Word template

Annual report on riverine inputs and direct discharges to Convention waters

CP (Country name):	**BELGIUM**
Year:	**2021**

Reporting authority (to which any further enquiry should be addressed):

Name of authority: Flanders Environment Agency (VMM)

Contact person: Mr. Rudy Vannevel

Email: r.vannevel@vmm.be

Phone (with country code): +32 476 988954

Information: The purpose of this template is to provide the OSPAR Commission with an assessment of this year's waterborne inputs to Convention waters, and an up-to-date description of the methodology used. "This year" is the calendar year in retrospect (e.g. data from January – December 2020 is reported in autumn 2021, and so on).

The template should be submitted to the Secretariat or RID Data Center by 1 November (30 November for Denmark only).

This template, the excel sheet with the graphs, and the excel sheet templates comprise the three mandatory submissions each year. These templates will be sent out to all CPs in early September.

Map of riverine sampling stations:

Please insert map(s).

Please insert a list of co-ordinates of river stations.

Discharge area ID	Discharge area	Station code	Station location	Latitude WGS84	Longitude WGS84	
			Water quality stations			
243	IJzer	BEVL_VMM_910000	IJzer (Nieuwpoort)	2,80192	51,12675	Surface water quality
243	IJzer	BEVL_VMM_856500	Kanaal Plassendale-Nieuwpoort (Nieuwpoort)	2,75759	51,13631	Surface water quality
243	IJzer	BEVL_VMM_694000	Ieperleed (Nieuwpoort)	2,76524	51,13900	Surface water quality
243	IJzer	BEVL_VMM_680000	Kanaal Plassendale-Duinkerken (Oostduinkerke)	2,74824	51,12144	Surface water quality
246	Langeleed					
247	Beverdijk	BEVL_VMM_676000	Beverdijkvaart (Ramskapelle)	2,76741	51,12485	Surface water quality
248	Vladslovaart	BEVL_VMM_690900	Vladslovaart (Lombardsijde)	2,78851	51,14311	Surface water quality
249	Gent-Oostende Canal	BEVL_VMM_770000	Kanaal Gent-Oostende (Oostende)	2,94940	51,22209	Surface water quality
255	Blankenbergse Vaart	BEVL_VMM_877000	Blankenbergsevaart (Blankenberge)	3,11866	51,29217	Surface water quality
250	Noordede	BEVL_VMM_865800	Noordede (Bredene)	2,96119	51,22384	Surface water quality
251	Boudewijn Canal	BEVL_VMM_UWWTP18	UWWTP 18 (Brugge)	3,20998	51,25489	Sewage Effluent UWWTP
252	Leopold Canal	BEVL_VMM_6000	Leopoldkanaal (Ramskapelle)	3,22940	51,32546	Surface water quality
256	Lissewege vaart	BEVL_VMM_6010	Isabellavaart (Heist)	3,23795	51,32770	Surface water quality
254	Schipdonk Canal	BEVL_VMM_765007	Afleidingskanaal van de Leie (Zeebrugge)	3,22864	51,32436	Surface water quality
254	Schipdonk Canal	BEVL_VMM_684000	Langgeleed (Koksijde)	2,74681	51,12142	Surface water quality
238	Coastal Area					
102	Schelde	BEVL_VMM_154100	Zeeschelde (Zandvliet)	4,24068	51,35300	Surface water quality
244	Gent-Terneuzen Canal	BEVL_VMM_30000	Kanaal Gent-Terneuzen (Zelzate)	3,80311	51,20761	Surface water quality
245	Schelde Basin					
79	**North Sea (BE)**					
	BE					
			Water quantity stations			
243	IJzer	BEVL_MOW_IJZ02A	IJzer (Keiem)	2,85264	51,08423	Surface water flow
243	IJzer	BEVL_MOW_KPN03A	Kanaal Plassendale-Nieuwpoort (Slijpe)	2,83148	51,16470	Surface water flow
243	IJzer	BEVL_MOW_LOK02A	Lokanaal (Lo-Reninge)	2,74222	50,98042	Surface water flow
246	Langeleed					Surface water flow
247	Beverdijk	BEVL_VMM_L01_48C	Grote Beverdijkvaart (Nieuwpoort)	2,68671	51,13250	Surface water flow
248	Vladslovaart					Surface water flow
249	Gent-Oostende Canal	BEVL_MOW_KGO03A	Kanaal Gent-Oostende (Varsenare)	3,12286	51,20861	Surface water flow
255	Blankenbergse Vaart					Surface water flow
250	Noordede	BEVL_VMM_L02_442	Ede (Maldegem)			Surface water flow
251	Boudewijn Canal	BEVL_VMM_UWWTP18	UWWTP 18 (Brugge)	3,20998	51,25489	Sewage Effluent UWWTP
252	Leopold Canal	BEVL_MOW_LEK03A	Leopoldkanaal (Damme)	3,30961	51,26149	Surface water flow
256	Lissewege Vaart					Surface water flow
254	Schipdonk Canal	BEVL_MOW_AKL04A	Afleidingskanaal van de Leie (Zomergem)	3,56522	51,10112	Surface water flow
238	Coastal Area					Surface water flow
102	Schelde	BEVL_MOW_ZES00A	Zeeschelde (BE-NL border calc)			Surface water flow
244	Gent-Terneuzen Canal	BEVL_MOW_RVG03A	Ringvaart (Evergem)	3,66871	51,08951	Surface water flow
244	Gent-Terneuzen Canal	BEVL_MOW_MOE02A	Moervaart (Mendonk)	3,82486	51,14883	Surface water flow
245	Schelde Basin					
79	**North Sea (BE)**					

