EEA/NSV/10/002 – ETC/ICM

European Topic Centre
Inland, coastal, marine waters

Emissions of chemicals to Europe's waters
Analysis of data reported under European data flows

ETC/ICM Technical Report x/2014

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Abbreviations:

AKU: Anita Künitzer, UFZ
BJ: Bo Jacobsen, EEA
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Content

1 Introduction

Emissions to water are a key component of any water or water related European Directives, but no directive or legislation covers all types of emissions to water, and mostly not with sufficient source apportionment.

SoE Emissions reporting was established in 2009 (following a test in 2008) to improve the European-wide overview of emissions to water, their apportionment and trends based on aggregated data at national RBD or RBD-subunit level, in exceptional cases at national level. SoE Emissions is focused on the quantification of pollutants from point and diffuse sources and covers significant determinands such as BOD, COD, nutrients, metals and hazardous substances. The data flow is further described in the Reporting Obligations Directory (ROD): http://rod.eionet.europa.eu/obligations/632.

SoE Emissions have a partial overlap with other related data flows at European level, where data on emissions are included as mandatory, agreed or additional data. The related data flows are data reported under the Urban Waste Water Treatment Directive, the European Pollutant Release and Transfer Register, the Water Framework Directive and the OECD/Eurostat Joint Questionnaire.

This data report presents an overview of SoE Emission data as well as an overlapping with the other emission data flows and, where applicable, draws comparisons between the existing emission data flows. So this report can then be a basis for further discussions and developments on streamlining and improving the data flows on emissions to water on a European level.

2 Overview of data flows on emissions to water under different reporting obligations

2.1 Available data on emissions to water

Emissions to water are requested under several reporting obligations: European Pollutant Release and Transfer Register (E-PRTR – as the main focus) and the Urban Waste Water Treatment Directive (UWWTD - as additional data), both cover detailed point sources data at facility level, SoE Emissions, OECD/Eurostat Join Questionnaire and the Water Framework Directive (WFD) include aggregated point and diffuse sources emissions at RBD (or country) level; also the E-PRTR contains a small section on diffuse emissions. However, all the existing sources of data have different approaches and different definitions of emissions data and also different ranges and details of emissions.

The following overview shows the different reporting obligations illustrated in this report and the types of emissions. However, detailed and important differences in reporting are mentioned in the following chapters.

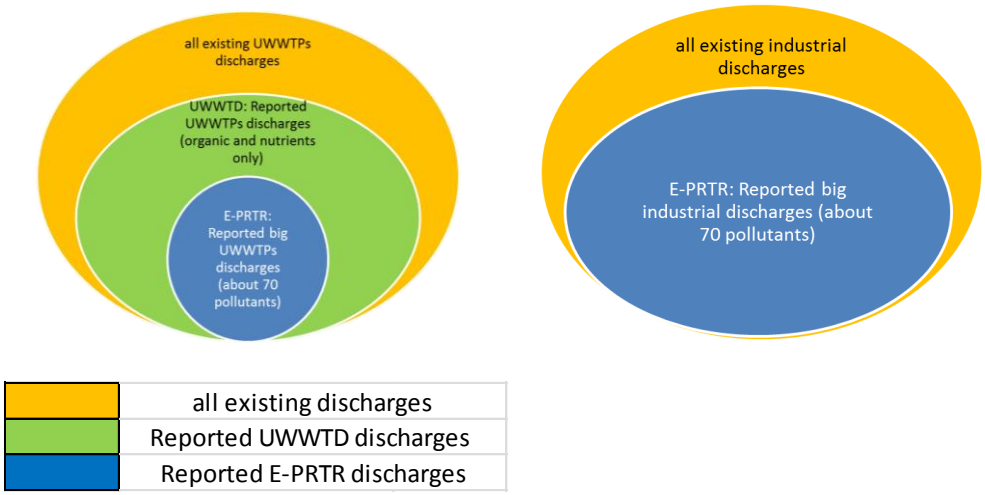
Reporting obligations for emissions	UWWTD	E-PRTR	WFD	OECD Eurostat/JQ	SoE Emissions
Diffuse sources	not reported	not reported	aggregated per RBD and sub-unit	aggregated per country and region	aggregated per RBD or sub-unit, detailed apportionment
Point sources - UWWTPs	facility level	above 100000 p.e., facility level	all point sources, aggregated per RBD and sub-unit	aggregated per country and region	aggregated per RBD or sub-unit, detailed apportionment
Point sources - untreated UWW	rarely, facility level	not reported		aggregated per country and region	aggregated per RBD or sub-unit, detailed apportionment
Point sources - industrial WWTPs	not reported	selected sectors, facility level		aggregated per country and region	aggregated per RBD or sub-unit, detailed apportionment
Point sources - industrial untreated WW	not reported	not reported		aggregated per country and region	aggregated per RBD or sub-unit, detailed apportionment

2.1.1 Point sources emissions – facility level

Two pieces of European legislation cover emissions at facility level – UWWTD (as additional data) and the E-PRTR (see Fig. 2.1). While the UWWTD focuses on Urban Waste Water Treatment Plants (UWWTP) only, the E-PRTR includes some UWWTPs as well as industrial facilities. The E-PRTR has mandatory reporting at facility level for UWWTPs above 100,000 p.e. and an over reporting threshold for about 70 pollutants. The UWWTD dataflow includes (as additional data) organic matter and nutrients typically based on monitoring data for compliance assessment. Emissions from urban waste water plants are reported under both data flows. The UWWTD includes a wider range of UWWTPs (above 2.000 p.e. and partly

smaller ones), more valuable information which is missing in the E-PRTR (e.g. entering load, design capacity and volume of waste water), nevertheless discharges are focused on organics and nutrients only and the information is reported as additional data on a voluntary basis. Discharges from industrial facilities, treated in independent waste water plants (i.e. not treated in urban waste water treatment plants) are included in the E-PRTR only. The E-PRTR has mandatory reporting at facility level for certain sectors only (for more detail see chapter 2.2).

Fig. 2.1 Existing and reporting point emissions at facility level (UWWTPs and industrial discharges)



SoE Emissions aim to cover almost all existing discharges (orange colour).

2.1.2 Point sources emissions – RBD or country level

Aggregated point sources emissions are reported under SoE Emissions, OECD/Eurostat and the WFD (see Fig. 2.2 – 2.4). While SoE emissions are detailed and parted according to source, treatment and size, OECD/Eurostat data are split according to source and treatment; WFD data include only the sum of all `significant` point sources in RBDs and "significant" could be subject to many different interpretations (see document "A User Guide to the WFD Reporting Schemas").

Fig. 2.2 Reported SoE point source emissions at RBD level

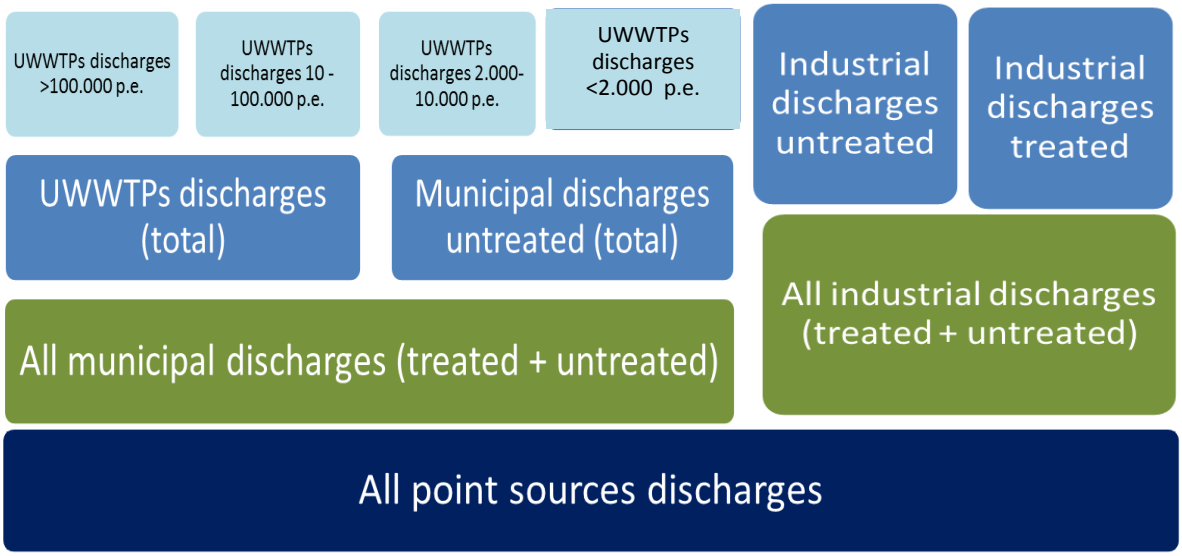


Fig. 2.3 Reported OECD/Eurostat point source emissions at country or regional level

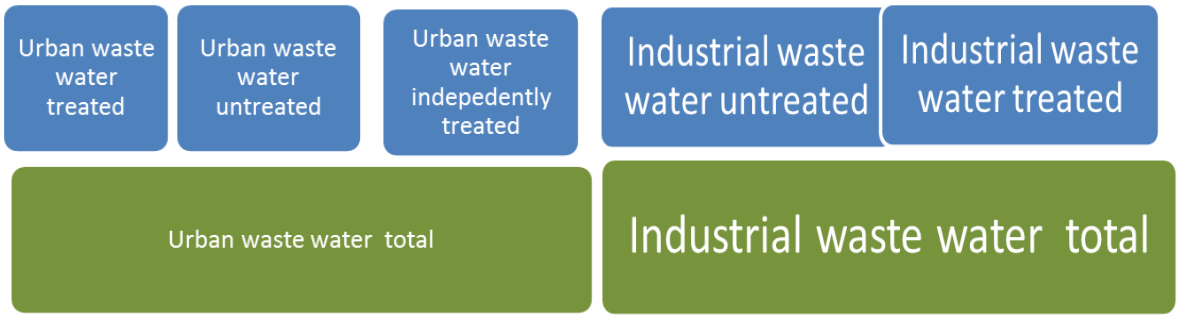


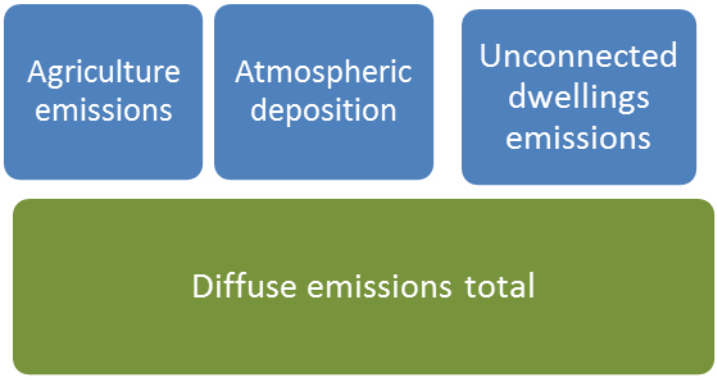
Fig. 2.4 Reported WFD point source emissions at RBD level

It appears from the above figures that the 3 data flows have several different aggregations and cover different selections of facilities and/or emissions, thus an easy comparison on a 1:1 basis is not possible.

2.1.3 Diffuse sources emissions – RBD or country level

Diffuse sources emissions are reported as aggregated data under the above mentioned sources except the UWWTD and E-PRTR (see Fig. 2.5 – 2.7). As the point source emissions, only SoE Emissions are detailed and parted according to source (see Fig. 2.5) (at RBD level), the other sources require only the sum of the emissions: OECD/Eurostat requires all non-point sources discharges (at country or regional level), the WFD requires all significant diffuse sources discharges (at RBD level). Published E-PRTR diffuse emissions currently include only nitrogen and phosphorus loss from agriculture per country. Moreover, all of the sources are very vague regarding which diffuse emissions are covered (for existing definitions see chapters 2.2 – 2.5 and 3.1).

Fig. 2.5 SoE diffuse emissions at RBD level



Note: SoE Emissions includes more categories (see chapter 2.4)

Fig. 2.6 OECD/Eurostat diffuse (non-point) emissions at country or regional level

Fig. 2.7 WFD diffuse emissions at RBD level

2.2 E-PRTR releases data

The E-PRTR water releases data (http://prtr.ec.europa.eu/) is reported annually by individual facilities across 65 economic activities in Europe. Pollutant releases have to be reported when exceeding specific thresholds specified in Annex II of the E-PRTR Regulation. The database covers the 27 EU Member States as well as the European Fair Trade Association (EFTA) countries (Iceland, Liechtenstein, Norway, Serbia and Switzerland).
The register contains data reported annually by urban waste water treatment plants and industrial facilities across Europe.

For each facility, information is provided concerning the amounts of pollutant releases to water as well as off-site transfers of pollutants in waste water from a list of 71 key pollutants

including chlorinated organics, other organics, heavy metals, pesticides, and inorganic substances from 2007 to 2010. Some information on releases from diffuse sources (to air and nitrogen and phosphorus loss from agriculture to water) is also available and will be gradually enhanced. Diffuse sources are defined as the many smaller or scattered sources from which pollutants may be released to water, whose combined impact may be significant and for which it is impractical to collect reports from each individual source.

A facility has to report data under E-PRTR if it fulfils the following criteria:

- the facility falls under at least one of the 9 E-PRTR industrial sectors (energy, production and processing of metals, mineral industry, chemical industry, waste and waste water management, paper and wood production and processing, intensive livestock production and aquaculture, animal and vegetable products from the food and beverage sector, and other activities) and exceeds at least one of the E-PRTR capacity thresholds (e.g. ferrous metal foundries with a production capacity of 20 tonnes per day or installations for the intensive rearing of poultry with 40.000 places for poultry)
- The facility releases pollutants which exceed specific thresholds specified for water in Annex II of the E-PRTR Regulation.

The waste water treatment plants covered are UWWTPs with a capacity of above 100.000 p.e. (population equivalent) and Independently Operated Waste Water Treatment Plants (industrial facilities' waste water which is not treated in UWWTPs) serving one or more E-PRTR Annex I activities (IOWWTP) with a capacity of above 10.000 m^3 per day. Emissions to water (releases) are reported if they exceed threshold values (e.g. 50.000 kg per year of nitrogen, 5.000 kg of phosphorus, 5 kg of arsenic or 1 kg of atrazine.
The reported releases are given in kg per year. The whole database is available to the public .

2.3 UWWTD discharges data

The UWWTD database contains data obtained from the biannual reporting of Member States (MS) on the UWWTD implementation. The UWWTD data set covers information on agglomerations with a generated load of ≥ 2,000 p.e. and some with smaller ones. Other information includes UWWTPs connected to the agglomerations, and the size of the UWWTP according to its entering load and capacity (in p.e.). Reporting of the discharged loads of nutrients (N, P) and organic matter, (BOD and COD) (expressed in tonnes per year) from the UWWTP is voluntary – in the last UWWTD data request, 15 Member States reported data on discharge loads. No diffuse sources are reported under the UWWTD.

The ID codes of UWWTPs are different from those used in the E-PRTR database, which makes comparative analyses more difficult. Although Member States were asked to provide matching ID codes as additional data in the UWWTD reporting; only Romania updated their ID codes accordingly. The results of previous comparative analyses (based on geographical analyses and similar names of facilities) were part of annual E-PRTR reports.
The dataset used in the report is the latest dataset available at the time of this report and pertains to the reference year 2009 or 2010. The data set contains reports from the 27 EU countries and Norway.
Public database (http://www.eea.europa.eu/data-and-maps/data/waterbase-uwwtd-urban-waste-water-treatment-directive-3) includes all of the above mentioned information.

2.4 OECD/Eurostat emissions data

All water related data are included in the OECD/Eurostat Joint Questionnaire (JQ) Emission data in Table 8 (previously Table 7). This table is partly focused on generated load (see Fig. 2.8 and Table 2.1) and on discharges of BOD, COD, nitrogen, phosphorus and heavy metals - Cd, Cr, Cu, Pb, Ni and Zn (see the coloured cells in Table 3.1). Emissions data are aggregated per country or region (NUTS or RBD).

Urban wastewater is divided up into the following categories - discharges after treatment in WWTPs (UWWTPs), discharges after independent treatment and discharges without treatment. Discharges after independent treatment are defined as facilities for preliminary treatment, treatment, infiltration or discharge of domestic wastewater from dwellings generally between 1 and 50 population equivalents, not connected to an urban wastewater collecting system. Examples of such systems are septic tanks. Excluded are systems with storage tanks from which the wastewater is transported periodically by trucks to an urban wastewater treatment plant. These systems are considered to be connected to the urban wastewater system.

Industrial wastewater is reported as discharges after treatment in 'other' WWTPs, discharges without treatment and total industrial discharges. 'Other' WWTPs are defined as treatment of wastewater in any non-public treatment plant, e.g. industrial wastewater treatment plants or treatment facilities of hotels, army camps etc. that do not fall under Independent Treatment nor UWWT. Excluded from "other wastewater treatment" is the treatment in septic tanks.

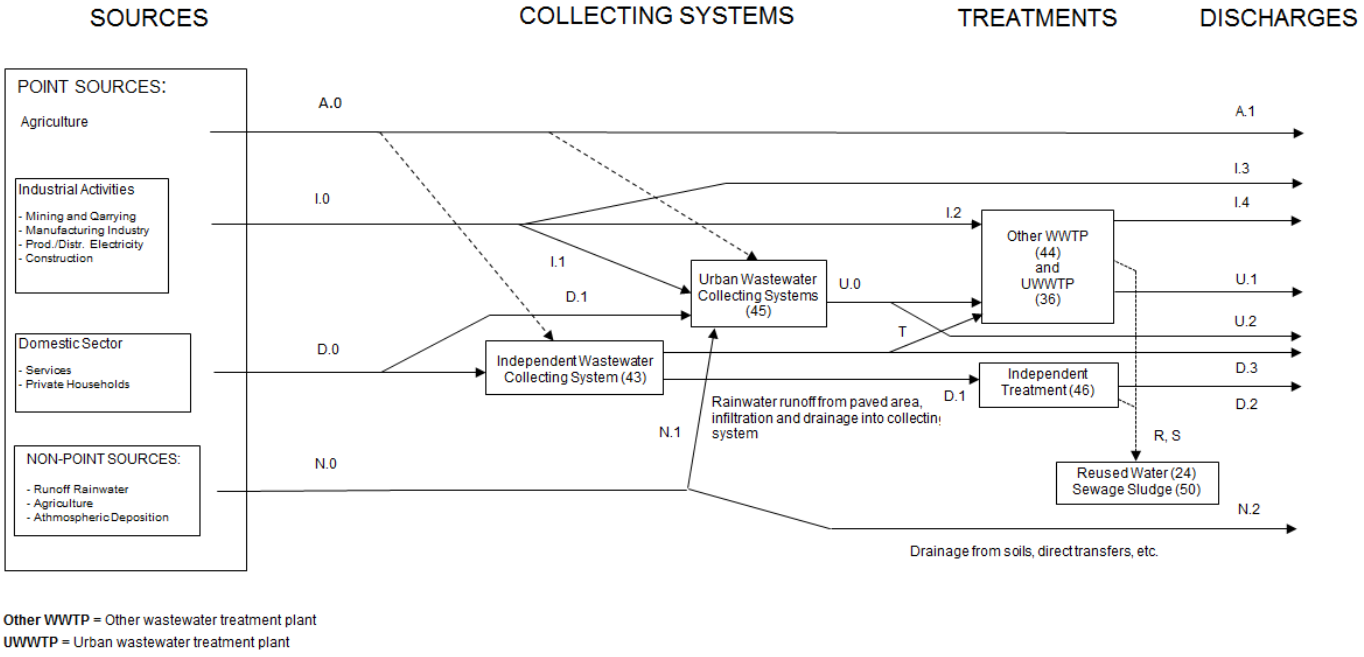
Also total discharges of wastewater treatment plants (urban) and other are included in the table.

Diffuse emissions are specified as direct discharges from non-point sources and because no single definition will be able to cover all possibilities or aspects, they are defined by examples set out in the guidance "Data Collection Manual for the OECD/Eurostat Joint Questionnaire on Inland Waters Tables 1 – 7" (http://ec.europa.eu/eurostat/ramon/coded_files/OECD_ESTAT_JQ_Manual_version_2_21.pdf).

Total discharges to inland waters are defined as all discharges (A.1 - N2) in Fig. 2.8. The data are provided biennially, but they include every year and cannot be related for more than a one year period.

OECD/Eurostat emission database is publicly available on Eurostat websites.

