EUROPEAN
COMMISSION

Brussels, 11.10.2021
SWD(2021) 1001 final

PART 18/38

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



France's utilised agricultural area amounts to 29.1 Mha, representing 53.1% of the total land area and has remained stable since 2007. The major outputs of the agricultural industry include in a decreasing order wine (16.1%), other crops (13.8%) and cereals (13.1%).

Eurostat

Major land use statistics for France

Table 1.Utilized agricultural area (abbreviated as UAA)

France	2005	2007	2010	2013	2016
Utilised agricultural area UAA (1000 ha)	NA	29414	29311	28976	29089
arable land (1000 ha)	NA	18292	18701	18373	18612
permanent grass (1000 ha)	NA	9937	9811	9439	9296
permanent crops (1000 ha)	NA	1091	1050	1015	1029
kitchen gardens (1000 ha)	NA	24	24	16	152

Note:

Eurostat (FSS)

There were no major changes in the extent arable land in France. Permanent grassland continued to decrease, while kitchen garden has increased considerably from 2013.

Animal distribution in France

France live bovine number is stable from the last reporting period. There is a decrease in the number of live pigs while the number of live poultry has increased by 4%. The livestock density index has also remained stable and is close to the EU average of 0.8.

Table 2. Livestock statistics

France	2005	2007	2010	2013	2016
Livestock index	0.82	0.82	0.81	0.79	0.79
dairy cows (10^6 heads)	3.90	3.76	3.72	3.70	3.64
live bovines (10^6 heads)	18.93	19.12	19.60	19.10	19.37
live pigs (10^6 heads)	15.12	14.97	14.28	13.43	12.79
live poultry (10^6 heads)	NA	NA	296.13	297.08	308.14

Note:

Eurostat (FSS)

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

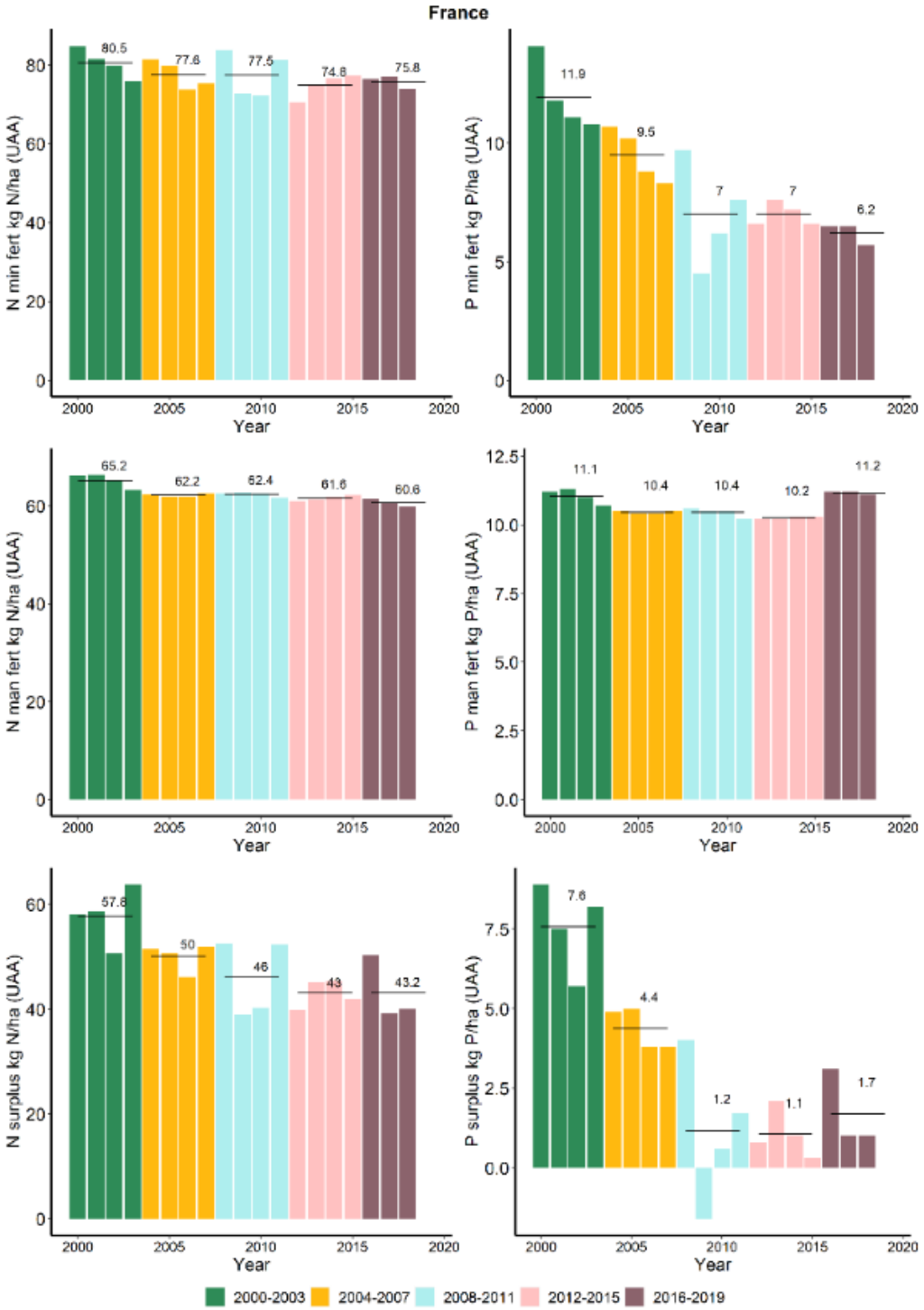


Figure 1. N and P fertilizers and gross surplus (kg/ha)

The gross nitrogen and phosphorus surpluses originate from EUROSTAT data for the years 2000-2018. Both N mineral fertilizers and manure remain stable with respect to the previous reporting period. There is an increase in the P manure for the last reporting period. The nitrogen surplus remains stable from the last reporting period, while phosphorus surplus slightly increased. 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

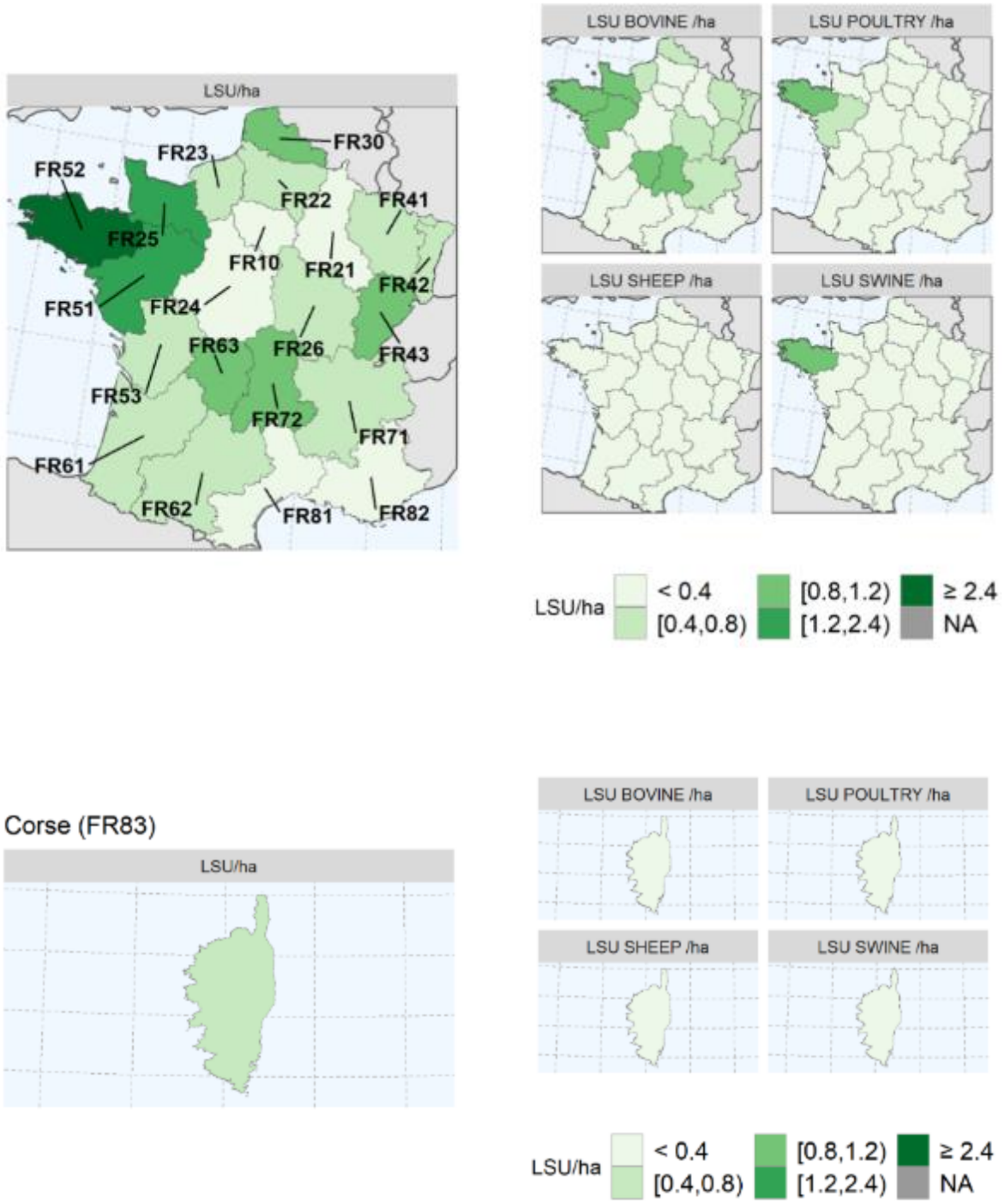


Figure 2. Map of livestock unit distribution for France and Corse, year 2016 (Source: Eurostat, February 2021)

Animal production is concentrated in the north west part of the mainland France (total LSU and LSU by animal type were retrieved individually from EUROSTAT). Animal production is dominated by bovine production.

