OSPAR COMMISSION

Levels and trends in marine contaminants and their biological effects – CEMP Assessment report 2021

Monitoring and Assessment Series

2021

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Acknowledgements

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OSPAR Convention

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. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom

Convention OSPAR

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. Les Parties contractantes sont l'Allemagne, la Belgique, le Danemark, l'Espagne, 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, la Suisse et l'Union européenne.

Executive Summary

This report summarises the 2021 annual CEMP assessment of levels and trends of contaminants and their biological effects. The full assessment is available online in the OSPAR Hazardous Substances Assessment Tool (OHAT): https://ocean.ices.dk/ohat/?assessmentperiod=2021.

There were 14870 time series (of three years or more) in biota, of which 9467 were assessed for trends and 9852 for environmental status and 2781 for human health status; 5104 time series in sediment, of which 3213 were assessed for trends and 3839 for status; and 1228 time series in water, of which 836 were assessed for trends and 463 for status.

Récapitulatif

Ce rapport résume l'évaluation annuelle CEMP 2021 des niveaux et tendances des contaminants et de leurs effets biologiques. L'évaluation complète est disponible en ligne dans l'outil OSPAR d'évaluation des substances dangereuses (OHAT) : https://ocean.ices.dk/ohat/?assessmentperiod=2021 .

Il y avait 14870 séries temporelles (de trois ans ou plus) dans le biote, dont 9467 ont été évaluées pour les tendances et 9852 pour l'état environnemental et 2781 pour l'état de santé humaine ; 5104 séries temporelles dans les sédiments, dont 3213 ont été évaluées pour les tendances et 3839 pour l'état ; et 1228 séries temporelles dans l'eau, dont 836 ont été évaluées pour les tendances et 463 pour l'état.

The 2021 annual CEMP assessment can be viewed on the OSPAR Hazardous Substances Assessment Tool (OHAT). It assessed 14870 time series (of three years or more) in biota, of which 9467 were assessed for trends, 9852 for environmental status and 2781 for human health status; 5104 time series in sediment, of which 3213 were assessed for trends and 3839 for status; and 1228 time series in water, of which 836 were assessed for trends and 463 for status.

A breakdown of trends and status by region and determinand is given in Tables 1-7. The assessment methodology is described in the help files on the OHAT.

Regional trends and environmental status were assessed for metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and polybrominated diphenyl ethers in biota and sediment, polycyclic aromatic hydrocarbon metabolites (PYR1OH) in fish, organotins in sediment, and imposex (VDS) in whelks. For biota, time series from mammals and birds were included in the regional trend assessments, but not in the regional status assessments as the comparability of thresholds for mammals and birds against those for fish and shellfish needs further investigation. The results of the regional assessments are summarised in Tables 8-9, with full details available on the OHAT. Regional trends and health status were assessed for metals, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and polybrominated diphenyl ethers in biota. The results are summarised in Table 10.

The major change since the 2020 assessment concerns the status of cadmium, lead, and mercury in biota. In previous assessments, the Maximum Permissible Concentration (MPC) was used as a proxy environmental threshold for these metals, whereas it is now correctly used as a human health threshold. Most cadmium, lead and mercury time series are below the MPC (Table 5) and the regional health status for all three metals is 'acceptable' (i.e. below the MPC) in all MIME subregions with sufficient coverage (Table 10). However, note the increasing regional trends in the Southern North Sea, Channel and Northern Bay of Biscay (Table 10). The Quality Standard (secondary poisoning) is now used as the environmental threshold for mercury. Relatively few mercury time series are below the QS (Table 4 – although note that some of the timeseries in Region 1 are for mammals and birds, where the AMAP low-risk threshold is used instead). The regional environmental status for mercury is 'unacceptable' (i.e. above the QS) in all MIME subregions (with sufficient coverage) apart from the Greenland-Scotland Ridge. Further, there are no environmental thresholds for cadmium or lead (other than BACs), so it is not possible to say whether most time series or subregions show acceptable environmental status (Tables 4, 8).