Fig. 2.8 Scheme 3 for Table 8 (OECD/Eurostat JQ 2012):



Other WWTP = Other wastewater treatment plant
UWWTP = Urban wastewater treatment plant

Table 2.1 Emissions data in Table 8 (OECD/Eurostat JQ 2012):

TABLE 8: Generation and discharge of wastewater - 2012		
INLAND WATERS 2012		
COD (53)	10^3 kg O_2/d	Emission data
- **Agriculture, forestry, fishing** (b)	10^3 kg O_2/d	
- **Industry, total**	10^3 kg O_2/d	
* Mining and quarrying	10^3 kg O_2/d	
* Manufacturing industries	10^3 kg O_2/d	
of which: Foodprocessing industry	10^3 kg O_2/d	
Basic metals	10^3 kg O_2/d	
Motor vehicles and transport equipment	10^3 kg O_2/d	
Textiles etc.	10^3 kg O_2/d	
Paper & paper products	10^3 kg O_2/d	
Chemical products & refined petroleum	10^3 kg O_2/d	
* Production & distribution of electricity (excluding cooling w ater)	10^3 kg O_2/d	
* Construction	10^3 kg O_2/d	
- Domestic sources - total (c)	10^3 kg O_2/d	
* Services	10^3 kg O_2/d	
* Private households	10^3 kg O_2/d	
NON-POINT SOURCES (d)	10^3 kg O_2/d	
ALL SOURCES	10^3 kg O_2/d	
TREATMENT AND DISCHARGE OF WASTEWATER		
1. Urban wastewater, total generated (38)	10^3 kg O_2/d	
of which: - **treated** in WWTPs (36,44) : total inflow (34)	10^3 kg O_2/d	
- **discharged :** total (52)	10^3 kg O_2/d	
of which: * discharged after treatment in WWTPs	10^3 kg O_2/d	
* discharged after independent treatment (46)	10^3 kg O_2/d	
* discharged w ithout treatment	10^3 kg O_2/d	
2. Industrial wastewater, total generated (e) (39)	10^3 kg O_2/d	
of which : - **treated** in 'Other' WWTPs: total inflow to (34, 44)	10^3 kg O_2/d	
- discharged : total (52)	10^3 kg O_2/d	
of which : * discharged after treatment in 'other' WWTPs	10^3 kg O_2/d	
* discharged w ithout treatment	10^3 kg O_2/d	
Discharges of w astew ater treatment plants (urban (36) and other (44)) (f)	10^3 kg O_2/d	
3. Agricultural wastewater (incl. forestry + fisheries), direct discharges	10^3 kg O_2/d	
Direct discharges from non-point sources (d)	10^3 kg O_2/d	
Total discharges to Inland waters (52)	10^3 kg O_2/d	
Total discharges to the sea (52)	10^3 kg O_2/d	

	Frequently reported SoE Emission data
	Rarely reported SoE Emission data (aggregated too much)
	Not reported SoE Emission data

2.5 WFD emissions data

WFD emissions data are required as part of the River Basin Management Plans in the 2010 reporting. They cover point and diffuse sources of emissions, and although different categories of point and diffuse sources are mentioned, reported emissions are defined as loads of substances arising from significant point/diffuse sources within RBD (or sub-unit). No other specification was required. Units of emission load could be selected from kg per year, tonnes per year or kilo tonnes per year. The value could be referred to one specific year or time period (several years).

The WFD emissions data per national RBD or sub-unit are included in the WFD master database developed for DG ENV as part of the post-processing of the data reported under the WFD Art. 13 including river basin management plans.
The WFD master database is hosted at the EEA, however, not fully integrated with EEA data services and only made publicly available in the form of aggregated tables[1]. These tables do not include the quantitative emissions data.

[1] http://www.eea.europa.eu/data-and-maps/data/wise_wfd

3 SoE Emissions data flow

3.1 SoE Emissions data – main information

State of Environment (SoE) Emissions data are submitted on an annual basis through the Water Information System for Europe (WISE) voluntary reporting process. It contains nutrients (total N total P), organic matter (BOD, COD) and hazardous substances (mainly heavy metals) emissions discharged to water from point and diffuse sources, aggregated at the national RBD level. The list of hazardous pollutants is not limited, but some of them are labelled as "preferred data" (see Table I in the Annex) where extra efforts have been made for solving QA problems. No thresholds are applied, which makes this dataflow applicable for reporting total emissions to water. The reported emissions data are available in the Eionet Central Data Repository: http://www.eea.europa.eu/data-and-maps/data/waterbase-emissions-3. SoE emission reporting has the current status as not being a priority data flow within Eionet as it is not a direct data source for the EEA core set of indicators. The scheme on Fig. 3.1 shows the whole structure of the required data.

Although SoE Emissions data are required as aggregated per spatial unit (it is possible to use River Basin District, sub-unit or water body), the structure of the data is selected according to the type of emissions (point/diffuse), source (urban waste water, industrial waste water, agriculture diffuse etc.), size of UWWTPs according to p.e. and the type of treatment (treated/untreated). All point sources emissions can be labelled during reporting if they contain E-PRTR emissions only, non E-PRTR emissions or both. Detailed information about required emission data is available in the Data Dictionary (http://dd.eionet.europa.eu/datasets/3091).
Emissions data have a hierarchical structure, thus in case of a lack of disaggregated information, data could be provided on a more aggregated level (see Tables 3.1 and 3.2).

The SoE emissions reporting, supports the SEIS "report only once" principle. This means that countries can opt not to report data which is already covered under any other reporting obligation. The ETC/ICM added all aggregated E-PRTR data to SoE Emissions in 2012 and countries could provide other reported data by minus codes instead of real values.

Fifteen countries reported SoE data directly in previous years, the period covered by this reporting exercise is 2000 – 2011 (see Table 3.3 for the list of countries reporting SoE Emissions data directly (emissions added by the ETC from E-PRTR are mentioned as E-PRTR reporting in the table). The most frequent pollutants are BOD, COD, N, P and heavy metals; point sources are reported more often than diffuse sources.

Emissions are reported mainly at RBD or sub-unit level, whereas sometimes it is very difficult to check, if sub-units cover the whole country or not (the list of sub-unit is not completed and sub-units were changed frequently in previous years).

Figure 3.1: SoE Emissions reporting scheme

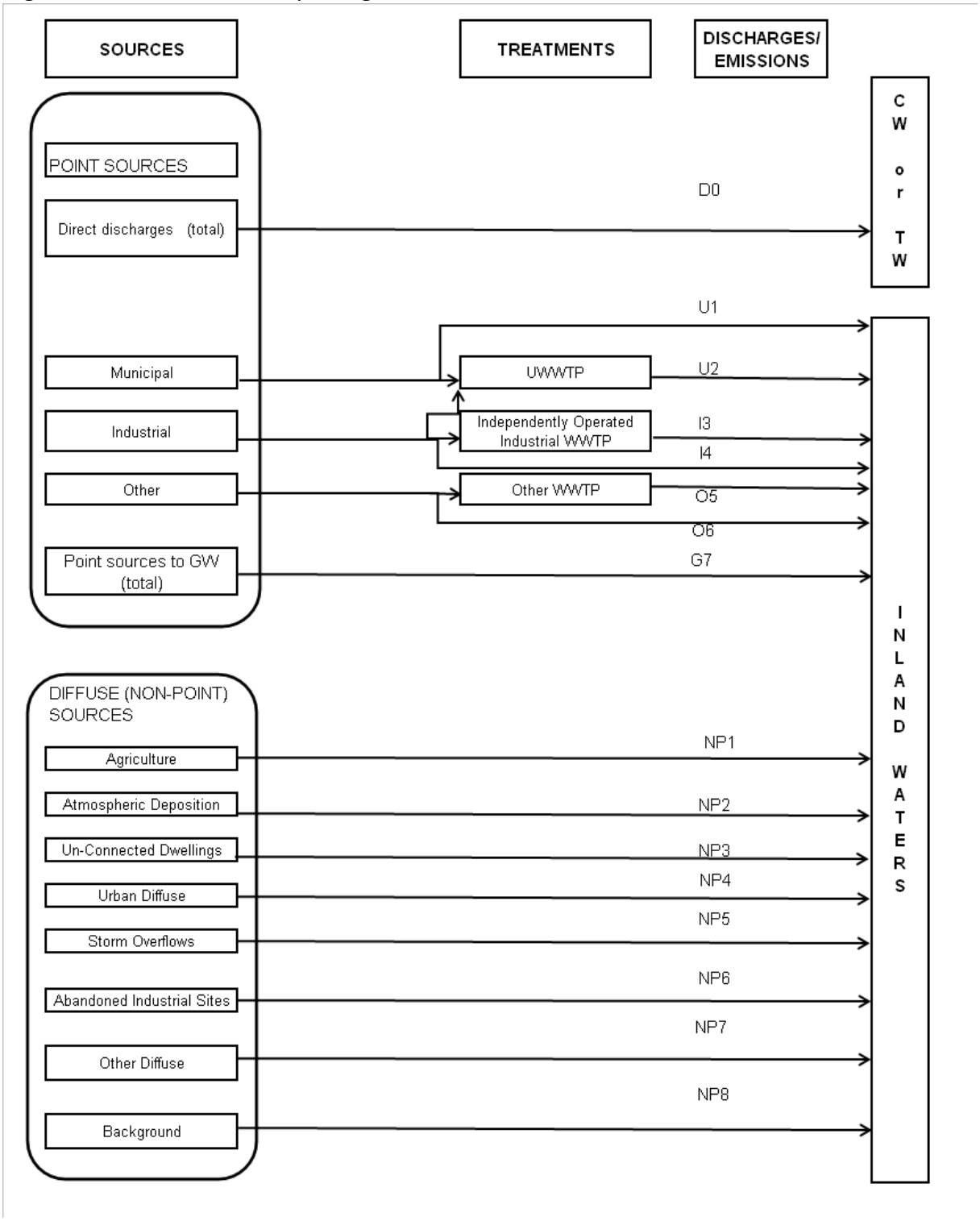


Table 3.1 SoE Emissions point source categories and definitions

Code	Name	Definition
D0	Direct Discharges to Coastal and Transitional Water total	
U21	Urban Waste Water Treated Discharges < 2 000 p.e.	
U22	Urban Waste Water Treated Discharges 2 000 ≥ p.e. ≤ 10 000	
U23	Urban Waste Water Treated Discharges 10 000 > p.e.≤ 100 000	
U24	Urban Waste Water Treated Discharges > 100 000 p.e.	
U2	Urban Waste Water Treated Discharges total	Refers to the discharge of municipal waste water following treatment in an UWWTP. Such wastewater may have come originally from domestic and industrial sources. In addition, it includes any urban runoff, generated during rainfall, which is collected and directed to a treatment plant. Ideally, such treated discharges should not include stormflows that exceed the storage capacity of the system. However, if only combined data is available then please flag.
U11	Urban Waste Water Untreated Discharges < 2 000 p.e.	
U12	Urban Waste Water Untreated Discharges 2 000 ≥ p.e. ≤ 10 000	
U13	Urban Waste Water Untreated Discharges 10 000 > p.e.≤ 100 000	
U14	Urban Waste Water Untreated Discharges > 100 000 p.e.	
U1	Urban Waste Water Untreated Discharges total	Refers to municipal wastewater that is collected but discharged without treatment.
U	Urban Waste Water Discharges total	
I3	Industrial Waste Water Treated Discharges	Refers only to the discharge of treated industrial waste water from **independently operated industrial WWTPs** and not that discharged from municipal treatment plants.
I4	Industrial Waste Water Untreated Discharges	Refers to discharges of industrial wastewater that remain untreated.
I	Industrial Waste Water Discharges total	
O5	Other Waste Water Treated Discharges	
O6	Other Waste Water Untreated Discharges	
O	Other Waste Water Discharges total	
PT	Point Sources to Inland Surface Water total	
G7	Point Sources to Groundwater total	
R	Riverine Input to Coastal Water	

Table 3.2 SoE Emissions diffuse sources categories and definitions

Code	Name	Definition
NP1	Agricultural Emissions	
NP2	Atmospheric Deposition	
NP3	Un-Connected Dwellings Emissions	
NP4	Urban Diffuse Emissions	Refers only to those emissions of pollutants in urban runoff that are not connected to a collecting system.
NP5	Storm Overflow Emissions	Refers to discharges/emissions to a receiving water following exceedance of the storage capacity of the collecting/treatment system during heavy 'storm' rainfall. Ideally, this discharge should be separate from that referred to under 'Urban Waste Water Treated' but if data are only available as combined then please flag.
NP6	Abandoned Industrial Site Emissions	
NP7	Other Diffuse Emissions	
NP8	Background Emissions	
NP	Total Diffuse Emissions to Inland Waters	

Table 3.3: List of countries which reported emissions to SoE Emissions one or more years during the reporting period 2000 – 2011 and/or to E-PRTR

Code	Country	SoE Emissions reporting	E-PRTR reporting*
AT	Austria	yes	yes
BE	Belgium	yes, not the whole country	yes
BG	Bulgaria	yes, at water body level	yes
CH	Switzerland	yes	yes
CY	Cyprus	no	yes
CZ	Czech Republic	yes	yes
DE	Germany	no	yes
DK	Denmark	no	yes
EE	Estonia	yes	yes
ES	Spain	no	yes
FI	Finland	yes	yes
FR	France	yes	yes
GB	United Kingdom	no	yes
GR	Greece	no	yes
HR	Croatia	no	no
HU	Hungary	no	yes
IE	Ireland	no	yes
IS	Iceland	yes	yes
IT	Italy	no	yes
LI	Liechtenstein	no	yes
LT	Lithuania	yes	yes
LU	Luxembourg	no	yes
LV	Latvia	yes	yes
MT	Malta	no	yes
NL	Netherlands	yes	yes
NO	Norway	no	yes
PL	Poland	no	yes
PT	Portugal	no	yes
RO	Romania	yes	yes
RS	Serbia	no	yes
SE	Sweden	yes	yes
SI	Slovenia	yes	yes
SK	Slovakia	yes	yes

*E-PRTR reporting is obligatory for EU Member States. All E-PRTR reported releases were aggregated and added to SoE Emissions by the ETC ICM.

3.2 SoE Emissions – reported data overview and main results

The overview of all reported data is difficult, because Member States reported different pollutants (11 nutrients and organic matter and 136 hazardous substances), different time periods (from 1977 to 2011) and different levels of emission source apportionment. Therefore, many of the pollutants or time periods are unique for one MS or one River Basin District.

Only the most frequent reported data were selected for the overview – 2010 year for point sources and from 2008 to 2010 period for diffuse sources. BOD_5, TOC, total nitrogen and total phosphorus were assessed as the main nutrients and organic matters, seven metals (As, Cd, Cu, Pb, Hg, Ni and Zn) were used as the most frequent reported hazardous substances. All the reported emission data from all Member States are included in this overview except data from Estonia, Lithuania and Bulgaria – they had to be excluded due to the incomplete spatial data. Also added was the E-PRTR data, which are not a part of the overview – they were used for the comparative analysis in the following chapters.

Reported data were aggregated from RBD or sub-unit level to country level and several figures were prepared for point and diffuse sources apportionment (see Figures 3.2 – 3.19). Also time series from Belgium (Flanders region) were prepared as an example – see Fig. 3.20. All the figures (except time series) are shown as a percentile proportion only – the total amount of emission loads cannot be compared among countries – they vary in area, number of inhabitants, industry and completeness of emission loads (e.g. the Czech Republic reported industrial discharges of hazardous substances only). The detailed information about emissions from untreated urban waste waters (U11 – U14) was provided by Romania only; thus they were aggregated as total untreated urban waste waters (U1) in the following figures. Also treated and untreated other waste water emissions (O5 and O6) were aggregated as all other waste water emissions (O).

The aggregated emission data for the figures are provided in the Annex – see Tables II – VII.

Fig. 3.2 Reported BOD_5 (left panel) and TOC (right panel) point sources emission apportionment (2010)

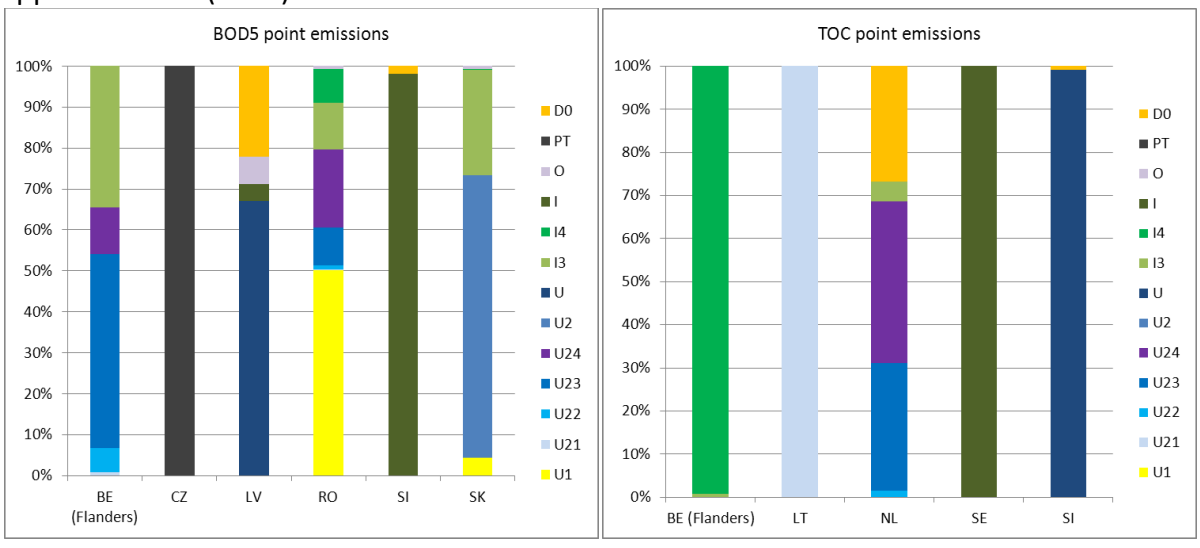


Fig. 3.3: Reported N tot. point sources emission apportionment (2010)

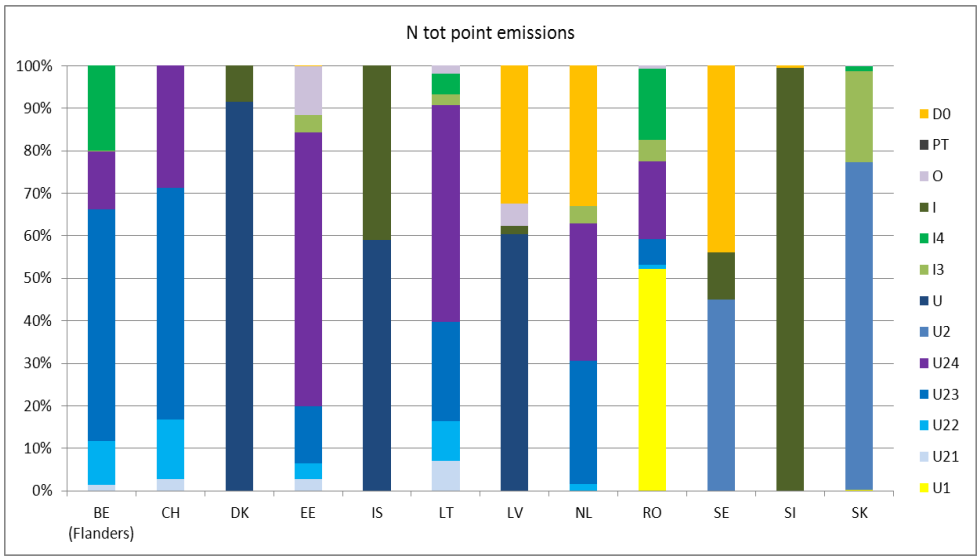
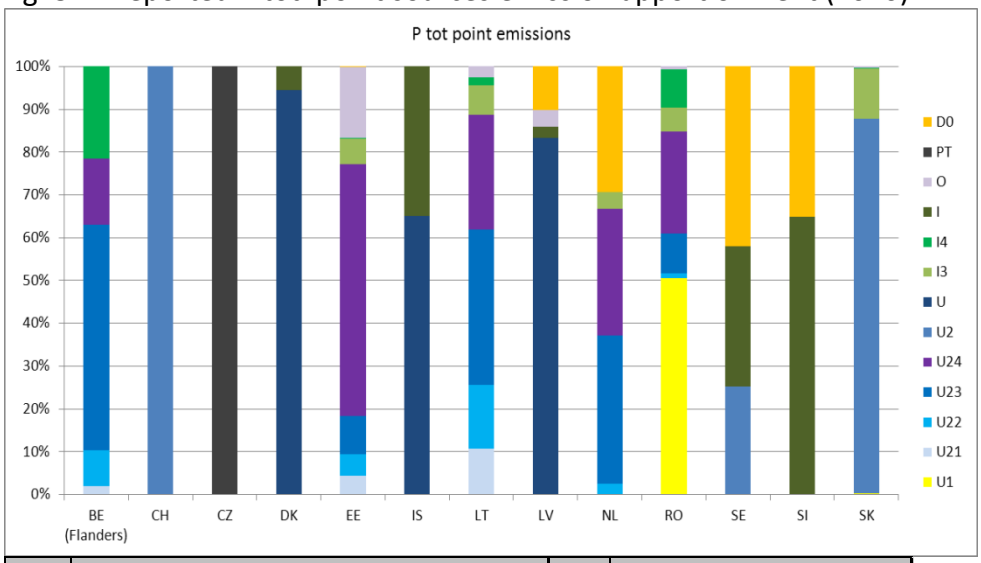


Fig. 3.4: Reported P tot. point sources emission apportionment (2010)



Code	Name	Code	Name
D0	Direct Discharges to Coastal and Transitional Water total	U1	Urban Waste Water Untreated Discharges total
U21	Urban Waste Water Treated Discharges < 2 000 p.e.	U	Urban Waste Water Discharges total
U22	Urban Waste Water Treated Discharges 2 000 ≥ p.e. ≤ 10 000	I3	Industrial Waste Water Treated Discharges
U23	Urban Waste Water Treated Discharges 10 000 > p.e.≤ 100 000	I4	Industrial Waste Water Untreated Discharges
U24	Urban Waste Water Treated Discharges > 100 000 p.e.	I	Industrial Waste Water Discharges total
U2	Urban Waste Water Treated Discharges total	O5	Other Waste Water Treated Discharges
U11	Urban Waste Water Untreated Discharges < 2 000 p.e.	O6	Other Waste Water Untreated Discharges
U12	Urban Waste Water Untreated Discharges 2 000 ≥ p.e. ≤ 10 000	O	Other Waste Water Discharges total
U13	Urban Waste Water Untreated Discharges 10 000 > p.e.≤ 100 000	PT	Point Sources to Inland Surface Water total
U14	Urban Waste Water Untreated Discharges > 100 000 p.e.		

