EUROPEAN
COMMISSION

Brussels, 11.10.2021
SWD(2021) 1001 final

PART 24/38

COMMISSION STAFF WORKING DOCUMENT

Accompanying the document

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2016–2019

{COM(2021) 1000 final}

Pressure from Agriculture

Latvia's utilised agricultural area amounts to 1.9 Mha, representing 31% of the total land area. The major outputs of the agricultural industry excluding services and secondary activities include in a decreasing order: cereals (25.3%) and milk (20.7%).

Eurostat

Major land use statistics for Latvia

Table 1.Utilized agricultural area (abbreviated as UAA)

Latvia	2005	2007	2010	2013	2016
Utilised agricultural area UAA (1000 ha)	NA	1839	1806	1878	1931
arable land (1000 ha)	NA	1188	1173	1208	1288
permanent grass (1000 ha)	NA	641	625	663	635
permanent crops (1000 ha)	NA	10	7	6	8
kitchen gardens (1000 ha)	NA	NA	NA	NA	0

Note:

Eurostat (FSS)

Latvia's arable land has increased by 8% since 2007. The permanent grass land area has remained stable since 2007.

Animal distribution in Latvia

Latvia's live bovine has remained stable since 2013. Live pigs and poultry decreased since 2010. The livestock density index (livestock unit per hectare of Utilized Agricultural Area) has also remained stable and is lower than the EU average of 0.8.

Table 2. Livestock statistics

Latvia	2005	2007	2010	2013	2016
Livestock index	0.27	0.28	0.26	0.26	0.26
dairy cows (10^6 heads)	0.18	0.18	0.16	0.16	0.15
live bovines (10^6 heads)	0.38	0.40	0.38	0.41	0.41
live pigs (10^6 heads)	0.43	0.41	0.39	0.37	0.34
live poultry (10^6 heads)	NA	NA	5.16	5.04	4.65

Note:

Eurostat (FSS)

Nitrogen and phosphorus fertilizers and surplus (kg/ha UAA)

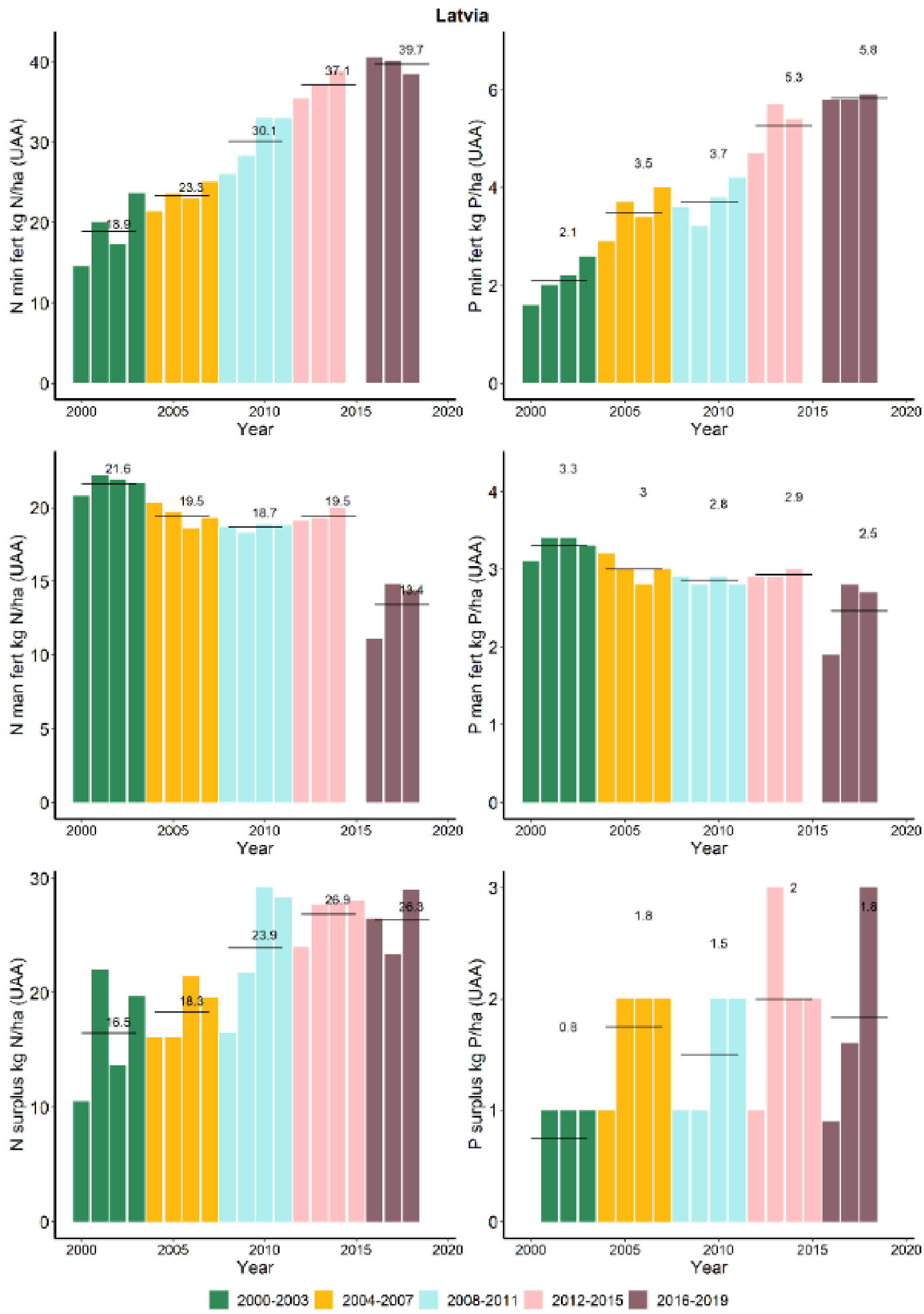


Figure 1. N and P fertilizers and gross surplus (kg/ha)

The gross nitrogen and phosphorus surpluses originate from EUROSTAT data for the years 2000-2018. N and P mineral fertilizers significantly increased from the last reporting period, while manure decreased. Both the nitrogen and phosphorus surpluses decreased from the last reporting period, by 6.3 and 15% respectively. In the plots: N/P min and N/P man are respectively the N/P mineral fertilizers and N/P manure.

