OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

Levels and trends in marine contaminants and their biological effects – CEMP Assessment report 2014

Monitoring and Assessment Series

2015

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.

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Introduction

The 2014-15 MIME roll-over (http://dome.ices.dk/osparmime2014/main.html) assessed 7800 time series (of three years or more) in biota, of which 4728 were assessed for trends and 7074 for status, and 7341 time series in sediment, of which 4897 were assessed for trends and 6300 for status. A breakdown of trends and status by region and determinand is given in Tables 1-4. For most organics, the prevalent trend is downwards, with an occasional upward trend. For metals, the picture is more diverse, especially for Cd in biota and As, Cu in sediments. This was also the case in the 2013-14 assessment (OSPAR Monitoring and Assessment series, Levels and trends in marine contaminants and their biological effects – CEMP Assessment Report 2013;

(http://www.ospar.org/documents/dbase/publications/p00631/p00631_cemp_assessment_report_2013.pdf)

The assessment methodology is described in the help files that accompany the assessment. There were two moderate changes to the methodology used for contaminants and biological effects (other than imposex) in the 2013-14 assessment:

a. the definition of 'recent trends' in biota was increased from 10 years to 20 years. Thus, a trend in concentration in biota means that there was a significant change in concentration in the last twenty years (i.e. between 1994 and 2013). This brings the definition of recent trends in line with that for sediment and reflects the increasing practice of monitoring some stations every two or three years, particularly when concentrations are low

b. the type of smoothing used in the assessment of trends was adapted to provide more statistical power for those stations which are monitored every two or three years, and for those time series which show little evidence of non-linearity.

In addition, the methodology for VDS (imposex) was modified to provide more a realistic assessment of status when individual data were available. At present, the types of trends that are considered are not flexible enough to model adequately the sharp decrease in imposex seen at many sites. Although trends are still detected, the fitted values are biased upwards, resulting in a status that is poorer than it should be. The trend assessment methodology has been left unchanged for this assessment (although it will be revised next year). However, when individual VDS measurements were available, a proportional-odds model was fitted to the individual data and status was based on the resulting upper one-sided 95% confidence limit on the index in the last monitoring year (as opposed to the upper confidence limit from the fitted trend line).

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												
CD	10	1	1	159	28	21	89	21	6	40	13	4
HG	10	3	0	163	18	13	63	1	5	40	9	1
PB	5	3	0	142	50	8	85	10	6	40	15	0
CU	8	1	1	141	22	3	83	7	2	38	2	3
ZN	9	1	0	141	32	2	83	13	3	38	8	1
PAHs (parent)												
NAP				44	12	0	16	1	0	14	1	3
PA	5	1	0	81	34	0	32	2	1	39	14	0
ANT	2	0	0	32	0	0	21	3	0	24	2	0
DBT	1	0	0	11	3	0						
FLU	5	2	0	81	25	1	34	1	1	39	4	1
PYR	5	1	0	81	21	1	34	3	0	39	5	1
BAA	3	0	0	59	13	2	18	3	1	38	3	1
CHR	5	2	0	70	13	0	19	6	0	39	3	1
BAP	3	0	0	35	6	2	4	0	0	31	2	3
BGHIP	2	0	0	46	2	2	16	3	1	29	2	0
ICDP	2	0	0	34	1	2	17	0	1	23	4	0
CBs												
CB28	1	0	0	53	13	1	25	9	1	22	5	0
CB52	3	3	0	75	15	0	30	7	2	33	12	0
CB101	1	1	0	101	41	0	50	8	1	41	13	0
CB105	3	3	0	53	29	0	22	2	0	21	6	0
CB118	5	5	0	125	67	2	58	7	2	41	9	0
CB126				7	4	0						
CB138	8	4	0	93	52	1	57	13	0	25	9	0
CB153	8	7	0	141	71	2	68	7	0	41	16	0
CB156				32	9	0	17	1	0	23	5	0
CB169				7	3	0						
CB180	4	4	0	78	45	1	39	2	3	36	12	0
Organobromines												
BDE28				6	0	1	8	1	0			
BDE47	1	0	0	24	16	0	23	10	0			
BDE99				7	4	0	14	7	0			
BD100	1	0	0	18	10	0	18	3	0			
BD153				3	0	0	9	2	0			
BD154	1	0	0	13	1	0	9	1	0			
HBCD				1	0	0						
Pesticides												
DDEPP	8	4	0	91	33	1	29	3	0	34	2	0
HCB	5	4	0	47	11	1	14	3	0	3	0	0
HCHA				5	1	0	16	1	0	15	2	0
HCHG				24	3	0	15	3	0	32	7	0