The relatively small proportion of discharges from small municipalities (treated and untreated) could be caused by the non-existence of these discharge measurements. The emission loads from agglomerations for UWWTP`s < 2.000 p.e. could be underestimated. Some countries did not report all of the main categories of emission loads (e.g. Slovenia reported industrial discharges and direct discharges to coastal water only).

While BOD and TOC diffuse emissions were reported by one or two countries only, nitrogen and phosphorus emission load from diffuse sources is modelled (and reported) more often. However, most of the countries reported diffuse emissions from agriculture and urban diffuse emissions. Background emissions (BOD and P tot) were reported by Lithuania only and atmospheric deposition (N tot) only by the Netherlands.

Fig. 3.5 Reported BOD_5 (left panel) and TOC (right panel) diffuse sources emission apportionment (2008 - 2010)

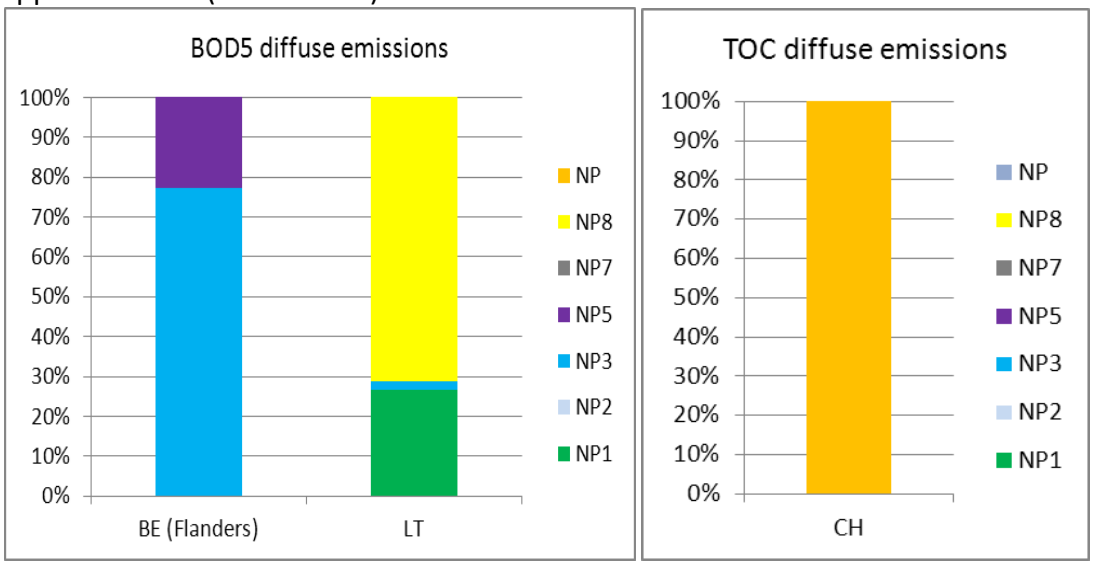
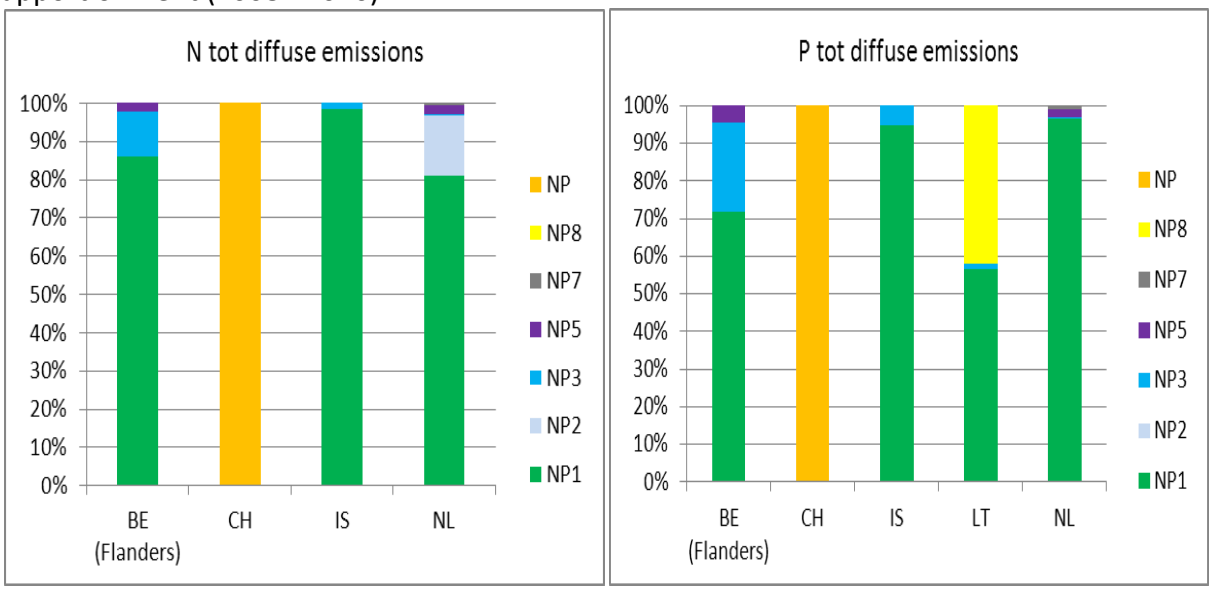
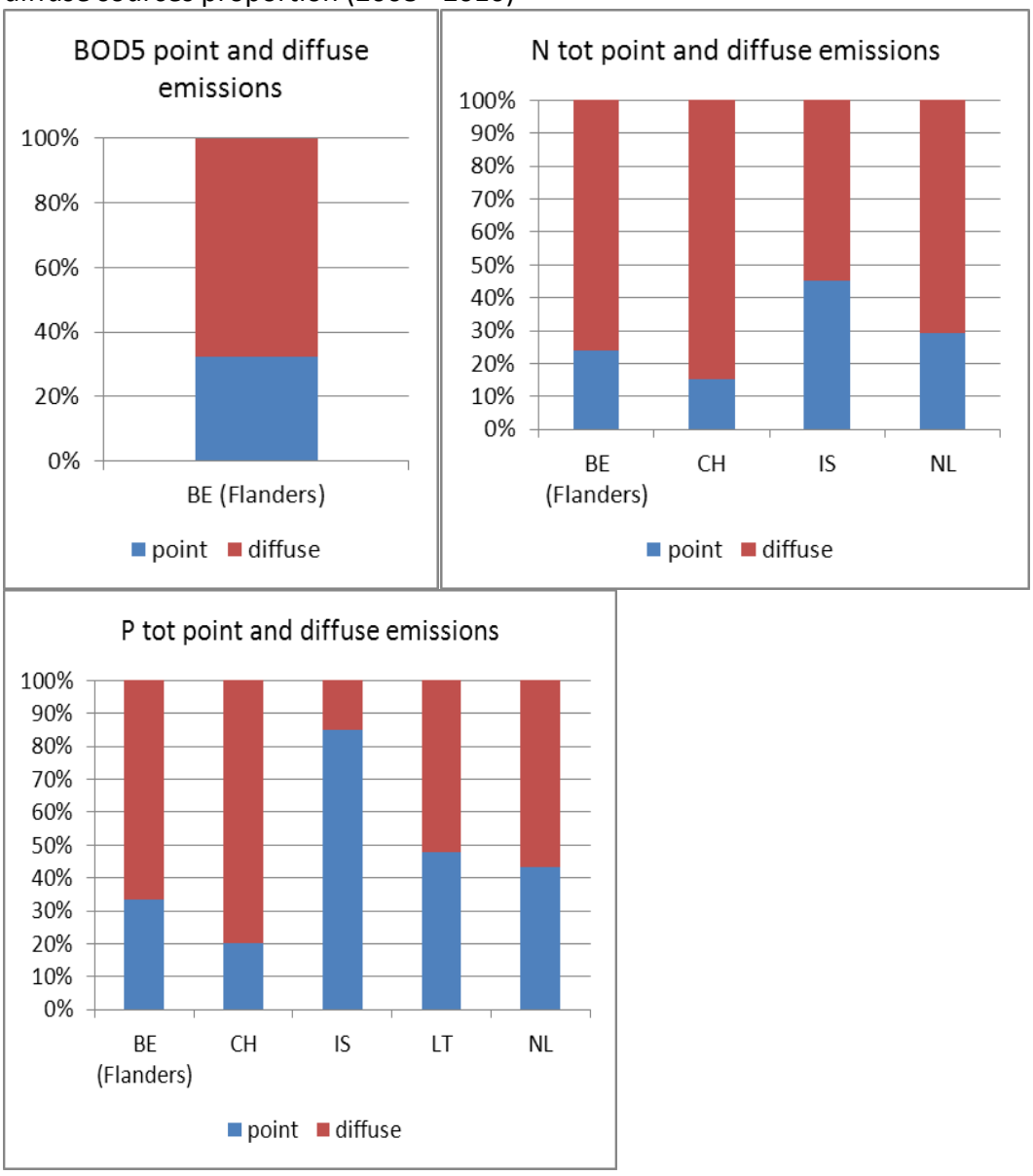


Fig. 3.6 Reported N tot. (left panel) and P tot. (right panel) diffuse sources emission apportionment (2008 - 2010)



Code	Name
NP1	Agricultural Emissions
NP2	Atmospheric Deposition
NP3	Un-Connected Dwellings Emissions
NP4	Urban Diffuse Emissions
NP5	Storm Overflow Emissions
NP6	Abandoned Industrial Site Emissions
NP7	Other Diffuse Emissions
NP8	Background Emissions
NP	Total Diffuse Emissions to Inland Waters

Fig. 3.7 Reported BOD_5 (left panel); N tot. (middle panel) and P tot. (right panel) point and diffuse sources proportion (2008 - 2010)



All assessed countries have higher proportions of diffuse sources for all organic matters and nutrient pollutants – Iceland is the only exemption. However, the quantification of diffuse sources is difficult and point sources emissions could also be underestimated.

Fig. 3.8: Reported as point sources emission apportionment (2010)

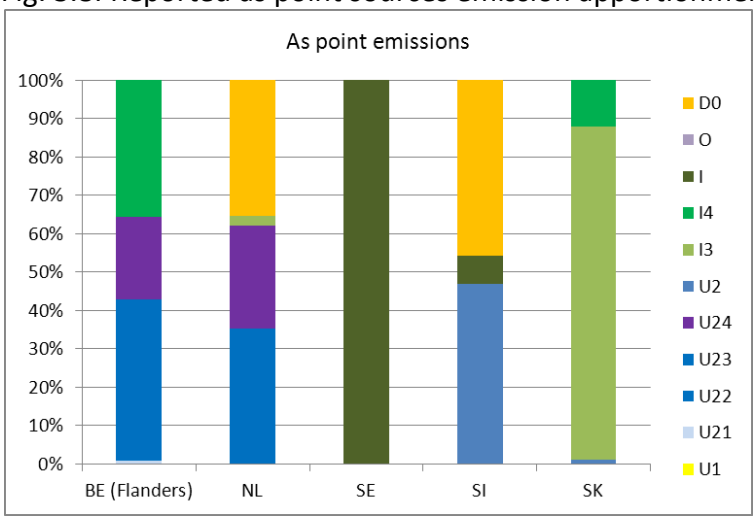


Fig. 3.9: Reported Cd point sources emission apportionment (2010)

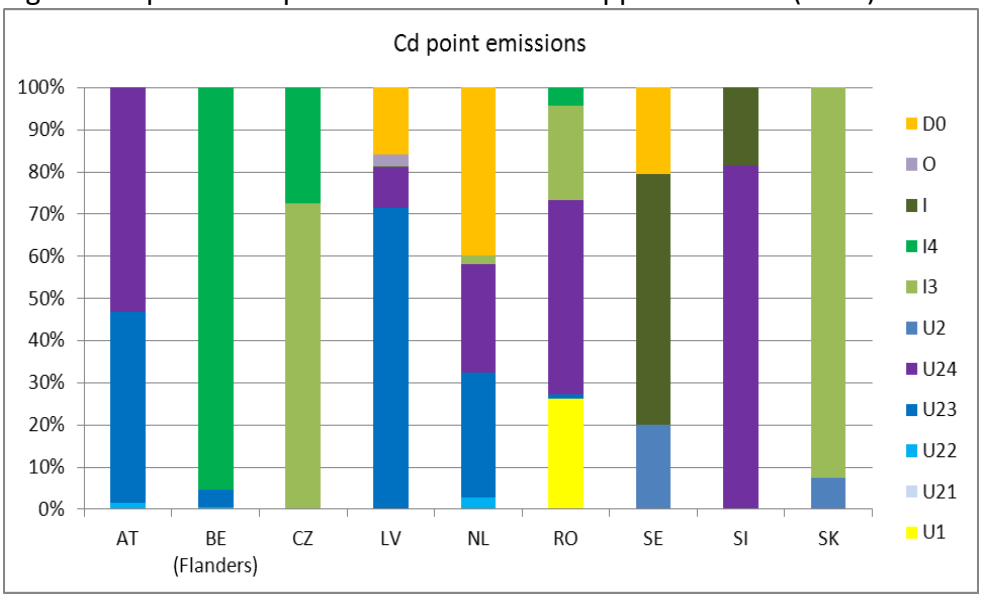


Fig. 3.10: Reported Cu point sources emission apportionment (2010)

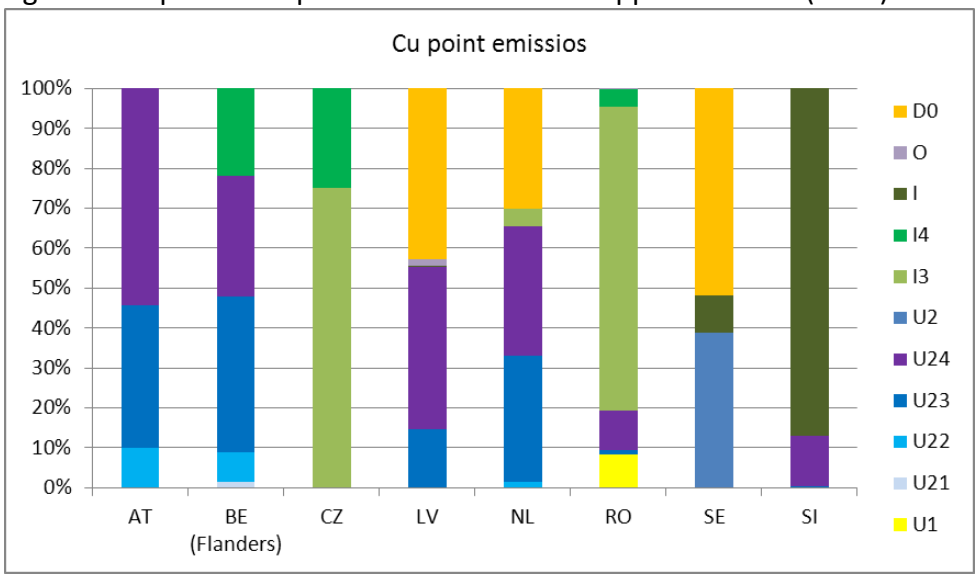


Fig. 3.11: Reported Pb point sources emission apportionment (2010)

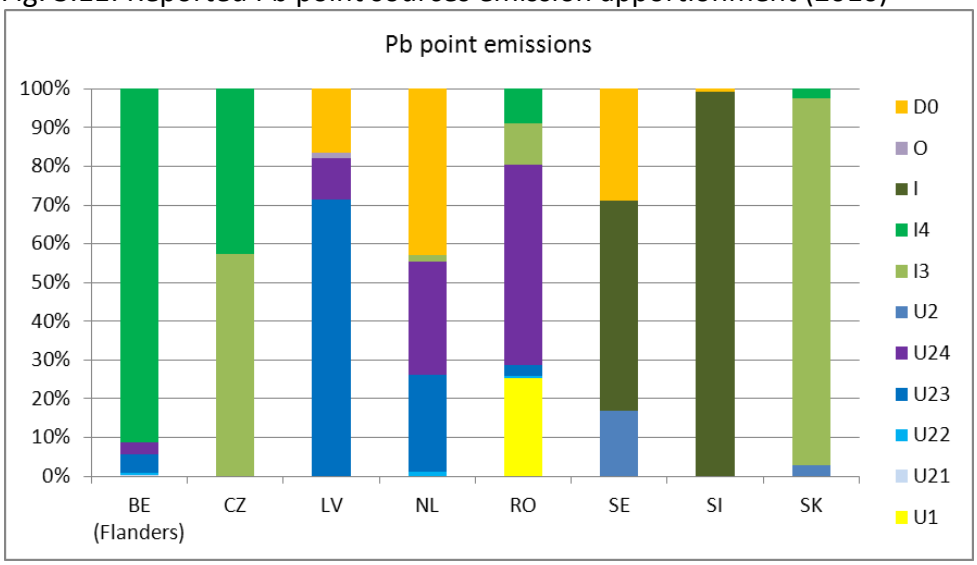


Fig. 3.12: Reported Hg point sources emission apportionment (2010)

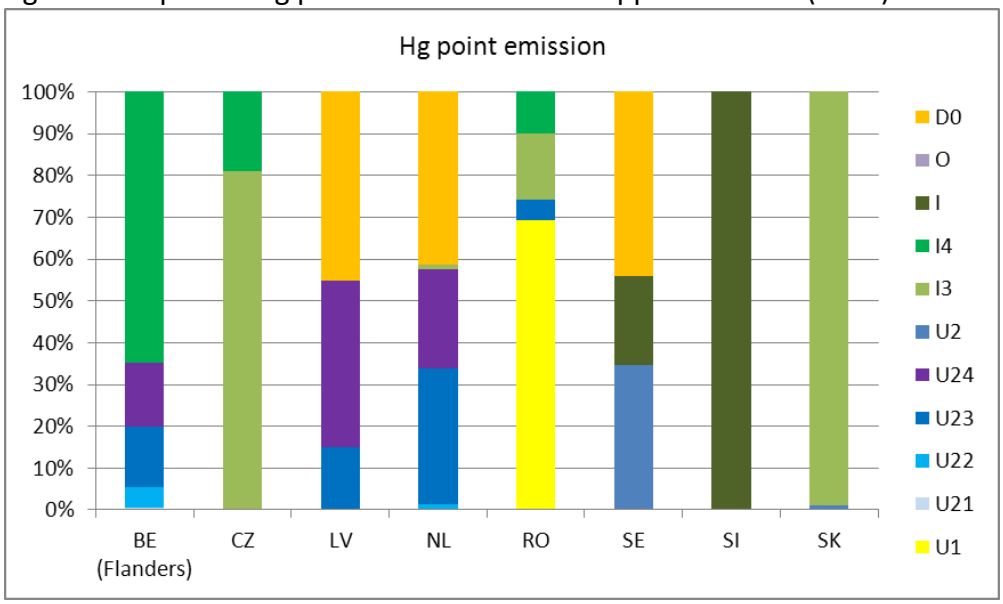


Fig. 3.13: Reported Ni point sources emission apportionment (2010)

