



EUROPEAN COMMISSION

Brussels, 13.7.2011  
SEC(2010) 118 final/2

CORRIGENDUM

Annule et remplace le document SEC(2010)118 final du 9.2.2010  
Concerne la version EN

**COMMISSION STAFF WORKING PAPER**

*Accompanying document to the*

**REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN  
PARLIAMENT**

**on 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 2004-2007**

{COM(2010) 47 final/2}

# COMMISSION STAFF WORKING PAPER

*Accompanying document to the*

## REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

**on 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 2004-2007**

### Chapter I

Figure 1A: Fertilizer consumption in the EU 27 (Source EFMA, 2009).

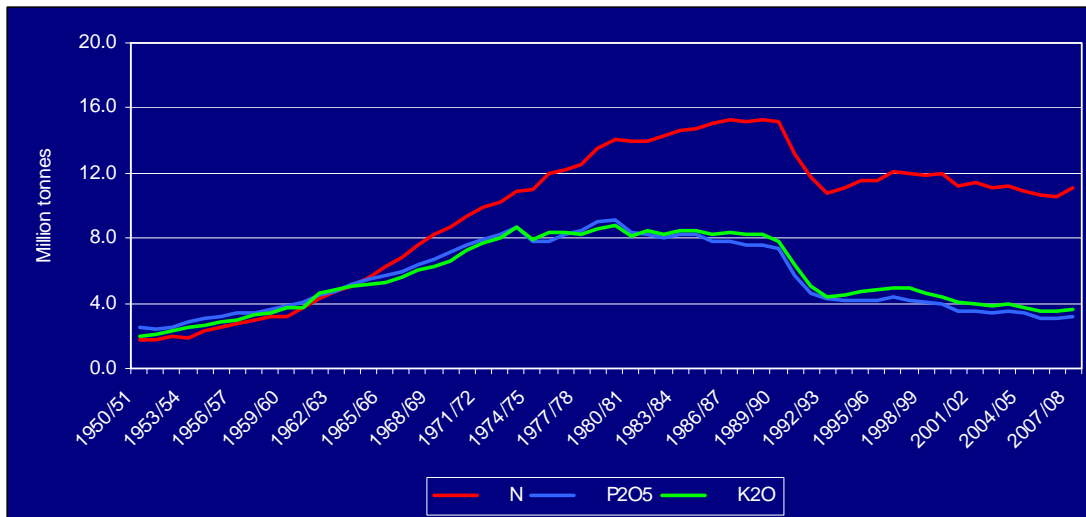


Figure 1B: Fertilizer consumption in the EU 15 (Source EFMA, 2009).

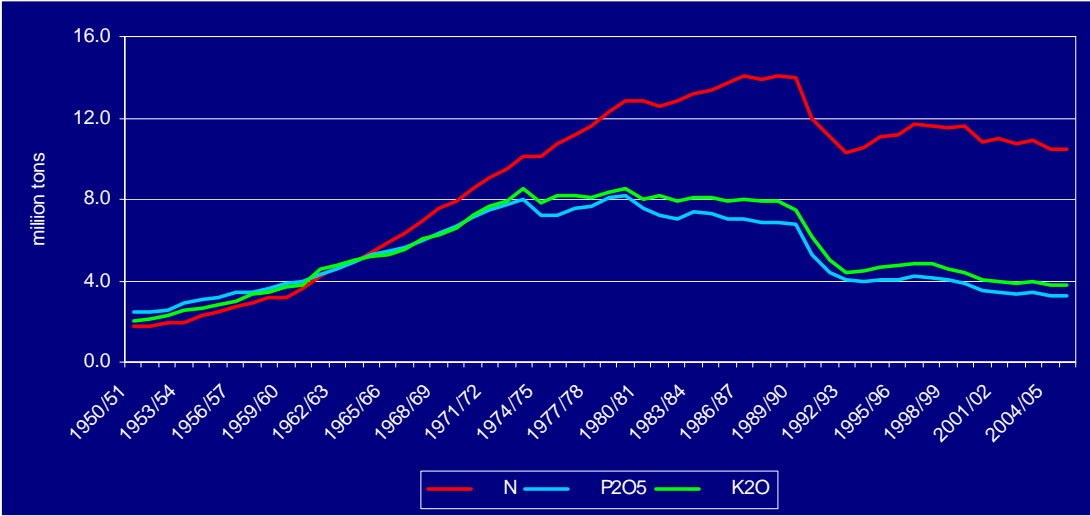
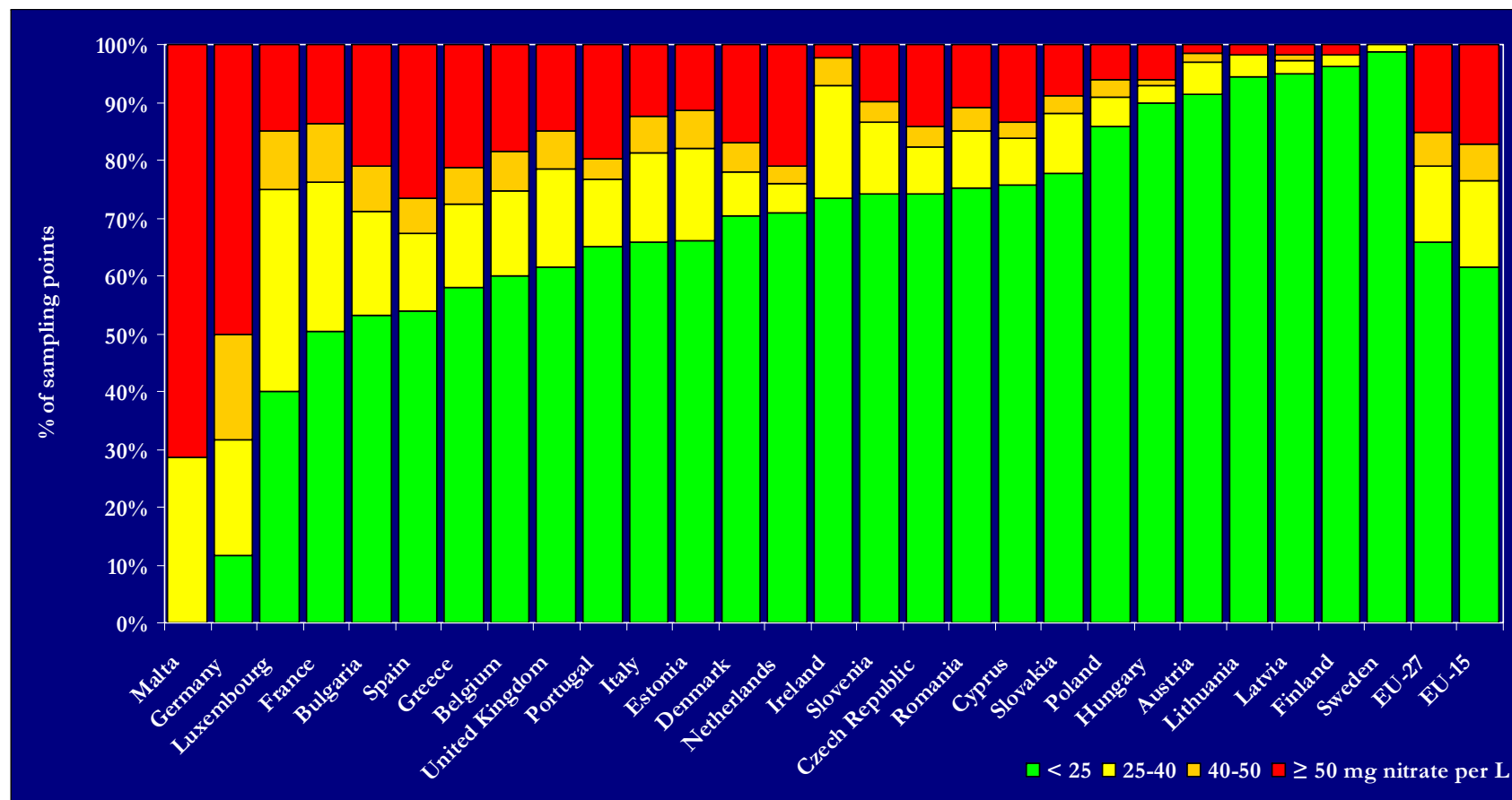


Figure 2. Frequency diagram of groundwater classes. Digital data provided by Member States<sup>1</sup>. The figure shows for each MS the percentage of sampling points per water quality class: (i) nitrate values measured below 25 mg/l; (ii) between 25 and 40 mg/l; (iii) between 40 and 50 mg/l; (iv) above 50 mg/l.

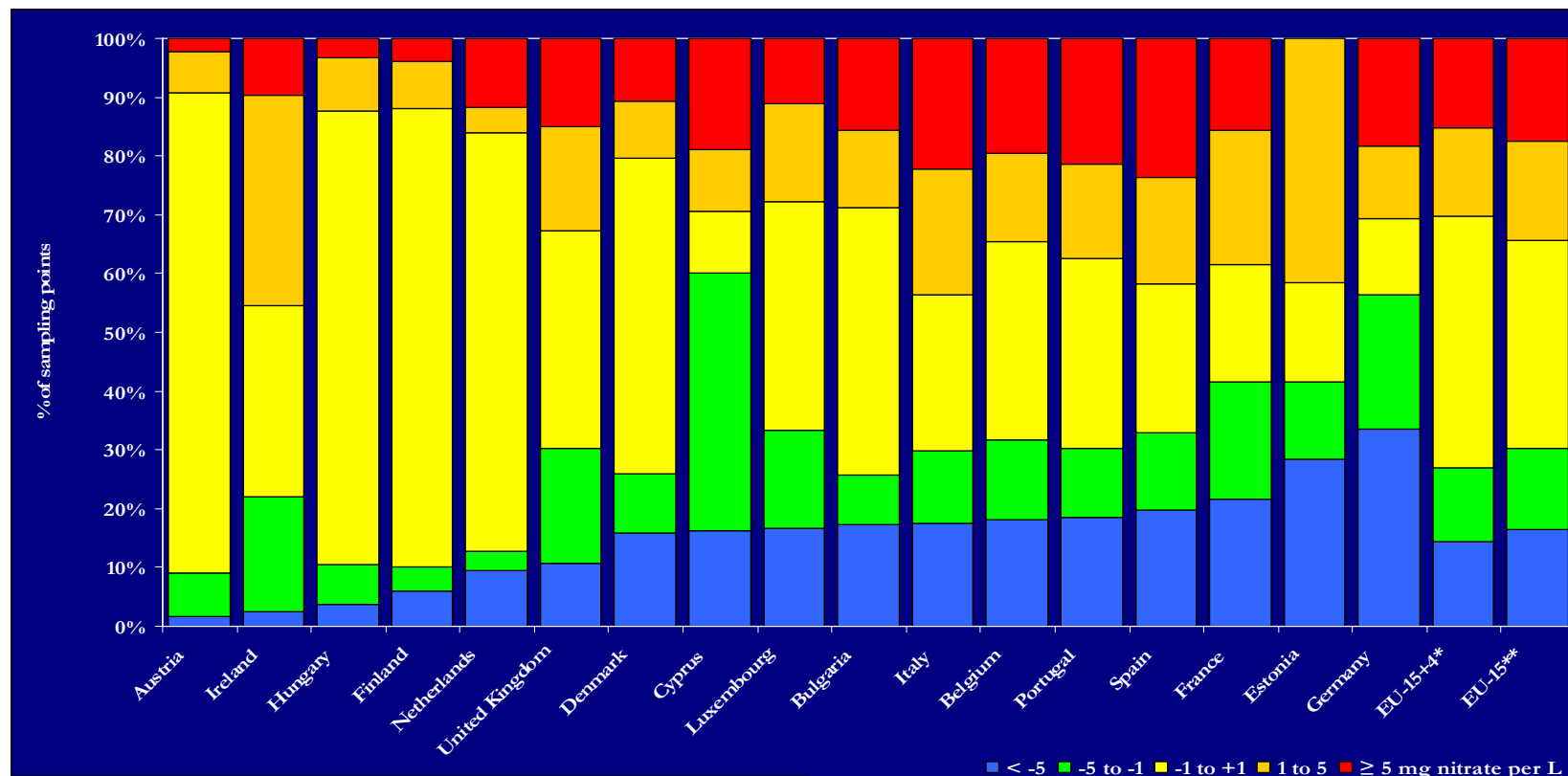


<sup>1</sup> Germany: Agricultural monitoring network only

Figure 3. Frequency diagram of trends in groundwater classes. Digital data provided by Member States<sup>2</sup>. The figure shows for each MS the percentage of sampling points per water quality trend class as compared with the previous reporting period: (i) nitrate values decreased with more than 5 mg/l; (ii) nitrate values decreased with values between 1 and 5 mg/l; (iii) nitrate values varied between -1 and +1 mg/l ; (iv) nitrate values increased with values between 1 and 5 mg/l; (v) nitrate values increased with more than 5 mg/l

EU-15 + 4\* = EU 15 minus Sweden and Greece, plus Bulgaria, Cyprus, Estonia and Hungary

EU-15\*\* = EU-15 minus Sweden and Greece



<sup>2</sup>

Germany: See foot note 1

Figure 4. Frequency diagram of groundwater classes at different depths. Digital data provided by Member States. The figure shows -the percentage of sampling points per water quality class and depth: (i) nitrate values measured below 25 mg/l;(ii) between 25 and 40 mg/l; (iii) between 40 and 50 mg/l; (iv) above 50 mg/l.

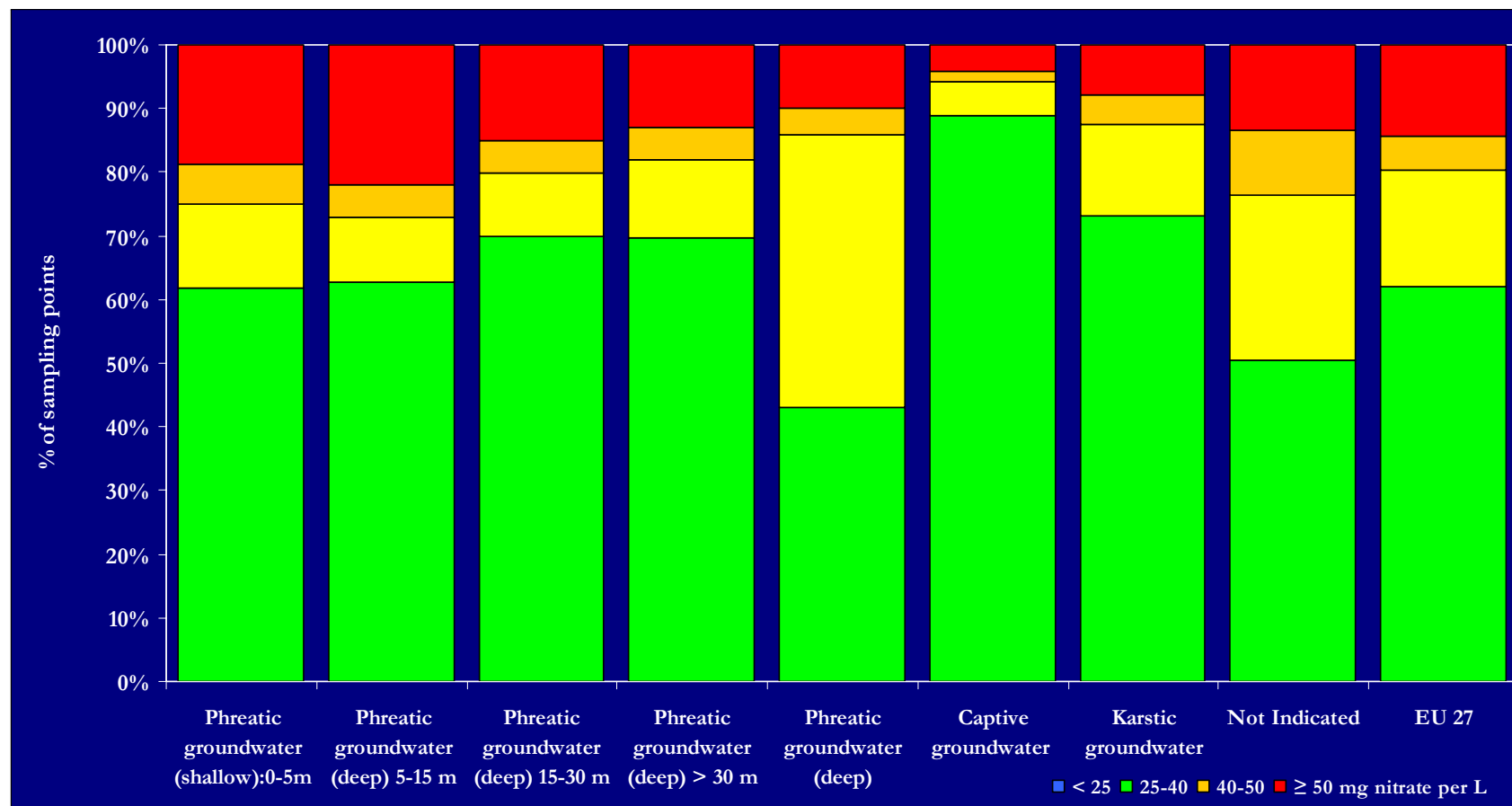


Figure 5. Frequency diagram of surface water classes. Digital data provided by Member States. The figure shows for each MS the percentage of sampling points per water quality class: (i) nitrate values measured below 2 mg/l; (ii) between 2 and 10 mg/l; (iii) between 10 and 25; (iv) between 25 and 40 mg/l; (v) between 40 and 50 mg/l; (vi) above 50 mg/l.

