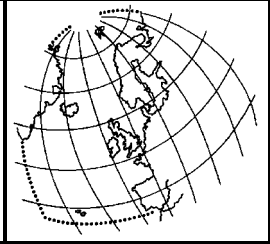


OSPAR Commission
2001



**Overview of the Results of the
Comprehensive Study on Riverine Inputs
and Direct Discharges (RID)
from 1996 to 1998**

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

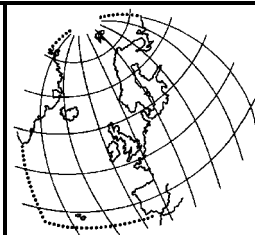
La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par l'Espagne et la Communauté européenne.

© OSPAR Commission, 2001. Permission may be granted by the publishers for the report to be wholly or partly reproduced in publications provided that the source of the extract is clearly indicated.

© Commission OSPAR, 2001. La reproduction de tout ou partie de ce rapport dans une publication peut être autorisée par l'Editeur, sous réserve que l'origine de l'extrait soit clairement mentionnée.

ISBN 0 946956 66 9

OSPAR Commission 2001



Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) from 1996 to 1998

Contents

PART I

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1996

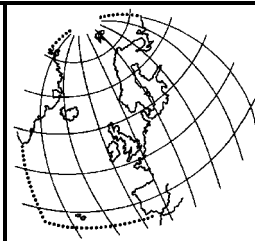
PART II

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1997

PART III

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1998

OSPAR Commission 2001



Part I

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1996¹

Contents

INTRODUCTION	2
RESULTS OF THE 1996 COMPREHENSIVE STUDY	2
Table 1a. Information Received on Inputs to the Maritime Area of the OSPAR Convention in 1996	
Table 1b. Determinands Reported by Contracting Parties in 1996	
Table 2. Direct Inputs to the Maritime Area of the OSPAR Convention in 1996 by Country	
Table 3. Riverine Inputs to the Maritime Area of the OSPAR Convention in 1996 by Country	
Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the OSPAR Convention in 1996 by Country	
Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the OSPAR Convention by Sea Area	

¹ Extract of:
Data Report on the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1996, available on request from the Secretariat of the OSPAR Commission.

INTRODUCTION

Good input data for substances carried to the maritime area of the Paris Convention by rivers and direct discharges are essential in order to allow an assessment of the effectiveness of the Paris Commission's policies. They are equally essential for the interpretation of monitoring data such as those collected under the Joint Assessment and Monitoring Programme (JAMP) of the Oslo and Paris Commissions, which replaced the former Joint Monitoring Programme in 1995.

The riverine discharges to the landward ends of estuaries and direct discharges to estuaries and coastal waters are combined to give estimates of the gross input of each substance to the maritime area. It is not feasible at the present time to estimate how much of these inputs are retained within estuaries and near-shore areas and how much passes into the open sea. Several major research projects are in hand to address this issue. The riverine loads reported also represent the loads coming from the whole of the river catchment areas. In the case of international rivers, loads from upstream countries are ascribed to the most downstream countries. No attempt has been made to identify the sources of these loads or whether these loads are of natural or anthropogenic origins. Again research aimed at differentiating between anthropogenic and natural contributions to riverine loads is needed to put the information into perspective for management purposes. As regards inputs to sea areas the considerable maritime fluxes across sea boundaries have not been taken into account.

RESULTS OF THE 1996 COMPREHENSIVE STUDY

The data report is incomplete with respect to data submissions for the river systems originally adopted for the Comprehensive Study on Riverine Inputs. Furthermore, not all Contracting Parties reported data for all mandatory parameters.

For the 1996 study, data sets on riverine inputs and direct discharges were provided by Belgium, Denmark, Germany, the Netherlands, Norway, Sweden and the United Kingdom of Great Britain and Northern Ireland (UK). Only riverine inputs were reported by France², Ireland³ and Spain⁴. Iceland⁵ and Portugal did not provide input data for 1996.

The geographical coverage for 1996 was slightly better than the coverage in previous years, with the inclusion of data from France and Spain, although Portugal did not provide data and significant gaps occur in the data from France and Spain. The region of the maritime area best covered remains the OSPAR Region II of the maritime area, the Greater North Sea, and especially the main body of the North Sea, although even here gaps exist.

The reporting of mandatory and voluntary determinands (cf. Table 1b) in 1996 was similar to 1995. All reporting Contracting Parties provided data on inputs of heavy metals with the exception of Denmark (metal data only for direct inputs), France (only riverine inputs), Spain (only riverine inputs) and Sweden (mercury data for riverine inputs were not provided). There are a number of gaps as regards the reporting of data for inputs of γ -HCH and PCBs (Denmark, Ireland, Norway for direct inputs, Sweden) and suspended particulate matter (Denmark, Sweden for rivers). A number of additional parameters, not summarised in the overview Tables 3 and 4, were reported by Ireland, the Netherlands Norway (cf. Table 1b).

² Rivers Seine, Loire and Gironde.

³ 1990 data for direct inputs are included, since the basis for the calculation remains unchanged.

⁴ Rivers Guadalquivir, Guadiana and Miño.

⁵ Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculation of riverine inputs.

Presentation of the 1996 data

Table 1a gives an overview of the information provided by Contracting Parties for 1995 and shows how the information was categorised:

- Direct inputs:
 - Sewage effluents
 - Industrial effluents
- Coastal areas: Data reported under "coastal areas" include discharges and run-off from coastal areas between rivers and also polder effluents. Depending on their nature, discharges from "coastal areas" are either counted under direct discharges or under riverine inputs.
- Riverine inputs:
 - Main rivers
 - Tributary rivers

Table 1b gives an overview of the determinands reported by Contracting Parties and shows where there are gaps in the reporting of mandatory determinands. Table 1b also indicates the precision of the estimate where the relevant information was provided by Contracting Parties. The last column of Table 1b informs on any additional determinands reported.

The data from Contracting Parties have in many cases⁶ been rounded to one significant number for data reported less than the unit in which they appear and to two significant numbers for data reported greater than one unit; the following examples illustrate this rounding convention:

Amount reported by Contracting Party	Figure reported in the tables
0,0011	0,001
0,011	0,01
0,11	0,1
1,11	1,1
11,1	11
111	110
1110	1100
11100	11000

Due to this procedure, there are sometimes slight differences between the calculated totals given in this report and those calculated by Contracting Parties.

Overviews of the input information by country and sea area are given in **Tables 2 to 4a and b**. Table 2 gives an overview of direct inputs to Paris Convention Waters in 1996. Table 3 gives an overview of riverine inputs to Paris Convention waters in 1996. Table 4a summarises the information contained in Tables 2 and 3 and gives overall figures on inputs from land-based sources. Table 4b contains the same information as Table 4a but lists inputs by sea area. Please note that, due to major gaps in the reporting, no totals for the Convention area are given in Tables 2 to 4a and b.

⁶ Secretariat note: Not all Contracting Parties wished to have their data rounded in accordance with this procedure. Totals in the summary tables are not rounded.

Table 1a. Information Received on Inputs to the Maritime Area of the Paris Convention in 1996

Country	Direct Discharges		Coastal Areas (2)	Riverine Inputs	
	Sewage Effluents	Industrial Effluents		Main Rivers	Tributary Rivers (1)
Belgium	NI	+	(3)	+	+
Denmark					
- Kattegat	+	+	NI	+	NI
- Skagerrak	+	+	NI	+	NI
- North Sea	+	+	NI	+	NI
France					
- North Sea	NI	NI	NI	NI	NI
- Channel	NI	NI	NI	+	NI
- Atlantic	NI	NI	NI	+	NI
Germany	+	+	(4)	+	+
Iceland	No 1996 input data available (5)				
Ireland					
- Irish Sea	+(6)	+(6)		+	+
- Celtic Sea	+(6)	+(6)		+	+
- Atlantic	+(6)	+(6)		+	+
Netherlands	+	+	(3)	+	+
Norway					
- Skagerrak	+	+	+(7)	+	+
- North Sea	+	+	+(7)	+	+
- Norwegian S	+	+	+(7)	+	+
- Barents Sea	+	+	+(7)	+	+
Portugal	No 1996 input data available				
Spain	NI	NI	NI	+	NI
Sweden					
- Kattegat	+	+	(3)	+	+
- Skagerrak	+	+	(3)	+	+
United Kingdom					
- East Coast	+	+	NI	+	NI
- Channel	+	+	NI	+	NI
- Celtic Sea	+	+	NI	+	NI
- Irish Sea	+	+	NI	+	NI
- Atlantic	+	+	NI	+	NI

+ = Information available

NI = No information

NA = Not applicable

(1) Tributary Rive - any tributary river flowing into (the estuary of) a main river, downstream from the sampling point
- any minor river which was not deemed to be a main river.

(2) Coastal areas: - 'downstream areas' of main and tributary rivers and rivers not monitored;
- areas discharging to the maritime area which, however, are located outside the catchment area of the river.

(3) Included in data on riverine inputs ("tributary rivers")

(4) Included in data on direct inputs

(5) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(6) 1990 data

(7) cf. category "run-off" in Table 6b. for Norway and explanation under [D.4] of the Norwegian Annual Report.