Table 1. Water quality and quantity monitoring stations located in Flanders (BE).

Part I: Information on results from the monitoring

Charts: Please fill in the latest year's data in the excel file named "<name of CP> 1990-20XX charts and tables", and update the corresponding charts; send in the excel file together with this report.
Summary of results: Please give a SHORT summary of this year's results in the below tables. Examples are provided. Please note that your text can be used directly into the annual RID Report, to be presented at INPUT and HASEC. If there are special cases that need more space, add this at the end of this section.

Hydrology	**Give a short summary of this year's results, as compared (in %) to the long-term water discharge average 1991-2020 (If you use another period, please indicate which).**
Example: Overall water flow for the country (or the main rivers) was 20% higher/lower than the long-term average. Rivers A, B and C had severe floods/droughts.	
Compared with the LTA 2010-2020 (including the very dry years 2017, 2018, and 2019) discharges to the North Sea, an increase in the mean flow of 17% in 2021 was noticed. The increase was higher in the Scheldt River and river basin (ca. +25 %) and highest in the Yser river (+40 %).	

Nutrients, sediment etc.	**Give a short summary (1-2 sentences) of this year’s result, as compared (in %) to the last 10-year average.**
Example: No major changes in riverine nutrient inputs this year. In direct discharges, an increase in phosphate to the <sea area> of 20 % from the last 10 years.	
Compared with the LTA 2010-2020 discharges to the North Sea, an increase in loads of 12,5% for t-N and 8,6¨for t-P in 2021 is calculated. Values of Tot-N meet +23% for the Scheldt River and river basin. Values of Tot-P range show an increase of 23% in the Scheldt River, but a substantial decrease of 12,7 % in the Canal Ghent-Terneuzen. Nutrient loads to the North Sea annually decreased by 2,38%¨for Tot-N and 2,23%¨for Tot-P since 2000. Overall discharges of SPM to the North Sea increased by 45% in 2021 compared with the 2010-2020 period. This is mainly due to discharges from the coastal area (+74%) and the Canal Ghent-Terneuzen (+83%).	

Heavy Metals	Give a short summary (1-2 sentences) of this year's result, as compared (in %) to the last 10-year average.
Example: No major changes in most metal inputs this year; exceptions are for River A where Zn had increased 40%, and River B where Cu had increased with 15 %. Nothing special to report on direct discharges.	
Note: Due to analytical issues related to LOQ values, no clear conclusion can be drawn from the dataset and trend analysis.	

Any other comments
Example: Unusual concentrations, specific episodes; missing data, quality issues, new direct sources, problems with hydrological estimates, etc.
Long-term effects of droughts can be illustrated by the Scheldt river over the period 1990-2021. Compared with this, the LTA 1990-2010 of the annual minimum flows is 10,4% higher, but the LTA 2010-2021 (see Fig. 7) is 20,6% lower. In 2021, the annual minimum flow decreased by 5,5% compared with the 1990-2021 LTA. 2021 is considered a very wet year (precipitation in 2021: 1039 mm; normal: 837 mm).

Any other issues can be added here, or in the methodology section (below).

i. Riverine inputs

Important note:
In 2021, the Belgian data have been revised, and data series have been completed and recalculated if needed. It must be noted that the Belgian 'coastal area' data do no longer indicate full discharges to the North Sea as the figures of the Canal Ghent-Ostend are missing. In the case of the Canal Ghent-Terneuzen and the Scheldt river, both transboundary with the Netherlands, flows and pollution loads are representative of the Belgian and French river basin areas. Depending on the case the Netherlands report data of net or gross discharges, respectively totals must be calculated for North Sea values, or differences for the country contributions. When the Netherlands do not report about the Scheldt riverine discharges, Belgian figures can be considered representative.

1) **Status** (monitoring year 2021)

- Flows (Table 2): The table with annual flows shows the percentages of the Scheldt river and of the Scheldt basin compared with the total flow drained to the North Sea. The mean and LTA flow percentages are very consistent, considering the complex water network of connected rivers and canals. The water flow discharged from the Scheldt river is circa 76% compared with the total and circa 89% in the case of the Scheldt river basin. (Note: 1 canal is missing in the total OSPAR area).

