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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

Lithuania's utilized agricultural area amounts to 2.95 Mha, representing 47% of the total land area. The major outputs of the agricultural industry excluding services and secondary activities include in a decreasing order cereals (28%), milk (4.6%) and industrial crops (10.7%).
Eurostat

Major land use statistics for Lithuania

Table 1.Utilized agricultural area (abbreviated as UAA)

Lithuania	2005	2007	2010	2013	2016
Utilised agricultural area UAA (1000 ha)	NA	2696	2772	2891	2954
arable land (1000 ha)	NA	1833	2125	2288	2141
permanent grass (1000 ha)	NA	829	613	567	776
permanent crops (1000 ha)	NA	25	26	28	30
kitchen gardens (1000 ha)	NA	8	8	8	8

Note:
Eurostat (FSS)

Lithuania's arable land has increased by 16.8% since 2007. Permanent grassland increased by 37% since 2013, while permanent crops and kitchen gardens remained stable.

Animal distribution in Lithuania

Lithuania has seen a decrease in all bovine and pig production while poultry has been increasing since 2010. The livestock density index has decreased by 35% and is below the EU average of 0.8.

Table 2. Livestock statistics

Lithuania	2005	2007	2010	2013	2016
Livestock index	0.46	0.39	0.33	0.29	0.29
dairy cows (10^6 heads)	0.42	0.40	0.36	0.32	0.29
live bovines (10^6 heads)	0.80	0.79	0.75	0.71	0.70
live pigs (10^6 heads)	1.12	0.92	0.93	0.76	0.66
live poultry (10^6 heads)	NA	NA	8.60	9.34	11.25

Note:
Eurostat (FSS)

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

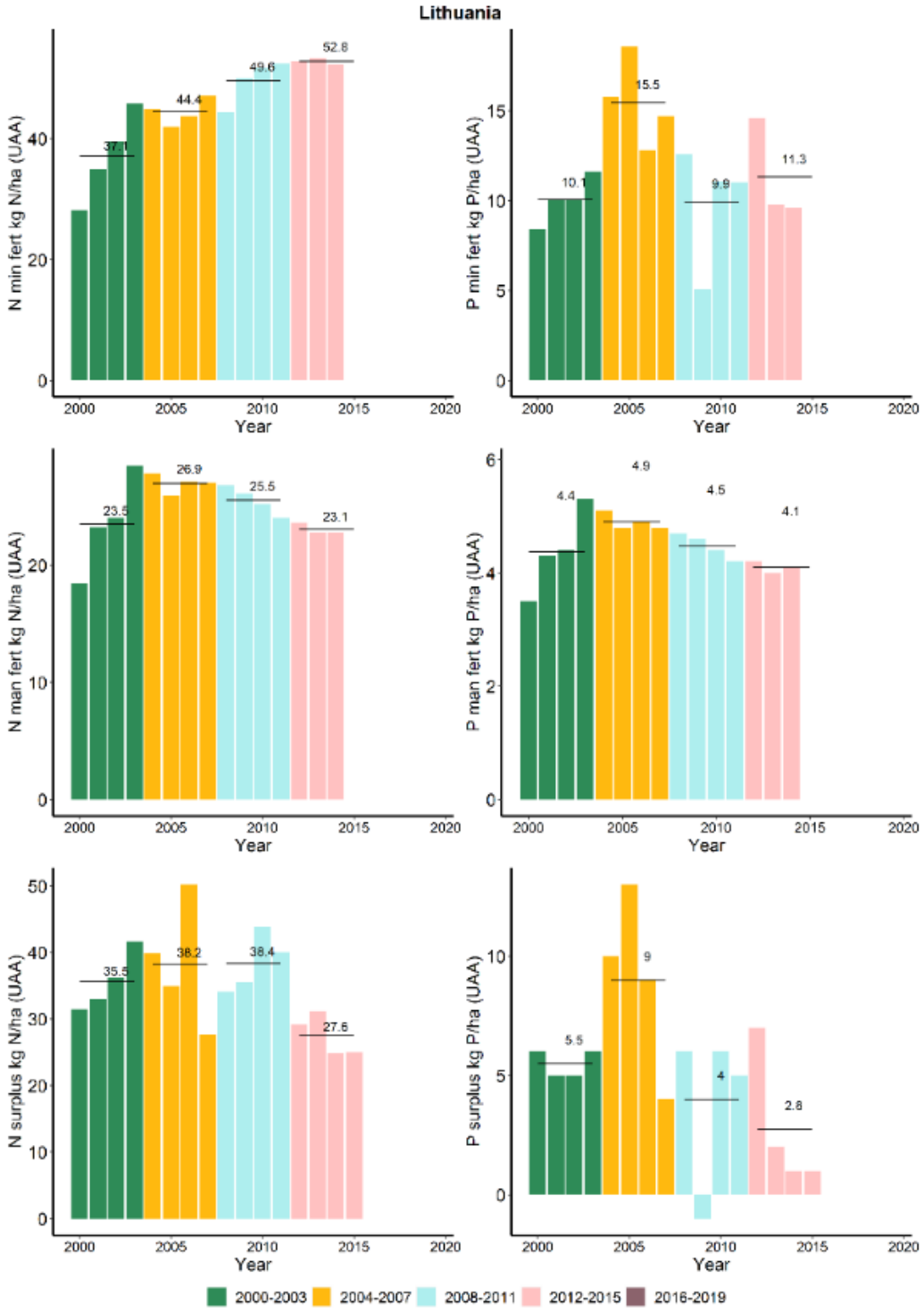


Figure 1. N and P fertilizers and gross surplus (kg/ha)

The gross nitrogen and phosphorus surpluses originate from EUROSTAT data for the years 2000-2018. N and P mineral fertilizers increased from last reporting period in average by 6% and 14% respectively. Both N and P manure decreased from the last reporting period by 9%. Also, N and P surplus decreased from last reporting period by 28% and 30% 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