Livestock unit - LSU /ha

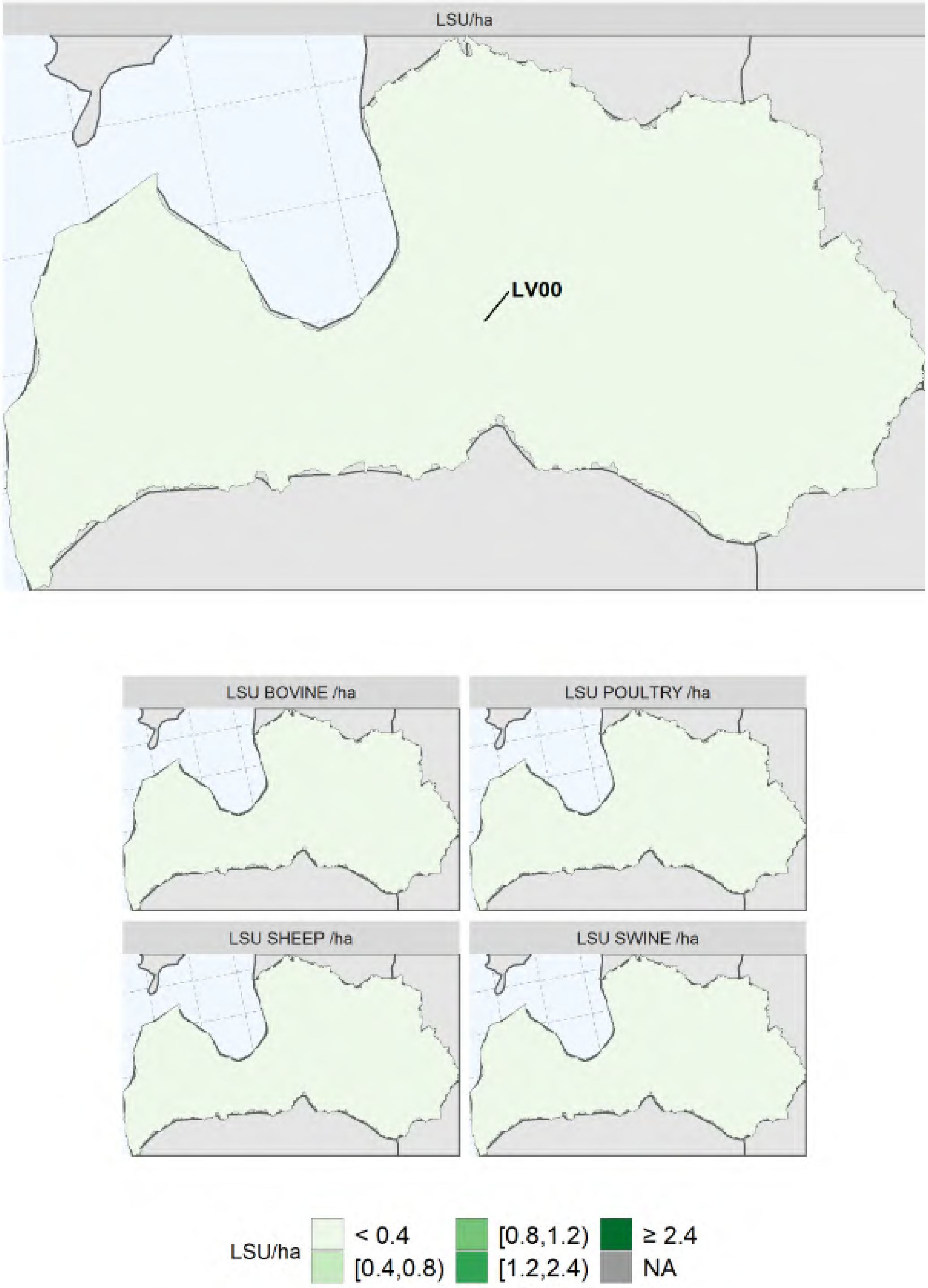


Figure 2. Map of livestock unit distribution, year 2016 (Source: Eurostat, February 2021)

Animal production density is low for all animal types (total LSU and LSU by animal type were retrieved individually from EUROSTAT).

In this document, the NUTS-2013 version is used.

(https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/nuts)

Water Quality Monitoring

The monitoring of nitrates in surface waters and groundwater is performed by the Latvian Environment, Geology and Meteorology Centre (LEGMC). The monitoring of agricultural runoffs under Latvia's Environmental Monitoring Programme is conducted by the Latvia University of Life Sciences and Technologies (LLU) while the monitoring of marine waters is conducted by the Latvian Institute of Aquatic Ecology (LIAE). Most of surface water stations had data available for one year, and the sampling frequency varied from 4 to 12 times per year. 11 stations were surveyed along the Baltic coast (within one nautical mile) while the Gulf of Riga was investigated more thoroughly (network density).

However, it is noteworthy that the monitoring points and results of the Agricultural Runoff monitoring have not been included in this fiche. Monitoring activities within the Agricultural Runoff monitoring consist of water sampling at 20 groundwater monitoring sites of which 15 sites sit at a depth of up to 5 m, 4 sites at a depth of 5 -15 m, 1 site in artesian waters. These groundwater monitoring sites mostly are located in the central and southwestern parts of the NVZ. Water sampling has been carried out at 9 drainage fields and small catchments, and 22 rivers in terms of surface waters as part of the Agricultural Runoff monitoring.

For groundwater measurements, some stations have same coordinates due to different depths. In this case, the average values cover different measurements in time, but also location. In maps providing the spatial distribution of monitoring points, it is not possible to distinguish stations with the same coordinates: for NO3 concentration, the average value is shown; for trends and trophic status the worst case was considered.

It is noteworthy that in some cases in the bar charts the total value can differ from 100% due to rounding errors.

Groundwater quality monitoring network

Table 3. Number of GW stations with measurements and trends per type

Station Type	Description	Number of stations with measurements			Number of stations with Trends		
		2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
0	Phreatic groundwater (shallow): 0-5 m	29	28	36	17	24	26
1a	Phreatic groundwater (deep) 5-15 m	27	29	34	21	28	28
1b	Phreatic groundwater (deep) 15-30 m	5	5	7	3	5	5
1c	Phreatic groundwater (deep) >30 m	3	2	2	2	2	1
2	Captive groundwater	109	135	153	97	104	124
3	Karstic groundwater	0	0	0	0	0	0
9	Not specified	0	0	0	0	0	0
	Total	**173**	**199**	**232**	**140**	**163**	**184**

Surface water quality monitoring network

Table 4. Number of SW stations with measurements, trends and trophic status per type

Station Type	Description	Number of stations with measurements			Number of stations with Trends			Number of stations with Trophic status		
		2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
4	River water	162	109	207	89	74	89	162	109	204
5	Lake/reservoir water	176	113	228	70	85	75	177	113	228
6	Transitional water	7	8	6	5	8	6	7	8	8
7	Coastal water	24	21	3	14	21	3	24	21	21
8	Marine water	14	14	7	11	11	7	16	14	13
9	Not specified	0	0	0	0	0	0	0	0	0
	Total	**383**	**265**	**451**	**189**	**199**	**180**	**386**	**265**	**474**

Groundwater Quality

Groundwater average annual nitrate concentration[1]

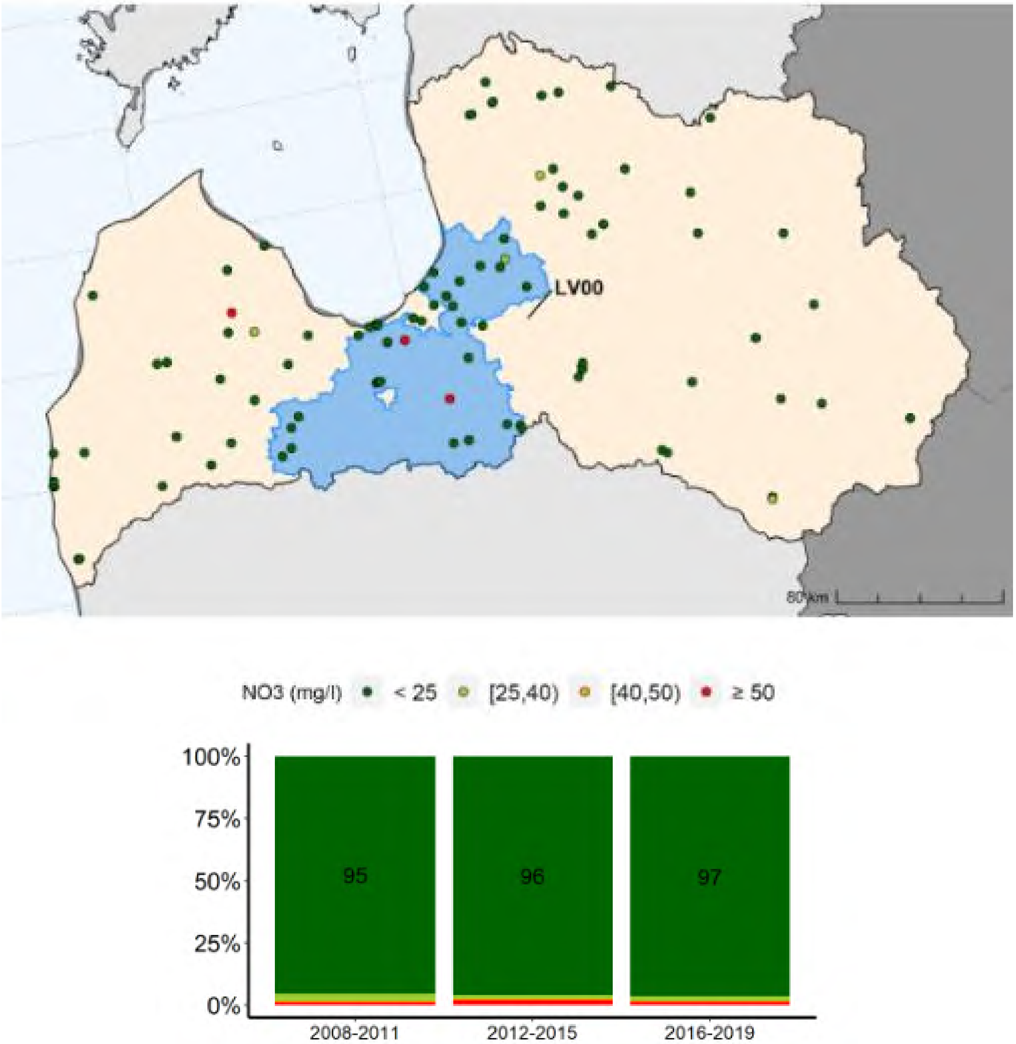


Figure 3. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

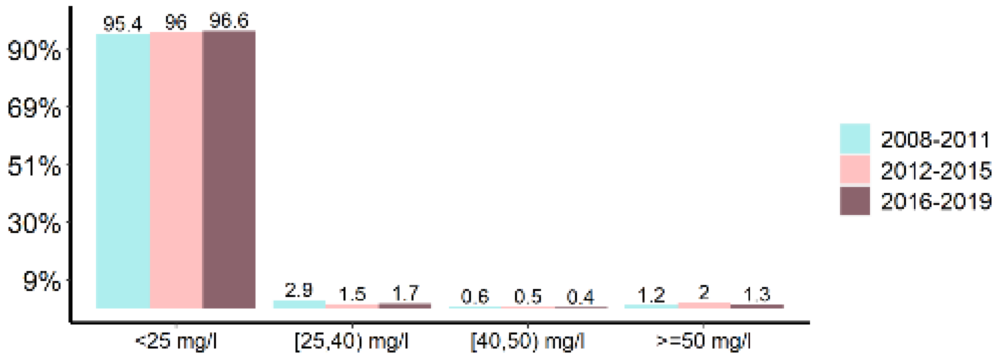


Figure 4. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis).