Tables 11-12 indicate whether there are likely to be sufficient stations to conduct regional assessments in the 2023 QSR. For a MIME subregion to be included in the current regional assessment it must contain at least three monitoring stations with reasonable geographic coverage, each station having at least three years of data of which at least one must be in the last six monitoring years (2014-2019). The same conditions will apply for the QSR so, as this will be based on the 2022 CEMP assessment, each station must have at least three years of data including one year in the period 2015-2020. Tables 11-12 give, by determinand group and MIME subregion, the number of qualifying monitoring stations in the current assessment. They also show how many stations are guaranteed to be included in the QSR because they have data collected between 2015 and 2019. The difference is due to stations that were last sampled in 2014, and that will not appear in the QSR unless more recent monitoring data are submitted before the 2022 assessment. Tables 11-12 show that no regional assessments will be lost in the QSR because stations last sampled in 2014 have dropped out of the assessment. However, looking beyond the QSR, there are some subregions which only have the minimum number of stations required, and others which do not have sufficient geographic coverage. If better regional

coverage is a priority, sampling of representative stations needs to begin soon to ensure timeseries of sufficient length are in place for the next OSPAR-wide assessment.

Table 1: Summary of trends in contaminants and biological effects in biota

	Region I			Region II			Region III			Region IV		
	total	down	Up	total	down	up	total	down	up	total	down	up
Metals												
Arsenic	23	4	1	99	8	8	88	16	5	23	12	0
Cadmium	29	3	1	156	27	44	98	22	12	60	9	12
Chromium	14	0	2	104	15	17	82	12	6	11	0	6
Cobalt	12	1	1	45	3	6	15	1	0			
Copper	23	5	0	173	26	23	122	12	17	57	0	21
Lead	19	8	0	154	26	31	107	19	10	60	11	9
Mercury	47	3	11	185	17	48	96	9	14	60	7	15
Nickel	14	0	3	116	16	11	93	11	8	34	0	8
Selenium	15	0	1	22	1	3	26	1	1			
Silver	10	2	2	62	11	3	53	14	0	32	4	2
Tin	4	1	1	8	0	1						
Zinc	23	6	3	166	22	34	119	11	11	57	6	7
Organotins												
MBSN+				10	6	0						
DBSN+				19	13	0				3	1	0
TBSN+	1	1	0	34	22	0				11	7	0
TPSN+				2	0	0						
PAH parent compounds												
NAP	1	0	0	56	10	0	13	0	2	17	0	2
ACNLE	2	1	0	15	2	0	28	5	3	2	0	0
ACNE	1	0	0	29	3	2	32	6	4	3	0	0
FLE	2	0	0	36	3	8	38	4	2	14	0	1
PA	3	0	0	72	11	2	58	9	6	45	1	9
ANT	2	1	0	33	6	7	42	4	0	32	7	5
DBT							1	0	0			
FLU	5	2	0	75	14	8	60	3	5	45	9	2
PYR	3	2	0	74	18	4	58	7	3	45	11	1
BAA	3	2	0	53	12	7	50	12	2	43	11	0
CHR	3	0	0	61	9	5	55	9	8	45	13	1
BAP	2	2	0	39	7	1	37	4	4	41	5	1
BEP				19	5	1	4	1	0	19	6	0
BBKF	3	0	0	46	7	2	35	2	0	43	14	0
DBAHA				17	1	0	23	3	1	14	0	0
PER				8	2	0	4	2	0			
BGHIP	2	2	0	47	9	1	51	6	4	33	9	0
ICDP	2	2	0	36	7	2	47	4	1	32	8	0
PAH alkylated compounds												
NAPC2				14	0	0	3	1	0			

