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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 10/27.

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Brussels, 15.7.2026
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PART 10/27

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

Spain

Country staff working document
on the implementation of the Nitrates Directive

Period: 2020-2023

Contents

1. KEY FINDINGS AND RECOMMENDATIONS

Spain submitted its report under the Nitrates Directive for the period 2020-2023 in November 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 Spanish 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 Spain, the utilised agricultural area (UAA) accounts for 48% of the country's total land area, which is higher than the EU average (38%). The livestock density is 0.7 livestock units per hectare (LSU/ha) of UAA, which is around the EU average of 0.7 LSU/ha, but there are regional variations with livestock densities above 2 and up to 3 LSU/ha UAA in some autonomous communities. The gross nitrogen balance is 36 kg/ha UAA and the gross phosphorus balance is 4 kg/ha UAA. (5)

Monitoring network

For groundwater, the density of the monitoring network is around 9 stations per 1 000 km^2, which is higher than the EU average (8 stations). Compared to the previous reporting period, the density increased by 6%.

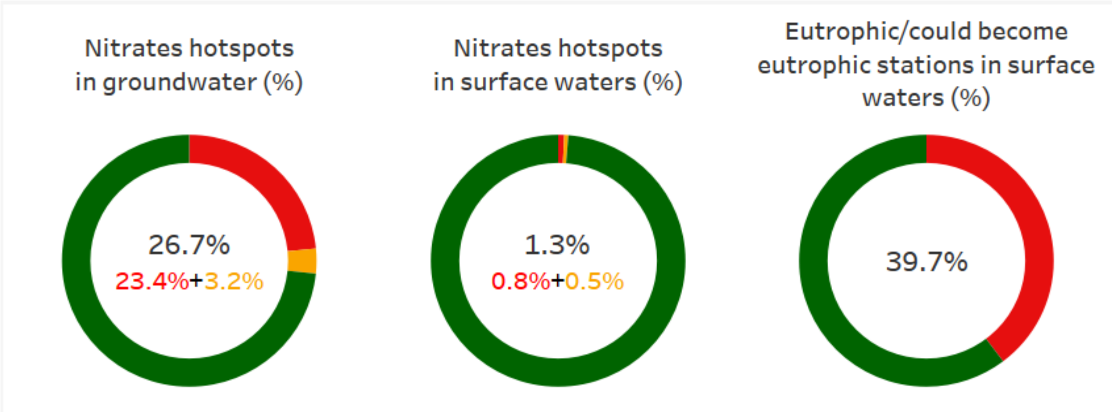
For surface freshwater, the density of the monitoring network is 7 stations per 1 000 km^2, which is the same as the EU average (7 stations). Compared to the previous reporting period, the density decreased by 1%. The monitoring network includes river and lake/water reservoir stations. However, trophic status in rivers is monitored mainly in the southern part of the country.

For surface saline waters, the monitoring network includes transitional and coastal waters.

(1) Final version was received in December 2024.
(2) Reportnet 3 is 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 trophic 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, 76.6% of monitoring points show nitrate concentrations below 50 mg/l.

Overall, 26.7% of monitoring points fall in two categories illustrated in Figure 1, i.e. they show nitrate concentrations ≥ 50 mg/l (23.4%) or between 37.5 and 49.99 mg/l with an increasing trend (3.2%). Compared to the data reported in the previous reporting period, this represents an increase of 0.3 percentage points (from 26.4% to 26.7%). The autonomous communities with the highest share are Region of Murcia (51.6%), Canary Islands (39.6%), Balearic Islands (36.2%), Catalonia (35.0%) and Extremadura (30.7%).

Compared to the previous reporting period, nitrate concentrations decreased in 37.6% of groundwater monitoring points and increased in 33.1%. Among points with nitrate concentration ≥ 50 mg/l, increases (50.9%) were more frequent than decreases (43.2%).

In **surface water**, 99.2% of monitoring points show nitrate concentrations below 50 mg/l and 60.3% are classified as non-eutrophic.

Overall, 1.3% of monitoring points fall in two categories illustrated in Figure 1, i.e. they show nitrate concentrations ≥ 50 mg/l (0.8%) or between 37.5 and 49.99 mg/l with an increasing trend (0.5%). Compared to the data reported in the previous reporting period, this represents a decrease of 0.3 percentage points (from 1.6% to 1.3%). 16% 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 21.5% of surface water monitoring points and increased in 20.0%.

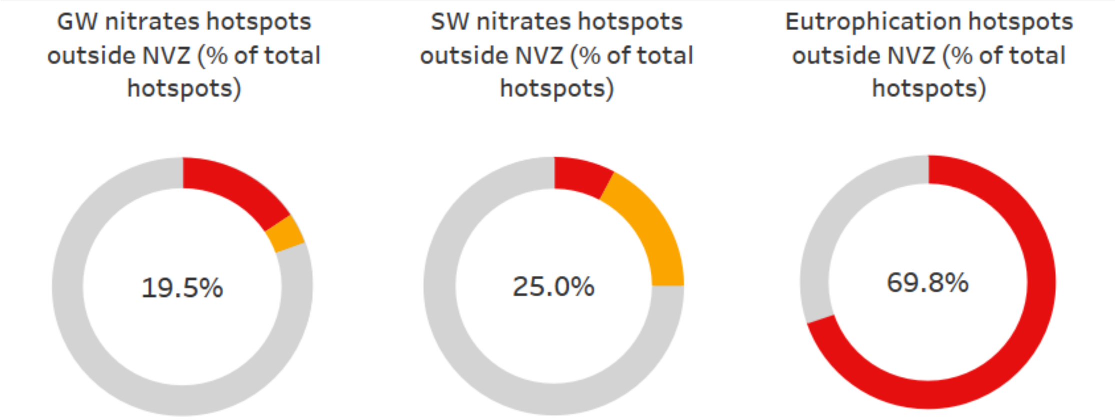
The share of monitoring points reported as eutrophic/could become eutrophic is 39.7% as illustrated in Figure 1. This represents an increase of 22.9 percentage points compared to the data reported in the previous period (from 16.8% to 39.7%). The autonomous communities with the highest shares are Region of Murcia (81.8%), Extremadura (74.4%) and Madrid (55.6%).

Nitrate Vulnerable Zones

Spain changed the Nitrate Vulnerable Zones (NVZ) during the reporting period. The area of NVZ increased and covers 35% of utilised agricultural area.

In Spain, some monitoring points showing pollution are located outside NVZ. Figure 2 reflects that outside NVZ, there are 19.5% of monitoring points showing nitrates pollution (228 out of 1 169), 25.0% of surface water monitoring points showing nitrates pollution (13 out of 52) and 69.8% of the 'eutrophic/could become eutrophic' points in surface waters (310 out of 444).

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

During the reporting period, 10 out of 17 autonomous communities ([6]) modified their action programme. Some amendments addressed buffer zones next to water courses, the fertiliser prohibition period and precautionary measures to avoid nutrient losses on slopes.

Enforcement action

In 2019, the Commission initiated an infringement procedure addressing concerns about Spain's failure to meet various obligations under the Directive. Specifically, it highlighted the lack of designation of NVZs, the failure to include the required mandatory measures in the action programs of a number of autonomous communities, and the failure to implement reinforced measures in areas where existing actions are insufficient to reduce and/or prevent further pollution. In March 2024, the Court of Justice of the EU ruled that

([6]) Andalusia, Aragon, Castile-La Mancha, Castile and León, Catalonia, Balearic Islands, Canary Islands, Navarra, Basque Country, and La Rioja

Spain had failed to fulfil its obligations (Commission vs Spain, C-576/22) by not designating several NVZs, by not including all necessary mandatory measures in the action programs of five autonomous communities, and by failing to take additional or reinforced measures to address pollution in four autonomous communities. Currently, the Spanish authorities and the Commission are in contact to ensure the full implementation of the court ruling.

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
- 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:
    - nitrate pollution hotspots in groundwaters
    - nitrate pollution hotspots in surface waters
    - waters that are eutrophic
- Improve representativeness and coverage of monitoring networks and reported data by extending the monitoring of eutrophication in rivers
- 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

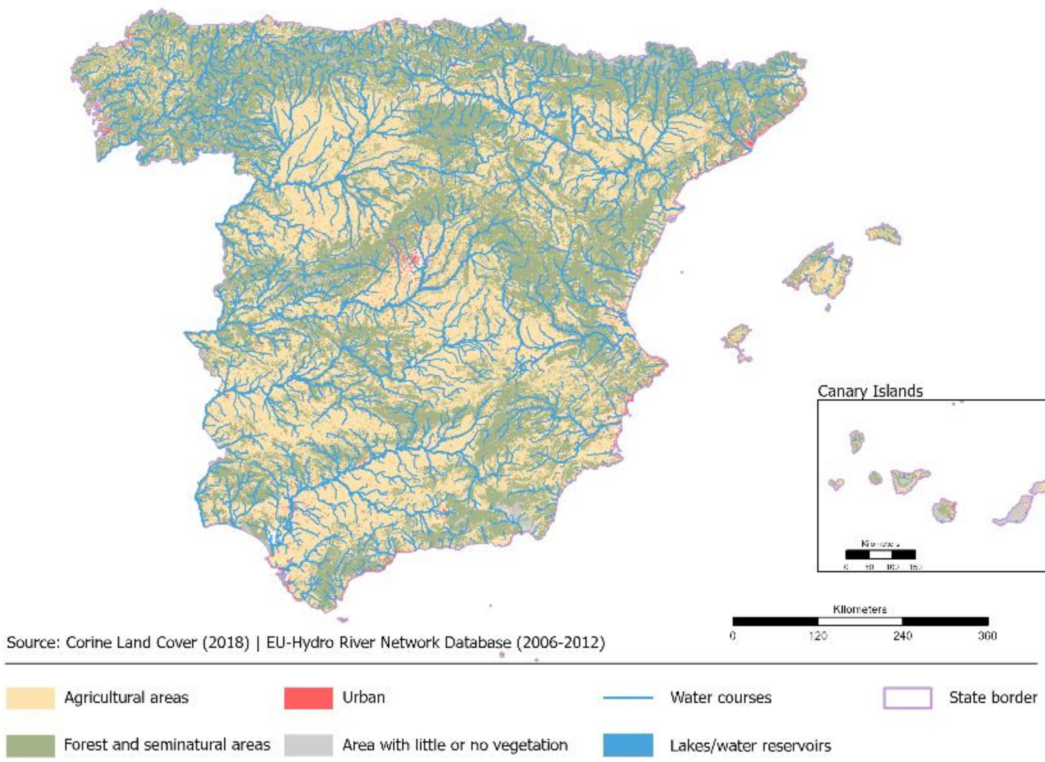
In Spain, crop production accounted for the largest portion of the agricultural sector's total output value at 58.7% in the reporting period 2020-2023. Animal production followed with 38.7%, and other outputs made up 2.6% ([7]). The share of agricultural land used for organic farming increased from 9.0% in the reporting period 2016-2019 to 10.9% 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 Spain along with watercourses and lakes/water reservoirs.

Figure 3 ([9]) – Land use distribution in Spain



(7) Source: Eurostat (aact_eaa01)
(8) Source: Eurostat (ef_m_org)
(9) Ceuta and Melilla could not be shown on all maps in this report. Nevertheless, Spain has provided data and information from these areas, which have been taken into account.

The utilised agricultural area (UAA) in Spain covered 23.9 million hectares in 2020, making up 47.6% of the country's total land area. Arable land accounts for 49.0% of UAA, followed by permanent grassland at 31.5% and permanent crops at 19.5%.

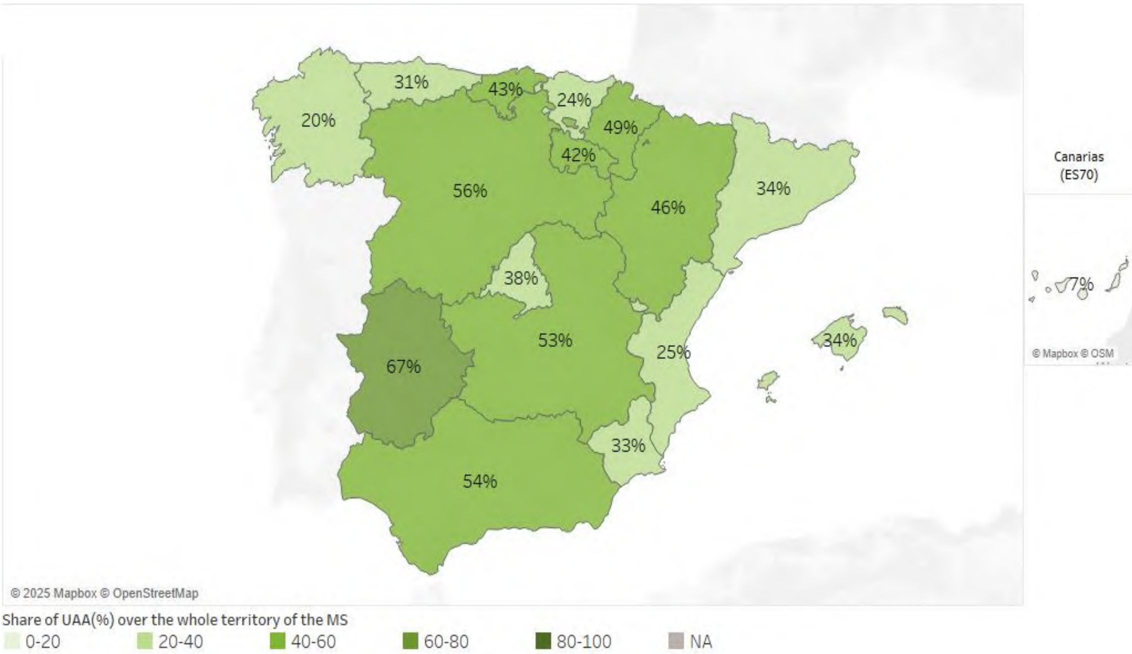
Table 1 – Evolution of the utilised agricultural area

	2010	2013	2016	2020	2023
utilised agricultural area (1000 ha)	23,753	23,300	23,230	23,914	NA
arable land (1000 ha)	11,286	11,295	11,463	11,715	NA
permanent grassland (1000 ha)	8,377	7,962	7,616	7,533	NA
permanent crops (1000 ha)	4,086	4,042	4,150	4,663	NA
kitchen gardens (1000 ha)	3	1	1	3	NA

Source: Eurostat (ef_lus_main)

In 2020, the share of the UAA ranged from 67% in Extremadura, to 20% in Galicia.

Figure 4 – Share of utilised agricultural area (UAA) at NUTS2 level in 2020 ([10])



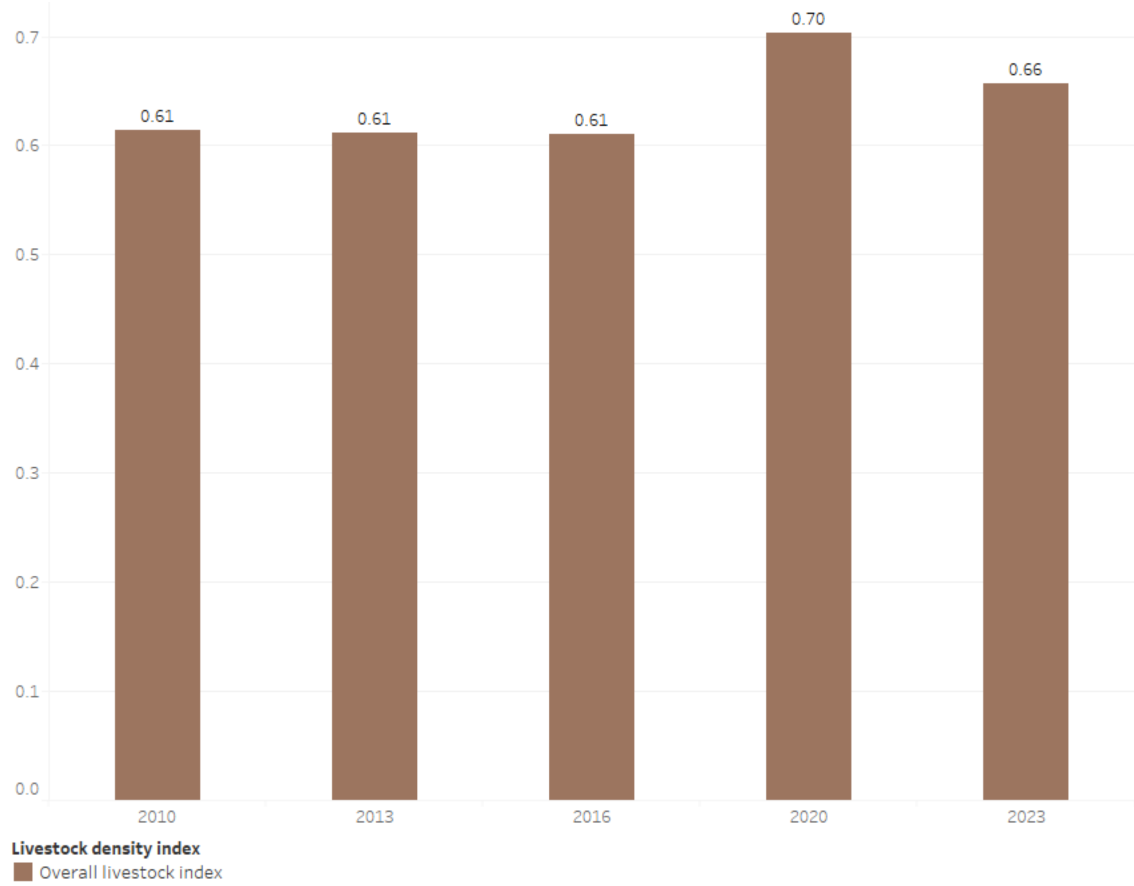
Source: Eurostat (ef_lus_main)

([10]) Latest available data.

