EUROPEAN
COMMISSION

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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}

# 4. COUNTRY FICHES

# Pressure from Agriculture



Austria's utilised agricultural area amounts to 2.7 Mha in 2016 and has been reduced by 17% since 2007. The major outputs of the agricultural industry excluding services and secondary activities include in a decreasing order milk (18.5%), cattle (11.5%) and cereals (10.5%).
Eurostat

## Major land use statistics for Austria

Table 1.Utilized agricultural area (abbreviated as UAA)

| Austria | 2005 | 2007 | 2010 | 2013 | 2016 |
|---|---|---|---|---|---|
| Utilised agricultural area UAA (1000 ha) | NA | 3239 | 3166 | 2862 | 2689 |
| arable land (1000 ha) | NA | 1376 | 1364 | 1354 | 1336 |
| permanent grass (1000 ha) | NA | 1789 | 1731 | 1441 | 1284 |
| permanent crops (1000 ha) | NA | 68 | 66 | 65 | 67 |
| kitchen gardens (1000 ha) | NA | 5 | NA | NA | 2 |

*Note:*
Eurostat (FSS)

While Austria's arable land has remained stable since 2007, the permanent grass land area has decreased by 28 % since 2007.

## Animal distribution in Austria

Austria's live poultry has increased by 19% since 2005. The livestock index has steadily increased since 2005 and is higher than the EU average of 0.8.

Table 2. Livestock statistics

| Austria | 2005 | 2007 | 2010 | 2013 | 2016 |
|---|---|---|---|---|---|
| Livestock index | 0.75 | 0.78 | 0.87 | 0.89 | 0.91 |
| dairy cows ($10^6$ heads) | 0.53 | 0.52 | 0.53 | 0.53 | 0.54 |
| live bovines ($10^6$ heads) | 2.01 | 2.00 | 2.01 | 1.96 | 1.95 |
| live pigs ($10^6$ heads) | 3.17 | 3.29 | 3.13 | 2.90 | 2.79 |
| live poultry ($10^6$ heads) | NA | NA | 14.62 | 15.74 | 17.43 |

*Note:*
Eurostat (FSS)

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

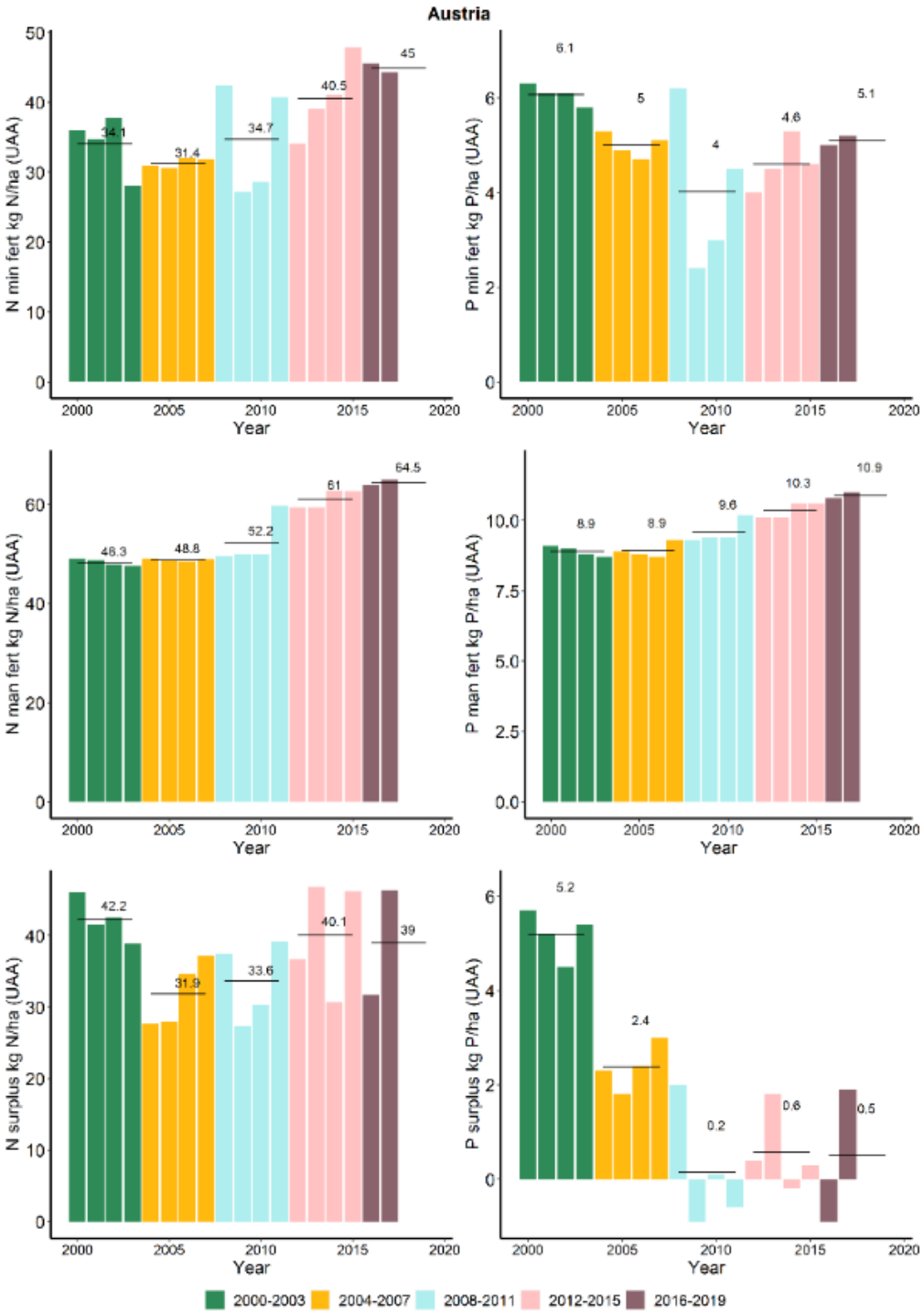



Figure 1. N and P fertilizers and gross surplus (kg/ha)

The gross nitrogen and phosphorus surpluses originate form EUROSTAT data for the years 2000-2017. The nitrogen mineral and manure fertilizer continue their steady increase since 2005. The same trend was observed for phosphorus mineral and manure fertilizer. The nitrogen surplus remained stable from the last reporting period, as well as phosphorus. 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