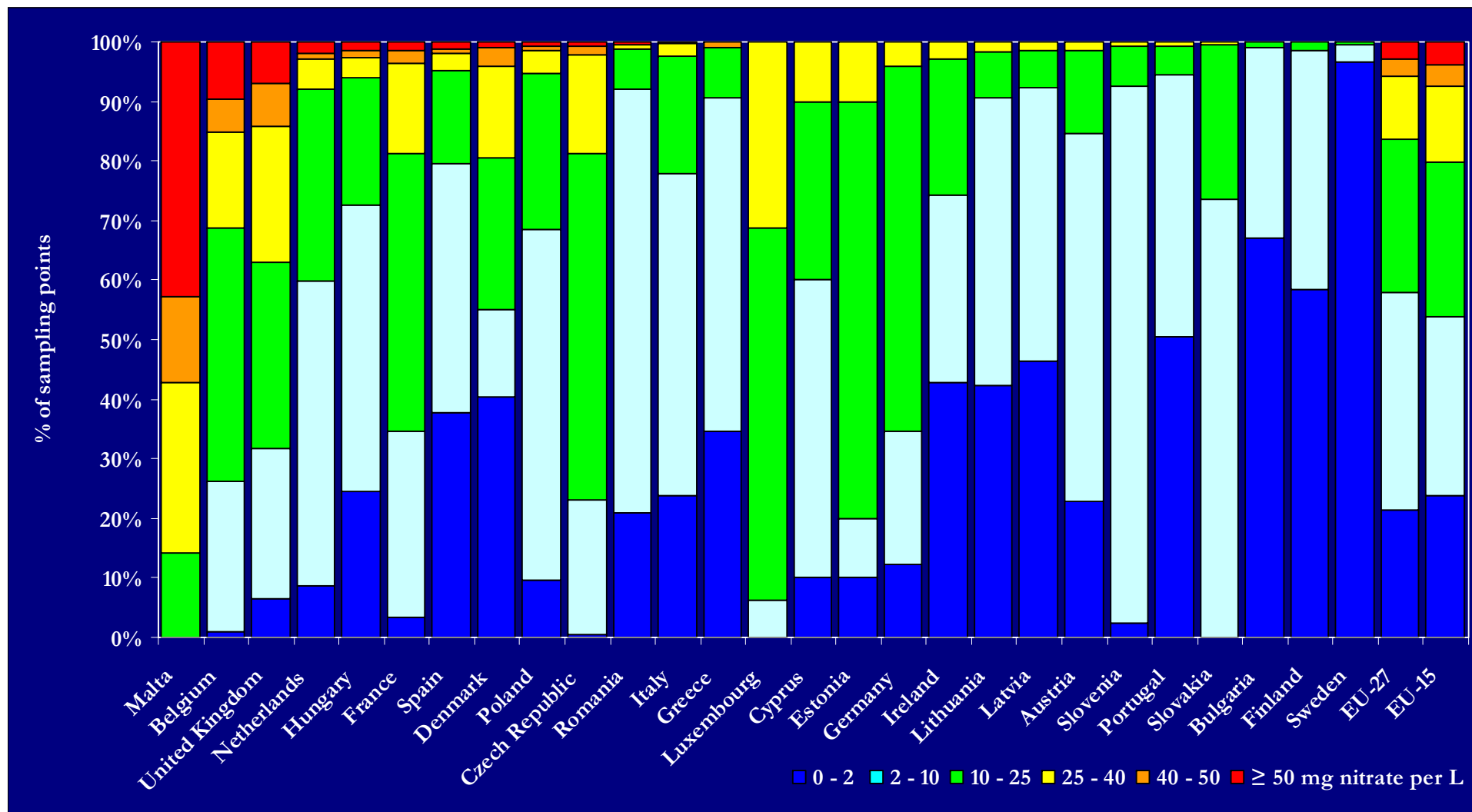


Figure 6. Frequency diagram of trends in fresh surface water classes. Digital data provided by Member States. The figure shows for each MS the percentage of sampling points per water quality trend class as compared with the previous reporting period: (i) nitrate values decreased with more than 5 mg/l; (ii) nitrate values decreased with values between 1 and 5 mg/l; (iii) nitrate values varied between -1 and +1 mg/l ; (iv) nitrate values increased with values between 1 and 5 mg/l; (v) nitrate values increased with more than 5 mg/l.

EU-15 + 4\* = EU 15 minus Sweden, plus Bulgaria, Cyprus, Estonia and Hungary

EU-15\*\* = EU-15 minus Sweden

Greece is revising data on surface water trends

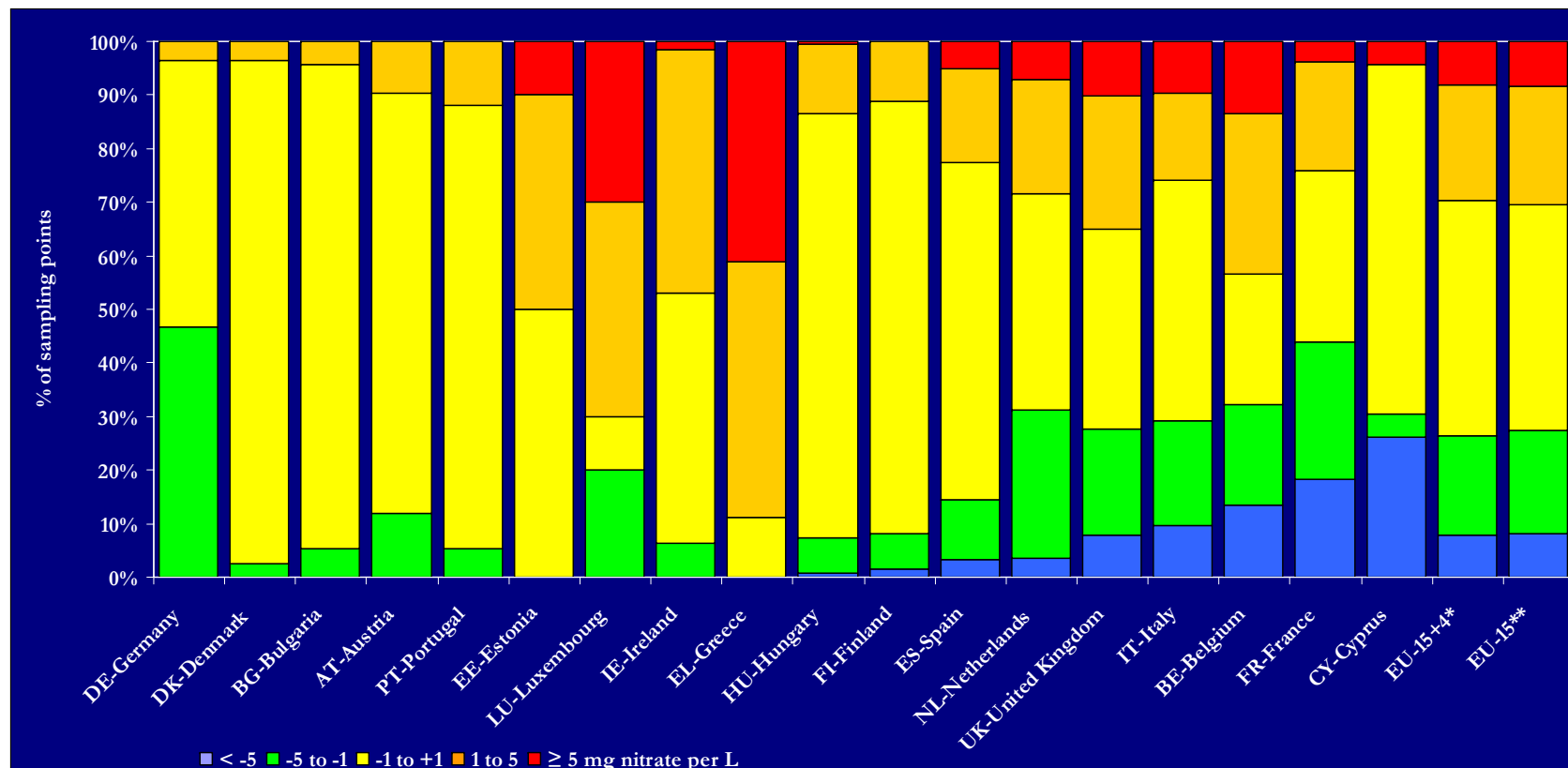




Figure 7. Frequency diagram of fresh surface water trophic classes. All fresh waters except for Austria, Germany, Spain, Portugal Romania and Slovenia (lakes only) and for Czech Republic and Slovakia (rivers only). Digital data provided by Member States. The figure shows for each MS the percentage of sampling points per water quality class: (i) ultra-oligotrophic; (ii) oligotrophic; (iii) mesotrophic; (iv) eutrophic; (v) hypertrophic.

EU\* = EU-27 minus Cyprus, Denmark, Estonia, Greece, France, Italy, Luxembourg, the Netherlands, Poland and the United Kingdom (for Greece and Italy the data were not covering all the required information to be included in the figure, for Italy some data are presented in map 15)

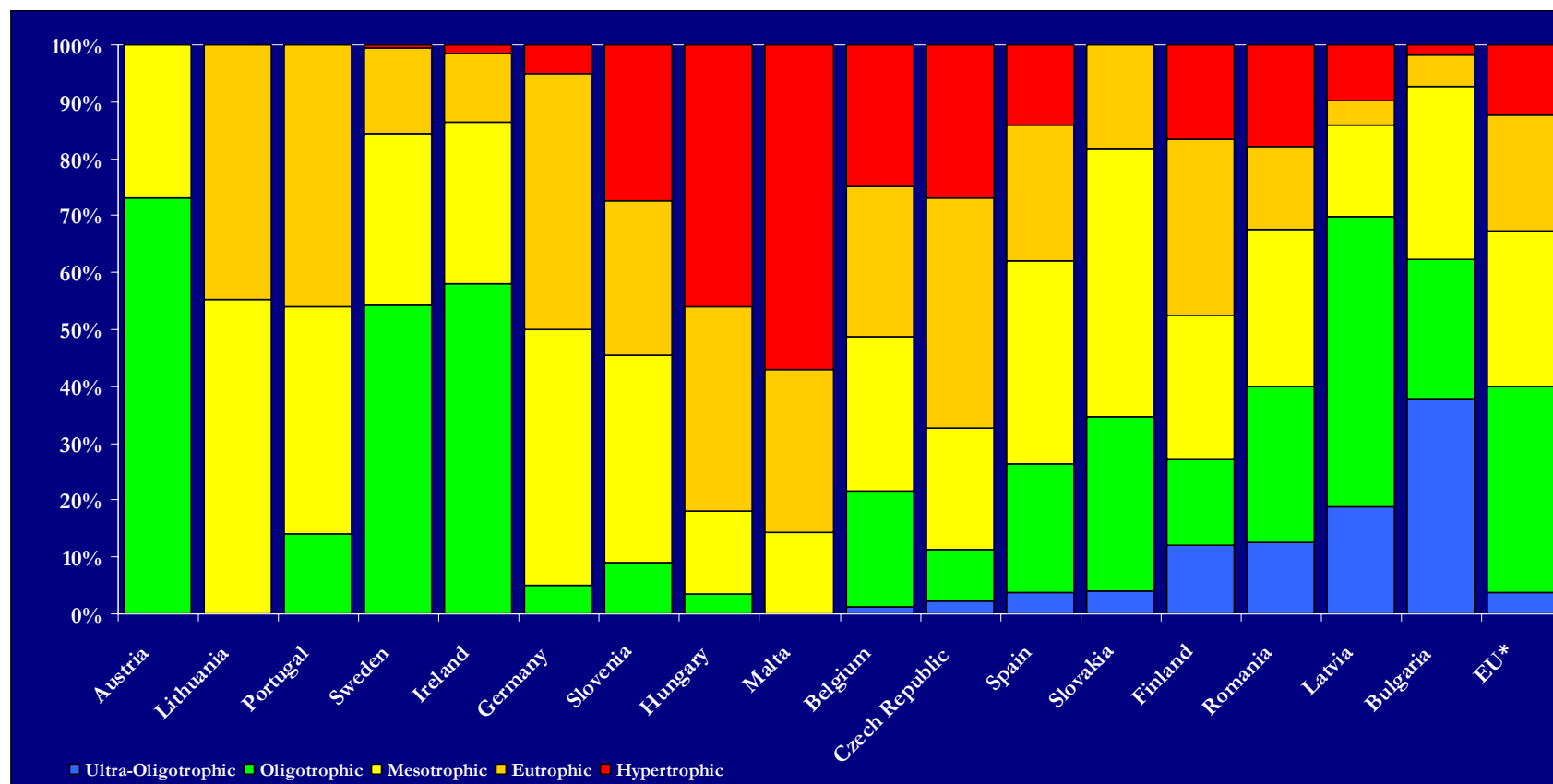


Table 1. Average groundwater: percentage of points per water quality class for all stations for EU 15 Member States for the period 2000-2003 and 2004-2007. Reduced comparability of data between the 2 reporting periods due to possible changes in monitoring networks and inconsistencies in reported data.

mg/l	< 25	25-40	40-50	≥ 50	reporting period	number of stations
Austria	89.3%	6.9%	1.3%	2.6%	2000-2003	392
	91.3%	5.7%	1.4%	1.6%	2004-2007	368
Belgium	56.8%	22.1%	7.6%	13.5%	2000-2003	944
	60.0%	14.7%	6.9%	18.4%	2004-2007	3020
Germany*	9.3%	16.7%	20.7%	53.0%	2000-2003	150
	11.8%	20.0%	18.2%	50.0%	2004-2007	170
Denmark ***	85.5%	7.2%	1.4%	5.8%	2000-2003	69
	70.4%	7.7%	4.9%	17.0%	2004-2007	1479
Greece	91.0%	4.8%	1.2%	3.0%	2000-2003	433
	58.1%	14.5%	6.3%	21.2%	2004-2007	415
Spain	55.6%	12.7%	6.7%	24.9%	2000-2003	6706
	54.0%	13.5%	6.1%	26.5%	2004-2007	4078
Finland	73.7%	10.5%		15.8%	2000-2003	19
	96.3%	1.9%		1.9%	2004-2007	54
France	51.0%	24.9%	10.7%	13.4%	2000-2003	3174
	50.3%	25.8%	10.3%	13.6%	2004-2007	2666
Ireland	79.0%	13.7%	5.9%	1.4%	2000-2003	219
	73.3%	19.5%	4.8%	2.4%	2004-2007	210
Italy	68.1%	15.9%	5.0%	11.0%	2000-2003	3041
	65.9%	15.5%	6.2%	12.5%	2004-2007	5782
Luxembourg	42.1%	31.6%	5.3%	21.1%	2000-2003	19
	40.0%	35.0%	10.0%	15.0%	2004-2007	20
Netherlands	90.1%	2.0%	1.3%	6.5%	2000-2003	902
	70.9%	5.1%	3.1%	20.9%	2004-2007	1244
Portugal	41.3%	14.1%	6.5%	38.1%	2000-2003	341
	65.1%	11.6%	3.5%	19.8%	2004-2007	630
Sweden	98.6%	0.7%	0.7%		2000-2003	147
	98.8%	1.2%			2004-2007	163
United Kingdom **	60.0%	23.5%	6.6%	10.0%	2000-2003	904
	61.4%	17.0%	6.6%	15.0%	2004-2007	3061

\* for Germany only agriculture monitoring network

\*\* for the reporting period 2000-2003 United Kingdom reported only stations within England.