2.2. Livestock density

In Spain, the livestock density was 0.66 livestock units per hectare (LSU/ha) of UAA in 2023. The livestock density has increased since 2010.

Figure 5 – Evolution of the livestock density (LSU/ha UAA)



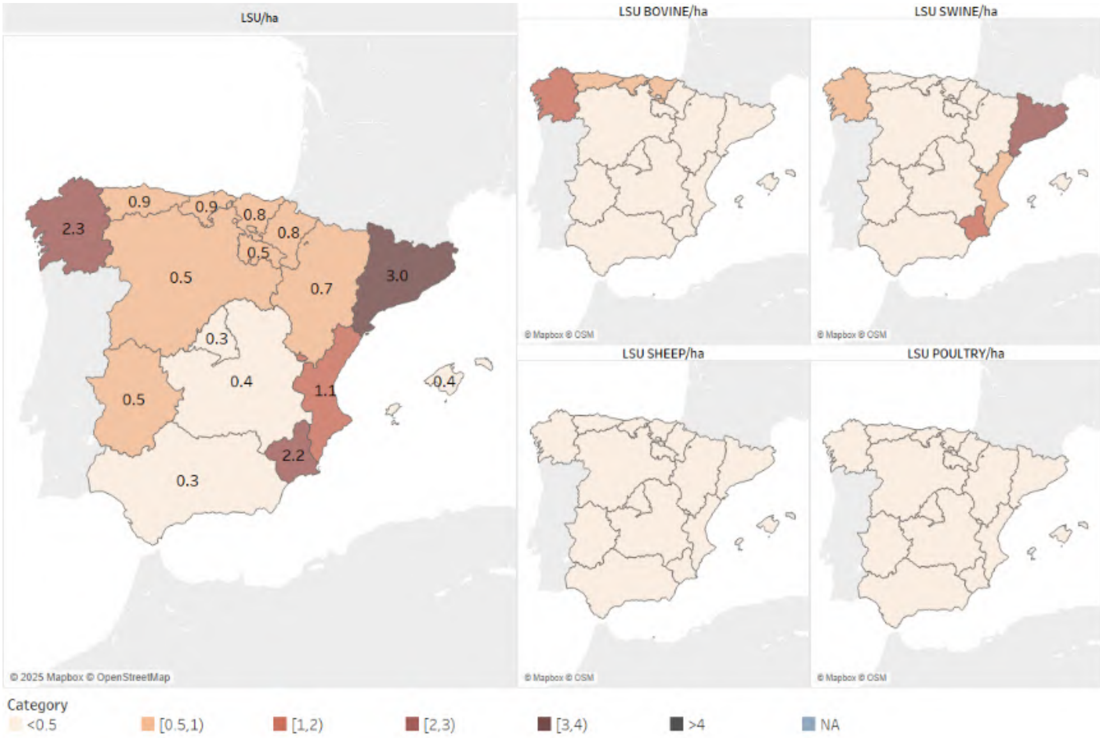
Source: Eurostat (ef_fsi_lskds)

Table 2 – Evolution of the livestock numbers by animal type

	2007	2010	2013	2016	2020	2023
live bovines (Million heads)	6.58	6.08	5.80	6.32	6.64	6.29
of which dairy cows (Million heads)	0.90	0.85	0.84	0.83	0.81	0.79
live pigs (Million heads)	26.06	25.70	25.49	29.23	32.80	33.80
live poultry (Million heads)	NA	200.90	205.82	203.11	211.58	NA
live sheep (Million heads)	NA	18.55	16.12	15.96	15.44	13.60
live goats (Million heads)	2.89	2.90	2.61	3.09	2.65	2.29

There are regional variations, with livestock densities of 3.0 LSU/ha UAA in Catalonia and above 2 LSU/ha in Galicia and the Region of Murcia.

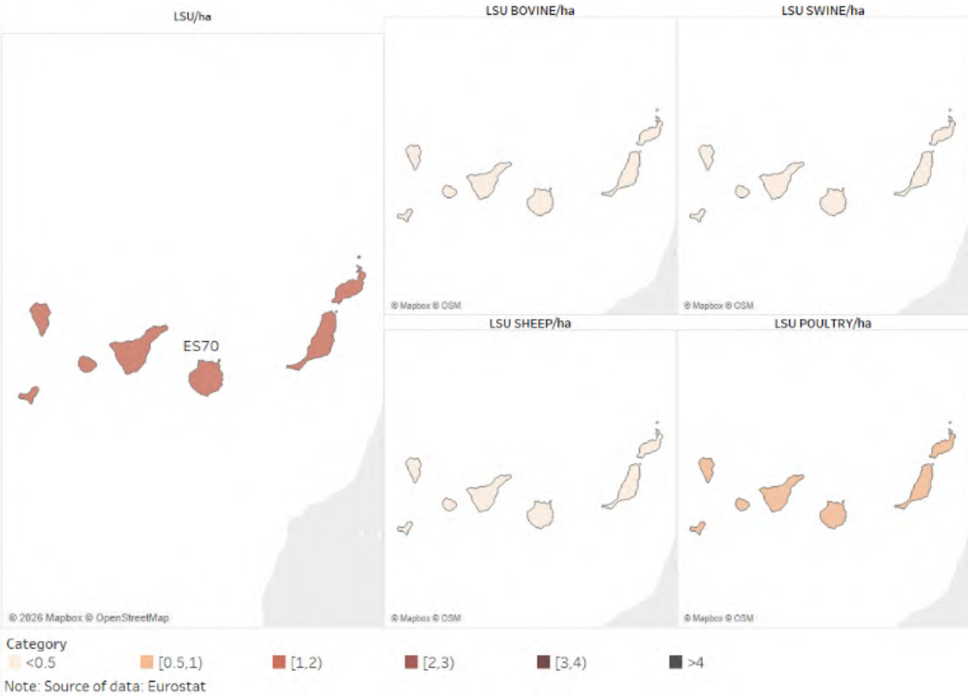
Figure 6 – Livestock density distribution by animal type (LSU/ha UAA) at NUTS2 level in 2020 ([11])



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

([11]) Latest available data.

Figure 7 – Livestock density distribution by animal type (LSU/ha UAA) in the Canary Islands in 2020 ([12])



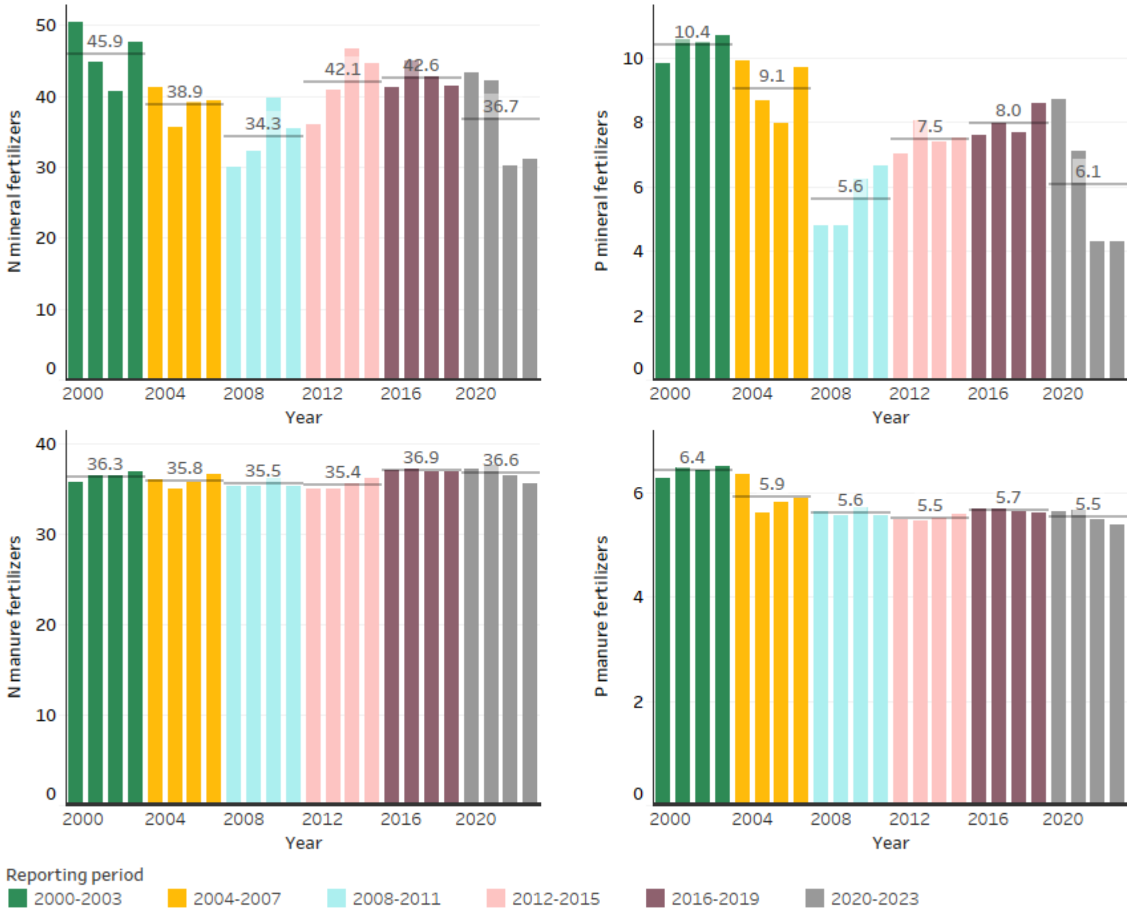
([12]) Latest available data. Livestock density for the Canary Islands: 1.4 LSU/ha UAA.

2.3. Nitrogen and phosphorus fertiliser use

In Spain, the use of **nitrogen (N) fertilisers** was 36.7 kg/ha UAA for mineral fertilisers and 36.6 kg/ha UAA for manure fertilisers in 2020-2023. The use of mineral fertilisers has decreased by 5.9 kg/ha UAA and the use of manure fertilisers has decreased by 0.3 kg/ha UAA since the last reporting period.

The use of **phosphorus (P) fertilisers** was 6.1 kg/ha UAA for mineral fertilisers and 5.5 kg/ha UAA for manure fertilisers in 2020-2023. The use of mineral fertilisers decreased by 1.9 kg/ha UAA since the last reporting period and the use of manure fertilisers decreased by 0.2 kg/ha UAA since the last reporting period.

Figure 8 – Evolution of nitrogen and phosphorus fertiliser use (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

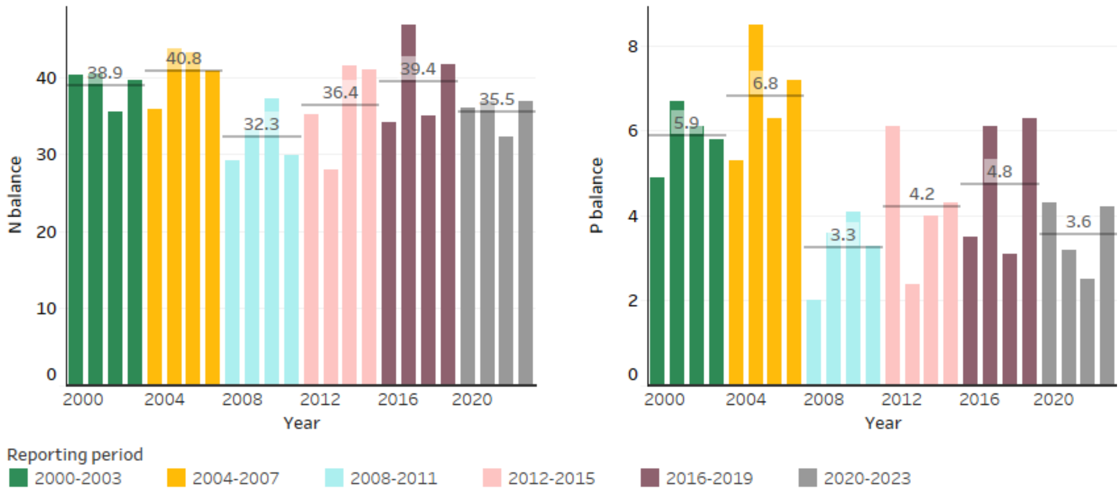
2.4. Nitrogen and phosphorus balance

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 Spain, the **gross nitrogen (N) balance** was 35.5 kg/ha UAA in 2020-2023. The nitrogen balance decreased by 3.9 kg/ha UAA since previous reporting.

The **gross phosphorus (P) balance** was 3.6 kg/ha UAA in 2020-2023. The phosphorus balance decreased by 1.2 kg/ha/UAA since previous reporting.

Figure 9 – Evolution of gross nitrogen and phosphorus balance (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

2.5. Nitrogen discharge to the environment

Spain provided information that the nitrogen losses from agriculture were 290 kilotonnes during the reporting period 2016-2019 and 286.9 kilotonnes during the reporting period 2020-2023. The agricultural sector's contribution to the country's total nitrogen loss increased from 53.7% to 60.3%.

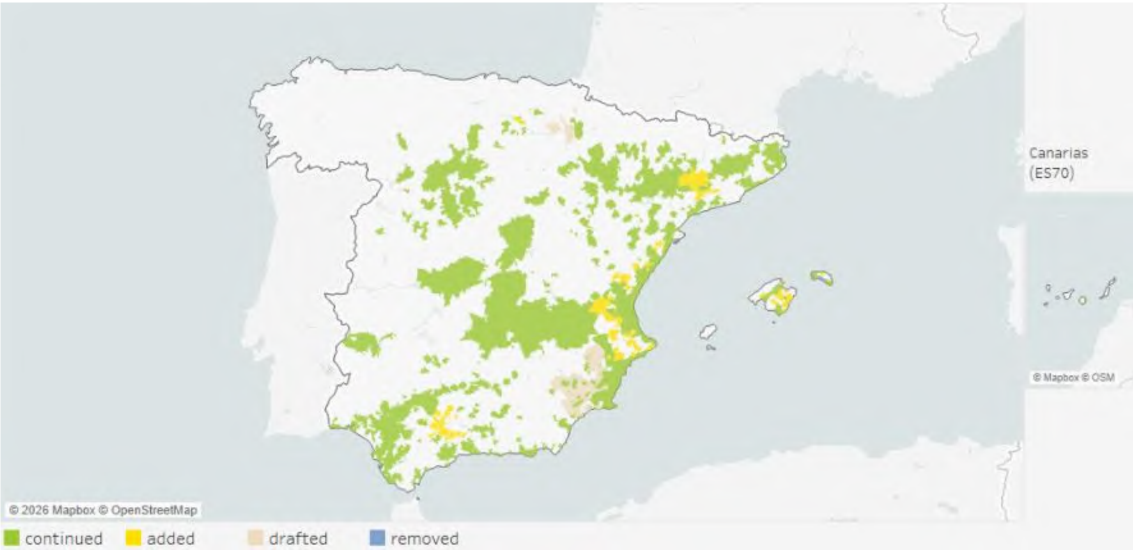
([13]) Gross nutrient balance (aei_pr_gnb)

3. NITRATE VULNERABLE ZONES

In line with Article 3 paragraph 2, Spain 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 consider changes and factors unforeseen at the time of the previous designation.