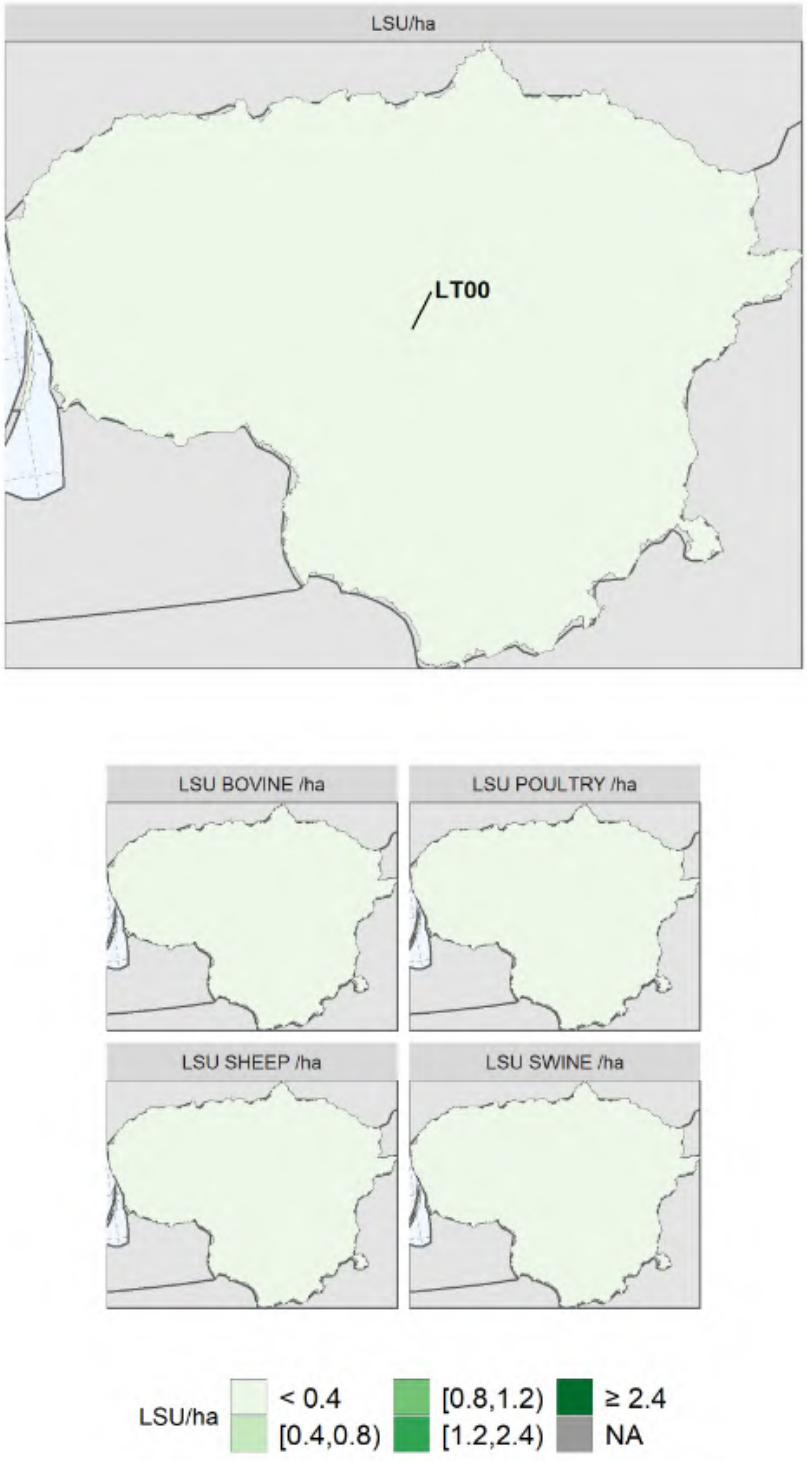


Figure 2. Map of livestock unit distribution, year 2016 (Source: Eurostat, February 2021)

Animal production is low for all animal types (total LSU and LSU by animal types 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 programme for monitoring rivers, lakes and reservoirs covered by the Nitrates Directive is part of the River Basin District (RBD) management plan monitoring of the WFD and the State environmental monitoring programmes for 2011–2017 and 2018–2023. River monitoring sites located in areas subject to the impact of intensive agricultural activity are monitored 12 times a year. In the other areas subject to the impact of mixed human activity, monitoring is carried out 12 times a year for most of the stations, and four times a year at intervals of 6 or 3 years based on a rotation principle. For most lakes, monitoring is conducted in accordance with a rotation principle, four times a year at intervals of six or three years.

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

		Number of stations with measurements			Number of stations with Trends		
Station Type	Description	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
0	Phreatic groundwater (shallow): 0-5 m	47	47	44	47	47	44
1a	Phreatic groundwater (deep) 5-15 m	14	17	15	14	17	15
1b	Phreatic groundwater (deep) 15-30 m	1	1	1	1	1	1
1c	Phreatic groundwater (deep) >30 m	0	0	0	0	0	0
2	Captive groundwater	0	0	0	0	0	0
3	Karstic groundwater	0	0	0	0	0	0
9	Not specified	0	0	0	0	0	0
	Total	**62**	**65**	**60**	**62**	**65**	**60**

Surface water quality monitoring network

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

		Number of stations with measurements			Number of stations with Trends			Number of stations with Trophic status		
Station Type	Description	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019	2008-2011	2012-2015	2016-2019
4	River water	70	66	62	39	66	61	4	3	62
5	Lake/reservoir water	221	254	227	27	151	145	221	254	227
6	Transitional water	7	7	7	7	7	7	4	4	7
7	Coastal water	8	8	8	8	8	8	0	0	8
8	Marine water	2	1	1	2	1	1	0	0	1
9	Not specified	0	0	0	0	0	0	0	0	0
	Total	**308**	**336**	**305**	**83**	**233**	**222**	**229**	**261**	**305**

Groundwater Quality

Groundwater average annual nitrate concentration

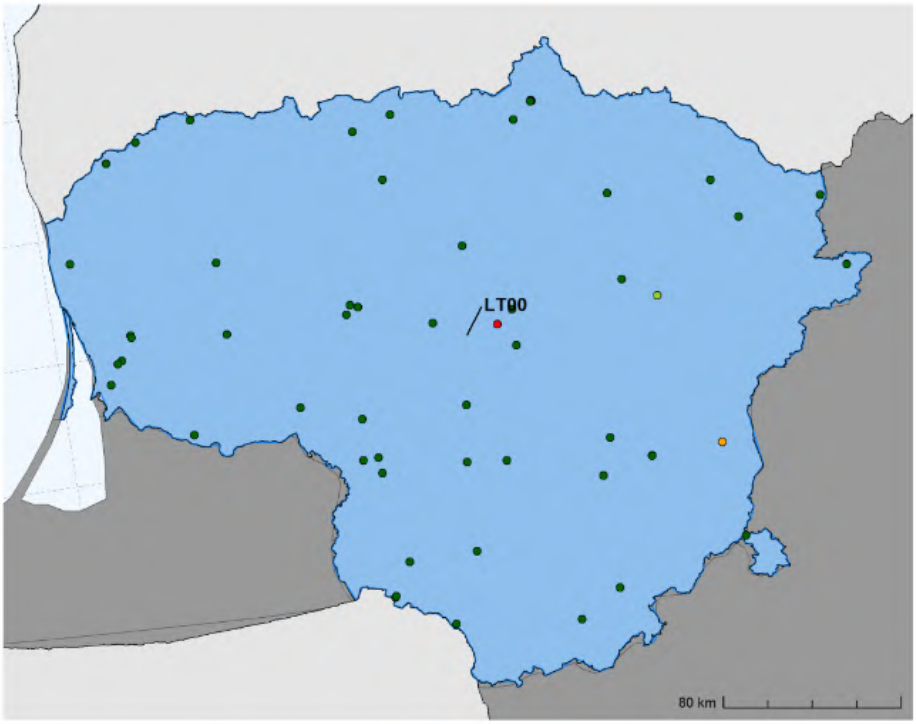


Figure 3. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

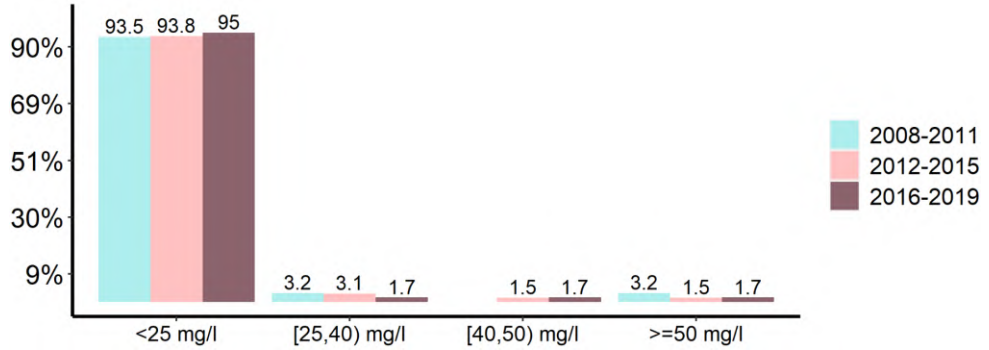


Figure 4. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Groundwater average annual nitrate concentration trend