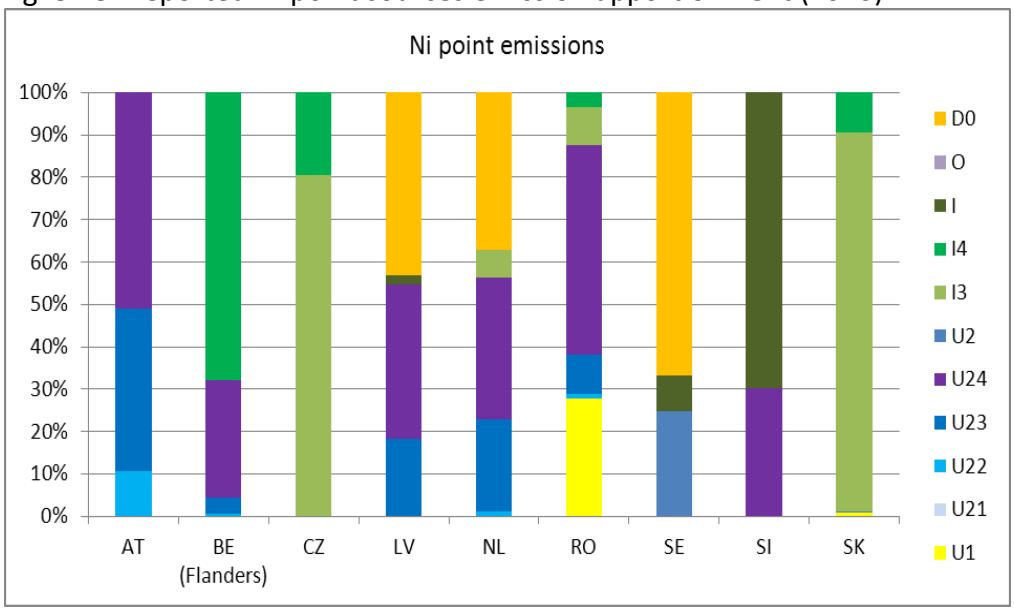
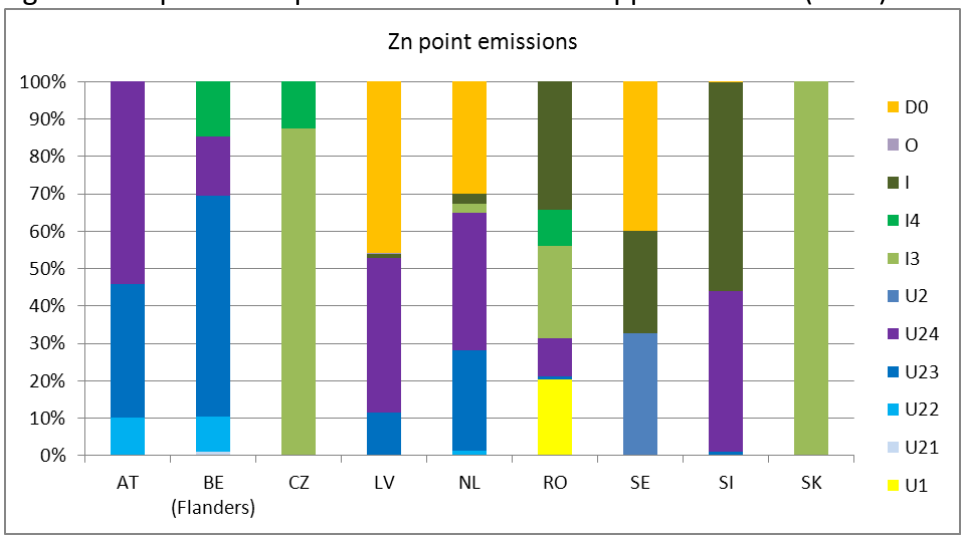


Fig. 3.14: Reported Zn point sources emission apportionment (2010)



Code	Name	Code	Name
D0	Direct Discharges to Coastal and Transitional Water total	U1	Urban Waste Water Untreated Discharges total
U21	Urban Waste Water Treated Discharges < 2 000 p.e.	U	Urban Waste Water Discharges total
U22	Urban Waste Water Treated Discharges 2 000 ≥ p.e. ≤ 10 000	I3	Industrial Waste Water Treated Discharges
U23	Urban Waste Water Treated Discharges 10 000 > p.e.≤ 100 000	I4	Industrial Waste Water Untreated Discharges
U24	Urban Waste Water Treated Discharges > 100 000 p.e.	I	Industrial Waste Water Discharges total
U2	Urban Waste Water Treated Discharges total	O5	Other Waste Water Treated Discharges
U11	Urban Waste Water Untreated Discharges < 2 000 p.e.	O6	Other Waste Water Untreated Discharges
U12	Urban Waste Water Untreated Discharges 2 000 ≥ p.e. ≤ 10 000	O	Other Waste Water Discharges total
U13	Urban Waste Water Untreated Discharges 10 000 > p.e.≤ 100 000	PT	Point Sources to Inland Surface Water total
U14	Urban Waste Water Untreated Discharges > 100 000 p.e.		

Hazardous substances are not regularly monitored and calculated in municipal discharges – especially from smaller municipalities. Some countries did not report metals from municipal discharges (CZ) or from bigger agglomerations only (e.g. Latvia or Slovenia). Austria did not report industrial discharges (except added E-PRTR recorded discharges).

Fig. 3.15 Reported Cd (left panel) and Cu (right panel) diffuse sources emission apportionment (2008 - 2010)

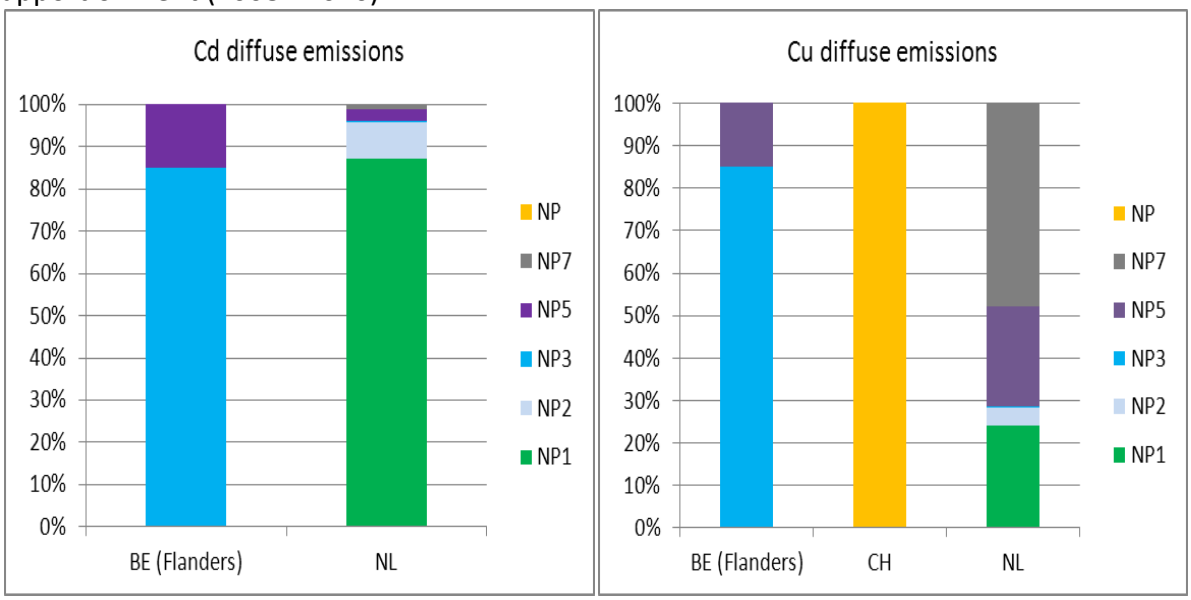


Fig. 3.16 Reported Pb (left panel) and Hg (right panel) diffuse sources emission apportionment (2008 - 2010)

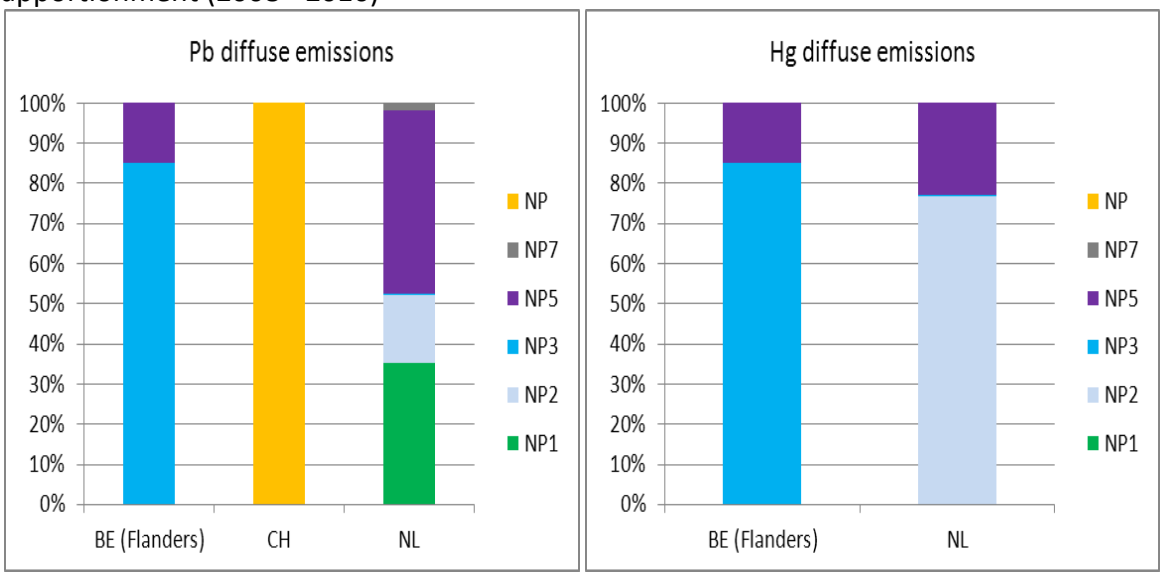
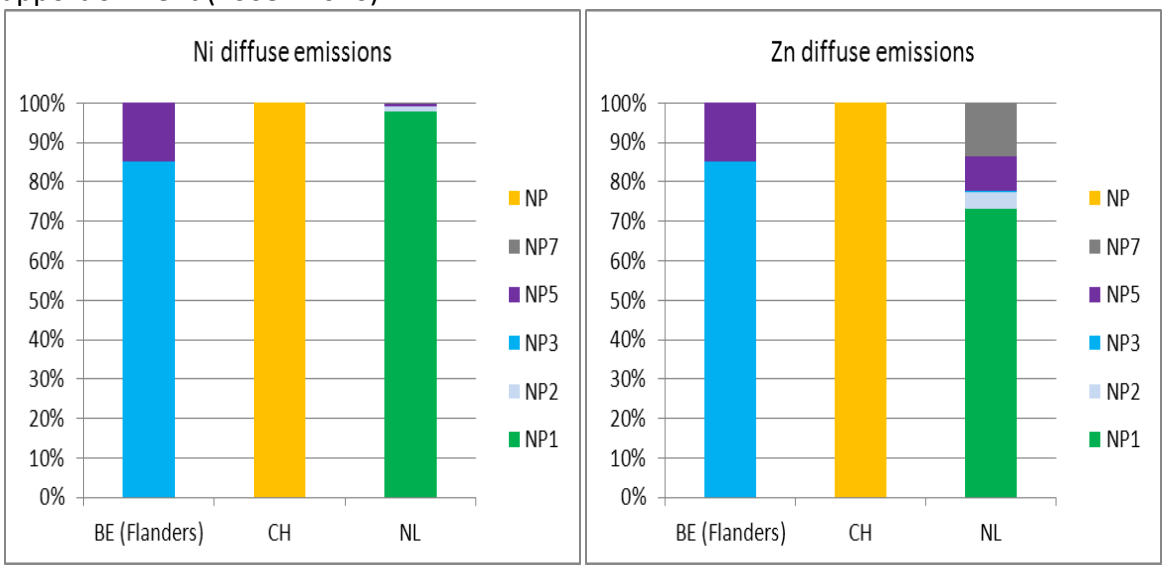


Fig. 3.17 Reported Ni (left panel) and Zn (right panel) diffuse sources emission apportionment (2008 - 2010)



Code	Name
NP1	Agricultural Emissions
NP2	Atmospheric Deposition
NP3	Un-Connected Dwellings Emissions
NP4	Urban Diffuse Emissions
NP5	Storm Overflow Emissions
NP6	Abandoned Industrial Site Emissions
NP7	Other Diffuse Emissions
NP8	Background Emissions
NP	Total Diffuse Emissions to Inland Waters

Diffuse emissions, reported by the Flanders region of Belgium, include un-connected dwelling emissions only and the proportion is almost the same for all metals. Dutch diffuse emissions cover more categories of diffuse sources and agriculture is the most significant source for Cd, Ni and Zn. Atmospheric deposition in the Netherlands is the major source of diffuse pollution for mercury.

Fig. 3.18 Reported Cd (left panel), Cu (middle panel) and Pb (right panel) point and diffuse sources proportion (2008 - 2010 diffuse sources, 2010 point sources).

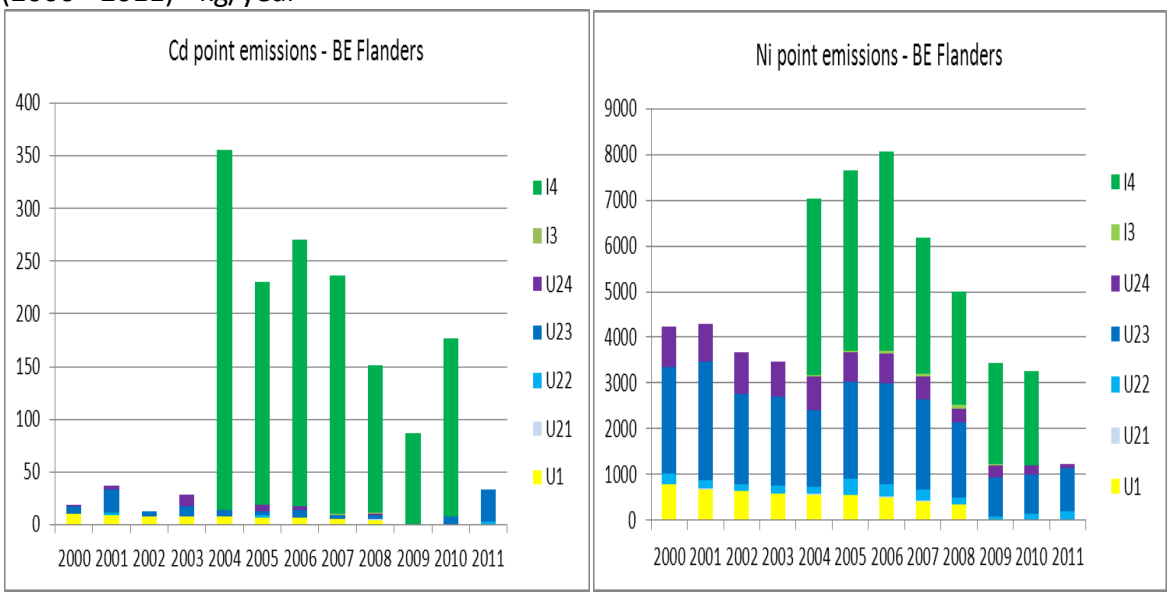
Fig. 3.19 Reported Hg (left panel), Ni (middle panel) and Zn (right panel) point and diffuse sources proportion (2008 – 2010 diffuse sources, 2010 point sources)

The comparison of point and diffuse sources of metal emissions could be prepared for Belgium (Flanders) and Netherlands only – no other Member States reported point and diffuse sources of metal emissions.

Point sources of the emissions of metals are prevailing in Flanders (especially Cd and Zn), while the situation in Netherlands is the opposite.

Two metals (Cd and Ni) from point sources emissions in the Flanders region are shown in an example of time series (see Figure 3.20).

Fig. 3.20 Reported Cd (left panel) and Ni (right panel) point sources time series in Flanders (2000 - 2011) - kg/year



It is difficult to interpret the time series correctly without additional knowledge; however there seems to be significant progress from untreated municipal waste water (yellow) to treated water. Also industrial discharges have a decreasing tendency.

3.3 Comparative analysis among SoE Emissions data, UWWTD data and E-PRTR data

As already mentioned in chapter 2.1, although some overlapping could be identified among different sources of emission data, a comparison is possible only to a limited degree.

The comparison is focused on **point sources** data, because diffuse emissions are not reported so frequently and their definitions and used methodology approaches are very different.

OECD/Eurostat emissions and WFD emissions are **not included** in the analysis due to a very high level of aggregation and the different use of the term "significant" emissions in the WFD data. However, the possible use of SoE Emissions data for pre-filling Table 8 OECD/Eurostat JQ is described in chapter 3.3.

3.3.1 Possibility of UWWTD and E-PRTR data comparison

The common data basis between UWWTD and E-PRTR should be UWWTPs above 100.000 p.e. and their emissions. However, some of the E-PRTR reported UWWTPs have smaller a capacity and some of the UWWTD reported UWWTPs with a high capacity (or entering load) are missing in the E-PRTR.
This type of comparison could be possible at facility level – by use of detailed location and the name of the facility for the analysis and comparison of each facility separately (this approach was used for E-PRTR QA analysis).
A second option is to compare the sum of all E-PRTR UWWTP discharges with UWWTP discharges and with the entering load or design capacity equal to or above 100.000 p.e., reported under the UWWTD. It is a simplification, because sometimes some UWWTPs smaller than 100.000 p.e. are reported in the E-PRTR and some of the bigger UWWTPs could be missed.
Because the UWWTD includes BOD, COD, N and P discharges only and the E-PRTR contains releases about N, P and TOC, the possibility of comparison is in any case only possible for N, P and by a recalculation of BOD or COD to TOC.

Another rough comparison could also be prepared – the number of all reported UWWTPs in the E-PRTR (and the number of UWWTPs with main pollutant releases) and the number of UWWTPs with an entering load or design capacity equal to or above 100.000 p.e., reported under the UWWTD.

3.3.2 Possibility of UWWTD and SoE data comparison

This comparison could be prepared for countries which reported detailed discharges of UWWTPs in the SoE and also discharges in the UWWTD only. The range of pollutants is limited by UWWTD reporting – BOD, COD, N and P. Data from the UWWTD should be aggregated into 4 size categories (the same as SoE Emissions reporting) and the proportion should then be compared.

3.3.3 Possibility of E-PRTR and SoE data comparison

E-PRTR and the SoE both contain UWWTPs and industrial discharges; hence the comparison could be prepared for both parts of emissions. As for the UWWTD and E-PRTR, urban discharges could be focused on category U24 only (equal or above 100.000 p.e.). Industrial discharges could be compared as I3 (industrial waste water treated discharges) or I (industrial waste water discharges total) with E-PRTR industrial facilities. Comparison of E-PRTR industrial emissions makes no sense now, because these emissions are aggregated and added to SoE by the ETC/ICM. The range of pollutants could be wider than the previous analysis for all pollutants, reporting them into the SoE if they are on the list of E-PRTR pollutants. The proportion of industrial discharges from SoE to E-PRTR industrial releases should be optimally equal or higher than 1.

3.3.4 Possibility of UWWTD, E-PRTR and SoE data comparison

Because only UWWTPs with an entering load or design capacity equal to or above 100.000 p.e. are common for all three sources, the comparison could be prepared for these sources only. However, only a small amount of the countries provided reliable data for all of the reporting, thus this type of comparison might be very rare.

3.4 Use of SoE Emissions data for pre-filling Table 8 OECD/Eurostat Joint Questionnaire JQ (version 2012)

The principle "report once, use several times" is applied for the reporting. Therefore SoE Emission data are used for the pre-filling of the OECD/Eurostat reporting. While the OECD/Eurostat Join Questionnaire, Table 8 includes most of the required data about the generated load, emission data reported under the SoE Emissions, UWWTD and E-PRTR are focused mainly on emission load to water. Only UWWTD collected emission loads to waste water treatment plants are due to a check of treatment plant efficiency. The possible streamlining between SoE emissions and the OECD/Eurostat Join Questionnaire could be based on discharges to inland waters. SoE Emissions data can be used for the pre-filling of Table 8 after the appropriate data processing (e.g. aggregation). It should be also considered that the SoE Emissions data may not always provide the complete nation-wide picture on the emission load into inland waters, because several sources of emissions from point and/or diffuse sources are not available for all Member States (e.g. discharges from treatment plants <2000 p.e.; discharges from industrial waste water treatment plants not required by the E-PRTR or all types of non-point or diffuse sources).

The possible data for prefilling the OECD/Eurostat Join Questionnaire, Table 8 are the following:

- Emissions from diffuse (non-point) sources to inland water are available in SoE Emissions (No 1 in Table 3.5) with more detailed information (agriculture emissions, atmospheric deposition and so on – see Table 3.2);
- treated urban wastewater (No 2 in Table 3.5) with more detailed information about size of agglomeration– see Table 3.2;
- untreated urban wastewater (No 3 in Table 3.5) with more detailed information about size of agglomeration– see Table 3.2 – however almost no data are available,

because most of the wastewater from agglomerations above 2,000 p.e. are treated and the data of wastewater from small agglomerations are not available;

- total industrial wastewater (No 4 in Table 3.5);
- treated industrial wastewater (No 5 in Table 3.5) and
- untreated industrial wastewater (No 6 in Table 3.5).