\*\*\* Denmark for the reporting period 2000-2003 provided aggregated number of stations

Table 2. surface water: percentage of points per water quality class for all stations for EU 15 Member States for the period 2000-2003 and 2004-2007. Reduced comparability of data between the 2 reporting periods due to possible changes in monitoring networks and inconsistencies in reported data.

mg/l	0 - 2	2-10	10-25	25 - 40	40 - 50	≥ 50	reporting period	number of stations
Austria	16.1%	68.2%	15.7%				2000-2003	242
	22.9%	61.6%	14.1%	1.3%			2004-2007	297
Belgium *	22.6%	51.8%	22.4%	3.0%	0.1%	0.1%	2000-2003	953
	3.0%	24.8%	41.6%	15.8%	5.6%	9.3%	2004-2007	1179
Germany	0.7%	19.7%	68.4%	11.2%			2000-2003	152
	12.3%	22.2%	61.4%	4.1%			2004-2007	171
Denmark	52.6%	10.3%	20.5%	13.9%	2.3%	0.3%	2000-2003	302
	60.1%	12.1%	15.7%	9.6%	2.0%	0.6%	2004-2007	356
Greece	26.5%	62.7%	8.8%	2.0%			2000-2003	102
	33.1%	58.5%	7.6%		0.8%		2004-2007	118
Spain	47.0%	37.5%	13.1%	1.4%	0.4%	0.6%	2000-2003	2505
	45.9%	36.7%	13.2%	2.6%	0.6%	1.0%	2004-2007	3083
Finland	61.0%	33.9%	5.1%				2000-2003	59
	65.3%	33.7%	1.0%				2004-2007	193
France	4.2%	29.7%	40.9%	18.4%	4.9%	1.9%	2000-2003	1720
	3.4%	31.0%	46.8%	15.1%	2.3%	1.4%	2004-2007	1769
Ireland	40.6%	33.3%	23.2%	2.9%			2000-2003	69
	47.8%	32.1%	18.4%	1.7%			2004-2007	343
Italy	26.4%	48.9%	21.0%	2.9%	0.6%	0.3%	2000-2003	1543
	36.5%	45.3%	16.2%	1.8%	0.1%	0.1%	2004-2007	2572
Luxembourg			100.0%				2000-2003	10
		6.3%	62.5%	31.3%			2004-2007	16
Netherlands	8.6%	47.4%	34.2%	7.3%	1.2%	1.2%	2000-2003	914
	13.6%	48.6%	30.4%	4.8%	0.7%	1.8%	2004-2007	543
Portugal	21.3%	70.5%	8.2%				2000-2003	61
	58.0%	37.3%	4.1%	0.6%			2004-2007	169
Sweden	86.7%	11.9%	1.2%	0.2%			2000-2003	579
	97.0%	2.7%	0.4%				2004-2007	2414
United Kingdom	7.2%	28.5%	29.3%	23.8%	6.7%	4.5%	2000-2003	8007
	11.7%	25.4%	29.1%	20.9%	6.6%	6.3%	2004-2007	8831

\* In the period 2000-2003 for Belgium for the Region of Flanders, the data were reported in nitrate-nitrogen (NO<sub>3</sub>-N) and were considered as nitrates (NO<sub>3</sub><sup>-</sup>)

Table 3. Change of animal numbers between the 2003 and 2007; year 2003=100, blank –no information (data source Eurostat, data set accessed 17<sup>th</sup> November 2009).

	all cattle	dairy cows	goats	sheep	pigs	broilers	laying hens	other poultry
Belgium	95.9	91.6			97.4	110.8	91.7	77.9
Austria	97.5	94.0	110.8	107.9	101.0	122.4	110.7	101.5
Bulgaria	83.0	92.8	68.3	95.5	86.1	79.3	76.9	91.2
Cyprus	95.4	89.1	90.2	110.4	95.7	85.6	71.1	91.3
Czech Republic	95.8	90.7	127.7	158.3	80.4	103.8	84.4	108.4
Denmark	91.9	93.5		93.3	101.5	96.3	84.9	111.6
Estonia	93.5	88.2	114.3	239.9	108.7	83.5	69.1	50.0
Finland	92.3	90.3	112.5	134.0	102.3	83.8	99.1	70.3
France	99.8	93.4	101.2	92.6	98.1	90.9	99.8	92.1
Germany	94.9	94.2	112.5	90.6	102.3	108.7	92.4	101.3
Greece	104.8	100.7	96.4	96.3	104.5	95.4	73.8	42.3
Hungary	95.4	85.8	81.7	95.1	78.8	73.8	91.2	104.9
Ireland	94.8	95.8	81.1	72.8	91.0	85.9	116.1	92.9
Italy	97.8	96.1	95.7	103.6	101.3	86.7	104.6	89.5
Latvia	105.3	96.8	86.7	137.5	93.2	183.9	111.8	77.8
Lithuania	97.0	90.3	72.4	256.2	87.3	154.0	115.7	43.6
Luxembourg	104.5	97.6	137.5	110.8	113.8	200.0	100.0	
Malta	108.4	98.7	114.8	82.6	105.2	77.6	109.8	0.0
Netherlands	102.3	96.0	122.4	116.2	108.8	102.5	133.7	147.5
Poland	102.4	95.1		95.3	95.6	69.7	99.6	88.1
Portugal	103.9	93.1	101.4	100.0	105.5	80.9	79.3	61.5
Romania	97.3		127.6	113.7	127.6	186.6	96.4	29.5
Slovakia	84.6	84.0	96.7	106.7	66.0	93.5	97.4	103.1
Slovenia	106.6	89.7	121.0	124.1	87.4	131.9	91.4	57.9
Spain	100.6	80.8	91.4	94.5	108.1	85.8	100.7	95.2
Sweden	97.6	90.6	0.0	115.5	86.2	112.5	117.8	34.5
United Kingdom	95.8	89.6		97.0	96.5	95.9	100.8	76.3
European Union (15 countries)*	97.6	93.0	96.8	95.5	102.5	93.4	101.4	84.2
European Union (27 countries)*	97.7	99.4	97.4	97.1	100.7	92.4	100.5	90.6

\* statistic for either EU-15 or EU-27 unless there is no data for a specific country in the table, then the statistic covers EU-15 or EU-27 minus that country



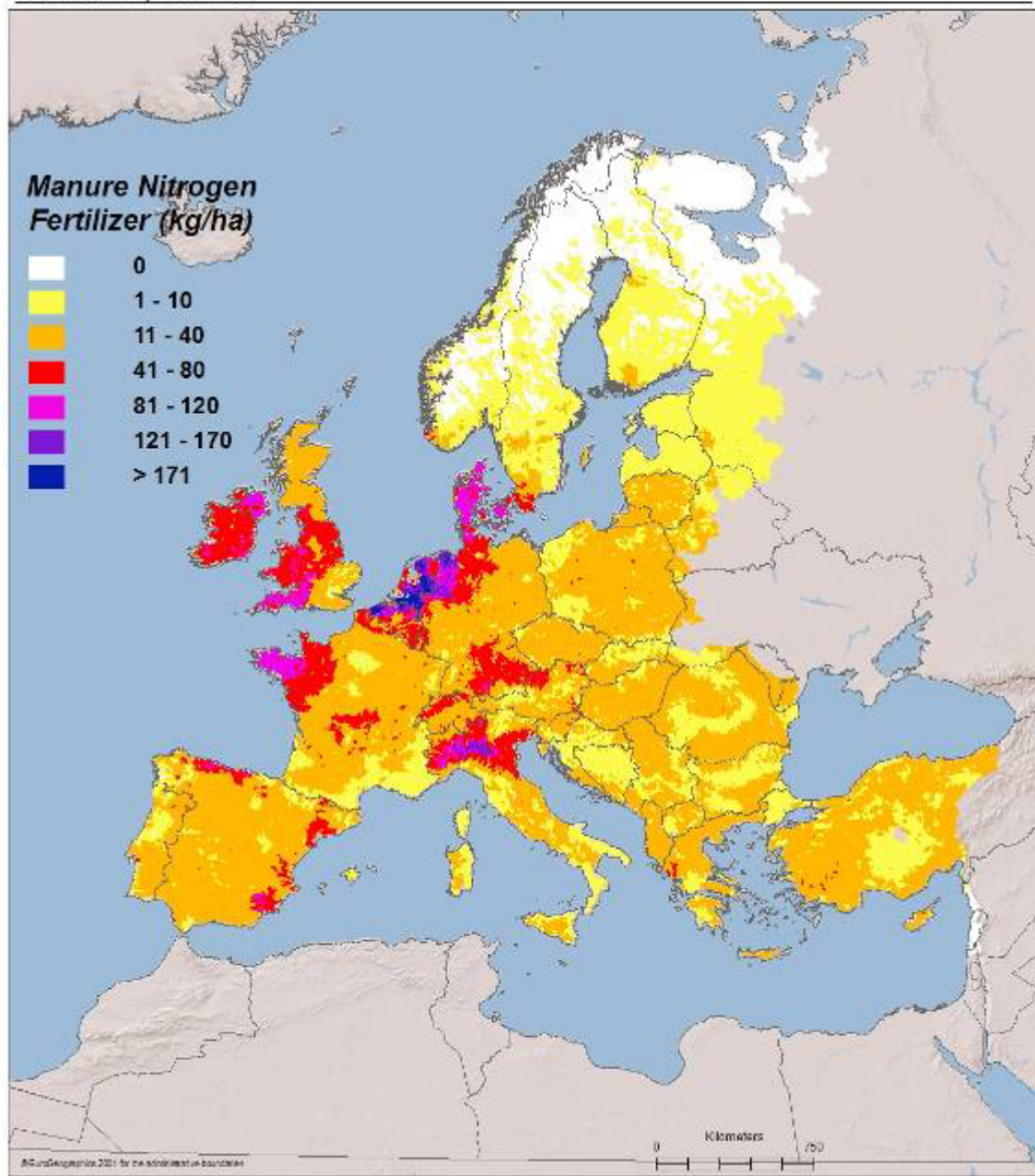
## Manure Nitrogen Fertilizer for year 2005



Administrative boundaries: Eurostat - GISCO 2004

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Map produced by: Institute for Environment and Sustainability,  
Rural, Water and Ecosystem Resources

Coordinate Reference System:  
ETRS89 Lambert Azimuthal Equal Area



Map 1. Manure nitrogen fertilizer application for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).



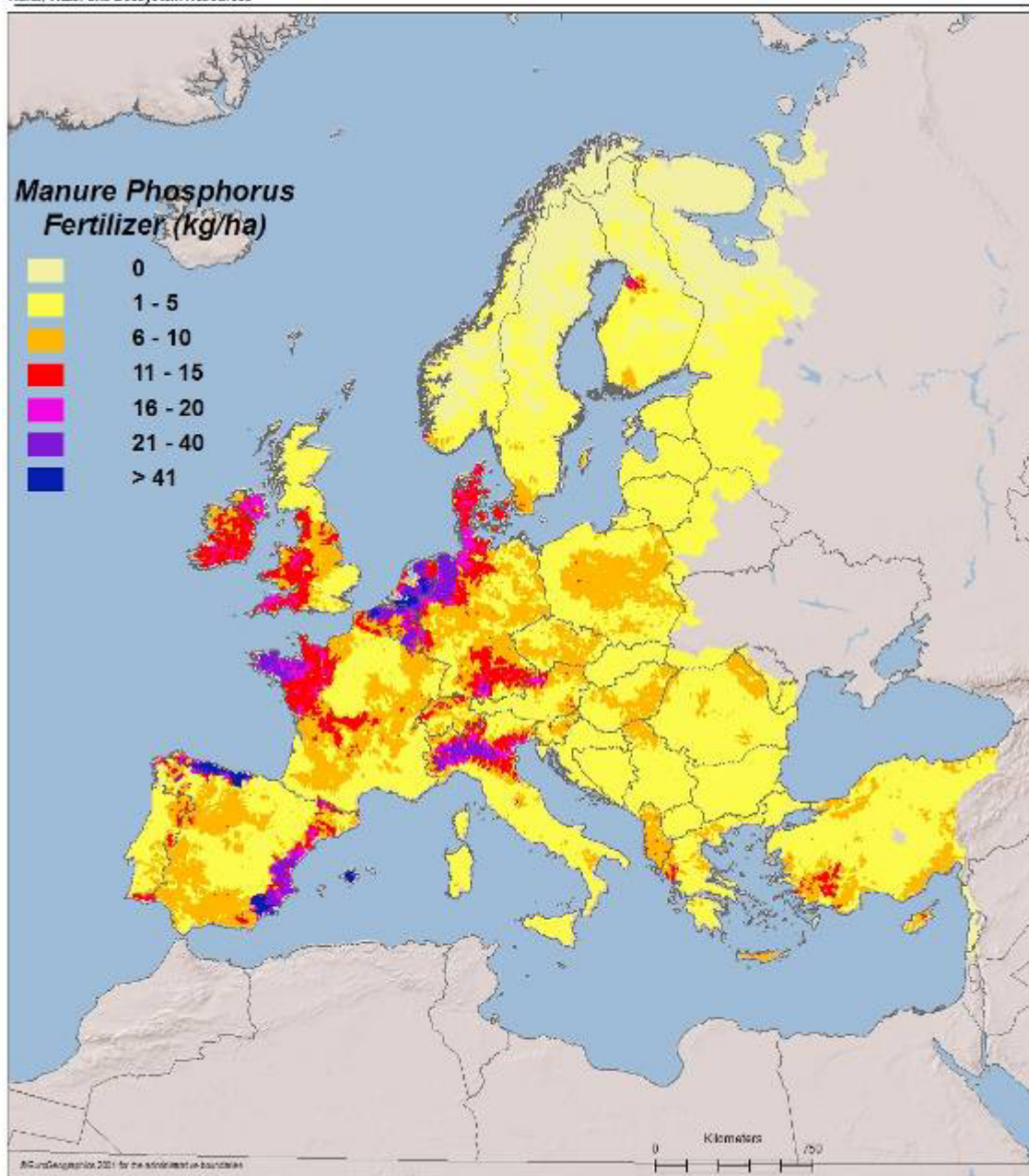
## Manure Phosphorus Fertilizer for year 2005



Administrative boundaries: Eurostat - GISCO 2004

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Map produced by: Institute for Environment and Sustainability,  
Rural, Water and Ecosystem Resources

Coordinate Reference System:  
ETRS89 Lambert Azimuthal Equal Area



Map 2. Manure phosphorus fertilizer application for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).