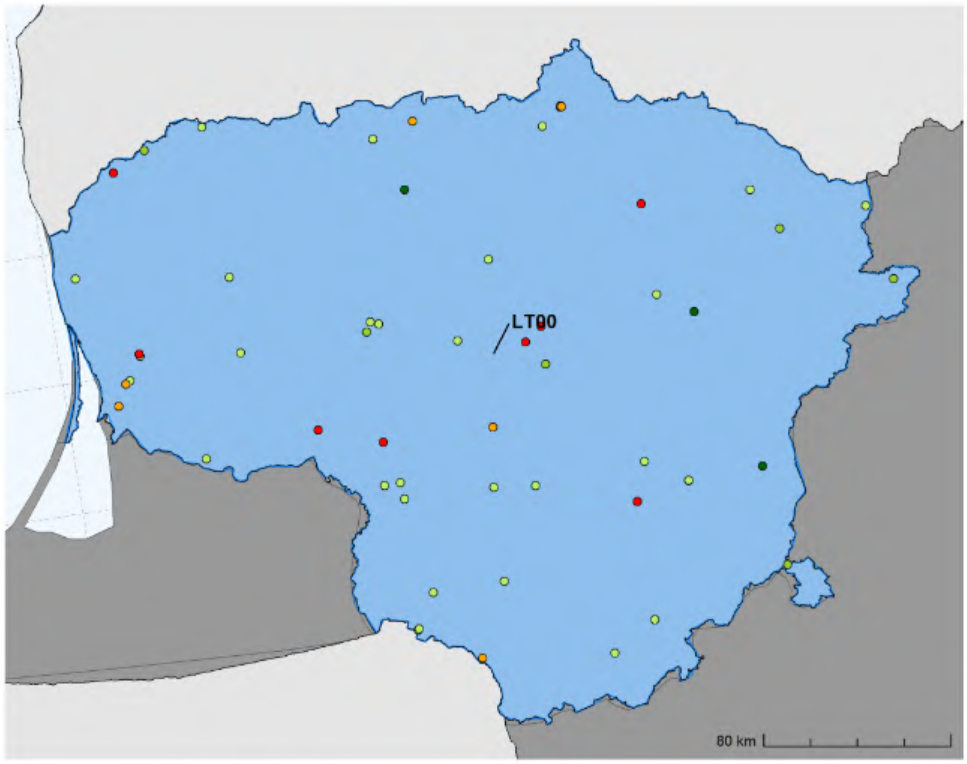


Figure 5. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis).

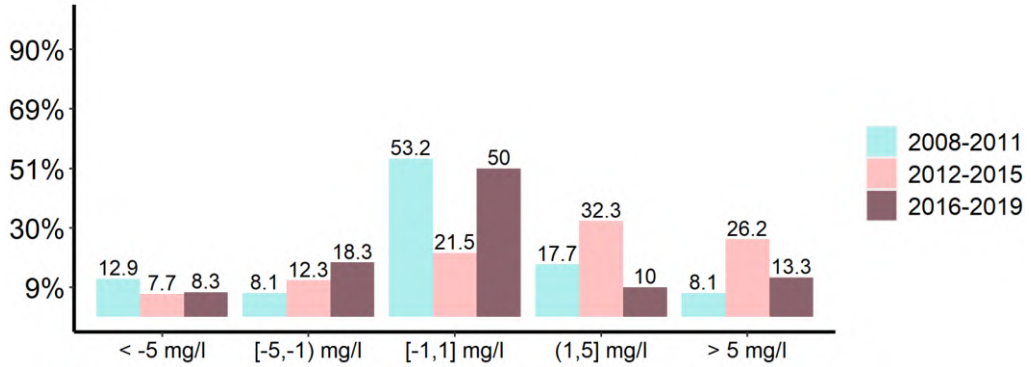
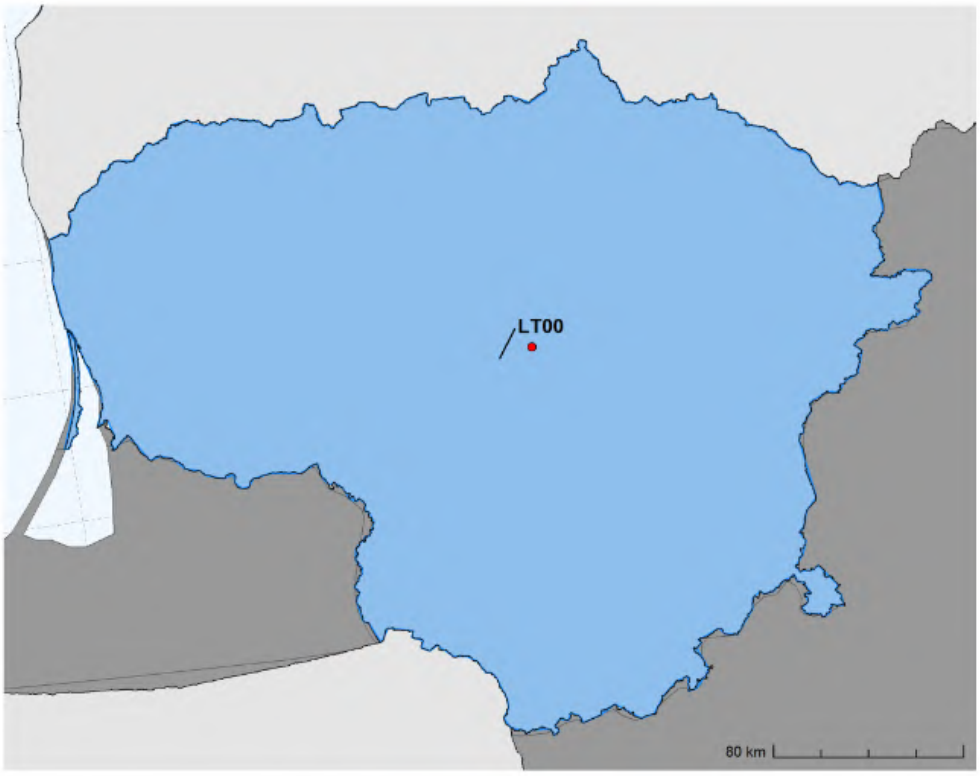


Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of annual NO3 average trends (x axis)

Groundwater hotspot

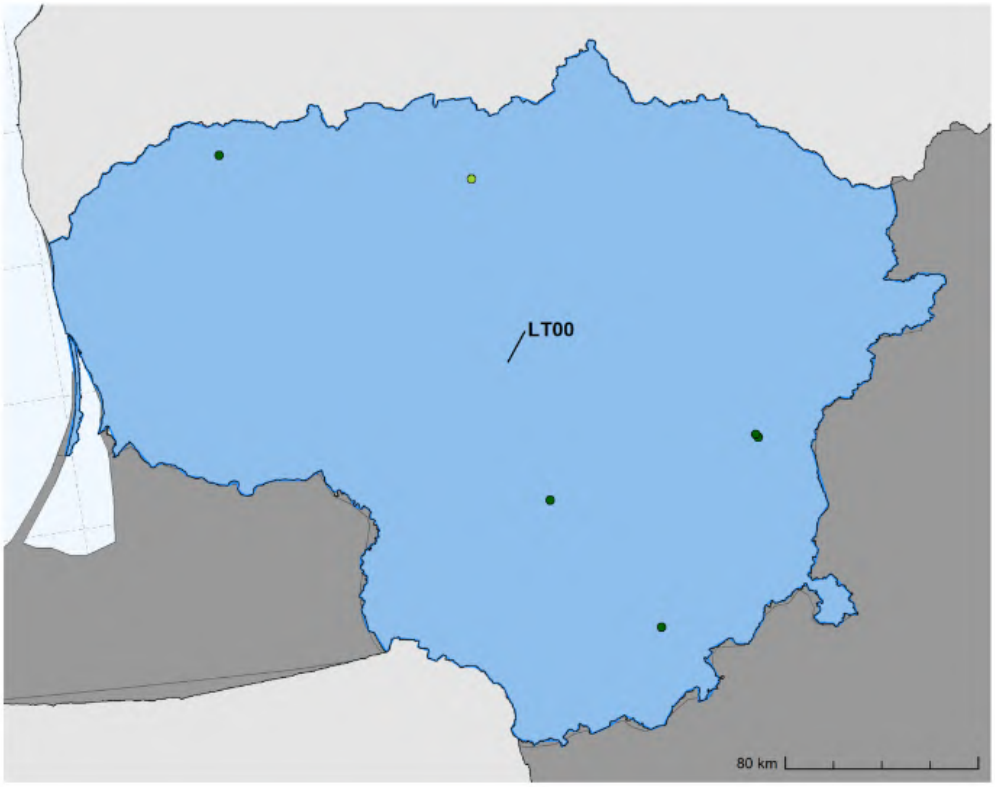


NUTS ID	NUTS NAME	>=40 and < 50 mg/l incr.trend	>=50 mg/l
LT00	Lietuva	0	1
	Total	**0**	**1**

