



EUROPEAN  
COMMISSION

Brussels, 11.10.2021  
SWD(2021) 1001 final

PART 16/38

## **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



Estonia's utilized agricultural area amounts to 1 Mha, representing 23% of the total land area and increased of 10% since 2007. The major outputs of the agricultural industry excluding services and secondary activities include in a decreasing order milk (27.3%), and cereals (17.3%).

Eurostat

### Major land use statistics for Estonia

Table 1. Utilized agricultural area (abbreviated as UAA)

| Estonia                                  | 2005 | 2007 | 2010 | 2013 | 2016 |
|------------------------------------------|------|------|------|------|------|
| Utilised agricultural area UAA (1000 ha) | NA   | 915  | 949  | 966  | 1004 |
| arable land (1000 ha)                    | NA   | 594  | 640  | 628  | 687  |
| permanent grass (1000 ha)                | NA   | 306  | 296  | 325  | 304  |
| permanent crops (1000 ha)                | NA   | 3    | 3    | 3    | 3    |
| kitchen gardens (1000 ha)                | NA   | 11   | 10   | 10   | 9    |

Note:

Eurostat (FSS)

Estonia's arable land has increased since 2013 by 9.4%. The permanent grass land area has decreased by 6.5% 2013.

### Animal distribution in Estonia

Table 2. Livestock statistics

| Estonia                              | 2005 | 2007 | 2010 | 2013 | 2016 |
|--------------------------------------|------|------|------|------|------|
| Livestock index                      | 0.38 | 0.35 | 0.33 | 0.32 | 0.28 |
| dairy cows (10 <sup>6</sup> heads)   | 0.11 | 0.10 | 0.10 | 0.10 | 0.09 |
| live bovines (10 <sup>6</sup> heads) | 0.25 | 0.24 | 0.24 | 0.26 | 0.25 |
| live pigs (10 <sup>6</sup> heads)    | 0.35 | 0.38 | 0.37 | 0.36 | 0.27 |
| live poultry (10 <sup>6</sup> heads) | NA   | NA   | 1.94 | 2.17 | 1.90 |

Note:

Eurostat (FSS)

Estonia's livestock decreased since that last reporting period for all animal types. The livestock density index has continued its steady decrease since 2005 and is significantly lower than the EU average of 0.8.

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

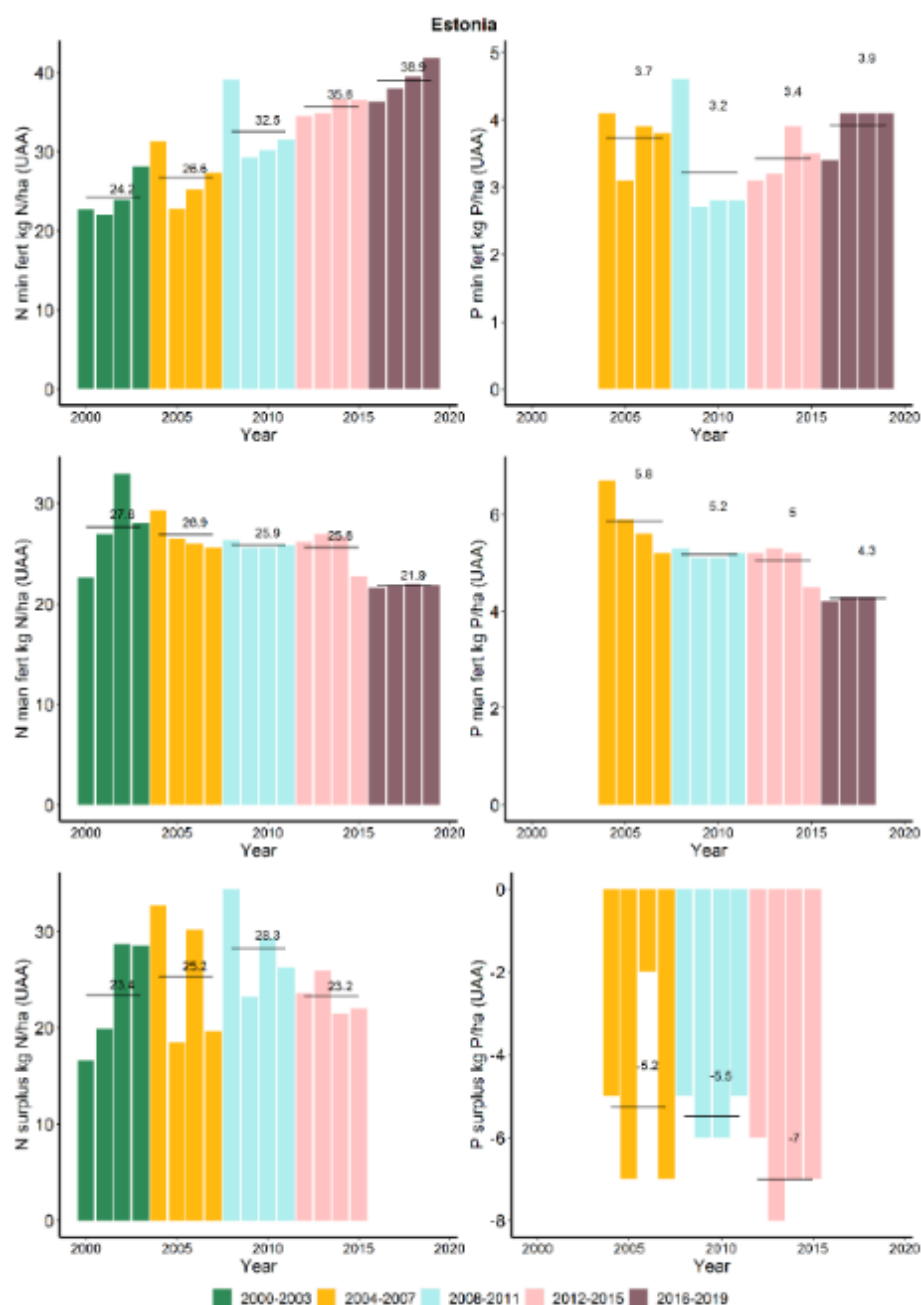


Figure 1. N and P fertilizers and gross surplus (kg/ha)

The gross nitrogen and phosphorus surpluses originate from EUROSTAT data for the years 2000-2014. No data are available beyond 2015. Data provided by Estonia have been used to complete the N and P mineral fertilizer and manure for the period 2015-2019. As regard to N and P manure values of year 2014, for which both Eurostat and national statistic were available, differences of 52% for N and 9% for P between the two sources were found.

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

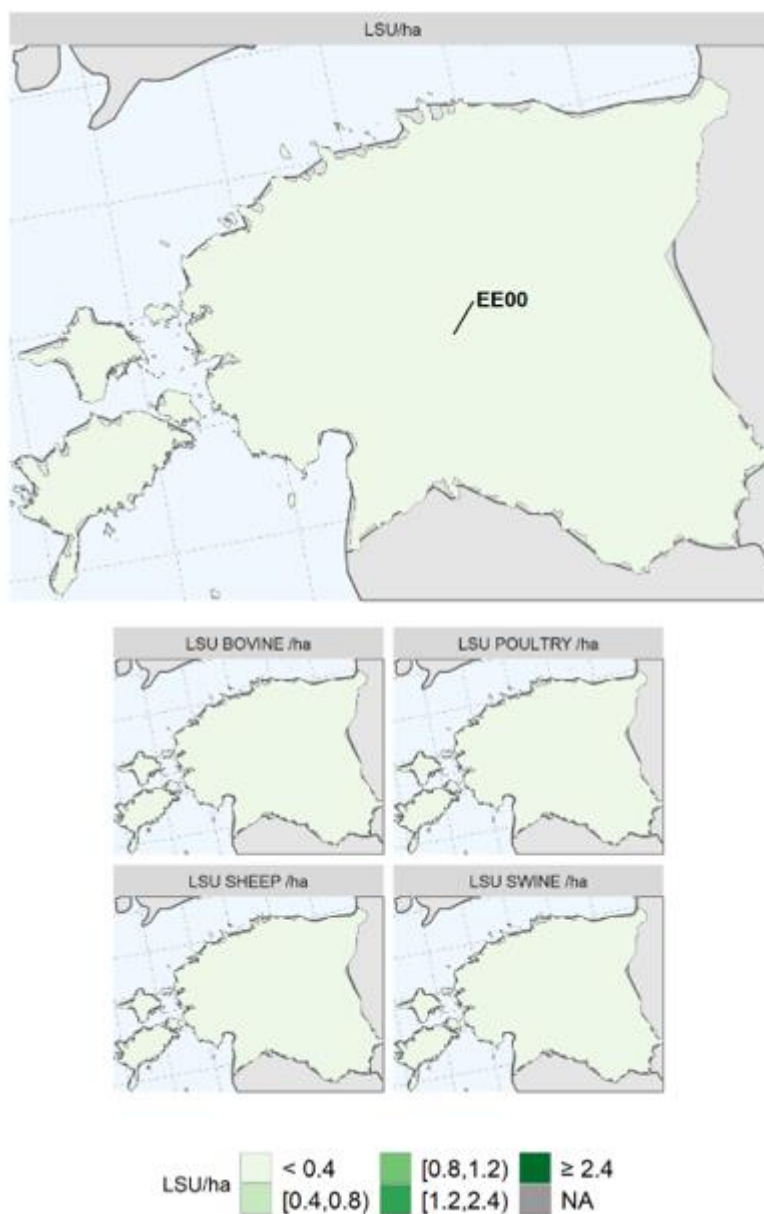


Figure 2. Map of livestock unit distribution, year 2016 (Source: Eurostat, February 2021)