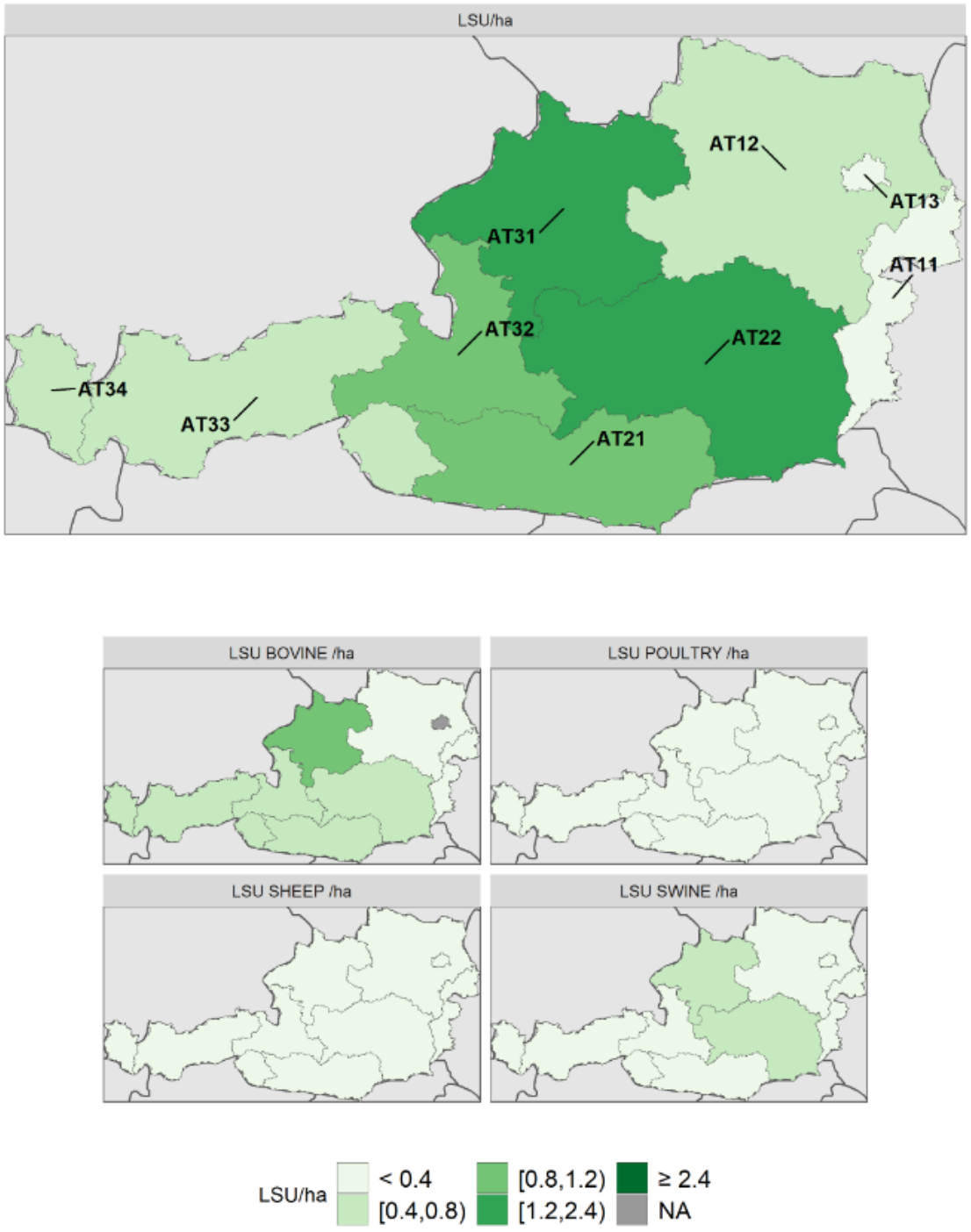



Figure 2. Map of livestock unit distribution, year 2016 (Source: Eurostat, February 2021)

Animal production is dominated by bovine and swine (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

Austria maintains three types of monitoring stations including Surveillance, Operative and Investigative monitoring, all with a different aim. As from 2016, new surveillance sampling sites are being monitored to better cover smaller catchment areas and bioregions/types not sufficiently covered previously. Surveillance and operative monitoring are implemented nationwide while investigative monitoring is carried out on an ad hoc basis under the provincial governor's water supervisory responsibility. At the surveillance sampling sites, the entire available range of parameters, general physical and chemical parameters, are measured continuously on a monthly basis. For the operative monitoring quality elements with highest sensitivity in terms of respective pressure are measured. General physical and chemical parameters are measured on a monthly basis over a 1-year period, whereas biological parameters are examined only once a year. The chemical status of groundwater is measured in all groundwater bodies. Sampling is carried out with comprehensive set of parameters at regular intervals up to four times a year. For groundwater bodies not in a good chemical status an operative monitoring is conducted after the first year of surveillance monitoring including a set of parameters indicative for the respective pressure until the groundwater body achieves a good chemical status.

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 | 780 | 754 | 726 | 705 | 732 | 694 |
| 1a | Phreatic groundwater (deep) 5-15 m | 483 | 507 | 511 | 450 | 485 | 463 |
| 1b | Phreatic groundwater (deep) 15-30 m | 152 | 143 | 144 | 135 | 140 | 133 |
| 1c | Phreatic groundwater (deep) >30 m | 63 | 70 | 71 | 55 | 68 | 68 |
| 2 | Captive groundwater | 142 | 143 | 138 | 132 | 139 | 138 |
| 3 | Karstic groundwater | 345 | 348 | 343 | 247 | 342 | 341 |
| 9 | Not specified | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Total** | **1965** | **1965** | **1933** | **1724** | **1906** | **1837** |

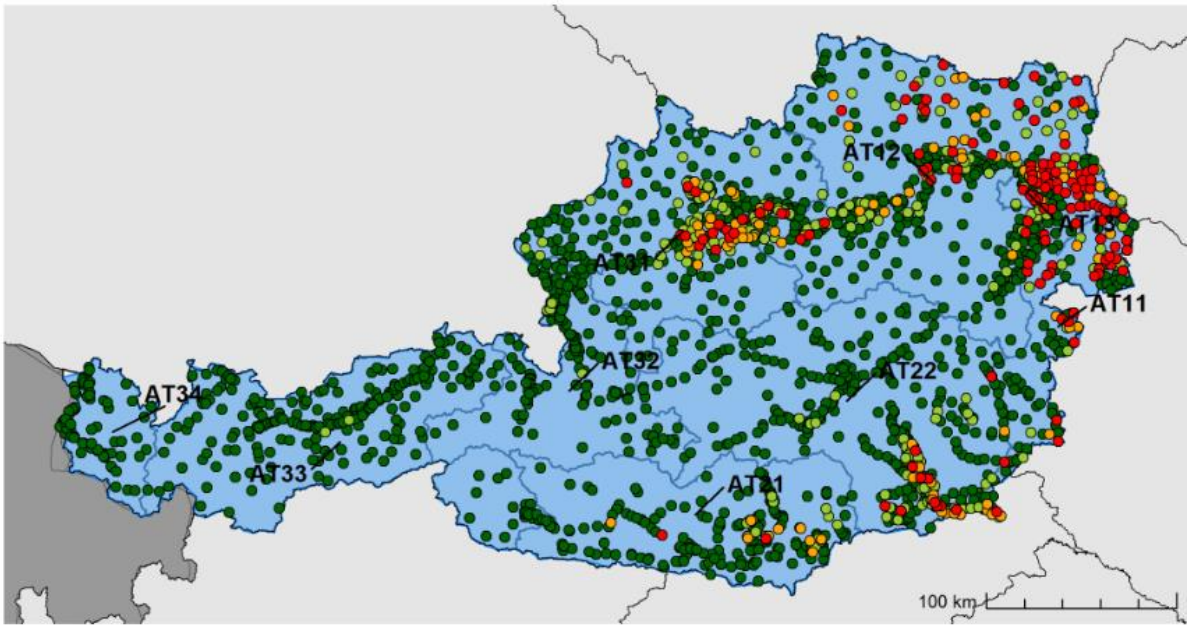
## Surface water quality monitoring network

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 | 81 | 80 | 100 | 75 | 79 | 74 | 71 | 79 | 100 |
| 5 | Lake/reservoir water | 28 | 28 | 28 | 25 | 28 | 28 | 27 | 28 | 28 |
| 6 | Transitional water | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 7 | Coastal water | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 8 | Marine water | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 9 | Not specified | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Total** | **109** | **108** | **128** | **100** | **107** | **102** | **98** | **107** | **128** |