Table 1b. Determinands Reported by Contracting Parties in 1996

Country	Determinands													
	Cd	Hg	Cu	Pb	Zn	g-HCH	PCBs (1)	NH4-N	NO3-N	PO4-P	Total N	Total P	SPM (2)	Others
						(voluntary)								
Belgium														
- direct inputs(7)	+	+	+	+	+	NA	NA	NA	NA	NA	+	+	+	PAHs
- riverine inputs	R (4)	NI	+	R (4)	R (3)	NI	NI	+	R (3)	+	+	+	R (3)	
Denmark														
- direct inputs	+	+	+	+	+	NI	NI	NI	NI	NI	+	+	NI	
- riverine inputs	NI	NI	NI	NI	NI	NI	NI	+	+	+	+	+	NI	
France														
- direct inputs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
- riverine inputs	+	+	+	+	+	+	+	+	+	+	+	+	+	
Germany														
- direct inputs	R	R	R	R	R	R	R	+	+	+	+	+	+	
- riverine inputs	+	+	+	+	+	+	+	+	+	+	+	+	+	
- riverine inputs	+	+	+	+	+	+	+	+	+	+	+	+	+	
*) Elbe **) Other main rivers														
Iceland														
- direct inputs	No 1996 input data available (6)													
- riverine inputs	No 1996 input data available (6)													
Ireland														
- direct inputs	+(8)	NI	+(8)	+(8)	+(8)	NI	NI	NI	NI	NI	+(8)	+(8)	+(8)	organic N, BOD organic N, BOD
- main riv. input	R (3)(4)	NI	R (3)	R (3)(4)	+	NI	NI	+	+	+	+	+	+	
- tributary rivers	R	NI	R	R	+	NI	NI	+	+	+	+	+	+	
Netherlands														
- direct inputs	+	+	+	+	+	NI	NI	+	+	NI	+	+	+	POPs
- main riv. input	+	+	+	+	+	+	+	+	+	+	+	+	+	
- tributary rivers	+	+	+	+	+	+	+	+	+	+	+	+	+	
Norway														
- direct inputs	+	+	+	+	+	NI	NI	+	+	+	+	+	+	As, Cr, Ni, TOC, COD As, Cr, Ni, TOC COD
- main riv. input	+	+	+	+	+	+	+	+	+	+	+	+	+	
- tributary rivers	R	R	+	+	+	+	R	+	+	+	+	+	+	
Portugal														
- direct inputs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
- main riv. input	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
- tributary rivers	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
Spain														
- direct inputs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
- riverine inputs	?	?	?	?	+	NI	NI	+	+	+	NI	NI	+	
Sweden														
- sewage effluent	+	+	+	+	+	NI	NI	+	+	+	+	+	+	(?): no '96 conc.data
- main riv. input	+	NI	+	+	+	NI	NI	+	+	+	+	+	NI	
- tributary rivers	NI	NI	+	+	+	NI	NI	+	+	+	+	+	NI	
United Kingdom														
- direct inputs	R	R	R	R	R	R	R	R	R	R	R	R(9)	R	
- riverine inputs	R	R	R	R	R	R	R	R	R	R	R	R(9)	R	

+ : Data provided

R: Estimate given as a range

NI: No information

NA: Not applicable; riverine inputs > 90% total inputs

DL: Detection limit

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

(3) 70 % of measurements above detection limit

(4) Less than 70 % of measurements above detection limit

(5) Includes run-off

(6) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(7) Direct inputs are deemed insignificant compared to the riverine inputs reported

(8) 1990 data, since the basis for calculation remained unchanged

(9) In England and Wales Total-P was not measured. To avoid anomalies, a value equal to the orthophosphate-P has been used.

Table 2[^]. Direct Discharges to the Maritime Area of the Paris Convention in 1996 by Country

Country	Region	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]	
Belgium	North Sea (upper estimate)	0.000	0.000	0.002	0.000	0.02	NI	NI	NI	NI	NI	0.006	0.003	0.02	
		(upper estimate) 0.000	0.000	0.002	0.001	0.02	NI	NI	NI	NI	NI	0.006	0.003	0.02	
Denmark	North Sea Skagerrak Kattegat	0.000	0.001	0.07	0.001	0.03	NI	NI	NI	NI	NI	0.3	0.03	NI	
		NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	0.1	0.02	NI	
		0.0001	0.0003	1.1	0.009	0.04	NI	NI	NI	NI	NI	1.1	0.1	NI	
France	Channel/North Sea Atlantic	no data submitted for 1996 no data submitted for 1996													
Germany	North Sea	0.02	0.01	2.2	1.2	11	0.04	0.02	2.0	2.0	0.1	4.3	0.5	1.6	
		0.07	0.07	3.1	1.8	16	0.05	1.0	2.0	2.0	0.1	4.3	0.5	1.6	
Iceland	Atlantic	no data submitted for 1996													
Ireland	Irish Sea Celtic Sea Atlantic	0.06	NI	7.5	3.3	63	NI	NI	NI	NI	NI	6.8	1.6	38	
		0.02	NI	3.2	4.4	21	NI	NI	NI	NI	NI	2.6	0.7	19	
		0.01	NI	0.9	0.4	7.7	NI	NI	NI	NI	NI	0.7	0.2	4.3	
Netherlands	North Sea	0.2	0.08	2.6	2.9	25	NI	NI	4.3	1.5	NI	6.4	0.8	8.4	
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	0.1	0.05	27	0.9	21	NI	NI	4.6	0.1	0.1	7.4	0.3	78	
		1.0	0.04	8.3	3.2	51	NI	NI	2.7	0.02	0.2	4.6	0.4	2500	
		0.1	0.02	25	0.9	58	NI	NI	3.4	0.02	0.4	5.3	0.7	1500	
		0.00	0.000	0.4	0.01	0.4	NI	NI	0.3	0.002	0.03	0.4	0.05	1400	
Portugal	Atlantic	no data submitted for 1996													
Spain	Atlantic	no data submitted for 1996													
Sweden	Kattegat Skagerrak	0.02	0.022	2.0	0.3	3.0	NI	NI	2.088	0.598	0.021	3.1	0.1	> 2.289	
		0.001	0.001	0.09	0.2	0.2	NI	NI	0.2	0.2	0	0.2	0.01	> 0.13	
United Kingdom	N Sea (East Coast)	(lower estimate)	1.1	0.1	90	43	510	53	0.4	25	10	8.0	41	8.8	410
		(upper estimate)	1.4	0.3	90	44	510	58	137	25	11	8.0	41	8.8	410
	N Sea (Channel)	(lower estimate)	0.06	0.01	23	6.5	29	8.0	0.0	8.4	0.8	1.7	9.4	1.7	4.8
		(upper estimate)	0.06	0.01	23	6.5	29	8.0	1.5	8.4	0.9	1.7	9.4	1.7	4.8
	Total North Sea	(lower estimate)	1.2	0.2	110	49	540	61	0.4	34	11	9.7	51	10	420
		(upper estimate)	1.5	0.3	110	50	540	66	140	34	11	9.7	51	10	420
	Celtic Sea	(lower estimate)	1.6	0.01	6.3	9.2	96	2.8	33	5.3	1.8	1.0	7.3	1.0	29
		(upper estimate)	1.6	0.01	6.3	9.2	96	3.4	45	5.3	1.8	1.0	7	1.0	29
	Irish Sea	(lower estimate)	3.6	0.3	14	35	90	4.5	0.1	4.5	1.1	3.1	11.2	3.4	58
		(upper estimate)	3.7	0.3	15	36	90	10	1.5	4.5	1.2	3.1	11.4	3.4	58
	Atlantic	(lower estimate)	0.9	0.06	23	8.1	31	14	0.4	4.1	1.6	1.0	6.3	1.6	42
		(upper estimate)	1.5	0.1	26	11	32	15	93	4.1	1.6	1.0	6.3	1.6	42
	Total Non-North Sea	(lower estimate)	6.1	0.4	44	52	220	21	33	14	4.5	5.1	25	6.0	130
		(upper estimate)	6.8	0.5	48	56	220	29	140	14	4.6	5.1	25	6.0	130

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

Table 3[^]. Riverine Inputs to the Maritime Area of the Paris Convention in 1996 by Country

Country	Sea area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (lower estimate) (upper estimate)	0.8 5.0	0.02 0.03	28 61	29 60	300 420	NI NI	NI NI	8.3 11	18 23	1.7 3.4	41 53	3.4 5.2	240 350
Denmark	North Sea Skagerrak Kattegat	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	9.7 1.3 14	0.07 0.02 0.2	12 1.6 18	0.3 0.05 0.5	NI NI NI
France	Channel/North Sea (4) Atlantic (3)	2 32	0.5 0.5	97 725	66 535	306 2856	120 1300	95 111	12 24	65 152	5.7 4.7	80 195	7.3 9.5	480 2388
Germany	North Sea (lower estimate) (upper estimate)	5.6 5.6	2.9 2.9	147 147	125 125	1067 1067	234 243	55 200	9.4 9.4	141 141	2.6 2.6	193 193	8.1 8.1	1292 1309
Iceland	Atlantic	no data submitted for 1996												
Ireland	Irish Sea Celtic Sea Atlantic	1.1 1.2 1.5 2.3 0.08 0.8	NI NI NI NI NI NI	31 32 49 52 19 20	10 11 78 85 13 18	260 260 480 480 100 100	NI NI NI NI NI NI	NI NI NI NI NI NI	1.4 2.9 0.4	32 80 19	0.4 1.8 0.3	39 110 30	0.9 5.2 1.1	92 250 75
Note: NO3 = total oxidised N														
Netherlands	North Sea	8.2	3.2	340	380	1900	300	200	18	220	9.1	300	21	3400
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	3.0 3.1 0.5 0.7 0.6 0.9 0.2 0.3	0.1 0.1 0.03 0.04 0.2 0.2 0.02 0.03	74 74 20 20 97 97 37 37	24 24 8.9 8.9 17 17 7.6 7.7	480 480 150 150 180 180 64 64	34 34 14 14 24 24 3.9 3.9	0.1 9.5 0.0 7.3 0.0 12.0 0.0 4.2	1.6 1.6 0.9 0.9 1.4 1.4 0.2 0.2	17 17 13 13 11 11 1.5 1.5	0.2 0.2 0.1 0.1 0.3 0.3 0.1 0.1	27 27 20 20 21 21 5 5	0.6 0.6 0.4 0.4 0.7 0.7 0.3 0.3	190 190 56 56 290 290 96 96
Portugal	Atlantic	no data submitted for 1996												
Spain	Atlantic	NI	NI	NI	NI	125	NI	NI	0.7	6.6	0.5	NI	NI	823
Sweden	Kattegat Skagerrak	0.2 0.04	NI NI	19 3.1	6.7 0.8	67 10	NI NI	NI NI	0.8 0.1	11 0.9	0.1 0.02	19 2.1	0.3 0.1	NI NI
United Kingdom	N Sea (East Coast) (lower estimate) (upper estimate) N Sea (Channel) (lower estimate) (upper estimate) Total North Sea (lower estimate) (upper estimate) Celtic Sea (lower estimate) (upper estimate) Irish Sea (lower estimate) (upper estimate) Atlantic (lower estimate) (upper estimate) Total non-North Sea (lower estimate) (upper estimate)	1.9 11 0.4 0.4 2.3 11 0.6 1.0 0.9 1.6 0.4 4.5 1.9 7.1	0.8 1.7 0.01 0.03 0.8 1.7 0.08 0.1 0.3 1.0 0.2 1.1 1.4 3.9	140 140 31 31 170 170 31 33 48 50 46 50 290 320	94 110 8.1 8.3 100 120 35 41 27 33 23 35 190 220	540 540 140 140 680 680 230 230 310 310 120 130 1340 1350	89 120 7.0 15 96 140 29 44 13 46 35 50 170 280	30.0 410 0.0 0.0 30.0 410 1.5 88 7.3 190 0.4 440 40 1130	4.6 4.7 0.3 0.4 4.8 5.0 1.4 1.5 6.3 6.3 3.0 3.2 16 16	93 93 21 22 110 110 38 38 35 35 17 17 200 200	8.4 8.4 0.9 0.9 9.3 9.3 2.1 2.1 2.8 2.8 1.2 1.3 15 16	110 110 19 19 130 130 39 39 43 45 21 21 230 230	8.9 9.0 0.9 0.9 9.9 9.9 2.1 2.1 3.0 3.1 1.9 2.0 17 17	500 520 65 67 570 590 270 270 150 150 220 240 1210 1240