2021		Total OSPAR	Scheldt basin	%	Scheldt river	%
Flow Rate	[1000m³/d]	16693	14917	89	12622	76
LTA	[1000m³/d]	14832	13278	90	11555	78
Minimum FR	[1000m³/d]	3361	3578		3341	
Maximum FR	[1000m³/d]	82696	69681		59495	

Table 2. Percentages of flows discharged from the Scheldt river basin and the Scheldt river compared with the total flow discharged to the North Sea.

This flow rate comparison is reliable when based on mean values, but should not be applied in a similar way to minimum (and maximum) values of interconnected and highly regulated waterways with significant transfers of water volumes. The difference between the reported and real values is explained in the Methodology section.

- Concentrations: It is not requested by OSPAR to report on mean concentrations values of chemical contaminants, although trends may provide valuable information. It is noticed that, in general, all parameters show a decrease in concentrations over the 2010-2021 period, with the exception of Cu-t. Comparison of the values of heavy metals (total fraction) is only relevant for total Cu and total Pb (>50% of the values above LOQ). Concentrations of Cd-t, Hg-t, Pb-t and Zn-t are highest in the Scheldt river, and of Cu-t in the Scheldt river and Yser river. Surprisingly, percentages of Cu-t values below LOQ are decreasing from 85% in 2010 to 8,7% in 2021, indicative of higher copper loads. Whereas concentrations of most heavy metals parameters decrease on almost all locations, Cu-t is increasing on all monitored locations at an average rate of 2,3% per year. The highest estimated increases of Cu-t are in the Canal Ghent-Terneuzen (11%/y), the Canal Plassendale-Nieuwpoort (12%/y), and the Yser river at (5,5%/y).
  Important note on heavy metals: It must be noticed that for analytical reasons a broad range of LOQ values have been applied over the past years for heavy metals that now seem to significantly influence - in terms of overestimation - the global results and conclusions. The figures are maintained here because they are likely to show similar trends, but not to that extent. The figures will be replaced during the next data submission.
  Nitrogen concentrations reach more or less comparable values on all monitoring sites. The highest mean values of Tot-N and NO3 are recorded in the agricultural areas of the coastal region, in particular the Yser river; the lowest concentrations are measured in the Scheldt river. Similar conclusions can be drawn for phosphorous. Nitrogen levels of the Canal Ghent-Terneuzen are also higher than

the Scheldt river, which indicates the impact of nearby industrial activities and the urban area of Ghent.
With regard to SPM, values are significantly higher for the Scheldt river compared to all other monitoring stations, which is clearly an effect of the tidal regime.
Note: percentages of values below LOQ in 2021: between 9% (Cu-t) and 100% (Hg-t) for total heavy metals, 19% for ammonia, 4% for nitrate, and 0% for Tot-N and Tot-P, 5% for ortho-phosphate, and 1% for SPM. The high amount of heavy metals concentrations below LOQ (Cd-t, Hg-t, Zn-t) means that calculated loads are likely to be overestimated when applying the LOQ/2 rule.

- Loads: Out of 13 parameters, 11 are monitored, as the parameters lindane and PCBs are excluded. The 2021 data set is sufficiently consistent to allow some regional comparison (Table 3). Compared with the coastal region, loads discharged from the Scheldt basin, and in particular the Scheldt river, are considerably higher. This river covers the largest part of the Belgian territory draining to the North Sea.
For the heavy metals (total fraction), loads from the Scheldt river range between 77% (Zn-t) and 89% (Cd-t). *Note: see in this respect the comment under Status*. A high percentage is also reached for suspended matter (84%), due to the tidal regime of the Scheldt, transporting a high volume of sediments. Nutrient loads of nitrogen and phosphorous reach lower percentages (between 55% for ammonia and 65% for nitrate and Tot-P in the Scheldt river basin), which indicates the impact of the coastal region, an agricultural area with intensive piggery. However, considering the Scheldt basin in total, the Canal Ghent-Terneuzen shows its influence on discharges of, in particular, the heavy metals copper and zinc, and N- and P-nutrients. The comparison of the Scheldt basin with the coastal area could result in an overestimation of the impact of the Scheldt basin loads since monitoring sites are located near the border, directly impacted by the heavy industries in the harbour areas and the urban area of Antwerp and Ghent. Because of the complex water network in the Ghent area, water is diverted to different directions in times of floods and droughts, which hampers a thorough impact evaluation.