# Groundwater Quality

## Groundwater average annual nitrate concentration



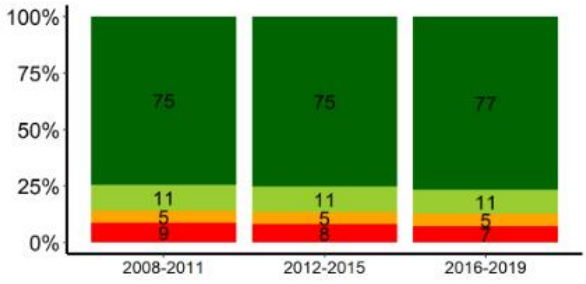




Figure 3. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

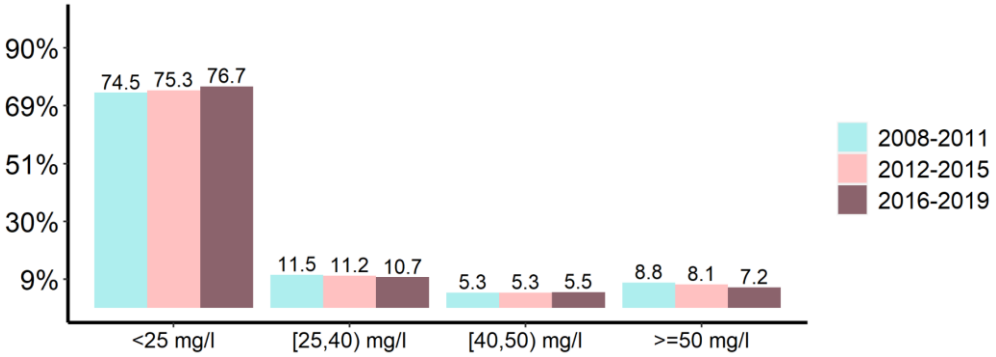



Figure 4. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

## Groundwater average annual nitrate concentration trend

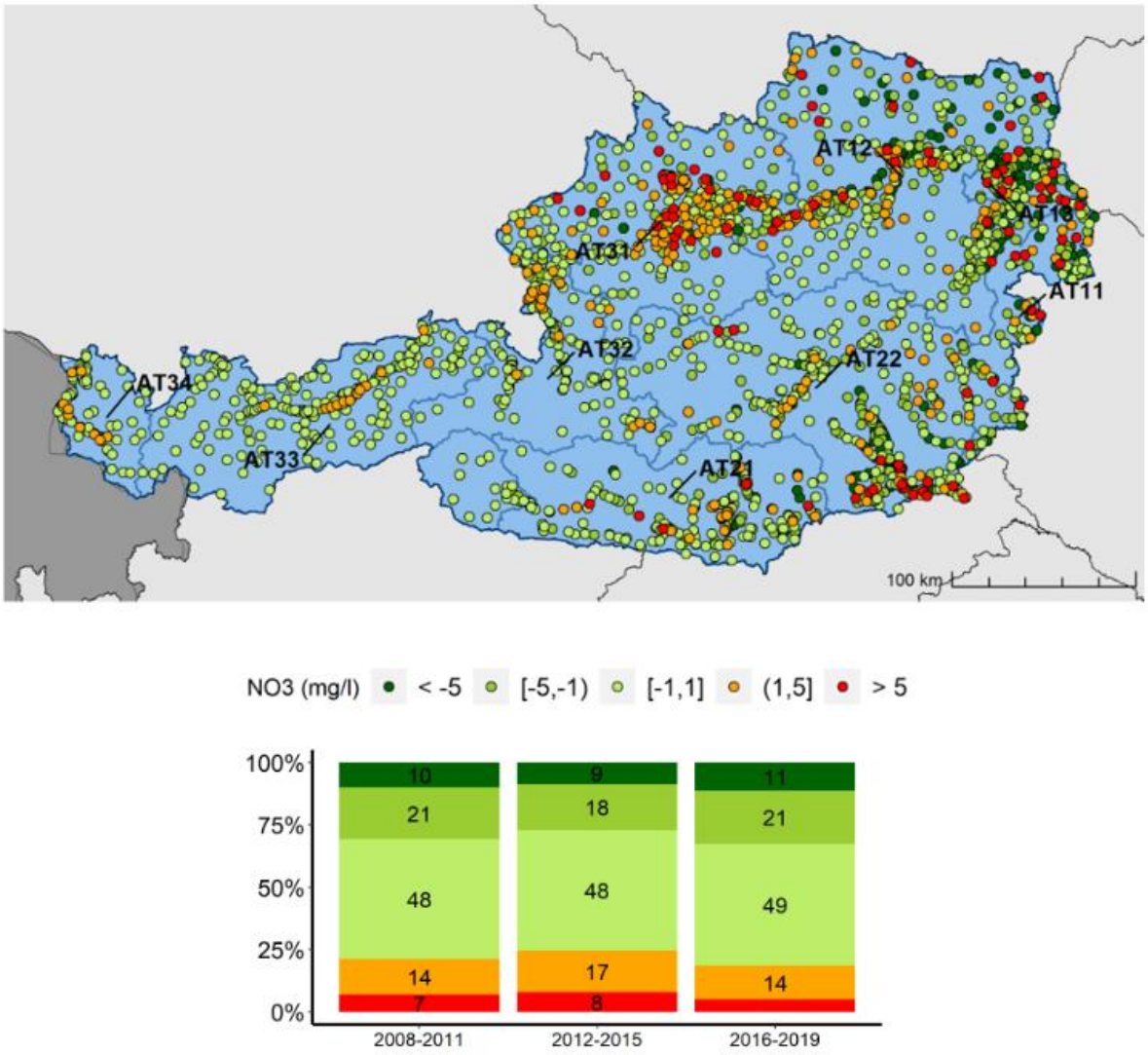



Figure 5. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

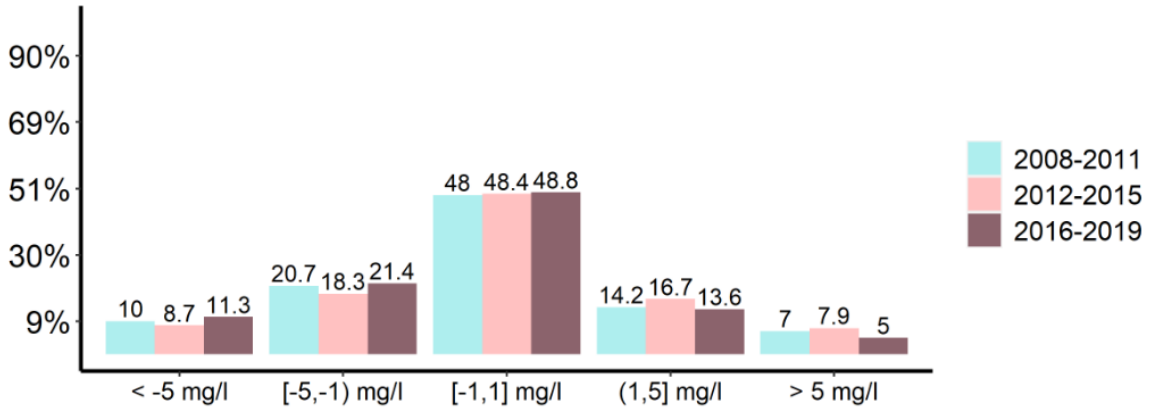
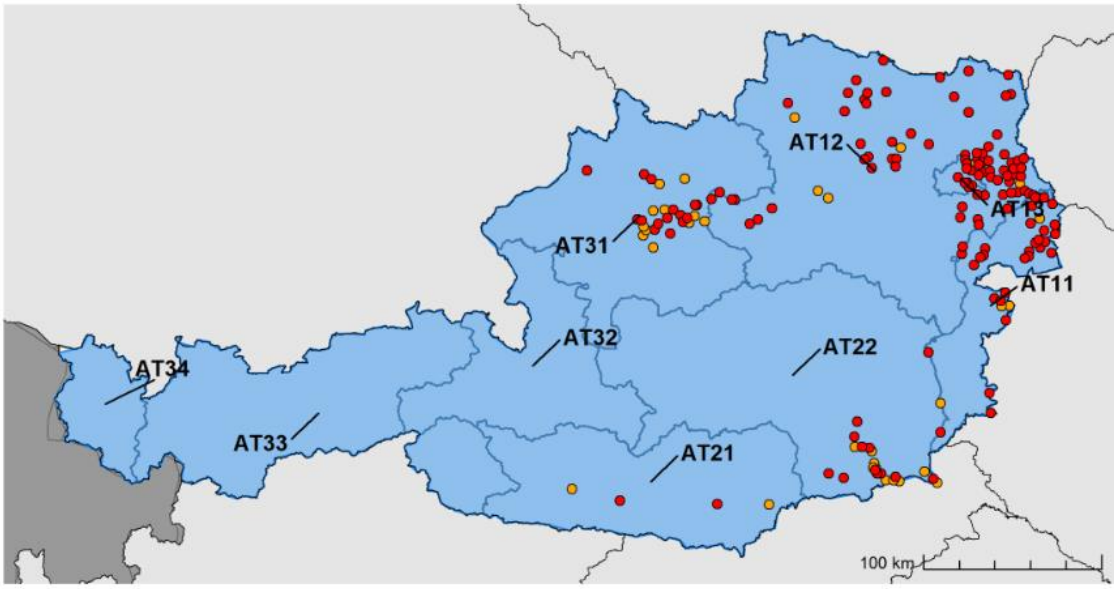