	Region I			Region II			Region III			Region IV		
NAPC3				15	0	0	3	1	0			
PAC1							1	0	0			
PAC2							1	0	0			
PAC3							1	0	0			
DBTC1				13	2	2	4	0	0			
DBTC2				12	0	3	4	1	0			
DBTC3				12	1	0	4	1	0			
PAH metabolites												
PA1OH				4	3	0	0	0	0			
PYR1OH				30	2	2	17	0	2			
BAP3OH				3	1	0						
Polybrominated diphenyl ethers												
BDE28	4	2	0	34	11	0	10	4	0			
BDE47	11	4	0	65	27	1	53	36	0	23	2	4
BDE66				2	0	0	5	4	0	19	0	0
BDE85				3	0	0				1	0	0
BDE99	4	2	0	47	14	2	40	18	2	23	8	0
BD100	6	3	0	57	11	0	39	23	0	23	4	0
BD153	1	1	0	33	5	1	15	10	0	16	1	1
BD154	4	2	1	41	3	0	23	8	1	20	0	3
BD183				4	0	0	1	1	0	1	1	0
SBDE6	7	2	0	51	19	1	55	29	1	23	2	2
Other organobromines												
HBCD	6	4	0	19	9	0						
HBCDA	6	4	0	10	4	0						
HBCDB				1	1	0						
HBCDG	3	1	0	4	1	0						
Organofluorines												
PFOA				4	2	0						
PFDA				2	0	0						
PFUNDA				7	0	0						
PFHXS				4	2	0						
PFOS	3	3	0	16	8	0						
PFOSA	3	1	0	5	4	0						
Polychlorinated biphenyls												
CB28	10	6	0	75	36	1	73	20	0	37	8	0
CB52	17	10	0	88	29	0	72	22	0	40	12	0
CB101	21	11	2	120	41	2	88	28	2	48	17	0
CB105	12	8	0	42	14	2	66	11	5	45	11	1
CB118	25	13	2	126	43	6	91	32	1	48	8	5
CB126	0	0	0	18	1	0	1	1	0	0	0	0
CB138	24	10	2	125	43	3	89	20	4	48	19	0

	Region I			Region II			Region III			Region IV		
CB153	24	9	2	132	35	7	95	14	5	48	20	1
CB156	7	5	0	40	11	1	45	4	1	35	13	0
CB169	0	0	0	10	0	1	0	0	0	0	0	0
CB180	16	8	1	100	29	3	76	16	1	43	15	0
SCB6	22	11	1	112	31	8	85	31	2	48	22	0
SCB7	23	11	2	113	29	10	85	34	2	48	20	0
Dioxins												
CDF2T				7	1	2	1	0	0			
CDD1N				4	0	1						
TCDD				4	0	0						
TEQDFP				2	1	0						
Other organochlorines												
DDEPP	17	6	0	56	14	2	57	8	0	41	8	0
DDTPP	8	4	0	37	8	0	25	3	0	8	2	0
TDEPP	12	6	0	43	19	1	41	10	3	31	11	0
HCB	17	1	1	42	12	4	46	3	3	7	2	0
HCBD							10	0	4			
HCHA	10	8	0	12	10	0	26	1	2	17	1	0
HCHB	6	2	0	5	3	0	9	2	0			
HCHG	9	6	1	33	17	3	27	12	1	31	13	0
HCH	9	7	0	8	4	0	25	1	0			
MCCP	7	2	0	12	5	0						
SCCP	7	3	1	12	6	0						
ALD							2	0	0	2	0	0
DIELD				3	1	0	22	8	1			
OCDAN	6	4	0				6	0	0			
Imposex												
INTS				5	0	0						
VDS	2	1	0	84	37	0	46	23	0	11	3	0
Other biological effects												
ALAD				3	0	0						
EROD				37	6	1	25	13	0			
GST				2	1	0						
SFG										21	8	0