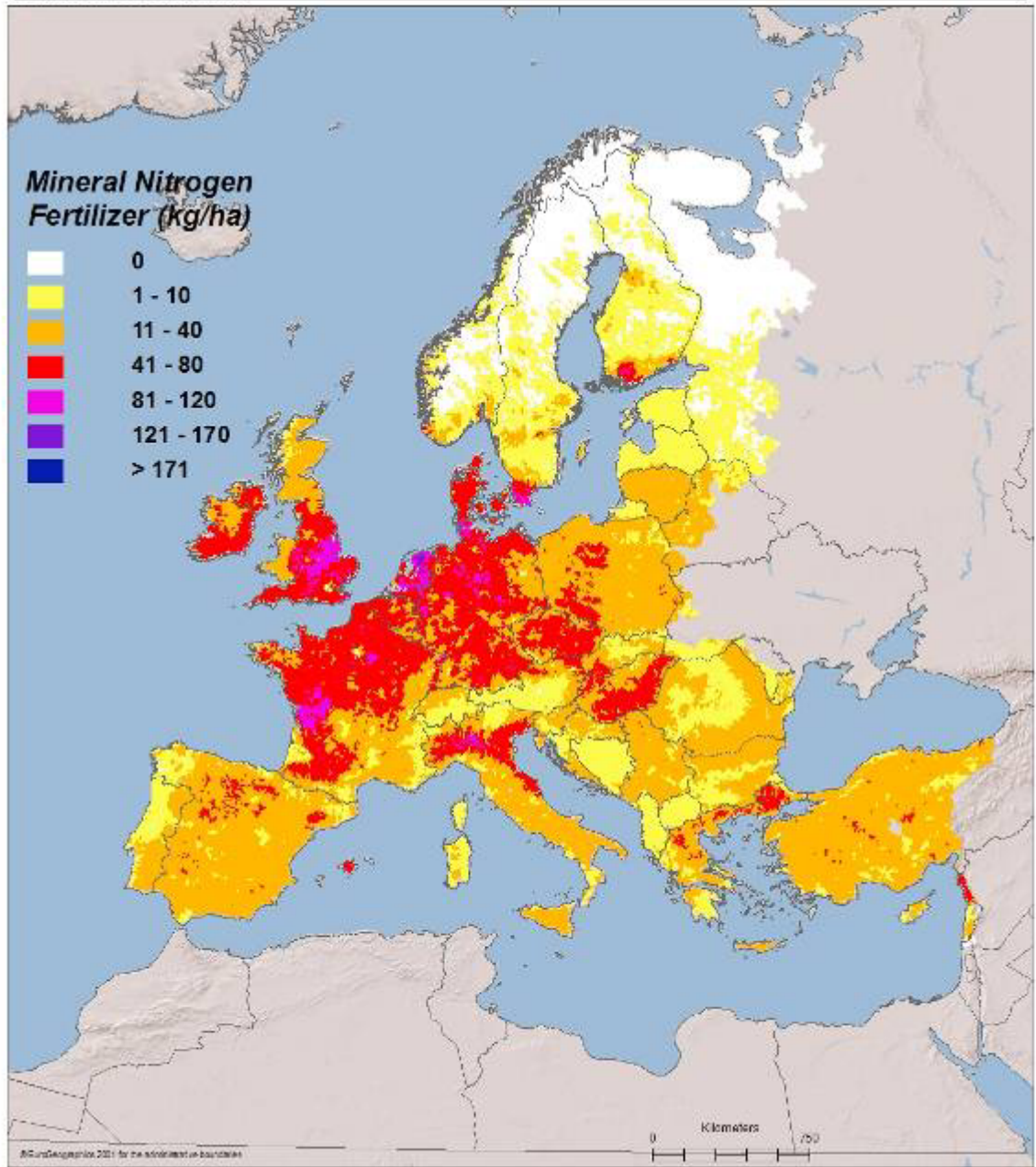
## Mineral Nitrogen Fertilizer for year 2005



Administrative boundaries: Eurostat - GISCO 2004

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Rural, Water and Ecosystem Resources

Coordinate Reference System:  
ETRS89 Lambert Azimuthal Equal Area



Map 3. Mineral nitrogen fertilizer application for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).



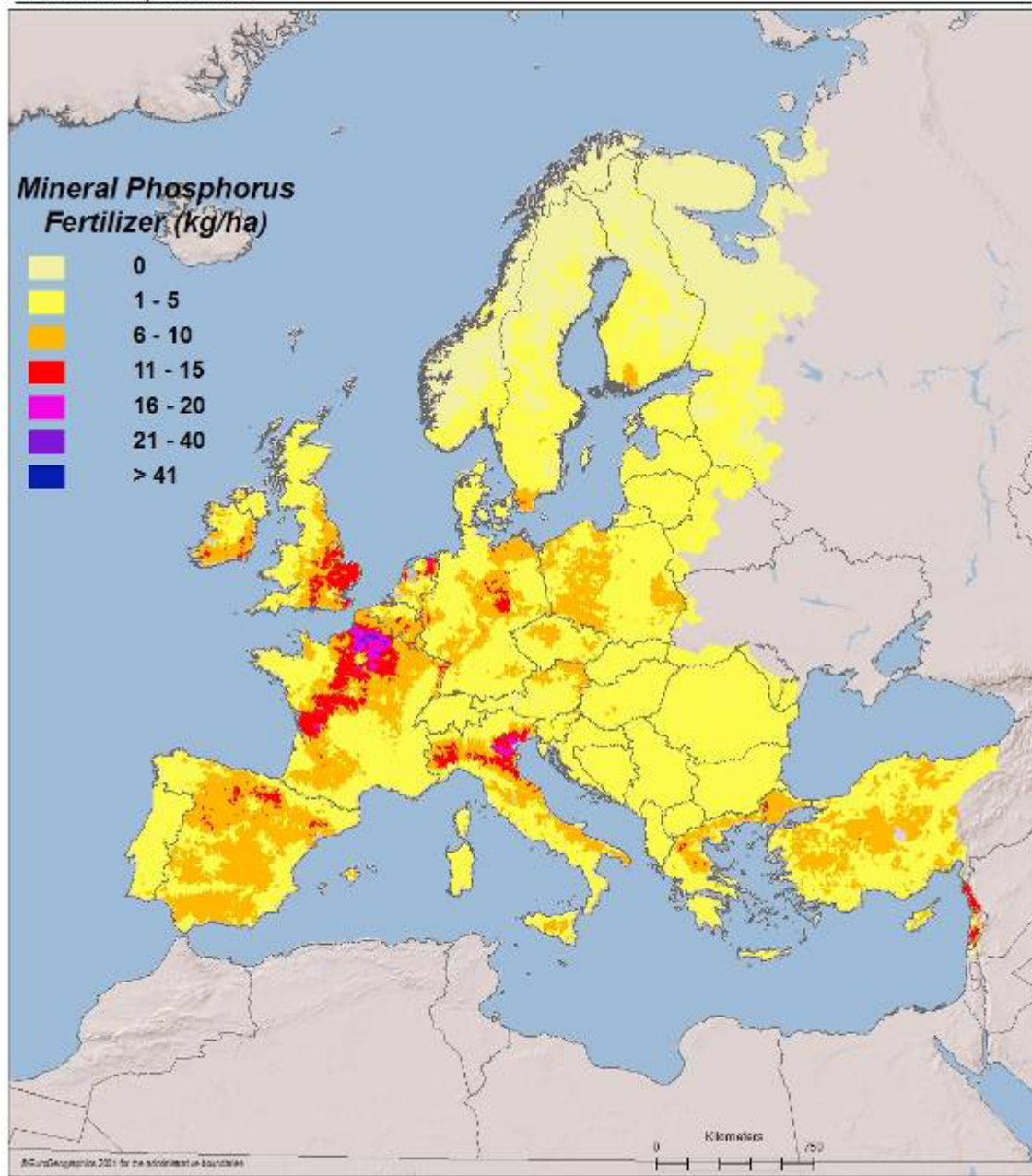
## Mineral Phosphorus Fertilizer for year 2005



Administrative boundaries: Eurostat - GISCO 2004

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Map produced by: Institute for Environment and Sustainability,  
Rural, Water and Ecosystem Resources

Coordinate Reference System:  
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Map 4. Mineral phosphorus fertilizer application for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).





EUROPEAN COMMISSION  
DIRECTORATE-GENERAL  
Joint Research Centre



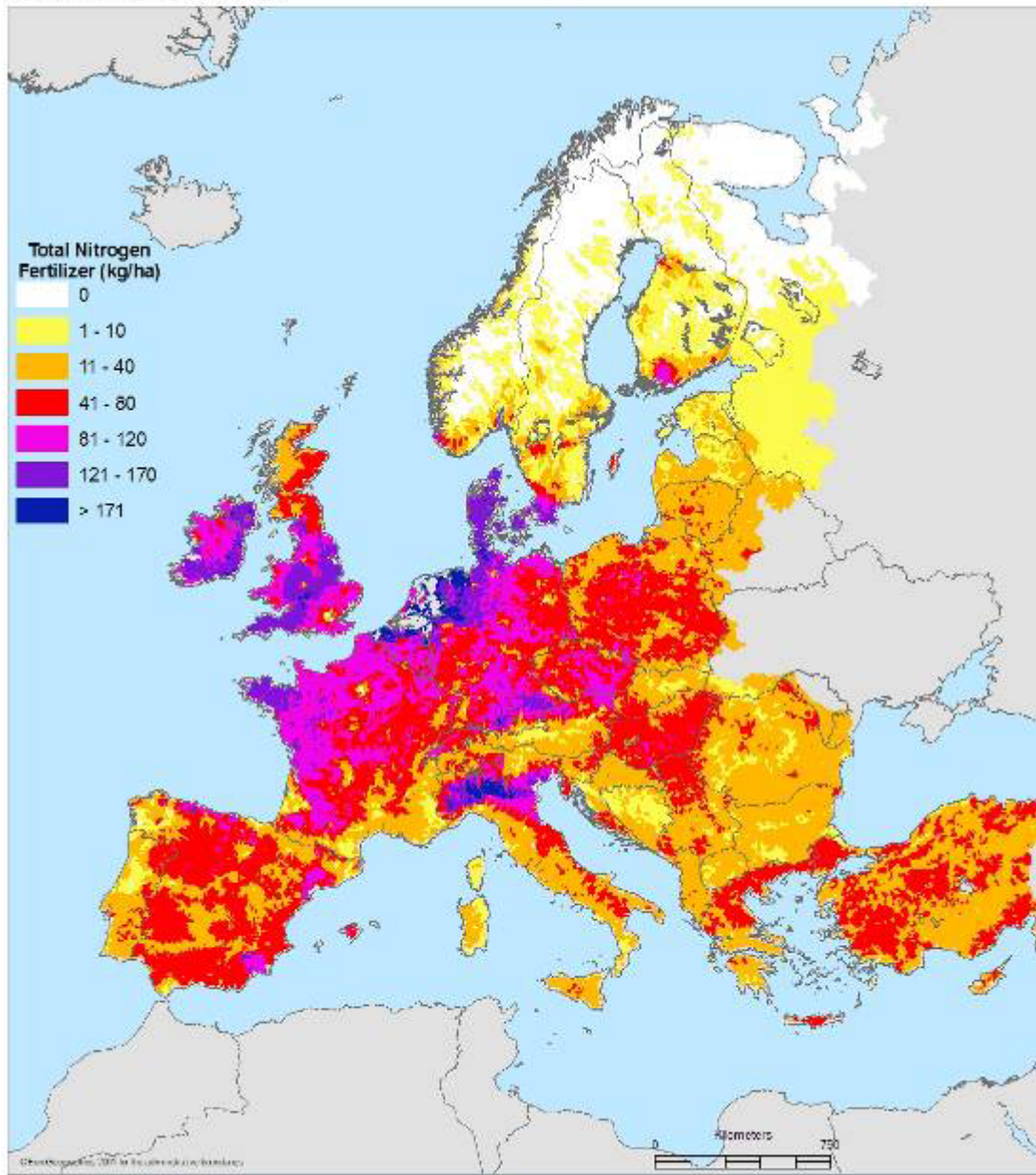
## Total Nitrogen Fertilizer for Year 2005



Administrative boundaries: Eurostat - GISCO 2004

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Map produced by: Institute for Environment and Sustainability,  
Rural, Water and Ecosystem Resources Unit

Coordinate Reference System:  
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Map 5. Total nitrogen application, manure and chemical fertilizer for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).



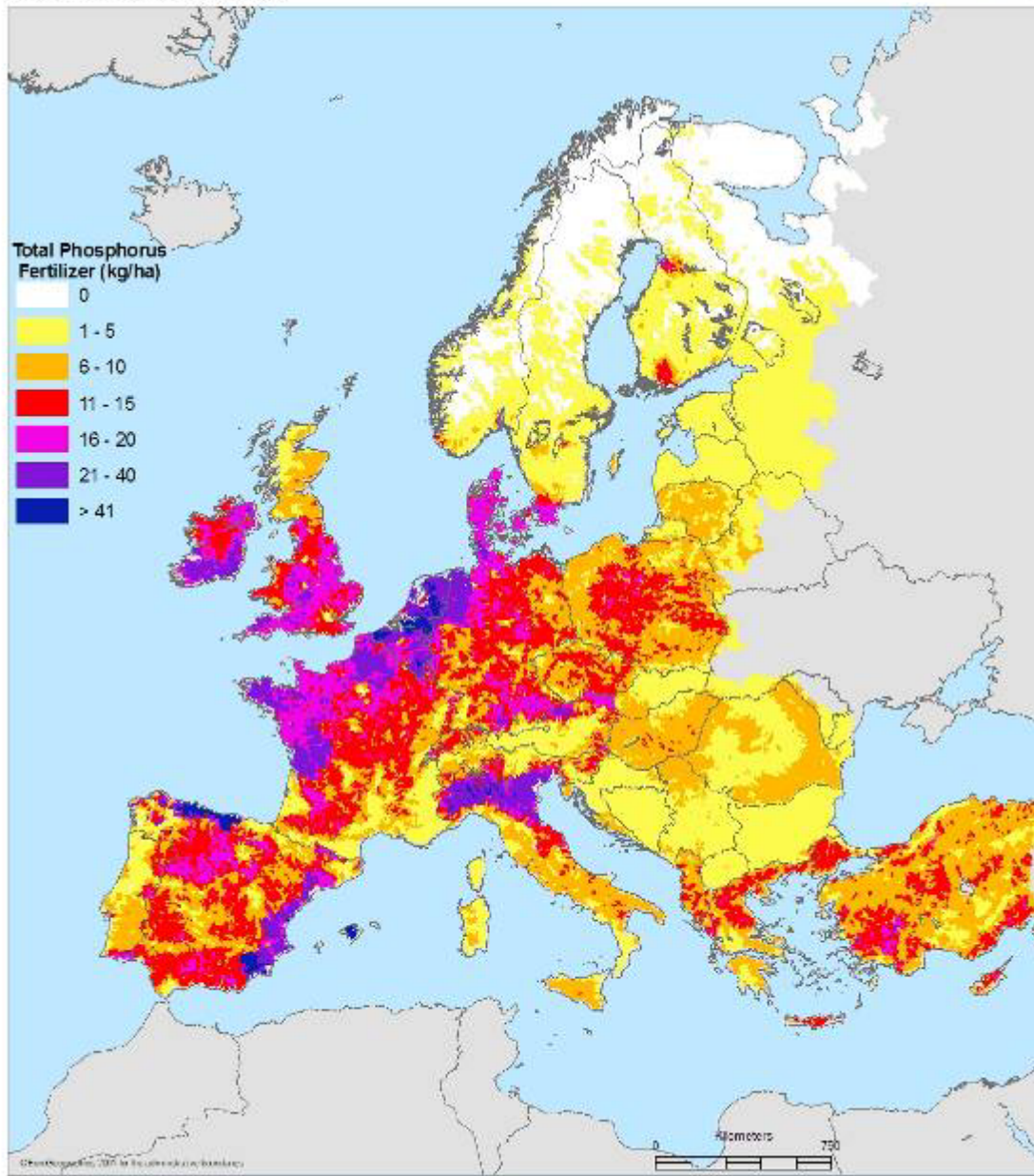
## Total Phosphorus Fertilizer for Year 2005



Administrative boundaries: Eurostat - GISCO 2004

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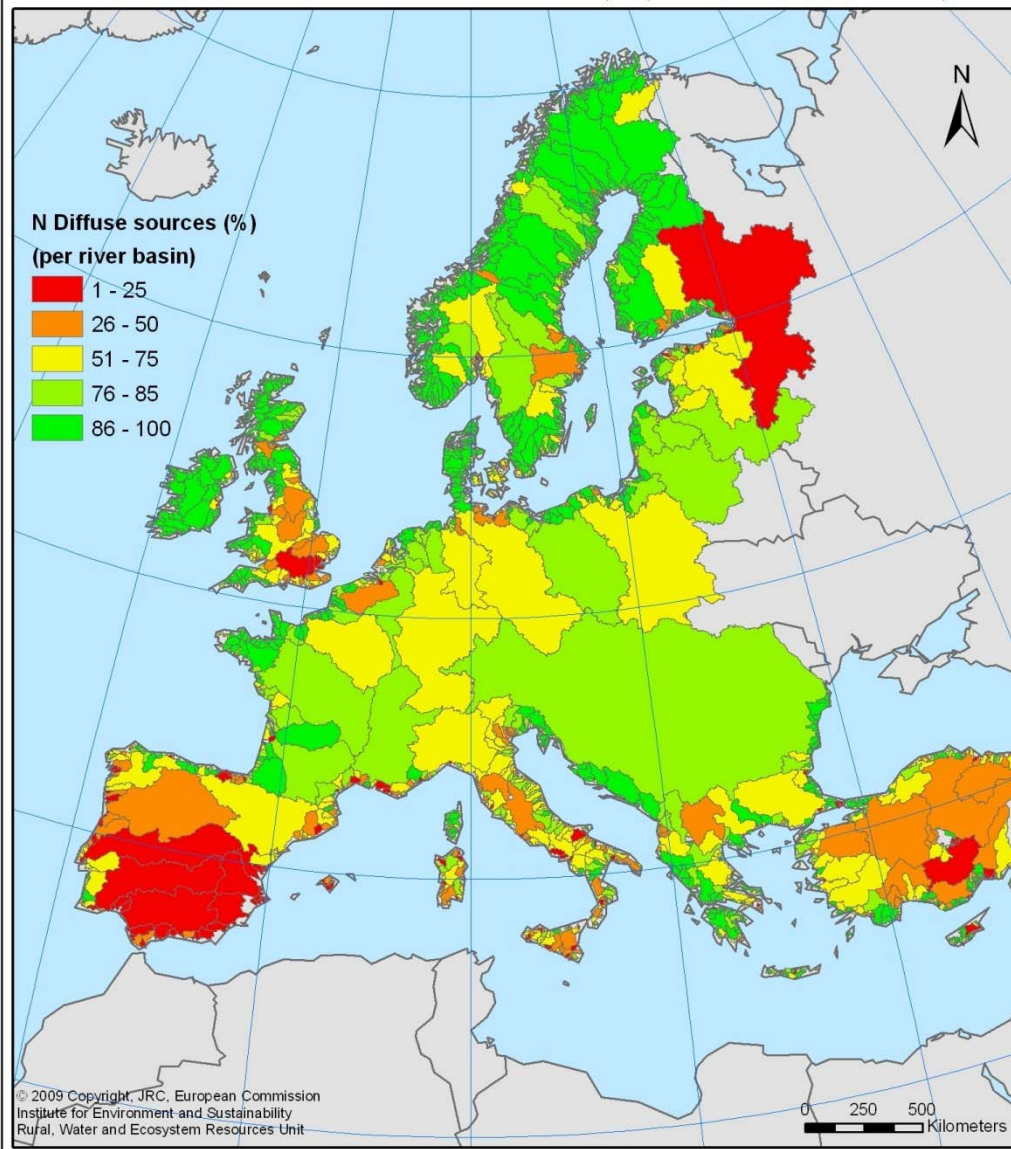


Map 6. Total phosphorus application, manure and chemical fertilizer for year 2005 (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).