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

The hotspot analysis identifies all the GW monitoring stations that have NO3 concentration in the range of 40-50 mg/l with increasing trends and 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



Station Type	Description	Number of removed stations		
		total removed	with measurements	with trends
0	Phreatic groundwater (shallow): 0-5 m	4	4	4
1a	Phreatic groundwater (deep) 5-15 m	2	2	2
1b	Phreatic groundwater (deep) 15-30 m	0	0	0
1c	Phreatic groundwater (deep) >30 m	0	0	0
2	Captive groundwater	0	0	0
3	Karstic groundwater	0	0	0
9	Not specified	0	0	0
	Total	**6**	**6**	**6**

Figure 8. GW removed stations map (top graph) and distribution by groundwater type (lower graph).

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

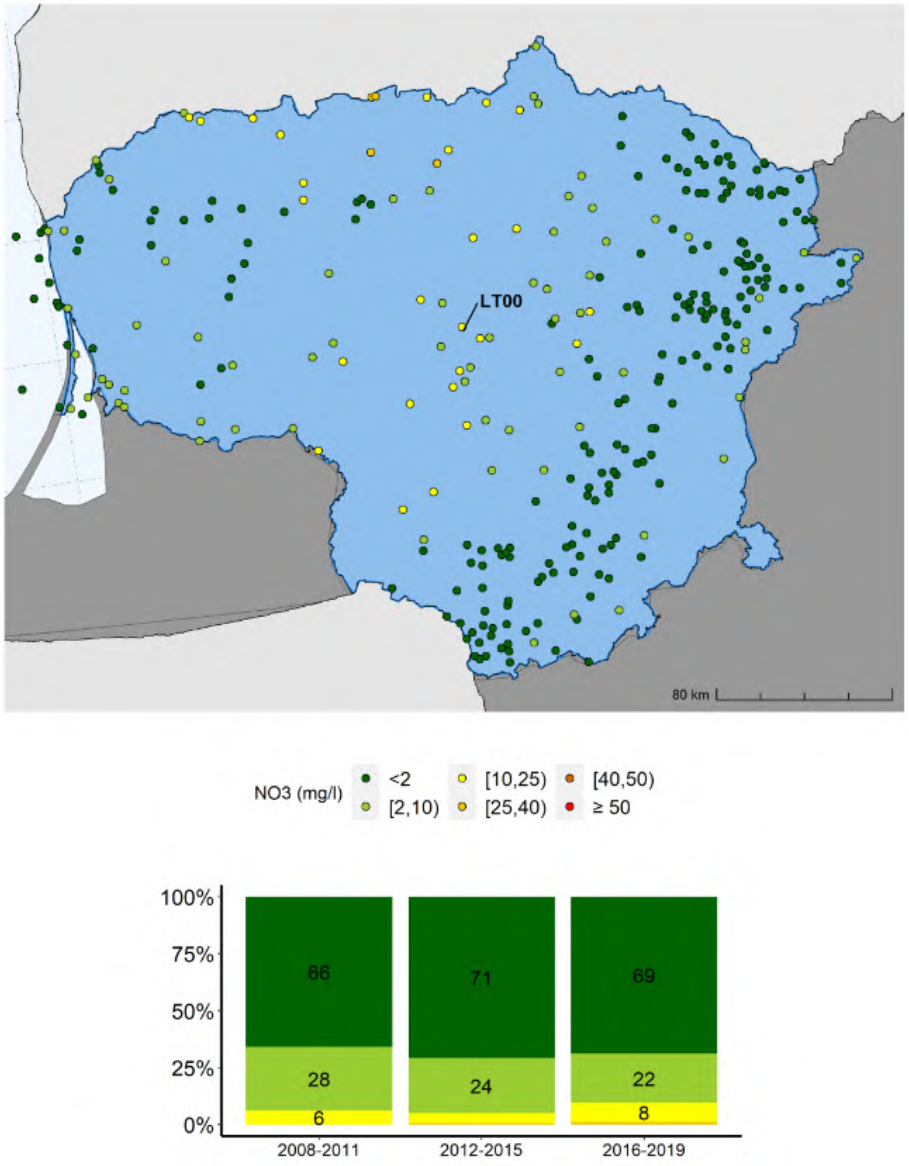


Figure 9. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

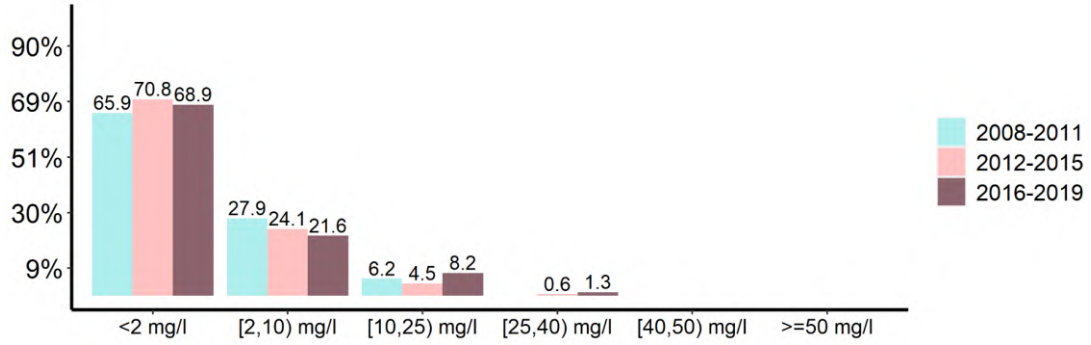


Figure 10. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis).