Figure 6. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

## Groundwater hotspot




| NUTS ID | NUTS NAME | >=40 and < 50 mg/l incr.trend | >=50 mg/l |
|---|---|---|---|
| AT11 | Burgenland (AT) | 4 | 27 |
| AT12 | Niederösterreich | 5 | 71 |
| AT13 | Wien | 1 | 11 |
| AT21 | Kärnten | 2 | 2 |
| AT22 | Steiermark | 10 | 11 |
| AT31 | Oberösterreich | 11 | 17 |
| | **Total** | **33** | **139** |

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 or are above 50 mg/l. The map shows the spatial distribution of these points, and the table reports the number of stations by NUTS inside and outside NVZ.
Only the NUTS of interest are reported.

# Surface Water Quality

## Surface water average annual nitrate concentration

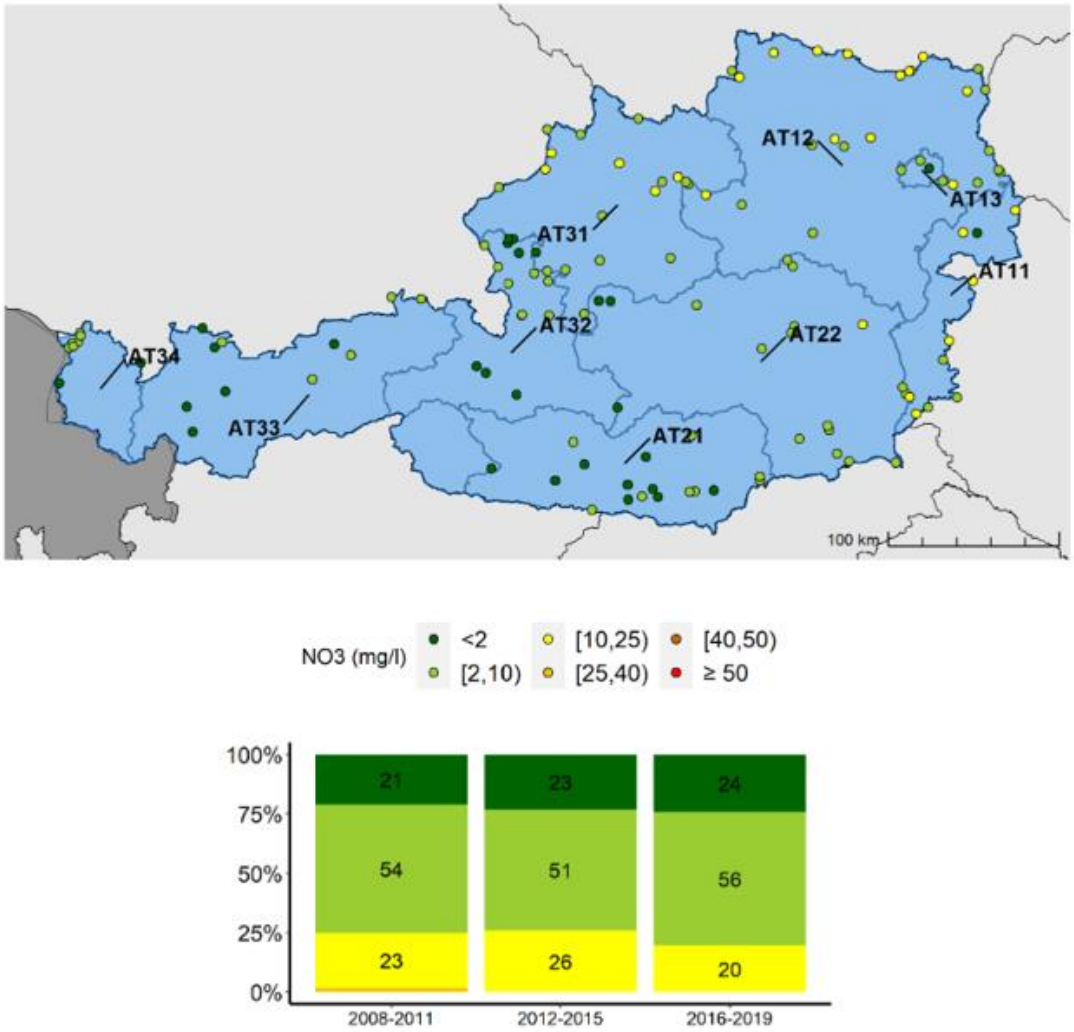



Figure 8. Spatial distribution of average NO3 annual concentration (map) and corresponding percentage of monitoring points per classes of concentration by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

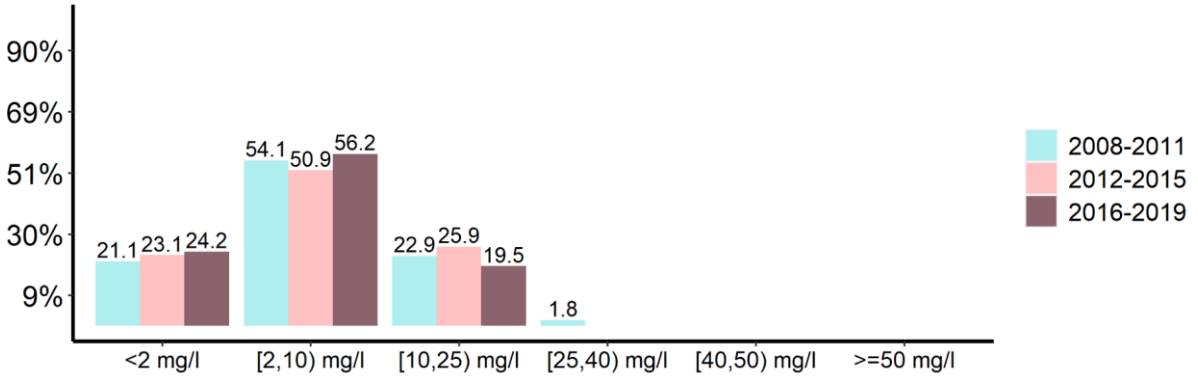



Figure 9. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual concentration (x axis)