Groundwater average annual nitrate concentration trend[1]

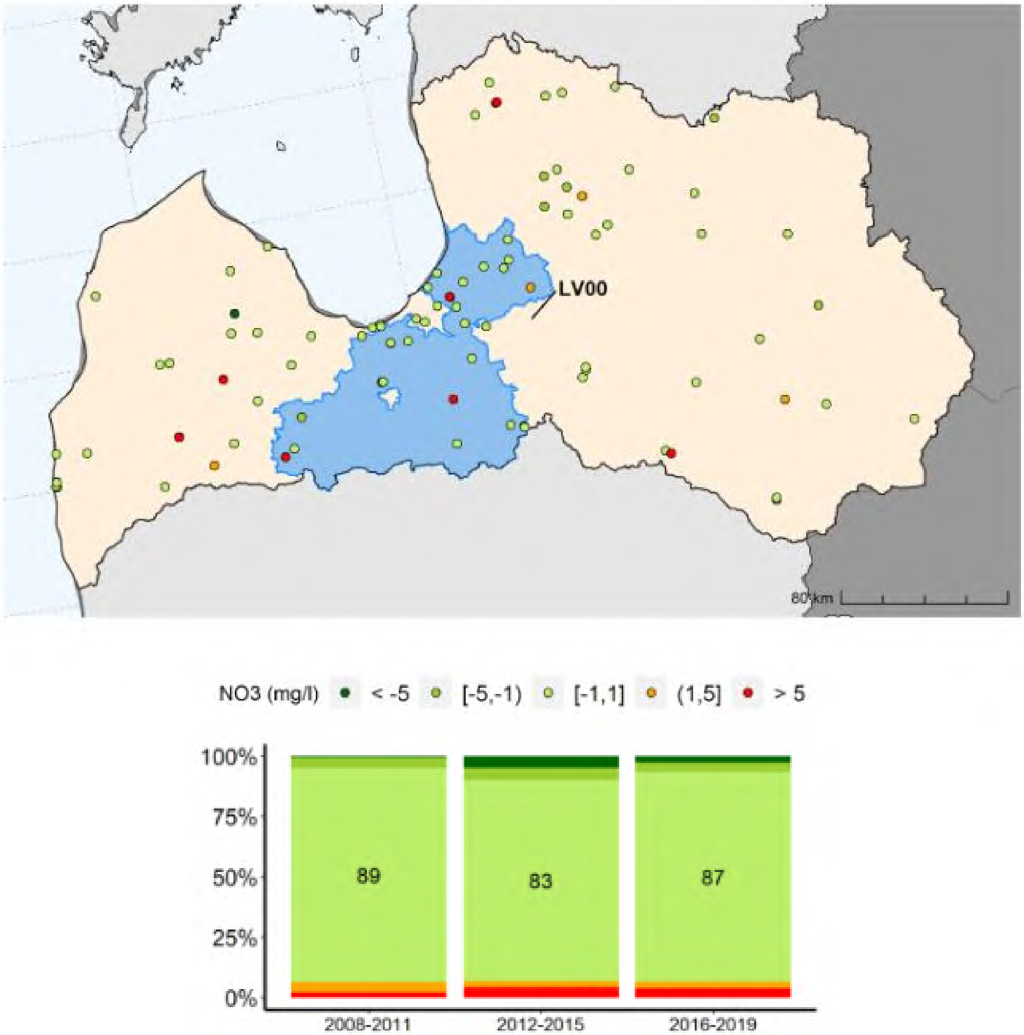


Figure 5. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

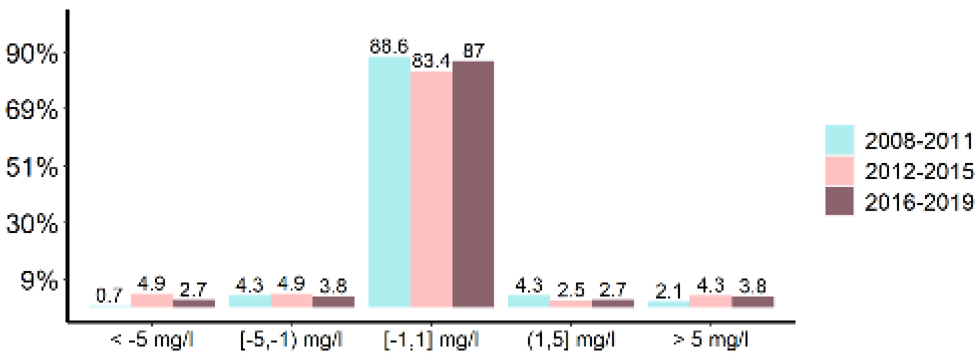
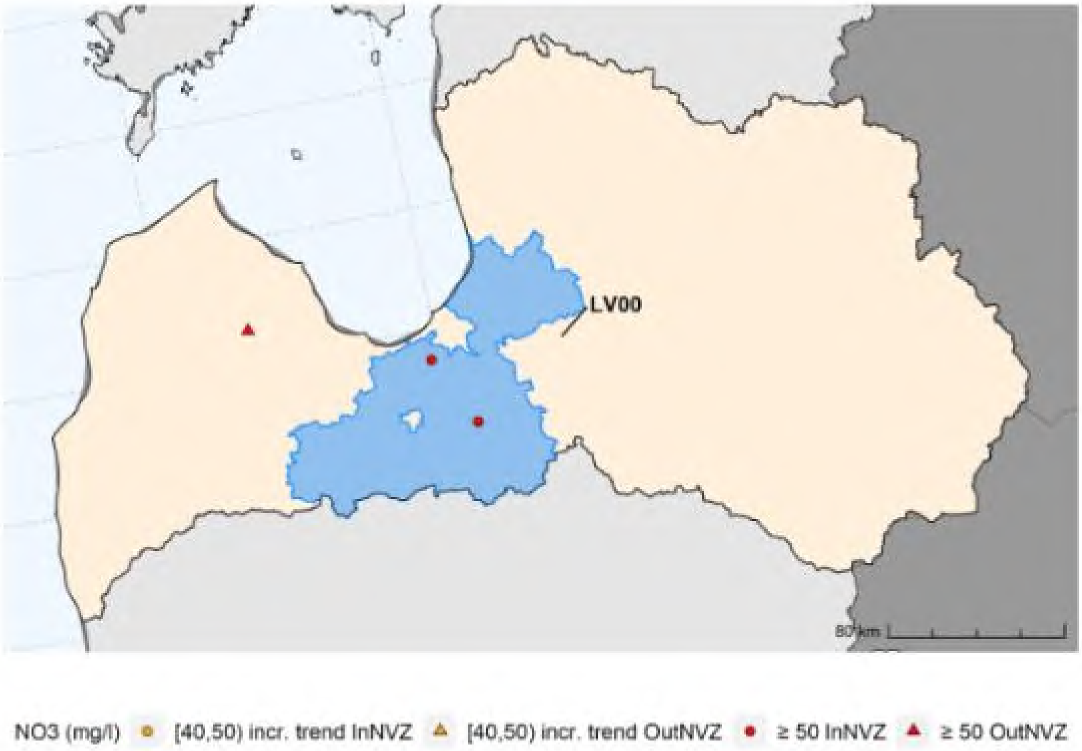


Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Groundwater hotspot

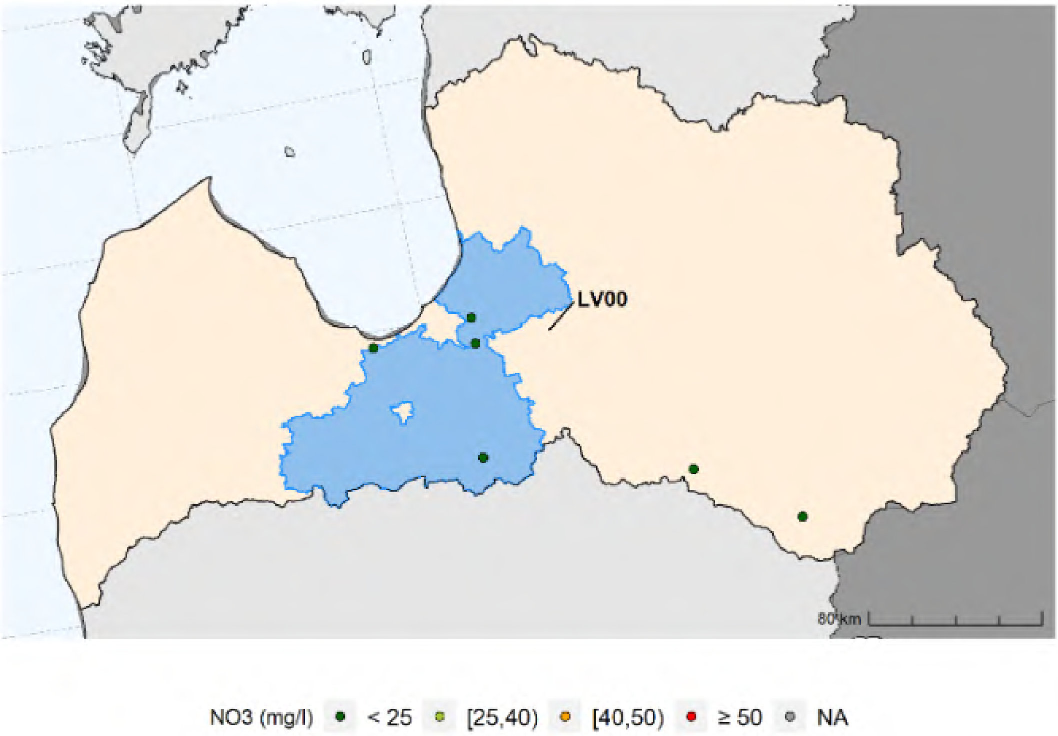


		>=40 and < 50 mg/l incr.trend		>=50 mg/l	
NUTS ID	NUTS NAME	InNVZ	OutNVZ	InNVZ	OutNVZ
LV00	Latvija	0	0	2	1
	Total	**0**	**0**	**2**	**1**

Figure 7. GW hotspot analysis map (top graph) and distribution by NUTS2 (lower graph) of average NO3 annual concentration greater than 40 mg/l. In the map in blue the NVZ.

The hotspot analysis identifies all the GW monitoring stations that have NO3 concentration in the range of 40-50 mg/l with increasing trends or are above 50 mg/l. The map shows the spatial distribution of these points, and the table reports the number of stations by NUTS inside and outside NVZ.
Only the NUTS of interest are reported.

Groundwater stations removed[1]



Station Type	Description	Number of removed stations		
		total removed	with measurements	with trends
0	Phreatic groundwater (shallow): 0-5 m	1	1	1
1a	Phreatic groundwater (deep) 5-15 m	1	1	1
1b	Phreatic groundwater (deep) 15-30 m	0	0	0
1c	Phreatic groundwater (deep) >30 m	1	1	1
2	Captive groundwater	11	11	5
3	Karstic groundwater	0	0	0
9	Not specified	0	0	0
	Total	**14**	**14**	**8**

Figure 8. GW removed stations map (top graph) and distribution by groundwater type (lower graph). In the map in blue the NVZ.

The removed stations analysis identifies all the GW monitoring stations that were removed in the current reporting period. The map shows the spatial distribution of these points with the concentrations of the previous reporting period, and the table reports the number of stations with measurements and trends per type.

Surface Water Quality

Surface water average annual nitrate concentration

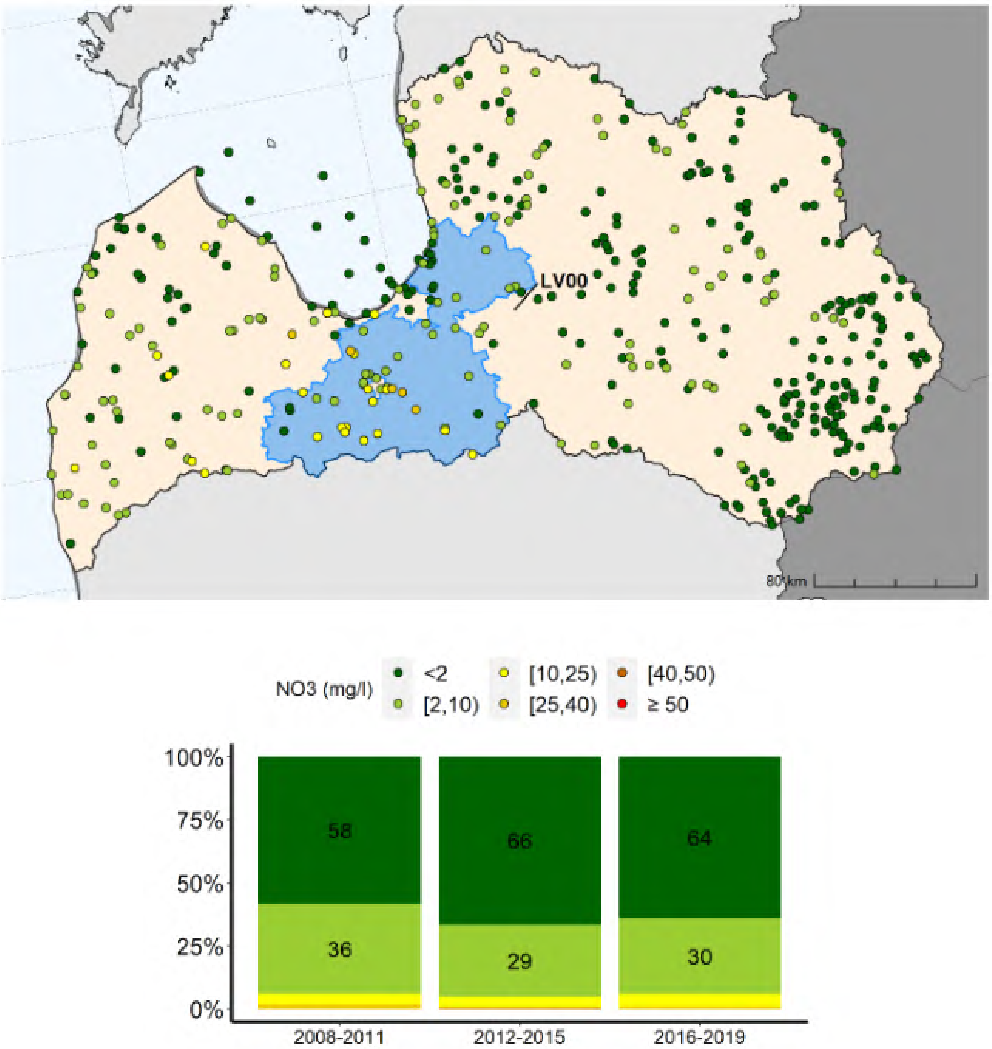


Figure 9. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

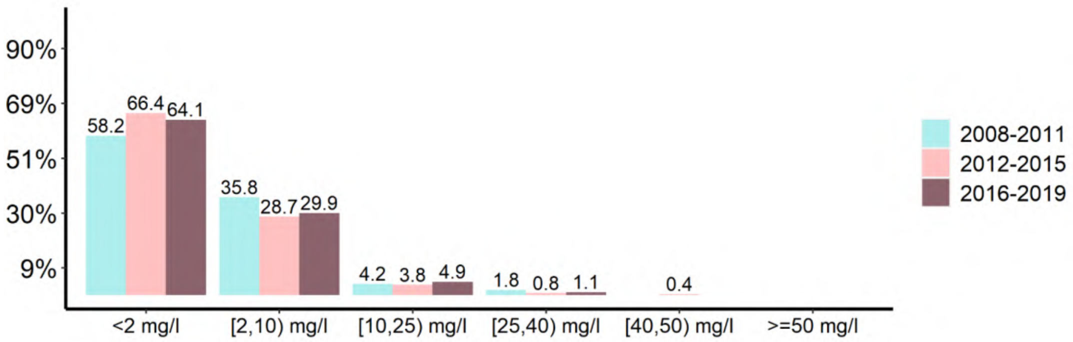


Figure 10. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Surface water average annual nitrate concentration trend