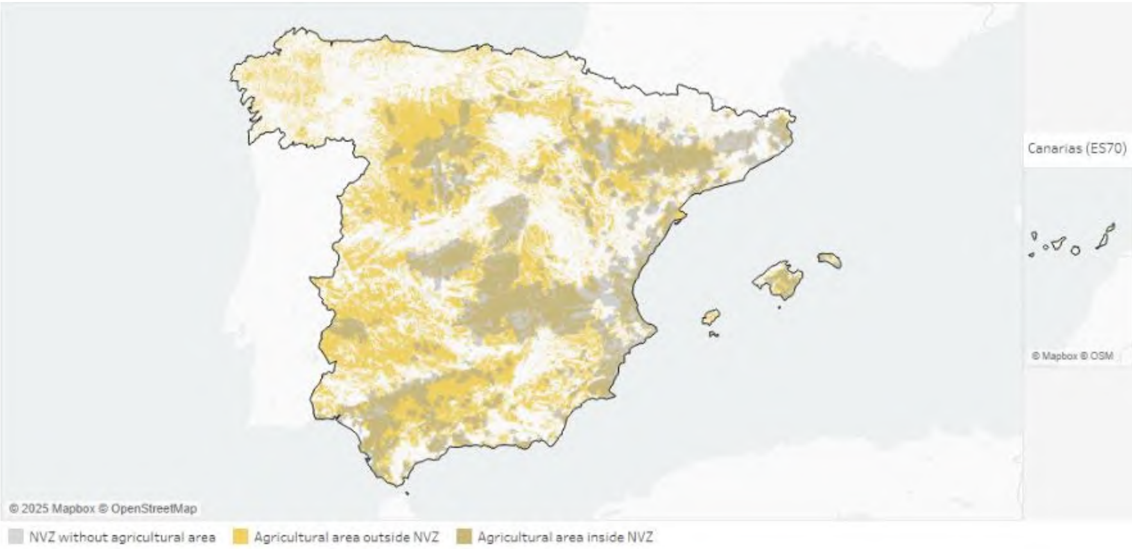
During the reporting period, Spain made several revisions of their NVZ, which resulted in an increase in comparison with the NVZ reported in the previous reporting period. The map below shows the current designation with the changes compared to the previous reporting period

Figure 10 – Changes in the designation of the Nitrates Vulnerable Zones during the reporting period 2020-2023



The map below shows the NVZ designation after the latest change in the reporting period 2020-2023 relative to the agricultural area. The designated areas cover 25.0% of the territory and 35.3% of UAA.

Figure 11 – 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

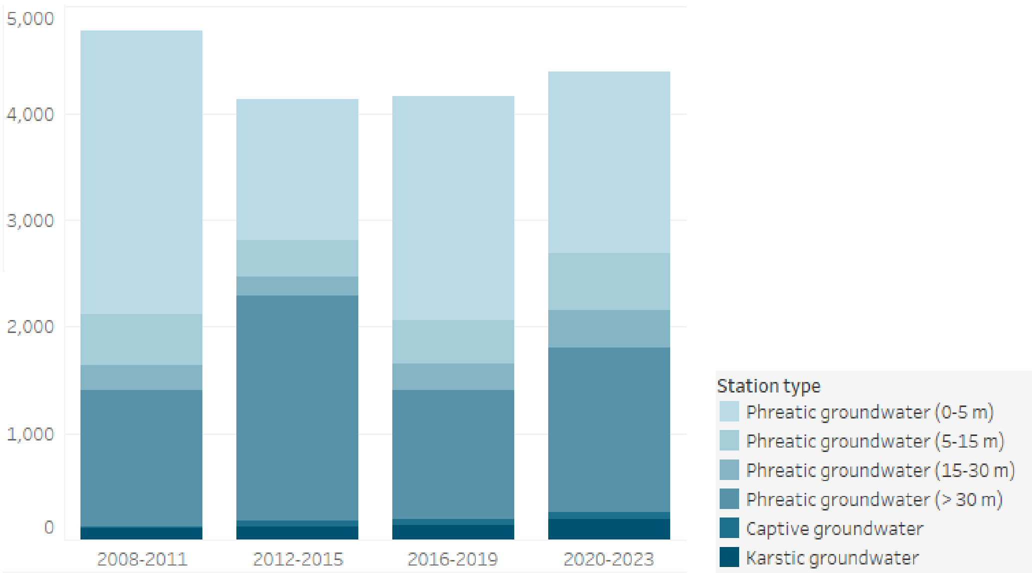
4.1. Monitoring of nitrate concentrations in groundwater

In Spain, groundwater monitoring is primarily overseen by the river basin authorities in collaboration with the national government. These authorities are responsible for ensuring compliance with the Water Framework Directive (WFD) and monitoring the quality and quantity of groundwater resources. The monitoring network for groundwater has undergone changes compared to previous reporting periods. The latest implementing legislation, effective since January 2022, aims to enhance the management of the nitrate network in Spain, including groundwater monitoring. It incorporates experiences from infringement procedures against Spain and aligns with management criteria set by the WFD.

During the reporting period 2020-2023 nitrate concentrations were reported at 4 384 groundwater monitoring points. The station density was 8.7 stations per 1 000 km^2. Of these monitoring points, 46.8% of monitoring points were located within NVZ and 53.2% outside NVZ.

The overall number of monitoring points increased by 227 (5.5%) compared to the previous reporting period. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 12 – 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 3 602 monitoring points, accounting for 82.2% of all points with measurements. The share of monitoring points with trends decreased compared to the previous reporting period, which was 93.6% 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 [14]

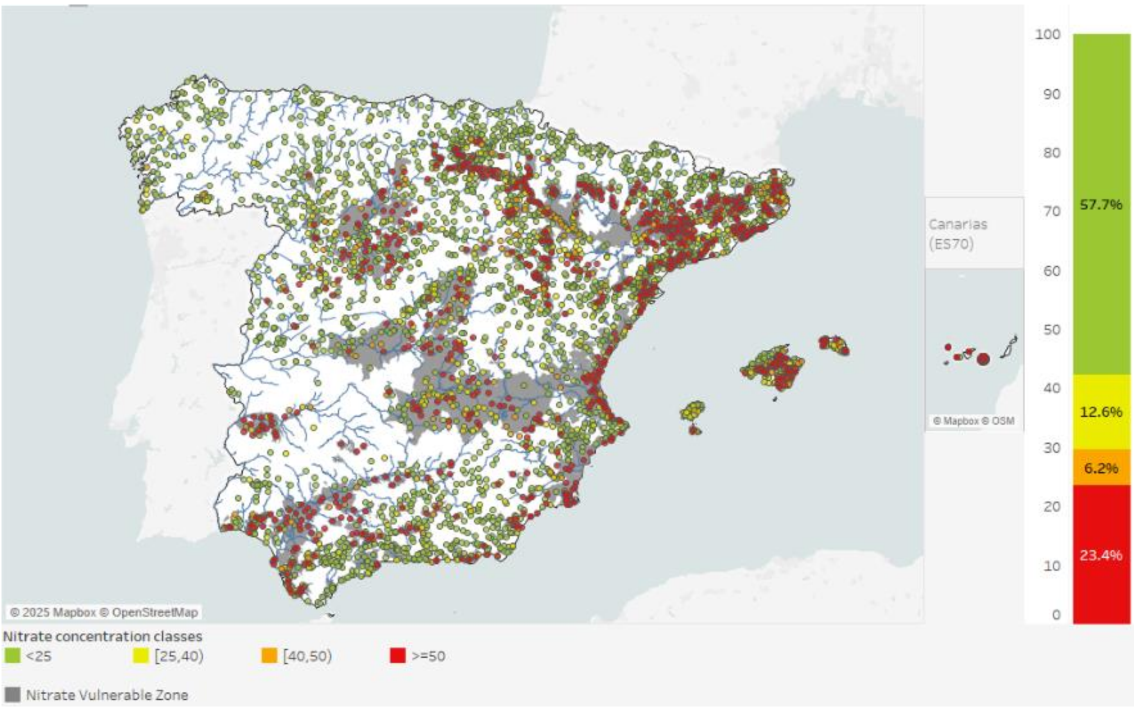
	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Phreatic groundwater (0-5 m)	2,669	1,325	2,096	1,703	1,042	1,278	1,997	1,336
Phreatic groundwater (5-15 m)	475	345	409	531	268	316	354	448
Phreatic groundwater (15-30 m)	236	172	247	353	125	168	230	293
Phreatic groundwater (> 30 m)	1,274	2,109	1,215	1,539	756	1,133	1,125	1,324
Captive groundwater	12	56	51	62	12	46	51	52
Karstic groundwater	112	125	139	196	112	94	136	149
Not specified								
Total	4,778	4,132	4,157	4,384	2,315	3,035	3,893	3,602

[14] Spain reported that monitoring was discontinued in 1 360 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 Spain, 23.4% of groundwater monitoring points showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 6.2% had concentrations between 40-49.99 mg/l, 12.6% showed concentrations between 25-39.99 mg/ and 57.7% 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 13 – 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.

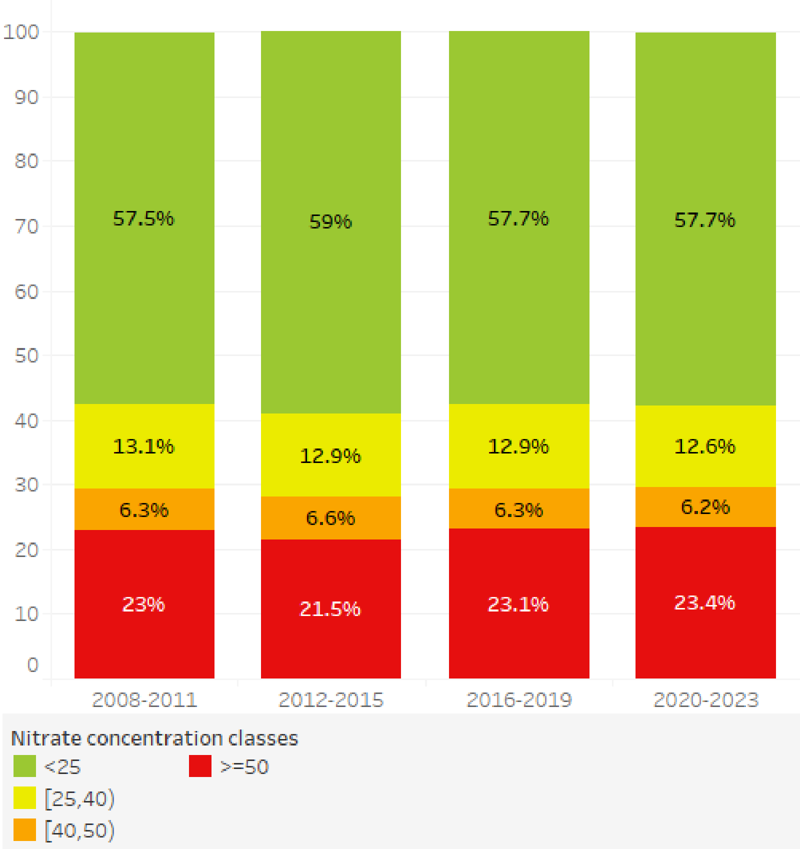
The station type category with the highest share of points with nitrate concentrations equal to or above the drinking water threshold of 50 mg/l was phreatic groundwater at depth 5-15m with a share of 37.7%, as shown in the table below.

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)	1,703	38.8%	63.8%	10.5%	5.3%	20.4%
Phreatic groundwater (5-15 m)	531	12.1%	40.9%	13.2%	8.3%	37.7%
Phreatic groundwater (15-30 m)	353	8.1%	43.1%	12.5%	8.8%	35.7%
Phreatic groundwater (> 30 m)	1,539	35.1%	59.0%	14.4%	6.1%	20.5%
Captive groundwater	62	1.4%	64.5%	14.5%	3.2%	17.7%
Karstic groundwater	196	4.5%	63.8%	15.8%	5.6%	14.8%
Total	4,384	100.0%	57.7%	12.6%	6.2%	23.4%

Compared to the previous reporting period, the share of monitoring points with concentration ≥ 50 mg/l increased from 23.1% to 23.4%. The graph below presents the share of monitoring points per classes of nitrate concentrations in the last four reporting periods. The shares in all classes remained relatively stable across the current and the previous three reporting periods.

Figure 14 – Share of monitoring points in groundwater by class of nitrate concentration (15) in the current and previous reporting periods

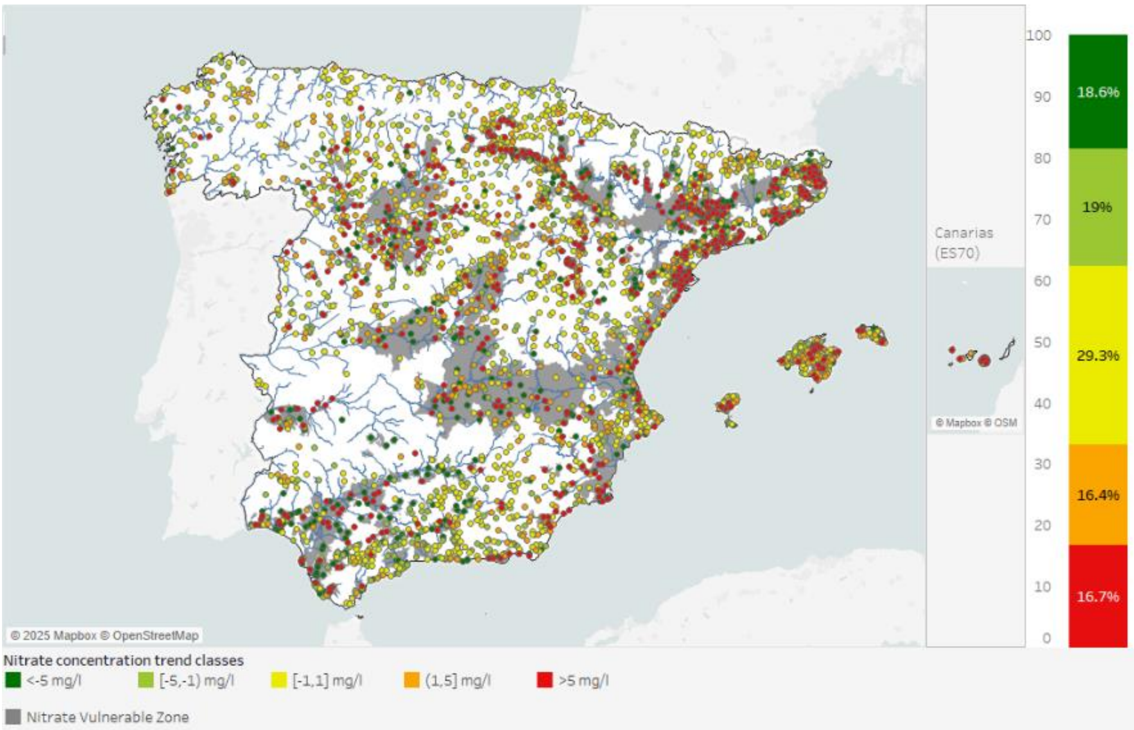


(15) Average of annual mean values over the reporting period.

4.3. Trends in nitrate concentrations in groundwater

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 37.6% of monitoring points and an increase in 33.1%. For the remaining 29.3% 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 it is above 5 mg/l.

Figure 15 – Map of trends in average annual mean nitrate concentrations (16) 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.

