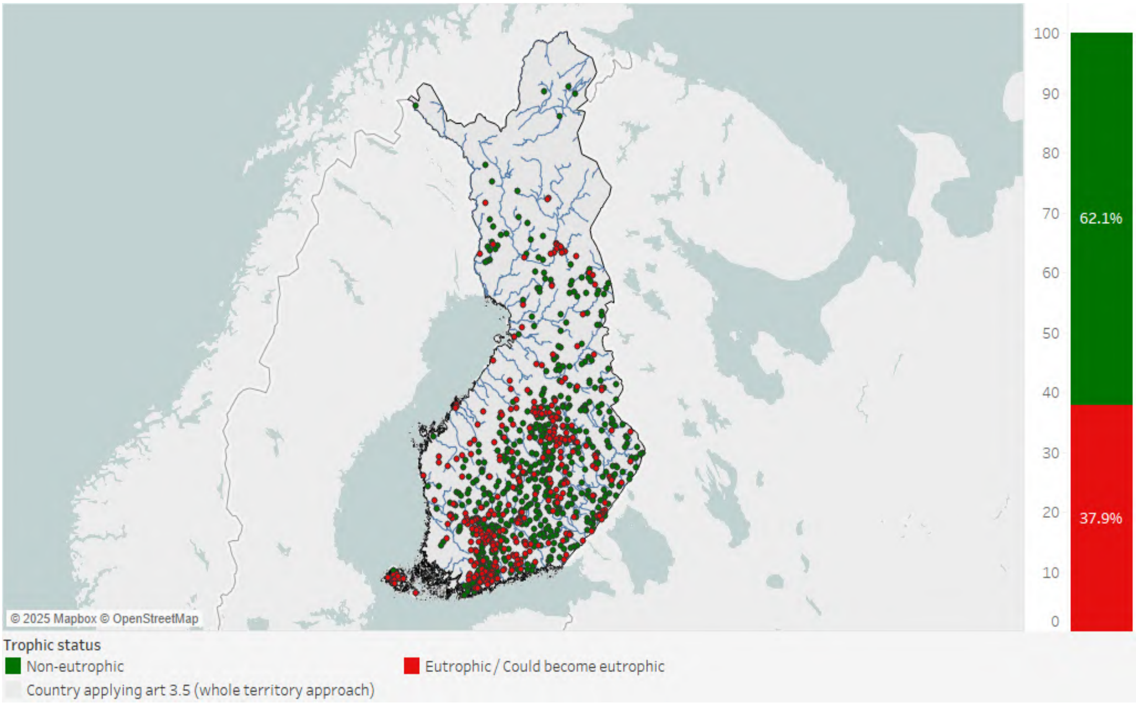
Figure 32 – Share of monitoring points in rivers by class of trophic status in the current and previous reporting periods



Lakes and water reservoirs

37.9% 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 33 – Map of trophic status in lakes/water reservoirs and share of monitoring points by trophic class in the reporting period 2020-2023



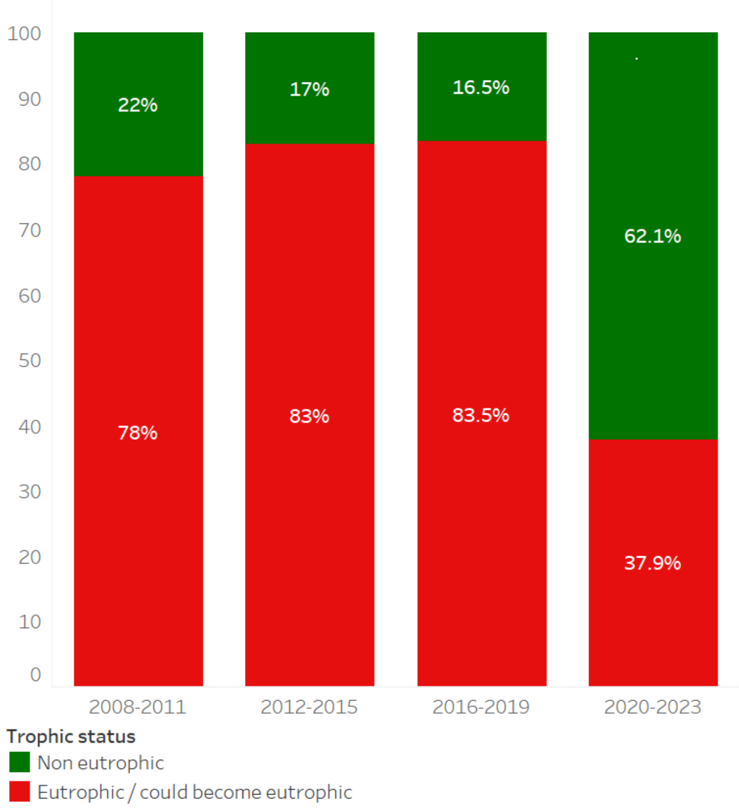
Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