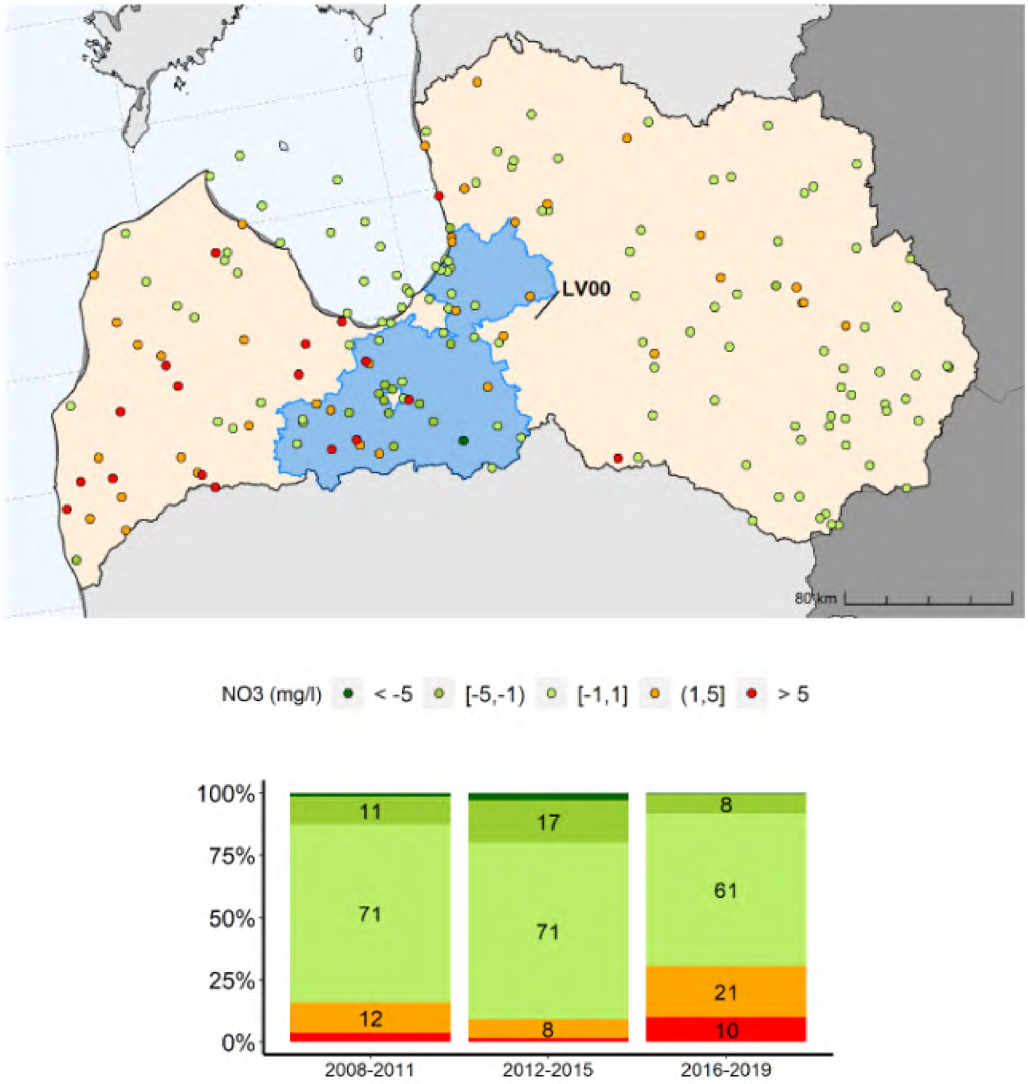


Figure 11. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

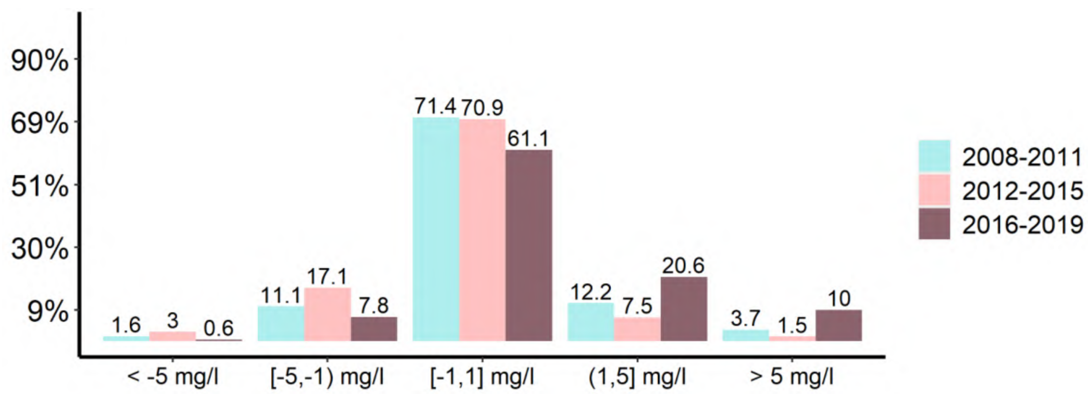


Figure 12. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Surface Water Eutrophication