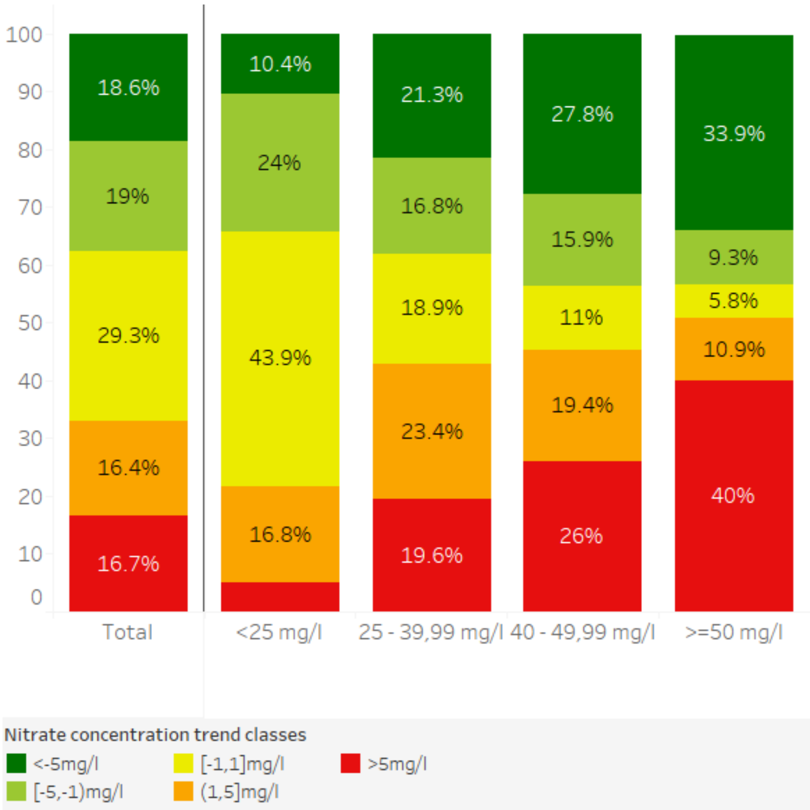
Table 5 – Share of monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type

	Total Number of Stations	% Total Number of Stations	<-5	[-5,-1)	[-1,1]	(1,5]	>5
Phreatic groundwater (0-5 m)	1,336	37.1%	17.2%	17.3%	34.5%	15.3%	15.7%
Phreatic groundwater (5-15 m)	448	12.4%	28.3%	18.5%	12.5%	15.8%	24.8%
Phreatic groundwater (15-30 m)	293	8.1%	24.2%	19.5%	19.5%	15.7%	21.2%
Phreatic groundwater (>30 m)	1,324	36.8%	15.9%	20.1%	31.1%	18.5%	14.4%
Captive groundwater	52	1.4%	23.1%	17.3%	26.9%	11.5%	21.2%
Karstic groundwater	149	4.1%	12.8%	25.5%	37.6%	12.8%	11.4%
Total	3,602	100.0%	18.6%	19%	29.3%	16.4%	16.7%

(16) 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 50.9% and a decrease for 43.2% 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 16 – 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) ([17])

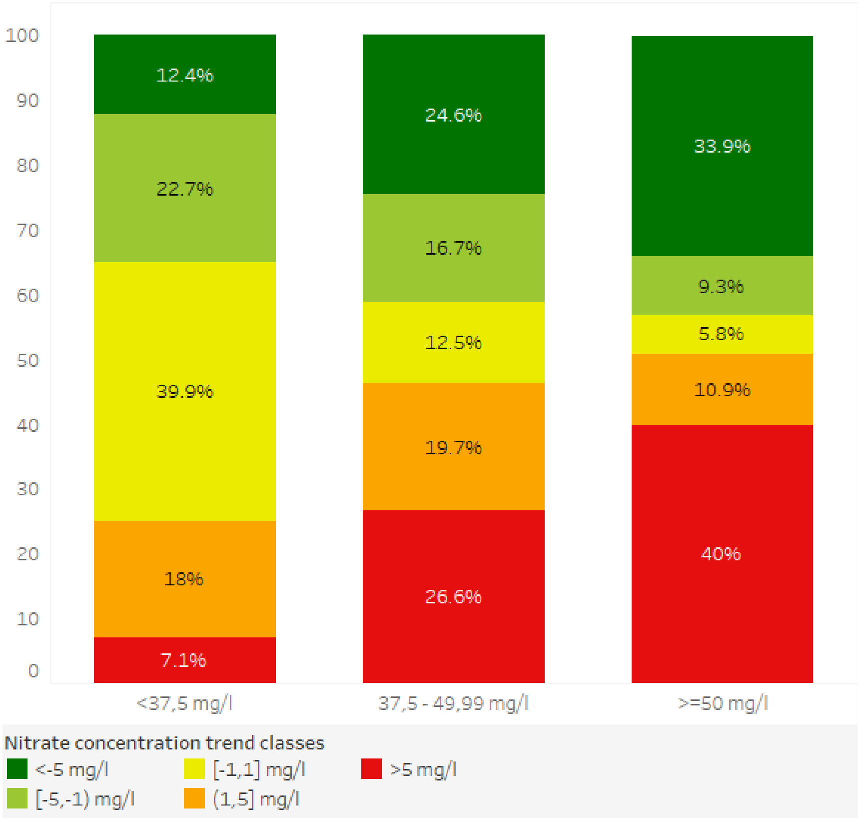


Note: The percentages below 5% are not labelled.

([17]) 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 46.3% and a decrease for 41.3% of monitoring points.

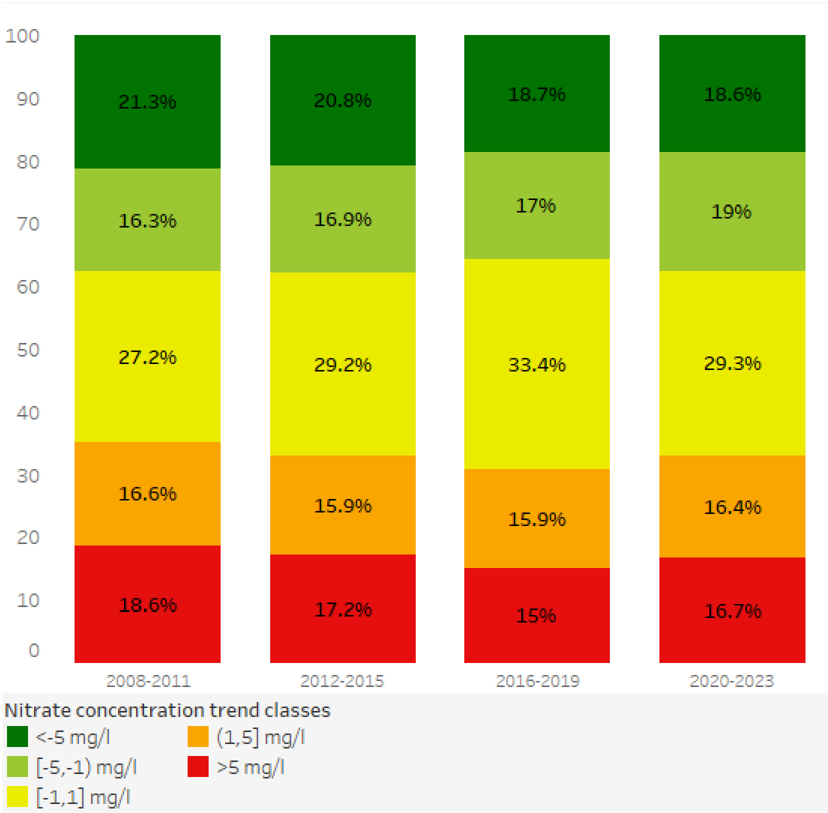
Figure 17 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, in different nitrate concentration classes (<37.5 mg/l, 37.5-49.99 mg/l and ≥50mg/l) [18]



[18] 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 higher share of monitoring points with decreasing nitrate concentrations (37.6% in the reporting period 2020-2023 compared to 35.7% in the previous reporting period) but also a higher share of monitoring points with increasing nitrate concentrations (33.1% compared to 30.9%). 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 18 – Share of groundwater monitoring points by class of nitrate concentration trend ([19]) in the current and previous reporting periods

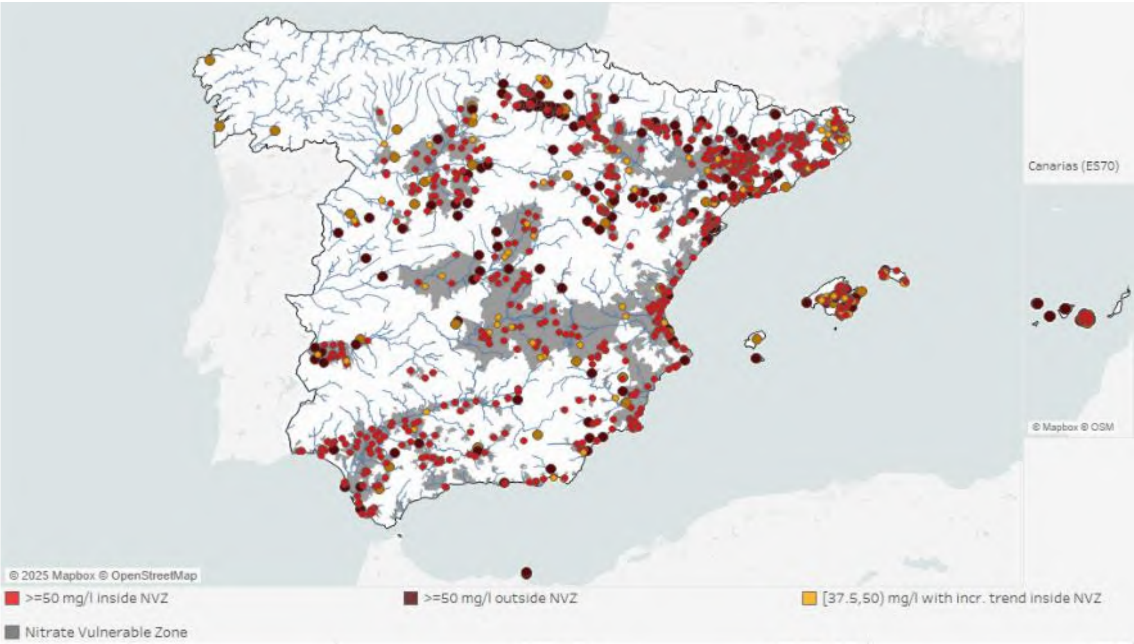


([19]) Change in average annual mean nitrate concentrations compared to the previous reporting period.

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 Spain there are 1 169 groundwater nitrate pollution hotspots, of which 228 are outside NVZ, accounting for 19.5% of all groundwater nitrate pollution hotspots.

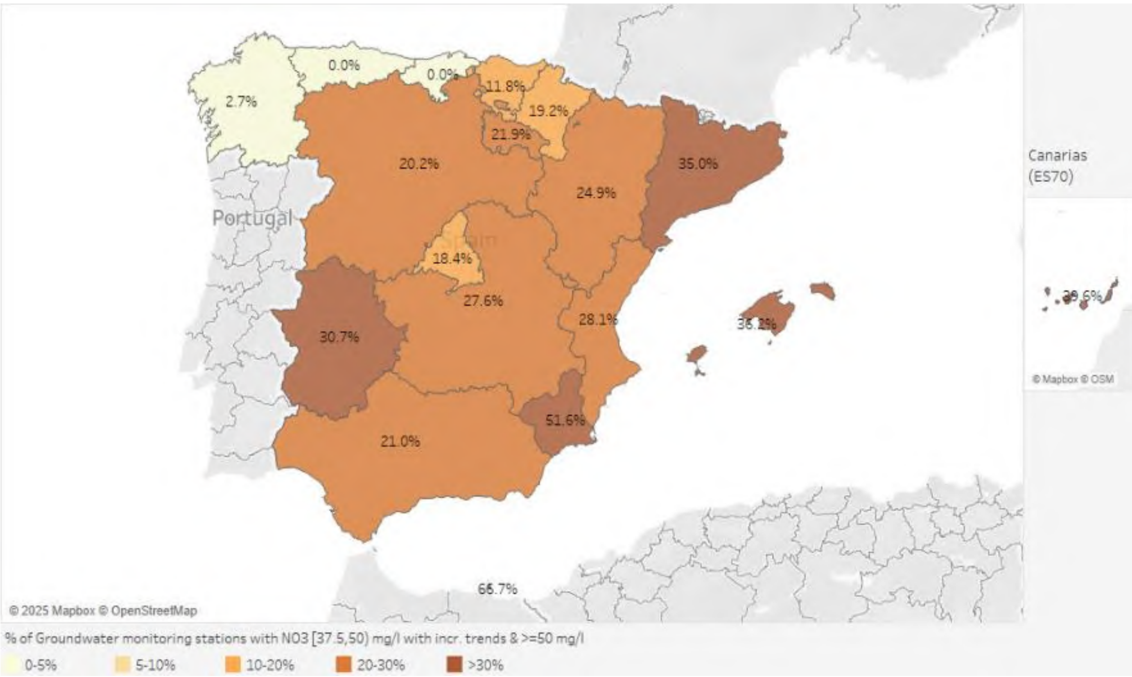
Figure 19 – Groundwater nitrate pollution hotspots (map) and their distribution inside and outside Nitrate Vulnerable Zones (table)



		inside NVZ	outside NVZ	Total
Groundwater	[37.5,50) with incr. trend	96	45	141
	>=50	845	183	1,028
Total		941	228	1,169

The autonomous communities with the highest share of hotspots are Region of Murcia (51.6%), Canary Islands (39.6%), Balearic Islands (36.2%), Catalonia (35.0%) and Extremadura (30.7%).

Figure 20 – Share of groundwater nitrate pollution hotspots at NUTS2 level



5. NITRATES IN SURFACE WATERS

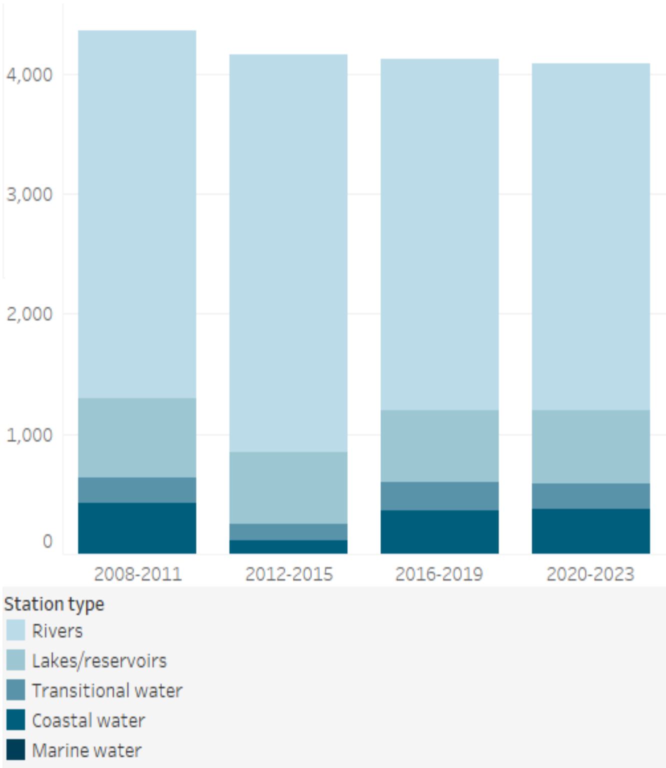
5.1. Monitoring of nitrate concentrations in surface waters

Surface water monitoring in Spain is conducted by the river basin authorities for inland waters and by the Autonomous Communities for intra-Community basins and open sea waters. The monitoring network includes rivers, lakes, reservoirs, and coastal waters. For groundwater and surface water the Spanish report does not explain the number of samples per year for the different types of monitoring stations.

During the reporting period 2020-2023, nitrate concentrations were reported at 4 079 surface water monitoring points. Among these, 70.9% were in rivers, 14.8% were in lakes or reservoirs, and 14.3% were in saline waters. The freshwater monitoring points density was 6.9 stations per 1 000 km^2. Of these monitoring points, 20.8% of monitoring points were located within NVZ and 79.2% outside NVZ.

The overall number of monitoring points decreased by 40 (1.0%) compared to the previous reporting period. The total number of stations has been slowly decreasing since 2008-2011. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 21 – 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 3 708 monitoring points, accounting for 90.9% of all points with measurements. The share of monitoring points with trends decreased compared to the previous reporting period (92.2% 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 (20)

	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	3,065	3,305	2,922	2,890	1,712	2,489	2,919	2,629
Lakes/reservoirs	665	598	603	603	360	427	598	580
Transitional water	212	136	238	209	94	153	106	203
Coastal water	419	114	356	377	177	220	174	296
Marine water								
Total	4,361	4,153	4,119	4,079	2,343	3,289	3,797	3,708

(20) Spain reported that monitoring was discontinued in 1 036 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.

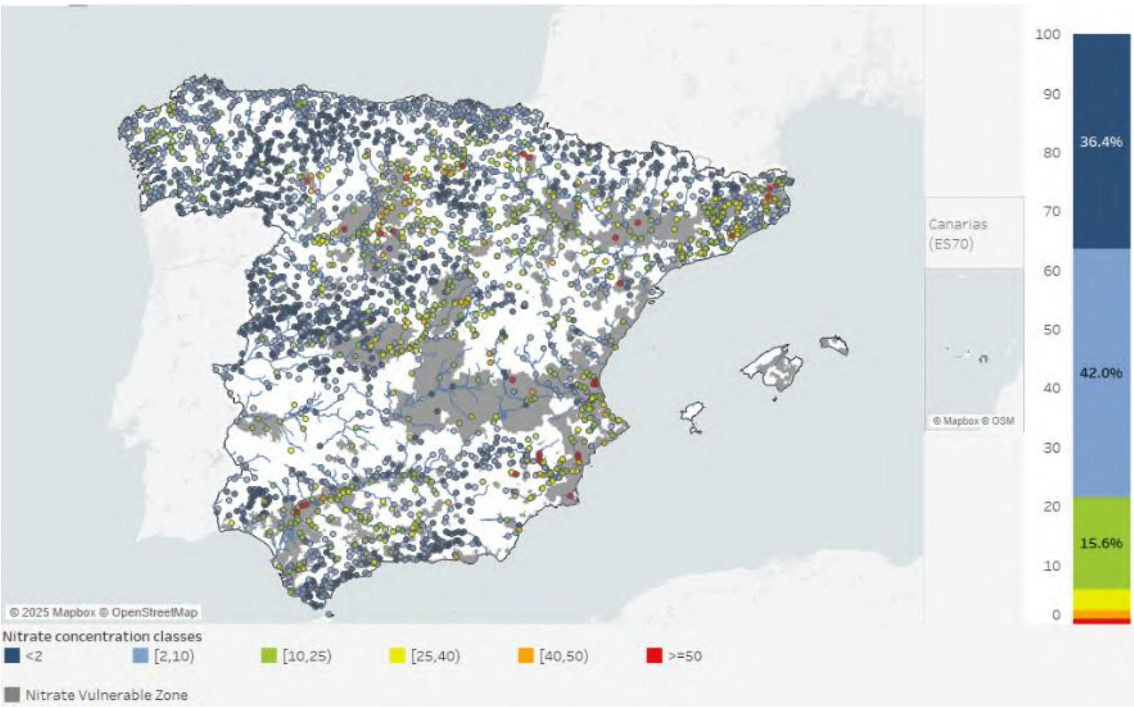
5.2. Nitrate concentrations in surface waters

Rivers

In Spain, 1.0% of monitoring points in rivers showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 1.3% had concentrations between 40-49.99 mg/l, 3.6% showed concentrations between 25-39.99 mg/, 15.6% in the class 10-24.99 mg/l, 42.0% in the class 2-9.99 mg/l and 36.4% 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 also in lower concentration classes.