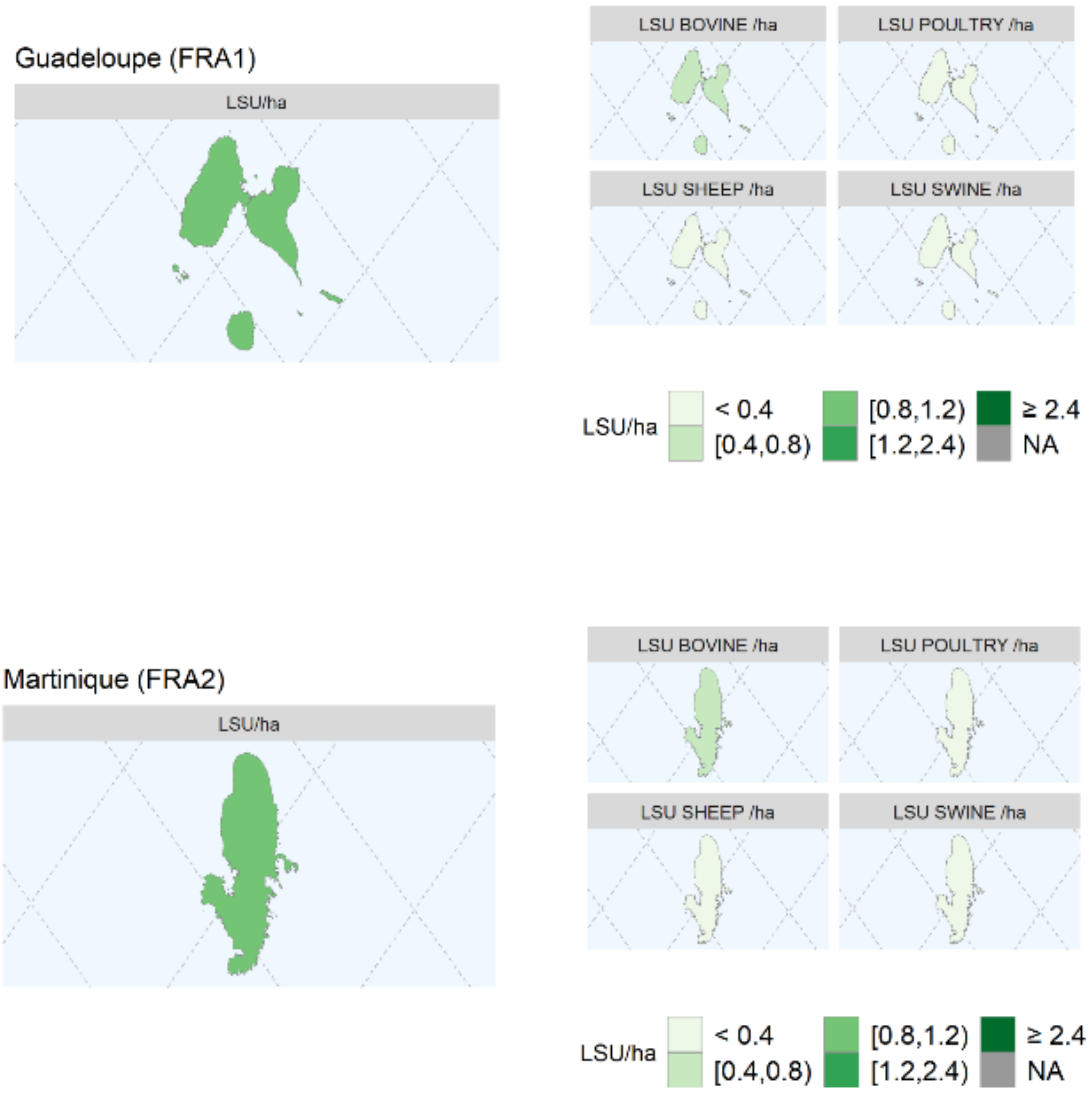


Figure 3. Map of livestock unit distribution for Guadeloupe and Martinique, year 2016 (Source: Eurostat, February 2021)

LSU for the Guadeloupe and Martinique Islands is dominated by bovine production (total LSU and LSU by animal type were retrieved individually from EUROSTAT).

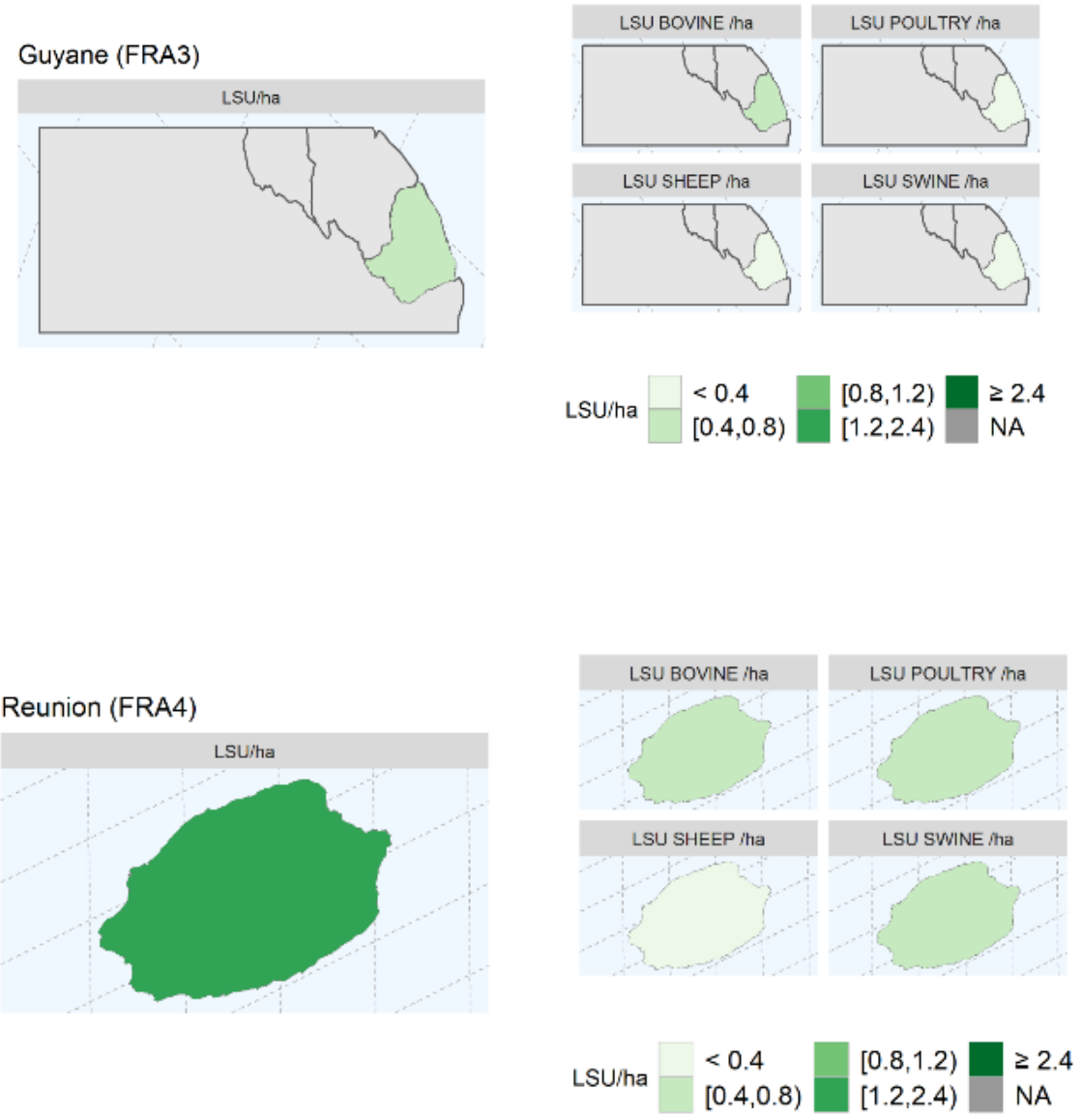


Figure 4. Map of livestock unit distribution for Guyana and Reunion, year 2016 (Source: Eurostat, February 2021)

LSU for the French Guyana and the Reunion Island is dominated by bovine production (total LSU and LSU by animal type were retrieved individually from EUROSTAT).

For Mayotte (FRA5) no data available 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

Monitoring data are produced by the local water agencies and the local health agencies. Data are then managed by DREAL (regional directorates of environment and land planning). Since 2010, the network has evolved to include when possible more common stations with the network of the Water Framework Directive. For surface water, sampling took place at least six times for the large majority of the stations. Groundwater sampling frequency is at least six samples for the large majority of the stations. France for the first time reported data about the trophic state of surface waters. Concentration measurements are provided for one single year for all water types.