Table 2: Summary of trends in contaminants in sediment

	Region II			Region III			Region IV		
	Total	**down**	**up**	**total**	**down**	**up**	**total**	**down**	**up**
Metals									
Arsenic	66	6	5	19	0	3	2	0	0
Cadmium	67	25	3	17	1	4	2	0	0
Chromium	75	11	3	19	3	2	2	0	0
Copper	75	27	3	19	3	1	2	0	0
Lead	77	22	3	19	3	1	2	0	0
Mercury	71	35	0	18	4	0	2	0	0
Nickel	77	14	4	19	1	2	2	0	0
Zinc	68	17	3	18	2	1	2	0	0
Organotins									
MBSN+	32	3	1						
DBSN+	29	17	0						
TBSN+	28	20	0	1	0	0			
TPSN+	1	0	0						
PAH parent compounds									
NAP	54	6	5	21	6	0			
ACNLE	26	1	2	15	5	0			
ACNE	42	8	2	17	1	0			
FLE	53	5	4	19	3	0			
PA	76	18	1	21	4	2			
ANT	72	9	4	21	5	1			
DBT	13	1	2	12	4	0			
FLU	78	16	1	21	4	2			
PYR	76	19	2	21	5	2			
BAA	74	15	1	21	2	1			
CHR	76	14	1	20	4	3			
BAP	75	13	1	21	3	1			
BEP	54	12	2	21	3	4			
BBKF	64	12	0	21	4	1			
DBAHA	71	7	2	21	5	1			
PER	35	6	6	20	8	0			
BGHIP	73	20	2	21	3	1			
ICDP	75	19	2	21	3	1			
PAH alkylated compounds									
NAPC1	29	9	1	16	4	0			
NAPC2	25	3	0	16	3	0			
NAPC3	25	4	0	16	3	0			
NAPC4	2	0	0	6	0	1			
PAC1	15	1	0	12	2	1			
PAC2	15	1	1	12	4	0			
PAC3	15	1	1	12	2	1			

	Region II			Region III			Region IV		
	Total	**down**	**up**	**total**	**down**	**up**	**total**	**down**	**up**
DBTC1	14	0	2	12	2	2			
DBTC2	14	0	0	12	3	0			
DBTC3	14	1	2	12	3	1			
Polybrominated diphenyl ethers									
BDE28				2	0	0			
BDE47	5	0	0	9	2	0			
BDE66				3	2	0			
BDE85				1	1	0			
BDE99	5	1	0	6	3	0			
BD100				3	1	0			
BD153	2	0	0	5	0	0			
BD154				4	1	0			
BD183	1	0	0	3	0	0			
BD209	10	0	0	3	0	0			
Polychlorinated biphenyls									
CB28	44	15	1	11	0	0			
CB52	41	12	2	10	2	1			
CB101	48	14	1	11	2	1			
CB105	12	3	0	7	0	1			
CB118	52	18	1	11	1	1			
CB138	53	24	0	14	2	0			
CB153	57	17	2	15	0	2			
CB156	1	0	0	6	0	0			
CB180	45	20	1	11	0	1			
Other organochlorines									
DDEPP	20	3	0						
DDTPP	17	6	0						
TDEPP	19	5	0						
HCB	35	16	0						
HCBD	10	0	4						
HCHA	8	1	0						
HCHB	10	0	1						
HCHG	16	6	1						

Table 3: Summary of trends in contaminants in water

	Region II			Region III		
	Total	**down**	**up**	**Total**	**down**	**Up**
Metals						
Cadmium	9	5	0			
Copper	10	2	2	48	0	2
Lead	10	5	1	3	0	0
Nickel	10	5	0	37	0	8
Zinc	10	1	6	5	0	0
PAH parent compounds						
NAP	25	5	0			
ACNLE	26	1	5			
ACNE	27	0	1			
FLE	27	6	0			
PA	27	2	0			
ANT	21	3	0			
DBT	24	3	0			
FLU	27	6	0			
PYR	26	7	0			
BAA	27	1	0			
CHR	27	3	0			
BAP	22	1	0			
BEP	25	1	0			
BBKF	3	1	0			
DBAHA	15	2	1			
PER	16	1	0			
BGHIP	25	2	0			
ICDP	27	1	0			
Polychlorinated biphenyls						
CB28	15	0	0			
CB52	18	1	0			
CB138	22	2	0			
CB153	24	1	0			
Other organochlorines						
DDEPP	17	1	0			
DDTPP	10	5	0			
TDEPP	14	3	1			
HCB	24	0	0			
HCHA	24	23	0			
HCHB	24	11	0			
HCHG	33	30	0			
HCH	24	24	0			
DIELD	24	12	0			
END	1	0	0			

	Region II			Region III		
	Total	**down**	**up**	**Total**	**down**	**Up**
Pesticides						
ATRZ	3	3	0			

Table 4: Summary of environmental status of contaminants and biological effects in biota: B = blue, G = green, O = orange (above BAC, but no EAC or equivalent), R = red