## Surface water average annual nitrate concentration trend

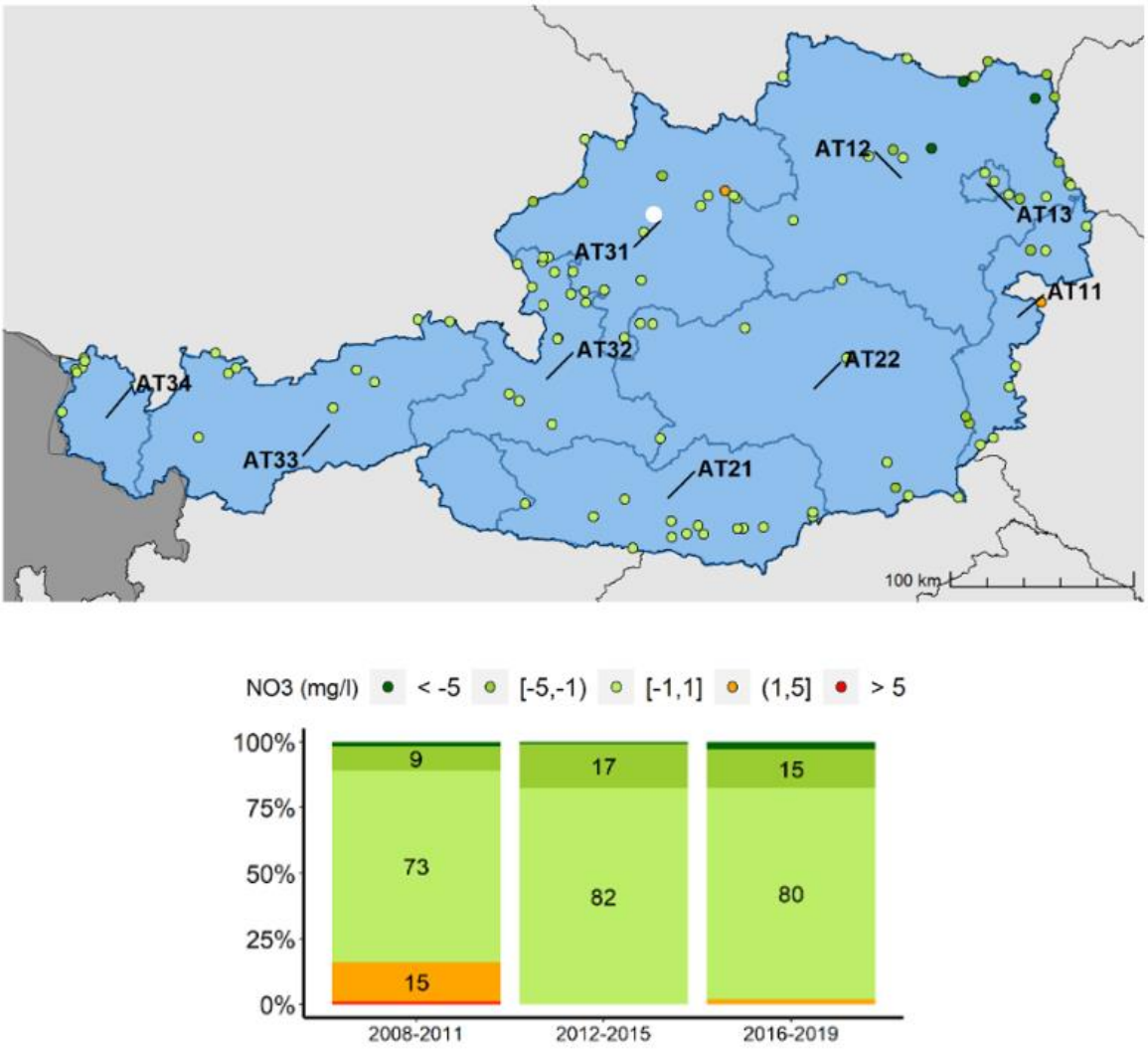



Figure 10. Spatial distribution of average NO3 annual trends (map) and corresponding percentage of monitoring points per classes of trends by reporting period (x axis). The percentages below 5% are not labelled, see the next plot for more information.

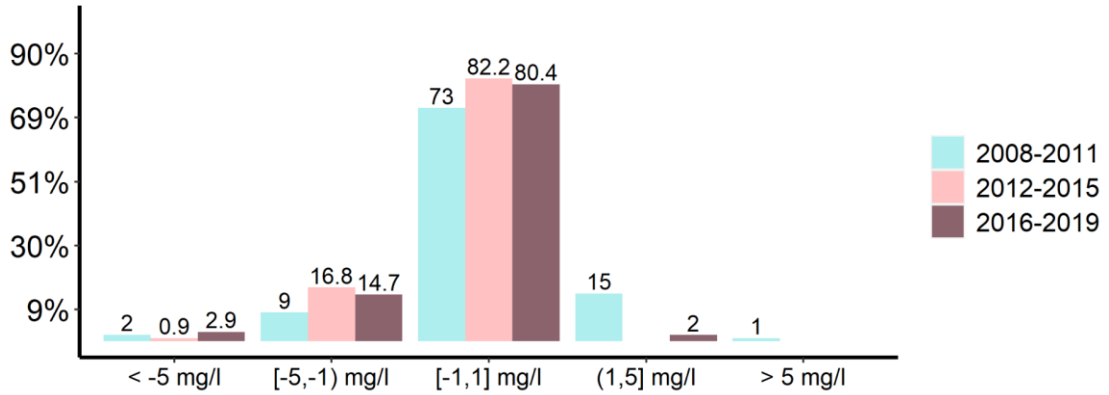
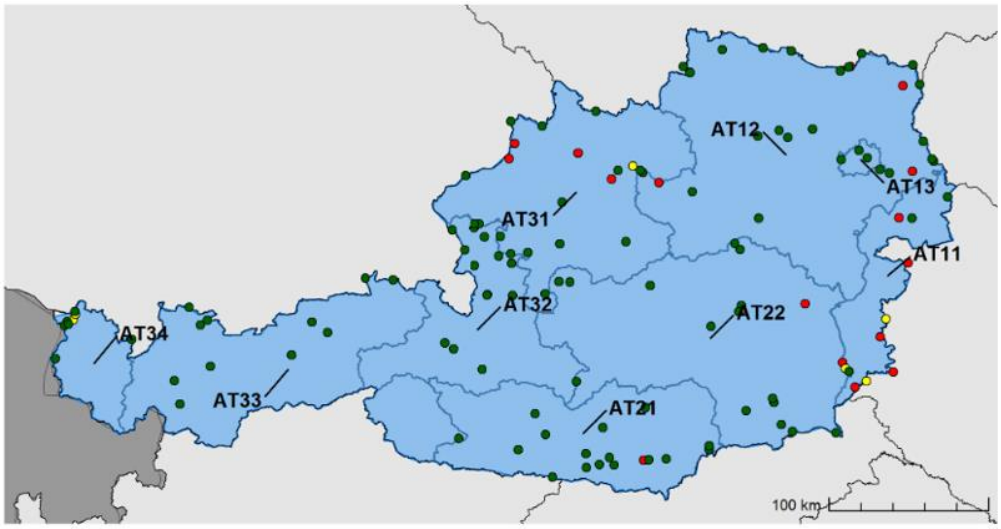



Figure 11. Comparison of percentage of monitoring points in the three reporting periods by classes of average NO3 annual trends (x axis)

# Surface Water Eutrophication



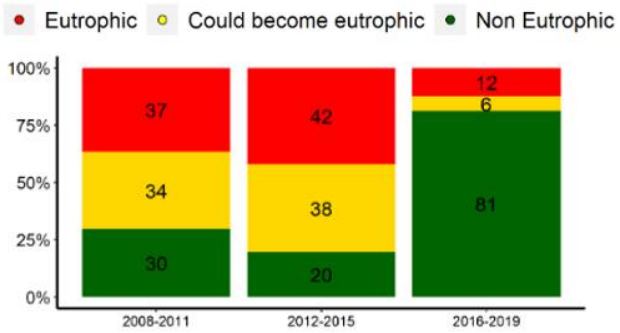




Figure 12. Spatial distribution of eutrophic status (map) and corresponding percentage of monitoring points per classes of status by reporting period (x axis).