2021		Total OSPAR	Scheldt basin	%	Scheldt river	%
Cd	[t/a]	1,02	0,95	93	0,90	89
Hg	[t/a]	0,185	0,168	91	0,157	85
Cu	[t/a]	36,44	32,45	89	29,02	80
Pb	[t/a]	23,76	19,93	84	18,75	79
Zn	[t/a]	170,92	147,87	87	132,33	77
NH4-N	[kt/a]	1,28	0,93	73	0,70	55
NO3-N	[kt/a]	25,57	21,09	82	16,57	65
PO4-P	[kt/a]	0,99	0,82	83	0,58	59
N-Total	[kt/a]	28,20	22,63	80	17,68	63
P-Total	[kt/a]	2,01	1,63	81	1,30	65
SPM	[kt/a]	342	296	86	287	84

Table 3. Percentage of loads discharged by the Scheldt river basin and the Scheldt river compared with the total loads discharged to the North Sea. (Heavy metals: total fraction).

The conclusions on the calculated loads are in line with the observations on flows and concentrations and seem to reflect very well the impact of human activities.

2) **Trends** (monitoring period 1998-2021)

- <u>Flows</u>: Flow data have been revised and completed in 2021, and data gaps are filled with estimated values. Regional flow trends based on RID table 9, and in particular those of the coastal area, now show less data heterogeneity. More reliable data sets are available for the Scheldt river (Fig. 1), with a stable annual mean flow between 9 and 13 Mio m³/d over the over the period 2003-2016 and in 2021. Flow drops during the dry period 2017-2020 reach levels as low as 8 Mio m³/d, comparable with conditions in 1990 and 1996-1997. In contrast, historical data sets indicate very high flow levels between 14 and 23 Mio m³/d between 2000 and 2002. Regional flow trends are similar.

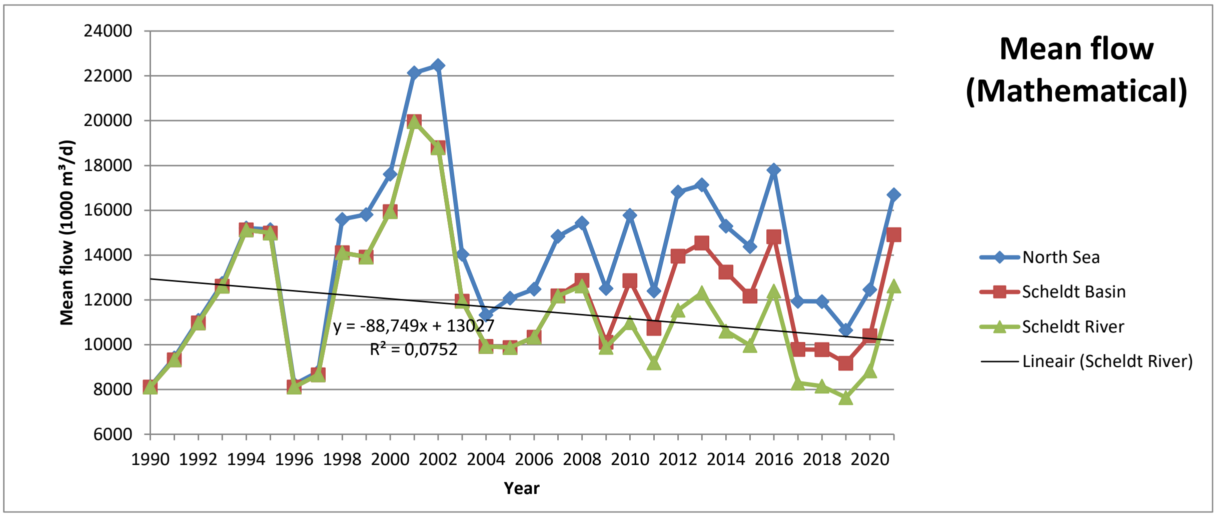

Fig. 1. Flow trends showing annual mean values of the Scheldt river (near the Belgian-Dutch border), the Scheldt river basin, and the discharges to the North Sea (1990-2021). Partial missing data for the Scheldt basin for the period preceding 2009 and for the coastal area preceding 1998.

- <u>Loads</u>: Trend analyses of pollutant loads are not reliable in the coastal area and for hazardous substances (heavy metals) because of the data gaps and low concentration values in the historical data series. The higher the number of concentration values below LOQ, the more the calculated loads tend to include overestimation (LOQ/2 rule) and reflect the flow curve. But nutrients are frequently monitored and values exceeding LOQs range between 81% (ammonia) and 100% (Tot-N, Tot-P), which makes these data series reliable. Nitrogen loads discharged to the North Sea (Fig. 2) show equal trends for total nitrogen and nitrates and low values for ammonia. Lower ammonia values result from: 1) decrease of discharges from pollution sources, 2) breakdown by available oxygen, resulting in higher nitrogen levels. There is a strong correlation between the mean annual flow and the total nitrogen (r = 0,910) and total phosphorous (r = 0,881) loads to the North Sea. Linear regression over a period of 22 years applied to the Tot-N data series reveals an annual decrease of 2,38%.