Surface water average annual nitrate concentration trend

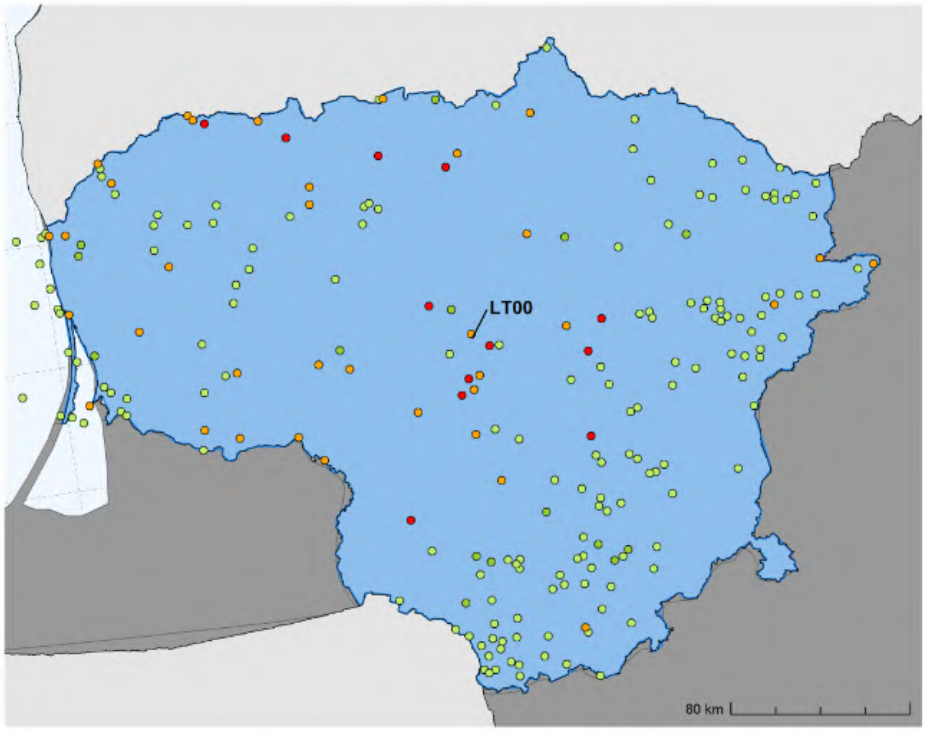


Figure 11. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

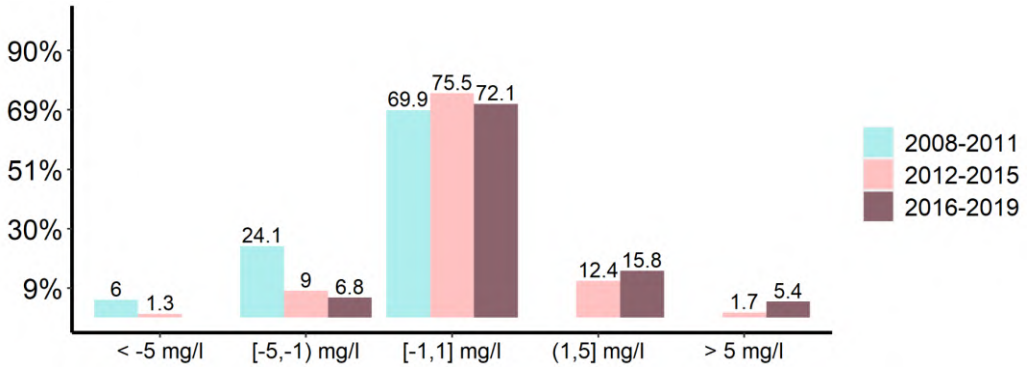


Figure 12. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis).

Surface Water Eutrophication

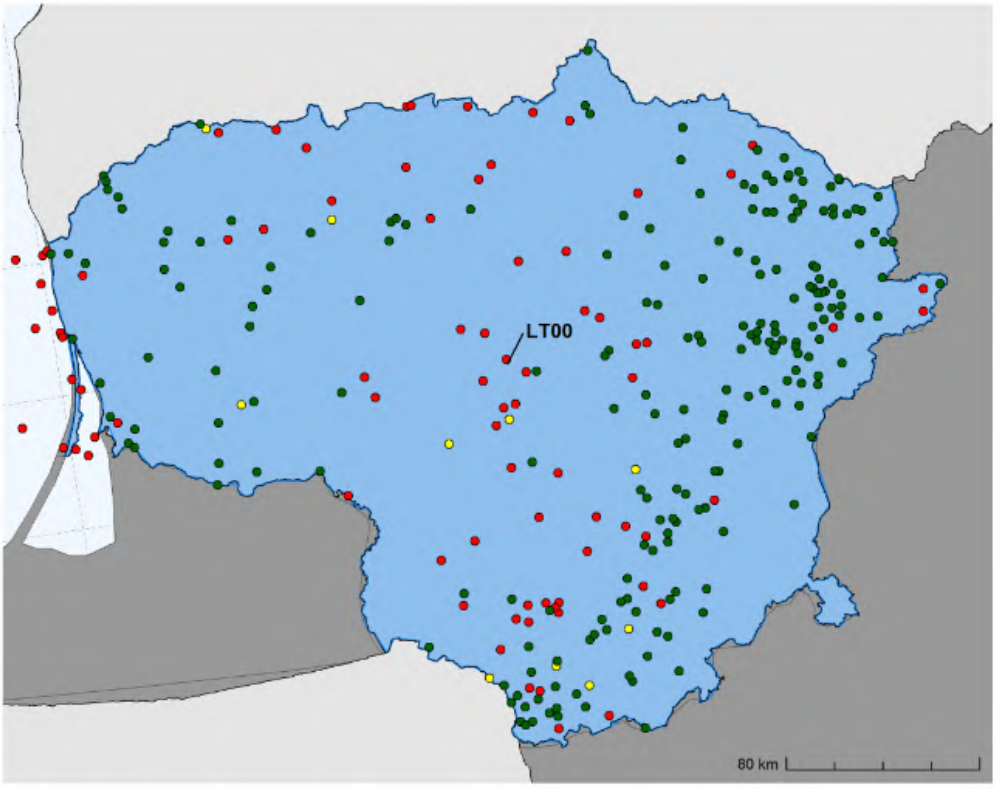


Figure 13. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

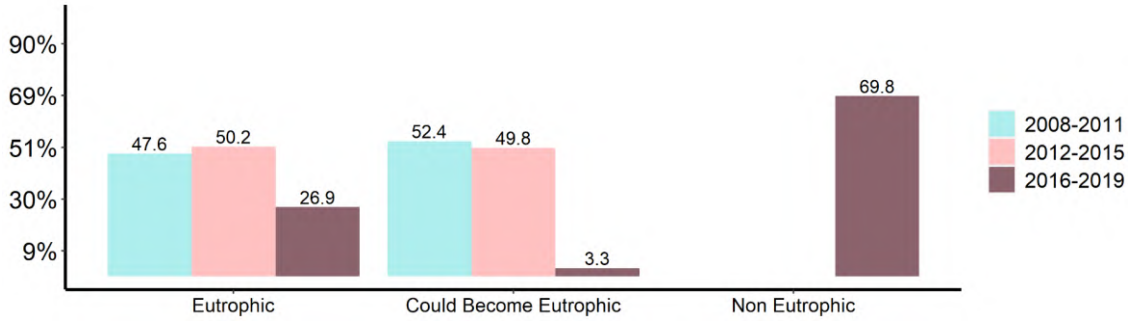
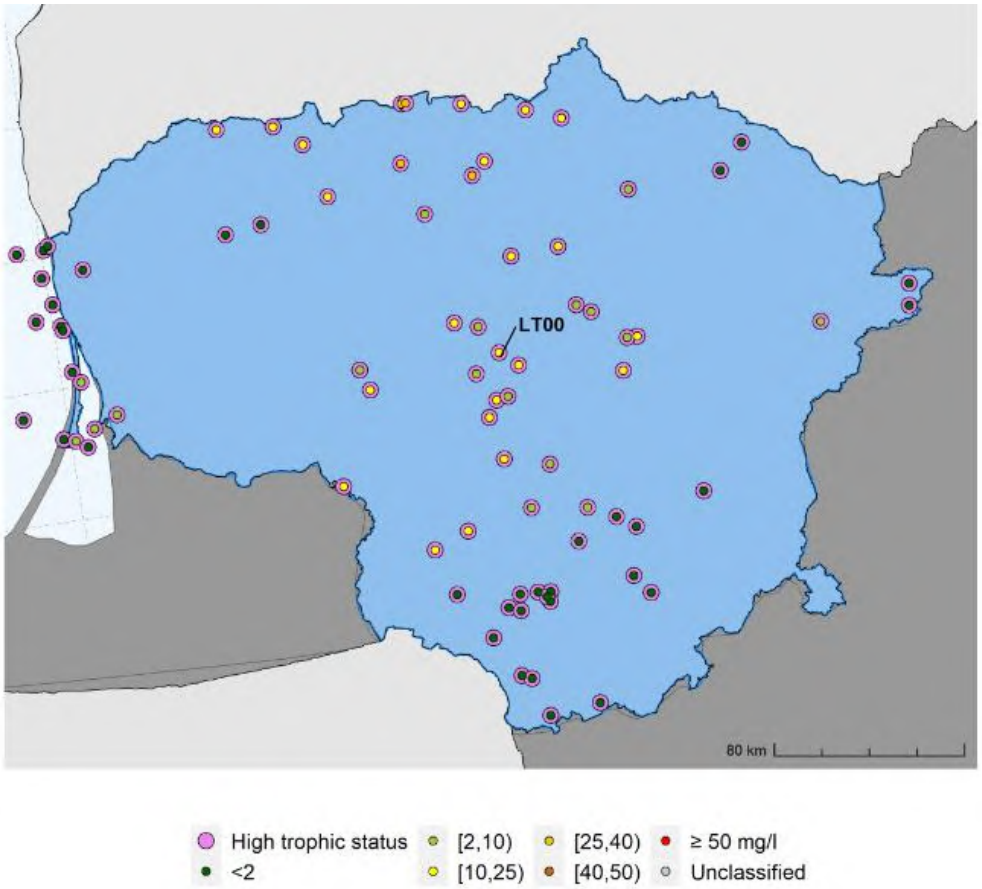