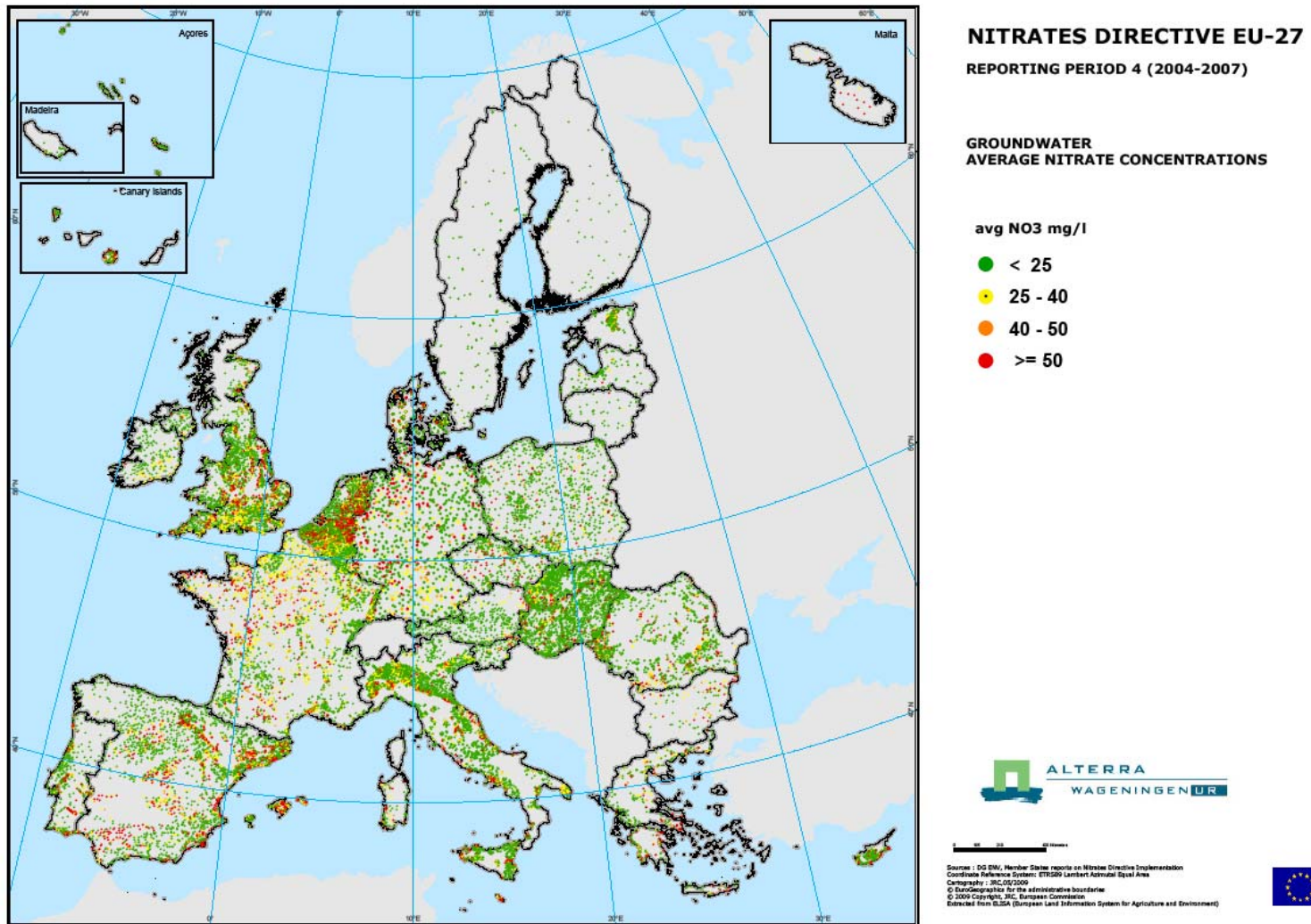
## Nitrogen source apportionment 2005 per river basin

Administrative boundaries: ESRI

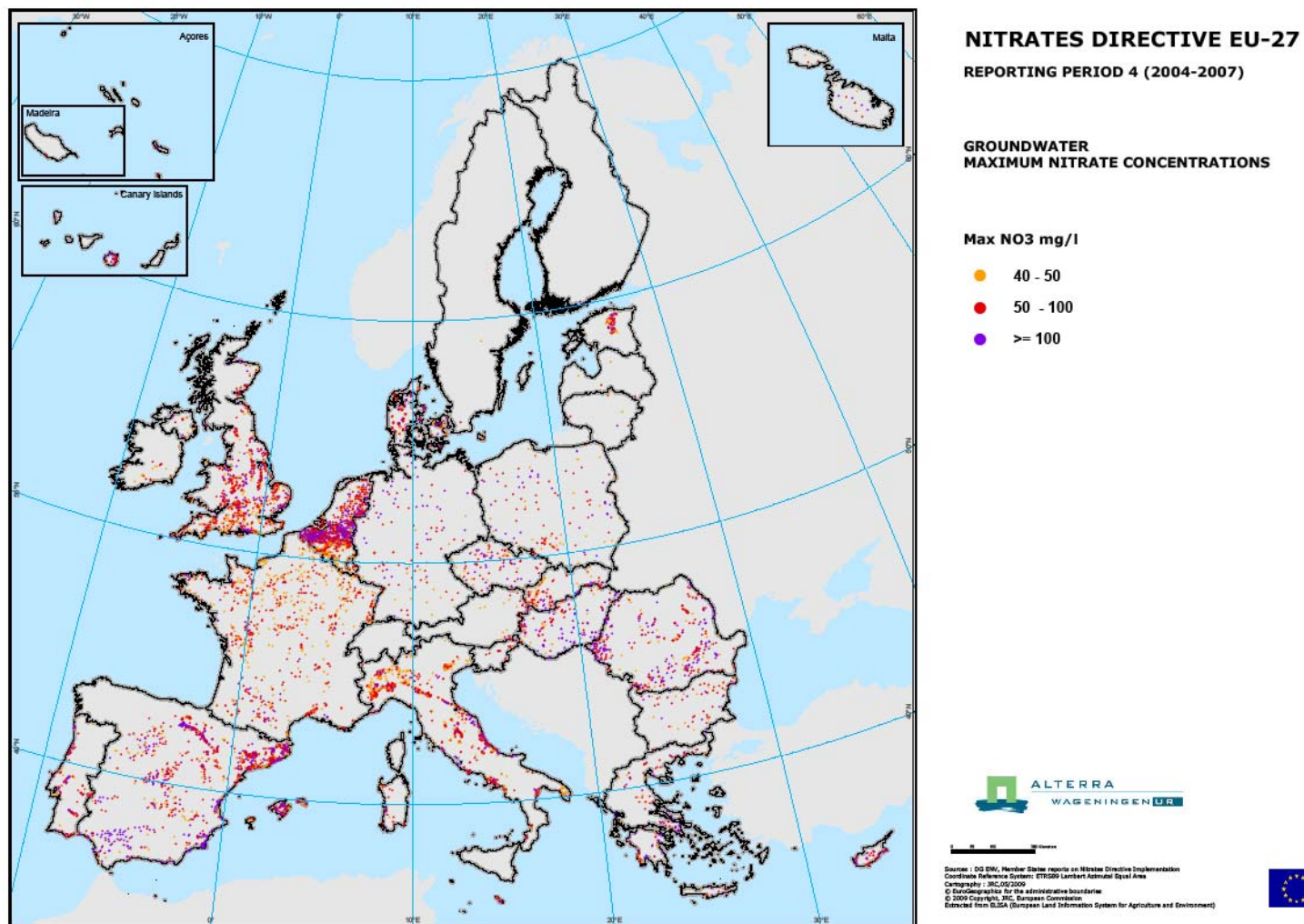
Map Projection: ETRS89 Lambert Azimutal Equal Area



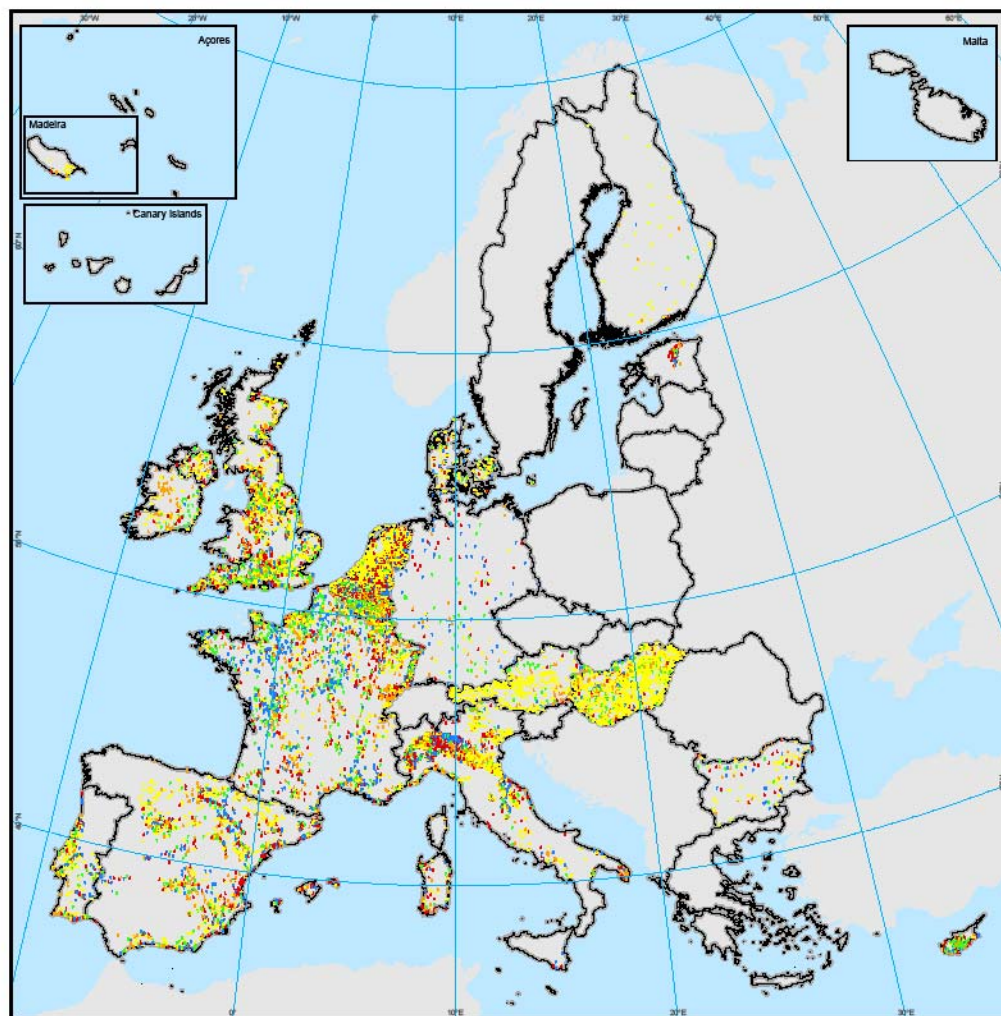
Map 7. Estimation of nitrogen source apportionment for Europe (Bouraoui F., Grizzetti B. Aloe A., 2009. Nutrient discharge from rivers to seas. JRC EUR 24002 EN, 72pp.).



Map 8. Groundwater average nitrate concentrations for reporting period 4 (2004-2007).



Map 9. Groundwater maximum nitrate concentrations, reporting period 4 (2004-2007).



## NITRATES DIRECTIVE EU-27

REPORTING PERIOD 4 (2004-2007)

GROUND WATER  
TREND NITRATE CONCENTRATIONS  
RP3 - RP4

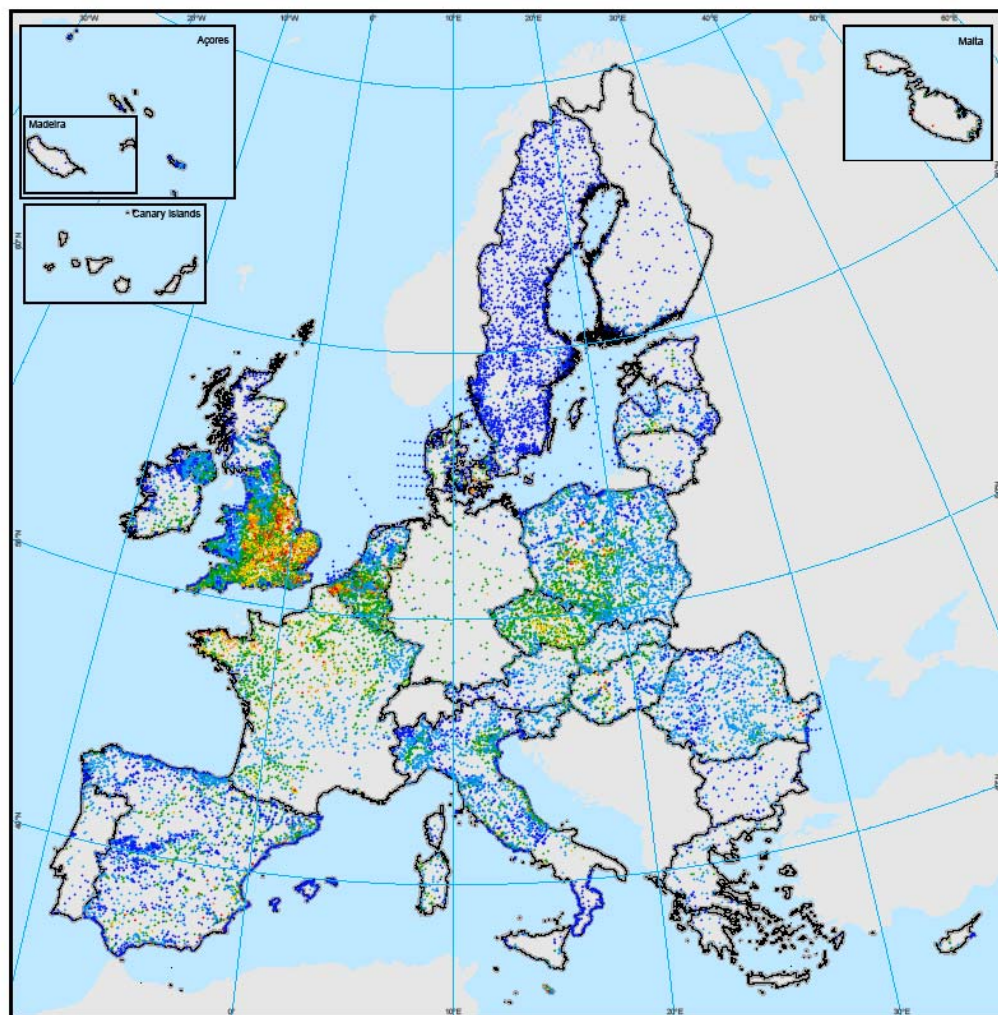
- Trend NO<sub>3</sub> mg/l
- ▼ < -5 strong decrease
  - ▼ - 5 to - 1 weak decrease
  - ▲ - 1 to + 1 stable
  - ▲ + 1 to + 5 weak increase
  - ▲ > + 5 strong increase



Source : DG ENV, Member States reports on Nitrates Directive Implementation  
Coordinate Reference System: ETRS89 Lambert Azimuthal Equal Area  
Cartography : IRI/IG/2009  
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Extracted from GLISA (European Land Information System for Agriculture and Environment)



Map 10. Trends in ground water nitrates concentrations between reporting period 3 (2000-2003) and 4 (2004-2007).