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	628	40.2%	42.0%	58.0%
Lakes/reservoirs	934	59.8%	62.1%	37.9%
Total	1,562	100.0%	54.0%	46.0%

Compared to the data reported in the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in lakes/reservoirs decreased from 83.5% to 37.9%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. However, due to the significant changes in the monitoring network, it is not possible to directly compare with previous reporting periods.

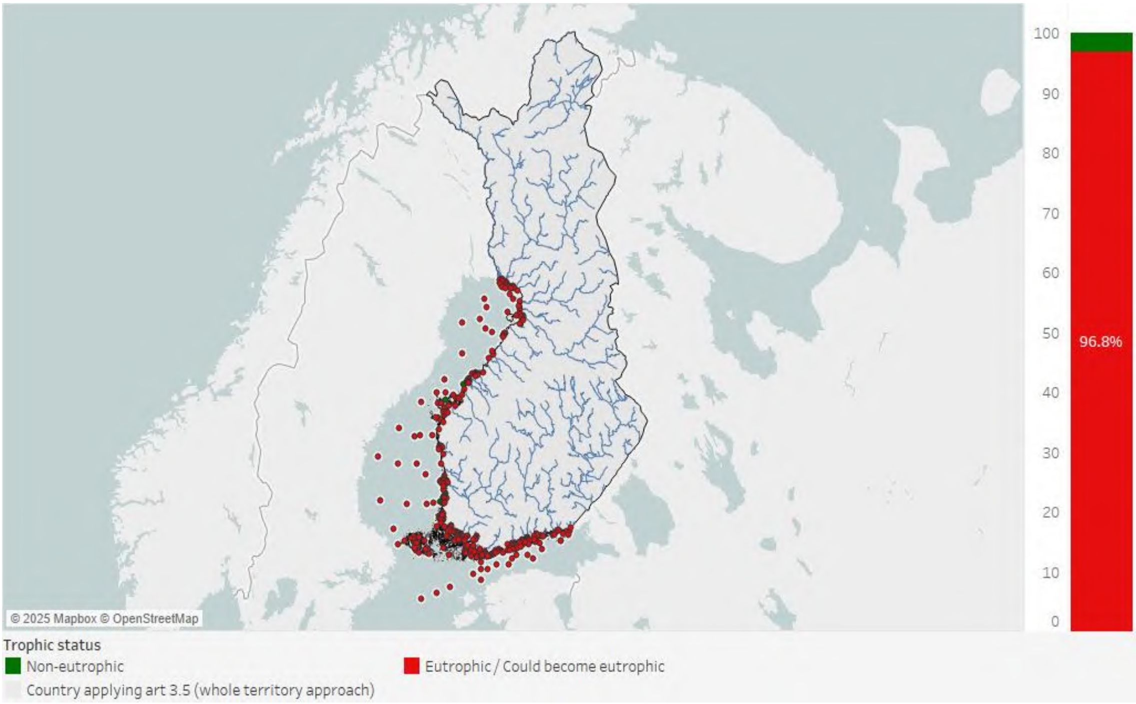
Figure 34 – Share of monitoring points in lakes/water reservoirs by class of trophic status in the current and previous reporting periods



Saline waters

96.8% 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 35 – 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. In the graph, the percentage below 5% are not labelled.