Animal density is low throughout the country (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

In Estonia, groundwater is monitored under the groundwater monitoring sub-programme of the national environmental monitoring programme; both in the bodies of groundwater established in accordance with the Water Framework Directive and in the Nitrate Vulnerable Zones (NVZ). The monitoring of groundwater covers the chemical and quantitative status of all 31 bodies of groundwater in Estonia. Given the higher agricultural pressure in the NVZ, the density of the network is higher in designated NVZ areas where sampling is performed up to four times a year (only once a year for groundwater bodies located outside NVZ areas).

The surface waters are subject to continuous monitoring. Trends are estimated every year at continuous monitoring stations. Status monitoring (on a rotational basis, at least once during each river basin management plan period, i.e. once every 6 years) is carried out on all major flowing and standing surface water bodies and coastal waters. This surveillance monitoring as defined in the WFD is designed to determine the ecological and/or chemical status of the water bodies; the monitoring of hydrobiological and hydrochemical parameters is also included. The sampling frequency at the continuous monitoring trend stations is four to 12 times a year.

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 in the whole country

| 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 | 59                                   | 38         | 31         | 16                             | 24         | 28         |
| 1a           | Phreatic groundwater (deep) 5-15 m    | 45                                   | 37         | 24         | 0                              | 10         | 22         |
| 1b           | Phreatic groundwater (deep) 15-30 m   | 124                                  | 94         | 102        | 13                             | 59         | 92         |
| 1c           | Phreatic groundwater (deep) >30 m     | 38                                   | 211        | 210        | 10                             | 11         | 188        |
| 2            | Captive groundwater                   | 0                                    | 0          | 0          | 0                              | 0          | 0          |
| 3            | Karstic groundwater                   | 6                                    | 2          | 2          | 5                              | 2          | 2          |
| 9            | Not specified                         | 25                                   | 3          | 0          | 1                              | 2          | 0          |
| <b>Total</b> |                                       | <b>297</b>                           | <b>385</b> | <b>369</b> | <b>45</b>                      | <b>108</b> | <b>332</b> |

## Surface water quality monitoring network

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

| 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          | 64                                   | 238        | 198        | 60                             | 111        | 110        | 64                                     | 283        | 208        |
| 5            | Lake/reservoir water | 81                                   | 86         | 82         | 5                              | 5          | 26         | 81                                     | 64         | 73         |
| 6            | Transitional water   | 0                                    | 0          | 0          | 0                              | 0          | 0          | 0                                      | 0          | 0          |
| 7            | Coastal water        | 23                                   | 26         | 21         | 9                              | 22         | 16         | 38                                     | 43         | 42         |
| 8            | Marine water         | 0                                    | 0          | 0          | 0                              | 0          | 0          | 0                                      | 0          | 0          |
| 9            | Not specified        | 0                                    | 0          | 0          | 0                              | 0          | 0          | 0                                      | 0          | 0          |
| <b>Total</b> |                      | <b>168</b>                           | <b>350</b> | <b>301</b> | <b>74</b>                      | <b>138</b> | <b>152</b> | <b>183</b>                             | <b>390</b> | <b>323</b> |

# Groundwater Quality

## Groundwater average annual nitrate concentration

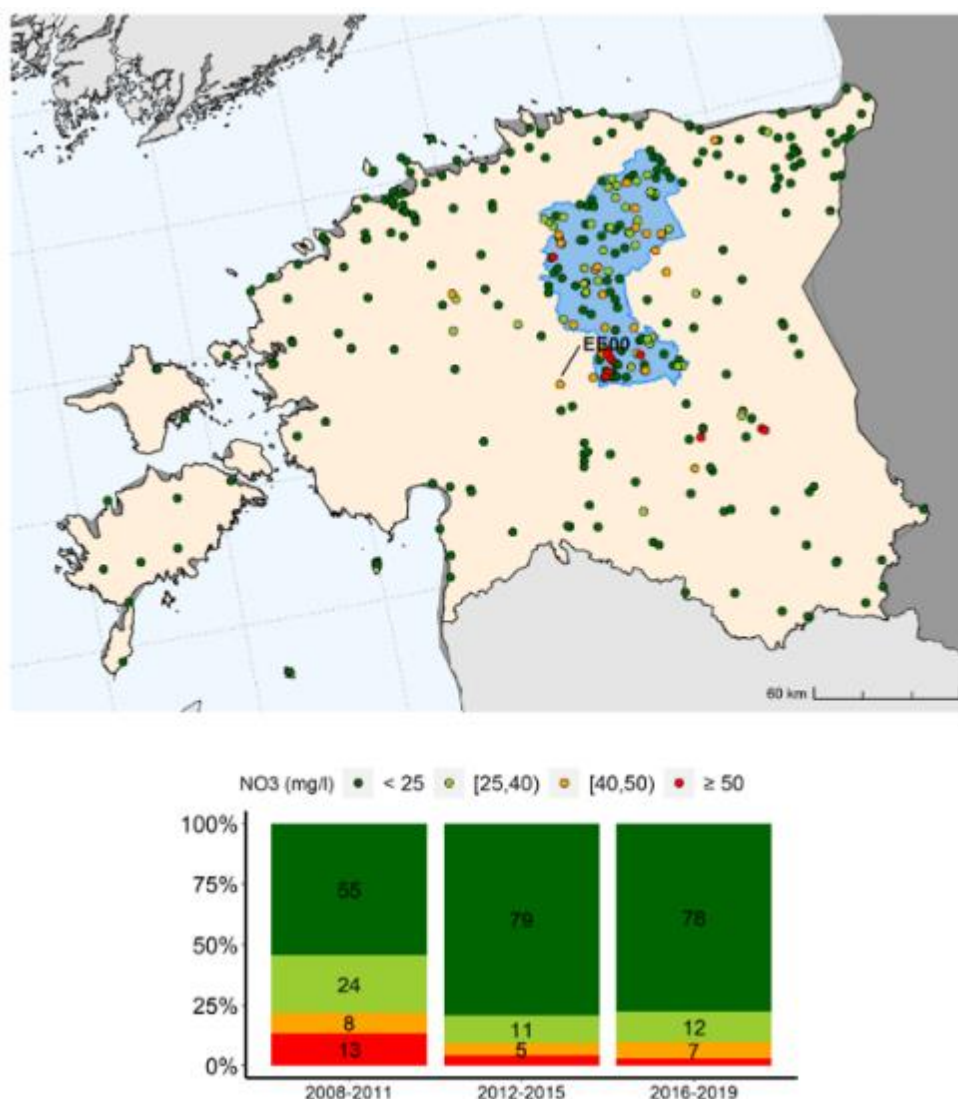


Figure 3. Spatial distribution of average NO<sub>3</sub> annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