**NITRATES DIRECTIVE EU-27**  
**REPORTING PERIOD 4 (2004-2007)**

**SURFACE WATER**  
**AVERAGE NITRATE CONCENTRATIONS**

avg NO3 mg/l

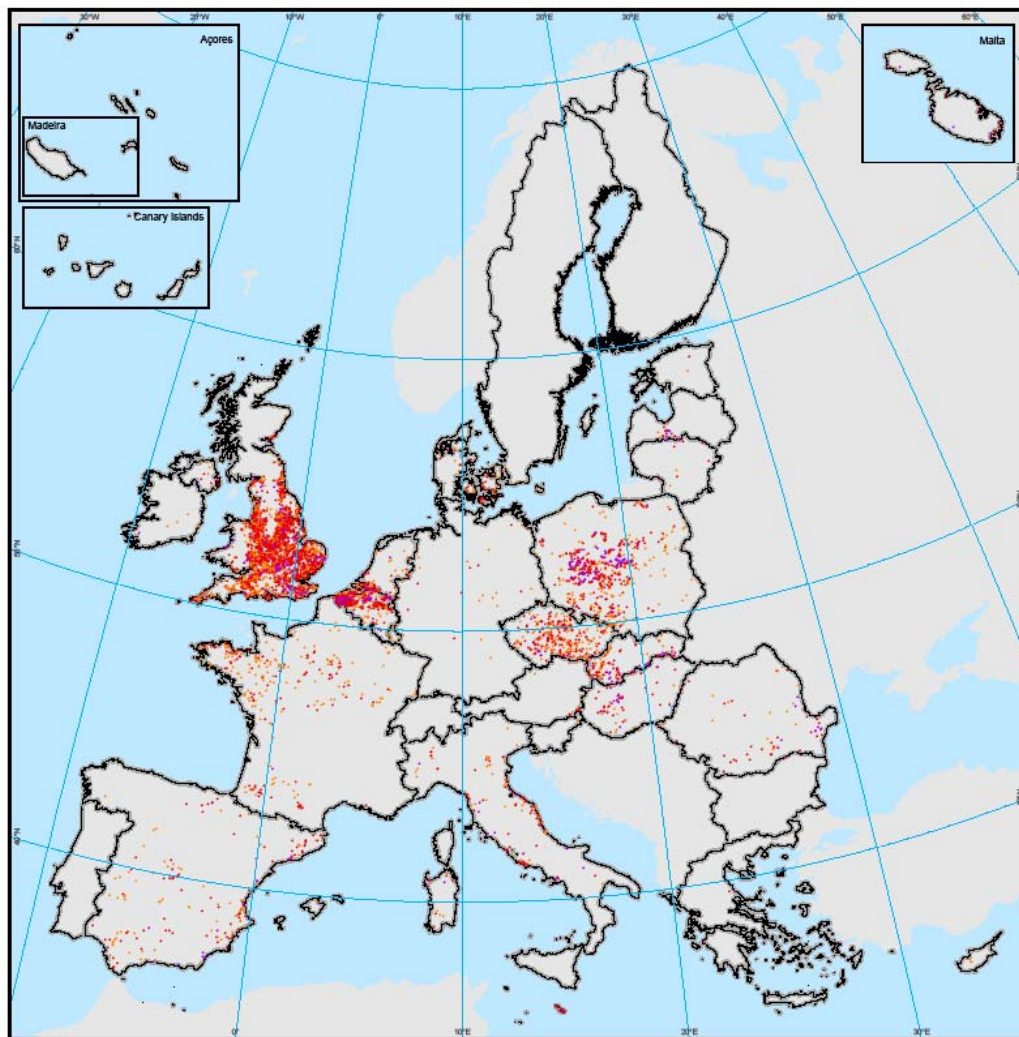
- < 2
- 2 - 10
- 10 - 25
- 25 - 40
- 40 - 50
- > 50



Source: DG ENV, Member States reports on Nitrate Directive Implementation  
 Coordinate Reference System: ETRS89 Lambert Azimuthal Equal Area  
 Cartography: JRC/IGIS/2009  
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 Extracted from GLISA (European Land Information System for Agriculture and Environment)



Map 11. Average surface water nitrate concentrations for reporting period 4 (2004-2007).



**NITRATES DIRECTIVE EU-27**  
**REPORTING PERIOD 4 (2004-2007)**

**SURFACE WATER**  
**MAXIMUM NITRATE CONCENTRATIONS**

Max NO3 mg/l

- 40 - 50
- 50 - 100
- ≥ 100

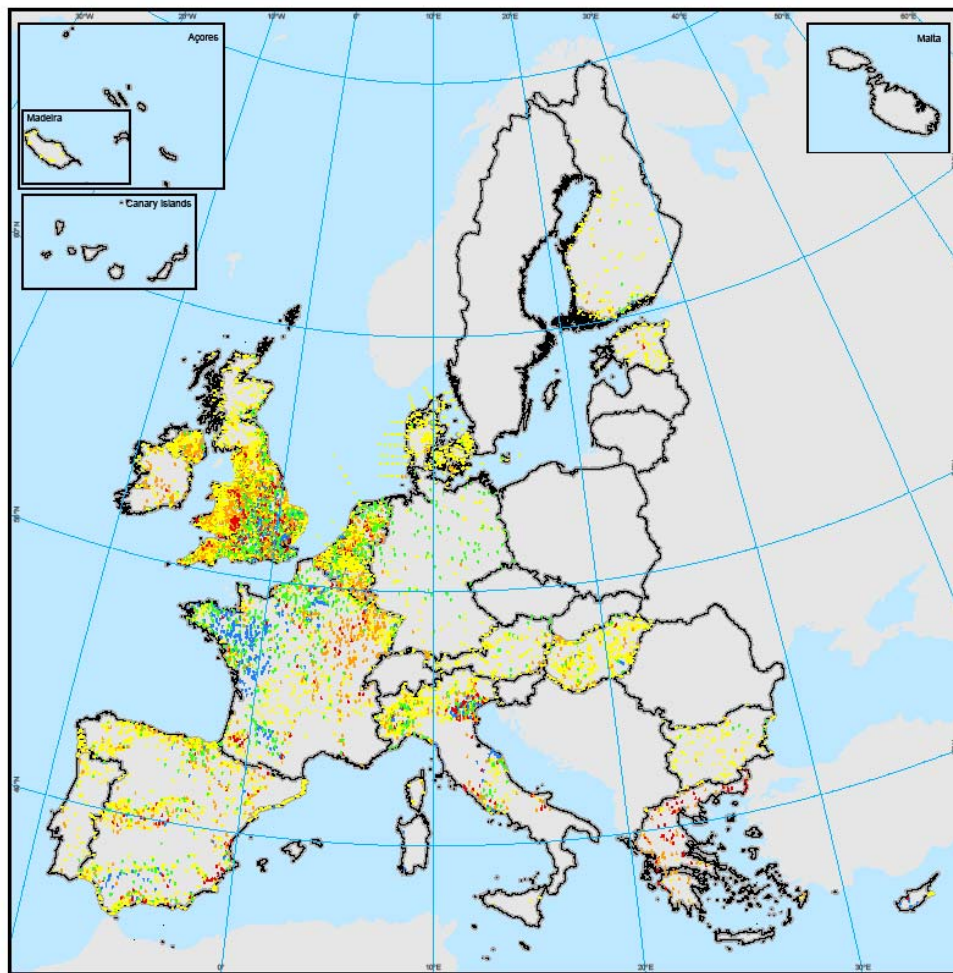


Source: DG EMU, Member States reports on Nitrates Directive Implementation  
 Coordinate Reference System: ETRS89 Lambert Azimuth Equal Area  
 Cartography: JRC, 08/2009  
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 Extracted from ELISA (European Land Information System for Agriculture and Environment)



Map 12. Maximum surface water nitrate concentrations for reporting period 4 (2004-2007).





### NITRATES DIRECTIVE EU-27

REPORTING PERIOD 4 (2004-2007)

**SURFACE WATER**  
**TREND NITRATE CONCENTRATIONS**  
 RP3 - RP4

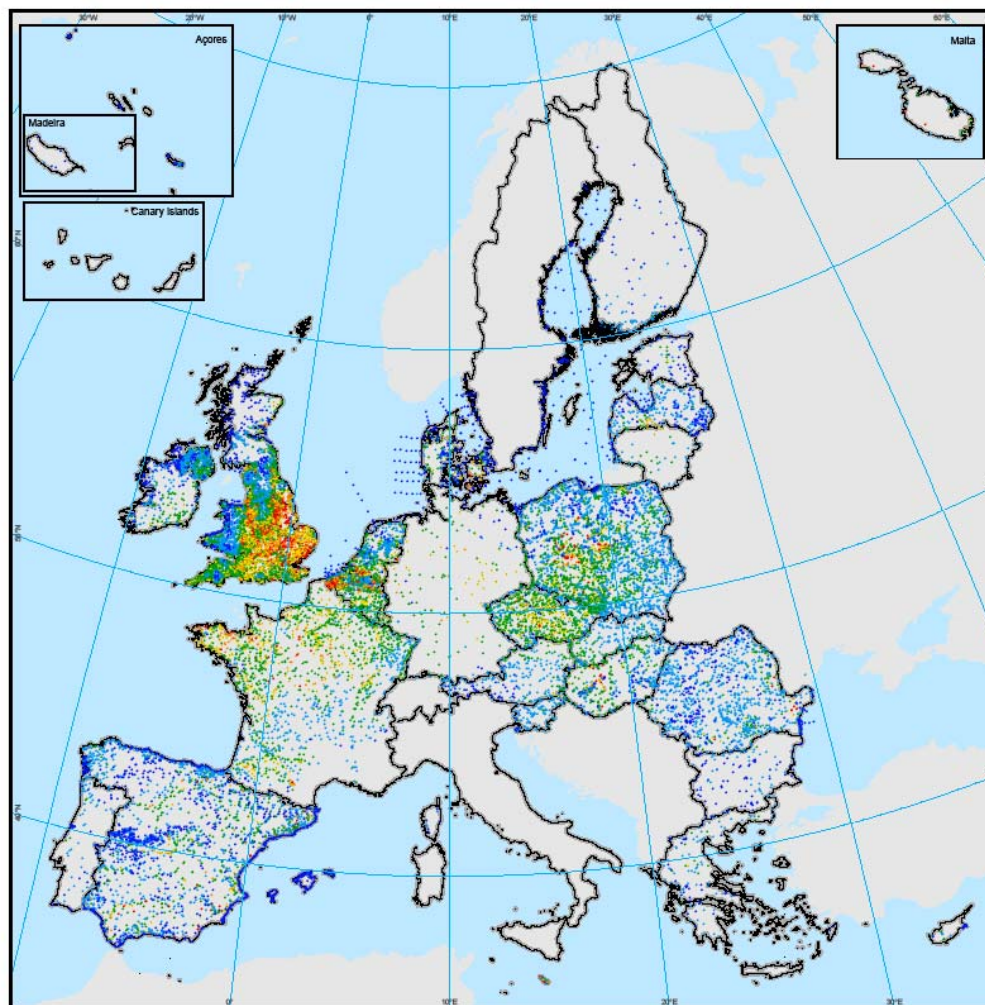
- Trend NO3 mg/l**
- ▼ < -5    strong decrease
  - ▼ -5 to -1    weak decrease
  - -1 to +1    stable
  - ▲ +1 to +5    weak increase
  - ▲ > +5    strong increase



Source: J. DG ENV, Member States reports on Nitrates Directive Implementation  
 Coordinate Reference System: ETRS2000 Lambert Azimuthal Equal Area  
 Cartography: JRC/2009  
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 Extracted from EUSA (European Land Information System for Agriculture and Environment)



Map 13. Trends of nitrate concentrations in surface water between reporting period 3 (2000-2003) and 4 (2004-2007). (Greece is revising data on surface water trends).



### NITRATES DIRECTIVE EU-27

REPORTING PERIOD 4 (2004-2007)

**SURFACE WATER  
WINTER AVERAGE NITRATE CONCENTRATIONS**

avg NO<sub>3</sub> mg/l

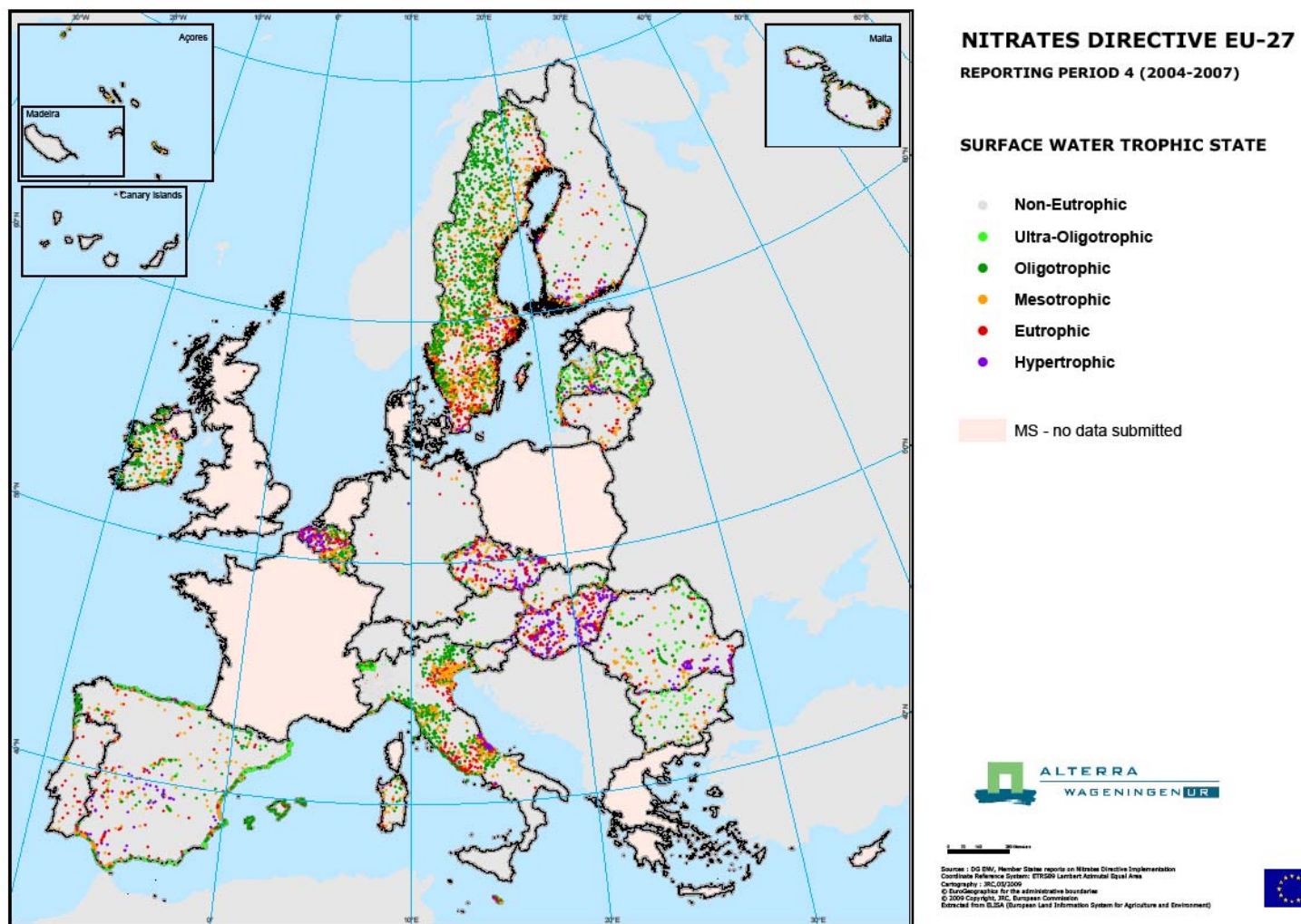
- < 2
- 2 - 10
- 10 - 25
- 25 - 40
- 40 - 50
- > 50