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	1162	1616	1099	637	1219	1028
1a	Phreatic groundwater (deep) 5-15 m	0	117	343	0	112	316
1b	Phreatic groundwater (deep) 15-30 m	0	61	185	0	56	176
1c	Phreatic groundwater (deep) >30 m	572	74	294	81	74	256
2	Captive groundwater	118	607	272	41	541	254
3	Karstic groundwater	657	123	229	280	92	211
9	Not specified	0	0	160	0	0	119
	Total	**2509**	**2598**	**2582**	**1039**	**2094**	**2360**

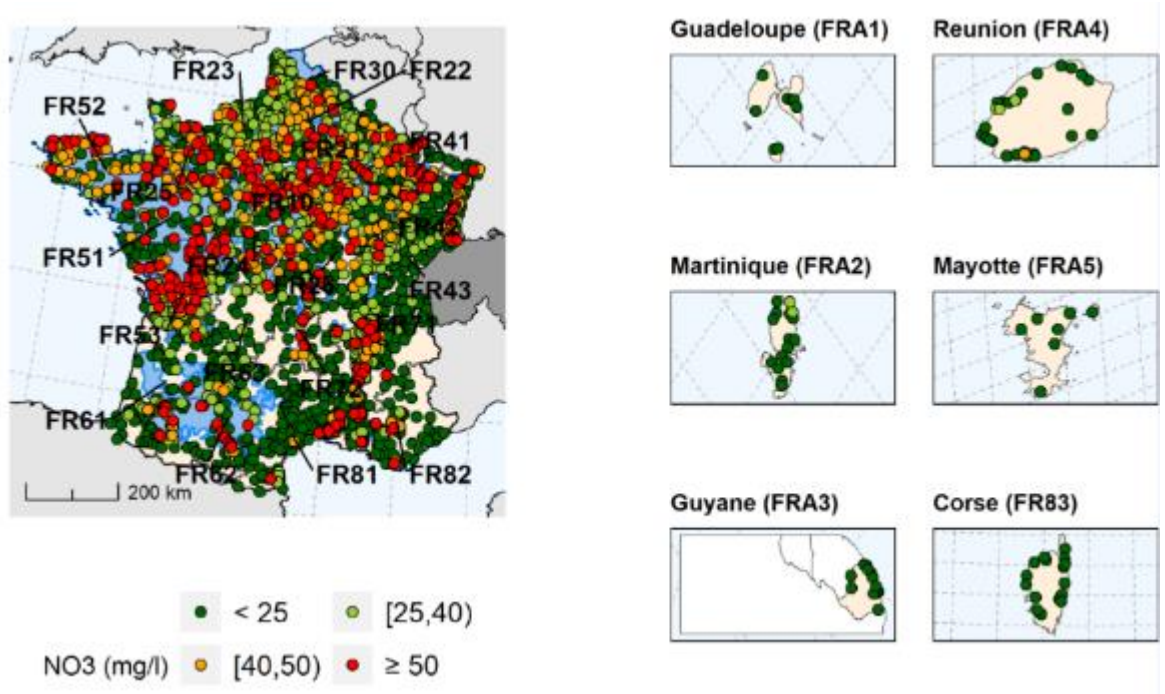
Surface water quality monitoring network

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	3331	3390	3246	1181	2897	3010	0	0	3246
5	Lake/reservoir water	0	0	5	0	0	1	0	0	5
6	Transitional water	4	8	23	4	3	14	0	0	0
7	Coastal water	17	0	0	17	0	0	0	0	50
8	Marine water	0	0	0	0	0	0	0	0	0
9	Not specified	0	0	0	0	0	0	0	0	0
	Total	**3352**	**3398**	**3274**	**1202**	**2900**	**3025**	**0**	**0**	**3301**

Groundwater Quality

Groundwater average annual nitrate concentration



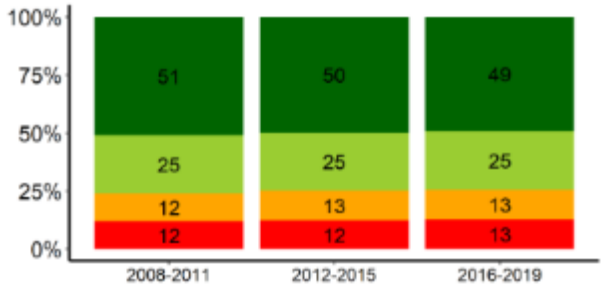


Figure 5. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). In the map in blue the NVZ.

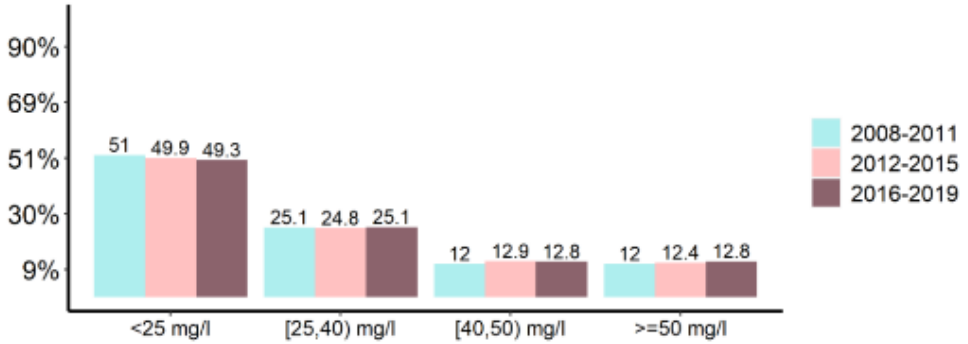


Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Groundwater average annual nitrate concentration trend

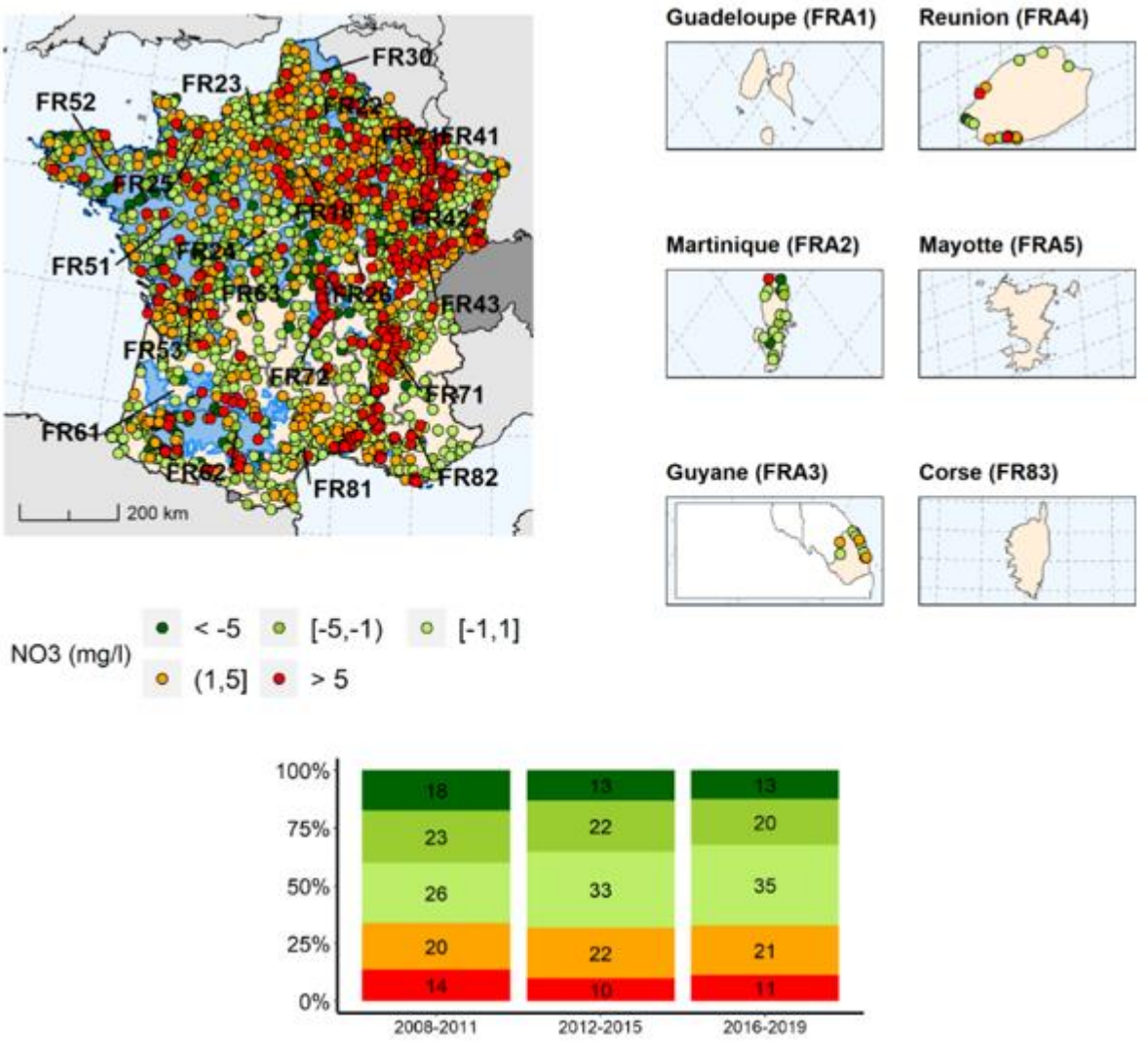


Figure 7. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). In the map in blue the NVZ.

