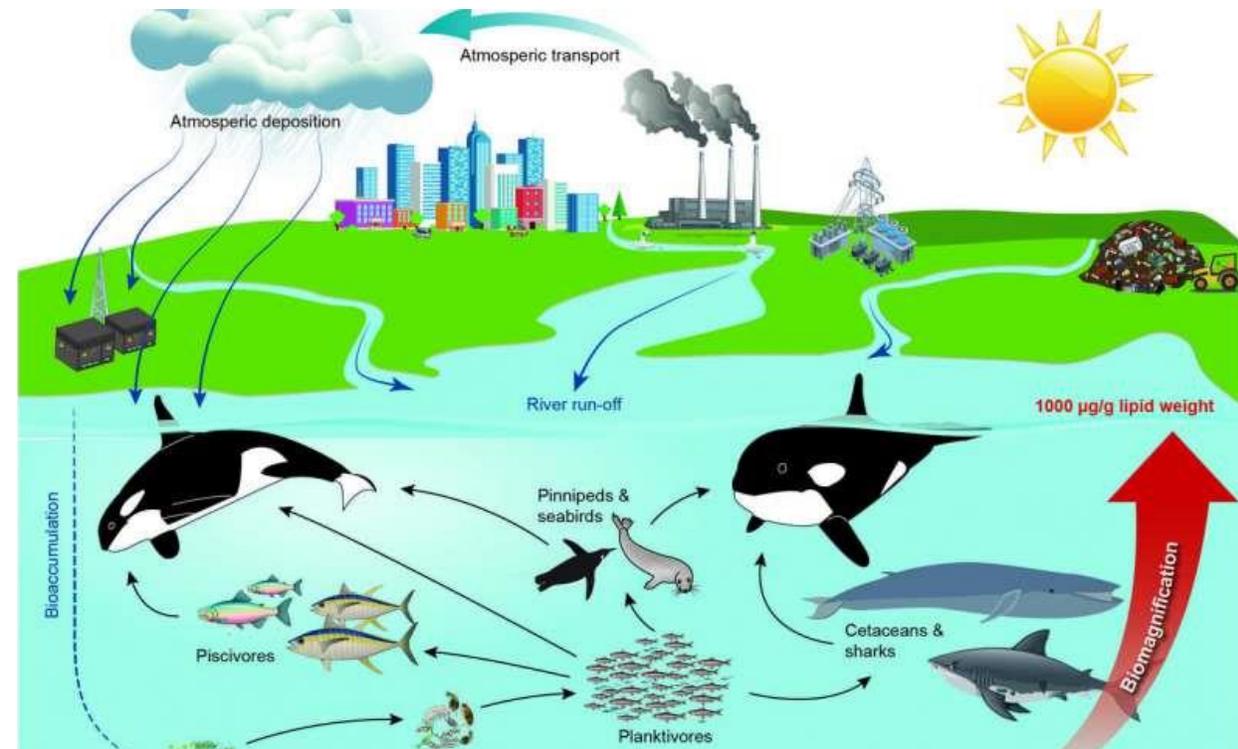
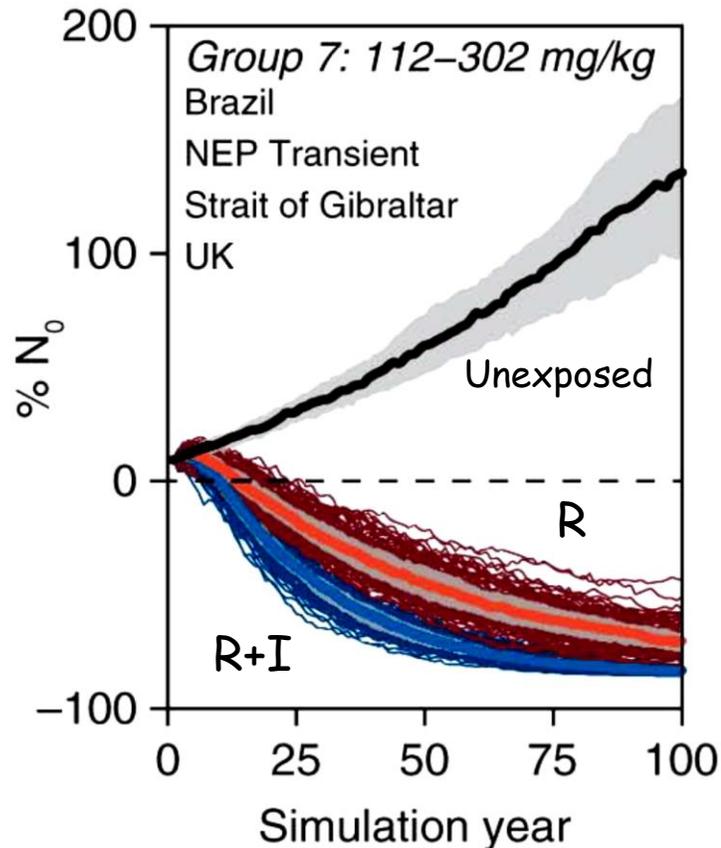
