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Monitoring programme: Contaminants

Programme topic: Concentration of contaminants

SUB-PROGRAMME: CONTAMINANTS IN BIOTA

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REGIONAL COORDINATION

The monitoring of this sub-programme is: **fully coordinated**.

- Common monitoring guidelines: [HELCOM COMBINE manual](#), MORS Guidelines and other guidelines (see [References](#)).
- Common quality assurance programme: [HELCOM COMBINE manual](#), [QUASIMEME](#), [DIN EN ISO/IEC 17025](#). Radioactive substances: [MORS Guidelines](#) defines methodologies for sample treatment, analysis and intercomparison. Reported data is manually quality assured by HELCOM secretariat and results reported and verified in annual MORS EG meeting.
- Common database: [COMBINE](#), MORS.

PURPOSE OF MONITORING (Q4K)

Follow up of progress towards:

Baltic Sea Action Plan (BSAP)	Segments	Hazardous substances
	Ecological objectives	Concentrations of hazardous substances close to natural levels All fish safe to eat Radioactivity at pre-Chernobyl level
Marine strategy framework directive (MSFD)	Descriptors	D8 Contaminants D9 Contaminants in seafood
	Criteria (<u>Q5a</u>)	8.1 Concentration of contaminants
	Features (<u>Q5c</u>)	Other features: A description of the situation with regard to chemicals, including chemicals giving rise to concern, sediment contamination, hotspots, health issues and contamination of biota (especially biota meant for human consumption)
Other relevant legislation (<u>Q8a</u>)	Water Framework Directive	

Assessment of: (Q4k)

State/Impacts	X	temporal trends, spatial distribution, status classification
Pressures		
Human activities causing the pressures		
Effectiveness of measures		

Scale of data aggregation for assessments: (Q10a)

HELCOM assessment unit Level 1: Baltic Sea	X
HELCOM assessment unit Level 2: Subbasin	X
HELCOM assessment unit Level 3: Subbasins with coastal and offshore division	
HELCOM assessment unit Level 4: Subbasins with coastal WFD division	X

MONITORING CONCEPTS TABLE

Coordination	Elements <u>Q9a (Q5c)</u>	Parameter <u>Q9a (Q5c)</u>	Method <u>Q9c, Q9d</u>	QA/QC <u>Q9e, 9f</u>	Frequency <u>Q9h, 9i</u>	Spatial resolution <u>Q9g, 9j</u>	Link to HELCOM core indicators	Link to MSFD GES characteristics <u>Q5b</u>	Spatial scope <u>Q4i</u>	Monitoring started <u>Q4h</u>	CPs monitoring
Regional (COMBINE)	PCBs, dioxins and furans	Concentration of chemical/nutrient/pollutant in biota	HELCOM COMBINE manual, <u>PartD</u> and different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see <u>References</u>)	<u>HELCOM COMBINE manual Part B, Annex B12, Appendix 1 and 3, QUASIMEME and DIN EN ISO/IEC 17025</u>	Other	<u>See map for details</u>	<u>Polychlorinated biphenyls and dioxins and furans</u>	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 1995 DK: 1998 EE: 2003 FI: 1998 PL: 1998 SE: 1979	DE, DK, EE, FI, PL, SE
Regional (COMBINE)	PAH	Concentration of chemical/nutrient/pollutant in biota	HELCOM COMBINE manual, <u>PartD</u> and different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see <u>References</u>)	<u>HELCOM COMBINE manual Part B, Annex B12, Appendix 1 and 2, QUASIMEME and DIN EN ISO/IEC 17025</u>	Other	<u>See map for details</u>	<u>Polyaromatic hydrocarbons and their metabolites</u>	8.1.1 Concentration of the contaminants measured in the relevant matrix	Coastal Waters/EEZ	FI: 2014	DE, FI, DK, PL, SE
National	BDE and PBDE	Concentration of chemical/nutrient/pollutant in biota	Different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see <u>References</u>)	<u>QUASIMEME and DIN EN ISO/IEC 17025</u>	Other	<u>See map for details</u>	<u>PBDE</u>	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 2007 DK: 2004 FI: 2012 PL: 2012 data only from 2009 SE: 1980	DE, DK, FI, PL, SE