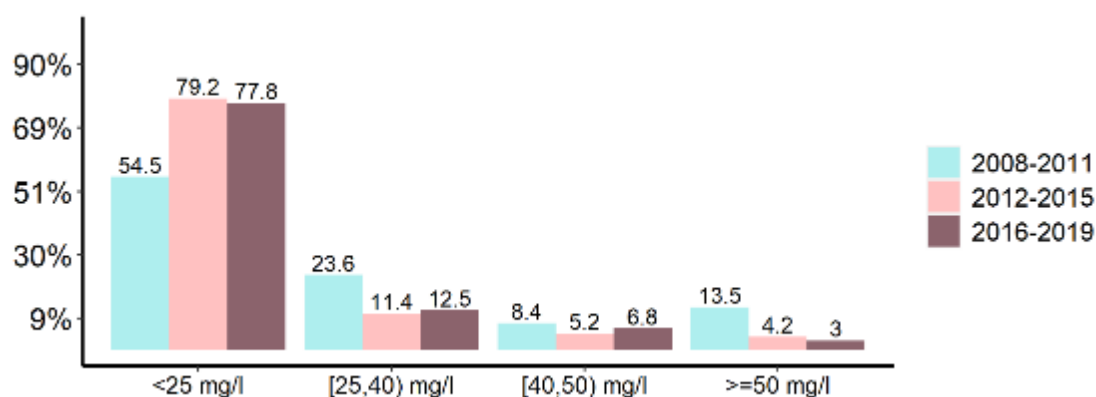


Figure 4. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO<sub>3</sub> annual concentration (x axis)

## Groundwater average annual nitrate concentration trend

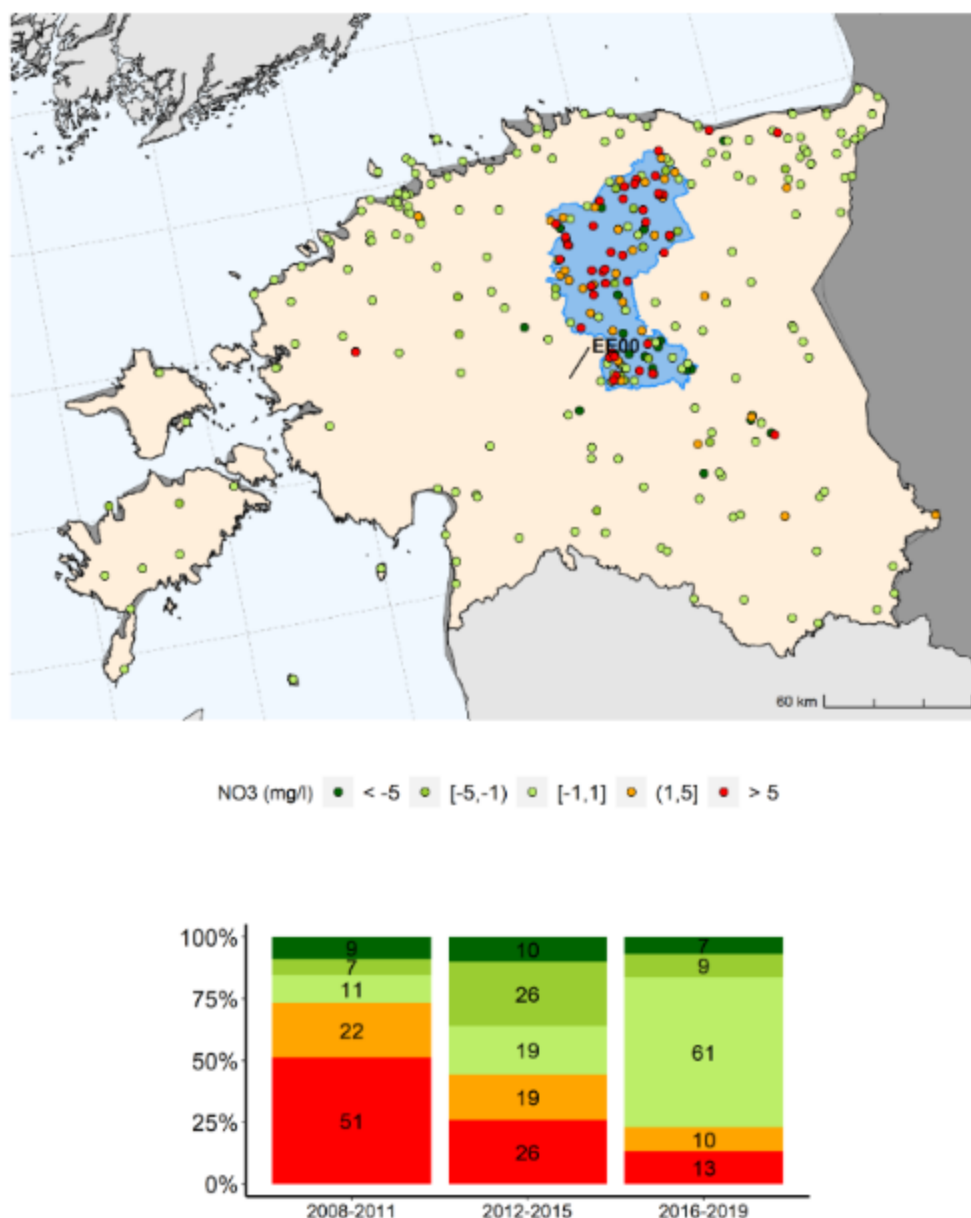


Figure 5. Spatial distribution of average NO<sub>3</sub> annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). In the map in blue the NVZ.

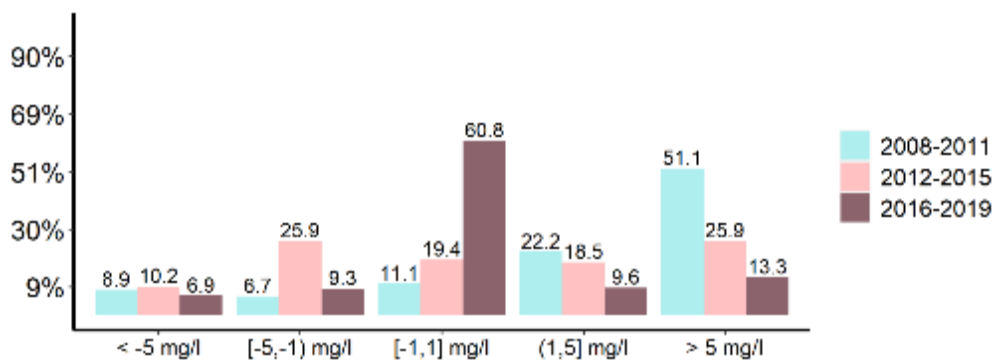
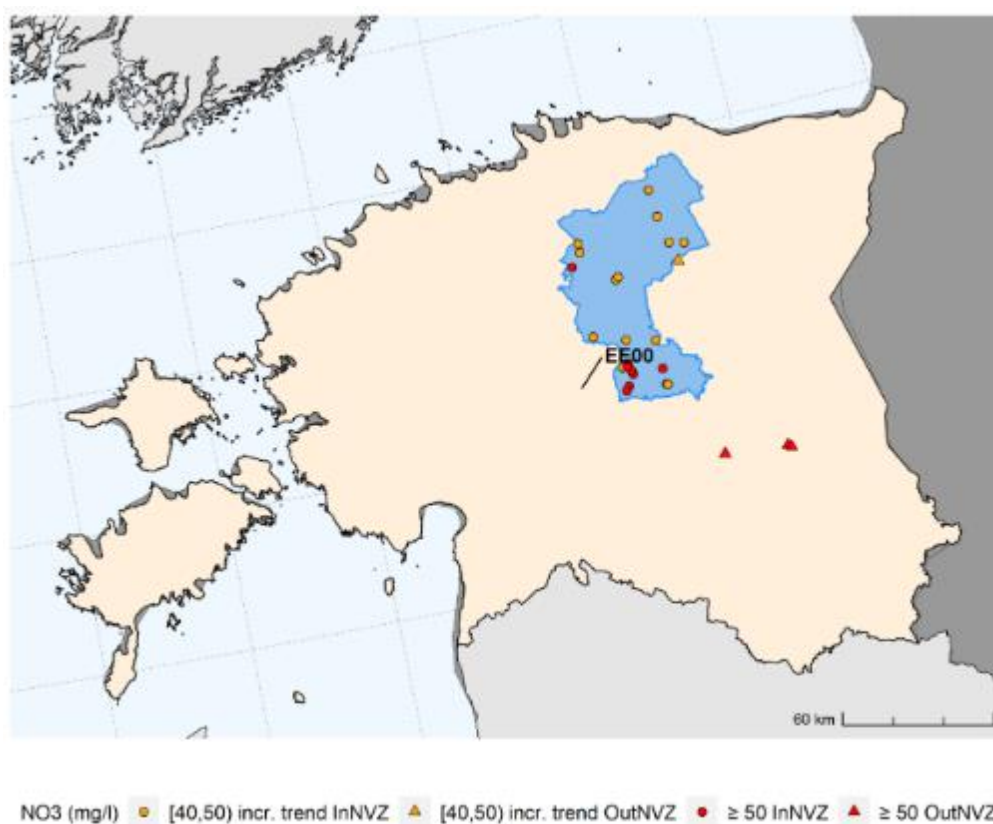


Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO<sub>3</sub> annual trends (x axis)



## Groundwater hotspot



| NUTS ID      | NUTS NAME | >=40 and < 50 mg/l incr.trend |          | >=50 mg/l |          |
|--------------|-----------|-------------------------------|----------|-----------|----------|
|              |           | InNVZ                         | OutNVZ   | InNVZ     | OutNVZ   |
| EE00         | Eesti     | 14                            | 1        | 8         | 3        |
| <b>Total</b> |           | <b>14</b>                     | <b>1</b> | <b>8</b>  | <b>3</b> |

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 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 Quality

## Surface water average annual nitrate concentration

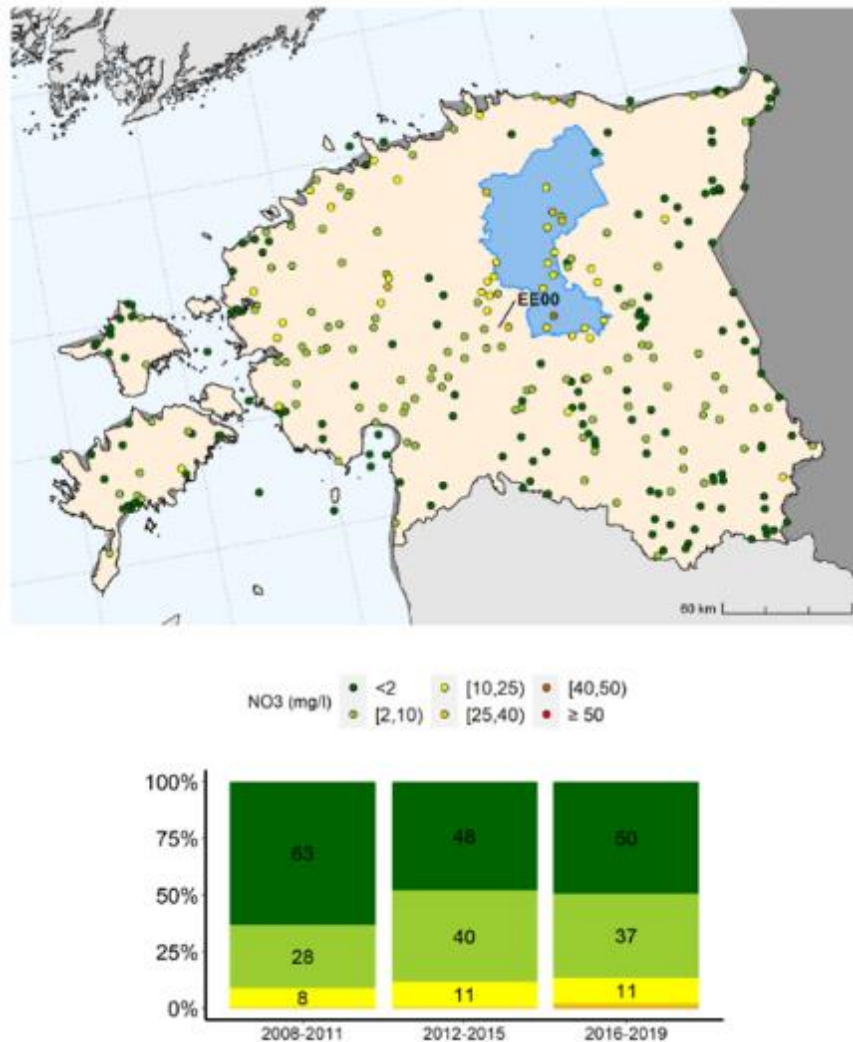


Figure 8. Spatial distribution of average NO<sub>3</sub> annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

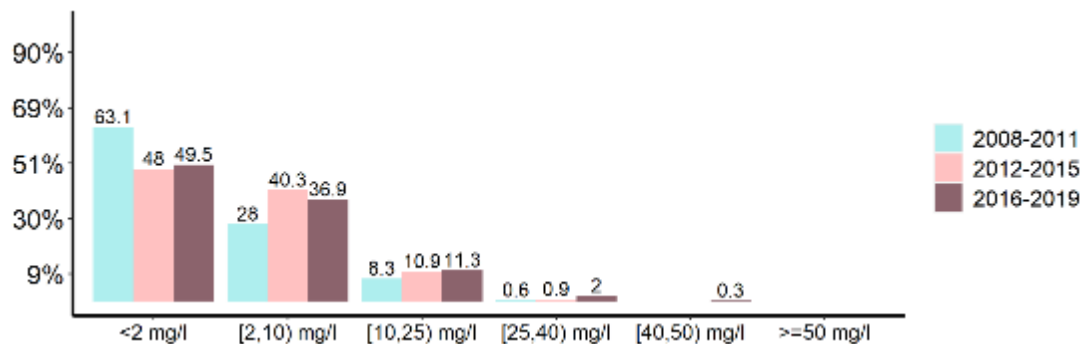


Figure 9. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO<sub>3</sub> annual concentration (x axis)

## Surface water average annual nitrate concentration trend

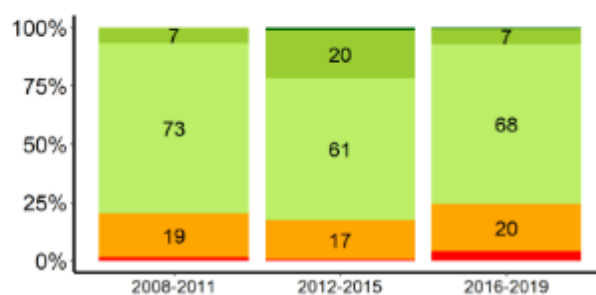
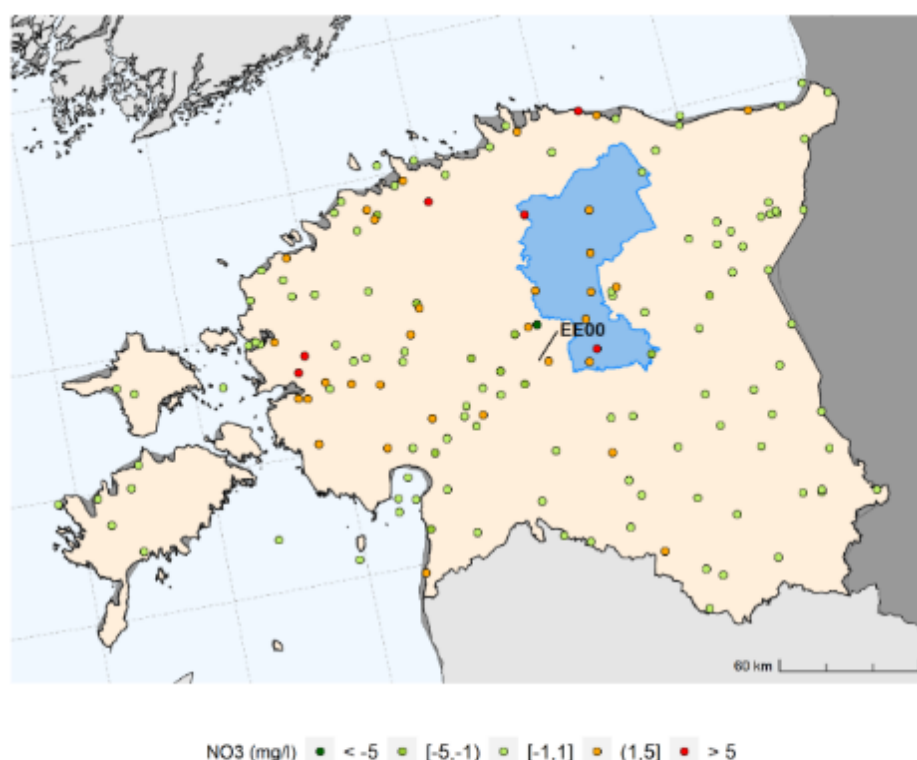


Figure 10. Spatial distribution of average NO<sub>3</sub> annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information. In the map in blue the NVZ.