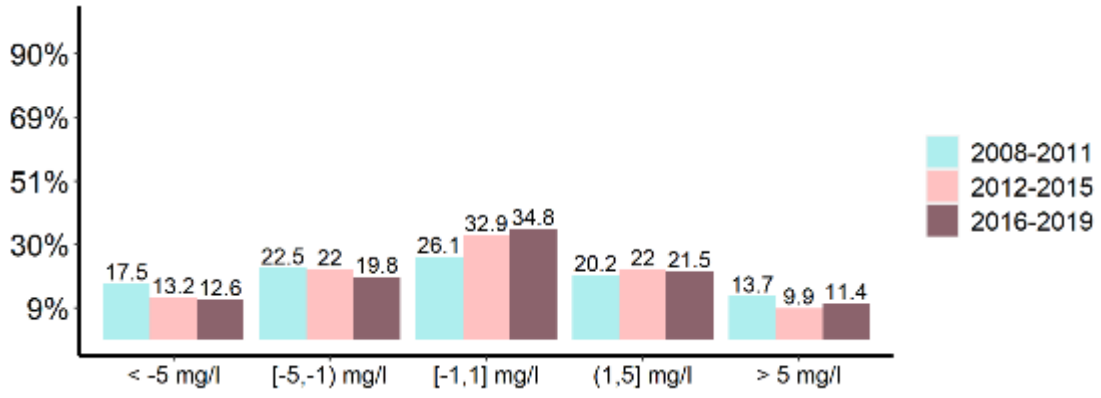
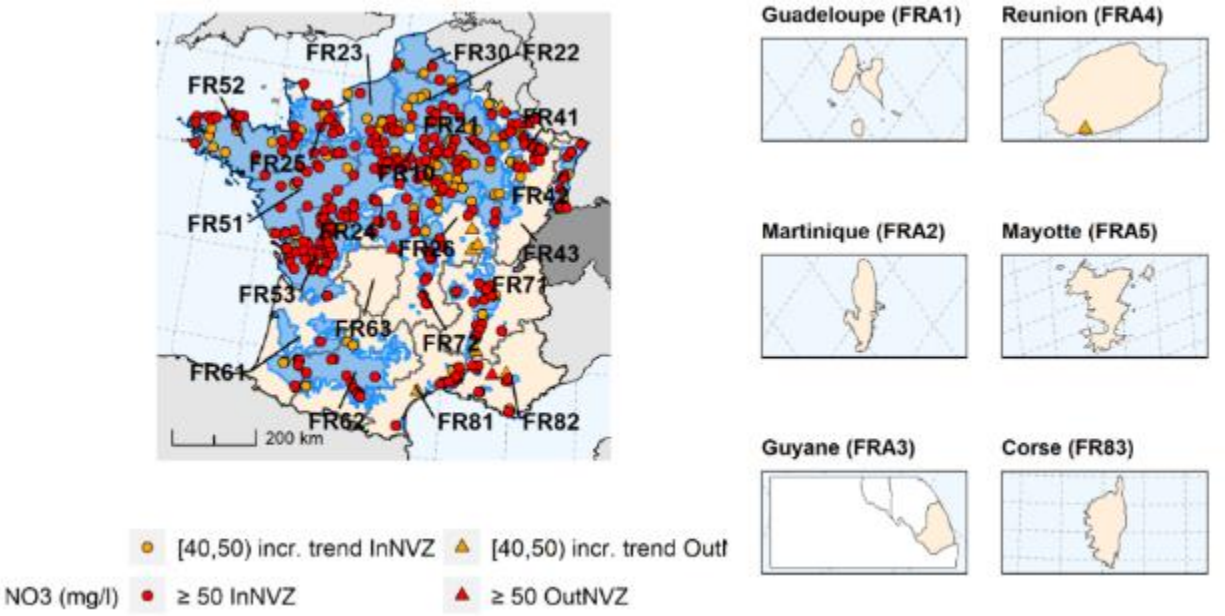


Figure 8. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Groundwater hotspot

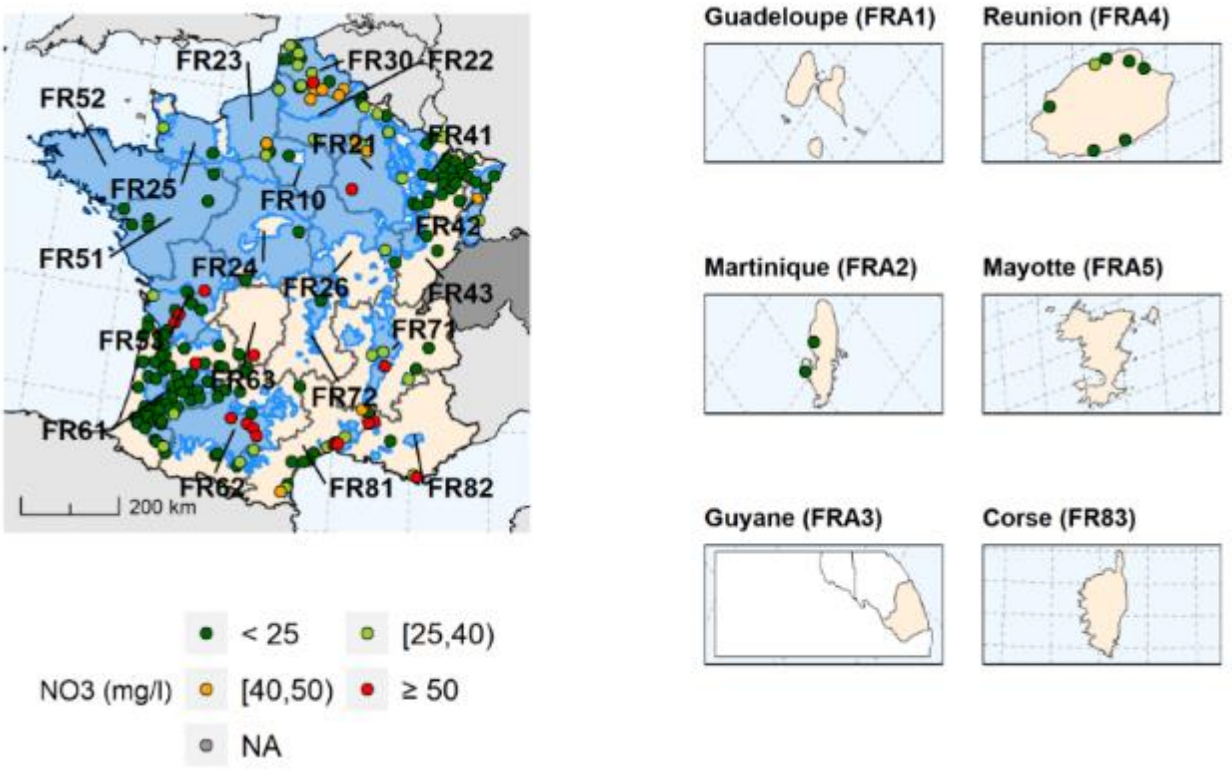


		>=40 and < 50 mg/l incr.trend		>=50 mg/l	
NUTS ID	NUTS NAME	InNVZ	OutNVZ	InNVZ	OutNVZ
FR10	Île de France	5	0	17	0
FR21	Champagne-Ardenne	13	1	17	0
FR22	Picardie	8	0	7	0
FR23	Haute-Normandie	6	0	3	0
FR24	Centre	2	0	38	0
FR25	Basse-Normandie	3	0	14	0
FR26	Bourgogne	13	3	10	0
FR30	Nord - Pas-de-Calais	3	0	3	0
FR41	Lorraine	17	1	36	3
FR42	Alsace	8	0	11	0
FR51	Pays de la Loire	6	0	22	0
FR52	Bretagne	8	0	16	0
FR53	Poitou-Charentes	9	0	43	0
FR61	Aquitaine	5	0	7	0
FR62	Midi-Pyrénées	4	0	12	0
FR63	Limousin	0	0	0	1
FR71	Rhône-Alpes	6	0	14	0
FR72	Auvergne	3	0	26	0
FR81	Languedoc-Roussillon	5	1	19	0
FR82	Provence-Alpes-Côte d'Azur	1	2	10	2
FRA4	La Réunion	0	1	0	0
	Total	**125**	**9**	**325**	**6**

Figure 9. 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 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