Figure 14. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

The Eutrophic status vs average NO3 annual concentration



			Number of stations by classes of concentration						
NUTS ID	NUTS NAME	High trophic status	<2 mg/l	[2,10) mg/l	[10,25) mg/l	[25,40) mg/l	[40,50) mg/l	>=50 mg/l	Unclassified
LT00	Lietuva	66	26	14	22	4	0	0	0
NO_NUTS	SALINE	16	13	3	0	0	0	0	0
	Total	**82**	**39**	**17**	**22**	**4**	**0**	**0**	**0**

Figure 15. The SW monitoring stations with eutrophic status versus the average NO3 annual concentration.

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 highest trophic status and the corresponding stations by classes of NO3 concentration. Only the NUTS of interest are reported.

The trophic level of rivers, lakes and reservoirs has been assessed in terms of the mean annual concentrations of total nitrogen (TN) and total phosphorus (TP) by assigning the water body to one of five ecological status classes based on the water body type and water body category. The high and good classes are reclassified as non-eutrophic while the rest of the classes fall into the eutrophic category. The majority of rivers and lakes/reservoirs are non-eutrophic while all transitional, coastal and marine are eutrophic. The same was observed in 2012-2015 for transitional waters.

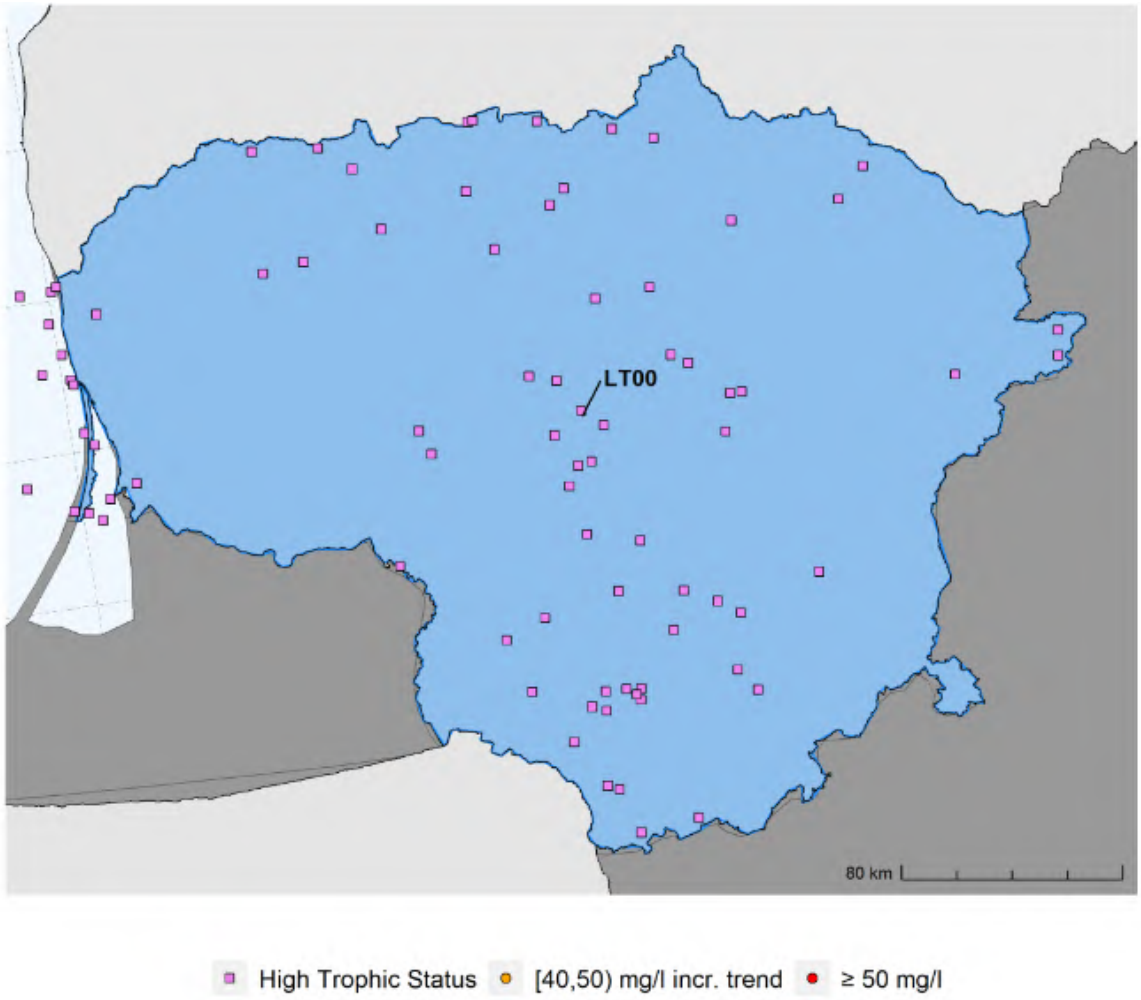
A different methodology was used for transitional waters in the periods 2008-2011 and 2012-2015 using Winberg scale in terms of the amount of chlorophyll-a. The trophic status of the surface waters was assessed using Vinberg's scale by chlorophyll-a concentrations.

The trophic status of water bodies in 2016-2019 was assessed using indicators of eutrophication (chlorophyll a, total nitrogen and total phosphorus) by comparing them to the targets set for the implementation of the Water Framework Directive (2000/60/EC) and the Marine Strategy Framework Directive (2008/56/EC).

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	16	3	43
5	Lake/reservoir water	50	7	170
6	Transitional water	7	0	0
7	Coastal water	8	0	0
8	Marine water	1	0	0
9	Not specified	0	0	0
	Total	**82**	**10**	**213**