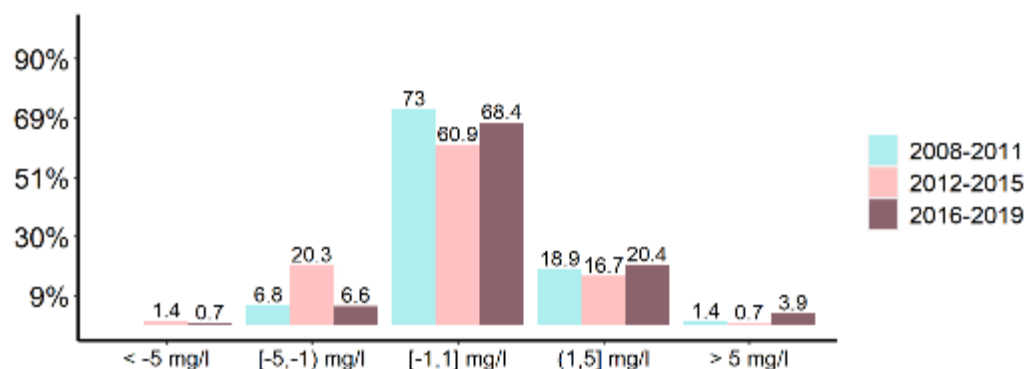
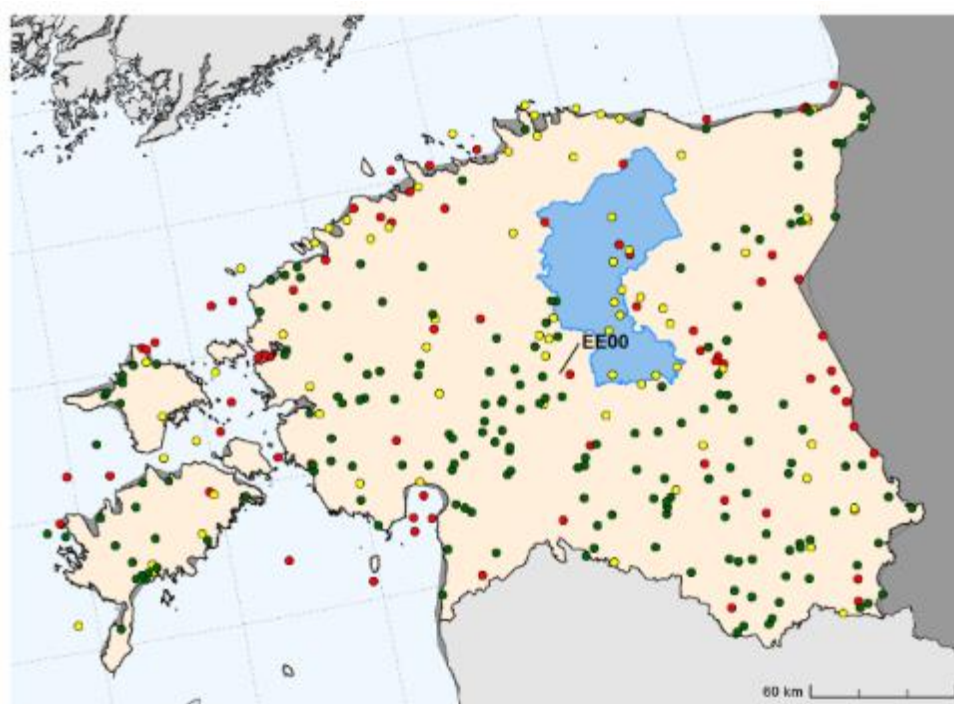


Figure 11. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO<sub>3</sub> annual trends (x axis)

## Surface Water Eutrophication



• Eutrophic • Could become eutrophic • Non Eutrophic

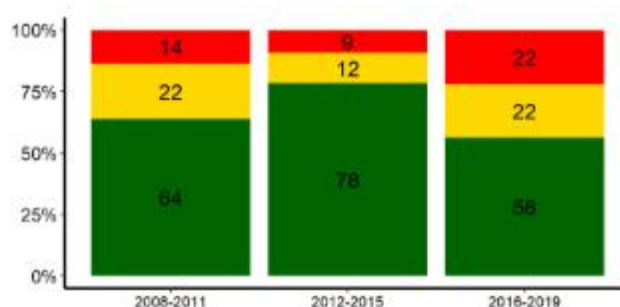


Figure 12. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis). In the map in blue the NVZ.

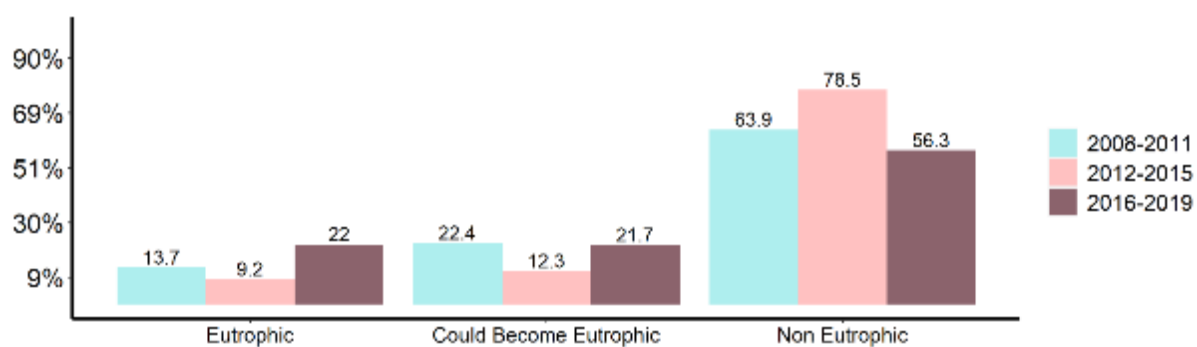
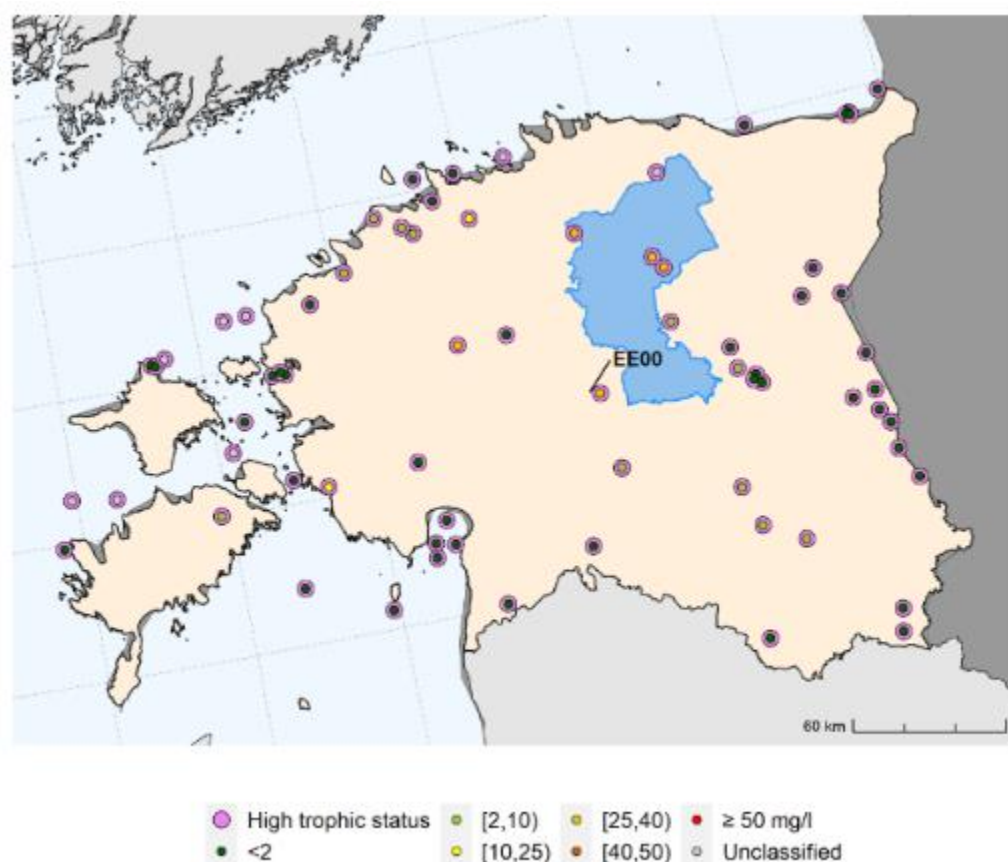


Figure 13. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

## The Eutrophic status vs average NO<sub>3</sub> 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 |
| EE00    | Eesti     | 44                  | 25                                             | 11          | 2            | 5            | 0            | 0         | 1            |
| NO_NUTS | SALINE    | 27                  | 20                                             | 0           | 0            | 0            | 0            | 0         | 7            |
| Total   |           | 71                  | 45                                             | 11          | 2            | 5            | 0            | 0         | 8            |

Figure 14. The SW monitoring stations with eutrophic status versus the average NO<sub>3</sub> annual concentration. In the map in blue the NVZ.