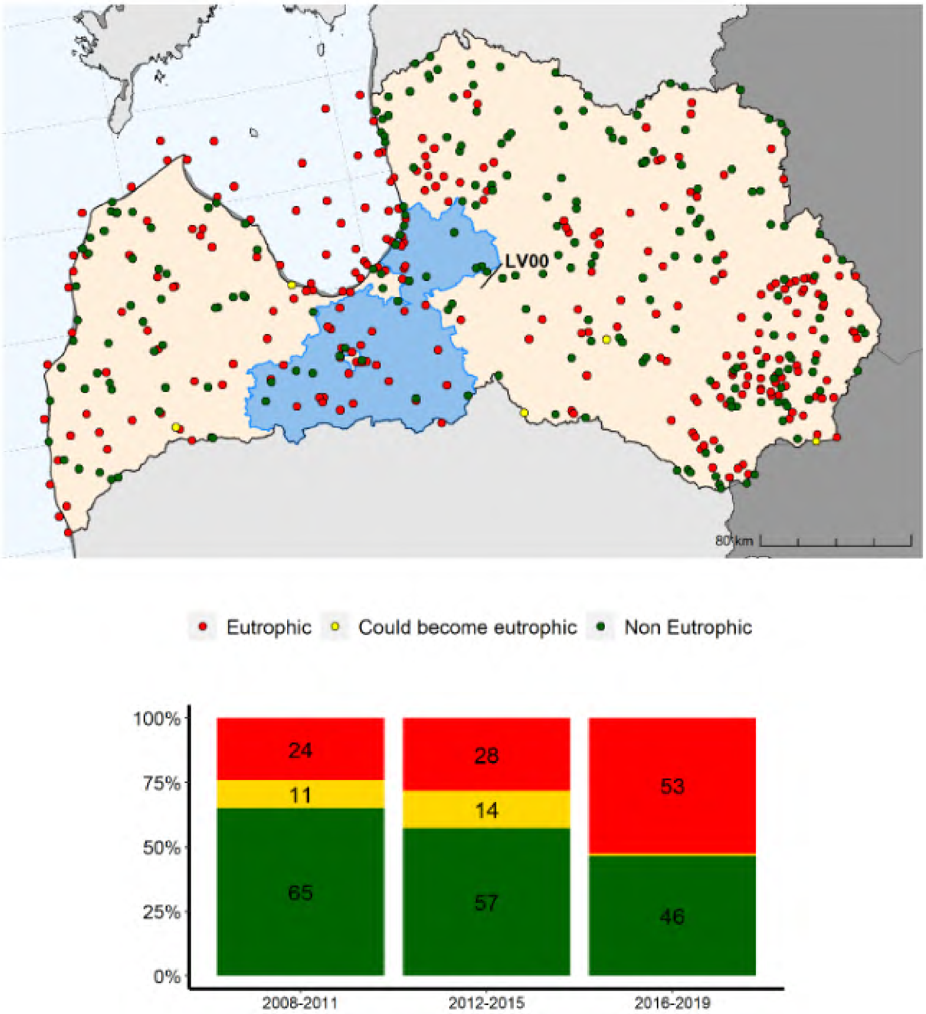


Figure 13. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

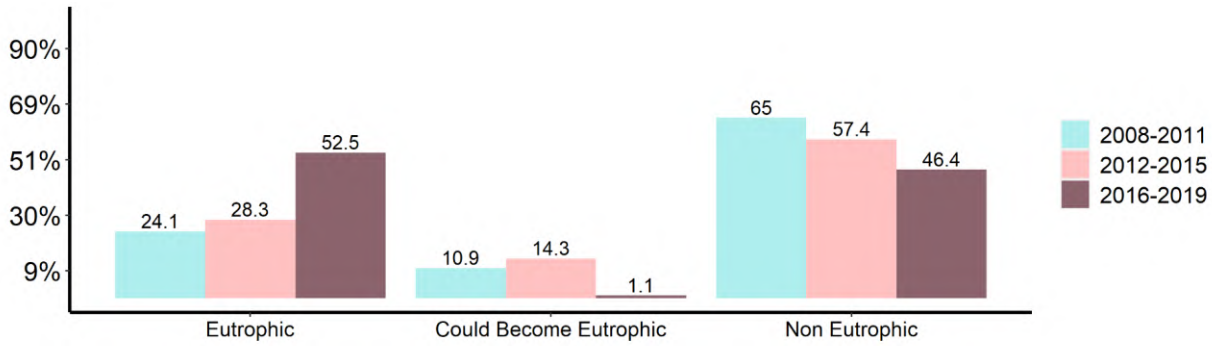
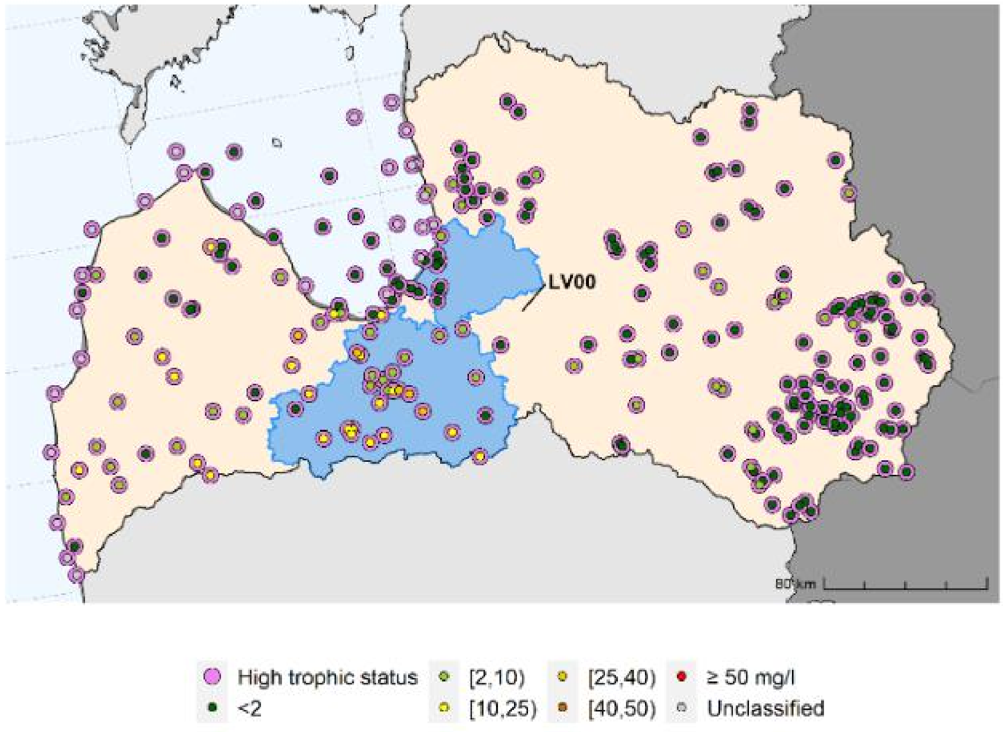


Figure 14. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

It is noteworthy that the main differences in the classification of trophic status in the current reporting period respect to the previous is due to a different methodology.

The Eutrophic status vs average NO3 annual concentration



NUTS ID	NUTS NAME	High trophic status	Number of stations by classes of concentration						
			<2 mg/l	[2,10) mg/l	[10,25) mg/l	[25,40) mg/l	[40,50) mg/l	>=50 mg/l	Unclassified
LV00	Latvija	207	136	45	21	5	0	0	0
NO_NUTS	SALINE	42	16	0	0	0	0	0	26
	Total	**249**	**152**	**45**	**21**	**5**	**0**	**0**	**26**

Figure 15. The SW monitoring stations with eutrophic status versus the average NO3 annual concentration. In the map in blue the NVZ.

The analysis shows all the SW monitoring stations with the higher trophic status and the corresponding value of NO3 concentration. The map shows the spatial distribution of these points, and the table reports the number of stations with measurements with higher trophic status and the corresponding stations by classes of NO3 concentration.

Only the NUTS of interest are reported.

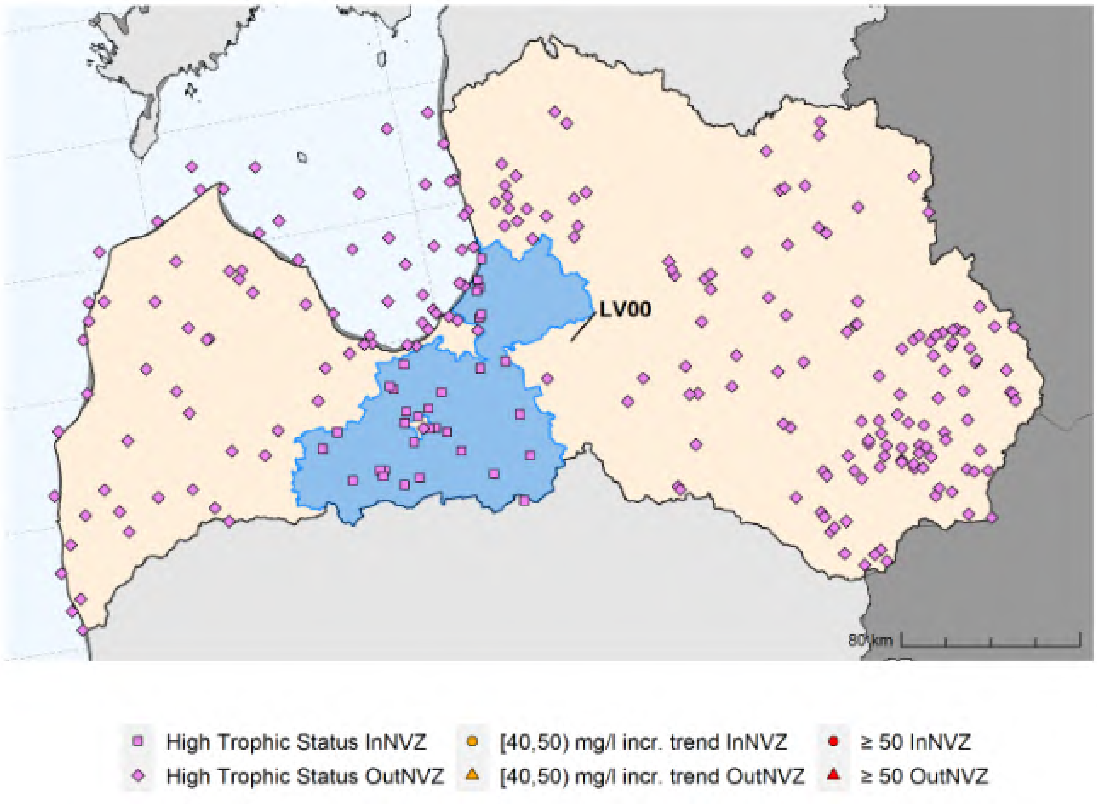
The assessment of eutrophication is based on the physical and chemical parameters used to assess the ecological state of rivers and lakes, as well as transitional, coastal and marine waters, and also on the presence of chlorophyll-a. The annual averages, except for Chl-a and transparency parameters, were used to assess the eutrophication processes. Only the average values measured in July and August have been used for Chl-a and transparency. The determinands used in the chemical assessment include for rivers O2, BOD5, N/NH4, Ntotal and Ptotal. The threshold values vary according to the river type. In lakes, the parameters used include Ntotal Ptotal, chlorophyll-a and Secchi depth. The threshold values vary also according to the lake type. Due to the availability of data, only summer chlorophyll-a and summer bottom water layer O2 concentrations were used for the assessment of eutrophication in the coastal areas of the Baltic.

A eutrophic state or risk of eutrophication was identified in 32.4% of all the river and 64% of all the lake stations inspected. The overall assessment of the coastal water body of the Baltic Sea indicates the status most still remains poor. The status of the Gulf of Riga still remains poor for both transitional and coastal waters.

Table 5. Summary of SW stations by classes of trophic status and type.