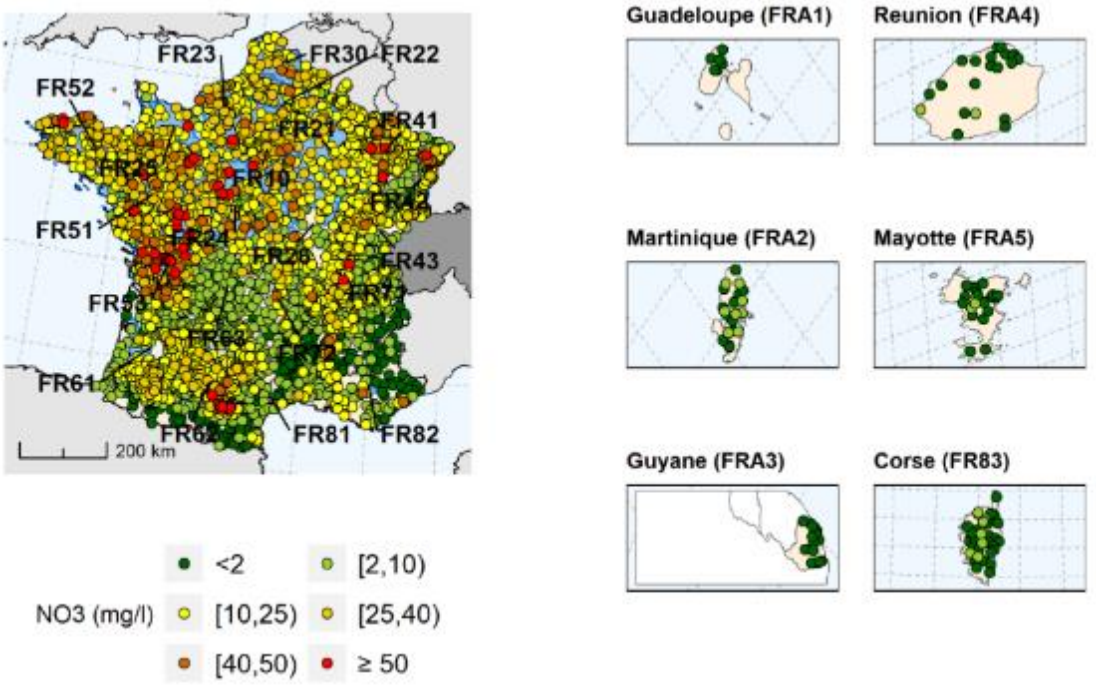
Station Type	Description	Number of removed stations		
		total removed	with measurements	with trends
0	Phreatic groundwater (shallow): 0-5 m	140	140	114
1a	Phreatic groundwater (deep) 5-15 m	10	10	10
1b	Phreatic groundwater (deep) 15-30 m	8	8	8
1c	Phreatic groundwater (deep) >30 m	13	13	13
2	Captive groundwater	24	24	20
3	Karstic groundwater	15	15	12
9	Not specified	0	0	0
	Total	**210**	**210**	**177**

Figure 10. 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



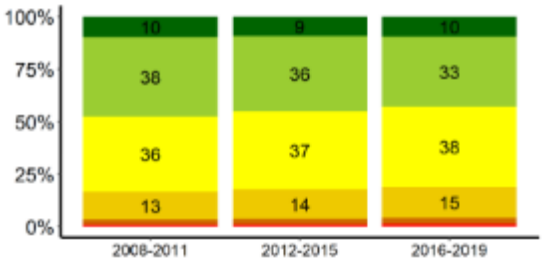


Figure 11. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

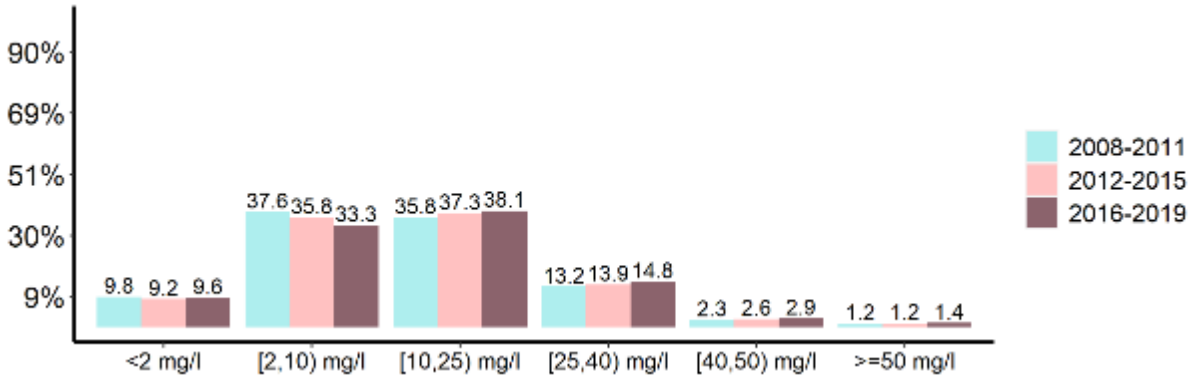
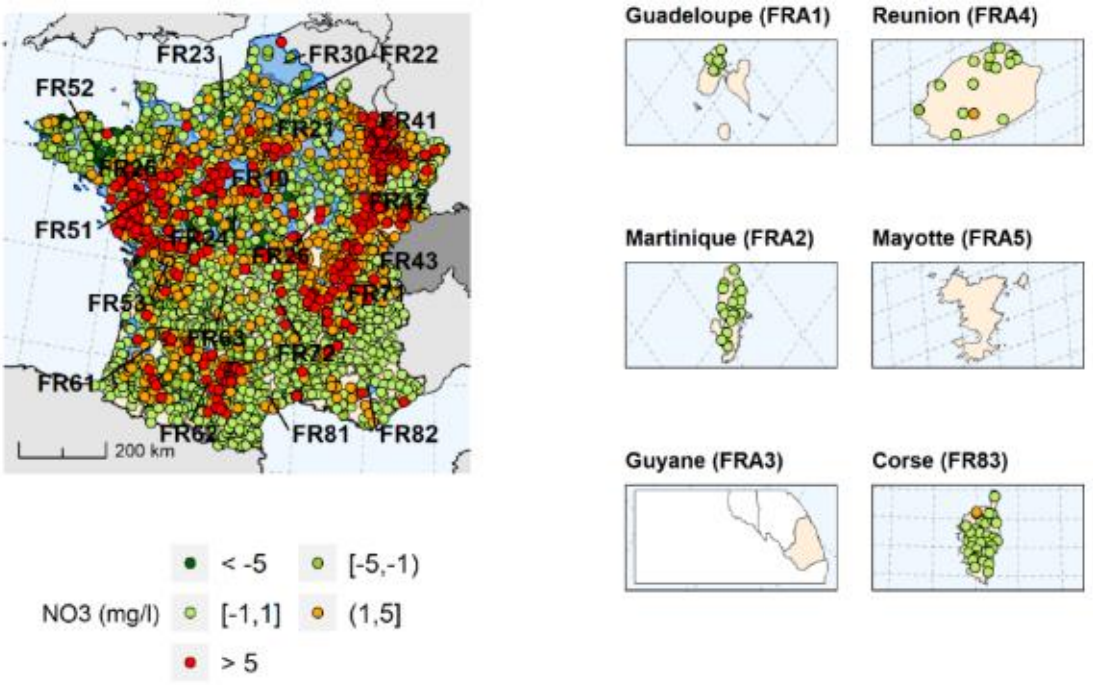


Figure 12. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

Surface water average annual nitrate concentration trend



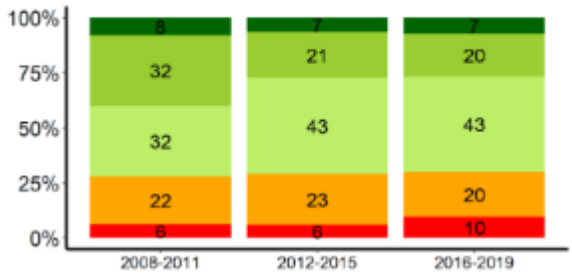


Figure 13. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). In the map in blue the NVZ.

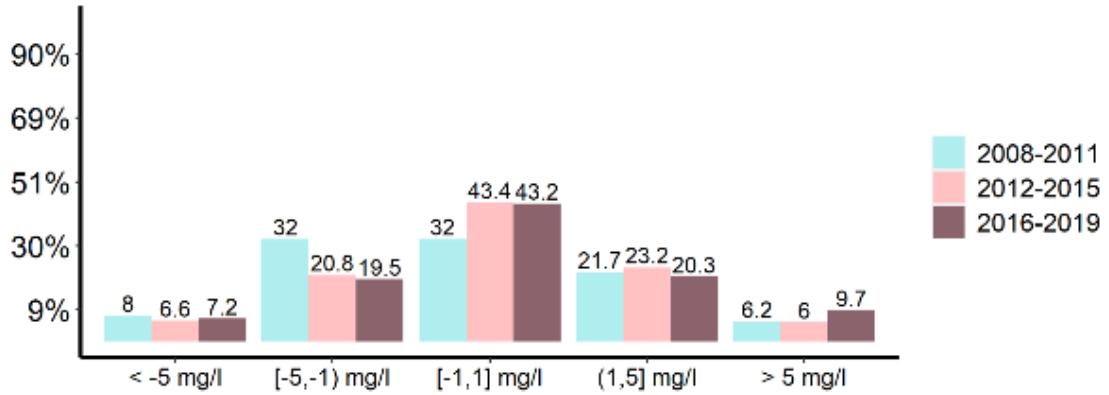
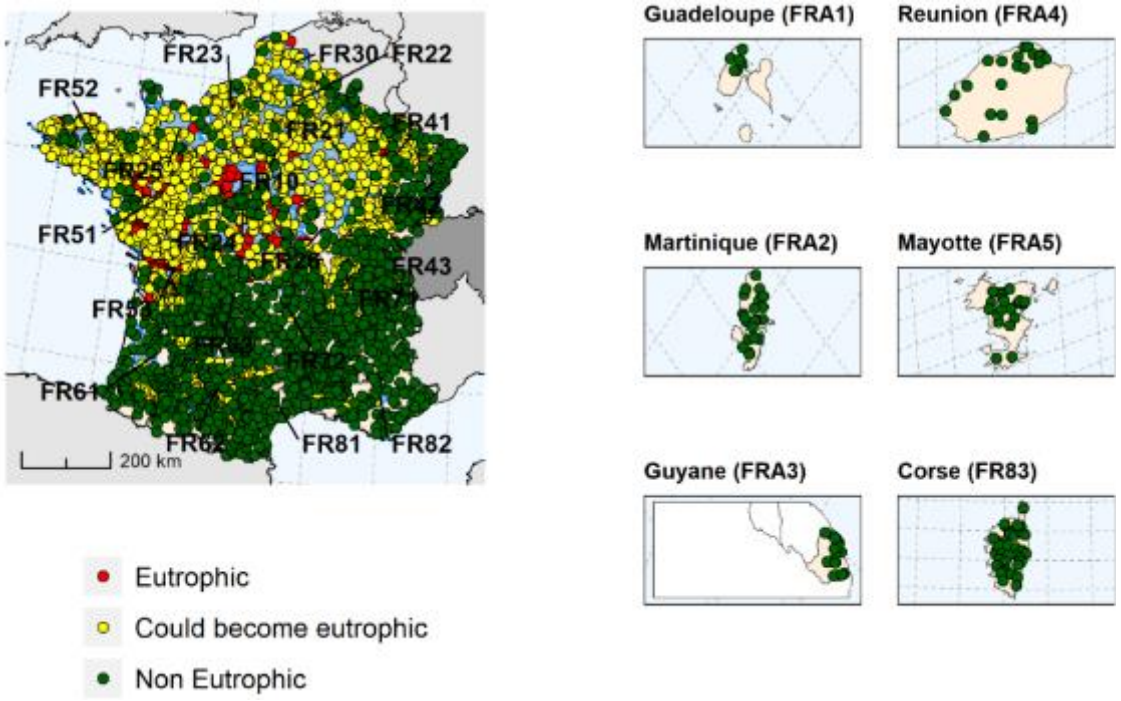