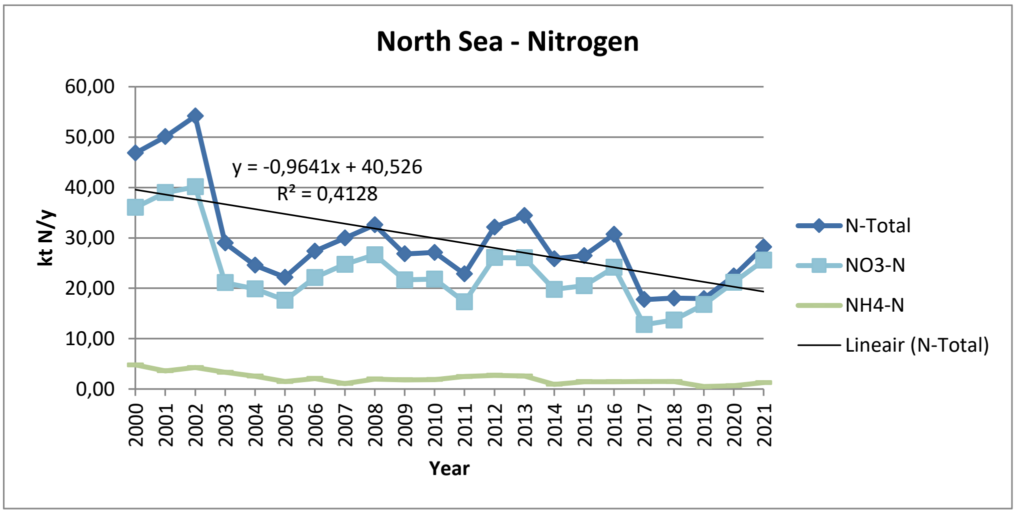

Fig. 2. Loads of nitrogen components discharged to the North Sea (2000-2021).

- Considering the flow rate of the Scheldt river, nitrogen loads show similar trends (Fig. 3) as the totals discharged to the North Sea (Fig. 3). At the level of the Belgian territory, the discharge from the Scheldt river is the highest share of nutrient transport to the North Sea. The conclusion is that after a rather stable outflow of nitrogen loads has been observed since 2007, nitrogen discharges dropped significantly in 2017 and 2018, but increased since 2019. Higher load discharges are monitored in 2021. For Tot-N, the improvement reaches 3,58% per year over the 2000-2021 period.

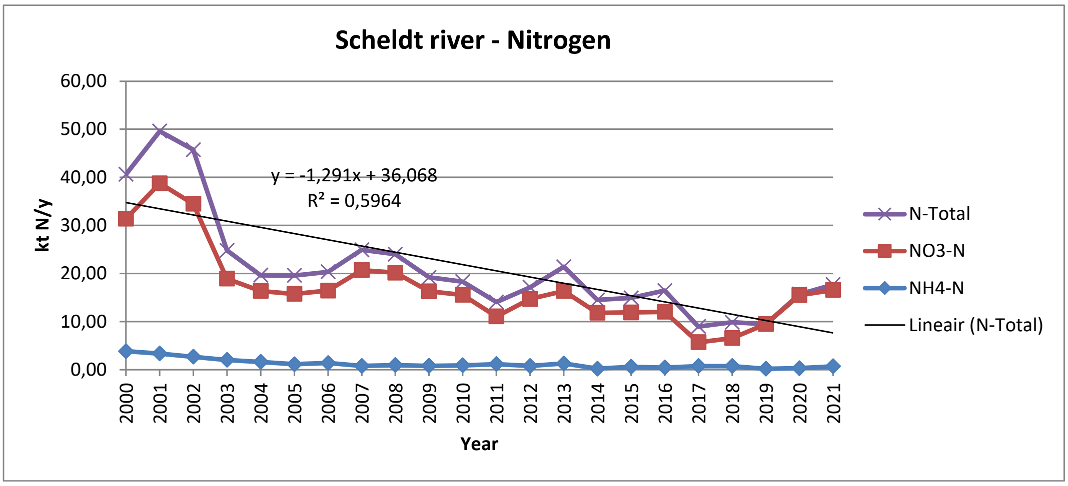

Fig. 3. Loads of nitrogen components discharged by the Scheldt river (2000-2021).

Looking at the phosphorous trends (Fig. 4), a decrease of loads is detected compared to the previous years. Considering the fluctuations since 2008, the decline is less prominent than for nitrogen. From 2009 on, total phosphorous loads discharged to the North Sea are significantly higher than those of the

Scheldt river. This can be partially explained by the inclusion of the data from the Canal Ghent-Terneuzen since 2010 (in the figure included in the North Sea total). On the other hand, the increasing load trend during the last decade is also a result of improved monitoring, including additional monitoring stations in the coastal area. Linear regression applied to the Tot-P data series (over a period of 22 years) reveals an annual decrease of 2,23% for discharges to the North Sea and 3,48% for discharges by the Scheldt river.