National	PFOA, PFOS and PFOSA	Concentration of chemical/nutrient/pollutant in biota	Different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	QUASIMEME and DIN EN ISO/IEC 17025	Other	See map for details	PFOS	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 2011 DK: data only from 2011 FI: 2012 PL: 2014 SE: data between 2005-2008	DE, DK, FI, PL, SE
National	HBCDD	Concentration of chemical/nutrient/pollutant in biota	Different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	QUASIMEME and DIN EN ISO/IEC 17025	Other	See map for details	HCBDD	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 2011 DK: 2011 FI: 2012 PL: 2012 SE: 1980	DE, DK, FI, PL, SE
Regional (COMBINE)	Tributyltin (TBT)	Concentration of chemical/nutrient/pollutant in biota	HELCOM COMBINE manual, PartD and different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	HELCOM COMBINE manual , QUASIMEME and DIN EN ISO/IEC 17025	Other	See map for details	Tributyltin (TBT) and imposex	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 2011 DK: 1998 PL: 2012 SE: 2008, sporadic years reported before 2008	DE, DK, PL, SE

Regional (COMBINE)	Metals	Concentration of chemical/nutrient/pollutant in biota	HELCOM COMBINE manual, Part D and different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	HELCOM COMBINE manual Part B, Annex B12, Appendix 1, 4 and 5, QUASIMEME and DIN EN ISO/IEC 17025	Other	See map for details	Metals (lead, cadmium and mercury).	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DE: 1995, data also reported for 1992 DK: 1998 EE: 2003, data also from 1986 FI: 1998 LT: 2007 PL: 1998 SE: 1980	DE, DK, EE, FI, LT, PL, SE
National	BDE	Concentration of chemical/nutrient/pollutant in biota	Different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	Other	Other			8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	DK: 2006, 2008	DK
National	PFOS	Concentration of chemical/nutrient/pollutant in biota	Different approaches e.g. CEMP manual, ICES guidelines, ISO/CEN standards (see References)	Other			PFOS	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	SE: 2005	SE
Regional (MORS)	Radionuclides: gamma-emitters	Concentration of chemical/nutrient/pollutant in biota	MORS Guidelines	MORS Guidelines	Yearly	Yearly, See map for details	Radioactive substances: Cs-137 in fish and surface waters	8.1.1 Concentration of the contaminants measured in the relevant matrix	EEZ	1984	DE, DK, EE, FI, LT, PL, SE

Brief description of monitoring

Full description in [HELCOM COMBINE manual](#). Detailed information on monitoring frequency and spatial resolution has not yet been collected from all countries but will be added.

Element / parameter	PCB, Dioxins, furans / Concentration of chemical/pollutant in biota
Method	<p>Measured in: In tissue of Platichthys flesus, Zoarces viviparous, Mytilus edulis, Perca fluviatilis, Clupea harengus, Limanda limanda (by DE in Kiel Bay). In the eggs of Uria aalge, Sterna hirundo, Haematopus ostralegus.</p> <p>Sampling and analytical methods are reported per sample and per parameter respectively in the data. HELCOM COMBINE manual.</p>
QA/QC	<p>Quality assurance is a laboratory's whole sampling and analytical process from start to finish. See HELCOM COMBINE manual.</p>
Frequency	<p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb , mussels: Baltic Sea: 2x/year(06/12), annually • LUNG: mussels, every 2nd or 3rd year • LLUR: 2x/yr (Mar/Oct) <p>FI: 1-6 years intervals, depending on station; time series stations yearly</p>
Spatial Scope	<p>EEZ / Whole Baltic Sea for assessment</p>
Spatial resolution	<p>Polychlorinated biphenyls (PCB) and dioxins and furans are measured in the following subbasins: Great Belt, Little Belt, Kattegat, Southern Baltic Proper, Kiel Bay, Bay of Mecklenburg, Arkona Basin, Bothnian Bay, Bothnian Sea, Northern Baltic Proper, Gulf of Gdansk, Gulf of Finland, Quark, Archipelago Sea.</p> <p>See map for details</p>