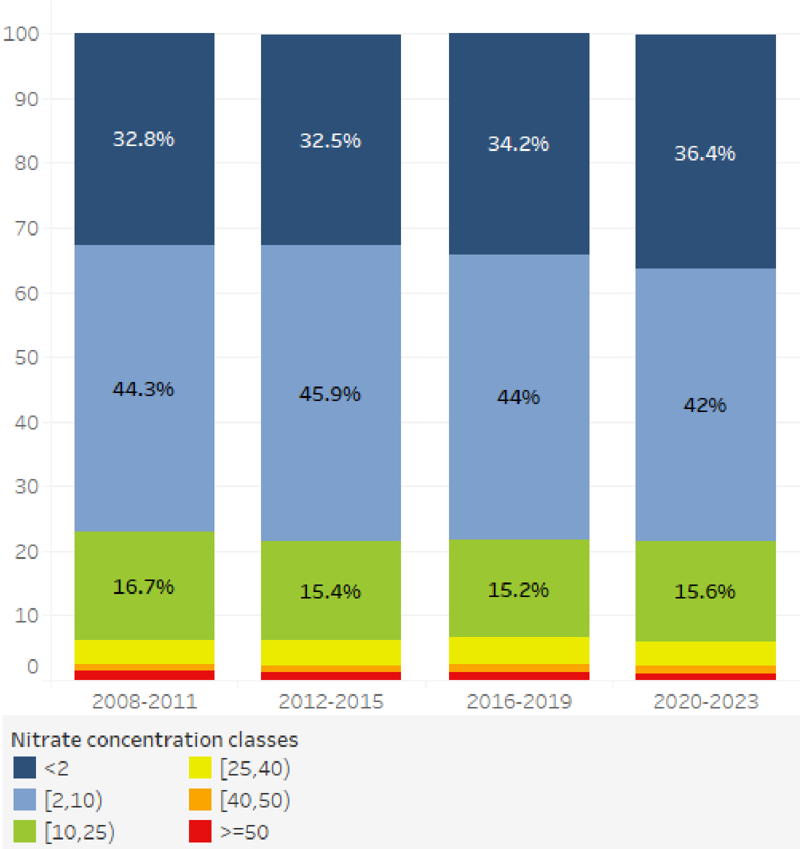
Figure 22 – Map of average nitrate annual mean concentrations in rivers and share of monitoring points by concentration class in the reporting period 2020-2023



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 decreased from 1.3% to 1.0%. The graph below presents the shares of monitoring points per classes of nitrate concentration in last four reporting periods. Over the last four reporting periods, there was an increase in the share of monitoring points with nitrate concentrations below 2 mg/l, rising from 32.8% to 36.4%.

Figure 23 – Share of monitoring points in rivers by class of nitrate concentration ([21]) in the current and previous reporting periods



Note: The percentages below 5% are not labelled.

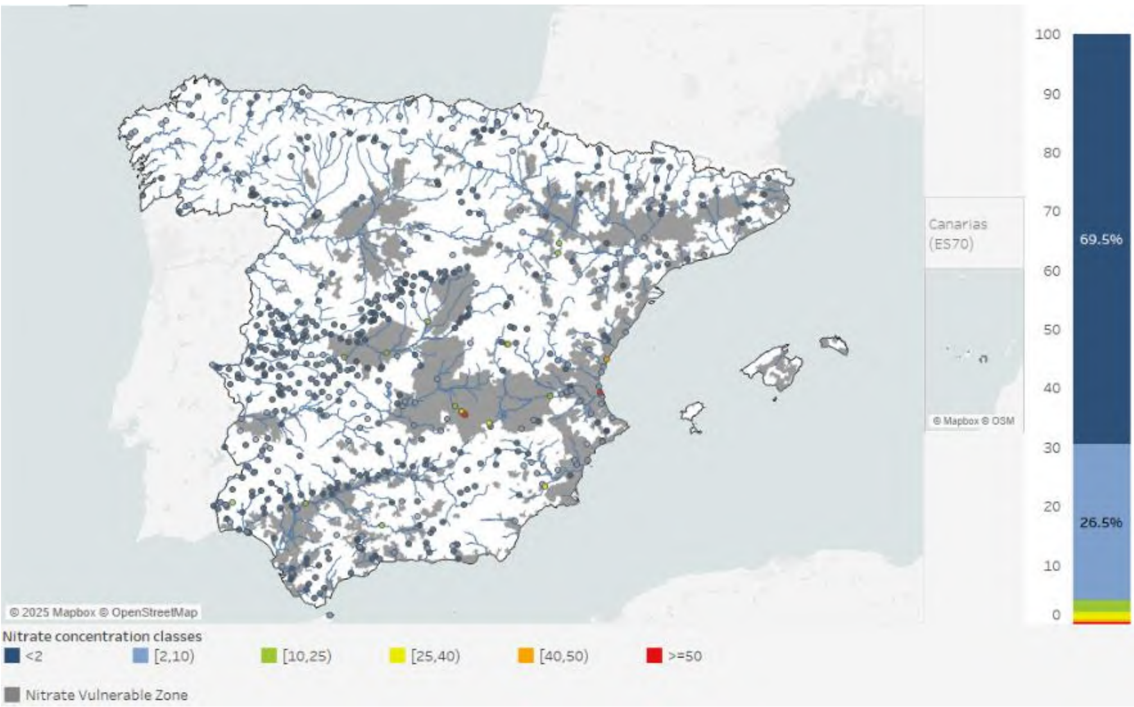
([21]) Average of annual mean values over the reporting period.

Lakes/water reservoirs

In Spain, 0.3% of freshwater monitoring points in lakes/water reservoirs showed average nitrate concentration equal to or above the drinking water threshold of 50 mg/l, whereas 0.3% had concentrations between 40-49.99 mg/l, 1.3% showed concentrations between 25-39.99 mg/, 2.0% in the class 10-24.99 mg/l, 26.5% in the class 2-9.99 mg/l and 69.5% 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 24 – 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



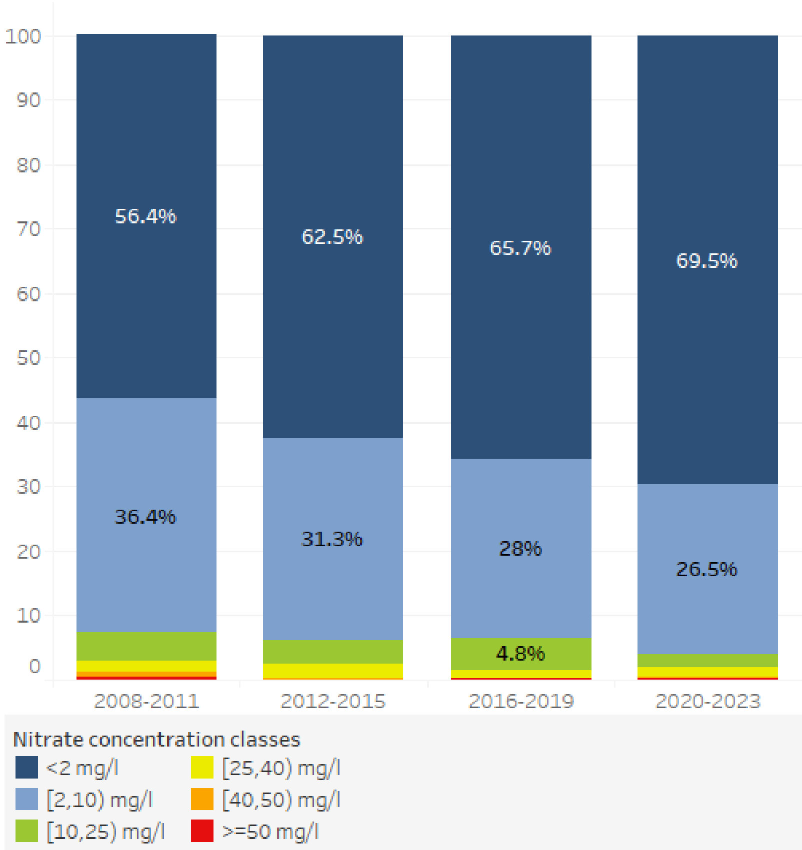
Note: In the map, monitoring points with higher values are plotted on top. In the graph, the percentages below 5% are not labelled.

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	2,890	82.7%	36.4%	42.0%	15.6%	3.6%	1.3%	1.0%
Lakes/reservoirs	603	17.3%	69.5%	26.5%	2.0%	1.3%	0.3%	0.3%
Total	3,493	100.0%	42.1%	39.4%	13.3%	3.2%	1.1%	0.9%

Compared to the previous reporting period, the share of monitoring points in lakes/water reservoirs with concentration ≥ 50 mg/l increased from 0.1% to 0.3%. The graph below presents the shares of monitoring points per classes of nitrate concentration in last four reporting periods. Over the last four reporting periods, there was an increase in the share of monitoring points with nitrate concentrations below 2 mg/l, rising from 56.4% to 69.5% with shares in all other categories decreasing.

Figure 25 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration ([22]) in the current and previous reporting periods



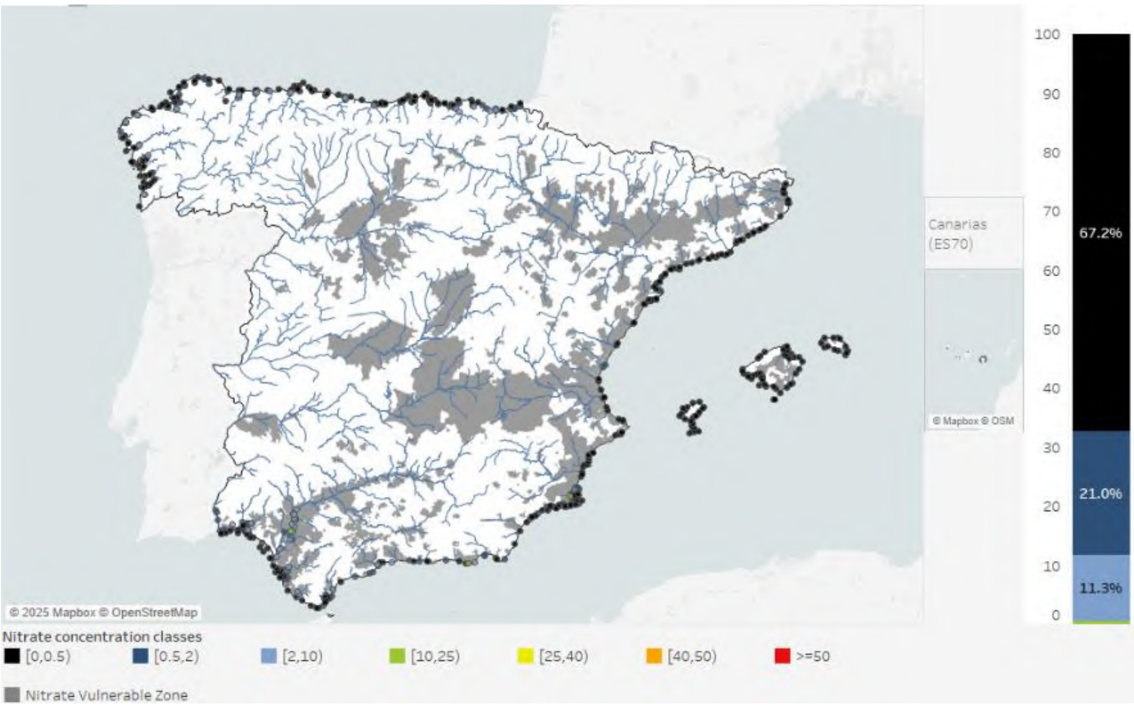
([22]) Average of annual mean values over the reporting period.

Saline waters

No points in saline waters monitoring points showed average nitrate concentrations ≥ 25 mg/l, 0.5% showed concentrations in the class 10-24.99 mg/l, 11.3% in the class 2-9.99 mg/l and 21.0% between 0.5-2 mg/l and 67.2% 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 26 – 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.

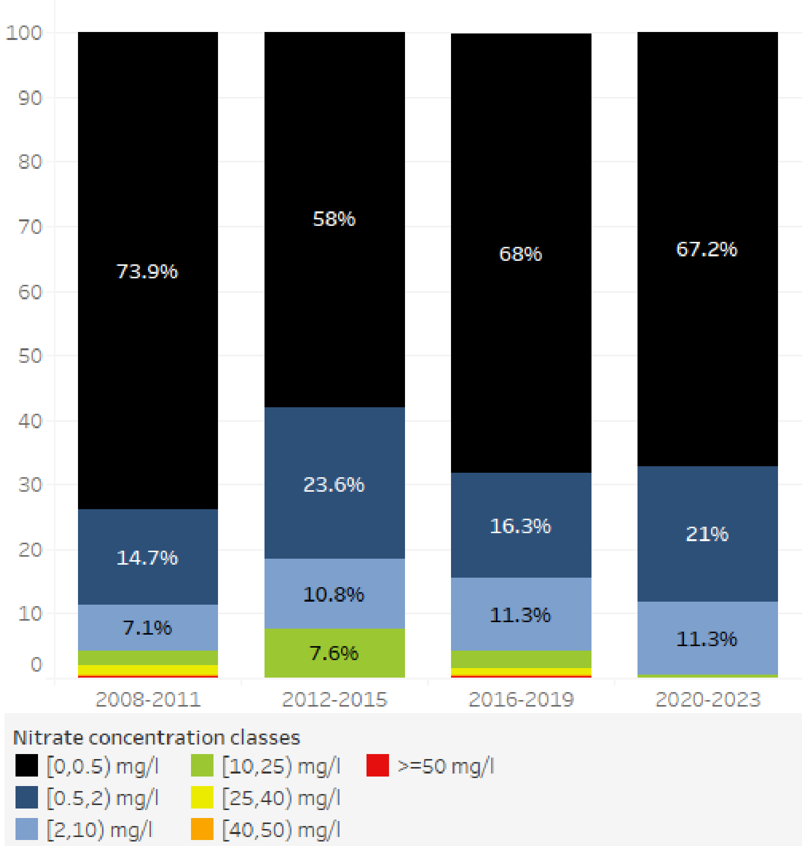
It is also relevant to look separately at transitional waters as they typically show higher nitrate concentrations. In Spain, 1.0% of monitoring points showed average annual mean nitrate concentrations at or above 10 mg/l, 30.6% in the class 2-9.99 mg/l, 32.5% between 0.5-2 mg/l and 35.9% below 0.5 mg/l, as shown in the table below.

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	209	35.7%	35.9%	32.5%	30.6%	1.0%			
Coastal water	377	64.3%	84.6%	14.6%	0.5%	0.3%			
Marine water									
Total	586	100.0%	67.2%	21.0%	11.3%	0.5%			

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

Figure 27 – 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.

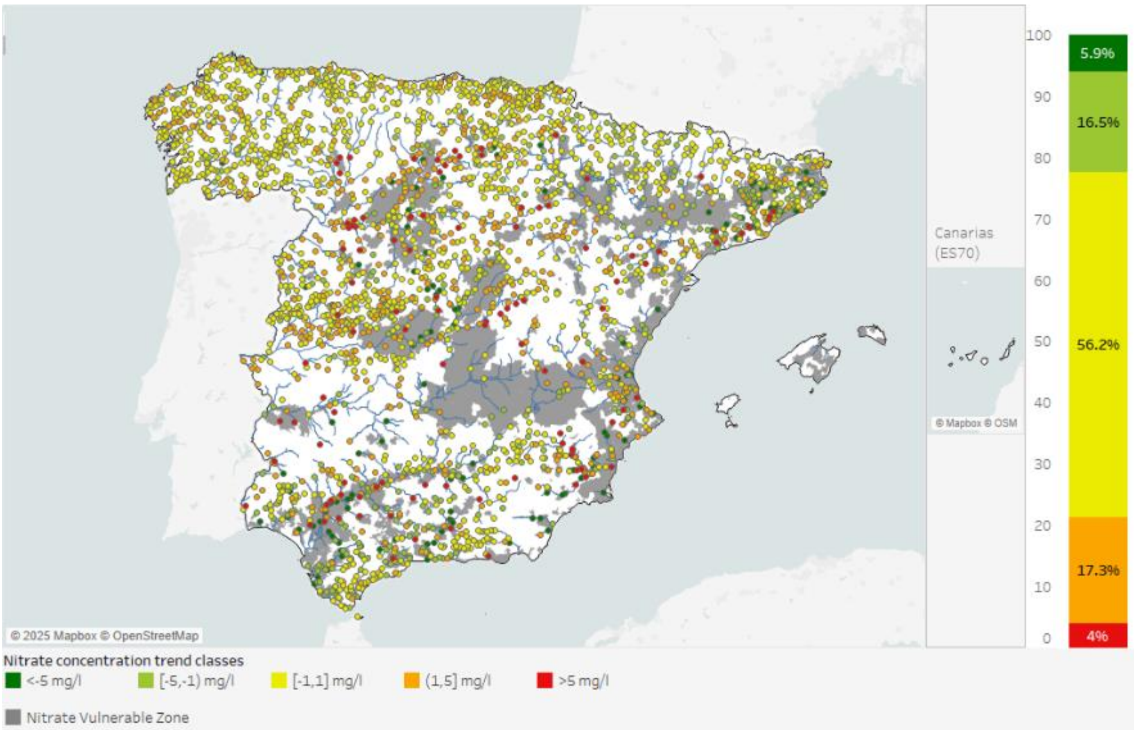
([23]) Average of annual mean values over the reporting period.