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

(3): Loire and Gironde (incomplete figures)

(4): Seine only

Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the Paris Convention in 1996 by Country

[illegible]

Table 4a Continued

Country	Sea Area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Spain	Atlantic	NI	NI	NI	NI	125	NI	NI	0.7	6.6	0.5	NI	NI	823
Sweden	Kattegat	0.2	0.02	21	7.0	70	NI	NI	2.9	12	0.1	22	0.4	2.3
	Skagerrak	0.04	0.001	3.2	0.9	10	NI	NI	0.3	1.1	0.02	2.3	0.1	0.1
United Kingdom	N Sea (Eas (lower estimate	3.1	0.9	230	136	1040	142	30	30	103	16	147	18	920
	(upper estimate	12	2.0	230	151	1050	178	551	30	104	16	147	18	940
	N Sea (Chz (lower estimate	0.4	0.02	54	15	169	15	0	8.7	22	2.6	29	2.6	70
	(upper estimate	0.4	0.04	54	15	169	23	1.5	8.8	22	2.6	29	2.6	70
	North Sea (lower estimate	3.5	1.0	280	150	1210	160	30	39	125	19	180	20	990
	(upper estimate	13	2.0	290	170	1220	200	550	39	126	19	180	20	1010
	Celtic Sea (lower estimate	2.2	0.1	37	45	328	32	34	7	40	3.2	47	3.2	300
	(upper estimate	2.6	0.1	40	50	329	47	133	7	40	3.2	47	3.2	300
	Irish Sea (lower estimate	4.5	0.6	62	62	400	18	7.4	11	36	6	54	6.4	210
	(upper estimate	5.3	1.3	66	69	400	56	190	11	36	6	56	6.5	210
	Atlantic (lower estimate	1.3	0.3	70	31	151	49	0.8	7.1	18	2.2	27	3.6	270
	(upper estimate	6.0	1.2	76	46	157	66	533	7.3	18	2.3	27	3.6	280
	non-North (lower estimate	8.0	1.0	170	140	880	98	43	25	94	11	130	13	770
	(upper estimate)	14	2.6	180	170	890	170	860	25	95	11	130	13	780
Total reported:														
(lower estimate)		69	10	2221	1607	10695	2286	534	165	1026	59	1459	99	16988
(upper estimate)		90	12	2270	1694	10837	2410	2048	168	1032	61	1473	101	17145

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

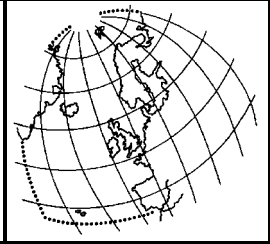
(2) Data provided comprise approx. 90% of the total pollution loads of the Netherlands into Convention Waters

Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the Paris Convention in 1996 by Sea Area

Sea Area		Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs(1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
North East Atlantic Ocean	<i>Arctic Ocean</i>	0.2	0.02	37	7.6	64	3.9	0.0	0.5	1.5	0.1	5.0	0.4	1539
	Barents Sea	0.3	0.03	37	7.7	64	3.9	4.2	0.5	1.5	0.1	5.0	0.4	1539
North Sea	<i>Atlantic Ocean</i> (main body)	1.4 6.8	0.3 1.2	90 96	45 64	259 265	49 66	0.8 533	7.5 7.7	37 37	2 2.6	58 58	4.9 4.9	350 360
	<i>Bay of Biscay and Iberian Coast</i>	32	0.5	725	535	2981	1300	111	25.0	159	5.2	195	10	3211
	Kattegat (lower estimate)	0.2	0.02	23	7.0	70			2.9	26	0.3	41	1.0	2.3
	(upper estimate)	0.2	0.02	23	7.0	70			2.9	26	0.3	41	1.0	2.3
	Skagerrak (lower estimate)	3.1	0.1	104	26	511	34	0	6.5	18	0.3	37	1.0	272
	(upper estimate)	3.2	0.1	104	26	511	34	10	6.5	18	0.3	37	1.0	272
	North Sea (lower estimate)	19	7.2	778	686	4544	690	285	75	499	30	729	53	8376
	(main body) (upper estimate)	33	8.4	812	733	4679	735	959	78	505	32	741	54	8523
	Channel (lower estimate)	2.4	0.5	151	81	475	135	95	21	87	8	109	10	550
	(upper estimate)	2.4	0.5	151	81	475	143	97	21	87	8	109	10	550
Norwegian Sea	(lower estimate)	0.7	0.2	122	18	238	24	0.0	4.8	11	0.7	26	1.4	1778
	(upper estimate)	1.0	0.2	122	18	238	24	12	4.8	11	0.7	26	1.4	1778
Irish Sea	(lower estimate)	5.7	0.6	101	75	723	18	7.4	12	68	6.3	100	8.9	340
	(upper estimate)	6.6	1.3	105	83	723	56	190	12	68	6.3	102	9.0	340
Celtic Sea	(lower estimate)	3.7	0.1	90	127	829	32	34	10	120	5.0	160	9.1	570
	(upper estimate)	4.9	0.1	100	140	830	47	133	10	120	5.0	160	9.1	570

Note: Some Contracting Parties have not submitted information on direct inputs because under the current Principles of the Comprehensive Study, these inputs do not fall under the 90 % (of total inputs) monitoring requirement.

OSPAR Commission 2001



Part II

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1997¹

Contents

INTRODUCTION	2
RESULTS OF THE 1997 COMPREHENSIVE STUDY	2
Table 1a. Information Received on Inputs to the Maritime Area of the OSPAR Convention in 1997	
Table 1b. Determinands Reported by Contracting Parties in 1997	
Table 2. Direct Inputs to the Maritime Area of the OSPAR Convention in 1997 by Country	
Table 3. Riverine Inputs to the Maritime Area of the OSPAR Convention in 1997 by Country	
Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the OSPAR Convention in 1997 by Country	
Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the OSPAR Convention by Sea Area	

¹ Extract of:
Data Report on the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1997, available on request from the Secretariat of the OSPAR Commission.

INTRODUCTION

Good input data for substances carried to the maritime area of the Paris Convention by rivers and direct discharges are essential in order to allow an assessment of the effectiveness of the Paris Commission's policies. They are equally essential for the interpretation of monitoring data such as those collected under the Joint Assessment and Monitoring Programme (JAMP) of the Oslo and Paris Commissions, which replaced the former Joint Monitoring Programme in 1995.

The riverine discharges to the landward ends of estuaries and direct discharges to estuaries and coastal waters are combined to give estimates of the gross input of each substance to the maritime area. It is not feasible at the present time to estimate how much of these inputs are retained within estuaries and near-shore areas and how much passes into the open sea. Several major research projects are in hand to address this issue. The riverine loads reported also represent the loads coming from the whole of the river catchment areas. In the case of international rivers, loads from upstream countries are ascribed to the most downstream countries. No attempt has been made to identify the sources of these loads or whether these loads are of natural or anthropogenic origins. Again research aimed at differentiating between anthropogenic and natural contributions to riverine loads is needed to put the information into perspective for management purposes. As regards inputs to sea areas the considerable maritime fluxes across sea boundaries have not been taken into account.

RESULTS OF THE 1997 COMPREHENSIVE STUDY

For the 1997 study, data sets on riverine inputs and direct discharges were provided by Denmark, Germany, the Netherlands, Norway, Portugal, Sweden and the United Kingdom of Great Britain and Northern Ireland (UK). Only riverine inputs were reported by Belgium², Ireland³ and Spain⁴. France and Iceland⁵ did not provide input data for 1997.

The geographical coverage for 1997 was similar to the coverage in previous years. Significant gaps occur in the data from Portugal and Spain. The part of the maritime area best covered remains the OSPAR Region II, the Greater North Sea, and especially the main body of the North Sea, although even here gaps exist.

The reporting of mandatory and voluntary determinands (cf. Table 1b) in 1997 was similar to 1996. Not all Contracting Parties reported data for all mandatory parameters. All reporting Contracting Parties provided data on inputs of heavy metals with the exception of Denmark (no metal data for 1997) and Spain (only riverine inputs). There are a number of gaps as regards the reporting of data for inputs of γ -HCH and PCBs (Denmark Ireland and Sweden for all inputs, Norway and Spain for direct inputs) and suspended particulate matter (Denmark, Sweden for rivers). A number of additional parameters, not summarised in the overview Tables 3 and 4, were reported by Ireland and Norway (cf. Table 1b).

² Previously existing direct discharges no longer exist.

³ 1990 data for direct inputs are included, since the basis for the calculation remains unchanged.

⁴ Rivers Guadalquivir, Guadiana and Miño.

⁵ Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculation of riverine inputs.

PRESENTATION OF THE 1997 DATA

Table 1a gives an overview of the information provided by Contracting Parties for 1997 and shows how the information was categorised:

- Direct inputs:
 - Sewage effluents
 - Industrial effluents
- Coastal areas: Data reported under "coastal areas" include discharges and run-off from coastal areas between rivers and also polder effluents. Depending on their nature, discharges from "coastal areas" are either counted under direct discharges or under riverine inputs.
- Riverine inputs:
 - Main rivers
 - Tributary rivers

Table 1b gives an overview of the determinands reported by Contracting Parties and shows where there are gaps in the reporting of mandatory determinands. Table 1b also indicates the precision of the estimate where the relevant information was provided by Contracting Parties. The last column of Table 1b informs on any additional determinands reported.