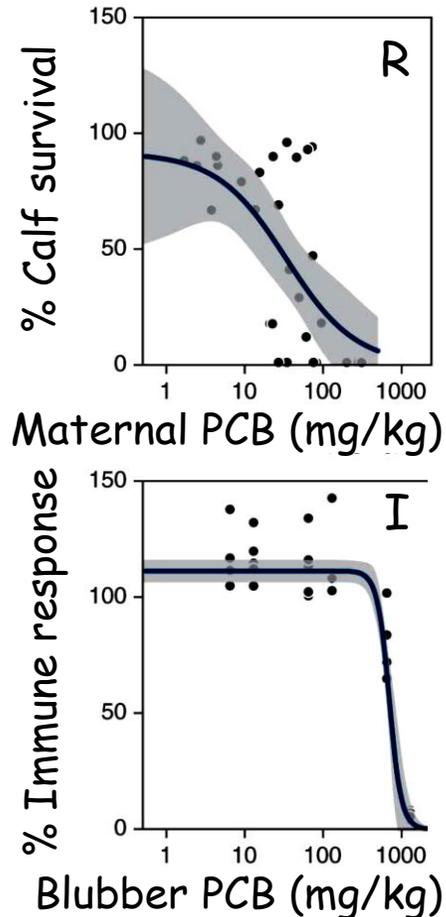