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 22.4% of monitoring points and an increase in 21.3%. For the remaining 56.2% 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.

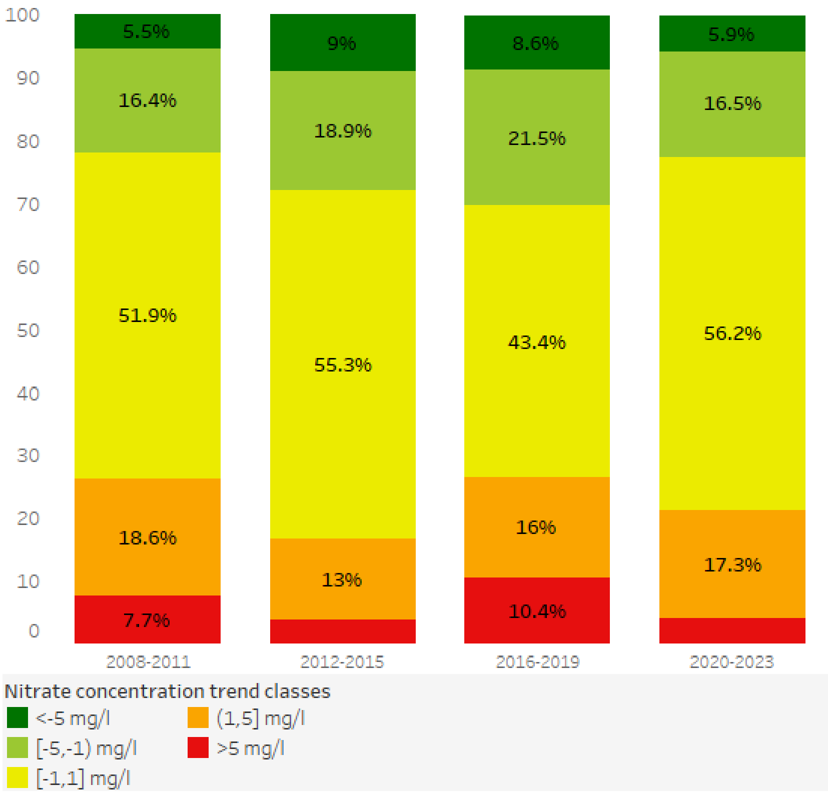
Figure 28 – Map of trends in average annual mean nitrate concentrations in rivers between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



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 (22.4% in the current reporting period compared to 30.1% in the previous reporting period) but also a lower share of monitoring points with increasing nitrate concentrations (21.3% compared to 26.4%). 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 29 – Share of monitoring points in rivers by class of nitrate concentration trend ([24]) in the current and previous reporting periods



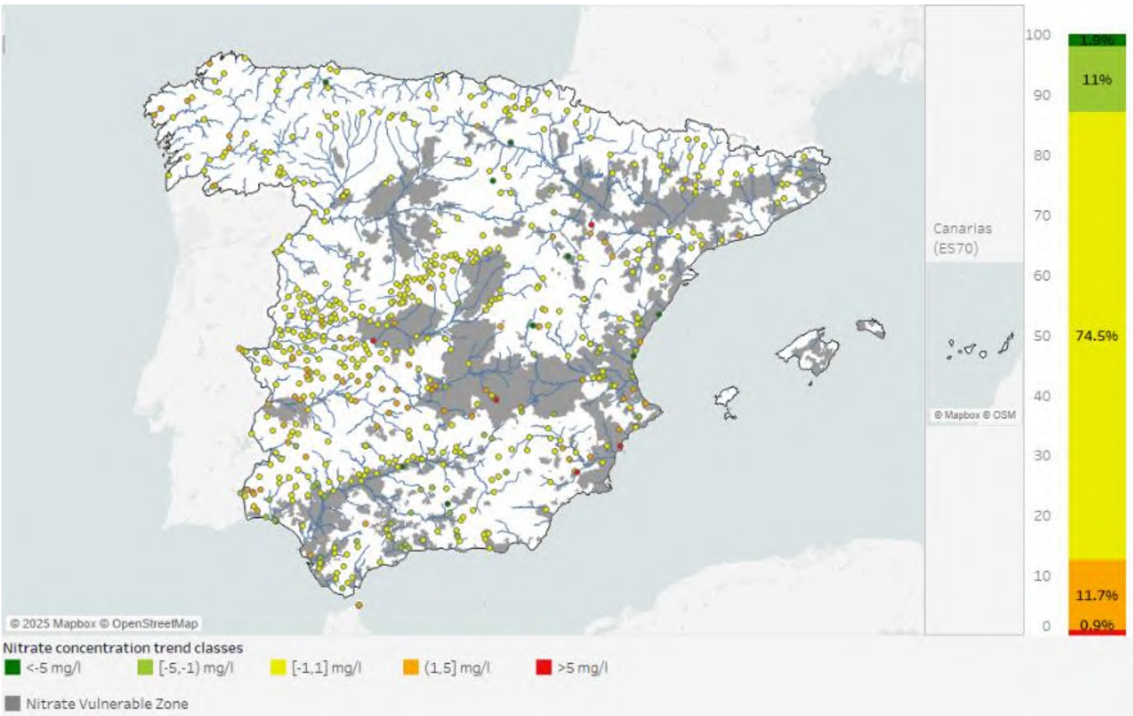
Note: The percentages below 5% are not labelled.

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

Lakes/water reservoirs

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 12.9% of monitoring points and an increase in 12.6%. For the remaining 74.5% 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 30 – 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



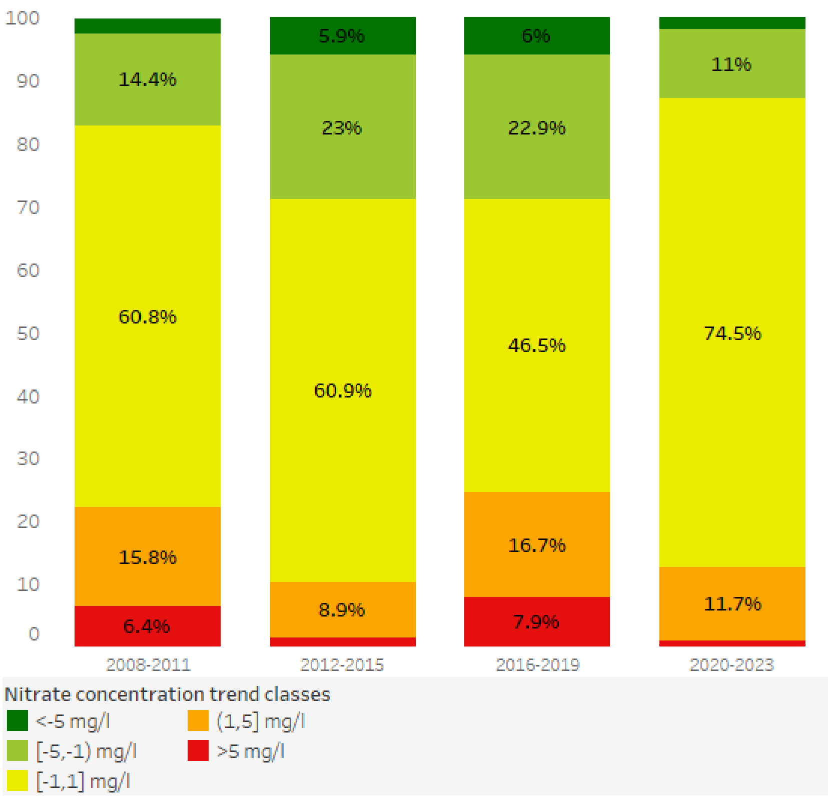
Note: In the map, monitoring points with higher values are plotted on top.

Table 9 – Share of freshwater monitoring points by trend class (mg/l) 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
River	2,629	81.9%	5.9%	16.5%	56.2%	17.3%	4%
Lake/Reservoir	580	18.1%	1.9%	11%	74.5%	11.7%	0.9%
Total	3,209	100.0%	5.2%	15.5%	59.5%	16.3%	3.5%

Compared to the previous reporting period, there is lower share of monitoring points with decreasing nitrate concentrations (12.9% in the current reporting period compared to 28.9% in the previous reporting period) but also a lower share of monitoring points with increasing nitrate concentrations (12.6% compared to 24.6%). 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 31 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration trend ([25]) in the current and previous reporting periods



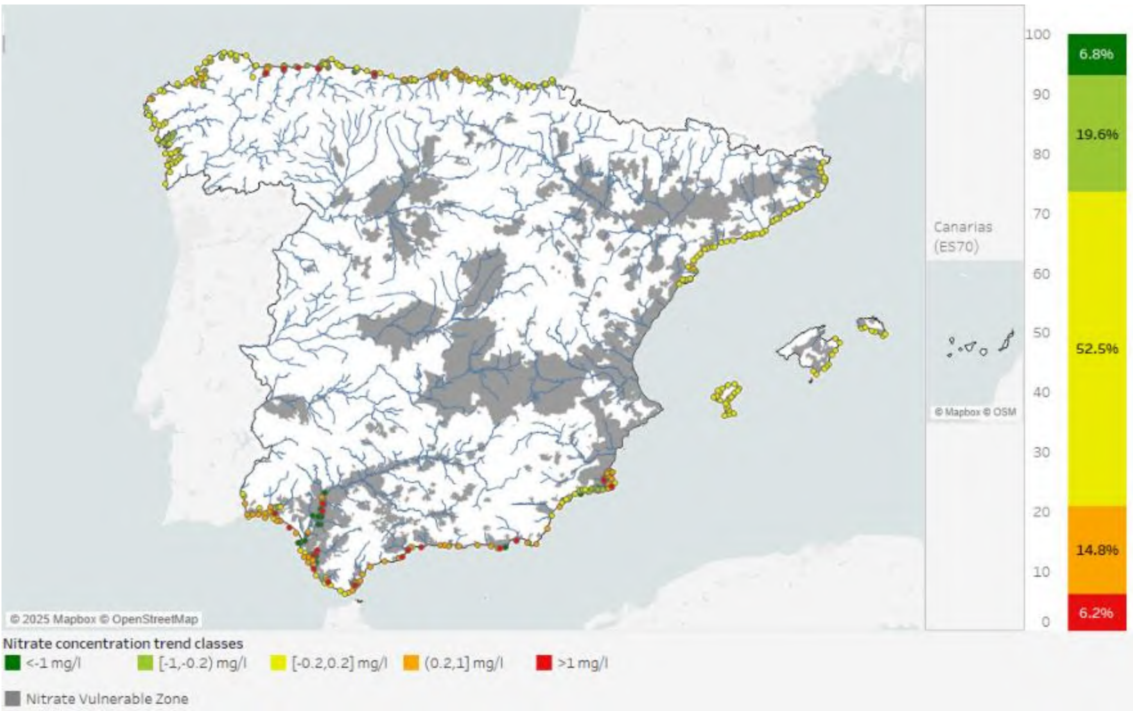
Note: The percentages below 5% are not labelled.

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

Saline waters

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 26.4% of monitoring points and an increase in 21.0%. For the remaining 52.5% 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 32 – 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



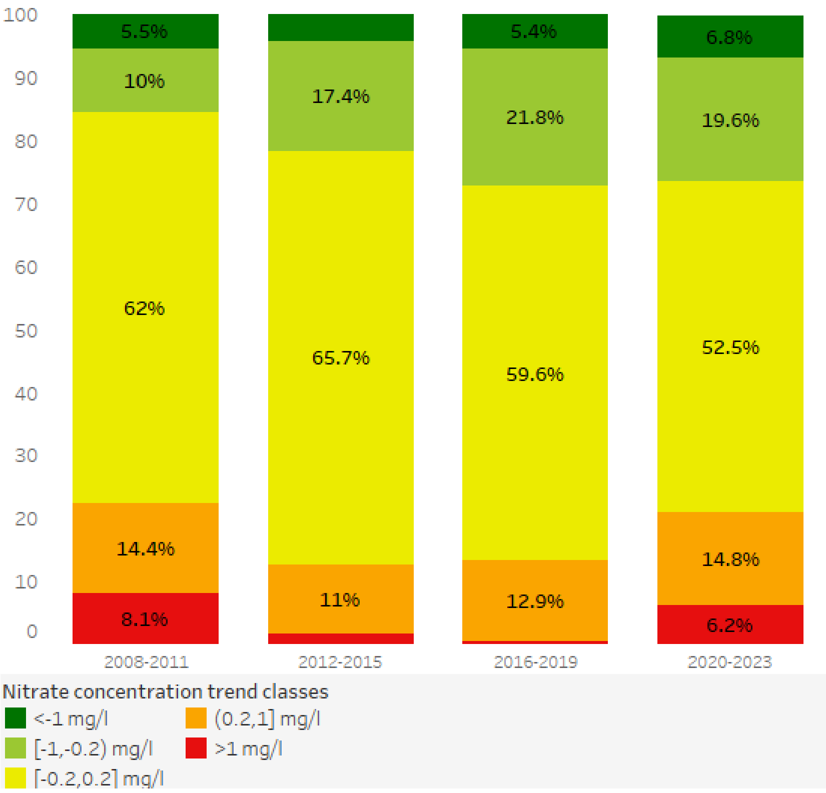
Note: In the map, monitoring points with higher values are plotted on top.

Table 10 – Share of saline water monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, 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	203	40.7%	10.8%	27.1%	36.5%	14.8%	10.8%
Coastal water	296	59.3%	4.1%	14.5%	63.5%	14.9%	3%
Marine water							
Total	499	100.0%	6.8%	19.6%	52.5%	14.8%	6.2%

Compared to the previous reporting period, there is lower share of monitoring points with decrease of nitrate concentrations (26.4% in the current reporting period compared to 27.2% in the previous reporting period) and a higher share of monitoring points with increase of nitrate concentrations (21.0% compared to 13.0%). 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 33 – Share of monitoring points in saline waters by classes of nitrate concentrations [26] in the current and previous reporting periods



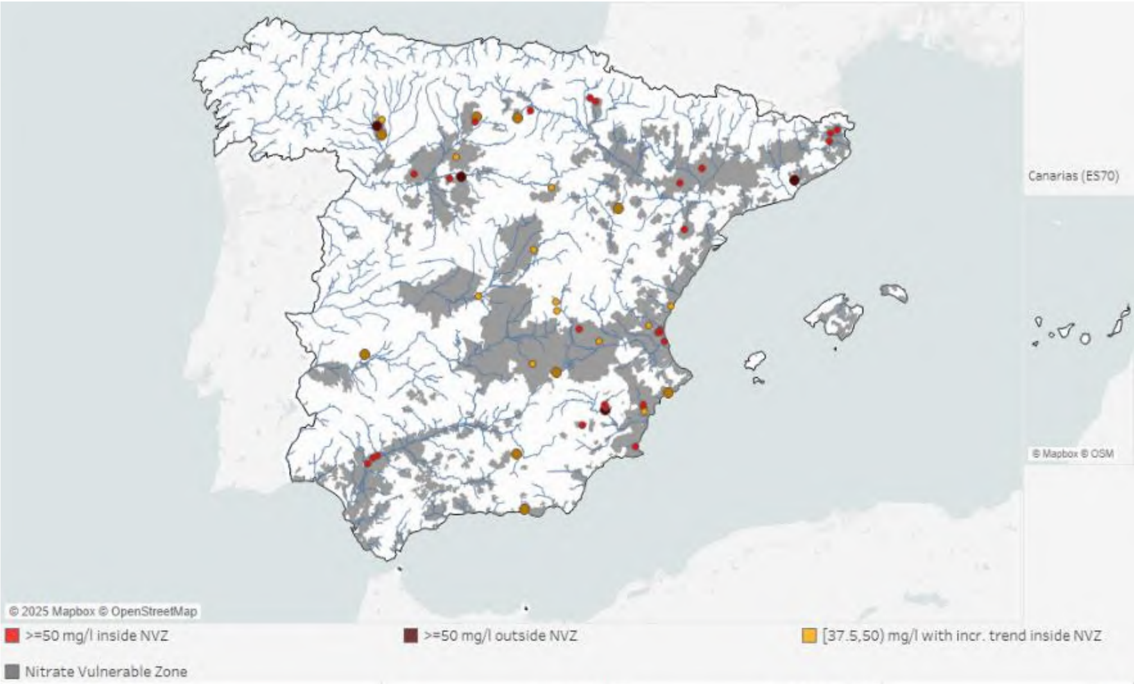
Note: The percentages below 5% are not labelled.