The data from Contracting Parties have in many cases⁶ been rounded to one significant number for data reported less than the unit in which they appear and to two significant numbers for data reported greater than one unit; the following examples illustrate this rounding convention:

Amount reported by Contracting Party	Figure reported in the tables
0,0011	0,001
0,011	0,01
0,11	0,1
1,11	1,1
11,1	11
111 and above	not rounded

Due to this procedure, there are sometimes slight differences between the calculated totals given in this report and those calculated by Contracting Parties.

Overviews of the input information by country and sea area are given in **Tables 2 to 4a and b**. Table 2 gives an overview of direct inputs to Paris Convention Waters in 1997. Table 3 gives an overview of riverine inputs to Paris Convention waters in 1997. Table 4a summarises the information contained in Tables 2 and 3 and gives overall figures on inputs from land-based sources. Table 4b contains the same information as Table 4a but lists inputs by sea area. Please note that, due to major gaps in the reporting, no totals for the Convention area are given in Tables 2 to 4a and b.

⁶ Secretariat note: Not all Contracting Parties wished to have their data rounded in accordance with this procedure. Totals in the summary tables are not rounded.

Table 1a. Information Received on Inputs to the Maritime Area of the OSPAR Convention in 1997

Country	Direct Discharges		Coastal Areas (2)	Riverine Inputs	
	Sewage Effluents	Industrial Effluents		Main Rivers	Tributary Rivers (1)
Belgium	NA	NA	(3)	+	+
Denmark					
- Kattegat	+	+	NI	+	NI
- Skagerrak	+	+	NI	+	NI
- North Sea	+	+	NI	+	NI
France					
- North Sea	NI	NI	NI	NI	NI
- Channel	NI	NI	NI	NI	NI
- Atlantic	NI	NI	NI	NI	NI
Germany	+	+	(4)	+	+
Iceland	No 1997 input data available (5)				
Ireland					
- Irish Sea	+(6)	+(6)		+	+
- Celtic Sea	+(6)	+(6)		+	+
- Atlantic	+(6)	+(6)		+	+
Netherlands	+	+	(3)	+	+
Norway					
- Skagerrak	+	+	+(7)	+	+
- North Sea	+	+	+(7)	+	+
- Norwegian S	+	+	+(7)	+	+
- Barents Sea	+	+	+(7)	+	+
Portugal	Very limited 1997 input data available				
Spain	NI	NI	NI	+	+
Sweden					
- Kattegat	+	+	(3)	+	+
- Skagerrak	+	+	(3)	+	+
United Kingdom					
- East Coast	+	+	NI	+	NI
- Channel	+	+	NI	+	NI
- Celtic Sea	+	+	NI	+	NI
- Irish Sea	+	+	NI	+	NI
- Atlantic	+	+	NI	+	NI

+ = Information available

NI = No information

NA = Not applicable

(1) Tributary Rive - any tributary river flowing into (the estuary of) a main river, downstream from the sampling point; any minor river which was not deemed to be a main river.

(2) Coastal areas: - 'downstream areas' of main and tributary rivers and rivers not monitored; - areas discharging to the maritime area which, however, are located outside the catchment area of the river.

(3) Included in data on riverine inputs ("tributary rivers")

(4) Included in data on direct inputs

(5) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(6) 1990 data

(7) cf. category "run-off" in Table 6b. for Norway and explanation under [D.4] of the Norwegian Annual Report.

Table 1b. Determinands Reported by Contracting Parties in 1997

Country	Determinands													
	Cd	Hg	Cu	Pb	Zn	g-HCH	PCBs (1)	NH4-N	NO3-N	PO4-P	Total N	Total P	SPM (2)	Others
Belgium														
- direct inputs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
- riverine inputs	R (4)	R (3)	R (4)	R (4)	R (3)	R (3)	R (4)	R (3)	R (3)	R (3)	R (3)	R (3)	R (3)	
Denmark														
- direct inputs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	+	+	NI	
- riverine inputs	NI	NI	NI	NI	NI	NI	NI	+	+	+	+	+	NI	
France	no data submitted for 1997													
- direct inputs														
- riverine inputs														
Germany														
- direct inputs	R	R	R	R	R	R	R	+	+	+	+	+	+	
- riverine inputs	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (4)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	
- riverine inputs ³	+ (3)(4)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (4)	+ (3)	+ (3)	+ (3)(4)	+ (3)	+ (3)	+ (3)(4)	
*) Elbe **) Other main rivers														
Iceland	No 1997 input data available (6)													
- direct inputs														
- riverine inputs														
Ireland														
- direct inputs	+(8)	NI	+(8)	+(8)	+(8)	NI	NI	NI	NI	NI	+(8)	+(8)	+(8)	
- main riv. input	R (3)(4)	NI	R (3)(4)	R (3)(4)	+ (3)	NI	NI	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	organic N (TKN)
- tributary rivers	R	NI	R	R	+	NI	NI	+	+	+	+	+	+	organic N (TKN)
Netherlands														
- direct inputs	+	+	+	+	+	NI	NI	+	+	NI	+	+	+	
- main riv. input	+ (3)(4)	+ (3)	+ (3)	+ (3)(4)	+ (4)	+ (3)	+ (3)(4)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	
- tributary rivers	+	+	+	+	+	+	+	+	+	+	+	+	+	
Norway														
- direct inputs	+	+	+	+	+	NI	NI	+	+	+	+	+	+	As, Cr, Ni, TOC
- main riv. input	+ (3)(4)	+ (4)	+ (3)	+ (3)	+ (3)	+ (3)	R (4)	+ (3)(4)	+ (3)	+ (3)(4)	+ (3)	+ (3)	+ (3)	As, Cr, Ni, TOC
- tributary rivers	R	R	+	+	+	+	R	+ (5)	+ (5)	+ (5)	+ (5)	+ (5)	+ (5)	As, Cr, Ni, TOC
Portugal														
- direct inputs	NI	+	NI	NI	NI	NI	NI	NI	NI	NI	+	+	+	
- main riv. Input	R(4)	R(4)	R(3)	R(4)	R(4)	NI	NI	+	+	+	NI	+	+	
- tributary rivers	R	R	R	R	R	NI	NI	+	+	+	NI	+	+	
Spain														
- direct inputs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
- riverine inputs	R(4)	R(4)	R(4)	R(4)	+ (3)(4)	R(4)	NI	R(3)(4)	R(3)	R(3)	NI	NI	+ (3)	
Sweden														
- sewage effluent	+	+	+	+	+	NI	NI	+	+	+	+	+	+	
- industrial efflu	+	+	+	+	+	NI	NI	NI	NI	NI	+	+	NI	
- main riv. input	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	NI	NI	+ (3)	+ (3)	+ (3)	+ (3)	+ (3)	NI	(?): no '96 conc.data
- tributary rivers	+	+	+	+	+	NI	NI	+	+	+	+	+	NI	
United Kingdom														
- direct inputs	R	R	R	R	R	R	R	R	R	R	R	R(9)	R	
- riverine inputs	R	R	R	R	R	R	R	R	R	R	R	R(9)	R	

+ : Data provided

R: Estimate given as a range

NI: No information

NA: Not applicable; riverine inputs > 90% total inputs

DL: Detection limit

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

(3) 70 % of measurements above detection limit

(4) Less than 70 % of measurements above detection limit

(5) Includes run-off

(6) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(7) River Tejo only

(8) 1990 data, since the basis for calculation remained unchanged

(9) In England and Wales Total-P was not measured. To avoid anomalies, a value equal to the orthophosphate-P has been used.

Table 2[^]. Direct Discharges to the Maritime Area of the OSPAR Convention in 1997 by Country

Country	Region	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (upper estimate) (upper estimate)	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
Denmark	North Sea Skagerrak Kattegat	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	0.7 0.08 1.3	0.07 0.009 0.1	NI NI NI
France	Channel/North Sea Atlantic	no data submitted for 1997 no data submitted for 1997												
Germany	North Sea	0.06 0.1	0.01 0.07	2.3 3.0	2.2 2.8	21 26	0.02 0.3	0.05 2.9	2.0 2.0	2.0 2.0	0.1 0.1	4.3 4.3	0.5 0.5	2.0 2.0
Iceland	Atlantic	no data submitted for 1997												
Ireland	Irish Sea Celtic Sea Atlantic	0.06 0.02 0.01	NI NI NI	7.5 3.2 0.8	3.3 4.4 0.4	63 22 7.7	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	6.8 2.7 0.7	1.6 0.7 0.2	38 19 4.3
Netherlands	North Sea	0.2	0.08	2.4	2.9	28	0	0	3.3	1.5	NI	6.4	0.6	9.6
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	0.1 1.0 0.1 0.00	0.05 0.04 0.02 0.000	27 8.7 27 0.4	0.6 4.2 0.9 0.01	21 58 61 0.4	NI NI NI NI	NI NI NI NI	4.0 2.7 3.4 0.3	0.1 0.02 0.02 0.002	0.1 0.2 0.3 0.03	6.6 4.8 6.1 0.4	0.3 0.4 0.7 0.05	10 1408 1403 377
Portugal	Atlantic	NI NI	0.03 0.03	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	7.4 7.4	2.2 2.2	45 45
Spain	Atlantic	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Sweden	Kattegat Skagerrak	0.09 0.001	0.03 0.002	2.6 0.08	0.6 0.03	7.1 0.2	NI NI	NI NI	0.1 0.1	0.1 0.1	0.006 0.002	2.8 0.5	0.1 0.01	NI NI
United Kingdom	North Sea (East Coast) (lower estimate) (upper estimate) North Sea (Channel) (lower estimate) (upper estimate) <i>Total North Sea</i> (lower estimate) (upper estimate) Celtic Sea (lower estimate) (upper estimate) Irish Sea (lower estimate) (upper estimate) Atlantic (lower estimate) (upper estimate) <i>Total Non-North Sea</i> (lower estimate) (upper estimate)	1.0 1.1 0.5 0.5 1.4 1.5 1.4 1.4 2.9 3.2 0.09 0.9 4.4 5.5	0.2 0.3 0.001 0.001 0.2 0.3 0.04 0.04 0.3 0.3 0.009 0.04 0.3 0.4	92 93 21 21 114 114 10.7 10.7 14 14 18 25 42 49	37 37 4.5 4.5 41 42 8.7 8.7 37 38 6.0 8.9 52 56	344 344 34 34 378 378 142 142 79 79 35 36 256 257	109 124 9.4 9.4 118 134 1.9 2.8 3.3 7.5 52 53 57 63	0.6 84 0.000 0.000 0.6 84 2.2 5.4 0.003 0.6 0.4 88 2.6 94	26 26 7.9 7.9 34 34 7.1 7.1 6.8 6.8 4.2 4.2 18 18	10 10 1.6 1.7 12 12 1.4 1.4 1.3 1.4 2.5 2.5 5.2 5.3	8.0 8.0 1.8 1.8 9.8 9.8 1.3 1.3 3.3 3.3 1.2 1.2 5.7 5.7	42 42 9.6 9.7 52 52 8.8 8.8 11 11 7.5 7.6 27 28	8.9 8.9 1.8 1.8 11 11 1.3 1.3 3.9 3.9 2.0 2.0 7.2 7.2	447 447 9.7 9.7 457 457 59 59 29 29 25 25 113 113