		Number of stations with Trophic status		
Station Type	Description	Eutrophic	Could become eutrophic	Non Eutrophic
4	River water	60	5	139
5	Lake/reservoir water	147	0	81
6	Transitional water	8	0	0
7	Coastal water	21	0	0
8	Marine water	13	0	0
9	Not specified	0	0	0
	Total	**249**	**5**	**220**

Surface Water quality hotspot

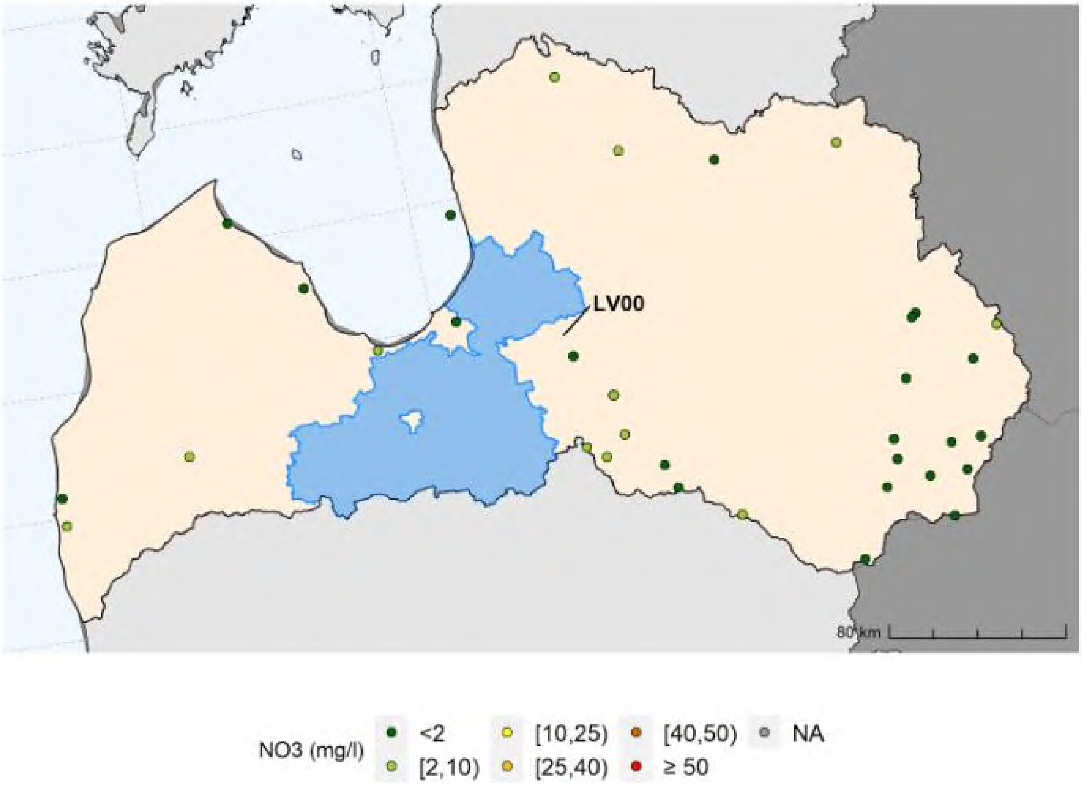


		High trophic status		>=40 and < 50 mg/l incr.trend		>=50 mg/l	
NUTS ID	NUTS NAME	InNVZ	OutNVZ	InNVZ	OutNVZ	InNVZ	OutNVZ
LV00	Latvija	33	174	0	0	0	0
NO_NUTS	SALINE	0	42	0	0	0	0
	Total	**33**	**216**	**0**	**0**	**0**	**0**

Figure 16. SW hotspot analysis map (top graph) and distribution by NUTS2 (lower graph) of average NO3 annual concentration greater than 40 mg/l and trophic status. In the map in blue the NVZ.

The hotspot analysis identifies all the SW monitoring stations that have high eutrophic status, NO3 concentration in the range of 40-50 mg/l with increasing trends or are above 50 mg/l. The map shows the spatial distribution of these points, and the table reports the number of stations by NUTS inside and outside NVZ.
Only the NUTS of interest are reported.

Surface Water Stations Removed



Station Type	Description	Number of removed stations			
		total removed	with measurements	with trends	with trophic status
4	River water	14	14	9	14
5	Lake/reservoir water	19	19	16	19
6	Transitional water	0	0	0	0
7	Coastal water	0	0	0	0
8	Marine water	1	1	0	1
9	Not specified	0	0	0	0
	Total	**34**	**34**	**25**	**34**

Figure 17. SW removed stations map (top graph) and distribution by surface water type (lower graph). In the map in blue the NVZ.

The removed stations analysis identifies all the SW monitoring stations that were removed in the current reporting period. The map shows the spatial distribution of these points with the concentrations of the previous reporting period, and the table reports the number of stations with measurements and trends per type.

Measures in the Action Programme

The first edition of the Code of Good Agricultural Practices (CGAP) was published in Latvia in 1999 and revised in 2008. Some of the measures included in the CGAP were defined as mandatory and incorporated in the laws and regulations and some of the measures were included in the agri-environmental measures of the 2004–2006 Rural Development Plan, the 2007–2013 Rural Development Programme and the 2014–2020 Rural Development Programme of Latvia.

The Action Programme (AP) for vulnerable zones was published in 2004. The AP has expired from 2010 as the Cabinet Regulation No. 834 and Cabinet Regulation No.829 were adopted, covering all the measures in the AP. The table below summarizes the measures. General details are reported in Measure: “General details in Cabinet Regulation No. 834 and Cabinet Regulation No.829”.

In the requirements of the Nitrates Directive to be implemented, measures are defined throughout the country with additional requirements in NVZ.

The assessment of the implementation and impact of the measures of the Action Programme for Vulnerable Zones was carried out for the period 2016–2019.

Individual cost-effectiveness studies were conducted for different practices.

Table 6. Details of the Action Programme

Measure	General details in Action Programme (*)
Period of prohibition of fertiliser application	Only for NVZ (Cabinet Regulation No 834, Section III)
	Livestock manure or fermentation residues
	• 20 October to 15 March
	• 5 November to 15 March: respect of grassland
	N-containing mineral fertilisers
	• 15 October to 15 March: on winter crops
	• 15 September to 15 March: on cultivated plants and grass
Restrictions for application on sloped soils	Only for NVZ (Cabinet Regulation No 834, Section III)
Restrictions for application on soaked, frozen, or snow-covered soils	• Not on frozen, waterlogged or snow-covered soil (Cabinet Regulation No 834, Section II)
	• Fertiliser may only be spread on floodplains and flood-prone areas after the season of possible floods has passed (Cabinet Regulation No 834, Section II)
Restrictions for application near watercourses (buffer strips)	• 10 m for fertiliser and chemical plant protection products (Cabinet Regulation No 834, Section II)
Effluent storage works	• For the animal housing in which more than 10 animal units are located or, if the animal housing is located in a NVZ - more than five animal units (Cabinet Regulation No 829, Section II)
Capacity of manure storage	• For the animal housing in which more than 10 animal units are located or, if the animal housing is located in a NVZ - more than five animal units (Cabinet Regulation No 829, Section II)
Rational fertilisation (e.g., splitting fertilisation, limitations)	• Requirements for the amount of nitrogen that may be applied to the soil with fertiliser, whole country + additional requirements for NVZ (Cabinet Regulation No 834, Sections II and III)
	• Methods (and uniformity) of spreading mineral fertiliser and livestock manure for the whole country (Cabinet Regulation No 834, Section II)
Crop rotation, permanent crop enhancement	• Application of crop rotation and cultivation of perennial crops for the whole country are included in the GCAP
Vegetation cover in rainy periods, winter	Only for NVZ (Cabinet Regulation No 834, Section III)
	• In autumn and winter, at least 50 % of the agricultural land in a farm must be green areas, except for farms where potatoes, fruit trees, berry bushes and vegetables are grown in at least 50% of the total sown or planted area;
	• The CGAP includes a recommendation on maintaining a minimum amount of vegetative crop cover (green areas) during non-vegetative periods to prevent soil erosion and leaching of plant nutrients
Fertilisation plans, spreading records	• For the whole country: farms have to register and record any applied, purchased, sold or otherwise used amount of livestock manure and fermentation residues and store the registration documents for at least three years (Cabinet Regulation No 834, Section II)
	• Only for NVZ: farms which manage the agricultural land with an area of 20 hectares and more and/or grows vegetables, potatoes, fruit trees or fruit bushes in an area of three hectares and more, have to document field history for each field and keep field history documentation for at least three years and, if using fertilisers (Cabinet Regulation No 834, Section III)
Other measures	• Not specified
Date for application limit of 170 kg N/ha/year:	• 2001 (Cabinet Regulation No 834)

(*) Cabinet Regulation No. 834: Regulation Regarding Protection of Water and Soil from Pollution with Nitrates Caused by Agricultural Activity

Cabinet Regulation No. 829: Special Requirements for the Performance of Polluting Activities in Animal Housing

Controls

The State Environmental Service (SES) ensures the implementation and control over the implementation of the state environmental protection policy. During the last reporting period, nearly 299 inspections were carried out in NVZ areas (263 inspections less than the previous reporting period). About 45.5% of the inspections performed showed compliance with the requirements. The majority of non-compliance dealt with the failure to ensure adequate storage of manure. Non-compliance resulted in a penalty in 27 cases. In addition to the SES, the State Plant Protection Service (SPPS) is in charge of verifying the compliance of fertiliser use. About 168 inspections based on complaints by residents or planned controls by SPPS were conducted, resulting in 38 violations. Inspections in NVZ areas to assess cross-compliance led to the identification of 4.3% of serious violations (14 out of 336 inspections).