	Region I				**Region II**				**Region III**				**Region IV**			
	B	G	O	R	B	G	O	R	B	G	O	R	B	G	O	R
Metals																
Cadmium	2	0	24	0	46	0	127	0	68	0	60	0	55	0	15	0
Copper	1	0	15	0	10	0	105	0	13	0	92	0	1	0	66	0
Lead	18	0	8	0	39	0	134	0	38	0	91	0	22	0	48	0
Mercury	15	12	0	18	5	18	0	190	18	21	0	111	5	4	0	62
Zinc	0	0	16	0	0	0	109	0	6	0	94	0	0	0	67	0
Organotins																
TBSN+	1	1	0	0	10	13	0	35	0	0	0	3	4	7	0	2
PAH parent compounds																
NAP	0	9	0	1	0	74	0	4	0	24	0	8	0	21	0	0
PA	1	9	0	0	2	89	0	0	4	87	0	1	4	53	0	0
ANT	0	10	0	0	0	87	0	0	0	83	0	5	0	52	0	2
FLU	3	5	0	2	5	75	0	10	10	74	0	8	6	48	0	3
PYR	4	5	0	2	1	77	0	10	9	68	0	13	6	48	0	3
BAA	3	7	0	0	2	77	0	5	9	64	0	7	7	45	0	2
CHR	6	0	3	0	11	0	78	0	28	0	61	0	8	0	46	0
BAP	1	9	0	0	2	77	0	2	14	65	0	1	5	49	0	0
BGHIP	1	8	0	1	0	84	0	0	9	72	0	0	5	49	0	0
ICDP	2	0	8	0	1	0	78	0	20	0	59	0	10	0	44	0
PAH metabolites																
PA1OH					2	0	2	0								
PYR1OH					1	0	13	0								
PYR1OHEQ					4	18	0	0	0	14	0	0				
Polybrominated diphenyl ethers																
BDE28	0	9	0	0	3	72	0	0	9	77	0	2	15	41	0	0
BDE47	0	18	0	0	0	89	0	0	0	93	0	0	0	56	0	0
BDE66					0	0	36	0	0	0	20	0	0	0	23	0
BDE85					0	0	17	0	0	0	3	0	0	0	23	0
BDE99	0	17	0	0	0	84	0	1	0	82	0	7	0	56	0	0
BD100	0	18	0	0	0	81	0	6	0	82	0	9	0	56	0	0
BD126	1	0	6	0	0	0	11	0								
BD153	2	5	0	0	1	76	0	0	5	74	0	1	19	37	0	0
BD154	0	8	0	0	0	78	0	1	0	85	0	3	1	55	0	0
BD183	0	0	7	0	0	0	32	0	0	0	37	0	0	0	23	0
BD209	0	0	8	0	0	0	22	0								
Other organobromines																
HBCD	0	9	0	0	0	37	0	0	0	12	0	0				
Organofluorines																
PFOS	0	4	0	0	0	23	0	0								

	Region I				Region II				Region III				Region IV			
Polychlorinated biphenyls																
CB28	6	17	0	0	31	98	0	17	57	41	0	12	43	17	0	0
CB52	7	16	0	0	9	112	0	14	41	63	0	7	20	40	0	0
CB101	5	19	0	1	3	122	0	26	24	78	0	12	4	53	0	3
CB105	7	0	3	0	4	0	62	0	51	0	36	0	24	0	30	0
CB118	8	7	0	9	2	45	0	102	22	40	0	52	0	12	0	48
CB138	5	18	0	2	0	123	0	20	4	105	0	4	0	55	0	5
CB153	2	22	0	1	0	147	0	5	0	113	0	2	0	60	0	0
CB156	7	0	3	0	19	0	47	0	63	0	22	0	40	0	13	0
CB180	7	15	0	1	17	115	0	3	45	61	0	1	13	47	0	0
Dioxins																
TEQDFP					0	2	0	1								
Other organochlorines																
DDEPP	8	0	7	0	0	0	82	0	1	0	80	0	1	0	46	0
HCB	10	5	0	0	14	55	0	1	47	20	0	1	20	6	0	0
HCHA	7	0	0	0	9	0	32	0	52	0	14	0	22	0	23	0
Imposex																
VDS	1	1	0	0	21	44	0	21	21	13	0	12	1	4	0	4
Other biological effects																
EROD					19	0	15	0	16	0	8	0				
SFG													0	4	0	17