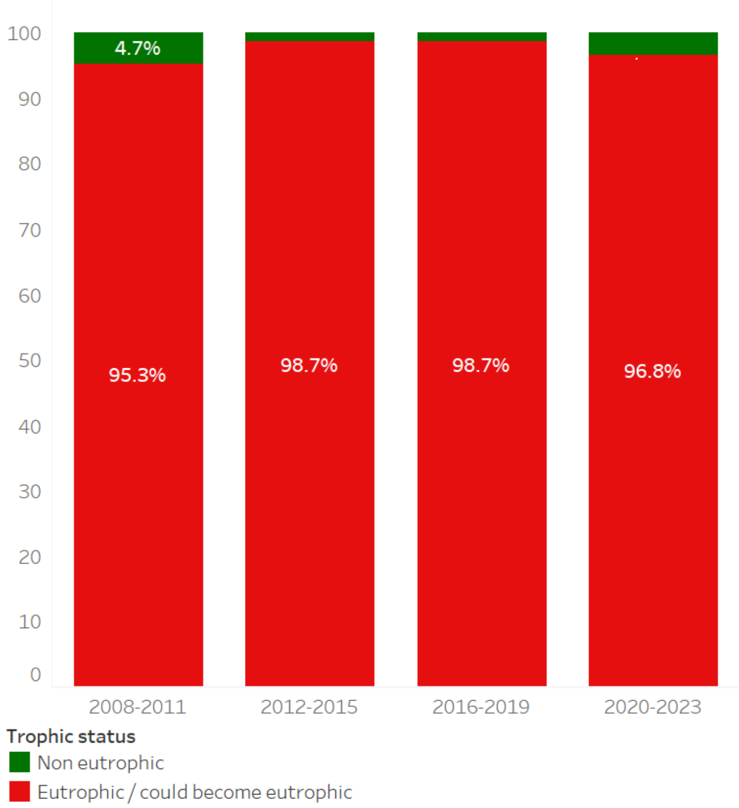
It is relevant to look separately at different types of saline waters (transitional, coastal and marine). In Finland, 96.4% of coastal water monitoring points were eutrophic/could become eutrophic, as shown in the table below. No transitional water monitoring stations were monitored.

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	332	89.0%	3.6%	96.4%
Marine water	41	11.0%		100.0%
Total	373	100.0%	3.2%	96.8%

Compared to the data reported in the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in saline waters decreased from 98.7% to 96.8%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. However, due to the significant changes in the monitoring network, it is again not possible to directly compare with previous periods.

Figure 36 – Share of monitoring points in saline waters by class of trophic status in the current and previous reporting periods

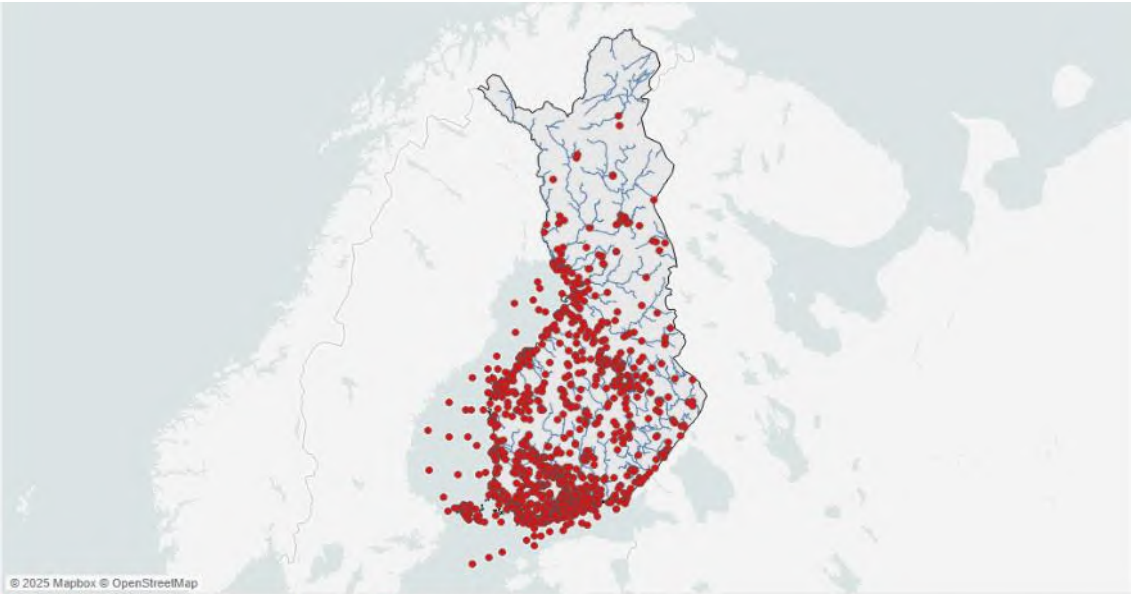


Note: The percentages below 5% are not labelled.