# ASCOBANS AC25 - Stralsund, Germany, 17-19 Sept 2019

## 2. Review of new information on threats to small cetaceans

### 2.3. Pollution and hazardous substances (incl. microplastics)

Relevant Resolutions: 8.9, 8.8, 8.7, 8.4, 8.3, 8.2, 8.1, 7.4, 7.1, 6.1, 5.7



Desforges et al., Science 361, 1373-1376 (2018)

**AIM:** to illustrate progress, during the reporting period, on understanding, monitoring and mitigating impacts on cetaceans of important and emerging pollution-related hazards.

Our oceans have been subject to a wide range of different types of pollution over the last decades. Top-predators such as small cetaceans that feed on higher trophic prey, tend to accumulate many of these potentially hazardous substances. A number of contaminants and pathogens that are known or suspected to have impacts on cetacean health, immune status or reproduction, for example polychlorinated biphenyls (PCBs) and other persistent organic pollutants (POPs), oil pollution (polycyclic aromatic hydrocarbons), toxins from harmful algal blooms (HABs), sewage, radionuclides, toxic elements, tri-butyl tin (TBT), morbillivirus, and *Brucella*. In addition, micro- and nano-plastics are also present in the environment and their impacts are presently poorly understood.

Monitoring can be done in tissues of cetaceans obtained from live animals through biopsies, or from dead animals that are generally found on the shore. Necropsies allow the sampling of different tissues such as blubber, muscle, kidney or liver and these can be analysed subsequently.

To better understand the impact of contaminants on cetacean health, to detect new emerging hazards and to work towards a common protocol for analysing samples, Parties are asked to provide information on their programs.

# National reports

BE	DK	FI	FR	DE	LT	NL	PO	SE	UK
10.1. Does your country conduct monitoring of pollutants in small cetaceans?									
Yes	No	No	Yes	Yes		Yes	No		Yes
<p><b>Any comments?</b></p> <p>BE: Project-based for the moment, but there are initiatives at OSPAR to incorporate this in a coherent monitoring programme</p> <p>FI: Harbour porpoise is the only regular species. Numbers are extremely low: due to lack of samples we are not able to monitor pollutants directly in small cetaceans</p> <p>DE: Signs of intoxication and macro debris (&gt;2.5 cm) are investigated in dead cetaceans on the coast of Schleswig-Holstein (e.g. size, type, location and associated lesions). Measurements on chemical pollutants are conducted occasionally for research projects</p> <p>UK: A time series of levels of PCBs, OCs, PBDEs, HBCD and PFCs in harbour porpoises is being added to each year</p>									

## 10.2. Who is carrying out the pollutant monitoring program? (institutions/agencies that collect and analyse the samples)

	Sample collection	Sample analysis
BE	University of Liège (Dept. Pathology)	University of Liège (Lab. of Oceanology)
FR	La Rochelle University	La Rochelle University
DE	LEVES, ITAW, Deutsches Meeresmuseum	ITAW, Deutsches Meeresmuseum
NL	Utrecht University (Fac. Vet. Medicine)	Wageningen Marine Research
UK	CSIP (Institute of Zoology)	Cefas

## 10.4. Select the source of your samples

	(Dead) stranding	(Dead) Bycatch	Live stranding	Biopsy	Other
BE	X	X			
FR	X	X			
DE	X	X	X		
NL	X	X			
UK	X	X			

10.3. Select the small cetacean species that were covered by your monitoring program during the reporting period from 2016 to 2018.

Species	BE	DK	FI	FR	DE	LT	NL	PL	SE	UK
AWSD										1,1,1
BD	1,1,0			X,X,X						1,4,1
CBW										0,0,2
CD	1,0,0			X,X,X	(?)					36,47,45
HP	X,X,X			X,X,X	X,X,X		X,X,X			76,74,69
KW					X, -, -					1,2,0
LFPW					X, -, X					0,4,9
N	1,0,0									
NBW										0,1,0
PSW										1,0,0
RD										4,4,2
SBW										1,1,4
SD										4,4,5
WBD	0,1,1									5,2,4

AWSD = Atlantic white-sided dolphin; BD = Bottlenose dolphin; CBW = Cuvier's beaked whale; CD = Short-beaked common dolphin; HP = Harbour porpoise; KW = Killer whale; LFPW = Long-finned pilot whale; N = Narwhal; NBW = Northern bottlenose whale; PSW = Pygmy sperm whale; RD = Risso's dolphin; SBW = Sowerby's beaked whale; SD = Striped dolphin; WBD = White beaked dolphin