Table 3.5 shows the possibility of pre-filling Table 8 (version 2012) with SoE Emissions data. The information about available data could be aggregated for volume, population equivalent, BOD, COD, Total Suspended Solids (TSS), N-tot, P-tot, Cd, Cr, Cu, Pb, Ni and Zn. However, volume and population equivalent are no pollutants, hence they are not included in SoE Emissions; and TSS is not reported in SoE Emissions either.

Total urban wastewater was not provided, because wastewater discharged after independent treatment (defined as: “Facilities for preliminary treatment, treatment, infiltration or discharge of domestic wastewater from dwellings generally between 1 and 50 population equivalents, not connected to an urban wastewater collecting system.”) is not required in SoE Emissions. Total discharges to inland waters were not pre-filled as well, but the value can be counted from detailed information (if available).

Table 3.5: Comparison of Eurostat/OECD Joint Questionnaire 2012 Table 8 with EEA SoE emissions

TABLE 8: Generation and discharge of wastewater - 2012 INLAND WATERS 2012			TABLE 8: Generation and discharge of wastewater - 2012
COD (53)	10^3 kg O_2/d	SoE data	Notes (SoE) data relevant)
- **Agriculture, forestry, fishing** (b)	10^3 kg O_2/d		
- **Industry, total**	10^3 kg O_2/d		
* Mining and quarrying	10^3 kg O_2/d		
* Manufacturing industries	10^3 kg O_2/d		
of which: Foodprocessing industry	10^3 kg O_2/d		
Basic metals	10^3 kg O_2/d		
Motor vehicles and transport equipment	10^3 kg O_2/d		
Textiles etc.	10^3 kg O_2/d		
Paper & paper products	10^3 kg O_2/d		
Chemical products & refined petroleum	10^3 kg O_2/d		
* Production & distribution of electricity (excluding cooling water)	10^3 kg O_2/d		
* Construction	10^3 kg O_2/d		
- Domestic sources - total (c)	10^3 kg O_2/d		
* Services	10^3 kg O_2/d		
* Private households	10^3 kg O_2/d		
NON-POINT SOURCES (d)	10^3 kg O_2/d		
ALL SOURCES	10^3 kg O_2/d		
TREATMENT AND DISCHARGE OF WASTEWATER			
1. Urban wastewater, total generated (38)	10^3 kg O_2/d		
of which: - **treated** in WWTPs (36,44) : total inflow (34)	10^3 kg O_2/d		
- **discharged :** total (52)	10^3 kg O_2/d		
of which: * discharged after treatment in WWTPs	10^3 kg O_2/d	**2**	U2 or (U21 + U22 + U23 + U24)
* discharged after independent treatment (46)	10^3 kg O_2/d		
* discharged without treatment	10^3 kg O_2/d	**3**	U1 or (U11 + U12 + U13 + U14)
2. Industrial wastewater, total generated (e) (39)	10^3 kg O_2/d		
of which : - **treated** in 'Other' WWTPs: total inflow to (34, 44)	10^3 kg O_2/d		
- discharged : total (52)	10^3 kg O_2/d	**4**	(I3 + I4)
of which : * discharged after treatment in 'other' WWTPs	10^3 kg O_2/d	**5**	I3
* discharged without treatment	10^3 kg O_2/d	**6**	I4
Discharges of wastewater treatment plants (urban (36) and other (44)) (f)	10^3 kg O_2/d		
3. Agricultural wastewater (incl. forestry + fisheries), direct discharges	10^3 kg O_2/d		
Direct discharges from non-point sources (d)	10^3 kg O_2/d	**1**	NP or (NP1 + NP2 + NP3 + NP4 + NP5 + NP6 + NP7 + NP8)
Total discharges to Inland waters (52)	10^3 kg O_2/d		
Total discharges to the sea (52)	10^3 kg O_2/d		

The approach for the pre-filling of the table follows these steps:

- Identification of common data between SoE Emissions and JQ Table 8;
- Development of queries for pre-filling including the recalculation of emission for requirement units;
- Development of conditions for aggregation of emission data;
- Application of queries;
- Aggregation of emissions;
- Selection of representative results; and
- Providing representative results to Eurostat.

The queries identify adequate emission data from SoE. Because SoE Emission data are required separately for different types of emissions (diffuse emissions) or according to the size of the agglomeration (municipal wastewater), queries content the aggregation of more detailed emissions as well.
Required emissions of the Joint Questionnaire are in different units than SoE Emissions - 10^3 kg O_2/d for BOD and COD discharges (daily average) and 10^3 kg per year for Cd, Cr, Cu, Pb, Ni and Zn. The unit 10^3 kg O_2/d is mentioned in JQ for N-tot and P-tot discharges, however it should be 10^3 kg N/d or 10^3 kg P/d, which is a mistake in this table. SoE Emissions use total emission load per year (in tonnes for BOD, COD, N and P and in kg for heavy metals). These units are in line with UWWTD and E-PRTR reporting. Thus the queries include the recalculation of emissions as well.

Member States can use minus codes instead of already reporting data (especially for E-PRTR reporting), the codes are then replaced by aggregated values. The information can be significant if MS reported separately emissions under E-PRTR and other emissions – especially for industrial wastewater.

All the issues had to be considered for the pre-filling of the table.

The aggregation of emissions had two main phases:

- Aggregation of detailed types of emissions; and
- Aggregation of river basin level data to country level.

The Joint Questionnaire requires emission data as a total – total emissions from diffuse sources; total urban wastewater treated in wastewater treatment plants and/or untreated urban waste water and total industrial wastewater to inland water, which include two specific categories – treated in “independent” wastewater treatment plants and untreated (in any plant). The industrial emissions have almost the same categories as SoE Emissions except a differentiation of the emissions under E-PRTR and not in E-PRTR. On the other hand, urban wastewaters are reported according to the size of the agglomeration in SoE Emissions. The main reason is that except the more detailed information, we cannot qualify the completeness of reported data – especially for emissions from agglomerations smaller than 2.000 p.e. For example, the Netherlands reported N-tot and P-tot emissions from urban treated wastewater for agglomerations above 2.000 p.e. only.
Emission data for SoE Emissions are reported at RBD or sub-units level and not all Member States report emissions for the whole territory. The JQ Table 8 required data per whole

country and regional data as well. Country data had to be aggregated from river basin data after a check of the completeness. The check was possible for data at river basin district level only and emissions were aggregated only if more than 90 % of the country area was reported (i.e. if an RBD with an area less than 10 % was missing). The condition did not pass data from Belgium and some data from Austria, Switzerland, Finland, Latvia and Lithuania. Either emission data were provided at sub-unit level only, or they had to be excluded from the pre-filling due to the impossibility of the spatial completeness check.

The same check of completeness was done for diffuse source emissions and total industrial emissions. Data were considered as complete, if treated and untreated industrial emissions were reported for industrial emissions; diffuse emissions had to be provided for at least 3 different types of diffuse sources. The check of completeness was not applied for urban emissions, because it is difficult to decide what size of agglomeration should be reported without further information. All types of information could be provided also as a total, the relevant total values were qualified as complete.

All checks of completeness were applied for each pollutant, type of emission and reported year separately.

SoE Emission data, which comply with the above conditions were identified as representative and provided to the OECD/Eurostat.

4 Examples of emissions data comparisons and their visualisation

4.1 Examples for comparison of UWWTD and E-PRTR data results

These results are at both levels – facility level and aggregated country level. For the comparison, the last available data were used: E-PRTR 2010 and UWWTD 2009 – 2010 (but most of the countries reported the year 2010).

4.1.1 Comparison of UWWTD and E-PRTR data results – facility level

The first example of the result is focused on the number of UWWTPs in the E-PRTR and UWWTD (see Table 4.1). Because the UWWTD database also includes untreated discharges, only discharges from urban waste water treatment plants were carefully selected. The second step was to sort out UWWTPs equal to or higher than 100.000 p.e. the UWWTD database contains information about entering load and design capacity (both in p.e.) and the results are different; thus both variants were used. This approach was repeated for all other analysis of the UWWTD data.

It seems about half of the countries reported UWWTPs in the E-PRTR not according to design capacity (which is prevailingly higher than the real entering load), but on entering load. Countries with a higher number of E-PRTR facilities (Belgium, Bulgaria) obviously reported smaller UWWTPs as well.

Also the number of reported releases in the E-PRTR was done (see Table 4.2). Due to the long list of E-PRTR reported pollutants (at least one release was reported for 66 pollutants), only TOC, N, P and heavy metals as the most often reported substances were selected (see Table 4.1).

The results could be used for a QA analysis of E-PRTR data, if some data are missing or if the treatment is more efficient than European values, thus leading to lower discharges (releases) than the E-PRTR threshold values for reporting.

Table 4.1: Number of urban waste water treatment plants > 100,000 p.e. (by entering load or capacity, respectively) reported in the UWWTD and in E-PRTR point sources, respectively (2010).

country	UWWTD (entering load)	UWWTD (capacity)	E-PRTR total
AT	20	33	20
BE	13	16	17
BG	6	17	24
CH	NR	NR	19
CY	2	4	1
CZ	11	26	20
DE	179	230	202
DK	9	27	15
EE	2	7	4
ES	121	172	105
FI	11	ND	17
FR	107	127	101
GR	11	12	3
HU	15	25	22
IE	4	7	7
IS	NR	NR	2
IT	120	167	97
LT	5	10	7
LU	1	1	2
LV	1	4	1
MT	0	1	
NL	42	57	50
NO	6	7	6
PL	ND	132	73
PT	27	35	34
RO	20	33	22
RS	NR	NR	
SE	ND	ND	15
SI	5	5	5
SK	7	15	8
UK	136	159	145
total	881	1 329	1 044

Legend:

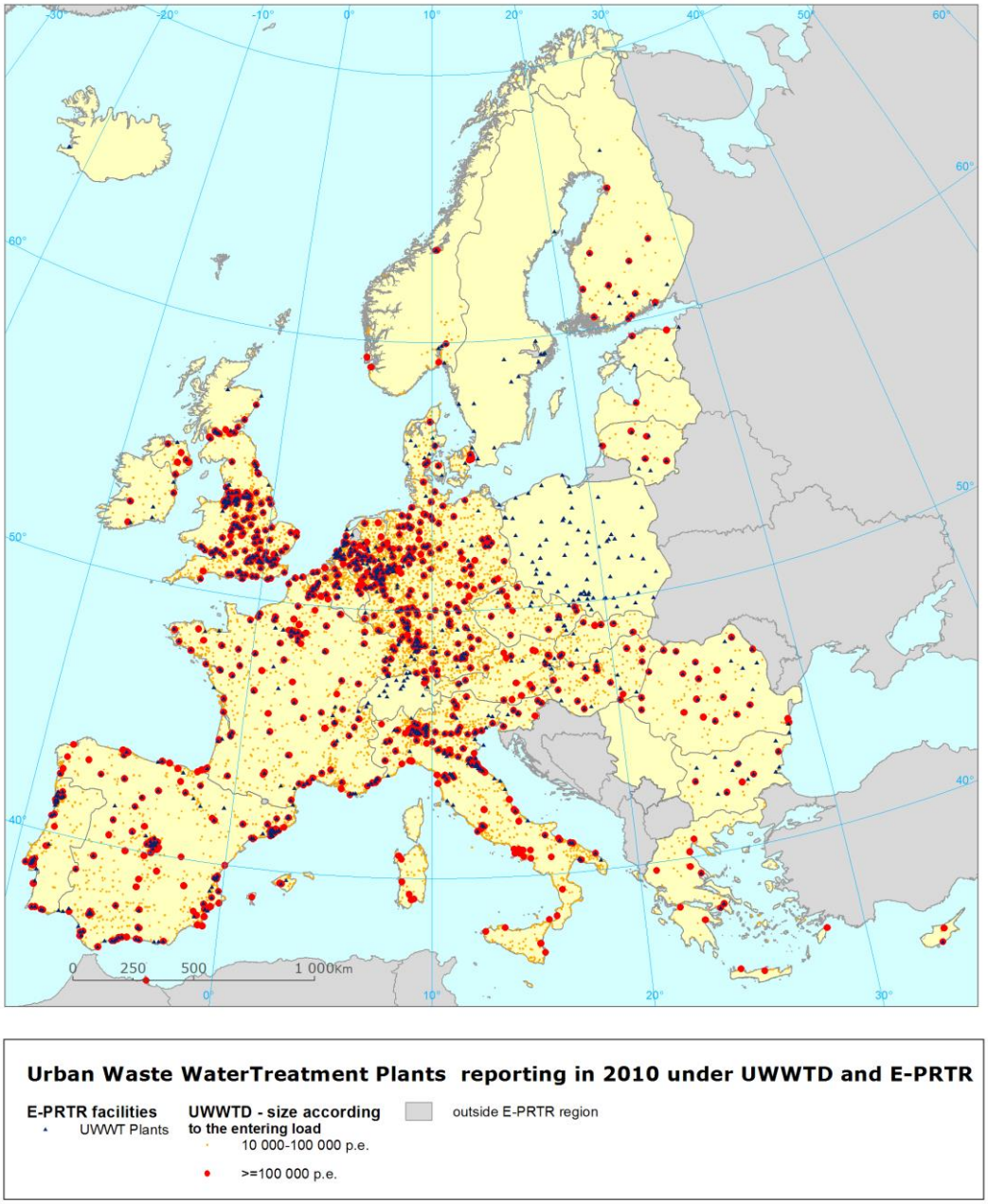
NR	not relevant (non-EU countries)
ND	no reported data

Table 4.2: Number of total urban waste water treatment plants in E-PRTR (2010) and number of reported releases (per pollutant)

country	E-PRTR total	E-PRTR TOC	E-PRTR N	E-PRTR P	E-PRTR As	E-PRTR Cd	E-PRTR Cr	E-PRTR Cu	E-PRTR Hg	E-PRTR Ni	E-PRTR Pb	E-PRTR Zn
AT	20	19	16	11	2	1	1	3		6	3	6
BE	17	14	15	15	6		2	8	1	8	7	15
BG	24	9	12	14	3	4	5	4	1	4	3	4
CH	19	13	19	13	1	3	3	4	2	3	2	2
CY	1								1			
CZ	20	11	13	13	5	5	5	5	8	5	4	6
DE	202	155	156	84	30	22	28	117	64	145	58	162
DK	15	15	8	5								
EE	4	4	3	2				2		2		3
ES	105	58	78	92	19	1	12	23	5	31	5	49
FI	17	8	17	5	6	1	2	8	4	10	3	10
FR	101	93	65	75	10	9	12	44	16	24	28	62
GR	3	2	3	3								
HU	22	20	21	19	1		1	1	1	1	1	1
IE	7	7	6	7	6	1	1	2	3	5	2	5
IS	2		2	2	2	2	2	2	2	2	2	2
IT	97	70	85	79	40	50	44	54	36	55	51	69
LT	7	2	5	2	1	1	3	4	1	4	1	7
LU	2	2	2	2								
LV	1		1	1	1	1	1	1	1	1	1	1
MT												
NL	50	44	41	42	26		8	26	7	35	23	43
NO	6		4	5	6	1	3	6		5	3	5
PL	73	47	57	35	19	22	14	27	19	34	32	60
PT	34	30	26	28	10	5	9	14	12	14	6	15
RO	22	15	21	21		4	8	8		10	10	14
RS												
SE	15	15	15	6	7		2	14	4	13	6	15
SI	5	3	5	5			1		1	1		3
SK	8	7	8	6		1			1			
UK	145	127	140	127	126	21	26	132	18	105	46	141
total	1 044	790	844	719	327	155	193	509	208	523	297	700

Though the tables provide most of the relevant information, a map of the reported urban waste water treatment plants in both data flows gives an interesting view, (see Fig. 4.1 and 4.2). In Fig. 4.1, UWWTPs from the UWWTD were selected according to the entering load; the second figure includes UWWTPs according to the capacity design. The E-PRTR urban waste water treatment plants with at least one pollutant reported release were used for these maps.

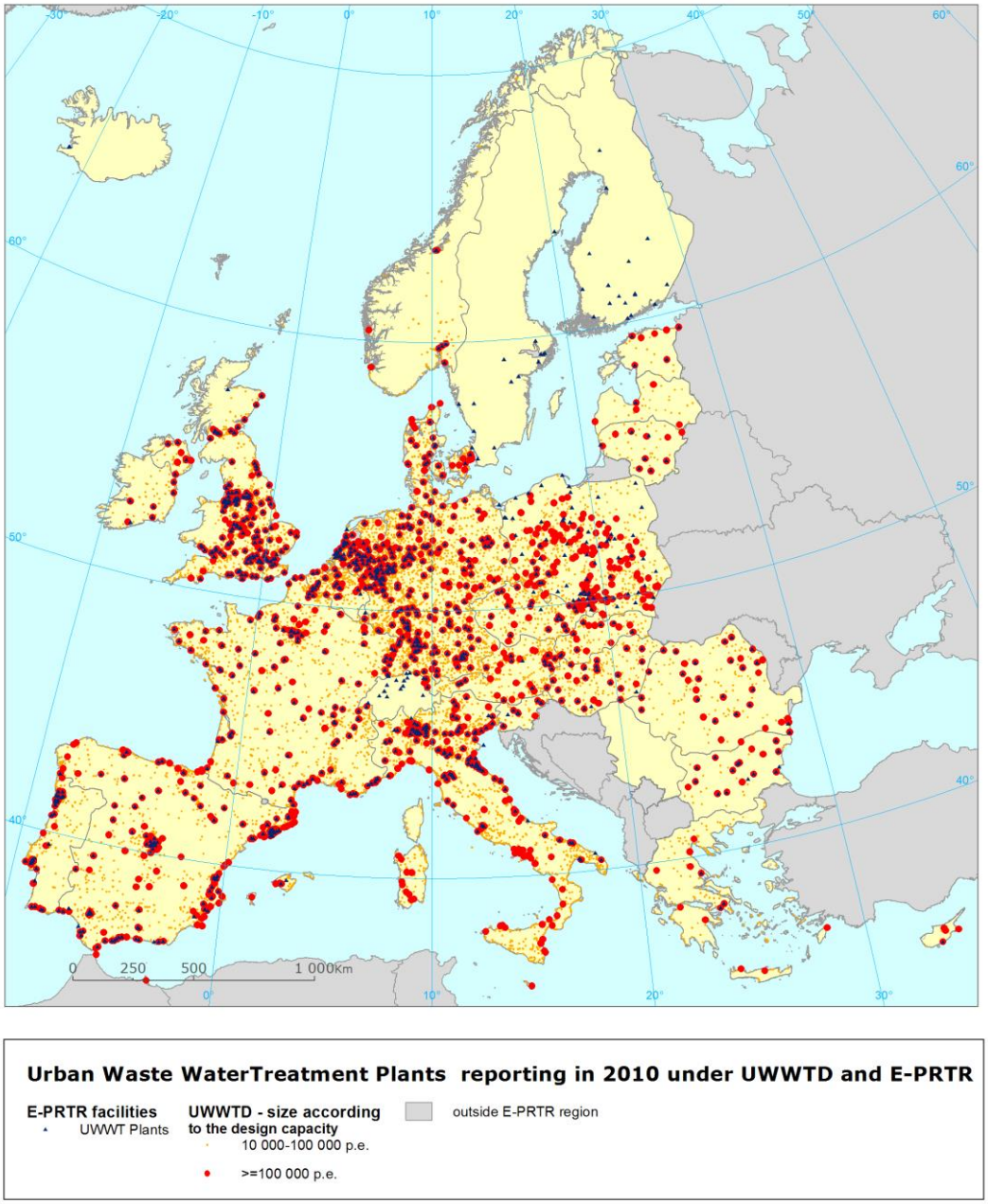
Fig. 4.1: Urban waste water treatment plants in the E-PRTR and UWWTD (according to the entering load)



If the blue triangles and red dots are together, it indicates possible consistency. Blue triangles alone represent UWWTPs reported in the E-PRTR only and the big red dots alone show UWWTPs above 100 000 p.e. (according to the entering load – Fig. 4.1 or design capacity – Fig. 4.2) reported in the UWWTD only.

The many blue triangles present in Poland (Fig. 4.1) are caused by the fact that Poland did not provide information about entering load in the UWWTD reporting, but the second figure (4.2) shows good consistency. Sweden did not report entering load nor design capacity for UWWTPs, thus the Swedish red dots are not present in both maps.

Fig. 4.2: Urban waste water treatment plants in the E-PRTR and UWWTD (according to design capacity)



Although the E-PRTR requires reporting of UWWTPs above 100 000 p.e. capacity and above thresholds, some countries report either UWWTPs according to the entering load or all UWWTPs with discharges above the thresholds.

An example of emission comparison at facility level was produced last year for selected countries only, hence the methodology is not described here and it is presented as a type of visualisation only (see Figure 4.3).