Table 5: Summary of human health status of contaminants in biota: G = green, R = red

	Region I		**Region II**		**Region III**		**Region IV**	
	G	R	G	R	G	R	G	R
Metals								
Cadmium	23	3	175	11	132	3	68	3
Lead	25	1	189	9	140	6	69	2
Mercury	27	0	182	0	128	0	71	0
Organotins								
TBSN+	2	0	53	7	1	2	13	0
PAH parent compounds								
FLU	9	1	84	6	89	3	55	2
BAP	8	2	67	14	71	9	50	4
Polybrominated diphenyl ethers								
SBDE6	0	9	0	83	0	92	0	56
Organofluorines								
PFOS	4	0	22	1				
Polychlorinated biphenyls								
SCB6	22	3	121	13	102	4	58	2
Dioxins								
TEQDFP			3	0				
Other organochlorines								
HCB	15	0	70	0	68	0	23	0
HCHG	10	0	67	0	69	0	45	0

Table 6: Summary of status of contaminants in sediment: B = blue, G = green, O = orange (above BAC, but no EAC or equivalent), R = red

	Region II				**Region III**				**Region IV**			
	B	G	O	R	B	G	O	R	B	G	O	R
Metals												
Arsenic	27	0	49	0	16	0	5	0	0	2	0	33
Cadmium	25	47	0	9	13	8	0	0	18	18	0	0
Chromium	0	21	0	61	0	1	0	20	0	25	0	9
Copper	51	13	0	18	10	2	0	9	0	29	0	7
Lead	10	3	0	70	7	2	0	12	8	14	0	14
Mercury	10	15	0	58	6	6	0	9	14	2	0	20
Nickel	39	0	47	0	1	0	20	0	0	15	0	21
Zinc	17	6	0	52	7	3	0	11	0	27	0	9
Organotins												
TBSN+	0	0	0	37	0	0	0	5				
PAH parent compounds												
NAP	9	44	0	8	1	19	0	1				
PA	12	60	0	11	2	15	0	4	3	22	0	9
ANT	9	69	0	4	4	15	0	2	3	19	0	10
DBT	0	25	0	0	0	15	0	0				
FLU	12	67	0	4	3	17	0	1	6	22	0	6
PYR	9	72	0	1	3	17	0	1	7	23	0	4
BAA	10	67	0	4	2	15	0	4	4	20	0	9
CHR	8	74	0	1	2	18	0	1	9	19	0	6
BAP	18	62	0	1	3	17	0	1	11	19	0	4
BGHIP	48	0	33	0	4	0	17	0	9	0	25	0
ICDP	54	0	28	0	7	0	14	0	8	0	25	0
Polybrominated diphenyl ethers												
BDE28	0	21	0	0	3	12	0	0				
BDE47	0	48	0	0	0	17	0	1				
BDE66	0	23	0	0	0	15	0	0				
BDE85	0	12	0	1	0	3	0	0				
BDE99	0	32	0	11	0	16	0	1				
BD100	0	17	0	8	2	13	0	0				
BD153	0	27	0	0	0	10	0	0				
BD154	0	25	0	0	1	14	0	0				
BD183	2	37	0	0	6	9	0	0				
BD209	0	23	0	21	0	5	0	9				
Polychlorinated biphenyls												
CB28	6	57	0	7	4	14	0	1	0	13	0	11
CB52	2	61	0	7	1	14	0	4	0	14	0	6
CB101	4	63	0	7	0	17	0	2	0	15	0	8

	Region II				Region III				Region IV			
CB118	3	30	0	40	1	7	0	11	0	9	0	19
CB138	2	68	0	1	1	16	0	0	0	20	0	10
CB153	2	71	0	0	1	19	0	0	0	24	0	6
CB180	5	65	0	1	1	18	0	0	0	17	0	8
Other organochlorines												
HCB	5	0	37	0								
HCHG	15	0	6	0								
DIELD	0	0	1	0								