Surface Water quality hotspot

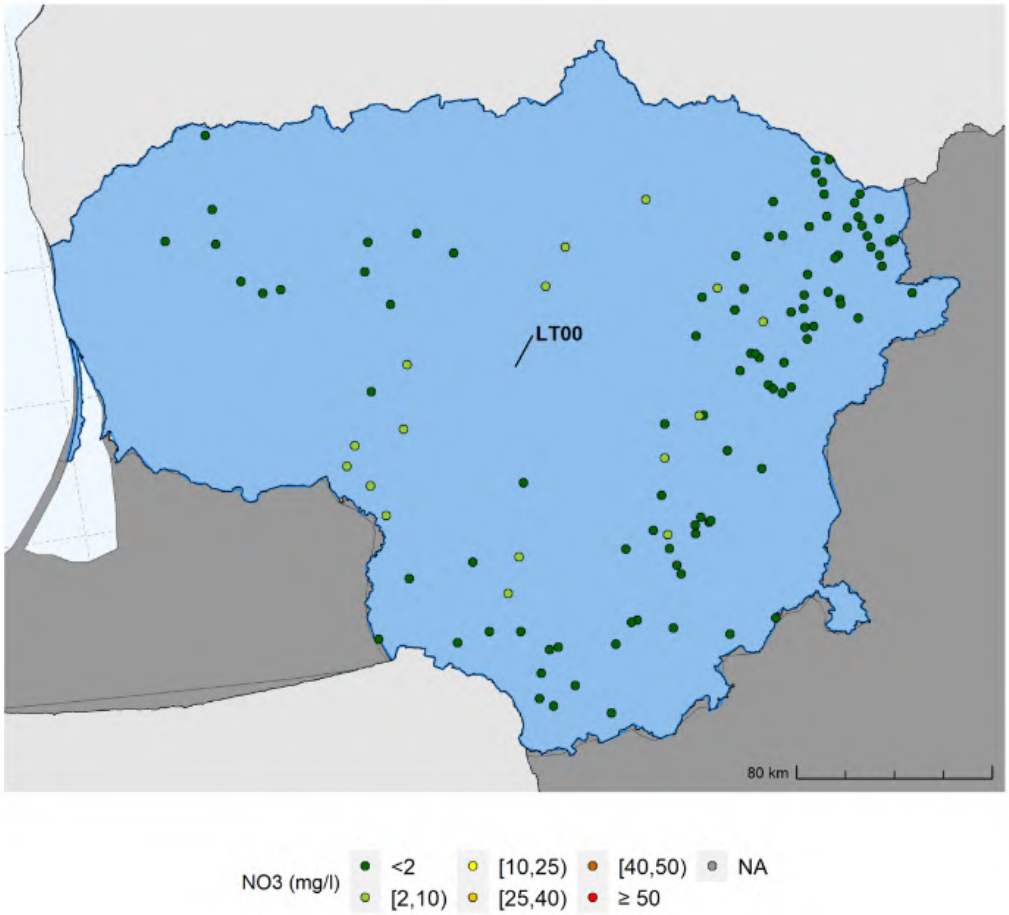


NUTS ID	NUTS NAME	High trophic status	>=40 and < 50 mg/l incr.trend	>=50 mg/l
LT00	Lietuva	66	0	0
NO_NUTS	SALINE	16	0	0
	Total	**82**	**0**	**0**

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.

The hotspot analysis identifies all the SW monitoring stations that have high trophic status, NO3 concentration in the range of 40-50 mg/l with increasing trends and 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	5	5	5	0
5	Lake/reservoir water	109	109	68	109
6	Transitional water	0	0	0	0
7	Coastal water	0	0	0	0
8	Marine water	0	0	0	0
9	Not specified	0	0	0	0
	Total	**114**	**114**	**73**	**109**

Figure 17. SW removed stations map (top graph) and distribution by surface water type (lower graph).

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 Action Programme for Lithuania was published in 2003 and the last revision was made in 2017. The first Code of Good Agricultural Practice was drawn up in 2000 and was recently revised on 8 April 2019. Particular attention was paid to improving soil fertility in an environmentally friendly and resource-friendly way, promoting anti-erosion and sustainable farming, the rational application of fertiliser to crops, plant protection, water and waste management, the utilisation of renewable energy sources and the maintenance and care of landscapes and biodiversity. The recommendations on methods and the time for incorporating manure and slurry, land governance and the application of crop rotation have been updated for the purpose of adapting to and mitigating the consequences of climate change. On the basis of the recommendations of the updated Code, the manure and slurry management requirements are scheduled to be reviewed during the period of implementation of the next Action Programme. The training programme on promoting the application of the Code's recommendations is also scheduled to be updated or, if necessary, a new one is to be drawn up.

Since all of Lithuania has been designated as nitrate vulnerable zone (NVZ), so a common action programme has been approved and is in force for the entire territory of Lithuania. The measures under the updated Action Programme are summarized in the following table. The updated measures concern: restrictions for application on sloped soils, crop rotation, cultivated areas without plant cover in the winter season, fertilization plans and spreading, and other specific new measures.

No individual cost-effectiveness analyses of good practices were carried out in Lithuania. However, in the process of implementing the WFD and drawing up the third river basin district management plans, new measures for reducing diffuse-source pollution will be identified.

Table 6. Details of the Action Programme

Measure	General details in Action Programme (*)
Period of prohibition of fertiliser application	• Prohibited: 15 November to 1 April (Order D1-367/3D-342, para.18-19)
	• Restricted in summer: 15 June to 1 August (Order D1-367/3D-342, para.18-19)
Restrictions for application on sloped soils	• No cultiveted crops when =12% (Order No 3D-932, para. 2.5)
Restrictions for application on soaked, frozen, or snow-covered soils	• Not allowed in these situations (Order D1-367/3D-342, para.18)
Restrictions for application near watercourses (buffer strips)	• The description of the procedure for establishing surface water body protection zones and coastal buffer zones (hereinafter referred to as 'the Description of the procedure') lays down the principles for establishing surface water body (excluding the Baltic Sea and the Curonian Lagoon) protection zones and coastal buffer zones (Order No 540)
Effluent storage works	• Not specified
Capacity of manure storage	• Manure tanks must be sufficient for at least six months (Order D1-367/3D-342, para.15)
	• Solid manure may be kept temporarily in field stacks but for no longer than six months (Order D1-367/3D-342, para.16)
Rational fertilisation (e.g., splitting fertilisation, limitations)	• Rules consistent with the Code of Good Agricultural Practice taking into account the characteristics of the vulnerable zone concerned, in particular soil conditions, soil type and slope
Crop rotation, permanent crop enhancement	• Recommendations on crop rotation, cultivation and the application of fertiliser on slopes to combat erosion, as set out in the Code of Good Agricultural Practice
Vegetation cover in rainy periods, winter	• Encouraged to maintain stubble fields through the winter (Order No 3D-254)
Fertilisation plans, spreading records	• A fertiliser plan is mandatory when applying fertiliser to 30 or more hectares. It is drawn up on the basis of soil survey or monitoring data, not more than three years old, on the accumulation of nitrogen and phosphorus in fertilised fields (Order D1-367/3D-342, para. 22)
	Crops must be fertilised using optimal doses of fertilising products recommended by scientific institutions, or on the basis of manufacturers' requirements, or in accordance with an established fertiliser plan (Order 3D-332, para. 5)
	An agricultural operator using mineral fertiliser must fill in a logbook of the fertilisers used no less than twice during the current year: once by 1 July and once by 31 December (Order 3D-332, para. 16)
Other measures	• Minimum soil cover - arable land (Order 3D-932, para. 2.4)
	• Restrictions on the amount of phosphorus
Date for application limit of 170 kg N/ha/year:	• Not specified

(*) Order No D1-367/3D-342 of the Minister for the Environment and the Minister for Agriculture of 14 July 2005

Order No 3D-932 of the Minister for Agriculture of 5 December 2014

Order No 3D-254 of the Minister for Agriculture of 3 April 2015

Order No 3D-332 of the Minister for Agriculture of 29 May 2019

Order No 540 of the Minister for the Environment of 7 November 2001

Controls

Administrative controls on the implementation of the Action Programme measures are carried out in the frame of the cross-compliance check. Checks to see whether agricultural operators are implementing the requirements of the Nitrates Directive are carried out by the Environmental Protection Department (AAD) under the Ministry of the Environment. Checks of compliance by operators applying for aid with cross-compliance requirements are carried out by the National Paying Agency. According to the AAD most of non-compliance dealt with manure storage and collection capacity (4.8%) followed by periods of land application (2.3%). The financial cost of applying the environmental measures remains one of the main reasons for incorrect implementation of the corresponding requirements within a complex competitive environment.

Designation of NVZ

Lithuania has adopted a whole territory approach.

Forecast of Water Quality

According to the national report of Lithuania if additional pollution reduction measures are not taken, nitrate concentrations in surface water bodies are not expected to diminish.