Fig. 4.3: Comparison of E-PRTR and UWWTD discharge data – Czech Republic (UWWTD data 2007/2008)

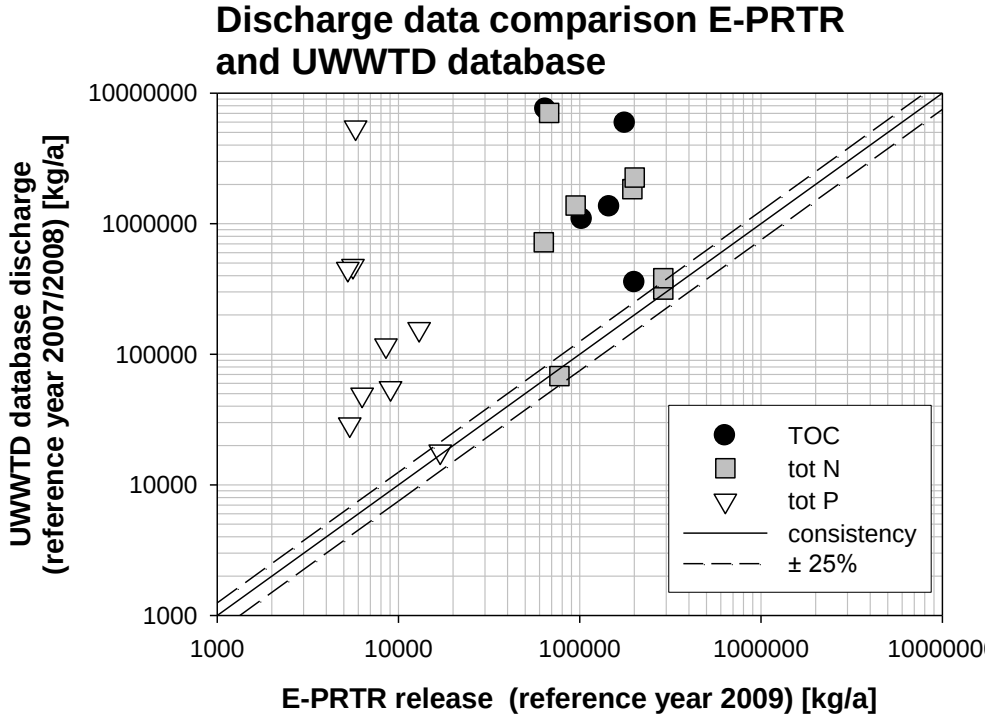
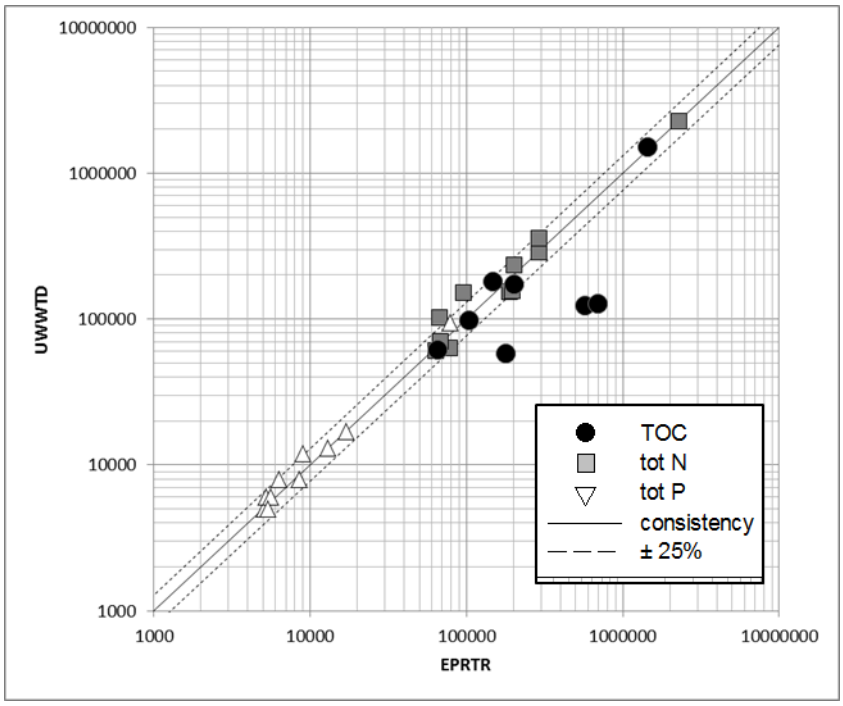


Fig. 4.4: Comparison of E-PRTR and UWWTD discharge data – Czech Republic (UWWTD data 2009 - 2010)



The Czech Rep. reported discharges from UWWTPs above 100 000 p.e. under the UWWTD (reference year 2007/2008) were significantly discrepant from the E-PRTR reported releases from the same UWWTPs (see Fig. 4.3). However, new UWWTD reported data (reference year 2009/2010) show a much better consistency (see Fig. 4.4).

4.1.2 Comparison of UWWTD and E-PRTR data results – country level

Before the aggregated data comparison it is necessary to check the completeness of UWWTD discharge data – some countries reported discharges for a small part of existing UWWTPs only and their sum should not be used for the comparison.

The completeness of UWWTD discharge data was calculated as a proportion of UWWTPs with discharge data to all UWWTPs not according to the number of facilities (because small facilities are mainly missing), but to the entering load (in p.e.). These calculations were provided for every pollutant separately and for all reported facilities together and for the biggest facilities separately (see Tables 4.3 – 4.6).
Only high (blue) or medium (yellow) reliable data (in terms of completeness) can be used for a credible comparison.
Belgium, Cyprus, Estonia and Italy have more reliable UWWTPs above 100.000 p.e., while Norway has discharges from smaller UWWTPs more complete. Germany did not report BOD and COD discharges at all. UWWTD discharge data from Belgium, Cyprus, Spain and Italy should not be used without gap-filling for comparison due to a low proportion of reported discharge data (maybe only selected RBDs, but spatial analysis was not provided).

The following tables 4.7 – 4.10 include results of the UWWTD completeness check, separately for nitrogen, phosphorus, BOD and COD discharges. Units in the tables are tonnes of N (P, BOD or COD respectively) per year. The UWWTPs were sorted into size categories (U21, U22, U23 and U24) according to the reporting entering load (in p.e.) except for Polish UWWTPs – see the foot notes under the tables for more information.

Table 4.3: Check of completeness of N discharges (tonnes N/year)(as a proportion of UWWTPs with reported discharges in terms of entering load (in p.e.) to total entering load)

	entering load (p.e.)						UWWTPs with N discharge (ent. load p.e.)					comparison of entering load	
	U21	U22	U23	U24	tot		U21	U22	U23	U24	tot	% (total)	% (U24)
BE	50 839	760 491	4 208 152	3 337 851	8 357 333	BE				1 425 250	1 425 250	17%	43%
CY	3 020	15 478	228 900	270 000	517 398	CY			35 200	130 000	165 200	32%	48%
CZ	194 630	1 229 130	4 135 340	3 634 199	9 193 299	CZ	122 362	976 814	4 123 605	3 378 179	8 600 960	94%	93%
DE	168 990	10 081 358	49 298 994	54 515 758	114 065 100	DE	167 737	10 024 904	49 280 044	54 515 758	113 988 443	100%	100%
DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	100%	100%
EE	14 379	56 122	499 943	572 749	1 143 193	EE		15 391	175 307	470 163	660 861	58%	82%
ES	307 748	4 354 410	17 590 209	35 761 007	58 013 374	ES	118 632	511 154	2 944 668	4 465 680	8 040 134	14%	12%
IT	887 437	8 476 274	28 028 138	33 239 382	70 631 231	IT	97 528	3 150 943	15 163 471	21 032 068	39 444 010	56%	63%
LT	13 200	138 000	765 600	1 457 400	2 374 200	LT	12 800	138 000	765 600	1 457 400	2 373 800	100%	100%
LU	5 210	64 467	484 587	121 778	676 042	LU	5 210	64 467	484 587	121 778	676 042	100%	100%
LV	42 054	144 578	452 802	707 228	1 346 662	LV	3 495	49 646	439 232	707 228	1 199 601	89%	100%
NO	42 436	346 460	1 695 932	1 491 139	3 575 967	NO	2 841	38 856	1 170 260	271 454	1 483 411	41%	18%
PL*	148 174	2 701 154	18 018 204	41 003 608	61 871 140	PL	133 297	2 584 468	17 972 121	41 003 608	61 693 494	100%	100%
RO	110 704	551 400	2 483 943	4 615 071	7 761 118	RO	94 507	505 410	2 337 546	4 615 071	7 552 534	97%	100%
SI	17 076	144 318	746 671	999 781	1 907 846	SI	12 229	139 127	746 671	999 781	1 897 808	99%	100%
Total	1 266 291	12 566 651	52 675 877	83 635 387	150 144 206	Tot	361 907	6 670 917	39 079 488	70 208 388	116 320 700	77%	84%

Comparison of entering load:

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Note: PL data were calculated according to capacity (no entering load was provided)

U21	UWW treated discharges < 2 000 p.e.
U22	UWW treated discharges 2 000 ≥ p.e. ≤ 10 000
U23	UWW treated discharges 10 000 > p.e.≤ 100 000
U24	UWW treated discharges > 100 000 p.e.

Table 4.4: Check of completeness of P discharges (tonnes P/year)(as a proportion of UWWTPs with reported discharges in terms of entering load to total entering load)

	entering load (p.e.)						UWWTPs with P discharge (ent. load p.e.)					comparison of entering load	
	U21	U22	U23	U24	tot		U21	U22	U23	U24	tot	% (total)	% (U24)
BE	50 839	760 491	4 208 152	3 337 851	8 357 333	BE				1 425 250	1 425 250	17%	43%
CY	3 020	15 478	228 900	270 000	517 398	CY			35 200	130 000	165 200	32%	48%
CZ	194 630	1 229 130	4 135 340	3 634 199	9 193 299	CZ	70 652	992 624	4 123 605	3 634 199	8 821 080	96%	100%
DE	168 990	10 081 358	49 298 994	54 515 758	114 065 100	DE	167 737	10 021 647	49 280 044	54 515 758	113 985 186	100%	100%
DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	100%	100%
EE	14 379	56 122	499 943	572 749	1 143 193	EE		15 391	175 307	470 163	660 861	58%	82%
ES	307 748	4 354 410	17 590 209	35 761 007	58 013 374	ES	118 632	502 654	2 786 668	4 465 680	7 873 634	14%	12%
IT	887 437	8 476 274	28 028 138	33 239 382	70 631 231	IT	89 370	3 092 799	14 726 141	21 145 703	39 054 013	55%	64%
LT	13 200	138 000	765 600	1 457 400	2 374 200	LT	12 800	138 000	765 600	1 457 400	2 373 800	100%	100%
LU	5 210	64 467	484 587	121 778	676 042	LU	5 210	64 467	484 587	121 778	676 042	100%	100%
LV	42 054	144 578	452 802	707 228	1 346 662	LV	3 495	49 646	439 232	707 228	1 199 601	89%	100%
NO	42 436	346 460	1 695 932	1 491 139	3 575 967	NO	16 546	272 185	1 487 490	490 997	2 267 218	63%	33%
PL*	148 174	2 701 154	18 018 204	41 003 608	61 871 140	PL*	136 124	2 590 985	17 943 201	41 003 608	61 673 918	100%	100%
RO	110 704	551 400	2 483 943	4 615 071	7 761 118	RO	87 599	480 821	2 312 250	4 615 071	7 495 741	97%	100%
SI	17 076	144 318	746 671	999 781	1 907 846	SI	9 065	129 788	726 238	999 781	1 864 872	98%	100%
Total	1 266 291	12 566 651	52 675 877	83 635 387	150 144 206	Tot	360 209	6 818 691	38 884 739	70 541 566	116 605 205	78%	84%

Comparison of entering load:

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Note: PL data were calculated according to capacity (no entering load was provided)

U21	UWW treated discharges < 2 000 p.e.
U22	UWW treated discharges 2 000 ≥ p.e. ≤ 10 000
U23	UWW treated discharges 10 000 > p.e.≤ 100 000
U24	UWW treated discharges > 100 000 p.e.

Table 4.5: Check of completeness of COD discharges (tonnes COD/year)(as a proportion of UWWTPs with reported discharges in terms of entering load to total entering load)

	entering load (p.e.)					UWWTPs with COD discharge (ent. load p.e.)						comparison of entering load	
	U21	U22	U23	U24	tot		U21	U22	U23	U24	tot	% (total)	% (U24)
BE	50 839	760 491	4 208 152	3 337 851	8 357 333	BE				1 425 250	1 425 250	17%	43%
CY	3 020	15 478	228 900	270 000	517 398	CY			35 200	130 000	165 200	32%	48%
CZ	194 630	1 229 130	4 135 340	3 634 199	9 193 299	CZ	189 936	1 212 312	4 123 605	3 634 199	9 160 052	100%	100%
DE	168 990	10 081 358	49 298 994	54 515 758	114 065 100	DE					0	0%	0%
DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	100%	100%
EE	14 379	56 122	499 943	572 749	1 143 193	EE		14 165	175 307	470 163	659 635	58%	82%
ES	307 748	4 354 410	17 590 209	35 761 007	58 013 374	ES	111 655	552 611	3 173 535	5 272 062	9 109 863	16%	15%
IT	887 437	8 476 274	28 028 138	33 239 382	70 631 231	IT	133 654	3 422 846	15 388 914	21 246 522	40 191 936	57%	64%
LT	13 200	138 000	765 600	1 457 400	2 374 200	LT	12 800	138 000	735 900	1 457 400	2 344 100	99%	100%
LU	5 210	64 467	484 587	121 778	676 042	LU	5 210	64 467	484 587	121 778	676 042	100%	100%
LV	42 054	144 578	452 802	707 228	1 346 662	LV	3 495	49 646	439 232	707 228	1 199 601	89%	100%
NO	42 436	346 460	1 695 932	1 491 139	3 575 967	NO	13 705	280 007	1 566 808	470 281	2 330 801	65%	32%
PL*	148 174	2 701 154	18 018 204	41 003 608	61 871 140	PL*	137 929	2 648 703	17 984 621	40 602 508	61 373 761	99%	99%
RO	110 704	551 400	2 483 943	4 615 071	7 761 118	RO	108 075	551 400	2 483 943	4 615 071	7 758 489	100%	100%
SI	17 076	144 318	746 671	999 781	1 907 846	SI	17 076	144 318	746 671	999 781	1 907 846	100%	100%
Total	1 266 291	12 566 651	52 675 877	83 635 387	150 144 206	Tot	431 944	7 299 387	39 830 676	70 220 569	117 782 576	78%	84%

Comparison of entering load:

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Note: PL data were calculated according to capacity (no entering load was provided)

U21	UWW treated discharges < 2 000 p.e.
U22	UWW treated discharges 2 000 ≥ p.e. ≤ 10 000
U23	UWW treated discharges 10 000 > p.e.≤ 100 000
U24	UWW treated discharges > 100 000 p.e.

Table 4.6: Check of completeness of BOD discharges (tonnes BOD/year)(as a proportion of UWWTPs with reported discharges in terms of entering load to total entering load)

	entering load (p.e.)					UWWTPs with BOD discharge (ent. load p.e.)						comparison of entering load	
	U21	U22	U23	U24	tot		U21	U22	U23	U24	tot	% (total)	% (U24)
BE	50 839	760 491	4 208 152	3 337 851	8 357 333	BE				1 425 250	1 425 250	17%	43%
CY	3 020	15 478	228 900	270 000	517 398	CY			35 200	130 000	165 200	32%	48%
CZ	194 630	1 229 130	4 135 340	3 634 199	9 193 299	CZ	191 700	1 212 312	4 123 605	3 634 199	9 161 816	100%	100%
DE	168 990	10 081 358	49 298 994	54 515 758	114 065 100	DE					0	0%	0%
DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	DK	89 725	1 003 070	3 279 753	2 069 714	6 442 262	100%	100%
EE	14 379	56 122	499 943	572 749	1 143 193	EE		22 183	175 307	470 163	667 653	58%	82%
ES	307 748	4 354 410	17 590 209	35 761 007	58 013 374	ES	61 631	538 039	3 173 535	5 272 062	9 045 267	16%	15%
IT	887 437	8 476 274	28 028 138	33 239 382	70 631 231	IT	135 531	3 445 874	15 622 901	21 246 522	40 450 828	57%	64%
LT	13 200	138 000	765 600	1 457 400	2 374 200	LT	13 200	138 000	765 600	1 457 400	2 374 200	100%	100%
LU	5 210	64 467	484 587	121 778	676 042	LU	5 210	64 467	484 587	121 778	676 042	100%	100%
LV	42 054	144 578	452 802	707 228	1 346 662	LV	3 495	49 646	439 232	707 228	1 199 601	89%	100%
NO	42 436	346 460	1 695 932	1 491 139	3 575 967	NO	17 801	278 915	1 605 809	689 824	2 592 349	72%	46%
PL*	148 174	2 701 154	18 018 204	41 003 608	61 871 140	PL*	139 879	2 661 834	17 964 621	40 602 508	61 368 842	99%	99%
RO	110 704	551 400	2 483 943	4 615 071	7 761 118	RO	108 075	551 400	2 483 943	4 615 071	7 758 489	100%	100%
SI	17 076	144 318	746 671	999 781	1 907 846	SI	16 163	144 318	746 671	999 781	1 906 933	100%	100%
Total	1 266 291	12 566 651	52 675 877	83 635 387	150 144 206	Tot	439 354	7 334 454	40 113 364	70 440 112	118 327 284	79%	84%

Comparison of entering load:

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Note: PL data were calculated according to capacity (no entering load was provided)

U21	UWW treated discharges < 2 000 p.e.
U22	UWW treated discharges 2 000 ≥ p.e. ≤ 10 000
U23	UWW treated discharges 10 000 > p.e.≤ 100 000
U24	UWW treated discharges > 100 000 p.e.

Tables 4.7 – 4.10 show the results of the comparison of UWWTD discharges from UWWTPs above 100 000 p.e. (separately for entering load size and capacity size) and E-PRTR discharges (releases) from reported UWWTPs. The reliable comparison of emission load is possible for high or medium consistency between the entering load of all relevant UWWTPs and UWWTPs with reported N, P, BOD or COD discharges.

The comparison of discharges was prepared for TOC, N and P. Because the UWWTD includes BOD and COD discharges and the E-PRTR covers TOC emissions, a recalculation was necessary. TOC was recalculated in two ways – the first one according to the proportion TOC= BOD/0,667 (the ratio was used in the QA E-PRTR report) and the second TOC= COD/3 (the ratio is mentioned in the E-PRTR Guidance - http://prtr.ec.europa.eu/pgDownloadGuidance.aspx). N and P discharges were compared directly. Polish UWWTD data have been post-processed for unit correction (reported in kg and not in tonnes, as required.

The recalculation of BOD to TOC seems not to be reliable – E-PRTR data are except for Italy, Lithuania and Romania much higher than UWWTD discharges. COD recalculated results are better – only E-PRTR data from Luxembourg are too high and data from Lithuania too small. Also all N and P results match very well except for phosphorus in Danish discharge data. The ratio, 0.5 – 2 was used as the good consistency category due to the facilities from data flows not overlapping very well. Also the independent emission calculation (E-PRTR releases are reported by operators of facility and UWWTD data are reported by Ministry, Environmental Agency or other governmental authority) cannot be so precise because of the seasonal variation of the measured concentrations of waste water.