Figure 14. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

Surface Water Eutrophication



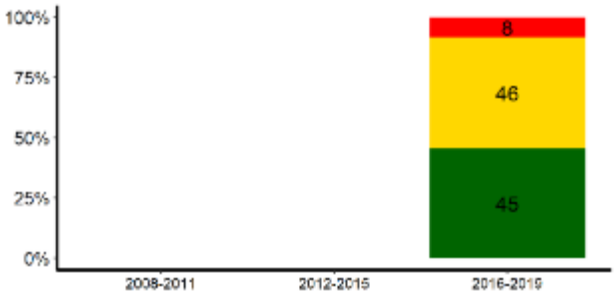


Figure 15. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis). In the map in blue the NVZ.

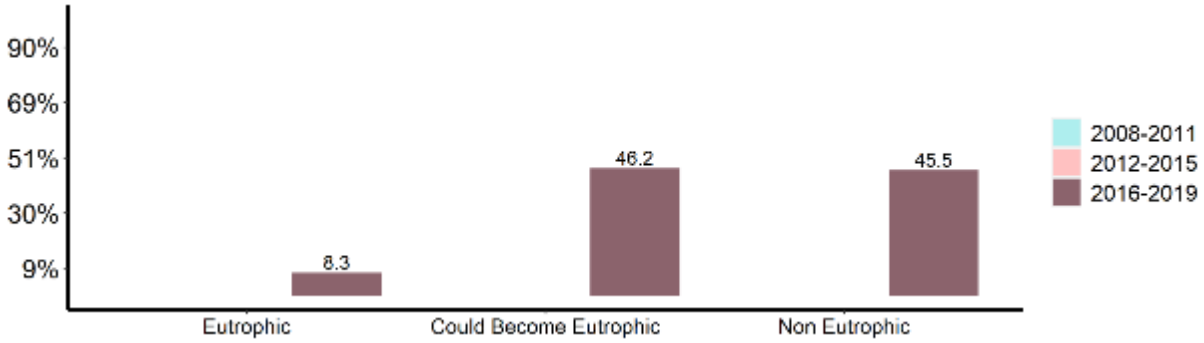
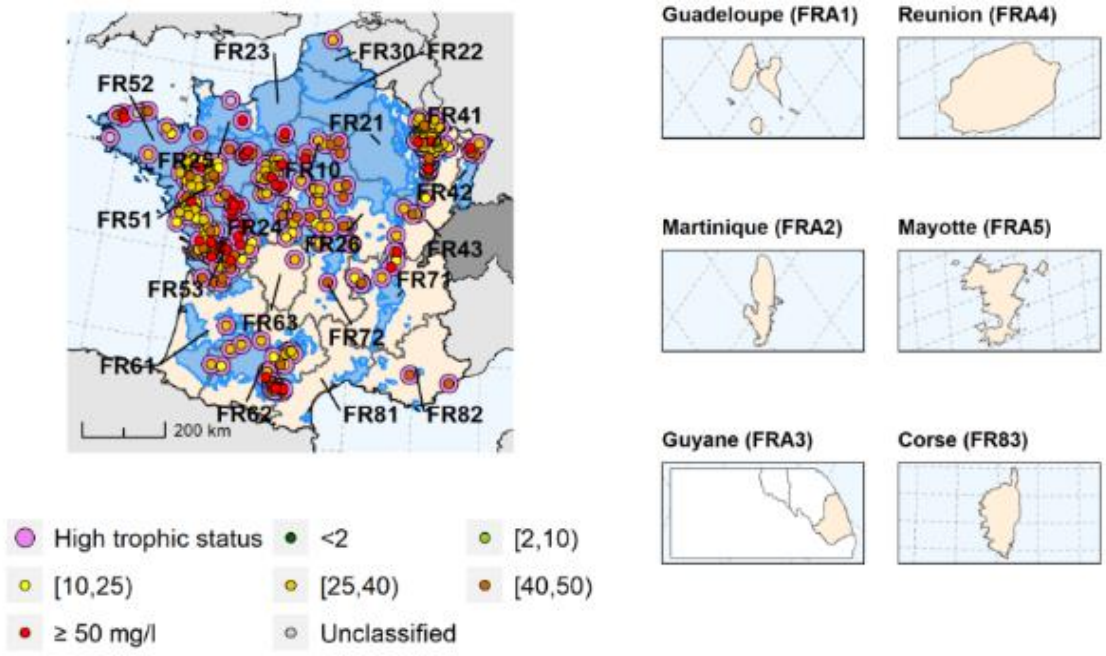


Figure 16. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

The Eutrophic status vs average NO3 annual concentration



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
FR10	Île de France	6	0	0	0	2	4	0	0
FR23	Haute-Normandie	1	0	0	0	0	0	1	0
FR24	Centre	40	0	0	6	21	8	5	0
FR25	Basse-Normandie	2	0	0	0	0	1	1	0
FR26	Bourgogne	9	0	0	2	4	3	0	0
FR30	Nord - Pas-de-Calais	1	0	0	0	1	0	0	0
FR41	Lorraine	43	0	0	8	27	5	3	0
FR42	Alsace	5	0	0	0	2	2	1	0
FR43	Franche-Comté	3	0	0	2	0	1	0	0
FR51	Pays de la Loire	58	0	0	24	18	11	5	0
FR52	Bretagne	15	0	0	4	3	5	3	0
FR53	Poitou-Charentes	42	0	0	3	9	13	17	0
FR61	Aquitaine	2	0	0	0	2	0	0	0
FR62	Midi-Pyrénées	14	0	0	4	7	2	1	0
FR63	Limousin	1	0	0	0	1	0	0	0
FR71	Rhône-Alpes	9	0	0	4	2	1	2	0
FR72	Auvergne	3	0	1	1	0	1	0	0
FR81	Languedoc-Roussillon	12	0	0	1	1	4	6	0
FR82	Provence-Alpes-Côte d'Azur	2	0	0	0	0	2	0	0
NO_NUTS	SALINE	7	0	0	0	0	0	0	7
	Total	**275**	**0**	**1**	**59**	**100**	**63**	**45**	**7**

Figure 17. The SW monitoring stations with eutrophic status versus the average NO3 annual concentration. In the map in blue the NVZ

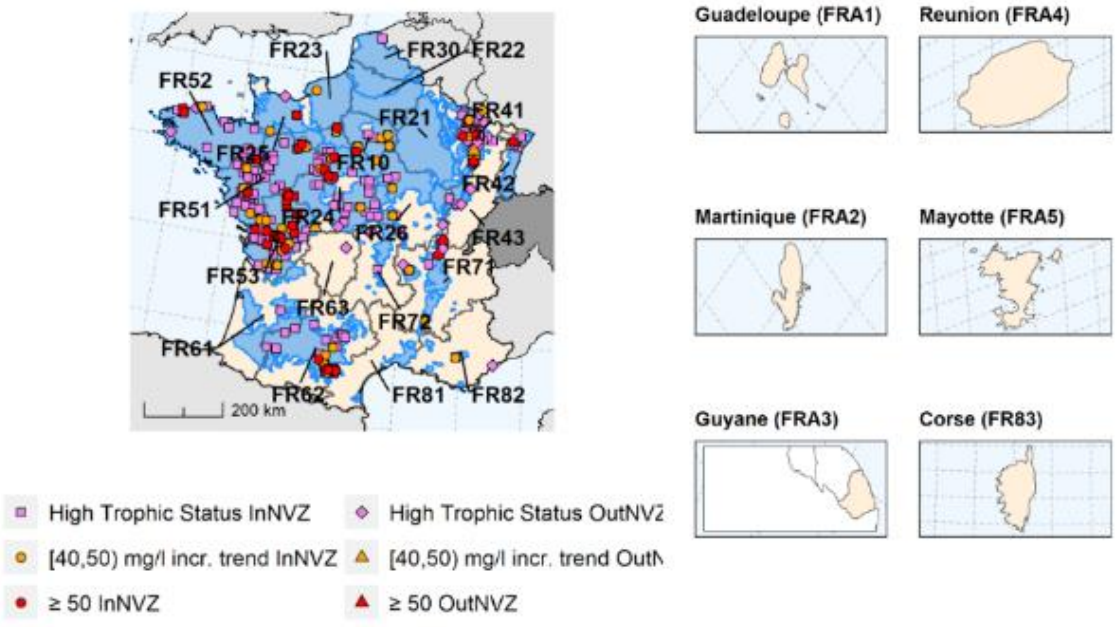
The analysis shows all the SW monitoring stations with the higher trophic status and the corresponding value of NO3 concentration. The map shows the spatial distribution of these points, and the table reports the number of stations with measurements with highest trophic status and the corresponding stations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