	Region I			Region II			Region III			Region IV		
Dioxins, furans and POPs												
TCDD				3	1	0						
CDF2T				7	3	0						
PFOS				4	2	0						
Organometals												
DBTIN				22	10	0						
MBTIN				14	5	0						
TBTIN	1	1	0	32	23	0						
TPTIN				2	0	0						
Biological effects												
EROD				3	0	0						
PYR1OH				5	1	0						
PA1OH				4	1	0						
BAP3OH				1	0	0						
ALAD				3	0	0						
SFG										7	0	0
VDS	2	1	0	93	67	0	39	7	0	16	11	0
INTS				9	3	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									
CD	146	26	2	29	1	0	29	2	0
HG	137	34	1	37	7	0	29	2	0
PB	166	10	3	43	3	1	29	2	0
AS	152	3	13	43	0	4	29	0	2
CR	166	9	8	44	5	2	29	4	0
CU	166	26	14	44	9	8	29	0	2
NI	166	6	6	44	4	2	29	0	0
ZN	161	13	3	44	9	2	29	8	0
PAHs (parent)									
NAP	45	1	0	24	5	2			
PA	140	24	3	40	2	1	29	4	0
ANT	108	18	1	25	1	0	29	3	0
DBT	6	0	0	16	2	0			
FLU	139	22	2	41	4	1	29	5	0
PYR	141	21	3	41	3	0	29	7	0
BAA	126	19	3	33	1	1	29	4	0
CHR	115	25	3	30	4	0	29	4	0
BAP	126	23	1	33	3	0	29	7	0
BGHIP	128	21	2	32	5	0	29	3	0
ICDP	128	20	4	32	2	0	29	10	0
PAHs (alkylated)									
NAPC1	10	0	0	4	0	0			
NAPC2	23	2	0	22	3	0			
NAPC3	24	4	1	22	3	0			
PAC1	14	2	0	18	2	0			
PAC2	14	3	1	18	3	0			
PAC3	11	1	0	14	4	0			
DBTC1	10	1	1	17	2	0			
DBTC2	11	3	0	17	3	0			
DBTC3	11	2	0	17	4	0			
CBs									
CB28	65	19	1	17	1	0	26	0	0
CB52	34	6	1	5	0	0	27	1	4
CB101	70	21	2	15	1	0	26	0	0
CB105	4	0	0	4	0	0	22	0	0
CB118	72	22	3	22	1	3	26	0	0
CB138	73	33	1	21	2	0	29	0	0
CB153	80	25	2	27	1	3	29	0	0
CB156	2	0	0	3	0	0	22	0	0
CB180	50	13	1	19	1	0	29	0	0

	Region II			Region III			Region IV
Organobromines							
BDE28				1	0	0	
BDE47	2	0	0	6	1	0	
BDE66				2	0	0	
BDE99				3	0	0	
BD100				1	0	0	
BD153				4	0	0	
BD154				1	0	0	
BD183				1	0	0	
Organometals							
DBTIN	45	17	0				
MBTIN	45	5	0				
TBTIN	60	33	0				