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

Table 3[^]. Riverine Inputs to the Maritime Area of the OSPAR Convention in 1997 by Country

Country	Sea area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH ₄ -N [kt]	NO ₃ -N [kt]	PO ₄ -P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (lower estimate) (upper estimate)	0.1 5.2	0.2 0.3	26 63	18 62	325 456	56 76	0.0 132	6.6 8.8	21 27	1.8 2.4	34 44	2.6 6.4	221 309
Denmark	North Sea Skagerrak Kattegat	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	10 1.3 17	0.09 0.03 0.3	12 1.6 20	0.3 0.07 0.6	NI NI NI
France	Channel/North Sea Atlantic	no data submitted for 1997 no data submitted for 1997												
Germany	North Sea (lower estimate) (upper estimate)	6.2 6.3	1.9 1.9	149 149	149 149	1051 1051	370 370	37 178	7.2 7.2	149 149	2.5 2.5	201 201	8.2 8.2	1527 1566
Iceland	Atlantic	no data submitted for 1997												
Ireland	Irish Sea Celtic Sea Atlantic	0.6 0.7 0.9 1.7 0.3 0.9	NI NI NI NI NI NI	22 22 58 58 20 22	24 24 69 72 18 19	209 209 279 279 111 112	NI NI NI NI NI NI	NI NI NI NI NI NI	1.9 1.9 2.9 2.9 0.4 0.5	23 23 67 67 14 14	0.4 0.4 1.8 1.8 0.3 0.3	NI NI NI NI NI NI	1.2 1.2 4.6 4.6 1.2 1.2	134 134 369 369 124 124
Note: NO ₃ = total oxidised N														
Netherlands	North Sea	3.7 4.0	2.6 2.6	280 280	230 230	1200 1300	300 300	140 200	14 14	210 210	8.7 8.7	280 280	17 17	2210 2220
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	1.4 1.6 0.9 1.1 0.8 1.2 0.6 0.7	0.04 0.07 0.02 0.05 0.2 0.2 0.01 0.03	76 76 26 26 128 128 34 34	18 18 16 16 18 18 5.6 5.7	281 281 186 186 235 235 63 63	28 28 18 18 29 29 3.7 3.7	0.04 11.2 0.0 10.6 0.0 19 0.0 4.3	1.5 1.5 1.0 1.1 1.6 1.6 0.2 0.2	18 18 15 14.9 14 14 1.6 1.6	0.2 0.2 0.2 0.2 0.3 0.3 0.05 0.05	28 28 25 25 26 26 4.4 4.4	0.6 0.6 0.5 0.5 0.9 0.9 0.2 0.2	254 254 3.1 3.1 35 35 3.0 3.0
Portugal	Atlantic	1.3 1.4	0.7 1.4	41 41	43 43	116 285	NI NI	NI NI	1.9 1.9	26 26	2.9 2.9	NI NI	3.7 3.7	302 302
Spain	Atlantic	11 18	2.6 2.6	94 153	16 18	3063 3063	157 250	NI NI	6.5 6.5	80 80	1.1 1.1	123 123	2.1 2.1	1174 1174
Sweden	Kattegat Skagerrak	0.3 0.07	0.05 0.007	25 4.5	7.3 0.8	87 21	NI NI	NI NI	0.9 0.09	13 1.0	0.1 0.009	22 2.2	0.5 0.03	NI NI
United Kingdom	N Sea (East Coast) (lower estimate) (upper estimate) N Sea (Channel) (lower estimate) (upper estimate) <i>Total North Sea</i> (lower estimate) (upper estimate) Celtic Sea (lower estimate) (upper estimate) Irish Sea (lower estimate) (upper estimate) Atlantic (lower estimate) (upper estimate) <i>Total non-North Sea</i> (lower estimate) (upper estimate)	2.6 6.5 0.6 0.6 3.2 7.1 0.9 1.2 0.9 1.6 0.7 2.6 2.5 5.4	1.6 2.4 0.04 0.06 1.6 2.5 0.07 0.1 0.3 1.0 0.7 1.2 1.0 2.4	140 140 37 37 177 178 42 42 48 50 54 54 144 147	159 164 7.3 7.5 166 172 35 40 27 33 33 35 95 108	597 609 168 169 765 778 295 295 310 310 154 159 759 765	61 92 9.7 16 70 108 17 29 13 46 21 33 51 108	53 118 0.00 0.00 53 118 32 61 7.3 190 2.3 75 42 326	3.7 3.8 0.7 0.7 4.4 4.5 1.8 1.8 6.3 6.3 3.4 3.7 12 12	81 82 24 24 105 105 35 35 35 35 16 16 86 86	8.6 8.6 1.1 1.1 9.6 9.7 2.4 2.4 2.8 2.8 0.4 1.4 5.6 6.6	95 96 25 25 120 120 37 37 43 45 17 17 97 99	9.0 9.0 1.1 1.1 10.1 10.1 2.4 2.4 3.0 3.1 2.2 2.2 7.7 7.8	488 509 89 90 577 599 565 566 150 150 253 267 969 983

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the OSPAR Convention in 1997 by Country

Country	Sea Area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (lower estimate) (upper estimate)	0.1	0.2	26	18	325	56	0.0	6.6	21	1.8	34	2.6	221
		5.2	0.3	63	62	456	76	132	8.8	27	2.4	44	6.4	309
Denmark	North Sea Skagerrak Kattegat	NI	NI	NI	NI	NI	NI	NI	NI	10	0.09	13	0.4	NI
		NI	NI	NI	NI	NI	NI	NI	NI	1.3	0.03	1.7	0.08	NI
		NI	NI	NI	NI	NI	NI	NI	NI	17	0.32	21	0.7	NI
France	Channel/North Sea Atlantic	no data submitted for 1997 no data submitted for 1997												
Germany	North Sea (lower estimate) (upper estimate)	6.3	1.9	151	151	1072	370	37	9.2	151	2.6	205	8.7	1529
		6.4	2.0	152	152	1077	370	181	9.2	151	2.6	205	8.7	1568
Iceland	Atlantic	no data submitted for 1997												
Ireland (2)	Irish Sea (lower estimate) (upper estimate)	0.6	NI	30	27	272	NI	NI	1.9	23	0.4	6.8	2.8	170
		0.7	NI	30	27	272	NI	NI	1.9	23	0.4	6.8	2.8	170
	Celtic Sea (lower estimate) (upper estimate)	0.9	NI	62	73	301	NI	NI	2.9	67	1.8	2.7	5.2	390
		1.7	NI	62	77	301	NI	NI	2.9	67	1.8	2.7	5.2	390
	Atlantic (lower estimate) (upper estimate)	0.3	NI	21	18	119	NI	NI	0.4	14	0.3	0.7	1.4	130
		0.9	NI	22	19	119	NI	NI	0.4	14	0.3	0.7	1.4	130
Netherlands(3)	North Sea	3.9	2.7	283	233	1228	300	140	17	211	8.7	286	18	2220
		4.2	2.7	283	233	1328	300	200	17	211	8.7	286	18	2230
Norway	Skagerrak (lower estimate) (upper estimate)	1.5	0.09	102	19	303	28	0.04	5.5	18	0.3	35	0.8	265
		1.6	0.12	102	19	303	28	11.2	5.5	18	0.3	35	0.8	265
	North Sea (lower estimate) (upper estimate)	1.8	0.06	35	20	244	18	0.0	3.7	15	0.4	29	0.9	1411
		2.0	0.09	35	20	244	18	10.6	3.7	15	0.4	29	0.9	1411
	Norwegian Sea (lower estimate) (upper estimate)	0.9	0.2	155	19	297	29	0.0	5.0	14	0.7	32	1.6	1439
		1.3	0.2	155	19	297	29	19	5.0	14	0.7	32	1.6	1439
	Barents Sea (lower estimate) (upper estimate)	0.6	0.01	34	5.6	64	3.7	0.0	0.5	1.6	0.1	4.8	0.2	380
		0.7	0.03	34	5.7	64	3.7	4.3	0.5	1.6	0.1	4.8	0.2	380
Portugal	Atlantic	1.3	0.8	41	43	116	NI	NI	1.9	26	2.9	7.4	5.9	347
		1.4	1.5	41	43	285	NI	NI	1.9	26	2.9	7.4	5.9	347