Table 7: Summary of status of contaminants in water: G = green, R = red

	Region II		Region III	
	G	R	G	R
Metals				
Cadmium	10	15	49	0
Lead	10	0	50	0
Nickel	10	0	66	0
Organotins				
TBSN+	0	1		
PAH parent compounds				
NAP	30	0	1	0
ANT	29	0	1	0
FLU	28	2	1	0
BAP	21	15	0	1
Organochlorines				
DDTPP	48	0		
HCEPX	0	16		
HCH	39	10		
Pesticides				
ATRZ	9	0	1	0

Table 8: Summary of regional assessments of trends and environmental status of metals in biota and sediment. The regional trend is indicated by up, down or — (no significant change). The regional status is indicated by blue (below BAC); green (below EAC or equivalent); orange (above BAC, but no EAC or equivalent); red (above EAC or equivalent). Note that some region metal combinations are assessed for status, but not trends and these are only coloured; conversely, other combinations are only assessed for trends (there are no assessment criteria) and these are not coloured.

Region	Subregion	Arsenic	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
Biota												
1	Barents Sea							—				
	West of Iceland											
	Greenland-Scotland ridge	—	—			down	—	—		—		—
	East of Iceland											
	Norwegian Sea	—	—	—	—	—	down	—	—		—	—
2	Norwegian Trench	—	down	up	—	—	down	—	up		—	—
	Northern North Sea	—	—	—	—	—	—	—	—	—	—	—
	Skagerrak and Kattegat	—	—	down	—	—	—	—	—		—	—
	Southern North Sea	up	up	down		up	—	up	—	up		up
	Channel		up	up		up	up	up	up		down	up
3	Irish and Scottish West Coast	down	down	—	—	—	—	—	down	—	down	down
	Irish Sea	—	down	—	down	up	—	—	—	—	down	—
	Celtic Sea	—	—	—		—	—	—	up		down	—
4	Northern Bay of Biscay		—	up		up	up	up	up		—	up
	Iberian Sea	down	—			up	down	—				—
	Gulf of Cadiz											
Sediment												
2	Norwegian Trench											
	Northern North Sea	up	—	—		down	—	down	—			down
	Skagerrak and Kattegat											
	Southern North Sea	down	down	down		down	down	down	down			down
	Channel	—		—		—	—	—	—			
3	Irish and Scottish West Coast	—	up	—		—	—	down	—			—
	Irish Sea	—	—	—		down	—	down	—			—
	Celtic Sea											
4	Northern Bay of Biscay											
	Iberian Sea											
	Gulf of Cadiz											

Table 9: Summary of regional assessments of trend and environmental status of polycyclic aromatic hydrocarbons, polychlorinated biphenyls, polybrominated diphenyl ethers in biota and sediment, polycyclic aromatic hydrocarbon metabolites (PYR1OH) in fish, organotins in sediment, and imposex (VDS) in whelks. The regional trend is indicated by up, down or – (no significant change). The regional status is indicated by blue (below BAC); green (below EAC or equivalent); orange (above BAC, but no EAC or equivalent); red (above EAC or equivalent). The polychlorinated biphenyl assessment is split into non-planar compounds (CB28, CB52, CB101, CB138, CB153, CB180) and the mono-otho compound CB118.

Region	Subregion	PAHs	Metabolites	PCBs		PBDEs	Organotins	Imposex
				non-planar	CB118			
Biota								
1	Barents Sea							
	West of Iceland							
	Greenland-Scotland ridge			down	down	—		
	East of Iceland							
	Norwegian Sea			—	down			
2	Norwegian Trench			—	—			
	Northern North Sea	down	—	down	—	down		down
	Skagerrak and Kattegat	—		down	down	—		down
	Southern North Sea	—	—	—	down	down		
	Channel	—	—	down	down	—		down
3	Irish & Scottish West Coast	—		down	down	down		down
	Irish Sea	—	—	down	down	down		down
	Celtic Sea	—		down	down	down		down
4	Northern Bay of Biscay	—		—	down			—
	Iberian Sea	down		down	—	—		
	Gulf of Cadiz							
Sediment								
2	Norwegian Trench							
	Northern North Sea	—		—	—			
	Skagerrak and Kattegat							
	Southern North Sea	—		down	down		down	
	Channel	—						
3	Irish & Scottish West Coast	up		—	—			
	Irish Sea	—						
	Celtic Sea							
4	Northern Bay of Biscay							
	Iberian Sea							
	Gulf of Cadiz							

Table 10: Summary of regional assessments of trend and health status of metals (cadmium, mercury and lead), polycyclic aromatic hydrocarbons (benzo[a]pyrene and fluoranthene), polychlorinated biphenyls (sum of the six non-planar ICES CBs) and polybrominated diphenyl ethers (sum of BDE28, 47, 99, 100, 153, 154) in biota. The regional trend is indicated by up, down or – (no significant change). The regional status is indicated by green (below MPC or QS human health); red (above MPC or QS human health).