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 1 079 surface water monitoring points which were reported as eutrophic/could become eutrophic.

Figure 37 – Eutrophic/could become eutrophic monitoring points



Eutrophic/could become eutrophic inside NVZ
Eutrophic/could become eutrophic outside NVZ
Country applying art 3.5 (whole territory approach)

	inside NVZ	Total
Rivers	364	364
Lakes	354	354
Coastal water	320	320
Marine water	41	41
Total	1,079	1,079

The highest shares of hotspots are in Åland (90.9%), Helsinki-Uusimaa (73.7%) and South Finland (68.9%).

Figure 38 – 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 watercourses, 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

Finland’s first nitrates action programme was adopted in 1998 and amended in 2000. Since 2014, the implementation of the Nitrates Directive has been governed by Government Decree 1250/2014 on the restriction of certain emissions from agriculture and horticulture. The Decree incorporates the nitrates action programme and applies to the entire territory of mainland Finland. Simultaneously, it serves as the national code of good agricultural practices.

The Government Decree have been amended in 2015 and 2024. No amendments were made to the Decree during the reporting period 2020-2023.

The Åland islands implement the Nitrates Directive through a separate Water Action Plan. The first Water Action Plan for Åland has been established on 10 December 2009. The current plan covers the period 2022-2025 and addressed pressures on water quality across all relevant activities and sectors, with a view to identifying and implementing appropriate mitigation measures.

A consolidated overview of the action programme currently in force is provided in a separate document ([28]).

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

7.2. Controls

On mainland Finland, compliance with the Action Programme is monitored through CAP conditionally controls carried out by the Finnish Food Authority. In 2022, a total of 258 farms were inspected, corresponding to approximately 0.6% of farms that have applied for CAP's direct payments. The most frequent non-compliances identified during these inspections related to incorrect fertiliser use (9.0 %), manure analysis procedures on farm (7.0 %), record keeping of fertiliser use (6.0 %) and manure storage (2.0 %).

In addition, a survey conducted by municipal environmental protection authorities, covering 210 municipalities (approximately 72% of mainland Finland), indicated that the majority of cases brought to the attention of the environmental protection authorities. concerned deficiencies in storing of manure and unpacked organic fertiliser products.

8. WATER QUALITY OUTLOOK

The Finnish report applies a model and makes general assumptions to forecast the development of future water qualities, describing the development of nutrient load, nitrogen flows, and nitrogen and phosphorus concentrations. It concludes that regional nutrient balances are slightly declining - despite the fact that the analysis is complicated by annual weather conditions and fertiliser price fluctuations affecting the balances - and the nitrogen load from agricultural sources in catchment areas has fallen by around 30%. The impact of pollution load changes and climate change on nutrient concentrations in coastal waters and phytoplankton biomass has been assessed using a coastal total load model. This model was applied in projects such as nutrient load ceilings for coastal waters and burden sharing for load reduction (KATOT), which evaluated various measures' effects on nutrient loads and coastal water states over 2024-2053. Despite potential improvements, the projects indicate that achieving good status is not possible even with extensive measures within the next 30 years, except possibly in the outer coastal waters of the Bothnian Sea.

According to the report, climate change will increase the likelihood of extreme weather phenomena, impact groundwater reserves and increase surface water levels. Rising water levels and flooding may transport agricultural nutrients to groundwater, deteriorating its quality over larger areas. A longer growing season and long summer droughts can lead to higher fertilizer loads and lower groundwater levels, degrading quality and leaching iron and manganese from deeper soil layers. Changes in water levels may alter flow directions, carrying pollutants into previously safe groundwater areas. The report states that more research is needed into the impacts of climate change on groundwater reserves and quality.

Publications Office
of the European Union