The analysis shows all the SW monitoring stations with the highest trophic status and the corresponding value of NO<sub>3</sub> 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 NO<sub>3</sub> concentration. Only the NUTS of interest are reported.

In Estonia, the methods for assessing the ecological status of bodies of water in accordance with the WFD have been laid down in Regulation No 19 of the Minister of the Environment of 16 April 2020 'List of surface water bodies, procedure for determination of surface water bodies and territorial sea status categories, values of quality indicators for ecological status categories of bodies of surface water and values of quality indicators for bodies of water not included in a surface water body'.

The trophic assessment of rivers takes into account only those years where at least four measurements of each assessment parameter. Only data on total nitrogen and total phosphorus were used to assess river eutrophication, because the small size of Estonian rivers means that phytoplankton and chlorophyll a concentrations are not representative enough to be used in the assessment of water quality status. The trophic assessment of lakes is based on the annual average concentration of total nitrogen, total phosphorus and chlorophyll a in the water column). The assessments of the trophic classes of lakes and coastal waters are given as an average of the assessments of three indicators (total phosphorus, total nitrogen and chlorophyll

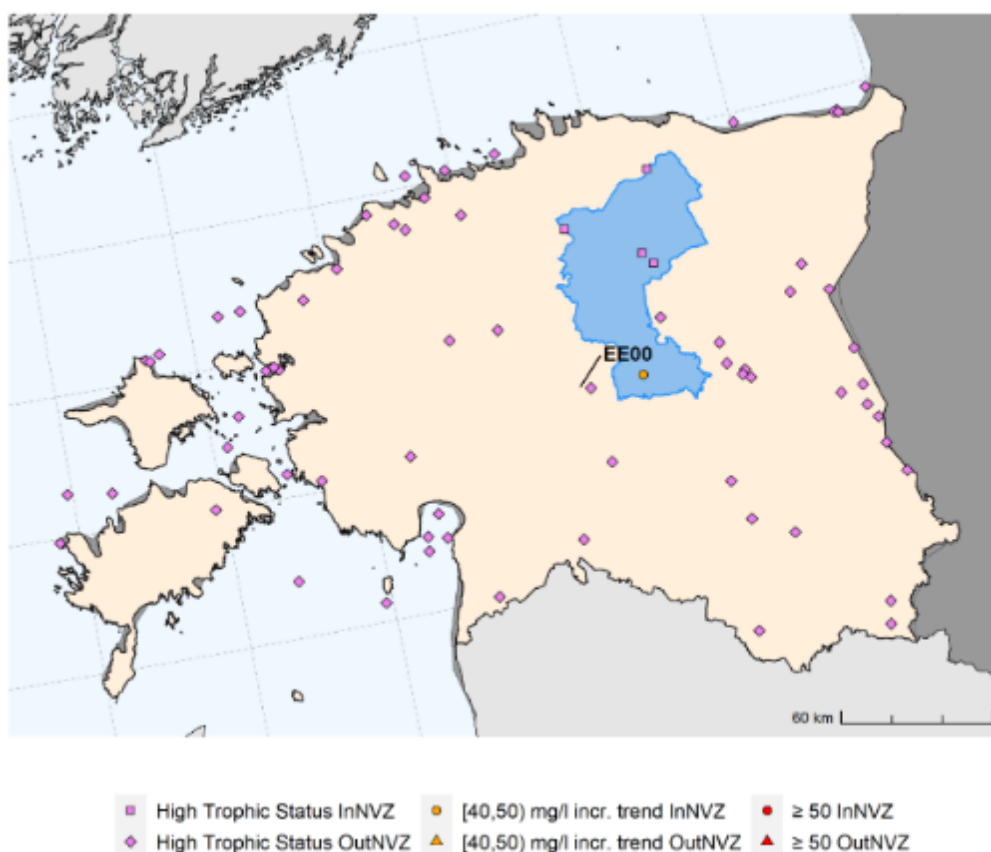
Data from 208 monitoring stations have been used in the trophic assessment of rivers and reported on Eionet. Most of the river in Estonia are non-eutrophic. The majority of lakes are either eutrophic or could become eutrophic, while coastal waters are mostly eutrophic. The assessment of the Estonian coastal waters trophic status reflects the large eutrophication problem of the Baltic Sea.

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

| Station Type | Description          | Number of stations with Trophic status |                        |               |
|--------------|----------------------|----------------------------------------|------------------------|---------------|
|              |                      | Eutrophic                              | Could become eutrophic | Non Eutrophic |
| 4            | River water          | 17                                     | 43                     | 148           |
| 5            | Lake/reservoir water | 27                                     | 15                     | 31            |
| 6            | Transitional water   | 0                                      | 0                      | 0             |
| 7            | Coastal water        | 27                                     | 12                     | 3             |
| 8            | Marine water         | 0                                      | 0                      | 0             |
| 9            | Not specified        | 0                                      | 0                      | 0             |
| <b>Total</b> |                      | <b>71</b>                              | <b>70</b>              | <b>182</b>    |



## Surface Water quality hotspot



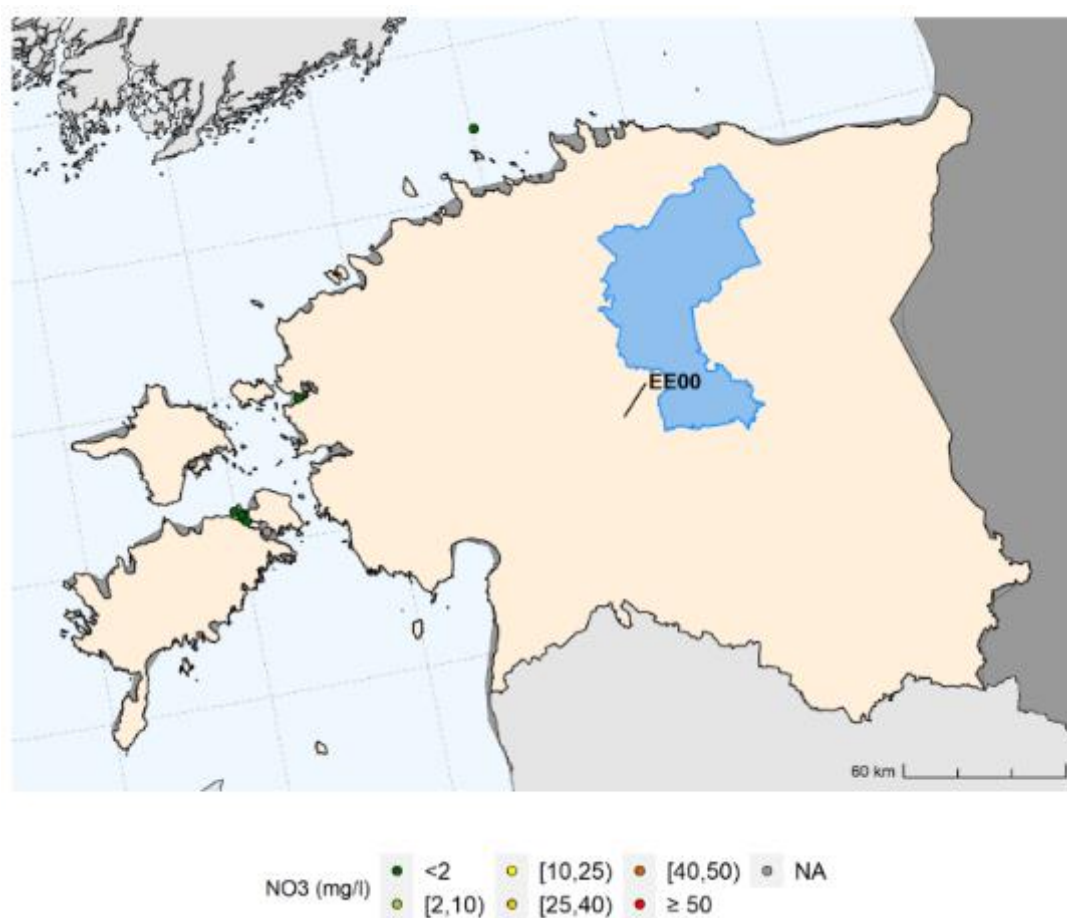
| NUTS ID | NUTS NAME | High trophic status |        | >=40 and < 50 mg/l incr.trend |        | >=50 mg/l |        |
|---------|-----------|---------------------|--------|-------------------------------|--------|-----------|--------|
|         |           | InNVZ               | OutNVZ | InNVZ                         | OutNVZ | InNVZ     | OutNVZ |
| EE00    | Eesti     | 4                   | 40     | 1                             | 0      | 0         | 0      |
| NO_NUTS | SALINE    | 0                   | 27     | 0                             | 0      | 0         | 0      |
| Total   |           | 4                   | 67     | 1                             | 0      | 0         | 0      |