Table 4.7: Comparison of aggregated BOD/TOC discharges from UWWTD > 100,000 p.e.[2] from UWWTD and E-PRTR data flows (2010)

country	UWWTD		E-PRTR		ratio		
	aggregated BOD by entering load (tonnes/year)	aggregated BOD by capacity (tonnes/year)	aggregated reported TOC releases (kg/year)	aggregated recalculated BOD releases (tonnes/year)	E-PRTR/UWWTD ent. load	E-PRTR/UWWTD capacity	completeness of UWWT data
AT			4 930 100	7 391			no data
BE	906	906	5 392 700	8 085	8,92	8,92	low
BG			6 567 400	9 846			no data
CY	33	37					low
CZ	1 594	1 975	3 690 800	5 533	3,47	2,80	high
DE			40 912 400	61 338			no data
DK	734	1 101	1 585 900	2 378	3,24	2,16	high
EE	171	240	763 600	1 145	6,69	4,77	medium
ES	6 772	7 424	17 255 000	25 870	3,82	3,48	low
FI			3 076 500	4 612			no data
FR			31 216 700	46 802			no data
GR			7 150 700	10 721			no data
HU			4 693 800	7 037			no data
CH			4 035 300	6 050			no data
IE			7 123 700	10 680			no data
IS							no data
IT	23 014	25 118	28 713 300	43 048	1,87	1,71	medium
LT	509	590	394 000	591	1,16	1,00	high
LU	194	194	538 000	807	4,16	4,16	high
LV	414	501					high
MT							no data
NL			13 469 100	20 194			no data
NO	5 504	6 866					high
PL		7 122	11 958 200	17 928		2,52	high
PT			15 788 900	23 672			no data
RO	22 166	27 248	12 484 000	18 717	0,84	0,69	high
RS							no data
SE			6 075 600	9 109			no data
SI	372	475	622 000	933	2,51	1,96	high
SK			1 140 100	1 709			no data
UK			63 408 900	95 066			no data

Completeness of UWWTD data (discharges):

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Highlighted cells (except completeness):

1,87	good consistency between UWWTD and E-PRTR data - ratio 0,5 - 2

[2] reference to entering load and plant capacity, respectively. in the two left columns

Table 4.8: Comparison of aggregated COD/TOC discharges from UWWTD > 100,000 p.e.[3] from UWWTD and E-PRTR data flows (2010)

country	UWWTD		E-PRTR		ratio		
	aggregated COD by entering load (tonnes/year)	aggregated COD by capacity (tonnes/year)	aggregated reported TOC releases (kg/year)	aggregated recalculated COD releases (tonnes/year)	E-PRTR/UWWTD ent. load	E-PRTR/UWWTD capacity	completeness of UWWT data
AT			4 930 100	14 790			no data
BE	6 032	6 032	5 392 700	16 178	2,68	2,68	low
BG			6 567 400	19 702			no data
CY	167	216					low
CZ	12 825	15 756	3 690 800	11 072	0,86	0,70	high
DE			40 912 400	122 737			no data
DK	6 624	9 213	1 585 900	4 758	0,72	0,52	high
EE	1 478	1 878	763 600	2 291	1,55	1,22	high
ES	25 275	26 696	17 255 000	51 765	2,05	1,94	low
FI			3 076 500	9 230			no data
FR			31 216 700	93 650			no data
GR			7 150 700	21 452			no data
HU			4 693 800	14 081			no data
CH			4 035 300	12 106			no data
IE			7 123 700	21 371			no data
IS							no data
IT	82 046	85 549	28 713 300	86 140	1,05	1,01	medium
LT	4 020	4 572	394 000	1 182	0,29	0,26	high
LU	639	639	538 000	1 614	2,53	2,53	high
LV	2 507	3 151					high
MT							no data
NL			13 469 100	40 407			no data
NO	6 998	10 881					low
PL		50 513	11 958 200	35 875		0,71	high
PT			15 788 900	47 367			no data
RO	54 450	68 203	12 484 000	37 452	0,69	0,55	high
RS							no data
SE			6 075 600	18 227			no data
SI	3 197	3 391	622 000	1 866	0,58	0,55	high
SK			1 140 100	3 420			no data
UK			63 408 900	190 227			no data

Completeness of UWWTD data (discharges):

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Highlighted cells (except completeness):

1,87	good consistency between UWWTD and E-PRTR data - ratio 0,5 - 2

[3] reference to entering load and plant capacity, respectively. in the two left columns

Table 4.9: Comparison of aggregated N discharges from UWWTD > 100,000 p.e.[4] from UWWTD and E-PRTR data flows (2010)

country	UWWTD		E-PRTR		ratio		
	aggregated N by entering load (tonnes/year)	aggregated N by capacity (tonnes/year)	aggregated reported N releases (kg/year)	aggregated recalculated N releases (tonnes/year)	E-PRTR/UWWTD ent. load	E-PRTR/UWWTD capacity	completeness of UWWT data
AT			3 975 100	3 975			no data
BE	1 374	1 374	3 190 400	3 190	2,32	2,32	low
BG			4 670 300	4 670			no
CY	25	32					low
CZ	3 787	5 161	4 533 600	4 534	1,20	0,88	high
DE	36 150	39 872	38 132 600	38 133	1,05	0,96	high
DK	881	1 418	547 000	547	0,62	0,39	high
EE	462	595	779 300	779	1,69	1,31	medium
ES	6 266	7 216	35 608 800	35 609	5,68	4,93	low
FI			5 391 700	5 392			no data
FR			28 723 300	28 723			no data
GR			3 105 000	3 105			no data
HU			4 693 900	4 694			no data
CH			7 207 500	7 208			no data
IE			4 556 100	4 556			no data
IS			1 045 000	1 045			no data
IT	20 733	22 637	26 175 700	26 176	1,26	1,16	medium
LT	897	1 020	904 900	905	1,01	0,89	high
LU	406	406	387 000	387	0,95	0,95	high
LV	1 205	1 396	1 090 000	1 090	0,90	0,78	high
MT							no data
NL			7 473 000	7 473			no data
NO	330	1 712	6 562 000	6 562	19,87	3,83	low
PL		15 676	15 908 700	15 909		1,01	high
PT			9 842 700	9 843			no data
RO	7 703	9 054	7 624 800	7 625	0,99	0,84	high
RS							no data
SE			5 748 600	5 749			no data
SI	990	1 183	1 037 400	1 037	1,05	0,88	high
SK			1 764 100	1 764			no data
UK			103 323 800	103 324			no data

Completeness of UWWTD data (discharges):

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Highlighted cells (except completeness):

1,87	good consistency between UWWTD and E-PRTR data - ratio 0,5 - 2

[4] reference to entering load and plant capacity, respectively. in the two left columns

Table 4.10: Comparison of aggregated P discharges from UWWTD > 100,000 p.e.[5] from UWWTD and E-PRTR data flows (2010)

country	UWWTD		E-PRTR		ratio		
	aggregated P by entering load (tonnes/year)	aggregated P by capacity (tonnes/year)	aggregated reported P releases (kg/year)	aggregated recalculated P releases (tonnes/year)	E-PRTR/UWWTD ent. load	E-PRTR/UWWTD capacity	completeness of UWWT data
AT			310 500	311			no data
BE	146	146	1 912 150	1 912	13,10	13,10	low
BG			1 123 190	1 123			no
CY	12	14					low
CZ	174	252	262 490	262	1,50	1,04	high
DE	1 851	2 046	1 549 310	1 549	0,84	0,76	high
DK	136	178	41 200	41	0,30	0,23	high
EE	45	56	52 600	53	1,17	0,94	medium
ES	545	639	3 760 390	3 760	6,91	5,89	low
FI			67 420	67			no data
FR			2 602 670	2 603			no data
GR			983 400	983			no data
HU			549 340	549			no data
CH			252 160	252			no data
IE			737 080	737			no data
IS			258 000	258			no data
IT	2 214	2 442	3 973 410	3 973	1,79	1,63	medium
LT	48	76	31 870	32	0,66	0,42	high
LU	23	23	31 010	31	1,36	1,36	high
LV	50	74	43 600	44	0,87	0,59	high
MT							no data
NL			899 540	900			no data
NO	65	132	667 000	667	10,27	5,05	medium
PL		813	455 160	455		0,56	high
PT			1 011 880	1 012			no data
RO	930	1 121	880 400	880	0,95	0,79	high
RS							no data
SE			89 590	90			no data
SI	163	189	163 900	164	1,00	0,87	high
SK			176 870	177			no data
UK			13 710 530	13 711			no data

Completeness of UWWTD data (discharges):

low	10 % - 50 % of UWWTPs (by entering load) reported discharges
medium	50 % - 70 % of UWWTPs (by entering load) reported discharges
high	more than 70 % of UWWTPs (by entering load) reported discharges
no data	less than 10 % of UWWTPs (by entering load) reported discharges

Highlighted cells (except completeness):

1,87	good consistency between UWWTD and E-PRTR data - ratio 0,5 - 2

[5] reference to entering load and plant capacity, respectively. in the two left columns

4.2 Comparison of UWWTD and SoE data results

Due to the lack of detailed data, the comparison of discharges according to the size categories was not prepared for UWWTD and SoE. Instead the proportion of emission from different categories was prepared from selected UWWTD data (see Fig. 4.4 – 4.7).
This information is important for knowledge of how much of the emissions could be covered by the E-PRTR. The highest proportion of UWWTPs above 100.000 p.e. (about 60 %) could be identified in Lithuania, Latvia and Romania for BOD and COD (and in Poland for COD), in Lithuania and Romania for nitrogen and in Romania and Slovenia for phosphorus.

Fig. 4.4: Proportion of BOD discharges from UWWTD according to the size categories

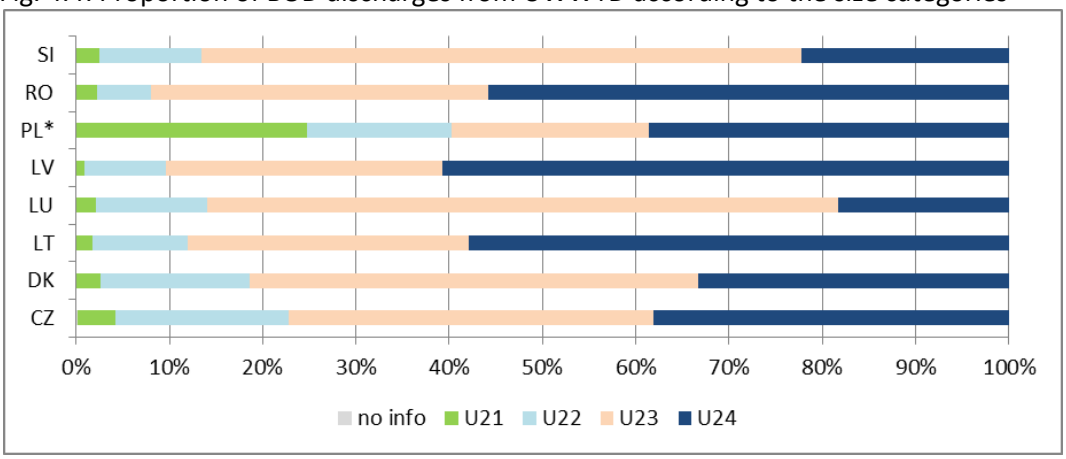


Fig. 4.5: Proportion of COD discharges from UWWTD according to the size categories

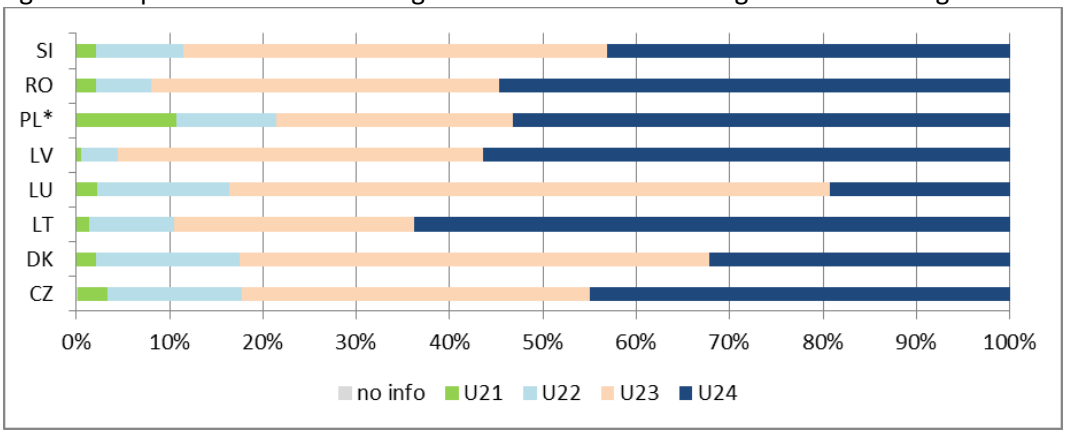


Fig. 4.6: Proportion of N discharges from UWWTD according to the size categories

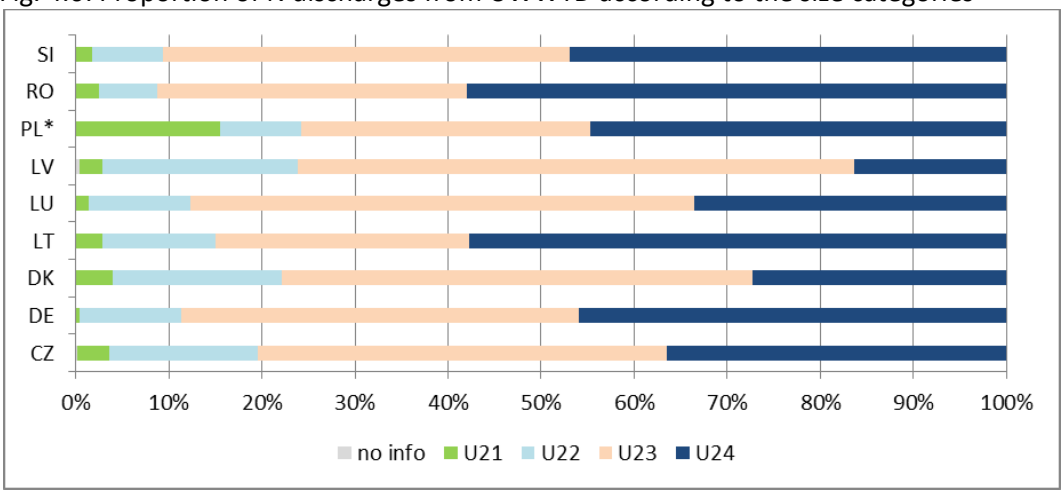
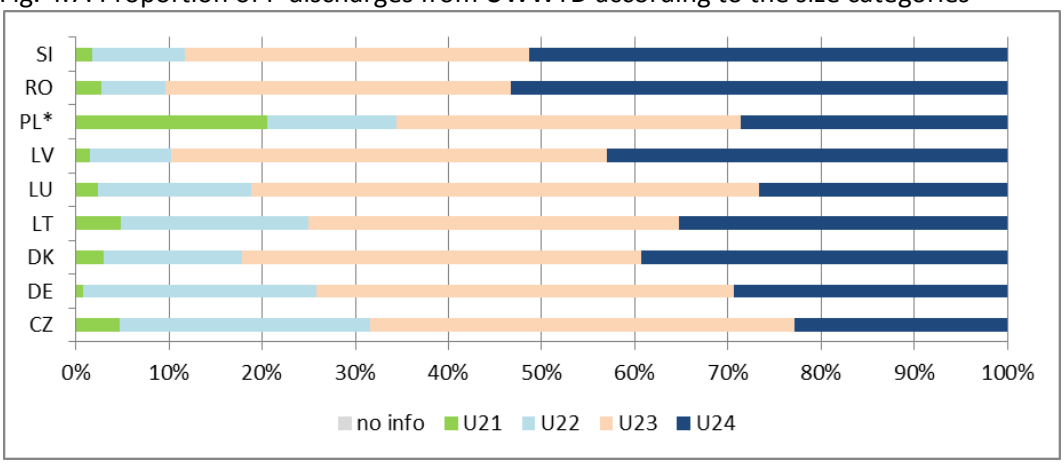


Fig. 4.7: Proportion of P discharges from UWWTD according to the size categories



U21	UWW treated discharges < 2 000 p.e.
U22	UWW treated discharges 2 000 ≥ p.e. ≤ 10 000
U23	UWW treated discharges 10 000 > p.e.≤ 100 000
U24	UWW treated discharges > 100 000 p.e.

4.3 Comparison of E-PRTR and SoE data results

The comparison of UWWTP discharges, reporting under E-PRTR and SoE data was possible for 7 countries only (see Tables 4.11 – 4.13), and the results match very well for most of the assessed pollutants. All nutrient discharges have a very good consistency; differences were identified in Estonia for heavy metals, in Switzerland for Cd and Hg, in Slovenia for Cr and in Iceland for Hg and Zn.

Table 4.11: Proportion of UWWTPs discharges from E-PRTR and SoE (U24) - nutrients

Country	Nitrogen emission load in tonnes per year			Phosphorus emission load in tonnes per year		
	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR
EE	779	791	1,0	53	60	1,1
CH	7 208	6 639	0,9	252	264	1,0
IS	1 045			258		
LT	905	932	1,0	32	43	1,3
NL	7 473	6 419	0,9	900	745	0,8
RO	7 625	5 196	0,7	880	848	1,0
SI	1 037			164	147	0,9

1,0	good consistency - ratio 0,8 - 1,2
1,87	reasonable consistency - ratio 0,5 - 2
3,3	poor consistency < 0,5; >2.0

Table 4.12: Proportion of UWWTPs discharges from E-PRTR and SoE (U24) – heavy metals I

Country	As emission load in kg/year			Cd emission load in kg/year			Cr emission load in kg/year			Cu emission load in kg/year		
	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR
EE								38		555	20	0,04
CH	157			46	9	0,2	618	476	0,8	1 838	1 253	0,7
IS	98	59	0,6	13	15	1,2	331	165	0,5	331	234	0,7
LT	51	51	1,0	7	7	1,0	334	319	1,0	1 086	1 122	1,0
NL	876	897	1,0		68		739	1 167	1,6	3 405	3 533	1,0
RO				551	562	1,0	3 607			6 053	7 848	1,3
SI					2		187	56	0,3		45	

1,0	good consistency - ratio 0,8 - 1,2
1,87	reasonable consistency - ratio 0,5 - 2
3,3	poor consistency < 0,5; >2.0

Table 4.13: Proportion of UWWTPs discharges from E-PRTR and SoE (U24) – heavy metals II

Country	Hg emission load in kg/year			Ni emission load in kg/year			Pb emission load in kg/year			Zn emission load in kg/year		
	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR	E-PRTR	SoE	ratio SoE/E-PRTR
EE				214	606	2,8				1 602	500	0,3
CH	4	16	4,4	413			509	364	0,7	3 888	3065	0,8
IS	20	7	0,4	98	115	1,2	133	167	1,3	531	2574	4,8
LT	8	9	1,1	910	753	0,8	45	54	1,2	6 131	4993	0,8
NL	15	25	1,7	3 797	4 324	1,1	1 536	1 407	0,9	41 076	40003	1,0
RO		0		6 533	5 252	0,8	2 469	8 140	3,3	34 156	35172	1,0
SI	3			47	31	0,7				1 322	1143	0,9

1,0	good consistency - ratio 0,8 - 1,2
1,87	reasonable consistency - ratio 0,5 - 2
3,3	poor consistency < 0,5; >2.0

4.4 Comparison of UWWTD, E-PRTR and SoE data results

The comparison of UWWTP discharges above 100.000 p.e., reporting under all three data sources was prepared for nitrogen and phosphorus only (see Fig. 4.8 – 4.13) in two variants of UWWTD data – according to the entering load and design capacity.