## 10.5. Select the geographical coverage of your monitoring program.

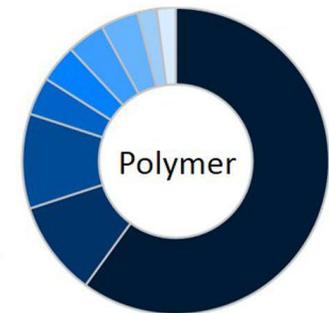
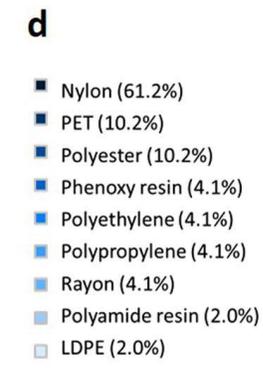
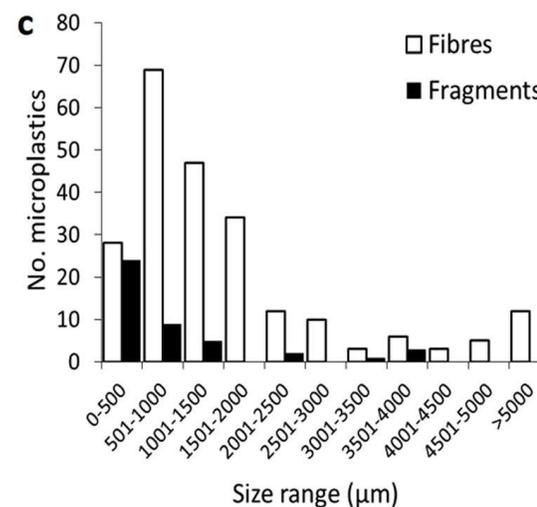
	OSPAR II	OSPAR III	OSPAR IV	HELCOM
BE	Southern North Sea			
FR	Southern North Sea Channel	Celtic Sea	N. Bay of Biscay	
DE	Southern North Sea Northern North Sea			Arkona Basin Balt Sea
NL	Southern North Sea			
UK	Southern North Sea Northern North Sea	Celtic Sea Irish Sea Irish & Scottish W. Coast		

## 10.6. Select the contaminant/pathogen analyses you conduct for small cetaceans.

	BE	DK	FI	FR	DE	LT	NL	PO	SE	UK
POPs (e.g. PCBs)	X			X	X		X			X
Oil (e.g. PAHs)										
HAB toxins					X					
Sewage										
Radionuclides										X
Toxic elements				X	X		X			
TBT										
Morbillivirus	X			~	X		~			X
Brucella	X			~	X		~			X
Microplastics					X		X			X
Nanoplastics										
<i>Potential infectious agents</i>					X		X			
<i>Macro debris</i>					X					
<i>Toxaphene, PBDEs, PFOX</i>					X					

## 10.7. Does your country determine microplastics in cetaceans? If yes, Do you have a specific protocol to monitor microplastic in small cetaceans?

	Specific protocol?
DE	No. Lower Saxony: during necropsy the content of gastro-enteral tract are examined for presence of plastics. Scleswig Holstein: Macroplastics (and lesions) photographed, measured and archived; tissue samples taken.
NL	Van Franeker et al. 2018. <i>Ambio</i> 47(4), 387-397 <a href="https://link.springer.com/article/10.1007%2Fs13280-017-1002-y">https://link.springer.com/article/10.1007%2Fs13280-017-1002-y</a>
UK	Nelms et al. 2019. <i>Nature Scientific Reports</i> <a href="https://www.nature.com/articles/s41598-018-37428-3">https://www.nature.com/articles/s41598-018-37428-3</a>



## 10.8. List initiatives/projects in 2016-2018 on impact of pollution and hazardous substances (incl. microplastics) on small cetaceans

	New initiatives and projects
BE	Routine monitoring of stomach contents for plastics. Project-based pollutant monitoring. PhD Project: "Metallic trace elements and stable isotopes of carbon, nitrogen and sulfur as ecological tracers in the harbour seal and the grey seal in the North Sea" (U. Liege)
DK	The BaltHealth project will examine POP concentrations in Danish porpoises. <a href="https://projects.au.dk/bonusbalthealth/">https://projects.au.dk/bonusbalthealth/</a>
DE	PhD project: "Marine Debris in the North- and Baltic Seas: spatio-temporal distribution patterns and its occurrence in marine mammals" (University of Veterinary Medicine Hannover)
NL	KRM Monitoring Bruinvissen 2018-2020. Wageningen Marine Research. Sub-project: Contamination analyses of blubber and tissue samples of harbour porpoises (mainly PCBs + PBDEs, HCB, HBCD, PFAS and OTCs.)
UK	PhD Project "Persistent Organic Pollutants: Assessing the threat to cetaceans." (Zoological Society of London, Brunel University London) PhD project: "Marine litter, microplastics and marine megafauna". (University of Exeter, Plymouth Marine Laboratory) MSc project: "Causes of spatio-temporal trends in skin lesions of Welsh bottlenose dolphins". (Bangor University, Sea Watch Foundation)