Table 4a Continued

Country	Sea Area		Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Spain	Atlantic		11	2.6	94	16	3063	157	NI	6.5	80	1.1	123	2.1	1174
			18	2.6	153	18	3063	250	NI	6.5	80	1.1	123	2.1	1174
Sweden	Kattegat		0.4	0.08	28	7.8	94	NI	NI	1.0	13	0.1	25	0.6	NI
	Skagerrak		0.07	0.009	4.6	0.9	21	NI	NI	0.2	1.1	0.01	2.6	0.04	NI
United Kingdom	N Sea (East Coast)	(lower estimate)	3.1	1.8	232	136	1040	170	53	30	91	17	137	18	935
		(upper estimate)	7.5	2.7	233	136	953	216	202	30	92	17	138	18	956
	N Sea (Channel)	(lower estimate)	1.1	0.04	59	12	202	19	0.0	8.5	25	2.8	34	2.8	99
		(upper estimate)	1.1	0.07	59	12	203	25	0.0	8.5	25	2.9	34	2.9	100
	North Sea	(lower estimate)	4.6	1.8	291	207	1143	189	53	38	117	19	171	21	1034
		(upper estimate)	8.6	2.7	292	214	1156	242	202	38	117	19	172	21	1056
	Celtic Sea	(lower estimate)	2.3	0.1	53	44	437	19	35	9.0	36	3.7	46	3.7	624
		(upper estimate)	2.7	0.2	53	49	437	32	66	9.0	36	3.7	46	3.7	625
	Irish Sea	(lower estimate)	3.8	0.6	62	64	389	16	7.3	13	36	6.1	54	6.9	179
		(upper estimate)	4.8	1.3	64	71	389	53	191	13	36	6.1	56	7.0	179
	Atlantic	(lower estimate)	0.8	0.7	72	39	189	73	2.7	7.6	19	1.6	24	4.2	279
		(upper estimate)	3.5	1.3	79	44	195	86	163	7.9	19	2.5	24	4.3	292
	non-North Sea	(lower estimate)	6.9	1.3	186	147	1015	109	45	30	91	11	124	15	1082
		(upper estimate)	11	2.7	196	164	1021	172	420	30	91	12	126	15	1096
Total reported:		(lower estimate)	41	12	1543	946	9774	1261	275	131	891	52	1126	87	11790
		(upper estimate)	64	15	1653	1015	10100	1489	1179	133	897	54	1139	91	11964

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) NH4-N, NO3-N, PO4-P: riverine inputs only; Total N: direct discharge only

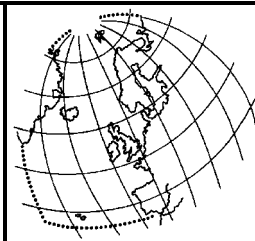
(3) Data provided comprise approx. 90% of the total pollution loads of the Netherlands into Convention Waters

Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the OSPAR Convention in 1997 by Sea Area

Sea Area			Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs(1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
North-East Atlantic Ocean	Arctic Ocean		0.6	0.01	34	5.6	64	3.7	0.0	0.5	1.6	0.1	4.8	0.2	380
	Barents Sea		0.7	0.03	34	5.7	64	3.7	4.3	0.5	1.6	0.1	4.8	0.2	380
North Sea	Atlantic Ocean (main body)		1.1 4.3	0.7 1.3	93 101	57 63	308 314	73 86	2.7 163	8.0 8.3	33 33	1.9 2.8	25 25	5.7 5.7	409 422
	Bay of Biscay and Iberian Coast		13 19	3.4 4.1	135 194	59 61	3179 3348	157 250	NI NI	8.4 8.4	106 106	4.0 4.0	130 130	8.0 8.0	1521 1521
	Kattegat	(lower estimate)	0.4	0.08	28	7.8	94	NI	NI	1.0	30	0.4	46	1.3	0.0
		(upper estimate)	0.4	0.08	28	7.8	94	NI	NI	1.0	30	0.4	46	1.3	0.0
	Skagerrak	(lower estimate)	1.5	0.1	107	20	323	28	0.0	5.7	21	0.4	39	0.9	265
		(upper estimate)	1.7	0.1	107	20	323	28	11	5.7	21	0.4	39	0.9	265
	North Sea (main body)	(lower estimate)	15	6.6	727	558	3909	915	230	67	500	30	705	48	6315
		(upper estimate)	25	7.7	766	603	4059	981	725	69	506	31	716	52	6473
	Channel	(lower estimate)	1.1	0.04	59	12	202	19	0.0	8.5	25	2.8	34	2.8	99
		(upper estimate)	1.1	0.07	59	12	203	25	0.0	8.5	25	2.9	34	2.9	100
Norwegian Sea	(lower estimate)		0.9	0.2	155	19	297	29	0.0	5.0	14	0.7	32	1.6	1439
	(upper estimate)		1.3	0.2	155	19	297	29	19	5.0	14	0.7	32	1.6	1439
Irish Sea	(lower estimate)		4.4	0.6	91	91	661	16	7.3	15	59	6.6	61	9.7	349
	(upper estimate)		5.5	1.3	94	99	661	53	191	15	59	6.6	63	9.8	349
Celtic Sea	(lower estimate)		3.2	0.1	114	117	737	19	35	12	103	5.5	48	8.9	1014
	(upper estimate)		4.4	0.2	115	125	738	32	66	12	103	5.5	49	8.9	1015

Note: Some Contracting Parties have not submitted information on direct inputs because under the current Principles of the Comprehensive Study, these inputs do not fall under the 90 % (of total inputs) monitoring requirement.

OSPAR Commission 2001



Part III

Overview of the Results of the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1998¹

Contents

INTRODUCTION	2
RESULTS OF THE 1998 COMPREHENSIVE STUDY	2
Table 1a. Information Received on Inputs to the Maritime Area of the OSPAR Convention in 1998	
Table 1b. Determinands Reported by Contracting Parties in 1998	
Table 2. Direct Inputs to the Maritime Area of the OSPAR Convention in 1998 by Country	
Table 3. Riverine Inputs to the Maritime Area of the OSPAR Convention in 1998 by Country	
Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the OSPAR Convention in 1998 by Country	
Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the OSPAR Convention by Sea Area	

¹ Extract of:
Data Report on the Comprehensive Study on Riverine Inputs and Direct Discharges (RID) in 1998, available on request from the Secretariat of the OSPAR Commission.

INTRODUCTION

Good input data for substances carried to the maritime area of the Paris Convention by rivers and direct discharges are essential in order to allow an assessment of the effectiveness of the Paris Commission's policies. They are equally essential for the interpretation of monitoring data such as those collected under the Joint Assessment and Monitoring Programme (JAMP) of the Oslo and Paris Commissions, which replaced the former Joint Monitoring Programme in 1995.

The riverine discharges to the landward ends of estuaries and direct discharges to estuaries and coastal waters are combined to give estimates of the gross input of each substance to the maritime area. It is not feasible at the present time to estimate how much of these inputs are retained within estuaries and near-shore areas and how much passes into the open sea. Several major research projects are in hand to address this issue. The riverine loads reported also represent the loads coming from the whole of the river catchment areas. In the case of international rivers, loads from upstream countries are ascribed to the most downstream countries. No attempt has been made to identify the sources of these loads or whether these loads are of natural or anthropogenic origins. Again research aimed at differentiating between anthropogenic and natural contributions to riverine loads is needed to put the information into perspective for management purposes. As regards inputs to sea areas the considerable maritime fluxes across sea boundaries have not been taken into account.

RESULTS OF THE 1998 COMPREHENSIVE STUDY

For the 1998 study, data sets on riverine inputs and direct discharges were provided by Denmark, Germany, the Netherlands, Norway, Portugal, Sweden, Spain and the United Kingdom of Great Britain and Northern Ireland (UK). Only riverine inputs were reported by Belgium², Ireland³. France and Iceland⁴ did not provide input data for 1998.

The geographical coverage for 1998 was similar to the coverage in previous years, with additions to the range of rivers reported by Spain. Significant gaps occur in the data from Portugal and Spain. The part of the maritime area best covered remains the OSPAR Region II, the Greater North Sea, and especially the main body of the North Sea, although even here gaps exist.

The reporting of mandatory and voluntary determinands (cf. Table 1b) in 1998 was similar to 1997. Not all Contracting Parties reported data for all mandatory parameters. All reporting Contracting Parties provided data on inputs of heavy metals with the exception of Denmark (no metal data for 1998) and Spain (mainly riverine inputs). There are a number of gaps as regards the reporting of data for inputs of γ -HCH and PCBs (Denmark Ireland, Spain and Sweden for all inputs, Norway for direct inputs) and suspended particulate matter (Denmark, Sweden for rivers). A number of additional parameters, not summarised in the overview Tables 3 and 4, were reported by Ireland and Norway (cf. Table 1b).

Presentation of the 1998 data

Table 1a gives an overview of the information provided by Contracting Parties for 1998 and shows how the information was categorised:

- Direct inputs:
 - Sewage effluents

² Previously existing direct discharges no longer exist.

³ 1990 data for direct inputs are included, since the basis for the calculation remains unchanged.

⁴ Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculation of riverine inputs.

- Industrial effluents
- Coastal areas: Data reported under "coastal areas" include discharges and run-off from coastal areas between rivers and also polder effluents. Depending on their nature, discharges from "coastal areas" are either counted under direct discharges or under riverine inputs.
- Riverine inputs:
 - Main rivers
 - Tributary rivers

Table 1b gives an overview of the determinands reported by Contracting Parties and shows where there are gaps in the reporting of mandatory determinands. Table 1b also indicates the precision of the estimate where the relevant information was provided by Contracting Parties. The last column of Table 1b informs on any additional determinands reported.

The data from Contracting Parties have in many cases⁵ been rounded to one significant number for data reported less than the unit in which they appear and to two significant numbers for data reported greater than one unit; the following examples illustrate this rounding convention:

Amount reported by Contracting Party	Figure reported in the tables
0,0011	0,001
0,011	0,01
0,11	0,1
1,11	1,1
11,1	11
111 and above	not rounded

Due to this procedure, there are sometimes slight differences between the calculated totals given in this report and those calculated by Contracting Parties.

Overviews of the input information by country and sea area are given in **Tables 2 to 4a and b**. Table 2 gives an overview of direct inputs to OSPAR Convention Waters in 1998. Table 3 gives an overview of riverine inputs to OSPAR Convention waters in 1998. Table 4a summarises the information contained in Tables 2 and 3 and gives overall figures on inputs from land-based sources. Table 4b contains the same information as Table 4a but lists inputs by sea area. Please note that, due to major gaps in the reporting, no totals for the Convention area are given in Tables 2 to 4a and b.

⁵ Secretariat note: Not all Contracting Parties wished to have their data rounded in accordance with this procedure.