In its latest report, France used nitrate concentration for eutrophication assessment, as defined in the French regulation transposing the Nitrates Directive. In particular, water bodies with concentrations below 18 mg NO3/L were considered non-eutrophic. Water bodies with nitrate concentrations between 18 and 50 mg NO3/l are considered potentially eutrophic, and all water bodies with concentrations above 50 mg NO3/L are eutrophic. Considering that no method is available in France for defining the trophic status of transitional water, no data were reported. No data are reported for coastal water as one year of data is not enough for the determination of the trophic state of coastal waters. The assessment of the trophic state based on six years measurements are reported for the French Metropolitan area. The criteria used in the classification include among others, nutrients, chlorophyll-a, presence of toxic algae, photic limit in the water column, dissolved oxygen, the benthic macrophyte and macrofauna habitats. About 14% of coastal waters are eutrophic with large spatial variability. A concentration of eutrophic stations occurs in the English Channel and certain areas in southern Brittany. A large majority of the coastal stations are characterised by a non-eutrophic state.

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	268	1523	1455
5	Lake/reservoir water	0	2	3
6	Transitional water	0	0	0
7	Coastal water	7	0	43
8	Marine water	0	0	0
9	Not specified	0	0	0
	Total	**275**	**1525**	**1501**

Surface Water quality hotspot

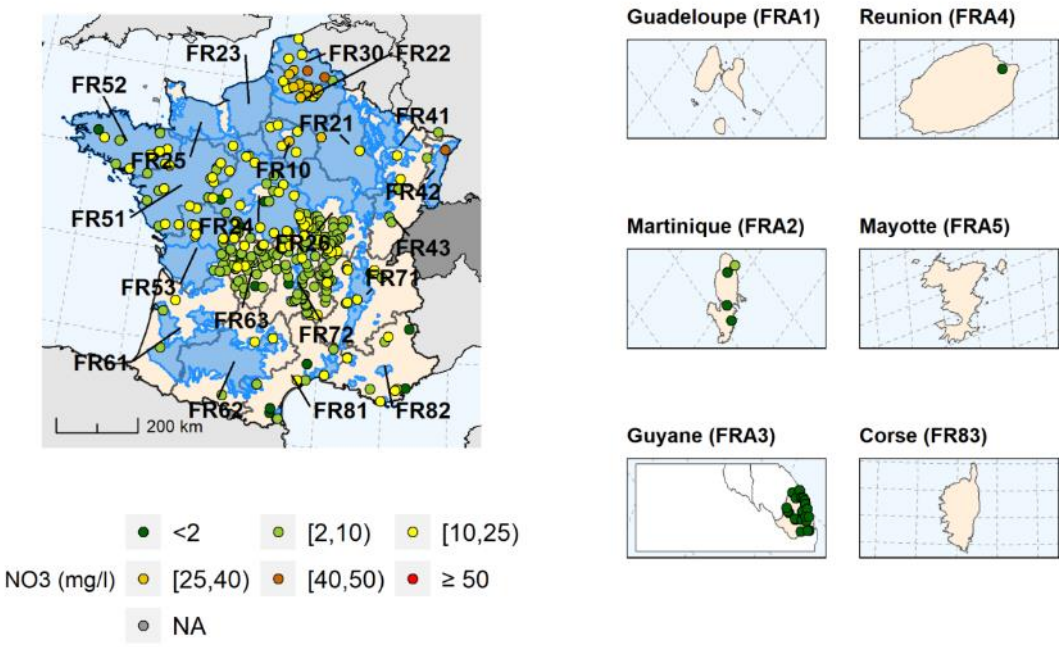


		High trophic status		>=40 and < 50 mg/l incr.trend		>=50 mg/l	
NUTS ID	NUTS NAME	InNVZ	OutNVZ	InNVZ	OutNVZ	InNVZ	OutNVZ
FR10	Île de France	6	0	5	0	0	0
FR23	Haute-Normandie	1	0	2	0	1	0
FR24	Centre	39	1	5	0	5	0
FR25	Basse-Normandie	2	0	1	0	1	0
FR26	Bourgogne	8	1	2	0	0	0
FR30	Nord - Pas-de-Calais	1	0	0	0	0	0
FR41	Lorraine	27	16	3	3	2	1
FR42	Alsace	4	1	0	0	0	1
FR43	Franche-Comté	1	2	0	0	0	0
FR51	Pays de la Loire	58	0	8	0	5	0
FR52	Bretagne	15	0	1	0	3	0
FR53	Poitou-Charentes	42	0	9	1	17	0
FR61	Aquitaine	2	0	0	0	0	0
FR62	Midi-Pyrénées	14	0	3	0	1	0
FR63	Limousin	0	1	0	0	0	0
FR71	Rhône-Alpes	4	5	2	0	0	2
FR72	Auvergne	1	2	0	0	0	0
FR81	Languedoc-Roussillon	12	0	1	0	6	0
FR82	Provence-Alpes-Côte d'Azur	1	1	1	0	0	0
NO_NUTS	SALINE	0	7	0	0	0	0
	Total	**238**	**37**	**43**	**4**	**41**	**4**

Figure 18. 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 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	333	333	309	0
5	Lake/reservoir water	0	0	0	0
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	**333**	**333**	**309**	**0**

Figure 19. SW removed stations map (top graph) and distribution by surface water type (lower graph). In the map NVZ in blue.

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 Code of Good Agricultural Practice was defined by the decree of 22 November 1993. It was established at the national level and it has not been changed since its release. Many organizations participated to the definition of the Code, as for instance COMIFER, INRAE, IDELE. In addition, the specific regulations under the ICPE “regulated installations for environmental protection“ allows the mandatory applications of these good agriculture practices and under the directive 2010/78/UE 6950 industrial plants are controlled for reducing the nitrogen emissions from agricultural sources.

France has had 6 action programmes since 1996. The latest action programme was adopted in December 2018. The national action programme is complemented by regional action programmes (PARs). Due to restructuring of merging of the French regions, the number of regions in nitrate vulnerable zones went from 21 to 12. So, the sixth action programme is composed by the national action programme and 12 regional action programmes. It is highlighted that the measures can be reinforced in specific “Zones d’Actions Renforcées” (ZAR), that can be also inside NVZ.

In the 2016–2019 period no study of cost-effectiveness was conducted. The following table summarizes the main measure of the action programme.

Table 6. Details of the Action Programme

Measure	General details in Action Programme (*)
Period of prohibition of fertiliser application	• During periods of risk of nitrate leakage into the water. These periods vary depending on the type of crop and the type of nitrogen fertilizer
Restrictions for application on sloped soils	• Any application of nitrogenous fertilizers in vulnerable areas must respect conditions linked to the distance from water courses (depends on the type of fertilizers and the slope of the soil) in order to reduce the risk of runoff into the water
	• Nine regions have chosen to reinforce this measure: water bodies of more than ten ha and "GAEC" rivers (Good Agro-Environmental Conditions) must be bordered by a grassland strip with a minimum width of 5 m
Restrictions for application on soaked, frozen, or snow-covered soils	• Any application of nitrogenous fertilizers in vulnerable areas must respect conditions linked on the condition of the soil encountered (soggy, flooded, snow-covered, frozen) in order to reduce the risk of runoff into the water
	• Nine regions have chosen to reinforce this measure: water bodies of more than ten ha and "GAEC" rivers (Good Agro-Environmental Conditions) must be bordered by a grassland strip with a minimum width of 5 m
Restrictions for application near watercourses (buffer strips)	•Any application of nitrogenous fertilizers in vulnerable areas must respect conditions linked to the distance from water courses (depends on the type of fertilizers and the slope of the soil), in order to reduce the risk of runoff into the water
	• Nine regions have chosen to reinforce this measure: water bodies of more than ten ha and "GAEC" rivers (Good Agro-Environmental Conditions) must be bordered by a grassland strip with a minimum width of 5 m
	• Some regions have a larger buffer strip (10 m)
Effluent storage works	• Not specified
Capacity of manure storage	• The storage capacities for livestock effluents are designed to comply with the periods when spraying is prohibited and designed to avoid direct runoff to the environment
Rational fertilisation (e.g., splitting fertilisation, limitations)	• Reinforcement of measure in 8 regions
Crop rotation, permanent crop enhancement	• Not specified
Vegetation cover in rainy periods, winter	• It is mandatory to cover the soil during rainy periods
Fertilisation plans, spreading records	• Not specified
Other measures	• The fertilization plan (PPF) and the practice registration book (CEP)
Date for application limit of 170 kg N/ha/year:	• Not specified

Controls

Administrative controls on the implementation of the Action Programme measures are carried out in the frame of the CAP cross-compliance check. About 520 farmers were controlled every year. Non-conformities for analysis of nitrogen content of manure were detected for 6.3% of the cases, manure storage leakage for 3.8% of the cases and fertilizer usage for 3.8% of the cases.