Summary

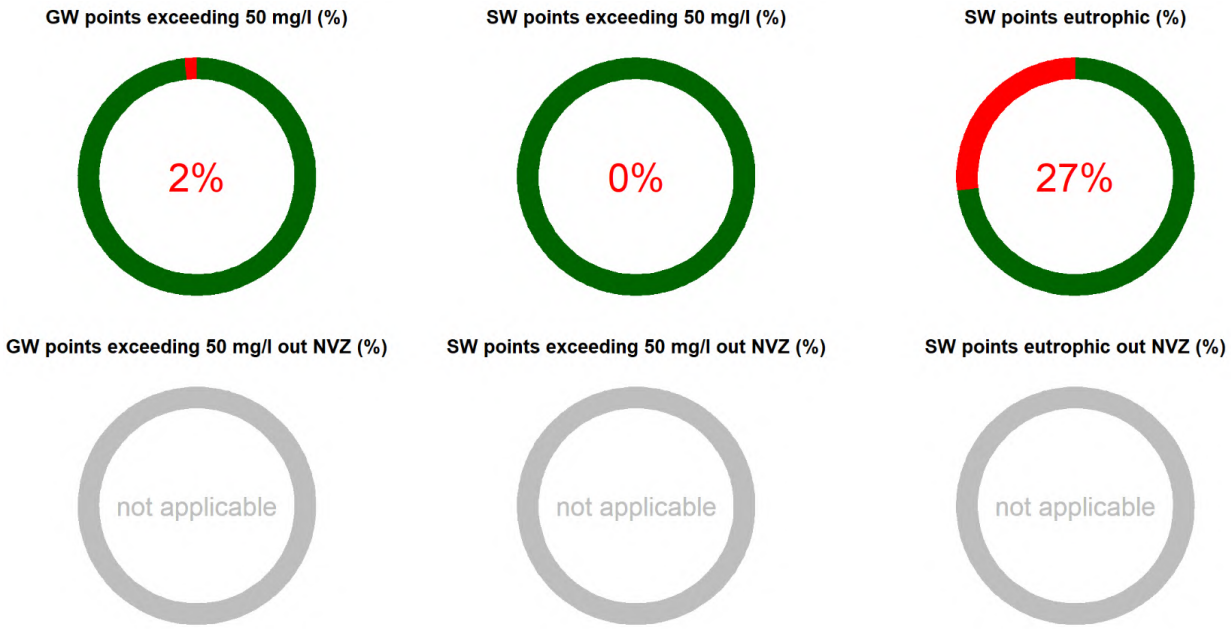


Figure 18. The summary plot for the period 2016-2019

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

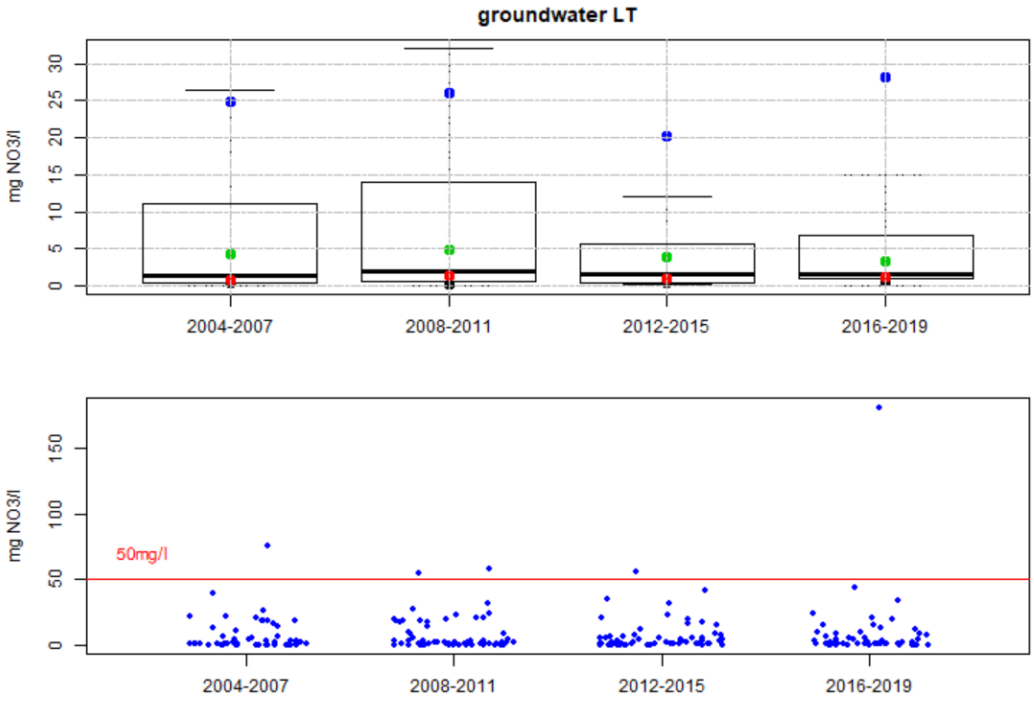


Figure 19. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period for groundwater stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

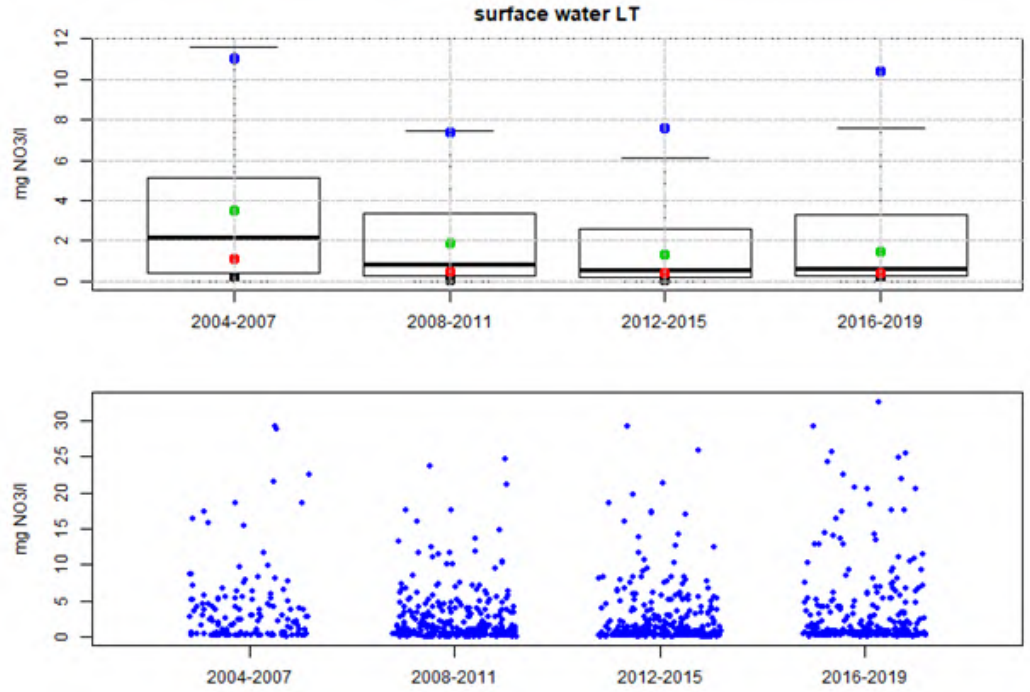


Figure 20. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period for surface water stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

Conclusions and recommendations

Lithuania has a low livestock density, the surplus of nitrogen and phosphorus is not available for 2016-2019.

There is a well elaborated network of monitoring stations. The groundwater quality is good, however there is a high number of groundwater monitoring stations with an increasing trend. A high number of the surface waters are found to be eutrophic. Eutrophication is affecting both inland and marine waters.

Lithuania updated its action programme dates in 2017.

The Commission recommends that Lithuania reinforces its action programme to better address eutrophication of surface waters where agriculture pressure is significant.