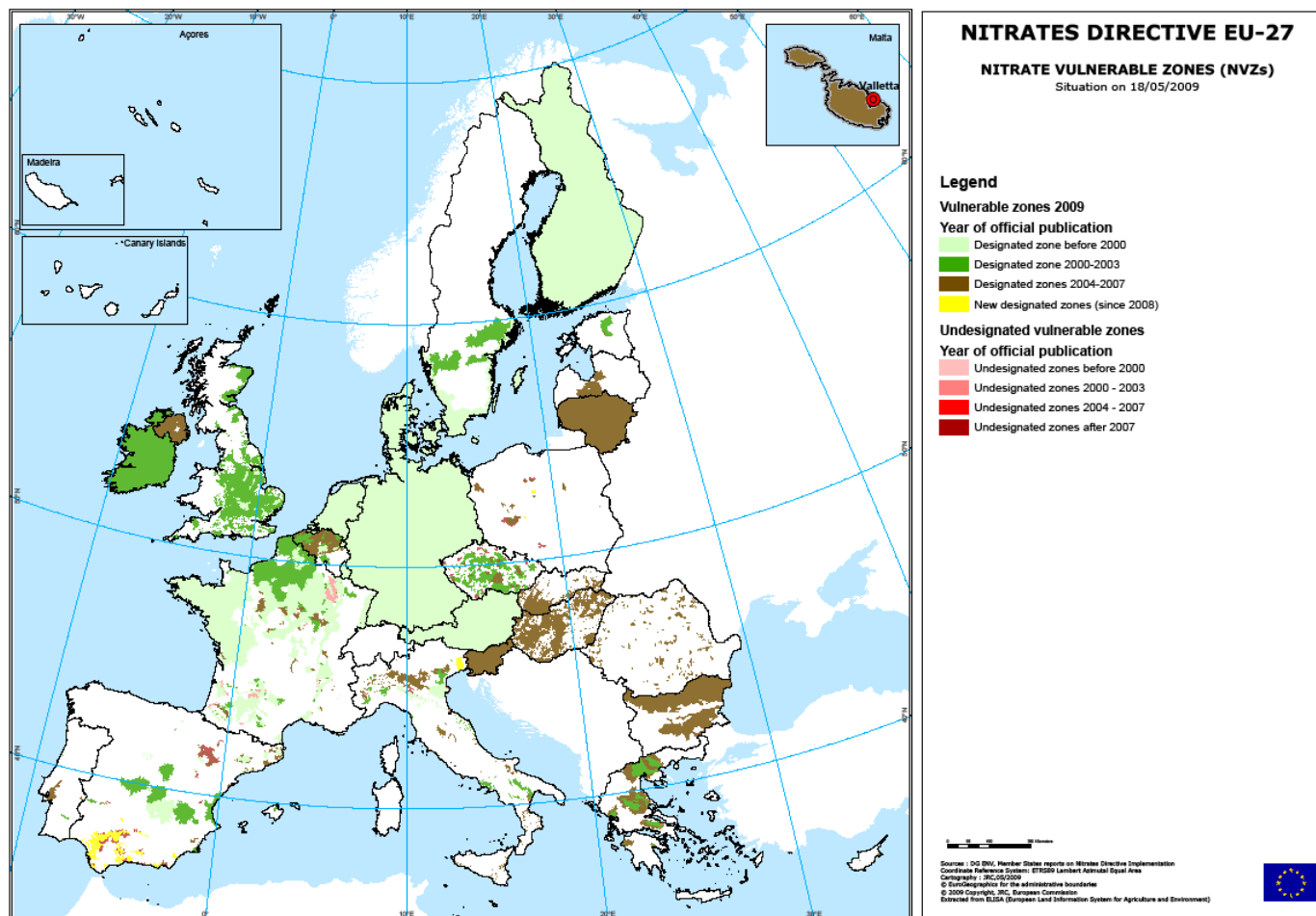
Source: DG ENV, Member States reports on Nitrate Directive Implementation  
 Coordinate Reference System: ETRS2000 Lambert Azimuthal Equal Area  
 Campaign: 2004-2007  
 © EuroGeographics for the administrative boundaries  
 © 2009 Copernicus, JRC, European Commission  
 Extracted from GLISA (European Land Information System for Agriculture and Environment)



Map14. Winter averages of nitrate concentration in surface water for reporting period 4 (2004-2007).



Map 15. Trophic status of surface water for reporting period 4 (2004-2007), (Greece submitted data however they were not covering required information to be included in the map).



Map 16. Designation of vulnerable zones in EU-27 including designation of whole territory of some Member States (Implementation of an Action Programme on the whole territory according to article 3 (5) of the Nitrates Directive; this does not necessarily mean that the whole territory is nitrate vulnerable according to article 3 (2) of the Nitrates Directive).

Table 4. Nitrate vulnerable zones in EU Member States 1999-2008 (# Values as provided by Eurostat in July 2009).

Member State	Total Area# (km2)*1000	Area NVZ 1999 (EU 15)		Area NVZ 2003 (EU15)		Area NVZ 2006 for EU15, For EU10+2 as from 2007**		Area NVZ 2008 **	
		(km2)*1000	%	(km2)*1000	%	(km2)*1000	%	(km2)*1000	%
Austria*	83.9	83.9	100.0	83.9	100.0	83.9	100.0	83.9	100.0
Belgium	30.5	1.8	5.9	7.2	23.6	7.20	23.6	20.7	67.8
Bulgaria	111.0					58.96	53.1	59.0	53.1
Cyprus***	9.3					0.46	5.0	0.6	6.8
Czech Republic	78.9					28.86	36.6	31.4	39.8
Denmark*	43.1	43.1	100.0	43.1	100.0	43.1	100.0	43.1	100.0
Estonia	45.2					3.0	6.7	3.4	7.5
Finland*	338.4	338.4	100.0	338.4	100.0	338.4	100.0	338.4	100.0
France	549.1	197.9	36.0	239.7	43.7	239.7	43.7	250.1	45.6
Germany*	357.1	357.1	100.0	357.1	100.0	357.1	100.0	357.1	100.0
Greece	132.0	-		14.0	10.6	14.0	10.6	32.0	24.2
Hungary	93.0					43.3	46.5	42.6	45.8
Ireland*	70.3	-		70.3	100.0	70.3	100.0	70.3	100.0
Italy	301.3	5.7	1.9	18.4	6.1	24.9	8.3	38.1	12.6
Lithuania*	65.3					65.3	100.0	65.3	100.0
Luxembourg*	2.6	2.6	100.0	2.6	100.0	2.6	100.0	2.6	100.0
Latvia	64.6					8.1	12.5	8.2	12.7
Malta*	0.3					0.3	100.0	0.3	100.0
Netherlands*	37.4	37.4	100.0	37.4	100.0	37.4	100.0	37.4	100.0
Poland	312.7					5.5	1.7	4.6	1.5
Portugal	91.9	0.2	0.2	0.3	0.3	1.1	1.2	3.4	3.7
Romania	238.4					16.0	6.7	16.0	6.7
Slovakia	49.0					16.5	33.6	16.4	33.5
Slovenia*	20.3					20.3	100.0	20.3	100.0
Spain	505.4	26.0	5.1	55.4	11.0	63.9	12.6	63.7	12.6
Sweden	450.3	41.6	9.2	67.1	14.9	67.2	14.9	67.5	15.0
United Kingdom	244.1	5.8	2.4	79.9	32.7	93.7	38.4	94.4	38.7
TOTAL EU15/EU27	4,325.1	119.2	3.7	1,414.7	43.7	1,711.0	39.6	1,770.6	40.9

\*Implementation of an Action Programme on the whole territory in accordance with art 3 (5) of the Nitrates Directive; this does not necessarily mean that the whole territory is nitrate vulnerable according to Article 3 (2) of the Nitrates Directive; \*\*based on information made available to the Commission in digital form. The estimate of designated area does not include some designations communicated in paper form only; \*\*\* According to Protocol 10 of Accession the application of the aqvis communautaire is suspended in the areas of the Republic of Cyprus not under the effective control of the Government of the Republic

Figure 8. Percentage of territory of Member states designated as NVZ. (Member States that apply the whole territory approach are not included in the figure: Austria, Denmark, Finland, Germany, Ireland, Lithuania, Luxembourg, Malta, Netherlands and Slovenia).

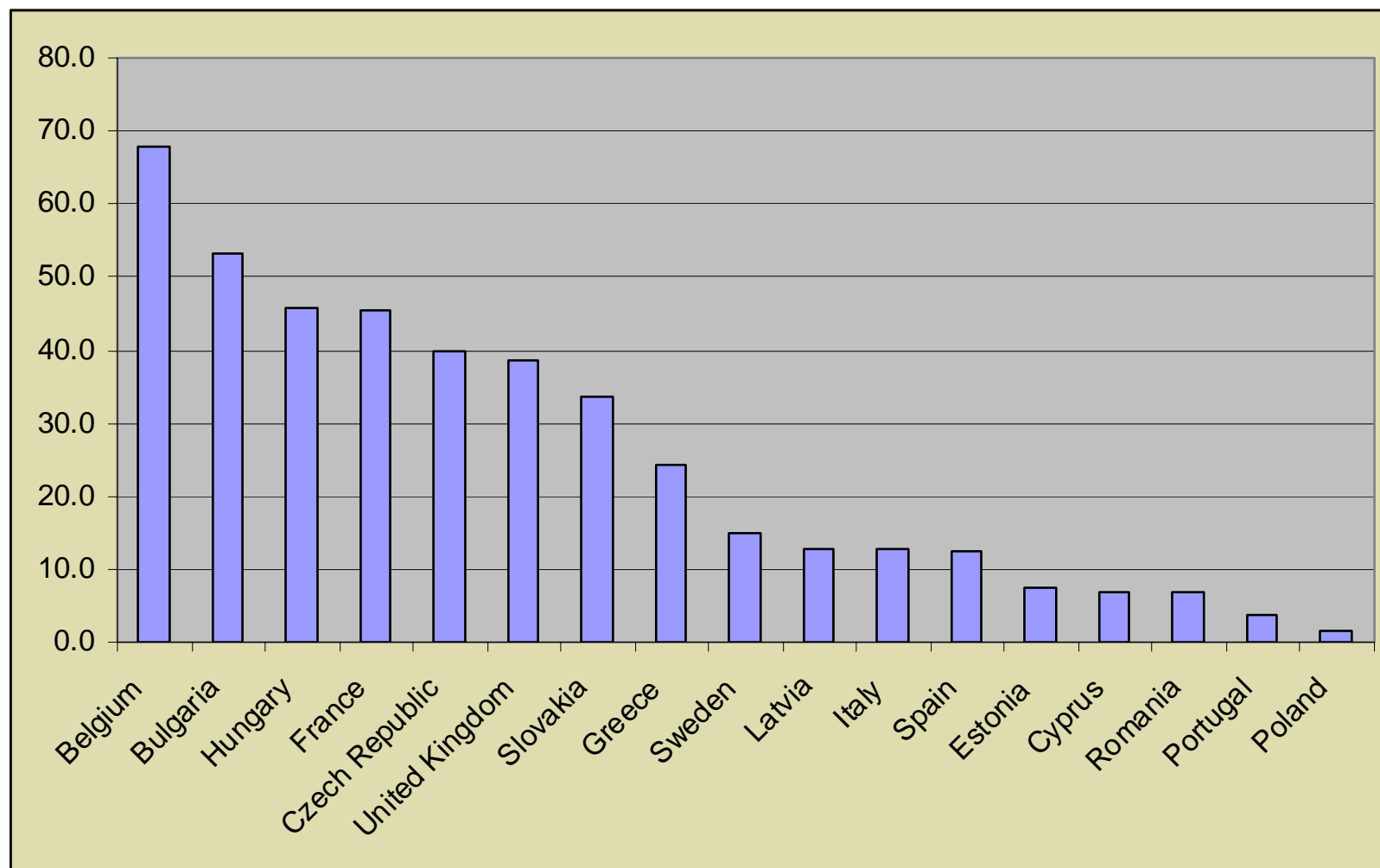


Table 5. Density of groundwater (GW) and freshwater stations (SW) measured for the whole land surface (yellow: MS that apply the whole territory approach).

MS	Total land surface km2*	GW stations	density of GW stations (points / 1000 km <sup>2</sup> )	SW stations	density SW stations (points / 1000 km <sup>2</sup> )
AT-Austria	83870	368	4.4	297	3.5
BE-Belgium	30528	3020	98.9	1154	37.8
BG-Bulgaria	110910	128	1.2	109	1.0
CY-Cyprus	9250	222	24.0	10	1.1
CZ-Czech Republic	78866	408	5.2	949	12.0
DE-Germany	357110	893	2.5	171	0.5
DK-Denmark	43090	1479	34.3	220	5.1
EE-Estonia	45222	621	13.7	70	1.5
EL-Greece	131940	418	3.2	107	0.8
ES-Spain	504782	4078	8.1	2544	5.0
FI-Finland	338420	54	0.2	147	0.4
FR-France	547030	2664	4.9	1746	3.2
HU-Hungary	93030	1868	20.1	535	5.8
IE-Ireland	70280	210	3.0	217	3.1
IT-Italy	301230	5479	18.2	2111	7.0
LT-Lithuania	65200	53	0.8	108	1.7
LU-Luxembourg	2580	20	7.8	16	6.2
LV-Latvia	63589	176	2.8	325	5.1
MT-Malta	316	14	44.3	7	22.2
NL-Netherlands	37350	1244	33.3	502	13.4
PL-Poland	312685	1266	4.0	3397	10.9
PT-Portugal	92391	630	6.8	127	1.4
RO-Romania	237500	1371	5.8	1240	5.2
SE-Sweden	449964	163	0.4	2185	4.9
SI-Slovenia	20270	112	5.5	117	5.8
SK-Slovakia	49035	1767	36.0	224	4.6
United Kingdom	244820	3061	12.5	7988	32.6

\* Data from Eurostat - July 2009

Table 6. Density of groundwater (GW) and freshwater stations (SW) within the NVZ areas.