Figure 15. SW hotspot analysis map (top graph) and distribution by NUTS2 (lower graph) of average NO<sub>3</sub> 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, NO<sub>3</sub> 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          | 0                          | 0                 | 0           | 0                   |
| 5            | Lake/reservoir water | 0                          | 0                 | 0           | 0                   |
| 6            | Transitional water   | 0                          | 0                 | 0           | 0                   |
| 7            | Coastal water        | 8                          | 5                 | 2           | 8                   |
| 8            | Marine water         | 0                          | 0                 | 0           | 0                   |
| 9            | Not specified        | 0                          | 0                 | 0           | 0                   |
| <b>Total</b> |                      | <b>8</b>                   | <b>5</b>          | <b>2</b>    | <b>8</b>            |

Figure 16. 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 Code of Good Agricultural Practice was published in 2001. A revised version of the GAP aligned with legislative amendments was published in 2007. In 2020, a new modernised Code of Good Agricultural Practice was published in cooperation with the Estonian Crop Research Institute and the Ministry of Rural Affairs. The publication is not a Code of Good Agricultural Practice within the meaning of the Nitrates Directive but a publication of the same name summarising agri-environmental requirements and recommended guidelines. Good Agricultural Practice within the meaning of the Nitrates Directive has been integrated into the Water Act and a provision has been added to the new Water Act, which entered into force on 1 October 2019, indicating in which sections of the Act the measures of good agricultural practice set out in the Nitrates Directive are provided.

The details of AP are reported in the following table.

Table 6. Details of Action Programme

| Measure                                                               | General details in Action Programme (*)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Period of prohibition of fertiliser application                       | • Periods when the land application of certain types of fertiliser is prohibited are listed in Water Act § 158 and § 159                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Restrictions for application on sloped soils                          | • Restrictions for application of fertiliser to steeply sloping ground are listed in Water Act § 160                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Restrictions for application on soaked, frozen, or snow-covered soils | • Not when the ground is frozen, covered with snow, periodically flooded or saturated with water (Water Act § 158 and § 159)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Restrictions for application near watercourses (buffer strips)        | • Conditions for land application of fertiliser near watercourses are listed in Water Act § 118 and § 158                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Effluent storage works                                                | • The area of land used by an agricultural undertaking for keeping livestock shall enable the spreading of manure in accordance with the maximum levels of nitrogen and phosphorus provided by manure as established under Section 161(1) and (8) of the Water Act                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Capacity of manure storage                                            | According to Water Act § 164. Requirements for storage of manure (1) All livestock buildings where more than ten livestock units of livestock are kept shall have storage facilities for manure or for manure and liquid manure, depending on the type of manure. (2) The storage facilities for manure or for manure and liquid manure shall enable the storage of manure and liquid manure excreted by the livestock during a period of at least eight months, and if necessary, depending on the technology used in the livestock building, also the storage of wastewater from the building. The quantities of manure left by the livestock on the grazing land during the grazing period may be excluded for the purpose of calculating the capacity of a manure storage facility. (3) A livestock building where livestock is kept on deep litter and which enables the storage of the quantity of manure set out in subsection (2) of this section, need not have a manure storage facility. (4) If a livestock building where livestock is kept on deep litter does not enable the storage of the quantity of manure set out in subsection (2) of this section, it is necessary to have a storage facility enabling the storage of the remaining quantity. (6) If there are ten or less livestock units of livestock kept in a livestock building and solid manure or deep litter manure is created there, such manure may be stored, temporarily before spreading or before taking it to a manure stack, in an area with a water-proof bottom and protected against storm water, next to the building. (7) If the keeper of livestock transfers, on the basis of a contract, manure for storage or processing to a storage or processing facility of another person, a leak-tight storage facility holding a manure quantity of at least one month must be ensured when using the livestock building. |
| Rational fertilisation (e.g., splitting fertilisation, limitations)   | • Procedures for the land application, including rate and uniformity of spreading, of both chemical fertiliser and livestock manure, that will maintain nutrient losses to water at an acceptable level are described in sections 9 and 159 of the Water Act.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Crop rotation, permanent crop enhancement                             | • Not defined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Vegetation cover in rainy periods, winter                             | • From 1 November until 31 March, at least 30% of the area under cultivation situated in a NVZ and used by a person engaged in agriculture shall be under plant cover. One-third of the above percentage may be covered by stubble. (Water Act section 168)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Fertilisation plans, spreading records                                | • Field record and, spreading plan for liquid manure and fertilisation plan are described in sections 155 and 162 of Water Act                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Other measures                                                        | • Maximum levels of nitrogen and phosphorus provided by fertilisers (Water Act section 163)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Date for application limit of 170 kg N/ha/year:                       | • 17 January 2001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

The 2016-2019 reporting period covers the Pandivere and Adavere-Põltsamaa NVZ action programme (NVZ action programme) for 2016–2020, approved by Government of the Republic Order No 263 of 21 July 2016. The 2016-2020 NVZ action programme is a continuation of the previous NVZ action programme for 2012-2015. The NVZ action programme has been adapted in light of the experience gained in carrying out the previous plan. The plan has been published on the website of the Ministry of the Environment. By the time of submission of this report, a new NVZ action programme for 2021-2024 is planned to be approved in December 2020.

In Estonia, a large part of the water conservation requirements is established by legal acts; therefore, there are no relevant cost-effectiveness studies that go beyond the legal requirements.

## **Controls**

A total of 560 inspections were carried out in the NVZ in the 2016-2019 period, including cross-compliance inspections (CC) in 70 enterprises each year. A total of 71 violations were identified. Most of the problems were related to compliance with manure handling requirements, followed by violations related to silo handling.

## **Designation of NVZ**

In Estonia, the Nitrate Vulnerable Zone (NVZ) was designated in accordance with Government of the Republic Regulation No 17 of 21 January 2003 'Protection Rules for the Pandivere and Adavere-Põltsamaa Nitrate Vulnerable Zone', which was revised in 2019. The total area of the Pandivere and Adavere-Põltsamaa NVZ is 3 250 km<sup>2</sup>, which represents 7.2% of mainland Estonia. The NVZ covers 33 local regions either in full or in part, including 31 rural municipalities and two cities (Rakvere and Põltsamaa). Since the establishment of the NVZ, its borders have not been changed and no new areas have been designated.

## **Forecast of Water Quality**

In Estonia, there is no model based on statistical or dynamic simulations that could be used in this report to prepare forecasts for groundwater or surface water quality. However, a forecast study improvement of the nitrate concentration and eutrophication status of groundwater and surface water was developed based on the agricultural forecasts and the future climate scenarios of Estonia. The main findings can be summarized as follows:

- Concerning groundwater where the nitrate concentration is or may rise above 50 mg/L, some increase in NO<sub>3</sub> concentration in the NVZ areas can still be predicted;
- Concerning surface water bodies where the nitrate concentration is or may exceed 25 mg/L and which are used for the abstraction of drinking water, no

stabilisation or decrease of nitrate levels is likely to occur in the next decade, but the situation may temporarily stabilise under suitable climatic conditions;

- Concerning natural freshwater lakes, other freshwater bodies, estuarine waters, coastal waters and marine waters which are or may become eutrophic in the near future, the risk of eutrophication is 4% in watercourses, 34% in stagnant water bodies and 29% in coastal water bodies. In the case of stagnant waters and coastal waters, it is extremely difficult to achieve improvement, as phosphorus pollution from earlier periods is often released by sediments. Removal of nutrient-rich sludge is very expensive, so a reduction in residual nutrient contamination is unlikely.