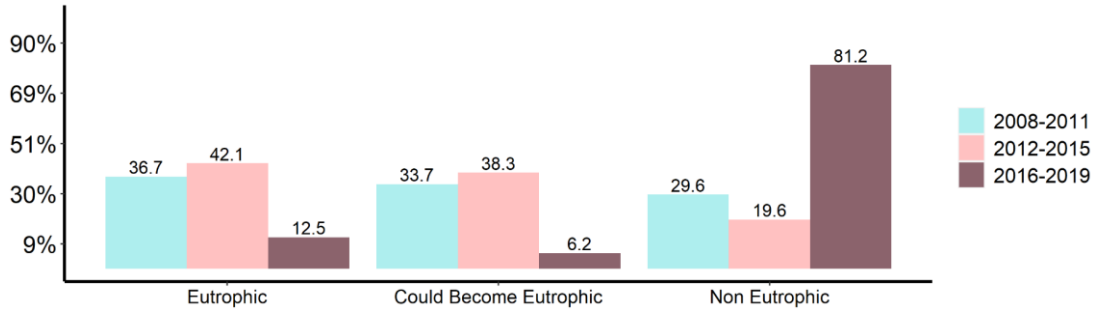
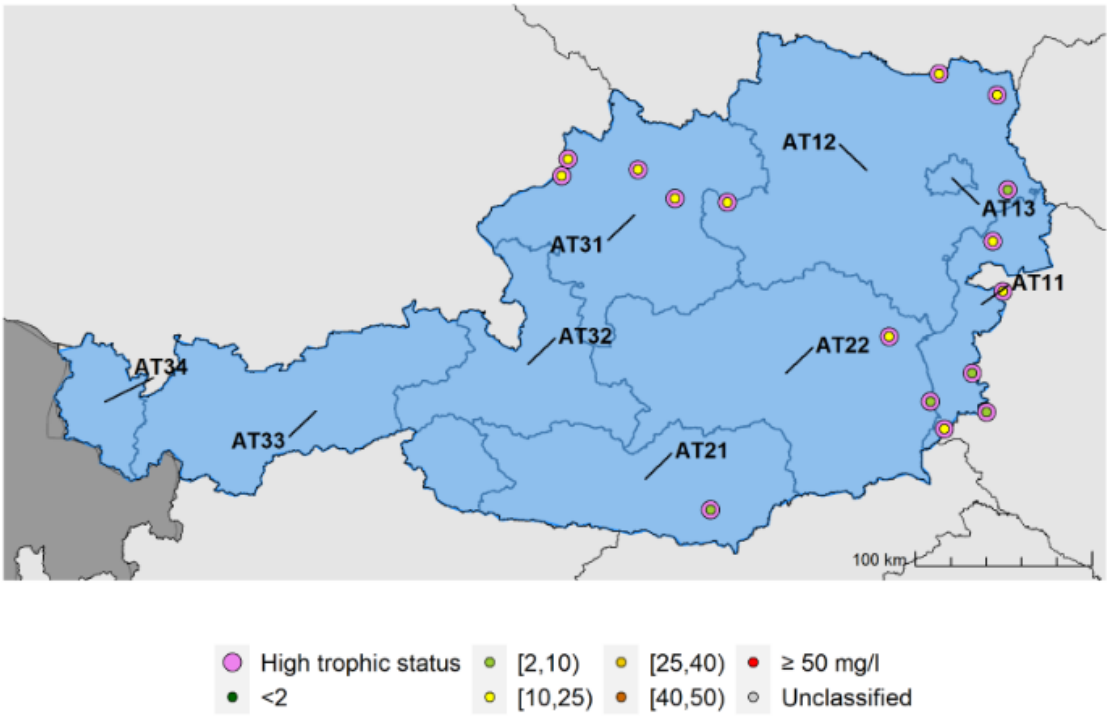



Figure 13. Comparison of percentage of monitoring points in the three reporting periods by classes of status (x axis)

Classification of the eutrophic status reported in Figures 12 and 13, have been carried out using different methodologies in the considered reporting periods. For the current reporting period, eutrophication status was assessed based on biological quality elements (phytobenthos for rivers, phytoplankton for lakes) according to the Water Framework Directive requirements (deviation in trophic status from trophic reference condition expressed as Ecological Quality Ratio, EQR). For the previous reporting periods, 2012-2015 and 2008-2011, eutrophication was evaluated based on the mean total phosphorus concentrations, without consideration of the trophic reference conditions for sampling stations.

## 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 |
| AT11 | Burgenland (AT) | 6 | 0 | 3 | 3 | 0 | 0 | 0 | 0 |
| AT12 | Niederösterreich | 4 | 0 | 1 | 3 | 0 | 0 | 0 | 0 |
| AT21 | Kärnten | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| AT22 | Steiermark | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| AT31 | Oberösterreich | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| | **Total** | **16** | **0** | **5** | **11** | **0** | **0** | **0** | **0** |

Figure 14. The SW monitoring stations with eutrophic status versus the average NO3 annual concentration.

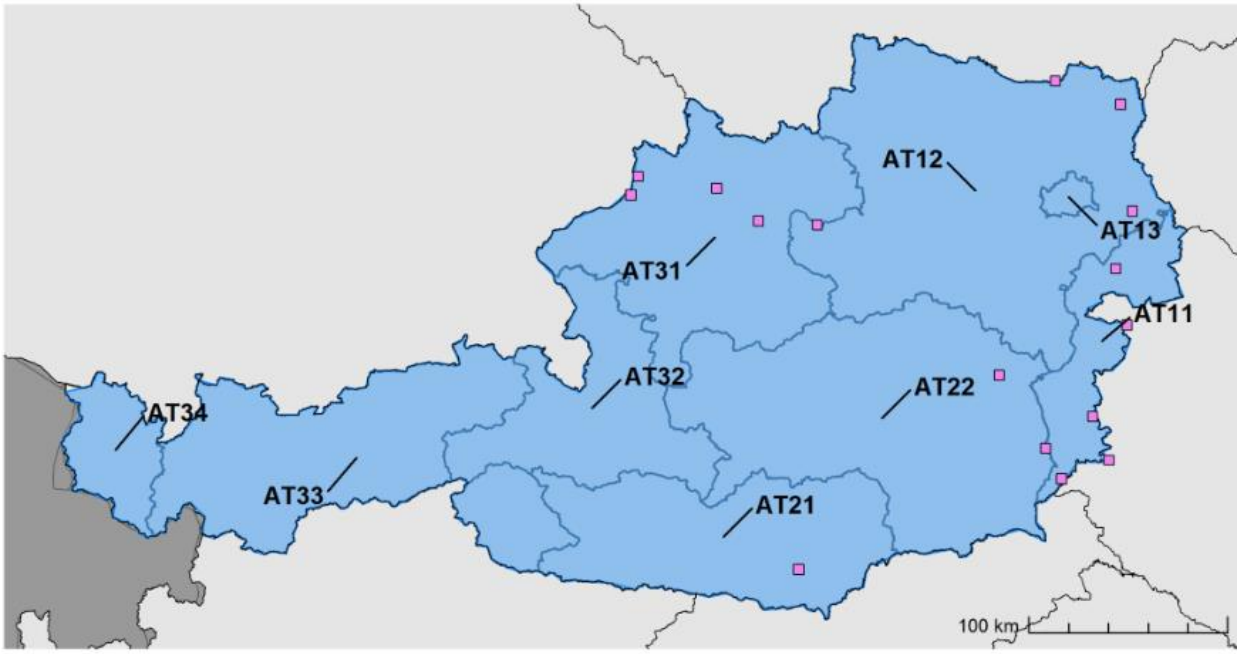
The analysis shows all the SW monitoring stations with the higher trophic status and the corresponding value of NO3 concentration. The map shows the spatial distribution of these points, and the table reports the number of stations with measurements with higher trophic status and the corresponding stations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

As required by the Water Framework Directive and in line with the instructions for the ecological assessment of Austrian rivers, the phytobenthos method was used for rivers and phytoplankton was used for lakes to assess whether the current status deviates from the basic or reference status. The phytobenthos quality element is measured at the surveillance monitoring sampling sites in rivers at regular intervals. The trophic status results for 2016 were used in the assessments for rivers. For lakes results for 2016-2018 were used in the assessments. The large majority of rivers and lakes are non-eutrophic.