Table 1a. Information Received on Inputs to the Maritime Area of the OSPAR Convention in 1998

Country	Direct Discharges		Coastal Areas (2)	Riverine Inputs	
	Sewage Effluents	Industrial Effluents		Main Rivers	Tributary Rivers (1)
Belgium	NA	NA	(3)	+	+
Denmark					
- Kattegat	+	+	NI	+	NI
- Skagerrak	+	+	NI	+	NI
- North Sea	+	+	NI	+	NI
France					
- North Sea	NI	NI	NI	NI	NI
- Channel	NI	NI	NI	NI	NI
- Atlantic	NI	NI	NI	NI	NI
Germany	+	+	(4)	+	+
Iceland	No 1998 input data available (5)				
Ireland					
- Irish Sea	+(6)	+(6)		+	+
- Celtic Sea	+(6)	+(6)		+	+
- Atlantic	+(6)	+(6)		+	+
Netherlands	+	+	(3)	+	+
Norway					
- Skagerrak	+	+	+(7)	+	+
- North Sea	+	+	+(7)	+	+
- Norwegian Sea	+	+	+(7)	+	+
- Barents Sea	+	+	+(7)	+	+
Portugal	Very limited 1998 input data available				
Spain	+	+	+	+	+
Sweden					
- Kattegat	+	+	(3)	+	+
- Skagerrak	+	+	(3)	+	+
United Kingdom					
- East Coast	+	+	NI	+	NI
- Channel	+	+	NI	+	NI
- Celtic Sea	+	+	NI	+	NI
- Irish Sea	+	+	NI	+	NI
- Atlantic	+	+	NI	+	NI

+ = Information available

NI = No information

NA = Not applicable

(1) Tributary Rive - any tributary river flowing into (the estuary of) a main river, downstream from the sampling point;

- any minor river which was not deemed to be a main river.

(2) Coastal areas: - 'downstream areas' of main and tributary rivers and rivers not monitored;

- areas discharging to the maritime area which, however, are located outside the catchment area of a river.

(3) Included in data on riverine inputs ("tributary rivers")

(4) Included in data on direct inputs

(5) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced

in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(6) 1990 data

(7) cf. category "run-off" in Table 6b. for Norway

Table 1b. Determinands Reported by Contracting Parties in 1998

Country	Determinands													
	Cd	Hg	Cu	Pb	Zn	g-HCH	PCBs (1) (voluntary)	NH4-N	NO3-N	PO4-P	Total N	Total P	SPM (2)	Others
Belgium - direct inputs - riverine inputs	NA R (4)	NA R (4)	NA R (3)	NA R (3)	NA R (3)	NA R (3)	NA R (4)	NA R (3)	NA R (3)	NA R (3)	NA R (3)	NA R (3)	NA R (3)	organic N (TKN) organic N (TKN) <

+ : Data provided

R: Estimate given as a range

NI: No information

NA: Not applicable; riverine inputs > 90% total inputs

DL: Detection limit

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

(3) 70 % of measurements above detection limit

(4) Less than 70 % of measurements above detection limit

(5) Includes run-off

(6) Iceland stated in 1988 that it had no plans to monitor riverine inputs; however, Iceland announced in 1996 that it was setting up a monitoring plan which would also result in calculations of riverine inputs

(7) River Tejo only

(8) 1990 data, since the basis for calculation remained unchanged

(9) In England and Wales Total-P was not measured. To avoid anomalies, a value equal to the orthophosphate-P has been used.

Table 2[^]. Direct Discharges to the Maritime Area of the OSPAR Convention in 1998 by Country

Country	Region	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (upper estimate) (upper estimate)	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA
Denmark	North Sea Skagerrak Kattegat	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	0.9 0.09 1.4	0.09 0.009 0.2	NI NI NI
France	Channel/North Sea Atlantic	no data submitted for 1998 no data submitted for 1998												
Germany	North Sea	0.01 0.06	0.01 0.07	2.3 3.0	1.1 1.7	12 17	0.02 0.3	0.05 2.8	2.0 2.0	2.0 2.0	0.1 0.1	4.3 4.3	0.5 0.5	2.0 2.0
Iceland	Atlantic	no data submitted for 1998												
Ireland (1990 data)	Irish Sea Celtic Sea Atlantic	0.06 0.02 0.01	NI NI NI	7.5 3.2 0.8	3.3 4.4 0.4	63 22 7.7	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	6.8 2.7 0.7	1.6 0.7 0.2	38 19 4.3
Netherlands	North Sea	0.1	0.08	3.5	2.4	30	0	0	0.4	1.3	NI	6.8	0.6	14
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	0.1 1.0 0.1 0.001	0.05 0.04 0.02 0.000	25 8.5 27 0.4	0.7 4.8 0.9 0.01	20 54 61 0.4	NI NI NI NI	NI NI NI NI	3.9 2.7 3.0 0.3	0.02 0.02 0.02 0.002	0.08 0.2 0.3 0.03	6.3 5.1 4.8 0.3	0.2 0.4 0.6 0.05	10 1554 1540 379
Portugal	Atlantic	NI NI	0.04 0.04	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI	NI NI
Spain	Atlantic	NI	NI	1.3	NI	4.3	NI	NI	4.5	NI	0.1	2.3	1.2	82
Sweden	Kattegat Skagerrak	0.05 0.001	0.02 0.01	2.0 0.13	0.4 0.01	3.5 0.5	NI NI	NI NI	1.3 0.2	0.7 0.1	0.02 0.007	2.4 0.5	0.1 0.03	NI NI
United Kingdom	North Sea (East Coast) (lower estimate) (upper estimate) North Sea (Channel) (lower estimate) (upper estimate) <i>Total North Sea</i> (lower estimate) (upper estimate) Celtic Sea (lower estimate) (upper estimate) Irish Sea (lower estimate) (upper estimate) Atlantic (lower estimate) (upper estimate) <i>Total Non-North Sea</i> (lower estimate) (upper estimate)	1.3 1.5 0.1 0.1 1.4 1.6 1.6 2.9 3.2 0.1 0.7 4.6 5.5	0.2 0.3 0.0 0.0 0.2 0.3 0.03 0.3 0.3 0.1 0.1 0.4 0.4	87 87 16 16 103 103 21 21 14 14 12 14 47 49	41 41 2.7 2.7 44 44 21 21 37 38 10 12 68 71	313 313 22 22 335 335 139 139 79 79 21 21 239 239	57 105 2.9 3.0 60 108 2.5 3.6 3.3 7.5 1.2 15 7.0 26	358 442 0.00 0.2 358 442 0.6 5.0 0.003 0.6 21 42 21.6 48	24 24 6.8 6.8 31 31 10.0 10.0 6.8 6.8 2.9 2.9 20 20	12 12 1.1 1.1 13 13 1.6 1.6 1.3 1.4 0.9 0.9 3.8 3.9	6.8 6.8 1.6 1.6 8.4 8.4 1.8 1.8 3.3 3.3 1.0 1.0 6.1 6.1	40 40 8.1 8.1 48 48 12.0 12.0 11 11 3.8 3.8 27 27	8.5 8.5 1.6 1.6 10 10 1.8 1.8 3.9 3.9 1.9 1.9 7.6 7.6	417 418 6.1 6.1 423 424 67 67 29 29 26 26 122 122

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

Table 3[^]. Riverine Inputs to the Maritime Area of the OSPAR Convention in 1998 by Country

Country	Sea area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH ₄ -N [kt]	NO ₃ -N [kt]	PO ₄ -P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (lower estimate) (upper estimate)	2.1 2.8	0.02 1.2	65 83	47 56	449 548	101 120	0.0 270	6.5 8.5	40 46	2.0 2.3	54 65	3.2 5.2	298 365
Denmark	North Sea Skagerrak Kattegat	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	NI NI NI	18.5 2.54 29	0.16 0.05 0.4	22 3.0 34	0.5 0.08 0.8	NI NI NI
France	Channel/North Sea Atlantic	no data submitted for 1998 no data submitted for 1998												
Germany	North Sea (lower estimate) (upper estimate)	6.1 6.3	2.1 2.1	200 200	180 180	1266 1266	261 261	6.0 167	8.7 8.9	190 190	3.7 3.7	248 248	10 10	1631 1708
Iceland	Atlantic	no data submitted for 1998												
Ireland	Irish Sea Celtic Sea Atlantic	0.9 1.0 2.0 0.6 1.3	NM NM NM	28 53 54 44 48	43 54 61 30 39	219 296 296 91 91	NM NM NM	NM NM NM	1.0 2.8 2.9 0.5 0.6	27 71 22	0.3 1.6 0.4	NM NM NM	1.4 3.6 1.5	NM NM NM
Note: NO ₃ = total oxidised N														
Netherlands	North Sea	9.6 9.6	2.0 2.1	328 328	255 256	1267 1467	258 261	179 183	15 15	281 281	9.5 9.5	368 368	19 19	1982 1984
Norway	Skagerrak North Sea Norwegian Sea Barents Sea	4.8 4.8 0.7 0.9 0.3 0.9 0.3 0.4	2.5 2.6 0.03 0.06 0.04 0.08 0.02 0.02	111 111 23 23 90 90 24 24	111 111 10 10 18 18 4.0 4.0	340 340 149 149 541 541 98 99	39 39 18 18 24 24 3.8 3.8	0.10 14.0 0.2 11 0.2 15 0.0 4.3	1.5 1.5 0.7 0.7 0.5 0.5 1.4 1.4	19 19 11 11 4.4 4.4 0.5 0.5	0.2 0.2 0.06 0.07 0.09 0.09 0.1 0.1	31 31 17 17 12 12 5.1 5.1	0.6 0.6 0.3 0.3 0.3 0.3 0.3 0.3	221 221 40 40 171 171 36 36
Portugal	Atlantic	0.5 0.7	0.3 1.2	26 26	4.5 5.3	1.2 138	NI NI	NI NI	0.5 0.6	13 13	1.2 1.3	NI NI	2.1 2.1	211 211
Spain	Atlantic	5.2 8.4	0.09 0.7	52 191	27 81	1239 1318	0 30	NI NI	3.2 3.3	77 77	0.8 0.8	34 34	1.5 1.7	712 712
Sweden	Kattegat Skagerrak	0.5 0.06	0.09 0.01	38 4.6	13 1.3	148 18	NI NI	NI NI	1.3 0.09	25 1.8	0.3 0.03	41 3.5	0.9 0.1	NI NI
United Kingdom	N Sea (East Coast) (lower estimate) (upper estimate) N Sea (Channel) (lower estimate) (upper estimate) Total North Sea (lower estimate) (upper estimate) Celtic Sea (lower estimate) (upper estimate) Irish Sea (lower estimate) (upper estimate) Atlantic (lower estimate) (upper estimate) Total non-North Sea (lower estimate) (upper estimate)	4.6 9.6 0.6 0.6 5.2 10.3 1.4 2.2 1.8 2.3 0.7 2.7 3.9 7.2	2.0 2.6 0.01 0.04 2.0 2.7 0.1 0.2 0.5 1.2 0.3 1.1 0.9 2.5	201 201 58 58 259 259 77 77 102 103 68 68 247 249	254 258 18 18 272 276 81 81 107 109 23 26 211 217	804 804 255 255 1058 1059 405 405 515 516 128 137 1047 1058	56 115 4.6 14 61 130 61 131 6.8 126 20 73 88 330	1.0 490 0.0 0.0 1.0 490 0.0 167 32 398 0.9 220 33 785	4.8 4.9 0.6 0.7 5.5 5.6 1.7 1.7 32 398 2.7 2.8 36 403	149 149 27 27 176 176 67 67 45 47 15 18 127 132	10 10 1.2 1.2 11.6 11.6 3.0 3.0 7.9 8.0 1.5 1.6 12.4 12.7	164 164 28 28 192 192 69 69 56 57 18 21 144 148	11 11 1.2 1.2 12.3 12.3 3.0 3.0 8.3 8.4 2.7 2.9 14.0 14.3	610 635 126 127 736 762 1072 1073 488 496 358 376 1918 1945