Element / parameter	PAH / Concentration of chemical/pollutant in biota
Method	FI and SE: Monitored in bivalves See HELCOM COMBINE manual .
QA/QC	See HELCOM COMBINE manual .
Frequency	FI: Survey type SE: Yearly
Spatial Scope	FI: Coastal sites
Spatial resolution	See map for details Coastal Waters / EEZ

Element / parameter	PBDE / Concentration of chemical/pollutant in biota
Method	Measured in: <i>Platichthys flesus</i> , <i>Zoarcetes viviparous</i> , <i>Mytilus edulis</i> , <i>Clupea harengus</i> , <i>Gadus morhua</i> , <i>Uria aalge</i> , <i>Sterna hirundo</i> , <i>Haematopus ostralegus</i> , <i>Limanda limanda</i> (by DE in Kiel Bay). Sampling and analytical methods are reported per sample and per parameter respectively in the data.
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish.

Frequency	<p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb , mussels: Baltic Sea: 2x/year(06/12), annually • LUNG: mussels, every 2nd or 3rd year • LLUR: 2x/yr (Mar/Oct) <p>FI: 1-6 years intervals, depending on station; time series stations yearly</p>
Spatial Scope	EEZ / Whole Baltic Sea for assessment
Spatial resolution	<p><u>See map for details</u></p> <p>PBDE and BDE measured in the following areas: Great Belt, Little Belt, Kattegat, Kiel Bay, Arkona Basin, Southern Baltic Proper, Gulf of Gdansk, Bothnian Bay, the Quarck, Bothnian Sea, Archipelago Sea, Northern Baltic Proper, Gulf of Finland.</p> <p>SE: Northern Baltic Proper, Bothnian Sea, Bothnian Bay.</p>
Element / parameter	PFOS, PFOSA / Concentration of chemical/pollutant in biota
Method	<p>Measured in the following species: <i>Platichthys flesus</i>, <i>Zoarcetes viviparous</i>, <i>Clupea harengus</i>, <i>Uria aalge</i>, <i>Sterna hirundo</i>, <i>Haematopus ostralegus</i>, <i>Perca fluviatilis</i>.</p> <p>Sampling and analytical methods are reported per sample and per parameter respectively in the data.</p>
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish.
Frequency	<p>Yearly</p> <p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb , mussels: Baltic Sea: 2x/year(06/12), annually • LUNG: mussels, every 2nd or 3rd year • LLUR: 2x/yr (Mar/Oct)

Spatial Scope	EEZ / Whole Baltic Sea for assessment
Spatial resolution	<p>PFOS and PFOSA are measured in the following areas: Great Belt, Kattegat, Little Belt, Southern Baltic Proper, Bothnian Bay, Northern Baltic Proper, Bothnian Sea, Gulf of Finland.</p> <p><u>See map for details</u></p> <p>SE: Northern Baltic Proper, Bothnian Sea, Bothnian Bay.</p>
Element / parameter	HBCDD / Concentration of chemical/pollutant in biota
Method	<p>Measured in the following species: <i>Mytilus edulis</i>, <i>Platichthys flesus</i>, <i>Clupea harengus</i>, <i>Zoarcetes viviparous</i>, <i>Gadus morhua</i>, <i>Uria aalge</i>, <i>Sterna hirundo</i>, <i>Haematopus ostralegus</i>, <i>Perca fluviatilis</i>.</p> <p>Sampling and analytical methods are reported per sample and per parameter respectively in the data.</p>
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish.
Frequency	<p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb , mussels: Baltic Sea: 2x/year(06/12), annually • LUNG: mussels, every 2nd or 3rd year • LLUR: 2x/yr (Mar/Oct) <p>FI: 1-6 years intervals, depending on station; time series stations yearly</p>
Spatial Scope	EEZ / Whole Baltic Sea for assessment