## 10.9. List publications and other evidence in 2016-2018 on impacts of pollution and hazardous substances (incl. microplastics) on small cetaceans

	New publications and other evidence #1
BE	Zanuttini et al., In press. High pollutant exposure level of the largest European community of bottlenose dolphins in the English Channel. <i>Scientific Reports</i> .
FR	Méndez-Fernandez et al.. Inter-species differences in polychlorinated biphenyls patterns from five sympatric species of odontocetes: Can PCBs be used as tracers of feeding ecology? <i>Ecological Indicators</i> , 74: 98-108. Zanuttini 2016. Evaluation de la contamination chimique chez les grands dauphins ( <i>Tursiops truncatus</i> ) du golfe normand-breton Analyses et résultats obtenus à partir de biopsies. Report from GECC (NGO)
DE	Unger et al. (2017). "Marine debris in harbour porpoises and seals from German waters." <i>Marine Environmental Research</i> . ITAW (2016-2018): Totfundmonitoring von Kleinwalen und Kegelrobben in Schleswig-Holstein im Jahr 2016, 2017, 2018. Bericht an das Ministerium für Energiewende, Landwirtschaft, Umwelt, Natur und Digitalisierung des Landes Schleswig-Holstein

## New publications and other evidence #2

NL

- van Franeker et al., 2018. Plastic ingestion by harbour porpoises *Phocoena phocoena* in the Netherlands: Establishing a standardised method. *Ambio* 47(4):387-397.
- van den Heuvel-Greve et al. (2016). Overdracht van contaminanten van moeder naar jong en chemische profielen in bruinvissen gestrand langs de Nederlandse kust. (Rapport / Wageningen Marine Research; No. C096/16). Wageningen Marine Research.
- van den Heuvel-Greve et al. (2017). Contaminants in harbour porpoises beached along the Dutch coast: A first overview of contaminants in all age classes. (Wageningen Marine Research rapport; No. C069/17). Yerseke: Wageningen Marine Research.

UK

- Acevedo-Whitehouse et al.(2018) Hepatic DNA Damage in Harbour Porpoises (*Phocoena phocoena*) stranded along the English and Welsh Coastlines. *Environmental and Molecular Mutagenesis*. 59(7), 613-624.
- Desforges et al. (2018) Predicting global killer whale population collapse from PCB pollution. *Science*. 361 (6409) pp. 1373-1376.
- Gajdosechova et al. (2016) Possible link between Hg and Cd accumulation in the brain of long-finned pilot whales (*Globicephala melas*). *Science of The Total Environment* 545-546, 407-413.
- Gajdosechova et al. (2016) In vivo formation of natural HgSe nanoparticles in the liver and brain of pilot whales. *Nature Scientific Reports* 6, 34361;

## New publications and other evidence #3

Jepson et al. (2016a) PCB pollution continues to impact populations of orcas and other dolphins in European waters. *Scientific Reports* 6: 18573

Jepson and Law (2016b) Persistent pollutants, persistent threats: Polychlorinated biphenyls remain a major threat to marine apex predators such as orcas. *Science* 352: 1388-1389.

Law and Jepson. (2017) Europe's insufficient pollutant remediation. *Science* 356, 148.