Table 4.13: Proportion of nitrogen emission loads from UWWTPs above 100.000 p.e. according to the entering load

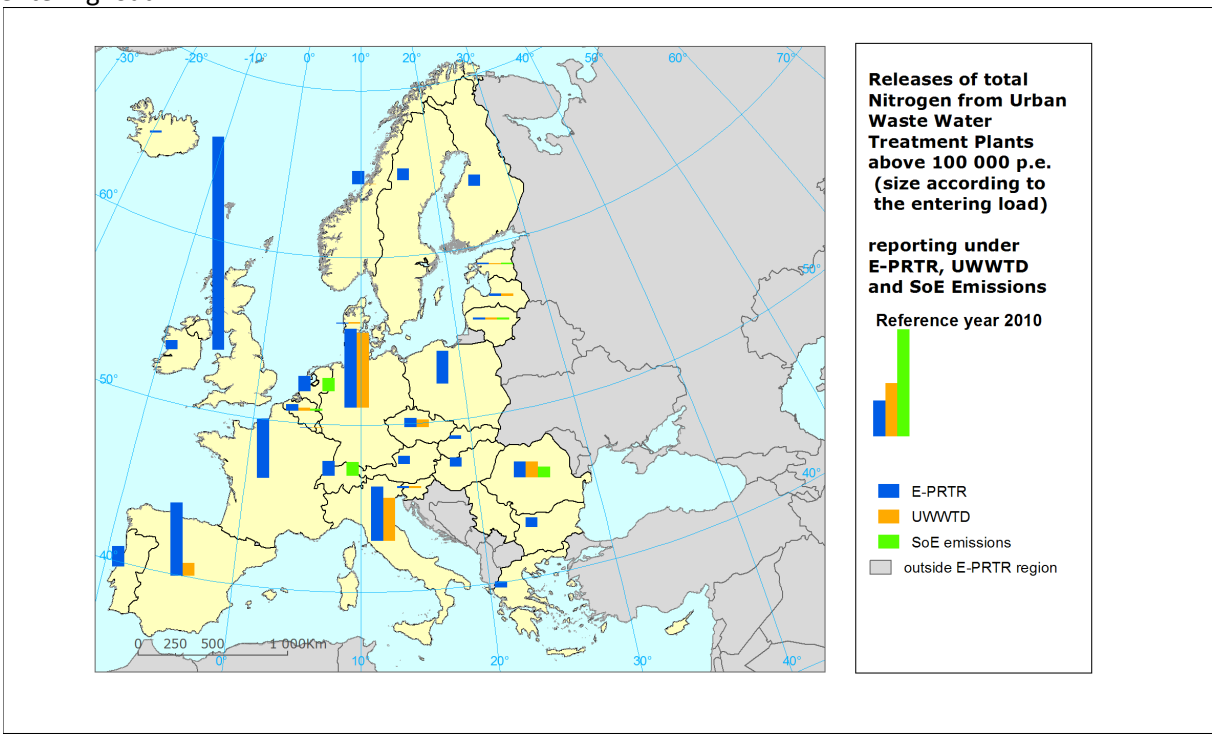


Table 4.14: Proportion of nitrogen emission loads from UWWTPs above 100.000 p.e. according to the design capacity

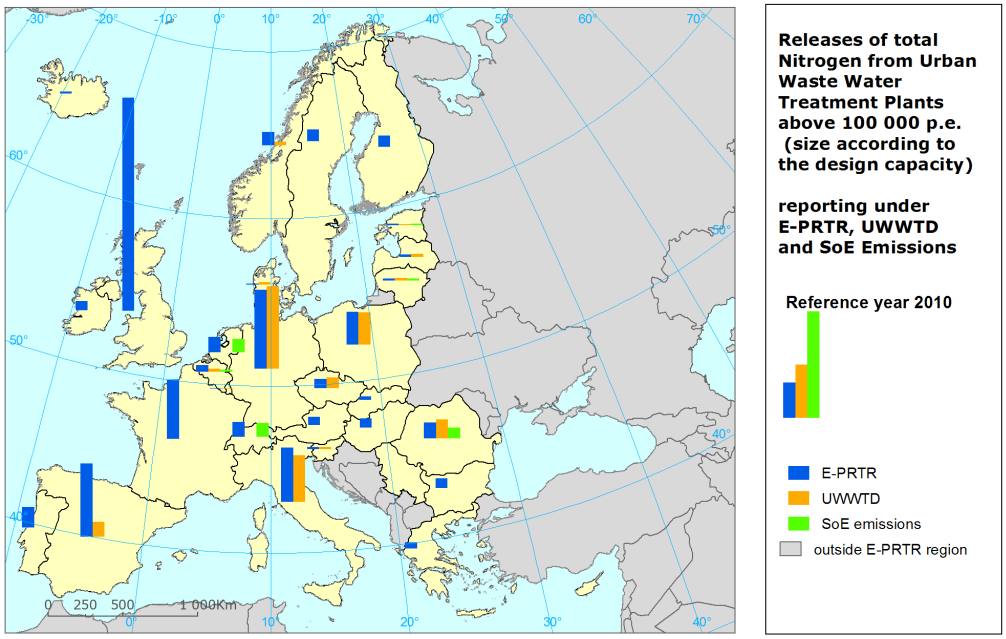


Table 4.13: Proportion of phosphorus emission loads from UWWTPs above 100.000 p.e. according to the entering load

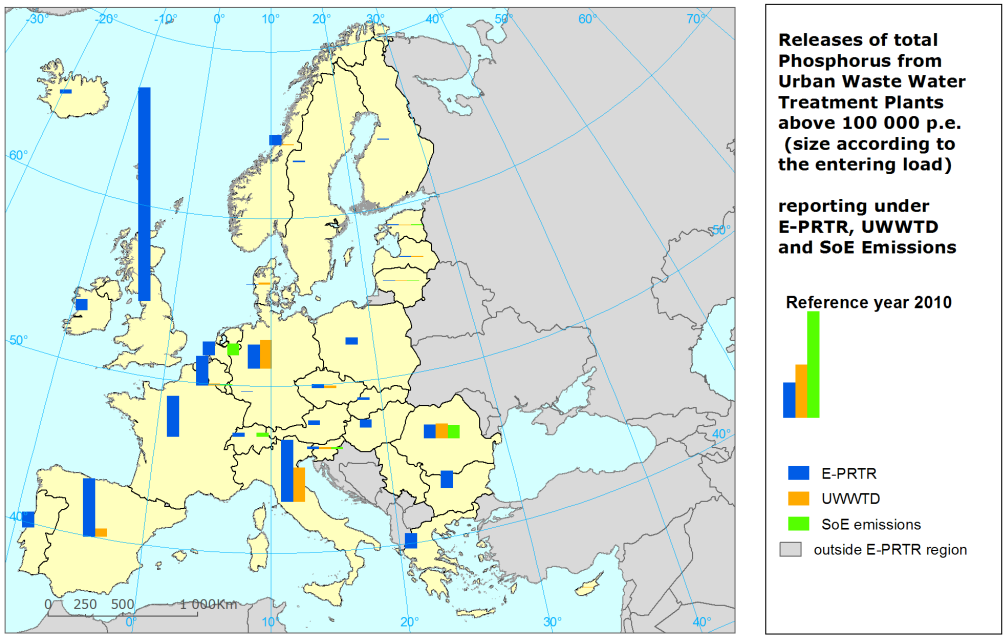
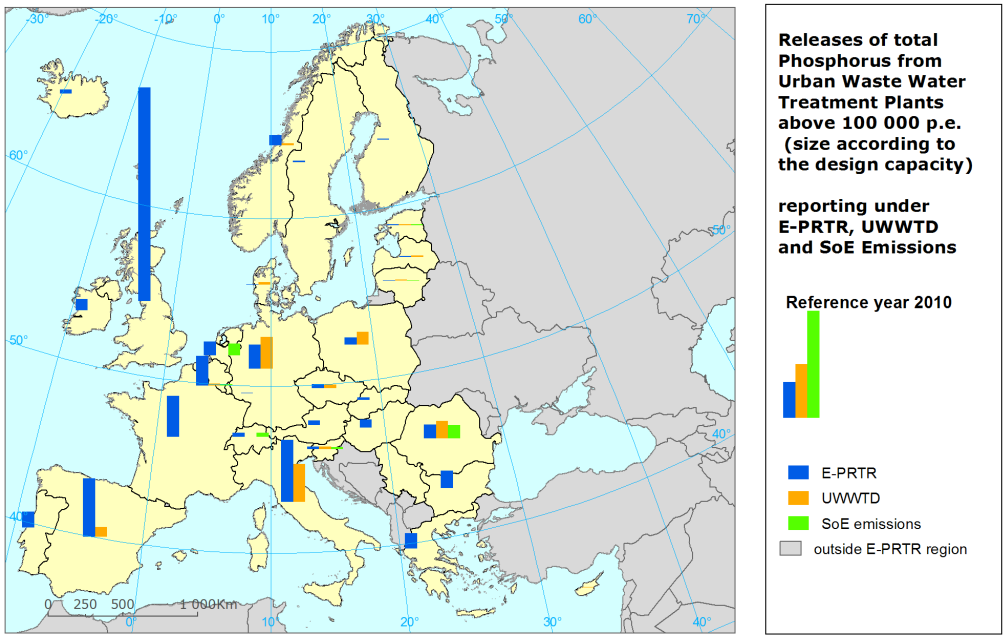


Table 4.13: Proportion of phosphorus emission loads from UWWTPs above 100.000 p.e. according to the design capacity



4.5 *Other types of emission data visualisations*

Proportion of UWWTPs and industrial discharges, reported under E-PRTR could be shown in different types of maps or graphs.
These graphs and maps were prepared in the Emission indicator report and they are available at (http://forum.eionet.europa.eu/etc-icm-consortium/library/subvention_2011/activities_2011/142a_indicator_update/deliverable_milestones/emission_indicators).

5 Possibility of emissions data streamlining and harmonisation

Overview on data and use of aggregated and disaggregated data

The presented report gives an overview on the emissions data that are reported under different obligations. To some extent these data can be compared with each other, in part this is difficult or not possible at all. In any case, the advantages of the different data streams can be used to improve the overall reporting of emissions. The main overlapping of the data is in the field of point sources, so this is where the biggest possibility of streamlining and harmonisation of the different data flows is.

Although SoE emissions data are aggregated per spatial units (RBD or sub-units), they provide the complete picture of emissions from point sources as well as diffuse sources to water, with reasonable apportionment. All other data sources are focused on the largest facilities only (E-PRTR), for one type of emissions and a small range of pollutants (UWWTD), or they require the total emissions to water without an apportionment (OECD/Eurostat or WFD). Disaggregated reporting at facility level as carried out for UWWTD and E-PRTR is important and highly useful as a principle. The access to disaggregated data, also at European level, enable various relevant aggregations – as well as the identification of gap filling needs, whereas aggregated reporting remains less flexible for one purpose only. Furthermore, disaggregated data can be used for an assessment of the data coverage, and data at facility level are fundamental for the Member States to prepare the required inventory of significant sources of pollution according to the Water Framework Directive and EQS Directive. And, last but not least, the emission information at facility level enables a better QA analysis of the reported data.

Potential use of data illustrated

So there are differences in the reporting of emission data, but as mentioned above, also overlapping, and the different data sources therefore can be used for mutual support.
For example the WFD has a good legal basis, whereas SoE Emissions provides an apportionment of emission sources, and the data are already available. The inventory of hazardous and priority substances required by the EQS Directive from the Member States could be supported by use of this data. Furthermore, disaggregated data from E-PRTR reporting could be used for the pre-filling of SoE emissions. And OECD/Eurostat emissions data are pre-filled from SoE reporting.

Another potential use of the data may be the improvement of time series or to support comparisons between Member States. Emission intensities are essential parts of water resource efficiency indicators (WREI001, WREI002, WREI003; see http://www.eea.europa.eu/data-and-maps/indicators/emission-intensity-of-manufacturing-industries/assessment), and the structure of SoE emissions, with a good data coverage, will be an important data source. SoE emissions represent a data flow which can provide harmonised and targeted information on emission pressures. In any case, there is a need for better data coverage.

Potential improvements of existing reporting streams

Some changes in the UWWTD and E-PRTR reporting could possibly improve the situation of reported emissions data. A change in UWWTD reporting could be to include at least the main information from all countries such as discharges from UWWTPs above 10.000 p.e. separately for every facility. On the other hand, discharges from smaller facilities could be removed from UWWTD reporting, if Member States would provide the sum of discharges from smaller facilities per river basin district in SoE reporting. The E-PRTR data flow could be improved by adding some fundamental information such as volume of waste water, by lowering some of the thresholds for reporting and by including information on the UWWTD-ID-codes for waste water treatment plants in case of transfer. An improvement in SoE reporting could be to require only national river basin districts as spatial units (as long as sub-units will be fixed).

Emissions from E-PRTR facilities are being added by the ETC/ICM just now, so the streamlining is already on-going in the field, probably with a potential for some further facilitation of interoperability.

Regarding diffuse sources of emissions further discussions will be necessary, such as clear definitions of the different types of diffuse sources, or to harmonise the general approach of how to model or estimate diffuse sources (if possible).

Most of the existing data gaps and uncertainties could be solved by small adaptations of existing requirements, but that will be middle or long-term process. Maybe it would be applicable to start with SoE and OECD/Eurostat streamlining and harmonisation and continue with changes in WFD reporting templates, e.g.to promote use of the SoE emissions data model for the second planning cycle, as well as to start the discussion about possible changes in E-PRTR and UWWTD reporting as mentioned above.

6 Annex

Table I: SoE Emissions of preferred pollutants

CAS	Name
127-18-4	1,1,2,2-tetrachloroethene
79-01-6	1,1,2-trichloroethene
107-06-2	1,2-dichloroethane
57-63-6	17alpha-ethinylestradiol
50-28-2	17beta-estradiol
104-40-5	4-nonylphenol
NA	Adsorbable organic halogens (AOX)
15972-60-8	Alachlor
309-00-2	Aldrin
959-98-8	Alpha-Endosulfan
120-12-7	Anthracene
7440-38-2	Arsenic
7440-38-2	Arsenic dissolved
1912-24-9	Atrazine
71-43-2	Benzene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
95-14-7	Benzotriazol
7440-43-9	Cadmium
298-46-4	Carbamazepin
7440-50-8	Copper
57-12-5	Cyanides (as total CN)
72-54-8	DDD, p,p'
72-55-9	DDE, p,p'
789-02-6	DDT, o,p'
50-29-3	DDT, p,p'
117-81-7	Di (2-ethylhexyl) phthalate (DEHP)
15307-86-5	Diclofenac
60-57-1	Dieldrin
75-09-2	Dichloromethane
330-54-1	Diuron
72-20-8	Endrin
206-44-0	Fluoranthene
58-89-9	Gamma-HCH (Lindane)
3194-55-6	Hexabromocyclododecane (HBCDD)
118-74-1	Hexachlorobenzene (HCB)
87-68-3	Hexachlorobutadiene (HCBD)
470-90-6	Chlorfenvinphos

85535-84-8	Chloroalkanes C10-13
2921-88-2	Chlorpyrifos
7440-47-3	Chromium
15687-27-1	Ibuprofen
193-39-5	Indeno(1,2,3-cd)pyrene
465-73-6	Isodrin
34123-59-6	Isoproturon
7439-92-1	Lead
7439-97-6	Mercury
136-85-6	Methylbenzotriazol
91-20-3	Naphthalene
7440-02-0	Nickel
3115-49-9	Nonylphenoxyacetic acid (NPE1C)
140-66-9	Para-tert-octylphenol
189084-64-8	PBDE100 (2,2',4,4',6-pentabromodiphenyl ether)
68631-49-2	PBDE153 (2,2',4,4',5,5'-hexabromodiphenyl ether)
207122-15-4	PBDE154 (2,2',4,4',5,6'-hexabromodiphenyl ether)
41318-75-6	PBDE28
5436-43-1	PBDE47 (2,2',4,4'-tetrabromodiphenyl ether)
60328-60-9	PBDE99
608-93-5	Pentachlorobenzene
87-86-5	Pentachlorophenol
335-67-1	PFOA
1763-23-1	PFOS and its derivatives
NA	Polyaromatic hydro-carbons (PAH) (sum)
122-34-9	Simazine
723-46-6	Sulfamethoxazol
56-23-5	Tetrachloromethane
108-88-3	Toluene
13351-73-0	Tolyltriazole
36643-28-4	Tributyltin cation
688-73-3	Tributyltin compounds
1582-09-8	Trifluralin
67-66-3	Trichloromethane
7440-66-6	Zinc

Table II: Nutrients and organic matter aggregated data from point sources (SoE Emissions) pollutants (tonnes/year)

pollutant	Country	U21	U22	U23	U24	U2	U11	U12	U13	U14	U1	U	I3	I4	I	O5	O6	O	D0	PT
BOD5	BE (Flanders)	30	231	1 872	449								1 357							
	CZ																			6 972
	LV											1 282			78			126	424	
	RO	29	1 241	9 942	20 393		50 713	30	283	3 118	47 282		12 496	8 720		595	245			
	SI														1 516				30	
	SK					3 852					243		1 435	16		30	4			
TOC	BE (Flanders)												12	1 450						
	LT	1																		
	NL	15	490	9 966	12 632								1 489						9 030	
	SE														652					
	SI											91							1	
Ntot	BE (Flanders)	95	670	3 577	885								9	1 313						
	DK											3 625			338					
	EE	33	45	165	791								49	1		142	0		717	
	CH	332	1 707	6 581	3 490															
	IS											1 318			912					
	LT	127	171	426	932								45	89		28	7			
	LV											2 162			64			190	1 161	
	NL	8	321	5 743	6 419								812						6 545	
	RO	10	287	1 667	5 196		1	35	83	14 622			1 430	4 746		96	83			
	SE					8 816									2 166				8 577	
	SI														134				1	
	SK					5 145					10		1 434	74		10	0			
P tot	BE (Flanders)	16	66	414	121									169						
	CZ																			1 222
	DK											406			24					
	EE	5	5	9,3	60,4								6	0		17	0		59,12	
	CH					469														
	IS											274			147					
	LT	17	24	58	43								11	3		4				
	LV											387			12			18	47	
	NL	2	63	869	745								95						739	
	RO	2	38	338	848		1 743	3	7	58	1 675		205	318		17	8			
	SE					100									130				167	
	SI														8				4	
	SK					419					2		56	1		1	0			

Table III: Hazardous substances aggregated data from point sources (SoE Emissions) pollutants (kg/year)

pollutant	Country	U21	U22	U23	U24	U2	U11	U12	U13	U14	U1	U	I3	I4	I	O5	O6	O	D0
As	BE (Flanders)	18	79	669	381									636					
	LT	0,1	2,7	10	51														
	NL	3	59	1114	897								89						1175
	SE														281,53				
	SI					3									0,4				3
	SK					2							127	18					
Cd	AT		1	32	38														
	BE (Flanders)	0,005	1	7										169					
	CZ												62	24					
	LV			0,1	0,01										0,0001			0,002	0,01
	NL	0,2	7	79	68								6						105
	RO	0	0,1	12	562		0	0,1	0	322	322		276	52		0	0		
	SE					28									82				28
	SI				2										0,4				
	SK					12							146						
Cu	AT		496	1 800	2 718														
	BE (Flanders)	77	401	2 115	1 635									1 192					
	CZ												1 752	584					
	LV			0,2	1										0,003			0,02	1
	NL	3	165	3 433	3 533								456						3 284
	RO	0	29	869	7 848		0	0	317	6 254	6 571		59 919	3 466		110		110	
	SE					4 274									1 028				5 728
	SI			1	45										307				
Pb	BE (Flanders)	8	13	141	89									2 632					
	CZ												490	364					
	LV			1	0,1										0,001			0,02	0,2
	NL	2	58	1 196	1 407								76						2 065
	RO	0	80	460	8 140		0	0,1	2	4 000			1 693	1 381		0,05			
	SE					250									804				430
	SI														25				0,2
	SK					4							139	4					

pollutant	Country	U21	U22	U23	U24	U2	U11	U12	U13	U14	U1	U	I3	I4	I	O5	O6	O	D0
Hg	BE (Flanders)	0,1	1	3	3									11					
	CZ												81	19					
	LV			0,003	0,01														0
	NL	0,1	1	34	25								1						43
	RO	0	0	10	0		0	0	0	141			32	20		0	0		
	SE					21									13				27
	SI														0,4				
	SK					4							389						
Ni	AT		472	1 695	2 260														
	BE (Flanders)		21	111	847	222								2 071					
	CZ												501	121					
	LV			0,1	0,3										0,01				0,31
	NL	3	149	2 794	4 324								843						4 790
	RO	0	105	985	5 252		0	1	183	2 777			951	373		0	0		
	SE					1 048									345				2 815
	SI				111										255				
	SK					0,4					2		164	17					
Zn	AT		3 572	12 546	18 914														
	BE (Flanders)	577	5 529	34 689	9 207									8 625					
	CZ												18 745	2 669					
	LV			1	3										0,1			0,01	4
	NL	33	1 286	29 334	40 003								2 720						32 666
	RO	0	70	3 062	35 172		0	0	433	70 174			84 926	33 689		0,4	0		
	SE					11 036									9 244				13 506
	SI			31	1 143										1 496				3
	SK												1						

Table IV: Nutrients and organic matter aggregated data from diffuse sources (SoE Emissions) pollutants (tonnes/year)

pollutant	Country	NP1	NP2	NP3	NP5	NP7	NP8	NP
BOD5	BE (Flanders)			6 358	1 875			
	LT	1 433		124			3 829	
TOC	CH							108 667
N tot	BE (Flanders)	17 932		2 445	479			
	CH							67 859
	IS	2 645		43				
	NL	38 651	7 618	102	1 187	204		
P tot	BE (Flanders)	1 134		374	69			
	CH							1 873
	IS	71		4				
	LT	98		3			73	
	NL	3 178		18	64	35		

Table V: Hazardous substances aggregated data from diffuse sources (SoE Emissions) pollutants (kg/year)

pollutant	Country	NP1	NP2	NP3	NP5	NP7	NP
Cd	BE (Flanders)			4	1		
	NL	831	81	2	28	10	
Cu	BE (Flanders)			1 560	273		
	CH						46 140
	NL	16 467	2 877	186	15 991	32 394	
Pb	BE (Flanders)			667	117		
	CH						17 616
	NL	3 822	1 839	21	4 951	193	
Hg	BE (Flanders)			5	1		
	NL		96	0	29		
Ni	BE (Flanders)			310	54		
	CH						23 762
	NL	40 601	621	13	270	28	
Zn	BE (Flanders)			3 318	581		
	CH						68 900
	NL	180 007	10 979	255	21 998	33 237	

Table VI: Nutrients and organic matter emissions from point and diffuse sources (SoE Emissions) pollutants (tonnes/year)

pollutant	Country	point	diffuse
BOD5	BE (Flanders)	3 938	8 233
N tot	BE (Flanders)	6 549	20 856
	CH	12 110	67 859
	IS	2 230	2 688
	NL	19 848	47 762
P tot	BE (Flanders)	786	1 577
	CH	469	1 873
	IS	421	75
	LT	160	174
	NL	2 512	3 295

Table VII: Hazardous substances emissions from point and diffuse sources (SoE Emissions) pollutants (tonnes/year)

pollutant	Country	point	diffuse
Cd	BE (Flanders)	177	5
	NL	265	951
Cu	BE (Flanders)	5 420	1 833
	NL	10 874	67 914
Pb	BE (Flanders)	2 883	784
	NL	4 805	10 825
Hg	BE (Flanders)	18	6
	NL	105	125
Ni	BE (Flanders)	3 272	364
	NL	12 902	41 533
Zn	BE (Flanders)	58 626	3 899
	NL	106 043	246 478