## Summary

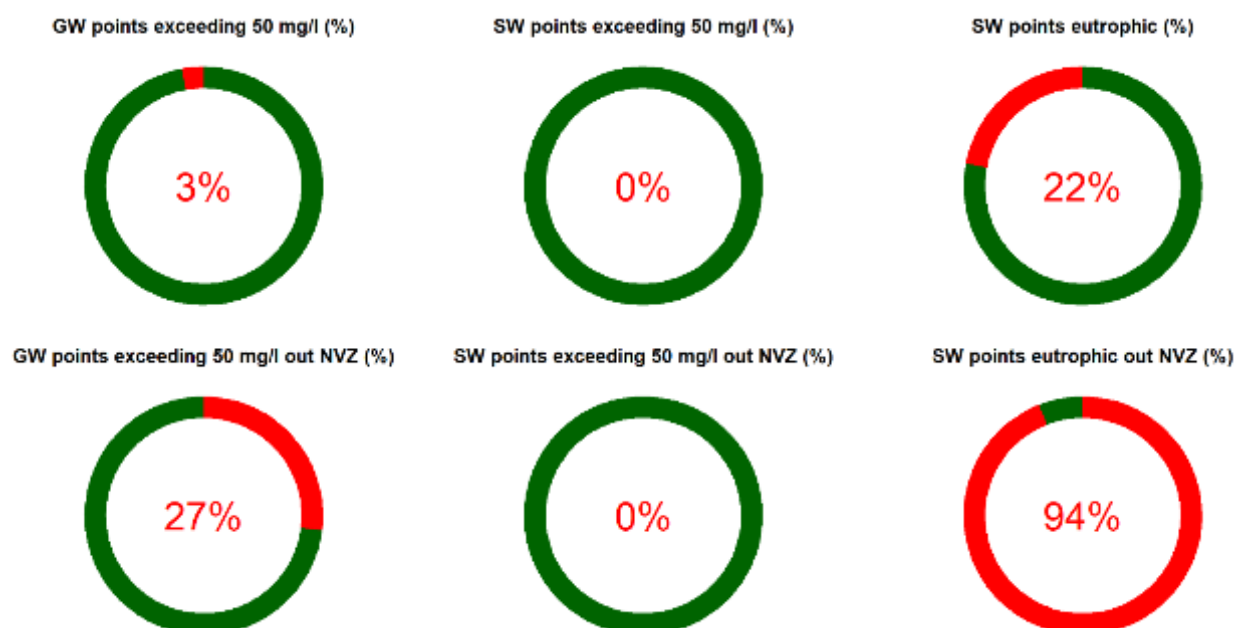


Figure 17. The summary plot for the period 2016-2019

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/l, and the percentage of SW eutrophic stations that are outside NVZ with respect to the total that are eutrophic.

## Long term analysis

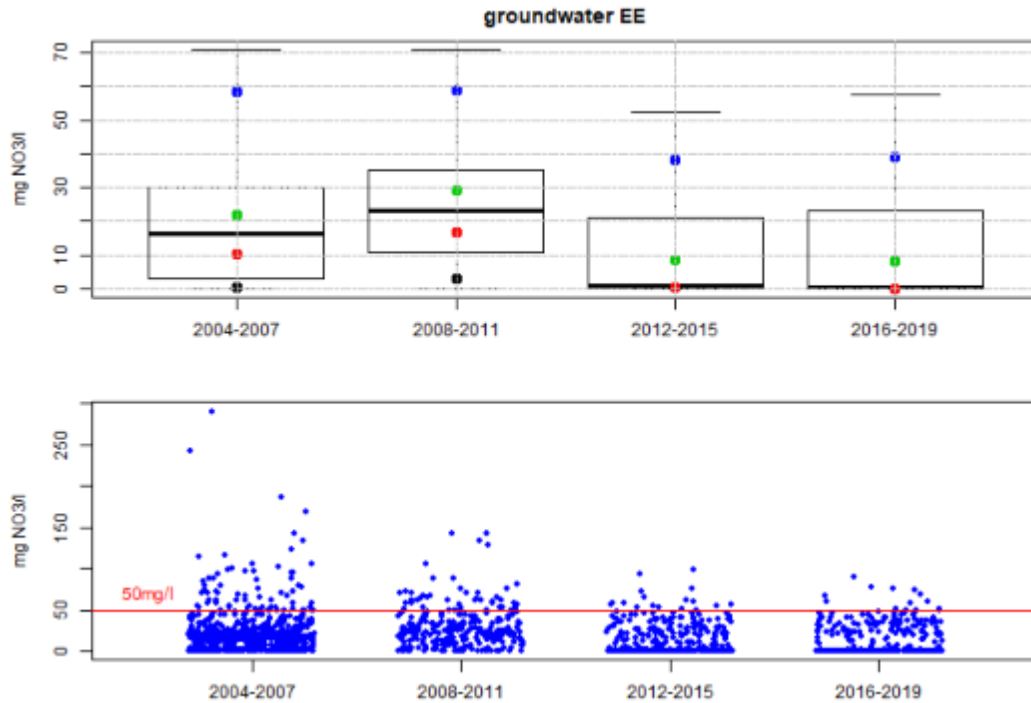


Figure 18. Time series of box whisker plots along with the distribution of the average NO<sub>3</sub> annual concentrations for each reporting period, for groundwater stations. RPs represent the reporting periods, RP7 being the last period (2016-2019). The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

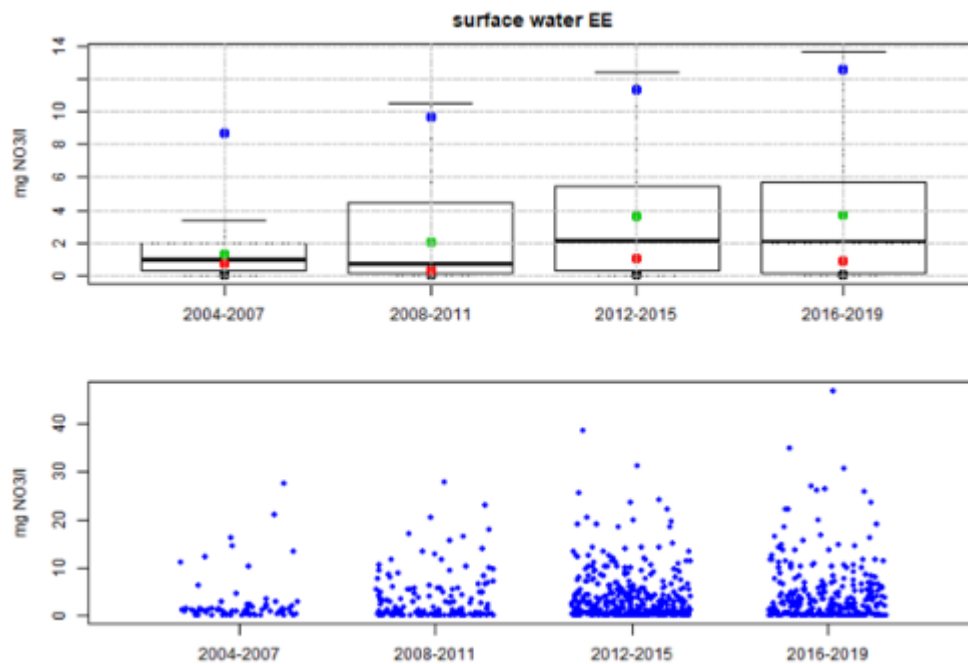


Figure 19. Time series of box whisker plots along with the distribution of the average NO<sub>3</sub> annual concentrations for each reporting period, for surface water stations. RPs represent the reporting periods, RP7 being the last period (2016-2019). The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

## **Conclusions and recommendations**

Estonia has a low livestock density, the surplus of nitrogen is low and there is a deficit of phosphorus.

There is a well-elaborated network of monitoring stations. The groundwater quality is generally good. However, a high number of surface waters are eutrophic, in and outside NVZ and for both inland and marine waters.

A revised action programme was published in 2016.

The Commission recommends Estonia to revise the designation of NVZ to include areas that drain into waters that are eutrophic and to revise its action programme in particular to reduce and prevent eutrophication of inland and marine surface waters where the agricultural pressure is significant.