Region	Subregion	Metals			PAHs		PCBs	PBDEs
Biota		cadmium	lead	mercury	BAP	FLU	SCB6	SBDE6
1	Barents Sea							
	West of Iceland							
	Greenland-Scotland ridge	—	—	—		—	down	
	East of Iceland							
	Norwegian Sea	—	down	—			—	
2	Norwegian Trench	down	down	—			—	
	Northern North Sea	—	—	—	—	down	down	down
	Skagerrak and Kattegat	—	—	—	—	—	—	—
	Southern North Sea	up	—	up	—	down	down	down
	Channel	up	up	up	up	up	—	—
3	Irish & Scottish West Coast	down	—	—	—	—	down	down
	Irish Sea	down	—	—	—	—	down	down
	Celtic Sea	—	—	—	—	—	down	down
4	Northern Bay of Biscay	—	up	up	—	—	—	
	Iberian Sea	—	down	—	down	down	down	—
	Gulf of Cadiz							

Table 11: Number of biota monitoring stations (with three years of data) in each MIME subregion with data in the period 2014-2019 (now) and data in the period 2015-2019 (QSR).

Region	Subregion	Metals		PAHs		PBDEs		PCBs		Imposex	
		now	QSR	now	QSR	now	QSR	now	QSR	now	QSR
1	Barents Sea	12	12	2	2	5	5	9	9	12	12
	West of Iceland										
	Greenland-Scotland ridge	17	16	8	8	10	10	14	12	17	16
	East of Iceland	2	2							2	2
	Norwegian Sea	6	6	1	1	4	4	5	5	6	6
2	Norwegian Trench	17	17			5	5	17	17	17	17
	Northern North Sea	39	32	26	19	11	11	37	30	39	32
	Skagerrak and Kattegat	40	39	18	18	16	16	29	29	40	39
	Southern North Sea	48	47	21	21	30	29	38	37	48	47
	Channel	32	32	25	25	26	26	29	29	32	32
3	Irish and Scottish West Coast	32	28	25	21	27	25	32	26	32	28
	Irish Sea	53	48	37	32	31	31	44	38	53	48
	Celtic Sea	33	32	27	27	29	29	31	29	33	32
4	Northern Bay of Biscay	43	43	33	33	32	32	33	33	43	43
	Iberian Sea	26	26	24	24	24	24	26	26	26	26
	Gulf of Cadiz	1	1					1	1	1	1
5	Wider Atlantic										

Table 12: Number of sediment stations (with three years of data) in each MIME subregion with data in the period 2014-2019 (now) and data in the period 2015-2019 (QSR).

Region	Subregion	Metals		PAHs		PBDEs		PCBs	
		now	QSR	now	QSR	now	QSR	now	QSR
1	Barents Sea								
	West of Iceland								
	Greenland-Scotland ridge								
	East of Iceland								
	Norwegian Sea								
2	Norwegian Trench								
	Northern North Sea	14	14	18	18	13	13	18	18
	Skagerrak and Kattegat			1		1			
	Southern North Sea	69	66	61	60	37	37	54	53
	Channel	3	3	3	3	3	3	3	3
3	Irish and Scottish West Coast	6	6	7	7	5	5	7	7
	Irish Sea	13	13	13	13	13	13	12	12
	Celtic Sea	2	2	1	1	1	1	1	1
4	Northern Bay of Biscay								
	Iberian Sea	36	36	34	34			30	30
	Gulf of Cadiz								
5	Wider Atlantic								

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Our vision is a clean, healthy and biologically diverse North-East Atlantic Ocean, which is productive, used sustainably and resilient to climate change and ocean acidification.

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