Spatial resolution	<p>HBCDD: are measured in the following areas: Gulf of Gdansk, Southern Baltic Proper, Great Belt, Little Belt, Kattegat, Bothnian Bay, Bothnian Sea, Gulf of Finland.</p> <p>See map for details</p> <p>SE (HBCDD): Northern Baltic Proper, Bothnian Sea, Bothnian Bay.</p>
Element / parameter	TBT / Concentration of chemical/pollutant in biota
Method	<p>Measured in the following species: <i>Mytilus edulis</i>, <i>Zoarcetes viviparous</i>, <i>Mya arenaria</i>, <i>Platichthys flesus</i>, <i>Clupea harengus</i>, <i>Perca fluviatilis</i>.</p> <p>Sampling and analytical methods are reported per sample and per parameter respectively in the data. See HELCOM COMBINE manual.</p>
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish. See HELCOM COMBINE manual
Frequency	<p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb , mussels: Baltic Sea: 2x/year(06/12), annually • LUNG: mussels, every 2nd or 3rd year • LLUR: 2x/yr (Mar/Oct)
Spatial Scope	EEZ / Whole Baltic Sea for assessment
Spatial resolution	<p>TBT is measured in the following areas: The Sound, Kattegat, Great Belt, Southern Baltic Proper, Little Belt, Bay of Mecklenburg, Gulf of Gdansk.</p> <p>See map for details</p> <p>SE: Kattegat, Northern Baltic Proper, Bothnian Sea.</p>

Element / parameter	Metals / Concentration of chemical/pollutant in biota
Method	<p>Measured in the following species: <i>Platichthys flesus</i>, <i>Mytilus edulis</i>, <i>Zoarcetes viviparous</i>, <i>Mya arenaria</i>, <i>Perca fluviatilis</i>, <i>Macoma balthica</i>, <i>Clupea harengus</i>, <i>Gadus morhua</i>, <i>Uria aalge</i>, <i>Sterna hirundo</i>, <i>Haematopus ostralegus</i>, <i>Limanda limanda</i> (by DE in Kiel Bay).</p> <p>Sampling and analytical methods are reported per sample and per parameter respectively in the data. See HELCOM COMBINE manual.</p>
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish. See HELCOM COMBINE manual .
Frequency	<p>DE:</p> <ul style="list-style-type: none"> • UBA: kelb and mussels:Baltic Sea: 2x/year (06/12) • LUNG: mussels: every 2nd or 3rd year, annually
Spatial Scope	EEZ / Whole Baltic Sea for assessment
Spatial resolution	<p>Metals are measured in the following subbasins: Great Belt, The Sound, Southern Baltic Proper, Kattegat, Little Belt, Kiel Bay, Bay of Mecklenburg, Arkona Basin, Bothnian Bay, Bothnian Sea, Northern Baltic Proper, Gulf of Gdansk.</p> <p>See map for details</p>
Element / parameter	Radionuclides: Gamma-emitters / Concentration of chemical/pollutant in biota