		NVZ surface	GW stations within NVZ	density GW stations within NVZ (points/1000 km <sup>2</sup> )	SW fresh water stations within NVZ	density SW fresh stations within NVZ (points / 1000 km <sup>2</sup> )
BE-Belgium	BE	20700	2527	<b>122.1</b>	1141	<b>55.1</b>
BG-Bulgaria	BG	58960	110	<b>1.9</b>	67	<b>1.1</b>
CY-Cyprus	CY	630	74	<b>117.5</b>	4	<b>6.3</b>
CZ-Czech Rep	CZ	31370	211	<b>6.7</b>	552	<b>17.6</b>
EE-Estonia	EE	3390	570	<b>168.1</b>	10	<b>2.9</b>
EL-Greece	EL	31960	114	<b>3.6</b>	41	<b>1.3</b>
ES-Spain	ES	63690	1512	<b>23.7</b>	378	<b>5.9</b>
FR-France	FR	250130	2260	<b>9.0</b>	1209	<b>4.8</b>
HU-Hungary	HU	52240	1627	<b>31.1</b>	369	<b>7.1</b>
IT-Italy	IT	38090	2549	<b>66.9</b>	707	<b>18.6</b>
LV-Latvia	LV	8170	62	<b>7.6</b>	53	<b>6.5</b>
PL-Poland	PL	4608	168	<b>36.5</b>	135	<b>29.3</b>
PT-Portugal	PT	3370	208	<b>61.7</b>	8	<b>2.4</b>
RO-Romania	RO	16040	298	<b>18.6</b>	145	<b>9.0</b>
SE-Sweden	SE	67520	35	<b>0.5</b>	442	<b>6.5</b>
SK-Slovakia	SK	16410	1275	<b>77.7</b>	120	<b>7.3</b>
UK-United Kingdom	UK	94410	1818	<b>19.3</b>	4203	<b>44.5</b>



## Chapter II

### Commission Decisions on derogation requests submitted by Member States

- Austria: Up to 230 kg N/ha from livestock manure on cattle farms on which the crop rotation includes more than 70% of particularly nitrogen consuming crops like grass, grass catch crops or beets and other crops being undersown by grass with low nitrate leaching potential  
(Decision 2006/189/EC<sup>3</sup>; expired on 31 December 2007)
- Belgium
  - Flanders: Up to 250 kg N/ha from grazing livestock manure and treated manure on parcels from any type of farms cultivated with grassland and maize undersown with grassland; Up to 200 kg N/ha from grazing livestock manure and treated manure on parcels from any type of farm cultivated with winter wheat followed by a catch crop and with beets.  
(Commission Decision 2008/64/EC<sup>4</sup>)
  - Wallonia: Up to 230 kg N/ha from livestock manure on cattle farms for grassland and not more than 115 kg N/ha on other farmland on cattle farms.  
(Commission Decision 2008/96/EC<sup>5</sup>)
- Ireland: Up to 250 kg N/ha from grazing livestock manure on grassland farms where 80% or more of the agricultural land is grassland.(Commission Decision 2007/697/EC<sup>6</sup>)
- Germany: Up to 230 kg N/ha from livestock manure on cattle farms and only on fields intensive grassland fields with at least four cuts per year or three cuts plus pasture.  
(Commission Decision 2006/1013/EC<sup>7</sup> as extended by Commission Decision 2009/753/EC<sup>8</sup>)
- Denmark: Up to 230 kg N/ha from livestock manure on cattle farms on which the crop rotation includes more than 70% of particularly nitrogen consuming crops like grass, grass catch crops or beets and other crops being undersown by grass with low nitrate leaching potential.  
(Decision 2002/915/EC<sup>9</sup> as replaced by Commission Decision 2005/294/EC<sup>10</sup> as extended by commission Decision 2008/664/EC<sup>11</sup>)
- Netherlands: Up to 250 kg N/ha from manure from grazing livestock on grassland farms with at least 70% or more of the agricultural land is grassland

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<sup>3</sup> OJ L 66/44, 8.3.2006

<sup>4</sup> OJ L16/28, 19.1.2008

<sup>5</sup> OJ L 32/21, 6.2.2008

<sup>6</sup> OJ L 284/27, 30.10.2007

<sup>7</sup> OJ L 382/1, 28.12.2006

<sup>8</sup> OJ L 268/35, 13.10.2009

<sup>9</sup> OJ L 319/24, 23.11.2002

<sup>10</sup> OJ L 94/34, 13.4.2005

<sup>11</sup> OJ L 217/16, 13.8.2008

(Commission Decision 2005/880/EC<sup>12</sup>; a draft proposal for extension of the decision received a positive opinion in the nitrates Directive, but not yet approved by the College; situation January 2010)

- United Kingdom:
  - England, Scotland and Wales: Up to 250 kg N/ha from grazing livestock manure on grassland farms where 80% or more of the agricultural land is grassland. (Commission Decision 2009/431/EC<sup>13</sup>)
  - Northern Ireland: Up to 250 kg N/ha from grazing livestock manure on grassland farms where 80% or more of the agricultural land is grassland. (Commission Decision 2007/863/EC<sup>14</sup>)

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<sup>12</sup> OJ L 324/89, 10.12.2005

<sup>13</sup> OJ L 141/48, 29.5.2009

<sup>14</sup> OJ L 337/122, 21.12.2007

## Chapter III

### Examples of progress made in action programmes

**Italy** revised its national framework decree on action programmes in 2006, after which the regions updated the specific regional action programmes in 2007-2008. The ministerial decree contains specific provisions on how to implement the measures of annex II and III of the directive, including the limit of 170 kg N/ha, criteria for the limitation of fertiliser application based on a balance system, the periods during which fertilisation should be banned (closed periods), norms on slurry storage differentiated by geographic areas, provisions on storage of solid manure, tables for design of storage constructions, manure nitrogen excretion figures for the evaluation of compliance with the limit of 170 kg N/ha per year from livestock manure. The decree obliges as well notification to the authorities of all livestock farms above a certain size, including the obligation of preparing detailed fertilisation plans. In addition, the decree sets out a series of obligations that also apply to farms outside designated nitrate vulnerable zones.

Based on the ministerial decree, the regions amended their action programmes or established new action programmes further specifying some provisions like the start of closed periods depending on the geographic area, detailed instructions on fertilisation plans and total N limit.

**Spain** carried out a revision of its action programmes with all regions with designated vulnerable zones having amended their action programmes in the period 2008-2009. All the regions have now established the standard of 170 kg N/ha from livestock manure and a federal decree established manure nitrogen excretion for the evaluation of compliance with this standard which are based on a detailed scientific study. The specific measures related to annex II and III of the directive were revised for all action programmes with particular attention to limitation of fertilisation (application standards in function of crop rotation, fertiliser plans, etc), storage capacity and specific technical requirements for construction, reinforcement of closed periods in function of local climatic conditions and practices and specific provisions for fertilisation through irrigation systems.

**Portugal** intends to integrate the different action programmes that currently apply in the different designated vulnerable zones into one action programme that would apply in all designated zones, including the new designated area in 2005, 2006 and 2007. The action programme would cover in detail the measures as outlined in annex II and III of the directive. End 2009, a draft text was available aiming to be approved early 2010.

**Ireland** established an action programme applicable on its whole territory in 2006. The programme covers all measures referred to in the annex of the directive and set detailed rules for farmyard management, storage requirements, closed periods for fertilisation, distance rules towards waters for fertilisation, procedures for land application to minimise pollution risks and provisions for nutrient management aiming balanced fertilisation for both nitrogen as phosphorus through a system of detailed application standards in function of the nitrogen and phosphorus content of soil and the crop nutrient needs.

**United Kingdom** for Northern Ireland established an action programme applicable on the whole region in 2006. For the regions England, Scotland and Wales a new action programme was established in 2008 referring to specific designated vulnerable zones. Both programmes covers all the measures referred to in the directive, including detailed rules on closed periods, land application procedures including application techniques, storage requirements, limitation

of fertilisation through means of a calculated balance system in combination with maximum application standards for grassland (Northern Ireland) and application standards based on crop type and soil conditions and land cover and specific provisions for application near waters and on slopes. England, Scotland and Wales introduced the obligation to draft a parcel risk map taking account of field slope, vicinity of waters, soil and crop type, etc. Northern Ireland established as well a specific regulation on phosphorus management regulating balanced phosphorus application in function of soil phosphorus status, crop phosphorus needs and phosphorus availability in (organic) fertilisers.

**Belgium** established in 2007 a new action programme for the regions Flanders and Wallonia. The Flemish action programme refers to the whole territory and includes reinforced action regarding closed periods, nitrogen application standards, storage capacity, livestock excretion values for nitrogen and phosphorus, and a reinforced system of phosphorus limitation in function of crop type and soil phosphorus saturation grade. The action programme introduces as well GPS recording of manure transports like it was already the case in the Netherlands. The Walloon region introduced measures that apply on the whole territory referring to minimum storage capacity, closed periods, procedures for land application, including closed periods and maximum application standards. The action programme includes in addition reinforced measures that apply only to the designated vulnerable zones like the application standard of 170 kg N/ha from livestock manure, land management procedures, particularly for grassland, land application on slopes and winter cover crop so land.

**The Netherlands** approved a new fourth action programme for the period 2010-2013 that builds further on the former third action programme with reinforced measures, particularly for the sandy areas, that refer to application standards, closed periods, storage capacity requirements and the stimulation of research to and use of innovative techniques for land application and management.

**Denmark** started in 2009 the integration of its action programme into the new green growth strategy policy aiming to ensure that a high level of environmental, nature and climate protection goes hand in hand with modern and competitive agriculture and food industries. The strategy sets specific reduction targets for nitrogen and phosphorus loads towards the aquatic environment.

All New Member States had established action programmes at the date of accession and most of the New Member States started in the period 2006-2009 a thorough revision process of their action programmes in close cooperation the Commission. Detailed discussions, including field visits carried out by Commission staff, were held in Czech Republic, Slovakia, Hungary, Latvia, Lithuania, Slovenia and Poland.

**Poland, Czech Republic, Slovakia and Hungary** established new action programmes in 2008. The polish implementation exists of a national ministerial framework order and 21 regional action programmes detailing the specific measures referred to in the annexes of the directive. The other countries have established one action programme that applies to the designated zone or zones in the state.

**Lithuania** has established a new action programme in 2009 while for **Slovenia**, and **Estonia** the revision process was still ongoing in 2009. **Latvia** on the other hand established one regulation implementing the action programme that has been amended several times during the period 2004-2009.

The new programmes substantially improve the first action programmes, however further technical analysis and discussions are required in order to ensure full compliance with the directive.

For **Bulgaria** and **Romania**, that joined the EU in 2007, the Commission has started first discussions on the quality of the action programmes. Bulgaria established one action programme that applies to all designated vulnerable zones while Romania established a federal framework decree and specific action programmes on commune level, resulting in over than four hundred action programmes country wide. However, the Romanian authorities work on simplification of NVZ designation and integration of action programmes.

Furthermore, it should be noted that for the action programmes of **Hungary**, **Spain** and **Cyprus** particular attention is paid to irrigation systems requiring farmers to take into account both the amount of water and the level of fertilizer application, in order to minimize its risks of losses. In **Hungary** farmers who want to use irrigation are required to have an irrigation soil conservation plan and a water law permit issued on the basis of this plan. In **Cyprus**, about 85-90% of farmers apply advanced irrigation techniques regulating water supply in function of actual crop water needs and for this reducing leaching risks.

## Chapter IV

### Links with other EU policies

#### *Water Quality*

The Water Framework Directive<sup>15</sup>, which entered into force in 2000, aims to reach a good status of European water bodies by 2015 by establishing an integrated approach to the protection of waters. The Nitrates Directive forms integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures. Besides nitrogen, phosphorus is a key nutrient in fertilisation practices and both elements play an important role in triggering eutrophication processes. The application needs to be controlled in order to attain good ecological status of waters. Several Member States, including Ireland, United Kingdom for Northern Ireland, the Netherlands and Belgium, have recognised this and included specific phosphorus controlling measures within their legislation. Several other Member States, particularly those having areas characterised by intensive livestock farming, will need to include phosphorus controlling measures within their legislation in order to meet the water quality goals stated in the Water Framework Directive. Member States will also need to integrate nitrate action programmes into River Basin Management Plans and Programmes of Measures containing the required actions in order to reach good ecological status of waters. Member States are working on integration of established monitoring networks under the Nitrates Directive into the networks established under the Water Framework Directive<sup>16</sup>.

The Groundwater Directive<sup>17</sup>, which entered into force in January 2007, aims to prevent and control groundwater pollution. The transposition of this directive was due by January 2009. The Directive requires Member States to establish threshold values for pollutants and indicators of pollutants causing a risk that the conditions for good chemical status of groundwater bodies are not being met. For nitrates, it confirms as quality standard the trigger quality value of 50 mg nitrate introduced by the Nitrates Directive. By this, it complements the Nitrates Directive by giving a clear time line for attaining the threshold of 50 mg/l in groundwater bodies. Furthermore, Member States are required to identify any significant and sustained upward trends of pollutants, including nitrates, and to reverse these trends on the basis of the programme of measures defined under the Water Framework Directive. Consequently, the requirements of the Nitrates Directive concerning trend and action programmes will have to be closely operated with the implementation of the Groundwater and Water Framework Directives.

It should be noted that if the nitrate quality standard of 50 mg per litre is not adequate for achieving the environmental objectives, more stringent values have to be

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<sup>15</sup> Directive 2000/60/EC

<sup>16</sup> See also point 4, monitoring networks

<sup>17</sup> Directive 2006/118/EC

established by Member States and several Member States have already indicated to set a more stringent threshold value for nitrates than the 50 mg nitrates per litre<sup>18</sup>.

### *Air quality and climate change*

All activities related to livestock management, including housing, chemical and organic fertiliser management, manure storage and fertilizers application have an impact on the environment. Besides losses of nitrates (NO<sub>3</sub><sup>-</sup>) to waters, the emissions of the greenhouse gasses nitrous-oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) cause impacts. Those gases are characterised by a global warming potential of 310 (for N<sub>2</sub>O) and 21 (for CH<sub>4</sub>) times higher than CO<sub>2</sub><sup>19</sup>. The emissions of ammonia (NH<sub>3</sub>) are responsible for impacts on human health, eutrophication of waters and acidification of soils. The field of application of the Nitrates Directive overlaps with EU policies related to the limitation of pollutants responsible for acidification, eutrophication and ground-level ozone pollution (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia)<sup>20</sup>, the control of industrial emissions, including from intensive livestock units<sup>21</sup>, and climate change strategies.

Scientific analysis<sup>22</sup> has shown that measures to be established in action programmes taken under the scope of the Nitrates Directive - therefore aiming at the emission reduction of nitrates to waters – represent "win win" solutions, as they also decrease atmospheric emissions of nitrogen compounds. In particular, the analysis showed that a "Nitrate Directive fully implemented" scenario would result in additional emission reductions of 14% and 6% respectively for ammonia and nitrous oxide in 2020 compared to 2000. The Commission will continue to study these synergistic effects in order to assess this impact in detail, particularly effects related to derogations allowing farmers to apply higher amounts of manure on land.

### *Agricultural policies*

The implementation of the Nitrates Directive has strong links with the common agricultural policy (CAP), related both to direct support and rural development.

Direct payments to farmers as well as certain rural development payments are subject to cross compliance. This means that, in order to avoid any possible reduction in the total level of support received under these aid schemes, farmers must comply with 18 statutory management requirements, including the Nitrates Directive, and a number of requirements for ensuring the 'good agricultural and environmental condition' of agricultural land.

The main instrument under rural development for environmental protection is the agri-environmental measure, which is the only measure Member States are required to include in their rural development programmes reflecting its importance for

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<sup>18</sup> Austria (45 mg/l); Ireland (37.5 mg/l); United Kingdom (between range 18-42 mg/l); Hungary (range between (25-50 mg/l); Latvia (48.7 mg/l)

<sup>19</sup> Climate Change 1995, The Science of Climate Change: Summary for Policymakers and Technical Summary of the Working Group I Report.

<sup>20</sup> Directive 2001/81/EC on National Emission Ceilings for certain pollutants (NEC Directive).

<sup>21</sup> Directive 2008/1/EC concerning integrated pollution and control (IPPC directive, codified version).

<sup>22</sup> Commission report 'Integrated measures in agriculture to reduce ammonia emissions', Alterra, 2007

environmental integration. Agri-environment commitments must go beyond baseline standards, including cross compliance standards as well as minimum requirements for fertiliser and plant protection product use established by national legislation. In relation to the Nitrates Directive, this means that farmers must go beyond the obligations specified in the nitrate action programmes for nitrate vulnerable zones and beyond provisions in the codes of good agricultural practices outside vulnerable zones. For the period 2007-2013, Several Member States have included in their rural development programmes agri-environmental measures that relate to nutrient management such as the establishment of wider buffer strips near water courses or reduced fertilisation application levels. The support for investments (e.g. for manure storage) is another important rural development measure contributing to the implementation of the Nitrates Directive.

#### *Research policies*

Actions undertaken under the 6<sup>th</sup> and 7<sup>th</sup> Framework Programme contributed on the better understanding of nitrate pollution pathways. It is particularly referred to the Euroharp (FP6) and Genesis (FP7) projects. The Euroharp project assessed different methodologies for quantifying diffuse losses of nutrients aiming to provide policy makers information on their ability to estimate diffuse nutrient losses to surface fresh water systems and coastal systems and by this facilitating implementation of the Water Framework Directive. The Genesis project expects to provide tools to assess land use and climate impacts on ground water and related ecosystems which will set the basis for future and better groundwater management.



## Chapter V

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