[26] Change in average annual mean nitrate concentrations 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 52 surface water nitrate pollution hotspots, of which 13 are outside NVZ, accounting for 25.0% of all surface water nitrate pollution hotspots in the country.

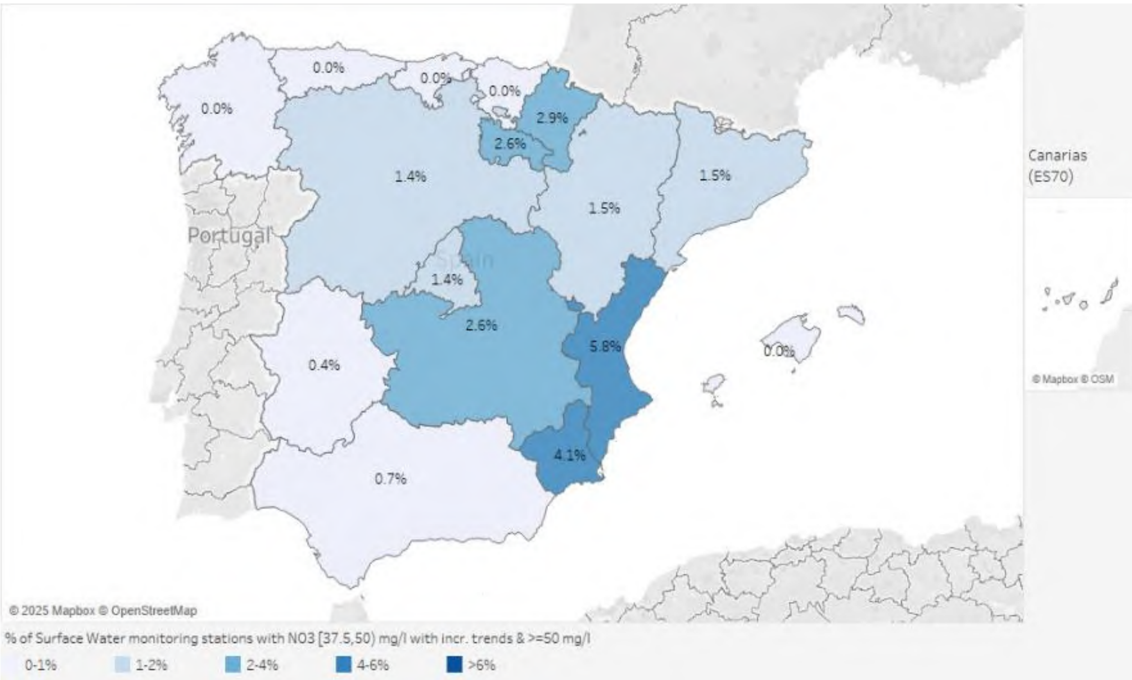
Figure 34 – Surface water nitrate pollution hotspots (map) and their distribution inside and outside Nitrates Vulnerable Zones (table)



		inside NVZ	outside NVZ	Total
Rivers	[37.5,50) with incr. trend	10	8	18
	>=50	25	4	29
Lakes/reservoirs	[37.5,50) with incr. trend	2	1	3
	>=50	2		2
Total		39	13	52

The highest shares of hotspots can be found in the autonomous communities of Valencian Community (5.8%), Region of Murcia (4.1%) and Navarre (2.9%).

Figure 35 – 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 eutrophication monitoring network in Spain has evolved significantly with the introduction of the latest implementing legislation. The network is managed by both the river basin authorities and the Autonomous Communities, who are responsible for monitoring nitrate pollution and its impacts on water bodies. For eutrophication at least six samples per year are required, with quarterly recordings to capture seasonal variations.

During the reporting period 2020-2023, trophic status was reported at 1 118 monitoring points. Among these, 10.6% were in rivers, 37.8% were in lakes or reservoirs, and 51.5% were in saline waters. The freshwater station density of monitoring points, where trophic status was assessed equals to 1.1 stations per 1 000 km^2. Of these monitoring points, 25.6% of freshwater monitoring points were located within NVZ and 74.4% outside NVZ.

The overall number of freshwater monitoring points increased by 77 (16.6%), and number of saline water monitoring points remained stable compared to the previous reporting period. The number of points decreased significantly during the reporting period 2012-2015, when monitoring points in rivers were removed from the monitoring network. In the following reporting periods, the numbers increased slightly again until 2020-2023, although remaining far below those in 2008-2011.

Figure 36 – Evolution in surface water monitoring network (number of points with trophic status reported)

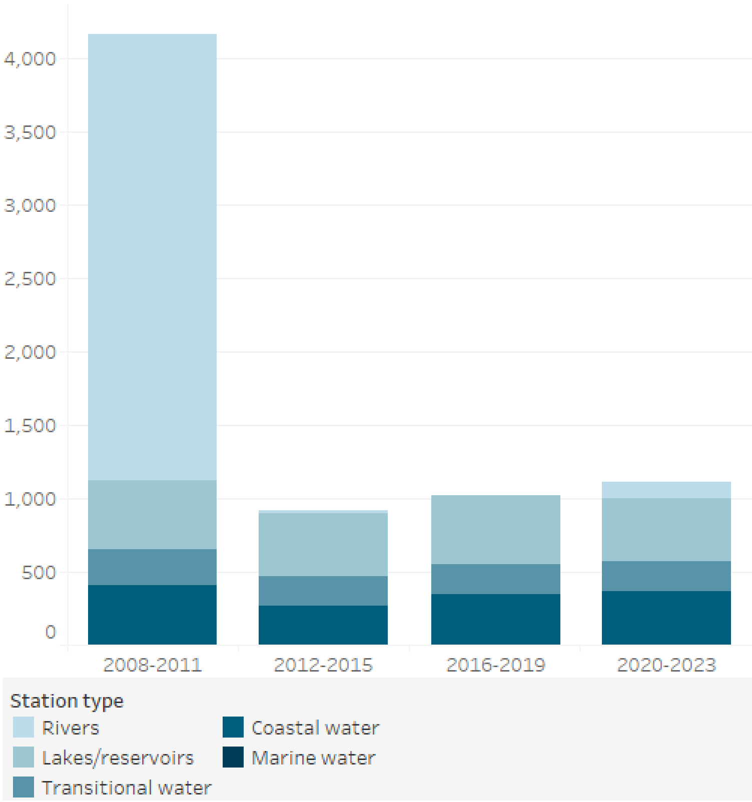


Table 11 – Number of monitoring points reporting trophic status by station type ([27])

Station type	Stations With Trophic Status 2008-2011	2012-2015	2016-2019	2020-2023
Rivers	3,035	13		119
Lakes/reservoirs	475	429	465	423
Transitional water	246	209	204	204
Coastal water	407	264	351	372
Marine water				
Total	4,163	915	1,020	1,118

6.2. Methodology for the assessment of trophic status

In the latest reporting period, the methodology for assessing trophic status has changed following the introduction of a new legislative framework in 2022. This framework has significantly altered the criteria for analysis, including a new classification for the risk of eutrophication, which has resulted in more stringent assessment criteria. Consequently, classification results should be interpreted with caution compared to previous periods.

The OECD (1982) criteria have been applied for assessing trophic status, focusing on inland waters classified as lakes and heavily altered waters comparable to lakes, as per the implementing legislation in Spain. Rivers in Spain typically do not face eutrophication issues due to their hydromorphological characteristics, which prevent the long-term accumulation of algae or aquatic plants. Despite this, Spain has reported the trophic status of rivers using the OECD (1982) methodology in this reporting period. This matter is currently under discussion between the Commission and Spanish authorities.

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

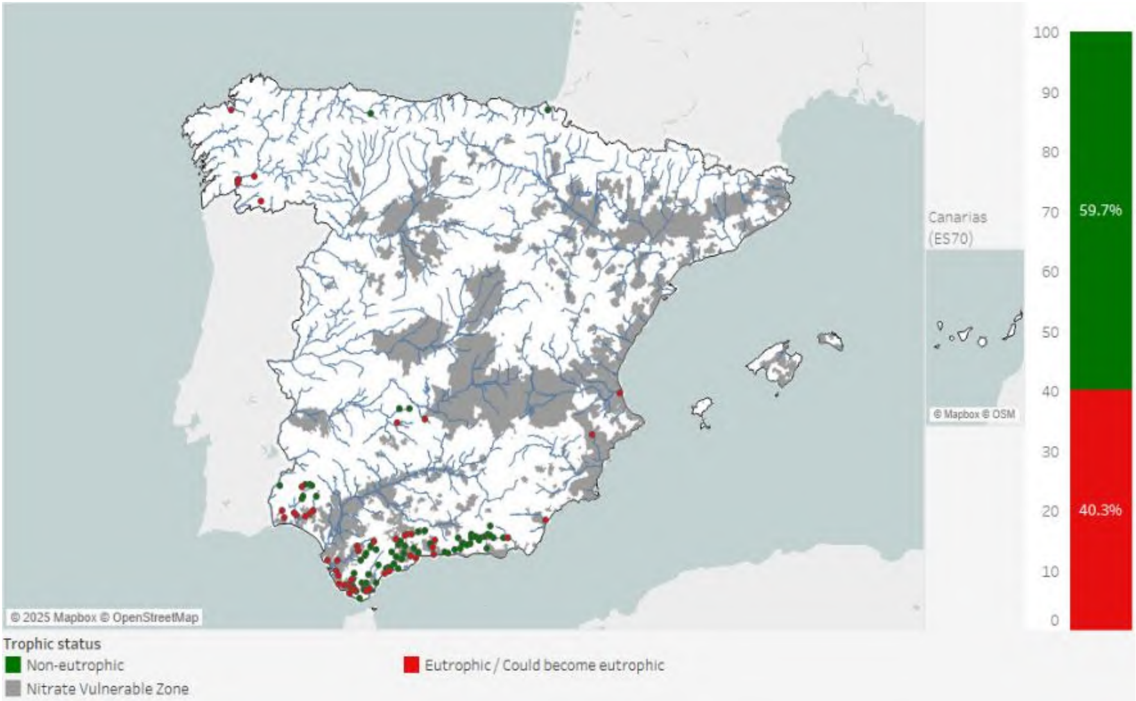
([27]) Spain reported that monitoring was discontinued in 291 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

6.3. Eutrophication of surface waters

Rivers

40.3% 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.

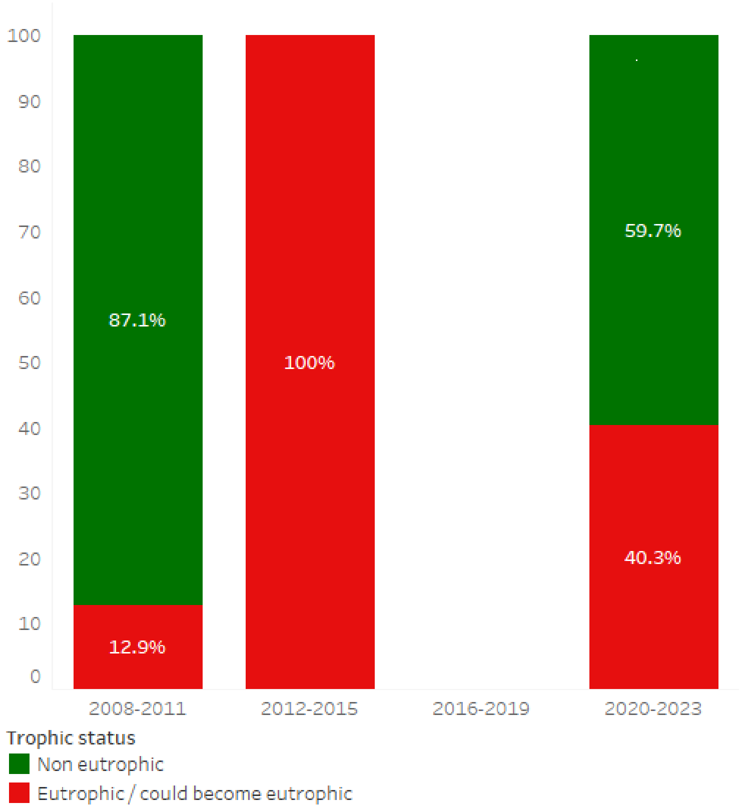
Figure 37 – Map of trophic status in rivers and share of monitoring points by trophic class in the reporting period 2020-2023



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

No trophic status was reported for rivers in 2016-2019. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. Due to a big change in the monitoring network where almost all river monitoring stations were removed from 2008-2011 to 2012-2015, it is not possible to compare the results in different reporting periods.

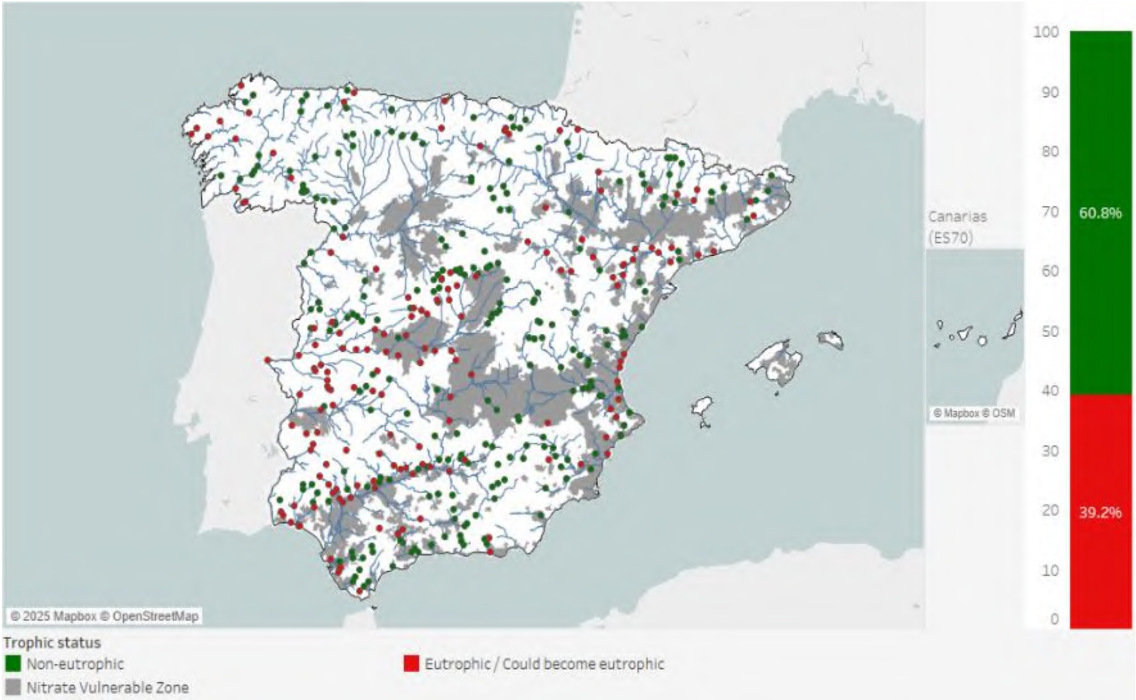
Figure 38 – Share of monitoring points in rivers by class of trophic status in the current and previous reporting periods



Lakes and water reservoirs

39.2% 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 39 – Map of trophic status in lakes/water reservoirs and share of monitoring points by trophic class in the reporting period 2020-2023



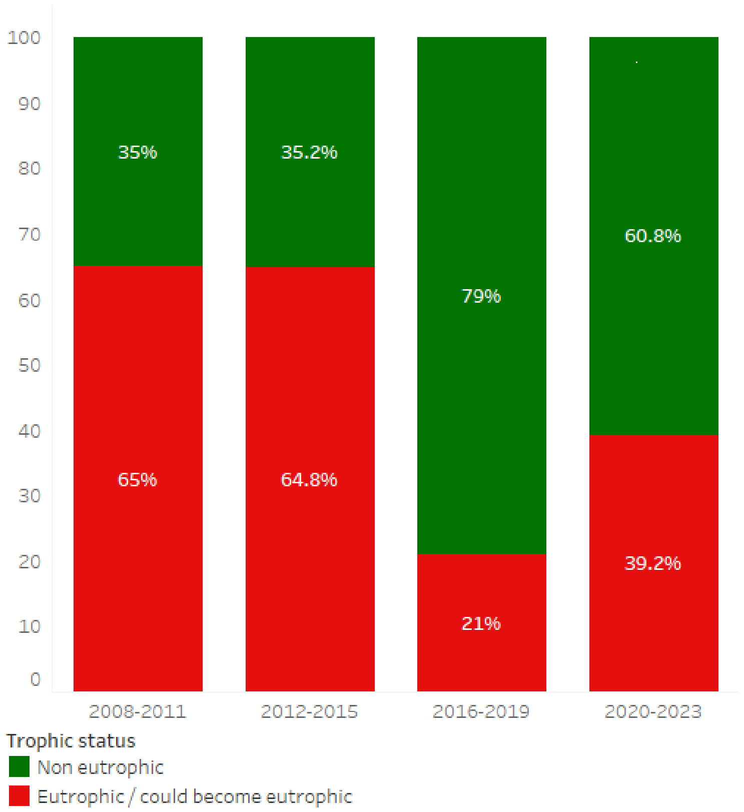
Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

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	119	22.0%	59.7%	40.3%
Lakes/reservoirs	423	78.0%	60.8%	39.2%
Total	542	100.0%	60.5%	39.5%

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points increased from 21.0% to 39.2%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. There was decrease in share of eutrophic/could become eutrophic monitoring points between reporting periods 2012-2015 and 2016-2019. This decrease was reverted in current reporting period but still well below levels in 2012-2015 and before. However, due to the change in methodology, classification results should be interpreted with caution compared to previous periods.