Method	<p>Measured in the following species:</p> <ul style="list-style-type: none"> • Fish (measured species depends on the location): <i>Clupea harengus</i>, <i>Gadus morhua</i>, <i>Platichthys flesus</i>, <i>Pleuronectes plates</i>, <i>Perca fluviatilis</i>, <i>Esox luciu</i>, <i>Limanda limanda</i> (by DE in Kiel Bay). • Benthic invertebrates: <i>Mya arenaria</i>, <i>Macoma balthica</i>, <i>Saduria entomon</i> • Aquatic plants: <i>Fucus vesiculosus</i> <p>Measured radionuclides:</p> <ul style="list-style-type: none"> • Obligatory: Gamma-emitters: K-40, Cs-137 and other γ-emitters identifies in the γ-spectrum . <ul style="list-style-type: none"> ◦ Voluntary: <ul style="list-style-type: none"> ◦ Fish: Sr-90; natural radionuclides (e.g. Po-210) ◦ Benthic invertebrates: Sr-90; Tc-99; natural radionuclides (e.g. Po-210); Pu-239, 240; Am-241 ◦ Aquatic plants: Sr-90; Tc-99; Pu-239, 240; Am-241; natural radionuclides <p>Sampling and analytical methods are reported per sample and per parameter respectively in the MORS database. See MORS Guidelines for detailed description.</p>
QA/QC	Quality assurance is a laboratory's whole sampling and analytical process from start to finish. MORS Guidelines defines methodologies for sample treatment and analysis and intercomparison. Reported data is manually quality assured by HELCOM secretariat and results reported and verified in annual MORS EG meeting.
Frequency	Yearly
Spatial Scope	EEZ / Whole Baltic Sea for assessment
Spatial resolution	See map for details

ASSESSMENT REQUIREMENTS

Monitoring requirements and gaps

Monitoring is to be carried out to fulfill assessment requirements of HELCOM ecological objectives that are specified through HELCOM core indicators. The requirements on monitoring can include number of stations, the sampling frequency and replication.

Monitoring requirements

There is currently no common agreement within HELCOM concerning the statistical requirements to fulfill the assessment regarding contaminants (statistical power).

Gaps

Assessment of gaps has not been carried out.

Adequacy for assessment of GES (Q5d)

Monitoring should provide adequate data and information to enable the periodic assessment of environmental status, and distance from and progress towards GES as required by MSFD under Article 9 and 11.

Adequate data?

Yes

Established methods for assessment?

Yes

Adequate understanding of GES?

Yes (environmental quality standards)

Adequate capacity to perform assessments?

Yes, for HELCOM core indicators.

Assessment of natural variability (Q5e)

Quantitative. The programme generates information both of within and between - year variation, further used in power analysis .

DATA PROVIDERS AND ACCESS

Data access point	Contaminants: ICES database Radioactive substances: HELCOM MORS database
Data type (Q10c)	Processed Data sets
Data availability (Q10c)	Contaminants: ICES database Radioactive substances: HELCOM MORS database
Data access (Q10c)	Open access
INSPIRE standard (Q10c)	Not defined for concentrations of contaminants
When will data become available? (Q10c)	Contaminants: Annually Radioactive substances: Annually
Data update frequency (Q10c)	Yearly
Describe how the data and information from the programme will be made accessible to the EC/EEA	
Contact points in the Contracting parties	Contact point to national monitoring programmes will be added
Has the data been used in HELCOM assessments?	Yes, e.g. BSEP120B Hazardous substances in the Baltic Sea.

REFERENCES

COMBINE Manual

[Common implementation strategy for the Water Framework Directive \(2000/60/EC\)](#). Guidance Document No. 19. European Commission 2010. Guidance on surface water chemical monitoring under the Water Framework Directive. Luxemburg: office for Official Publications of the European Communities.

CEMP Monitoring Manual (OSPAR)

Determination of polychlorinated biphenyls (PCBs) in sediment and biota. ICES TIMES No. 53 (2013)

Determination of polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, and dioxin-like polychlorinated biphenyls in biota and sediment. ICES TIMES No. 50 (2012)

JAMP Guidelines for Monitoring Contaminants in Biota. OSPAR Commission, Ref.-No. 99-02 (Revision. 2012)

Mariani et al. (draft report) Analytical methods for Biota Monitoring under the Water Framework Directive: Existing standards and proposal for a multi-residue approach for biota EQSs. JRC Technical Reports (draft).

Monitoring organotins in marine biota. ICES TIMES No. 47 (2010)

MORS Guidelines

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