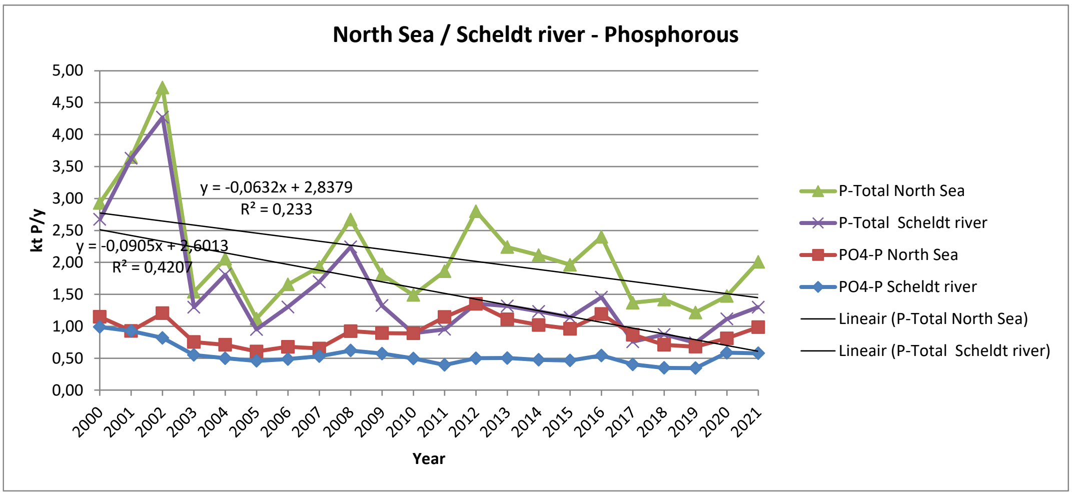

Fig. 4. Loads of phosphorous components discharged to the North Sea (total loads) and by the Scheldt river (2000-2021).

Considering the 2009-2021 period, loads of suspended particular matter (SPM) are dominated by the concentrations of the Scheldt river (Fig. 5). Because of the tidal regime of the Scheldt river, a mass of sediments is carried to the North Sea. On the other hand, the coastal region is dominated by a polder system with a regulated water system and slow-flowing or even standing water during long periods. Trend differentiation between total loads to the North Sea and discharged loads from the Scheldt river since 2009 is partially due to improved monitoring efforts. Lower SPM loads in the ‘dry period’ 2017-2020 indicate lower run-off (higher sedimentation) in the upper parts of the river basin. In contrast, SPM loads significantly increased in the wet year 2021.

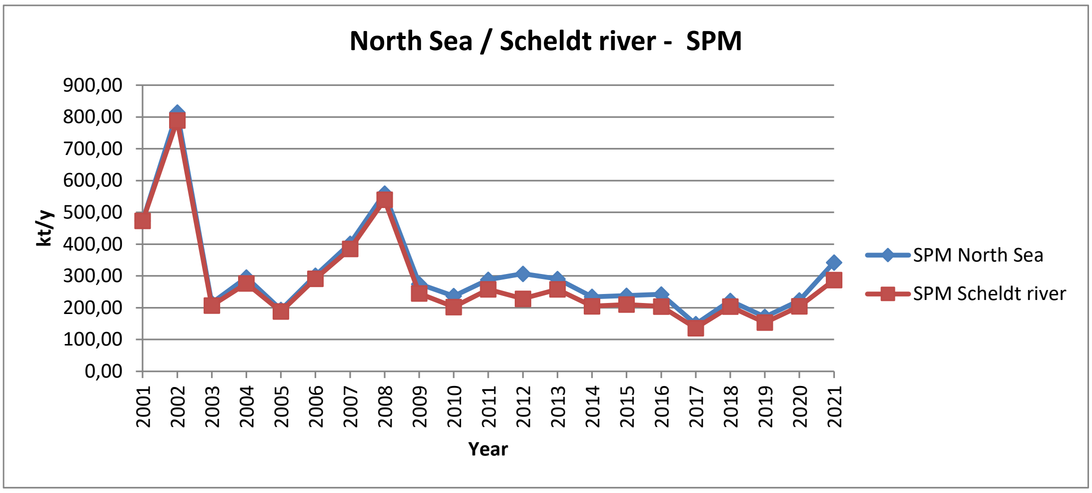

Fig. 5. Loads of SPM discharged to the North Sea (total loads) and by the Scheldt river (2001-2021).

ii. Direct discharges

There are no direct discharges to Belgium's convention waters since 1995.

iii. Unmonitored areas

There are no unmonitored areas with significant flow or load discharges.

iv. Overall loads

Overall loads are similar to riverine inputs since there are no direct discharges and no estimations of loads from unmonitored areas.

Part II: Methodology

Information: All details on this year's methodology should be given in the following sections. Please give a description of the methods used **even if the methodology does not differ from previous years**. This is necessary for keeping track of each year's methodology in the archives.

A. Overall information on changes in the monitoring methods

Has the monitoring programme been changed this year?

No: ___

Yes: X

If no, please copy last year's report in below.