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 | 7 | 77 |
| 5 | Lake/reservoir water | 0 | 1 | 27 |
| 6 | Transitional water | NA | NA | NA |
| 7 | Coastal water | NA | NA | NA |
| 8 | Marine water | NA | NA | NA |
| 9 | Not specified | 0 | 0 | 0 |
| | **Total** | **16** | **8** | **104** |

## Surface Water quality hotspot




| NUTS ID | NUTS NAME | High trophic status | >=40 and < 50 mg/l incr.trend | >=50 mg/l |
|---|---|---|---|---|
| AT11 | Burgenland (AT) | 6 | 0 | 0 |
| AT12 | Niederösterreich | 4 | 0 | 0 |
| AT21 | Kärnten | 1 | 0 | 0 |
| AT22 | Steiermark | 1 | 0 | 0 |
| AT31 | Oberösterreich | 4 | 0 | 0 |
| | **Total** | **16** | **0** | **0** |

Figure 15. 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.

# Measures in the Action Programme

The Code of Good Agricultural Practice (CAGP) has been incorporated into the Austrian Action Programme, which applies throughout the national territory. The Action Programme was last revised in 2016/2017, and the current programme entered into force on 1 January 2018 as the Nitrates Action Programme Regulation (NAPV). This is implemented throughout the country and the revision mainly puts in place regionally differentiated requirements, allowing stricter measures to be taken in areas with a higher nitrate concentration in groundwater or increased load risk to groundwater due to agricultural land use. In particular, for the first time areas where stricter measures are required in terms of necessary storage capacity and record-keeping obligations have been identified. The key measures are summarised in the table below, however additional measures can be taken on a voluntary basis to promote environmentally friendly and extensive agriculture that protects natural habitats. The AP is available online: Nitrat-Aktionsprogramm-Verordnung, bmlrt.gv.at. Cost effectiveness analysis was not reported.

Table 6. Details of Action Programme

| Measure | General details in Action Programme (*) |
|---|---|
| Period of prohibition of fertiliser application | • The prohibition period depends on the type of land, crops and weather conditions. Periods are reported in Section 2 of the NAPV. |
| Restrictions for application on sloped soils | • Restrictions for application on steeply sloping agricultural land are listed in Section 3 of the NAPV |
| Restrictions for application on soaked, frozen, or snow-covered soils | • Not allowed in these situations (Section 3 of the NAPV) |
| Restrictions for application near watercourses (buffer strips) | • 5 m for watercourses (3 m for ditches) (it can be reduced in case of inject of fertilizer and permanent buffer strip). Section 5 of the NAPV |
| | • 20 m for lakes, measured from the upper edge of the bank (it can be reduced in case of inject of fertilizer and permanent buffer strip,except for areas with a gradient towards a lake of more than 10%). Section 5 of the NAPV |
| Effluent storage works | • Slurry has to be collected on farm in slurry tanks, farmyard manure on impermeable surface with collection of leakage water in slurry tanks (Section 6 of NAPV) |
| Capacity of manure storage | • Storage tanks for farm manure must have storage capacity for at least 6 months (Section 6 of NAPV) |
| | • Specific requirements in areas with a higher nitrate concentration in groundwater or increased load risk to groundwater due to agricultural land use. In those areas storage capacity of at least 10 months is required (Section 6 of NAPV) |
| Rational fertilisation (e.g., splitting fertilisation, limitations) | • Procedure for applying nitrogen fertilisers are specified in section 7 of the NAPV. In particualr, the amount of nitrogen fertiliser required must be calculated on the basis of advisory documents, competent bodies' recommendations or fertilisation guides |
| | • Specific requirements in areas with high nitrate concentrations in GW and high load risk : record keeping is required for all holdings with more than 5 ha arable land and more than 2 ha vegetables in these regions (Section 9 of the NAPV) |
| Crop rotation, permanent crop enhancement | • Not specified |
| Vegetation cover in rainy periods, winter | • Not specified |
| Fertilisation plans, spreading records | • All holdings that have more than 15 hectares of agricultural land or which grow vegetables on more than 2 hectares are required to keep land management and crop-specific records; grassland farms (90% permanent grassland) are exempt (Section 7 of the NAPV) |
| | • There are specific requirements in areas with high nitrate concentrations in gw and high load risk : record keeping is required for all holdings with more than 5ha arable land and more than 2 ha vegetables in these regions (Section 9 of the NAPV) |
| Other measures | • Caps on total amount of fertiliser that can be used per crop, in the form of farm manure and all other types of fertiliser (Section 7 of the NAPV) |
| Date for application limit of 170 kg N/ha/year: | • Not specified |

(*) NAPV - Nitrates Action Programme Regulation (Nitrataktionsprogramm-Verordnung)

# Controls

Compliance with the Action Programme's requirements is monitored by the Water Inspectorate, as well as by Agrarmarkt Austria, the agency managing payments under the common agricultural policy pursuant to Regulation (EU) No 1306/2013. The implementation of the provisions of the nitrate Action Programme is monitored both through administrative controls and through on-site checks. The average annual number of holdings subject to on-site cross-compliance checks is 1391 in average in the period 2016-2019.

# Designation of NVZ

Austria has adopted a whole territory approach.

# Forecast of Water Quality

It is expected that nitrate loads can fall further, in particular in areas that currently have high nitrate concentrations, thanks to the measures taken. In most porous aquifers, however, it will take some time for the expected decline to become apparent due to the sometimes long retention times in groundwater. The favourable conditions reported so far in large parts of Austria, where nitrate concentrations have been comparatively low and stable for years, are expected to continue.