[^] For explanation of data and reasons for lack of information, see Tables 1a and 1b

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) Suspended particulate matter

Table 4a. Summary of Direct (Table 2) and Riverine (Table 3) Inputs to the Maritime Area of the OSPAR Convention in 1998 by Country

Country	Sea Area	Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Belgium	North Sea (lower estimate) (upper estimate)	2.1	0.02	65	47	449	101	0.0	6.5	40	2.0	54	3.2	298
		2.8	1.2	83	56	548	120	270	8.5	46	2.3	65	5.2	365
Denmark	North Sea Skagerrak Kattegat	NI	NI	NI	NI	NI	NI	NI	NI	18.5	0.2	22	0.6	NI
		NI	NI	NI	NI	NI	NI	NI	NI	2.5	0.05	3.1	0.09	NI
		NI	NI	NI	NI	NI	NI	NI	NI	29	0.4	35	1.0	NI
France	Channel/North Sea Atlantic	no data submitted for 1998 no data submitted for 1998												
Germany	North Sea (lower estimate) (upper estimate)	6.1	2.1	202	181	1278	261	6	10.7	192	3.8	252	10.5	1633
		6.4	2.2	203	182	1283	261	170	10.9	192	3.8	252	10.5	1710
Iceland	Atlantic	no data submitted for 1998												
Ireland (2)	Irish Sea (lower estimate) (upper estimate)	1.0	NI	35	46	282	NI	NI	1.0	27	0.3	6.8	3.0	38
		1.0	NI	35	47	282	NI	NI	1.0	27	0.3	6.8	3.0	38
	Celtic Sea (lower estimate) (upper estimate)	1.0	NI	57	58	317	NI	NI	2.8	71	1.6	2.7	4.2	19
		2.0	NI	57	65	317	NI	NI	2.9	71	1.6	2.7	4.2	19
	Atlantic (lower estimate) (upper estimate)	0.6	NI	45	30	99	NI	NI	0.5	22	0.4	0.7	1.7	4.3
		1.3	NI	49	40	99	NI	NI	0.6	22	0.4	0.7	1.7	4.3
Netherlands(3)	North Sea	9.7	2.1	332	257	1297	258	179	15	282	9.5	375	20	1996
		9.7	2.2	332	258	1497	261	183	15	282	9.5	375	20	1998
Norway	Skagerrak (lower estimate) (upper estimate)	4.9	2.6	136	112	360	39	0.1	5.4	19	0.3	37	0.8	231
		4.9	2.7	136	112	360	39	14.0	5.4	19	0.3	37	0.8	231
	North Sea (lower estimate) (upper estimate)	1.7	0.07	32	15	203	18	0.2	3.4	11	0.3	22	0.7	1594
		1.9	0.10	32	15	203	18	11.0	3.4	11	0.3	22	0.7	1594
	Norwegian Sea (lower estimate) (upper estimate)	0.4	0.1	117	19	602	24	0.2	3.5	4	0.4	17	0.9	1711
		1.0	0.1	117	19	602	24	15	3.5	4	0.4	17	0.9	1711
	Barents Sea (lower estimate) (upper estimate)	0.3	0.02	24	4.0	98	3.8	0.0	1.7	0.5	0.1	5.4	0.3	415
		0.4	0.02	24	4.0	99	3.8	4.3	1.7	0.5	0.1	5.4	0.3	415
Portugal	Atlantic	0.5	0.3	26	4.5	1.2	NI	NI	0.5	13	1.2	NI	2.1	211
		0.7	1.2	26	5.3	138	NI	NI	0.6	13	1.3	NI	2.1	211

Table 4a Continued

Country	Sea Area		Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs (1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
Spain	Atlantic		5.2	0.09	53	27	1243	0	NI	7.7	77	0.9	36	2.7	794
			8.4	0.7	192	81	1322	30	NI	7.8	77	0.9	36	2.9	794
Sweden	Kattegat		0.5	0.1	40	13	151	NI	NI	2.6	26	0.3	43	1.0	NI
	Skagerrak		0.06	0.03	4.8	1.3	18	NI	NI	0.3	1.9	0.04	4.0	0.1	NI
United Kingdom	N Sea (East Coast)	(lower estimate)	5.9	2.2	288	295	1117	113	359	29	161	17	204	20	1027
		(upper estimate)	11.1	2.9	288	299	1117	220	932	29	161	17	204	20	1053
	N Sea (Channel)	(lower estimate)	0.7	0.01	74	21	277	7.5	0.0	7.4	28	2.8	36	2.8	132
		(upper estimate)	0.7	0.04	74	21	277	17	0.2	7.5	28	2.8	36	2.8	133
	North Sea	(lower estimate)	6.6	2.2	362	316	1393	121	359	36	189	20	240	22	1159
		(upper estimate)	11.9	2.9	362	320	1394	238	932	36	189	20	240	22	1186
	Celtic Sea	(lower estimate)	3.0	0.1	98	102	544	63	0.6	11.7	69	4.8	81	4.8	1139
		(upper estimate)	3.8	0.3	98	102	544	135	172	11.7	69	4.8	81	4.8	1140
	Irish Sea	(lower estimate)	4.6	0.7	115	144	594	10	32.0	39	46	11.2	67	12.2	517
		(upper estimate)	5.5	1.5	117	148	595	133	399	405	48	11.3	68	12.3	525
	Atlantic	(lower estimate)	0.8	0.4	80	33	149	21	21.9	5.6	16	2.5	22	4.6	384
		(upper estimate)	3.4	1.2	82	38	158	88	262	5.7	19	2.6	25	4.8	402
	non-North Sea	(lower estimate)	8.4	1.3	294	279	1286	95	55	56	131	19	171	22	2041
		(upper estimate)	13	2.9	298	288	1297	356	832	422	135	19	175	22	2067
Total reported:		(lower estimate)	49	11	1823	1411	9079	921	599	154	1157	60	1328	97	12144
		(upper estimate)	66	16	1989	1506	9611	1352	2432	523	1167	61	1343	99	12343

(1) IUPAC Nos 28, 52, 101, 118, 153, 138, 180

(2) NH4-N, NO3-N, PO4-P: riverine inputs only; Total N: direct discharge only

(3) Data provided comprise approx. 90% of the total pollution loads of the Netherlands into Convention Waters

Table 4b. Summary of Direct and Riverine Inputs to the Maritime Area of the OSPAR Convention in 1998 by Sea Area

Sea Area			Cd [t]	Hg [t]	Cu [t]	Pb [t]	Zn [t]	g-HCH [kg]	PCBs(1) [kg]	NH4-N [kt]	NO3-N [kt]	PO4-P [kt]	Total N [kt]	Total P [kt]	SPM(2) [kt]
North-East Atlantic Ocean	Arctic Ocean		0.3	0.02	24	4.0	98	3.8	0.0	1.7	0.5	0.1	5.4	0.3	415
	Barents Sea		0.4	0.02	24	4.0	99	3.8	4.3	1.7	0.5	0.1	5.4	0.3	415
North Sea	Atlantic Ocean (main body)		1.4 4.7	0.4 1.2	125 131	64 78	247 257	21 88	21.9 262	6.1 6.3	37 40	2.9 3.0	23 26	6.3 6.5	389 407
	Bay of Biscay and Iberian Coast		5.7 9.1	0.4 1.9	79 218	32 86	1245 1460	0.0 30	NI NI	8.2 8.4	90 90	2.1 2.2	36 36	4.8 5.0	1005 1005
	Kattegat	(lower estimate)	0.5	0.11	40	13.3	151	NI	NI	2.6	55	0.7	78	2.1	0.0
		(upper estimate)	0.5	0.11	40	13.3	151	NI	NI	2.6	55	0.7	78	2.1	0.0
	Skagerrak	(lower estimate)	5.0	2.6	141	113	378	39	0.1	5.7	23	0.4	44	1.0	231
		(upper estimate)	5.0	2.7	141	113	378	39	14	5.7	23	0.4	44	1.0	231
	North Sea (main body)	(lower estimate)	25	6.4	919	795	4344	752	544	65	705	33	929	54	6548
		(upper estimate)	32	8.5	937	810	4648	881	1566	67	711	33	940	56	6720
	Channel	(lower estimate)	0.7	0.01	74	21	277	8	0.0	7.4	28	2.8	36	2.8	132
		(upper estimate)	0.7	0.04	74	21	277	17	0.2	7.5	28	2.8	36	2.8	133
Norwegian Sea	(lower estimate)		0.4	0.1	117	19	602	24	0.2	3.5	4	0.4	17	0.9	1711
	(upper estimate)		1.0	0.1	117	19	602	24	15	3.5	4	0.4	17	0.9	1711
Irish Sea	(lower estimate)		5.6	0.7	151	190	876	10	32	40	73	11.5	74	15	555
	(upper estimate)		6.5	1.5	153	194	877	133	399	406	75	11.6	75	15	563
Celtic Sea	(lower estimate)		4.0	0.1	155	161	861	63	0.6	15	139	6.4	84	9.0	1158
	(upper estimate)		5.8	0.3	155	167	861	135	172	15	139	6.4	84	9.0	1158

Note: Some Contracting Parties have not submitted information on direct inputs because under the current Principles of the Comprehensive Study, these inputs do not fall under the 90 % (of total inputs) monitoring requirement.