Murphy et al. (2018). Chapter 1: Organochlorine Contaminants and Reproductive Implications in Cetaceans: A Case study of the Common Dolphin. In *Marine Mammal Ecotoxicology Impact of Multiple Stressors on Population Health*. pg. 3-38.

Schnitzler et al. (2018) Inter-individual differences in contamination profiles of stranded sperm whales: Can the contamination be used as tracer of social group association? *Scientific Reports* 8: 10958

Stuart-Smith and Jepson (2017) Persistent threats need persistent counteraction: responding to PCB pollution in marine mammals. *Marine Policy* 84: 69-75.

Tierney et al. (2017) Nuclear reprocessing-related radiocarbon ( $^{14}\text{C}$ ) uptake into UK marine mammals. *Marine Pollution Bulletin*

Analyses by Cefas on PCBs in apex predators, also PBDEs, HBCD and PFAs in porpoises

UK

10.10. If applicable, list evidence of reduced impacts of pollutants on small cetaceans following implementation of national mitigation measures

BE	DK	FI	FR	DE	LT	NL	PO	SE	UK
N/A	N/A	N/A	N/A	N/A		N/A	N/A		N/A

10.11. Provide web links to other relevant information to this section

BE	DK	FI	FR	DE	LT	NL	PO	SE	UK

10.12. Have there been any other notable instances/issues in the report period?

BE	DK	FI	FR	DE	LT	NL	PO	SE	UK
No	?		?	No					

10.13. Is the perceived pressure from pollution and hazardous substances in your country increasing (I), decreasing (D), staying the same (S) or unknown (U)?.

Species	BE	DK	FI	FR	DE	LT	NL	PL	SE	UK	
AWSD				All spp. = U						U	
BD											U
CBW											U
CD											U
HP	U					U		U			U
KW											U
LFPW											U
N											
NBW											U
PSW											U
RD											U
SBW											U
SD											U
WBD											U

AWSD = Atlantic white-sided dolphin; BD = Bottlenose dolphin; CBW = Cuvier's beaked whale; CD = Short-beaked common dolphin; HP = Harbour porpoise; KW = Killer whale; LFPW = Long-finned pilot whale; N = Narwhal; NBW = Northern bottlenose whale; PSW = Pygmy sperm whale; RD = Risso's dolphin; SBW = Sowerby's beaked whale; SD = Striped dolphin; WBD = White beaked dolphin

# From the IWC

- The IWC Scientific Committee (SC) has conducted 3 comprehensive research programmes on pollution (Pollution 2000, 2000+ and 2020). Pollution 2020 aimed to assess risks to cetaceans from microplastics and polycyclic aromatic hydrocarbons (PAHs). A detailed report will be presented to the SC in May 2020.
- At its 2019 meeting the SC agreed to develop a new, multidisciplinary pollution initiative, Pollution 2025, building on previous work, and with a potential focus on cumulative impacts. A Steering Group has been established to develop options, to be submitted to the 2020 SC meeting. The SC stressed the importance of collaboration with other organizations on this issue, including the chemicals conventions.
- Pollution is also highlighted as a key threat in the IWC's Conservation Committee (CC) Strategic Plan. The IWC is currently considering how a CC work programme, potentially focused on mitigation options, could build on the scientific work. A paper on this will be put to the SC in May 2020.
- The IWC would very much welcome further collaboration with ASCOBANS on this issue and, in particular, ACSCOBANS participation in the two aforementioned areas of work.

# Conclusions: pollutants, pathogens

- Some pollutants and pathogens (e.g. PCBs, morbillivirus) represent important threats to cetaceans
- Some countries report no routine monitoring of pollutants in cetaceans
- Related projects and publications are reported by more countries
- Monitoring is mainly based on samples from necropsies, and mostly in harbour porpoise
- The pollutants and pathogens monitored differ between countries: PCBs are best covered, Germany appears to cover more substances
- Protocols for microplastics analysis have been published
- Knowledge on trends in pressure due to pollution is lacking
- Several questions are capturing no useful information