Designation of NVZ

France has designated 184260 km^2 of Nitrates Vulnerable zones representing about 33.9% of the entire territory. The designated area is lower than the previous designation of NVZ areas that extended over 188793 km^2, representing about 34.7% of the territory.

Forecast of Water Quality

The evolution of water quality was done through the analysis performed for the Water Framework Directive implementation. A decrease by 32% of the number of groundwater bodies affected by diffuse agricultural pollution and 31% of the number of surface water bodies affected by agricultural diffuse contamination is expected in 2021.

Summary

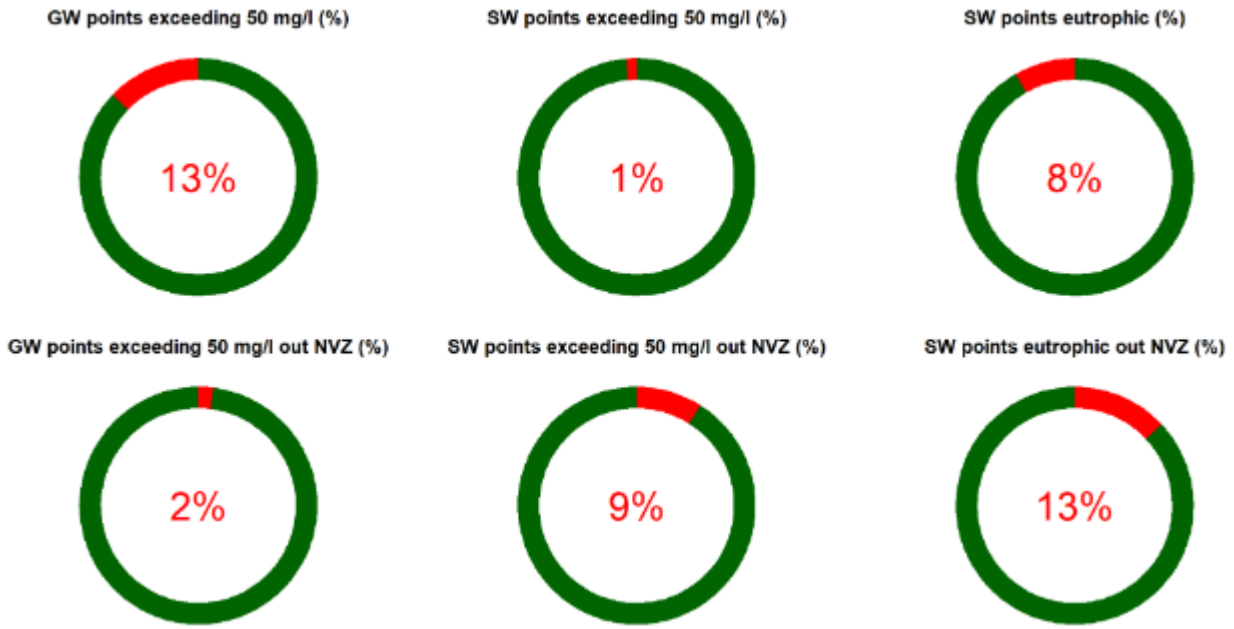


Figure 20. The summary plot for the period 2016-2019

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

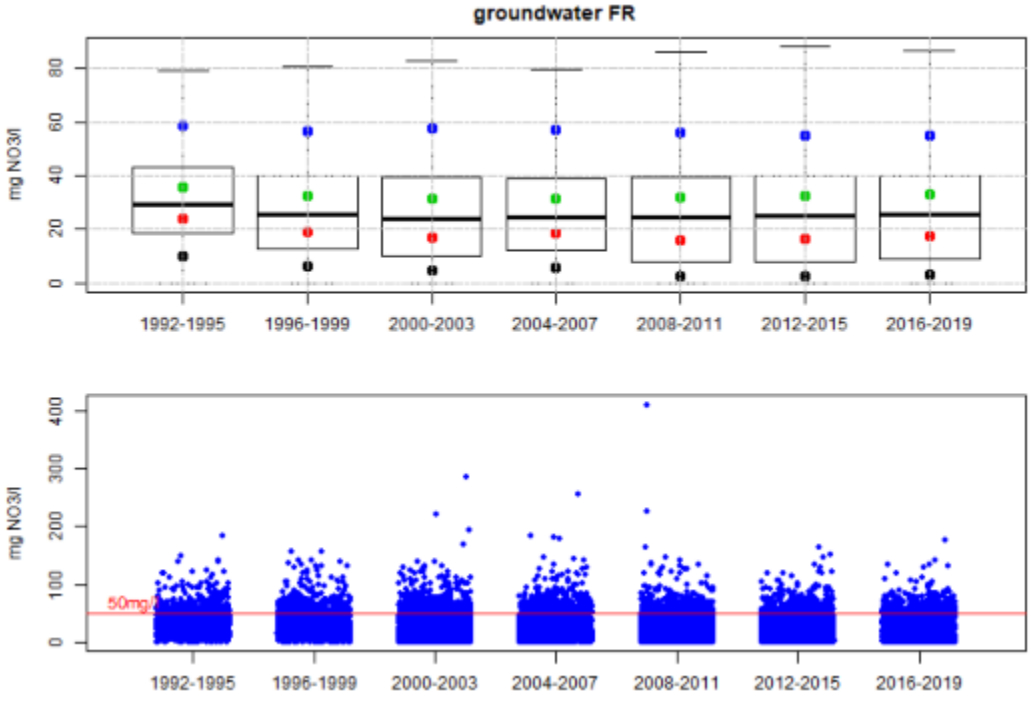


Figure 21. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period for groundwater stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

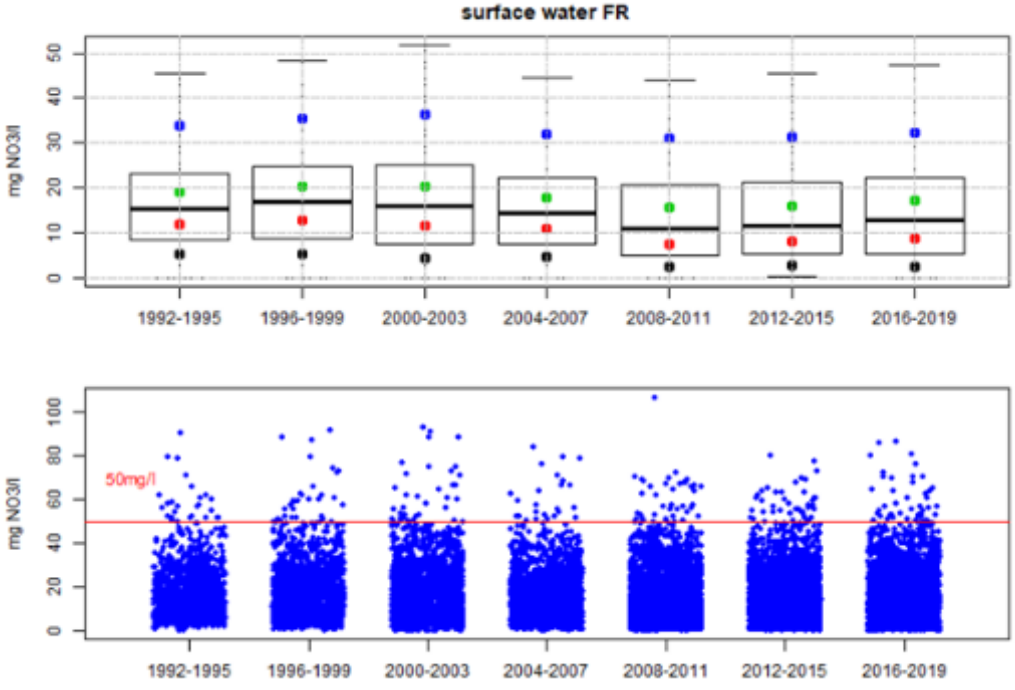


Figure 22.Time series of box whisker plots along with the distribution of average NO3 annual concentrations for each reporting period for surface water stations. The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

Conclusions and recommendations

The livestock density is close to the EU average but very high in the north west of the country, especially in Brittany. The surplus of nitrogen is close to the EU average, while there is almost no surplus of phosphorus.

The current reporting period includes data only for year 2019.

There is a well-elaborated network of monitoring stations. Groundwater water is of average quality, with a lot of historical (Brittany, centre west) and new (north, north east) hotspots. Eutrophication of marine water is an issue in the north coast of Brittany.

France revised its actions programmes in 2018.

The Commission recommends France to revise its NVZ based on the latest nitrates pollution data and to reinforce its action programmes for groundwater in hot spots where nitrates pollution is high and for inland and marine surface waters affected by eutrophication where the agricultural pressure is significant. It also recommends extending the monitoring data to include the four years of the reporting period.