Table 3: Summary of 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																
CD	1	9	0	1	45	124	0	6	40	69	0	2	49	13	0	5
HG	6	5	0	0	18	156	0	4	10	97	0	2	14	52	0	0
PB	3	7	0	1	31	132	0	7	30	73	0	5	20	39	0	7
CU	0	0	3	0	22	0	99	0	17	0	71	0	17	0	45	0
ZN	0	0	5	0	0	0	122	0	0	0	88	0	0	0	63	0
PAHs (parent)																
NAP	0	6	0	0	0	81	0	2	0	35	0	0	0	24	0	0
PA	0	6	0	0	18	79	0	0	3	51	0	0	17	46	0	0
ANT	0	5	0	0	0	91	0	0	0	47	0	0	0	56	0	0
FLU	1	2	0	2	7	79	0	10	5	35	0	11	13	46	0	4
PYR	1	2	0	2	6	71	0	18	5	37	0	9	8	49	0	4
BAA	0	3	0	2	2	84	0	7	1	48	0	4	3	51	0	2
CHR	0	0	5	0	15	0	77	0	12	0	35	0	4	0	54	0
BAP	0	5	0	0	7	63	0	0	1	28	0	0	4	51	0	1
BGHIP	0	5	0	0	0	87	0	2	2	48	0	1	4	52	0	0
ICDP	0	0	5	0	1	0	75	0	3	0	37	0	8	0	48	0
CBs																
CB28	3	6	0	0	28	98	0	19	19	49	0	12	26	25	0	1
CB52	3	6	0	0	24	97	0	19	9	64	0	10	16	35	0	1
CB101	0	9	0	0	3	123	0	35	10	64	0	16	1	46	0	12
CB105	3	0	6	0	27	0	57	0	21	0	20	0	19	0	21	0
CB118	1	4	0	4	4	52	0	110	8	23	0	68	0	10	0	49
CB138	2	7	0	0	0	116	0	12	4	79	0	8	0	32	0	11
CB153	2	7	0	0	0	163	0	8	0	102	0	1	0	59	0	1
CB156	3	0	6	0	37	0	47	0	26	0	16	0	15	0	21	0
CB180	3	6	0	0	35	106	0	3	16	62	0	3	10	45	0	0
Pesticides																
DDEPP	0	0	9	0	0	0	93	0	0	0	45	0	0	0	44	0
HCB	3	0	6	0	29	0	42	0	31	0	6	0	13	0	4	0
HCHA	3	0	0	0	47	0	23	0	31	0	5	0	25	0	14	0
HCHG	3	3	0	3	36	25	0	31	23	4	0	5	33	6	0	5
Organometals																
TBTIN	0	1	0	1	2	2	0	30					0	3	0	5
Biological effects																
EROD					6	0	2	0	2	0	3	0				
PYR1OH					0	0	8	0								
PYR1OHEQ					1	3	0	0	0	2	0	0				
PA1OH					0	0	4	0								
SFG													2	13	0	9
VDS	1	1	0	0	15	52	0	61	6	66	0	29	2	4	0	42

Table 4: 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												
CD	45	104	0	38	31	13	0	3	2	26	0	1
HG	11	20	0	157	12	15	0	22	0	7	0	22
PB	13	8	0	173	9	13	0	26	1	1	0	27
AS	47	0	123	0	38	0	11	0	0	0	0	29
CR	0	11	0	178	0	2	0	47	0	6	0	23
CU	67	31	0	92	22	6	0	21	0	2	0	27
NI	37	0	154	0	9	0	40	0	0	2	0	27
ZN	17	23	0	147	12	10	0	27	0	9	0	20
PAHs (parent)												
NAP	12	38	0	34	2	46	0	11				
PA	23	115	0	43	5	30	0	24	12	13	0	4
ANT	14	124	0	42	5	40	0	13	7	20	0	2
DBT	0	24	0	0	0	31	0	0				
FLU	18	141	0	22	8	39	0	11	12	15	0	2
PYR	15	151	0	15	5	47	0	7	10	19	0	0
BAA	17	134	0	26	3	42	0	13	10	17	0	2
CHR	18	133	0	6	4	44	0	5	13	16	0	0
BAP	26	133	0	17	7	41	0	11	12	17	0	0
BGHIP	74	5	0	98	10	1	0	48	11	7	0	11
ICDP	84	57	0	36	12	24	0	23	13	14	0	2
CBs												
CB28	7	119	0	22	6	35	0	7	0	27	0	2
CB52	0	132	0	11	1	37	0	5	0	27	0	2
CB101	0	146	0	15	1	45	0	4	0	20	0	9
CB118	1	35	0	127	1	12	0	37	0	9	0	20
CB138	0	152	0	8	0	45	0	1	0	21	0	8
CB153	3	161	0	0	0	51	0	0	0	29	0	0
CB180	4	130	0	6	1	44	0	0	0	24	0	5

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OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

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