Designation of NVZ

The area of vulnerable zones in Latvia is 8258.7 km^2, including 7963 km^2 land area and 295.6 km^2 of surface water area. The designated area of NVZs has not changed compared to the previous reporting period.

Forecast of Water Quality

It was not possible to make predictions of nitrate content trends in groundwater in the next reporting period, as the monitoring programme implemented is not optimal for assessing the impact of agricultural pollution on groundwater. Most monitoring points (66%) are located in artesian waters, whereas only 16 % of all monitoring points sit in shallow groundwater (at a depth of up to 5 m). In addition, number of observation points in the southern and south-western parts of the NVZ area is too low.

Summary

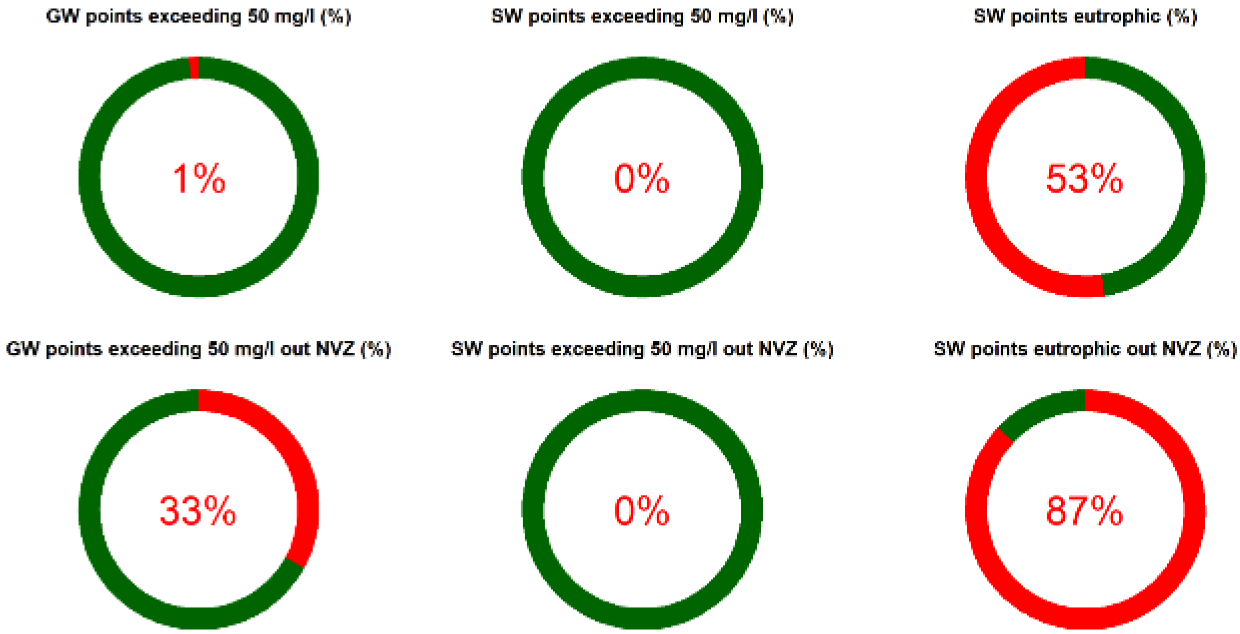


Figure 18. The summary plot for the period 2016-2019

This plot provides in the first row the percentage of stations exceeding 50 mg/l with respect to the total stations with measures and the percentage of eutrophic SW stations with respect to the total for which the trophic status is reported. In the second row, the percentage of stations exceeding 50 mg/l that are outside NVZ with respect to the total of stations exceeding 50 mg/, and the percentage of SW eutrophic stations that are outside NVZ with respect to the total that are eutrophic.

Long term analysis

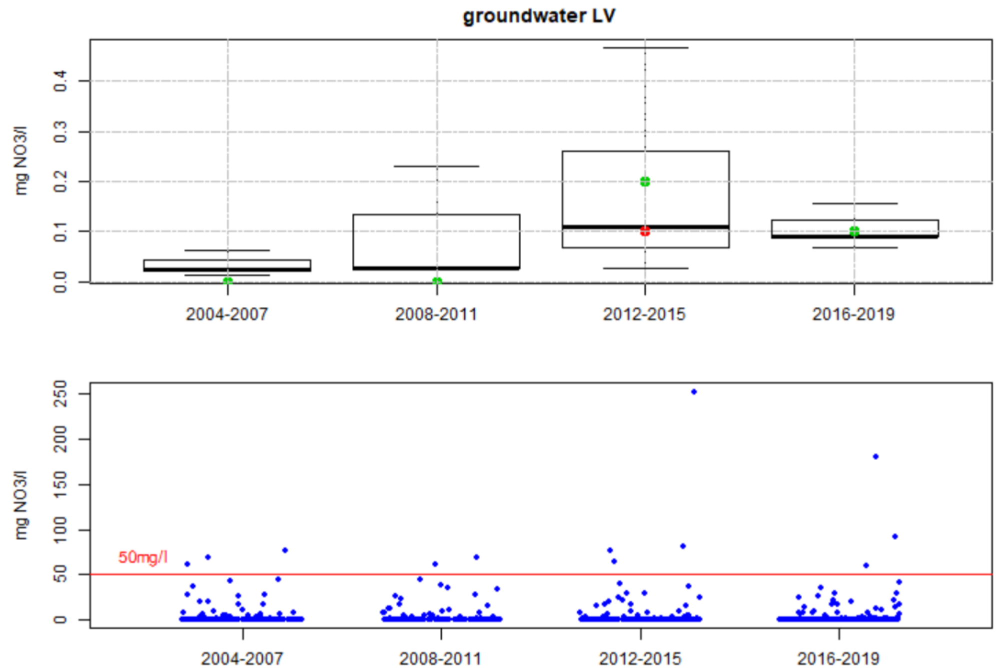


Figure 19. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for groundwater stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

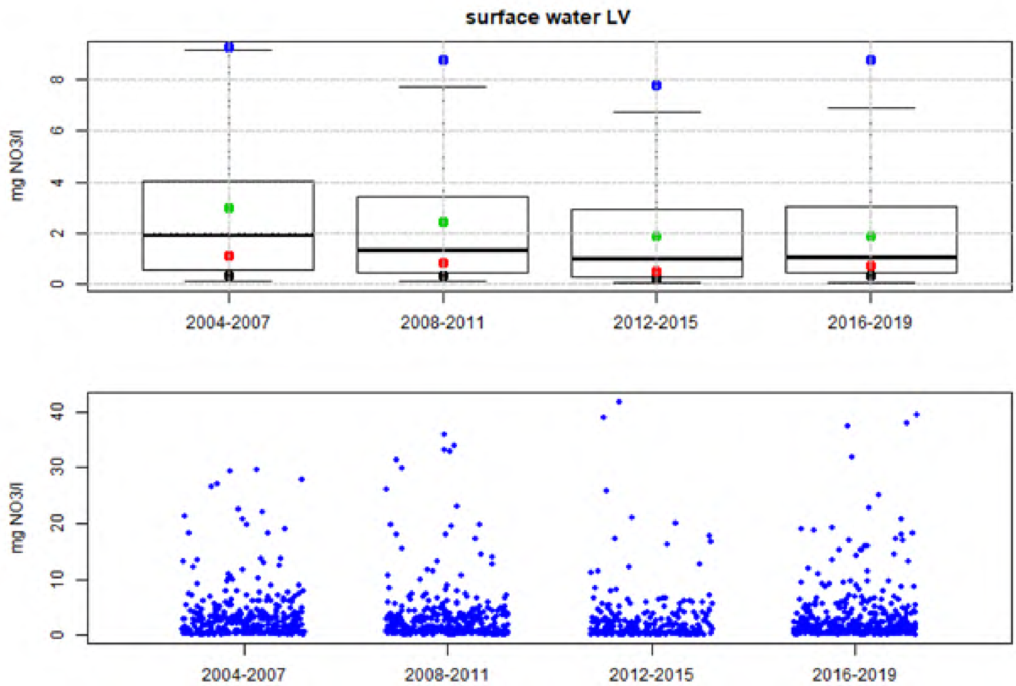


Figure 20. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for surface water stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

Conclusions and recommendations

Latvia has a low livestock density, the surpluses of nitrogen and phosphorus are low.

There is a well elaborated network of monitoring stations. . A very high number of the surface waters are found to be eutrophic. Eutrophication is affecting both inland and marine waters. A very high of waters found to be eutrophic are located outside NVZ.

Latvia updated its action programme dates in 2018.

The Commission recommends that Latvia revises its NVZ to address eutrophication of surface waters where agriculture pressure is significant.