If yes, please indicate which parts of the programme that have changed and give additional comments below the table when needed:

Methodology of components	Main change since last year
Direct discharges	
- Sewage	
- Industry	
- Aquaculture	
- Other	
Riverine monitoring	
Unmonitored areas	
Analytical methods or LOD/LOQ	
Water discharge	Canal Plassendale-Nieuwpoort: no flow data available
Other	

B. Direct discharges (Tables 5a-5e)

Information: Please give a comprehensive description of the methods used for determining direct discharges. If the methodology differs from the recommended methodology of the RID Principles, please give comments and explanations for this deviation.

The methodology description should, to the best possible extent, give information on:

- Which types of point sources are included (e.g. all industries or only the larger ones);
- General geographical location of point sources (e.g. are point sources downstream of the sampling sites in monitored rivers included? How far up the river mouths are point sources in unmonitored areas included, or are these not included at all?)
- Sampling procedures or measurements/calculations used.
- If any inter- or extrapolation of data series is done, please explain the method.
- Give any other relevant information.

Use the number of pages needed.

This section does not apply to Belgium: all direct discharges to the North Sea (coastal area) have been stopped in 1995-96.

i. Sewage

ii. Industry

iii. Aquaculture

iv. Urban storm runoff

v. Any other direct discharges reported

Determinand coverage for direct discharges (indicate with an X):

Determinand	**Sewage**	**Industry**	**Aquaculture**	**Storm/urban**	**Other**
Tot-P					
PO_4-P					
Tot-N					
NH_4-N					
NO_3-N					
SiO_2					
TOC					
SPM					
Conductivity					
pH					
As					
Cd					
Cu					
Cr					
Hg					
Ni					
Pb					
Zn					
PCB					
Lindane					
Other (please specify)					

C. Riverine inputs (Tables 6a-6c)

Information: Please give a comprehensive overview of the methods used for riverine inputs. If the methodology differs from the recommended methodology of the RID Principles, please give comments and explanations for this deviation.

The methodological description should cover the following items (if there are rivers with differing monitoring procedures, please provide a description for each type):

Use the number of pages needed.

i. Station network[1]

See Table 1.

ii. Sampling methodology

1. Flow metering: only automated and continuous flow metering data are used. Hydrological stations only providing water level data are omitted from load calculations.
2. Physico-chemical monitoring: in situ by means of beaker sampling is applied to all monitoring sites. Sampling depth does not exceed 30 cm. No sample is taken when the water level is too low to guarantee a qualitative sample result.

iii. Sampling frequency

1. Flow metering: Flow data are provided as a daily average.
2. Physico-chemical monitoring: sampling frequency is normally 12 times/year, equally distributed over the year. Monitoring frequency is higher (e.g. 24 times/year) in some stations. Lower frequencies are noted for hazardous substances.

iv. Chemical parameters and their analytical method, incl. LOD/LOQ

1. The number of parameters reported is restricted to those mentioned in table 6.
2. Heavy metals: data are available on dissolved and total concentrations, but only results of total HM are reported. Data series of total HM, however, show significant data gaps.
3. LOD/LOQ analyses and values depend on the laboratory and hence are not steady values.

[1] Include a list of coordinates in addition to the map in Part I.

v. Values below LOD/LOQ[2]

Load values are calculated on the basis of LOD/2 for all stations, except 251 Boudewijn Canal (discharge of an urban waste water treatment plant) of which effluent data are provided by the operator.

vi. Water discharge[3]

In 2021, the OSPAR flow data set has been reviewed and completed as far as possible. Updated data series have been used as provided by the hydrological agency, including aggregation and extrapolation of flow data representative of the end point of the water bodies. As a result, more reliable flow data sets are now available for the period 1990-2020. Monitored and modelled data are obtained from the Waterinfo database (https://www.waterinfo.be/). However, in this context, the use of the (totals of) reported minimum and maximum data must be discussed.

Minimum values dropped significantly since 2017 and often reach negative values (intrusion). But it must be noted that the reported totals (regional aggregations) of minimum values are theoretical since they represent the mathematical addition of the annual minima of each of the rivers examined. The real discharges, based on the minima of the total daily run-off is much less pronounced, albeit they also show a decreasing trend. The main reason is that the network of rivers and canals is highly regulated, and large volumes are deviated depending on (local) droughts or heavy rainfall, and the need to secure shipping. Another cause could be the changing precipitation pattern, with locally frequent short and heavy rainfalls. A similar pattern is noticed for maximum values, although to a lesser extent. Differences between the mathematical and observed flow calculations are shown in the 2020 OSPAR-RID Report (reporting year 2021).

vii. Calculation method for determining loads

1) All rivers, except the Scheldt river and "251 Boudewijn Canal": load calculations are based on the formula proposed in the "Principles of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID)"

$$\frac{Qr\sum_{i=1}^{n}(CiQi)}{\sum_{i=1}^{n}(Qi)}$$

applying a correction factor U_f according to the CIS Guidance Document No. 28 (p. 23)[4] :

[2] Explain how values below LOQ/LOD are dealt with when calculating loads. Give comments if LOQs are higher than recommended in the RID Principles.