# Summary

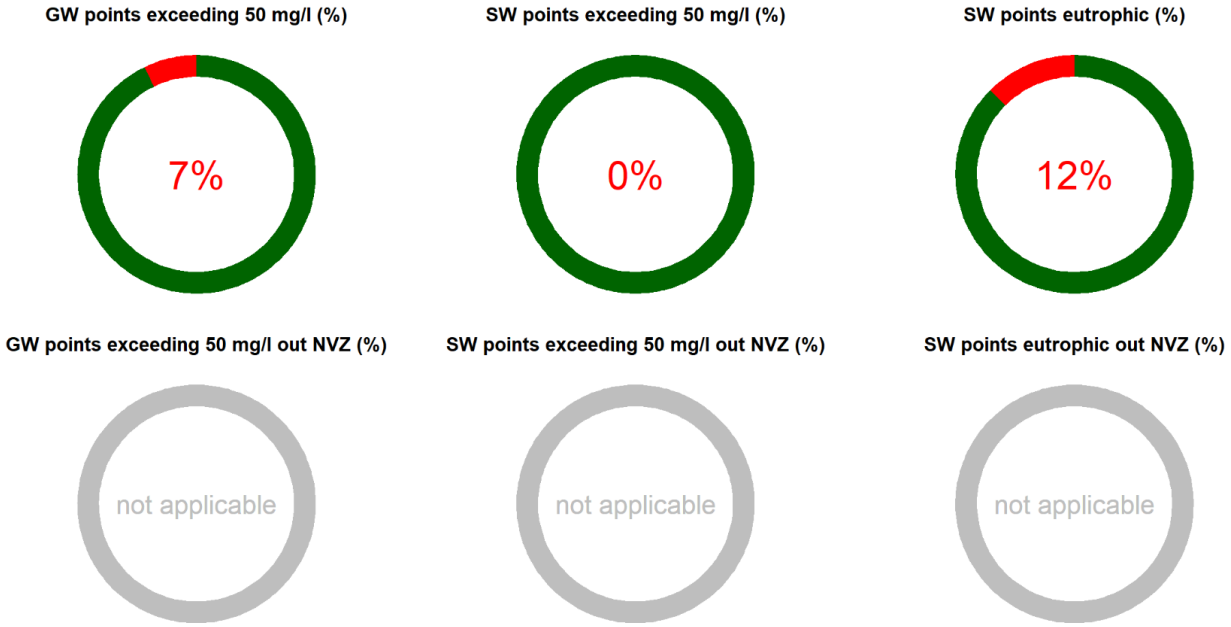



Figure 16. The summary plot for the period 2016-2019

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

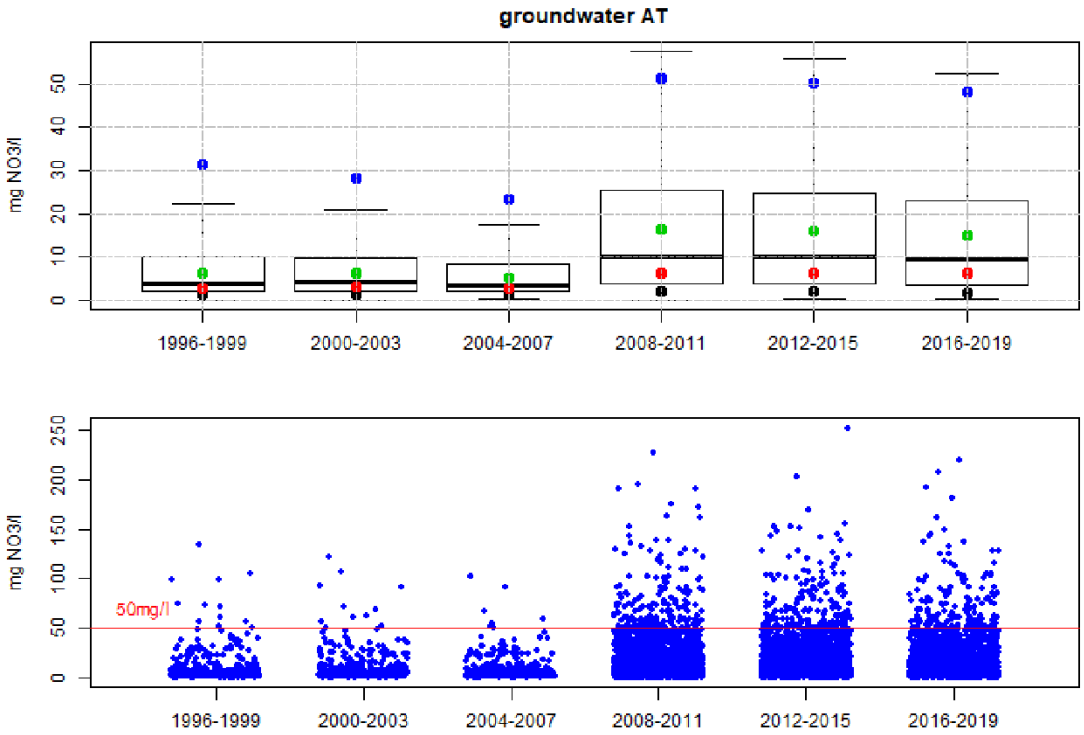



Figure 17. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for groundwater stations. RPs represent the reporting periods, RP7 being the last period (2016-2019). The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

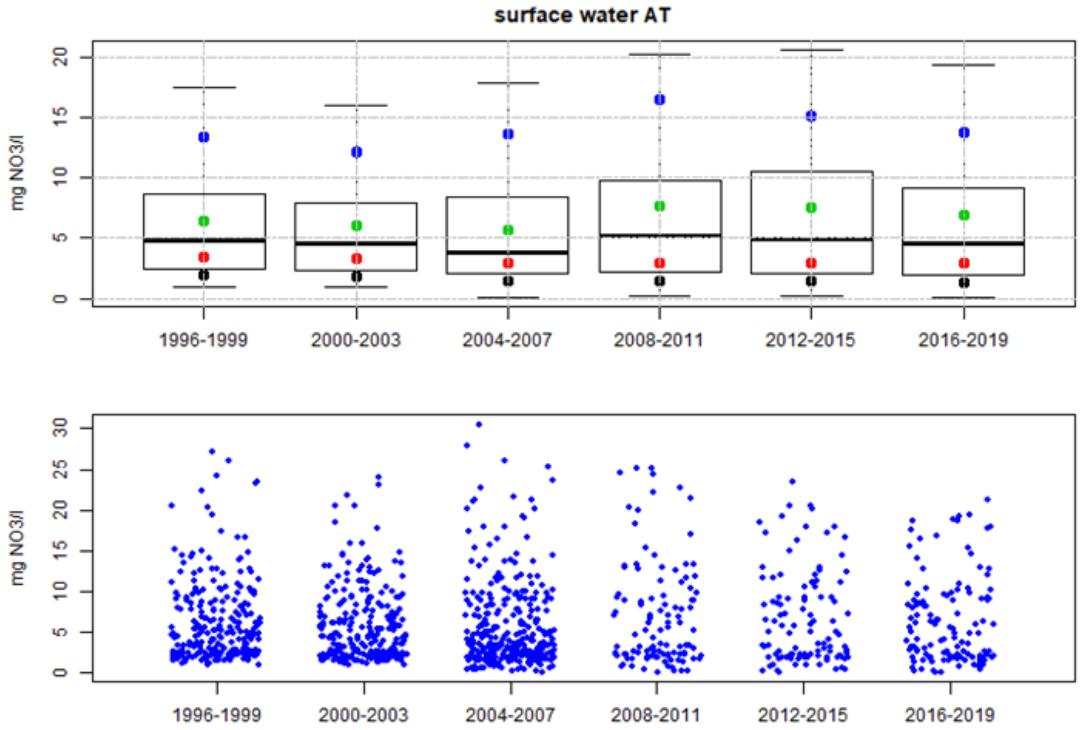



Figure 18. Time series of box whisker plots along with the distribution of the average NO3 annual concentrations for each reporting period, for surface water stations. RPs represent the reporting periods, RP7 being the last period (2016-2019). The blue, red, green and black dots represent the mean of the fourth third, second and first quartiles, respectively.

# Conclusions and recommendations

Austria has an average livestock pressure, the phosphorus surplus is below the average for the EU.

There is a well-elaborated network of monitoring stations. The groundwater quality is good in most of the regions; however, hotspots remain in certain regions. All surface waters comply with the maximum nitrate level set in the Nitrates Directive and most of these waters have a good trophic status.

The Nitrate Action Programme was reviewed in 2018 and includes stricter measures for hotspots.

The Commission encourages Austria to continue to follow-up these hotspots and to take appropriate actions if it appears necessary.