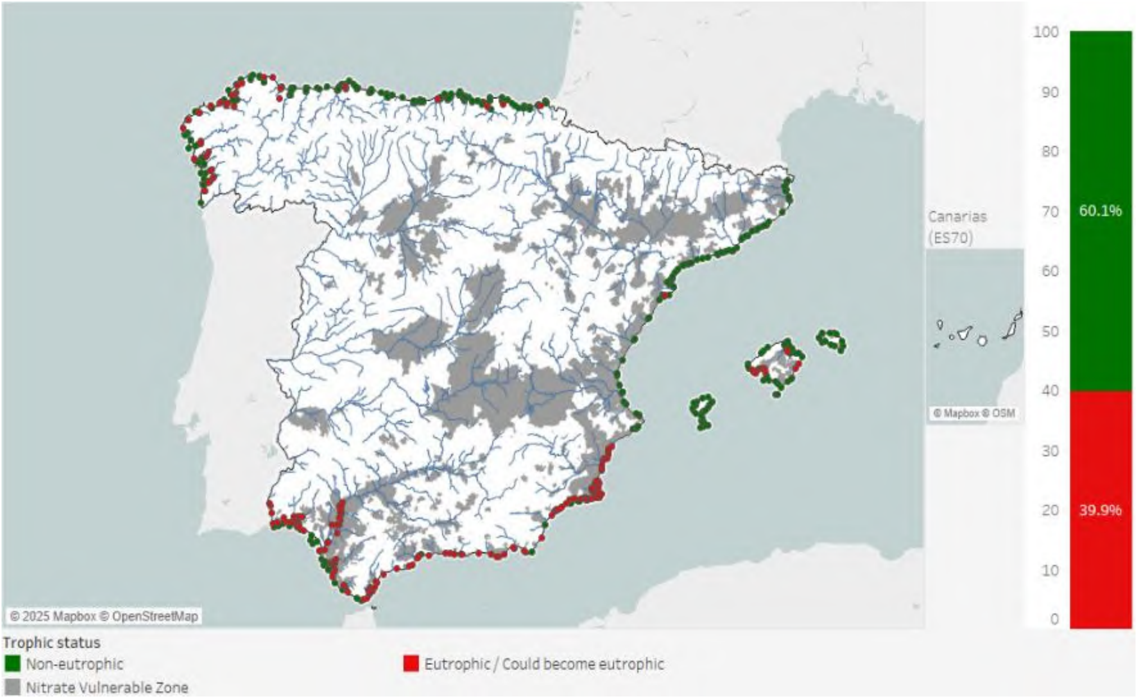
Figure 40 – Share of monitoring points in lakes/water reservoirs by class of trophic status in the current and previous reporting periods



Saline waters

38.9% 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 41 – 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.

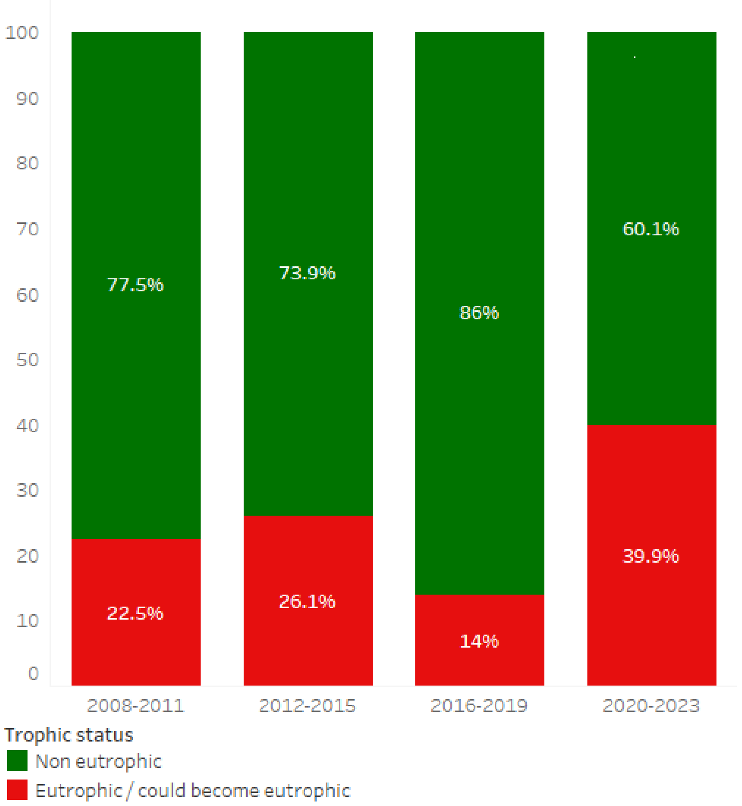
It is relevant to look separately at different types of saline waters (transitional, coastal and marine). In Spain, 53.4% of transitional water and 32.5% of coastal water monitoring points were eutrophic/could become eutrophic, as shown in the table below.

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	204	35.4%	46.6%	53.4%
Coastal water	372	64.6%	67.5%	32.5%
Marine water				
Total	576	100.0%	60.1%	39.9%

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in saline waters increased from 14.0% to 39.9%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. There was decrease in the share of eutrophic/could become eutrophic monitoring points between the reporting periods 2008-2011 and 2016-2019, however this decrease was reverted in the reporting period 2020-2023 with a higher share than in all three previous reporting periods. However, due to the change in methodology, classification results should be interpreted with caution compared to previous periods.

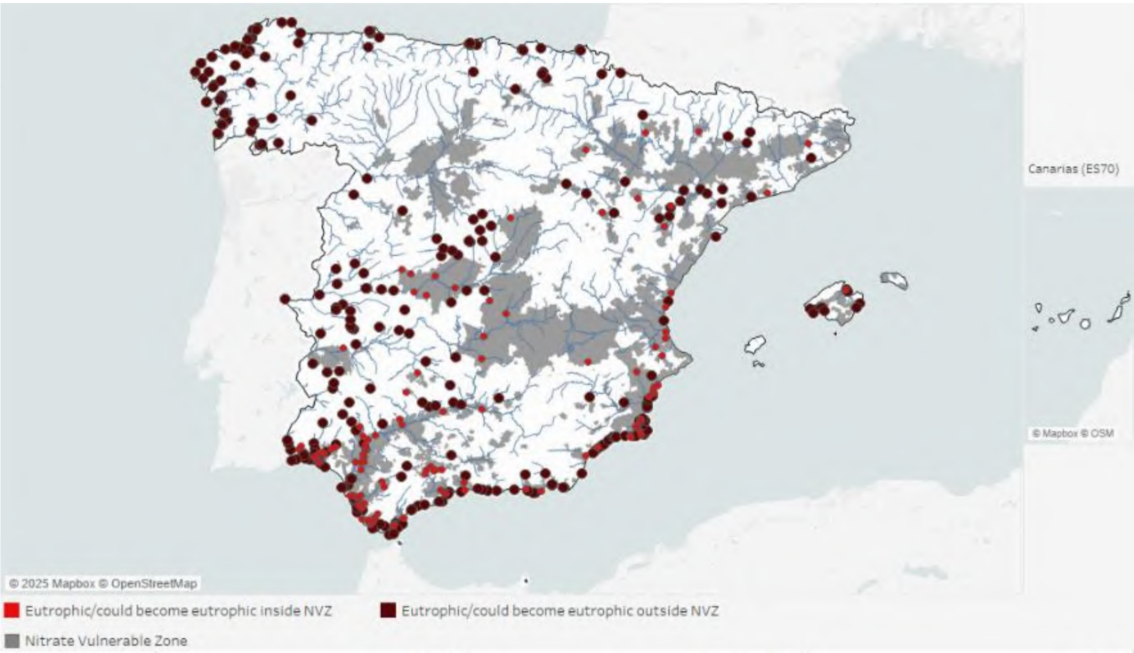
Figure 42 – Share of monitoring points in saline waters by class of trophic status in the current and previous reporting periods



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 444 surface water monitoring points which were reported eutrophic/could become eutrophic, of which 310 are outside NVZ, accounting for 69.8% of all eutrophication hotspots in the country.

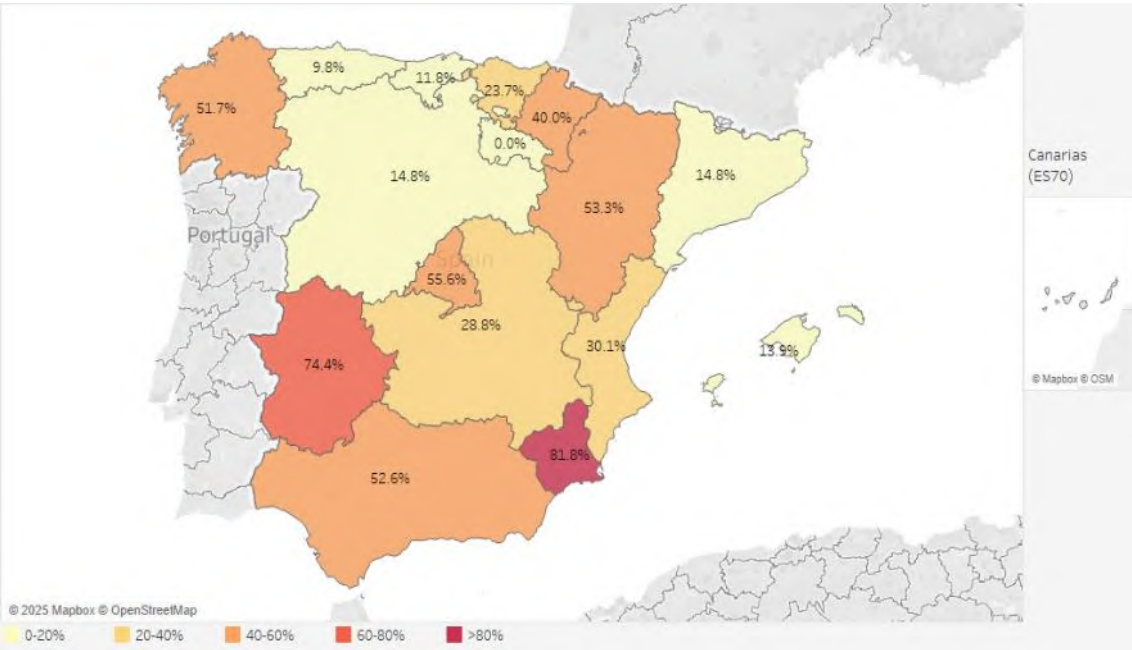
Figure 43 – Eutrophic/could become eutrophic monitoring points (map) and their distribution inside and outside Nitrate Vulnerable Zones (table)



	inside NVZ	outside NVZ	Total
Rivers	25	23	48
Lakes	50	116	166
Transitional water	34	75	109
Coastal water	25	96	121
Total	134	310	444

The highest share of the hotspots is in Region of Murcia (81.8%), Extremadura (74.4%) and Madrid (55.6%).

Figure 44 – 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

Pursuant to Royal Decree 261/1996, in force since 1996 and amended by Royal Decree 47/2022, the national authorities have entrusted the competent bodies of the 17 Autonomous Communities with the establishment and implementation of Codes of Good Agricultural Practices (CGAP) and Nitrates Action Programmes. Royal Decree 261/1996 lays down the measures to be included in the CGAP and the action programmes.

In addition, Royal Decree 1051/2022 establishes basic standards for achieving a sustainable supply of nutrients in agricultural soils. While this Royal Decree does not constitute a CGAP or an action programme under the Nitrates Directive, it provides a national baseline applicable throughout the Spanish territory, above which regional authorities may set additional or more stringent measures within their respective action programme.

The autonomous communities of Andalusia, Aragon, the Balearic Islands, the Canary Islands, Castile and León, Castile-La Mancha, Catalonia, the Valencian Community, Extremadura, Madrid, Region of Murcia, Navarre, the Basque Country, and La Rioja have designated nitrate vulnerable zones and have adopted both a CGAP and an action programme. The Principality of Asturias, Cantabria, and Galicia have not designated nitrate vulnerable zones.

The first CGAP adopted by the autonomous communities were approved in the late 1990s. Since their initial adoption, CGAP have been reviewed in Aragon, the Principality of Asturias, Castile and León, Region of Murcia, the Basque Country and the Valencian Community. During the reporting period 2020-2023, only the CGAP of Castile and León was updated.

The first action programmes were adopted between 2000 and 2003, except for the Autonomous Community of Madrid, which first action programme dates from 2012. Most action programmes have subsequently been revised at least once. Madrid's action programme, however, has not been updated since its adoption. During the reporting period 2020–2023, the following autonomous communities adopted or revised their action programmes: Andalusia, Aragon, Castile-La Mancha, Castile and León, Catalonia, the Balearic Islands, the Canary Islands, Navarre, the Basque Country, and La Rioja. The Region of Murcia did not update its action programme during this period but introduced additional regulatory measures.

According to the Spanish implementation report for 2020-2023, draft action programmes were under preparation in Castile-La Mancha, Extremadura, Madrid and Region of Murcia at the time of reporting.

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

7.2. Controls

A total of 313 736 agricultural holdings were reported in Spain, of which 263 845 are located within designated vulnerable zones. Compliance with Nitrates Directive requirements is monitored through annual holding inspections carried out by the administrations of the Autonomous Communities, primarily in the context of CAP conditionality controls. At national level, the average inspection rate is slightly above 2% of holdings per year.

The main non-compliances relate to irrigation control (12% in Andalusia, 12% in Castile-La Mancha and 32% in Murcia), the proximity to water courses (17% in Castile-La Mancha), the manure collection and storage capacity (10% in Catalonia), the maximum nitrate concentration in the soil (14% in Catalonia), the lack or incompleteness of records (13% in La Rioja), the winter vegetation cover (50% in Madrid), the responsible fertiliser use (37% in Murcia) and the physical and climatic conditions (38% in Murcia).

The Autonomous Communities of Castile and León and the Canary Islands do not report numbers on non-compliances with the measures of the Nitrates Action Programmes.

The implementation report for the period 2020-2023 does not report the main difficulties encountered in the implementation of the measures in the action programmes

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

8. WATER QUALITY OUTLOOK

The methodology used for forecasting water quality in relation to nitrates across all water bodies in Spain is based on the PATRICAL model (Precipitation-Contribution in Water Quality Integrated Network Sections). This distributed model simulates the water cycle and water quality for large and medium-sized water basins. It incorporates a geographic information system (GIS) and is employed by authorities for planning and managing water resources, conducting research projects that assess surface and groundwater resources, identifying nitrate concentrations, and establishing environmental targets to safeguard water bodies from nitrate pollution.

For forecasting purposes, Spanish authorities select a subset of stations to evaluate the recovery periods. These stations are chosen based on the "recovery threshold" outlined in Spanish legislation and are classified as waters affected by pollution. Specifically, they select surface water (SW) stations with a maximum recorded nitrate concentration exceeding 25 mg/l and groundwater (GW) stations with a maximum recorded concentration exceeding 37.5 mg/l. ([29]).

Regarding the objectives of the Water Framework Directive (WFD) for nutrients, the forecast suggests that by 2027, 98% of SW bodies will achieve a good ecological or chemical status, and 99% of GW bodies will achieve a good quantitative or chemical status. In 2021, these percentages were 55% for SW bodies and 56% for GW bodies.

([29]) The recovery periods have been calculated by linear regression, considering different thresholds for impact (GW 37.5 and SW 25 mg/l) and recovery (GW 25 mg/l and SW 18.75 mg/l). This result was compared with the recovery time horizons of the water bodies for which the PATRICAL model had been incorporated.

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