[3] Could include information on whether the discharge is monitored or modelled (if modelled, please state which model); monitoring frequency, etc.

[4] Reference: Common Implementation Strategy for the Water Framework Directive (2000/60/EC) - Guidance Document No. 28 Technical Guidance on the Preparation of an Inventory of Emissions,

$$Ly = \frac{Q_d}{Q_{Meas}} \cdot \left(\frac{1}{n} \sum_{i=1}^{n} C_i \cdot Q_i \cdot U_f \right)$$

Load calculations depend on the monitoring frequency of both flows and determinants. Flows are normally not restricting, but in some cases they are not available for some period. The maximum number of basic load data for a particular water course equals the sampling frequency of the chemical determinants, but is lower in cases flow data are lacking or with invalid physical-chemical samples.

2) Scheldt river: Annual loads are calculated according to the formula proposed in the "Principles of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID)"

$$\frac{Qr\sum_{i=1}^{n}(CiQi)}{\sum_{i=1}^{n}(Qi)}$$

Annual loads are calculated on the basis of daily loads and a weighted annual flow average. Daily loads are calculated using: i) monitored physical-chemical data, and ii) estimated flows based on monitored and estimated flows of its tributaries. These flows are monthly averages in the period 2002-2005 and 10-days averages from 2006 on. The reason for this is the Scheldt is a tidal river, not allowing monitoring of direct discharge flows. As a result, estimated flows are considered net flows. The mean daily load is based on normally 12 concentration values multiplied by its respective (monthly or) 10-days mean flow. Load calculations including values less than LOQ and/or LOD limits are reported according to LOQ/2 or LOD/2.

3) 251 Boudewijn Canal: the riverine load is considered identical to the effluent load of the UWWTP Bruges. As this canal is an unmonitored standing water with a very small external inflow of surface water, the load is calculated on the basis of its main polluter, the urban waste water treatment plant of Bruges (UWWTP 18 Brugge). Values are based on effluent measurements. All pollution is considered steady and discharged into the marine environment.

4) Salinity correction. No correction on physico-chemical values was applied as this requires a concerted approach within OSPAR and with the Netherlands in particular. Salinity of the waters considered varies between 'not' to 'slightly' or 'highly' brackish, resulting from natural (tidal Scheldt), semi-natural (water courses within polder system) or artificial (intrusion of brackish water as a result of sluice activity on the Canal Ghent-Terneuzen) conditions. Note discharges of the Canal Ghent-Terneuzen and Scheldt river are not directly to the North Sea but to the Dutch territory of the lower tidal Scheldt.

Determinand coverage for riverine inputs (indicate with an X):

Discharges and Losses of Priority and Priority Hazardous Substances.
https://circabc.europa.eu/sd/a/6a3fb5a0-4dec-4fde-a69d
5ac93dfbbadd/Guidance%20document%20n28.pdf

Please fill in the table as far as possible. If different rivers are monitored differently (e.g. less load-bearing rivers are monitored with fewer parameters), please indicate this/prepare a separate table.

Determinand	**Analytical method**	**LOQ***	**LOD***	**Comments**
Tot-P				
PO_4-P				
Tot-N				
NH_4-N				
NO_3-N				
SiO_2				
TOC				
SPM				
Conductivity				
pH				
As				
Cd				
Cu				
Cr				
Hg				
Ni				
Pb				
Zn				
PCB				
Lindane				
Other (please specify)				

* Please remember to give units.

D. Unmonitored areas (Table 6b)

Information: Please give a thorough description of the method used **for estimating water discharge and loads from unmonitored areas**. If a model is used, please give information on and *references* to this model.

Use the number of pages needed.

i. Methodology

For the monitored water bodies, extrapolation of the data is applied and cover the whole catchment. For the Scheldt river, monitoring data from the main tributaries (rivers and canals) are totalised and extrapolation is applied to cover the river basin area at the BE-NL border.

ii. Proportion of unmonitored area

Please fill in the table below:

	km^2	%
Total area of your country	30.689 (1)	
Total area draining to the OSPAR Maritime Area	24.054 (2)	100% *
Monitored area draining to the OSPAR Maritime Area	22.619 (3)	94,0
Unmonitored area draining to the OSPAR Maritime Area	1.435 (4)	6,0

* The total land area *draining to the OSPAR Maritime area* is set to 100%. The proportions of monitored and unmonitored area should be given relative to this.

(1) Belgium only

(2) Includes parts of FR, BE, and NL; covers OSPAR 245+238+222; OSPAR 245 = 102+244

(3) Excludes NL OSPAR 222.

(4) NL OSPAR 222.

E. Quality assessment

Information: Please give relevant information on how quality assessment is carried out.