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Monitoring programme: Biodiversity - Water column habitats, Eutrophication, Hydrographical changes

Programme topic: Hydrography

## SUB-PROGRAMME: ICE

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### REGIONAL COORDINATION

The monitoring of this sub-programme is: **partly coordinated**. See International Ice Chart Working Group ([IICWG](#)), UN Expert Team on Sea Ice ([ETS](#)) and [Baltic Sea Ice Service](#).

- Common monitoring guidelines: monitoring of the whole Baltic Sea using satellite observations.
- Common quality assurance programme: missing. Every country has its own and quality assurance tools.
- Common database: missing. Every country has its own databases.

### PURPOSE OF MONITORING (Q4K)

Follow up of progress towards:

<b>Baltic Sea Action Plan (BSAP)</b>	Segments	Maritime activities
	Ecological objectives	Safe maritime traffic without accidental pollution
<b>Marine strategy framework directive (MSFD)</b>	Descriptors	D1 Biodiversity D7 Hydrographical changes
	Criteria ( <u>Q5a</u> )	1.4 Habitat distribution 1.5 Habitat extent
	Features ( <u>Q5c</u> )	Physical and chemical features: Annual and seasonal temperature regime and ice cover, current velocity, upwelling, wave exposure, mixing characteristics, turbidity, residence time  Biological features: The predominant seabed and water column habitat type(s) with a description of the characteristic physical and chemical features, such as depth, water temperature regime, currents and other water movements, salinity, structure and substrata composition of the seabed.  Other features: A description of any other features or characteristics typical of or specific to the marine region or subregion

#### Assessment of: (Q4k)

State/Impacts	<b>X</b>	temporal trends, spatial distribution
Pressures		
Human activities causing the pressures		
Effectiveness of measures		

#### Scale of data aggregation for assessments: (Q10a)

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

## MONITORING CONCEPTS

Coordination	Elements Q9a (Q5c)	Parameter Q9b	Method Q9c, Q9d	QA/QC Q9e, 9f	Frequency Q9h, 9i	Spatial resolution Q. 9g, 9i	Link to HELCOM core indicators	Link to GES characteristics Q5b	Spatial scope Q4i	Monitoring started Q4h	CPs monitoring
Other	Extent of ice cover	Other parameter	See below	National	Daily	Synthetic- aperture radar (SAR) data - resolution 100 m, other satellite 250 m – 1 km	-	-	EEZ	Systematic observations: late 1800's  First near- realtime ice charts: 1915	All Contracting Parties monitoring but only FI and SE the whole sea
Other	Ice thickness	Other parameter	See below	National	Daily	Synthetic- aperture radar (SAR) data - resolution 100 m, other satellite 250 m – 1 km	-	-	EEZ	1915	All Contracting Parties monitoring but only FI and SE the whole sea

### Brief description of monitoring

Detailed information on monitoring frequency and spatial resolution has not yet been collected from all countries but will be added.

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**Element / parameter**

**Extent of ice cover**

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<b>Method</b>	Extent of ice cover is measured using satellite observations. The whole Baltic is monitored by Finland ( <a href="#">FMI</a> ) and Sweden ( <a href="#">SMHI</a> ). The rest of Contracting Parties monitor national waters.  Synthetic-aperture radar (SAR) satellite image is used. The algorithm, which combines SAR data and ground truth, provides ice thickness information in 500 m resolution. The products are provided operationally and are available for users shortly after the SAR data is available.
<b>QA/QC</b>	It follows nationally accredited methods and results are compared internationally.
<b>Frequency</b>	<u>Extent</u> of ice cover maps operationally produced every time a SAR image has been received.
<b>Spatial Scope</b>	Whole Baltic Sea.
<b>Spatial resolution</b>	The algorithm, which combines SAR data and ground truth, provides ice coverage information in 500 m resolution.

<b>Element / parameter</b>	<b>Ice thickness</b>
<b>Method</b>	Ice thickness is measured using satellite observations and in-situ measurements. The whole Baltic is monitored by Finland (FMI) and Sweden (SMHI). The rest of the Contracting Parties monitor national waters.  Synthetic-aperture radar (SAR) satellite image is used. The algorithm, which combines SAR data and ground truth, provides ice thickness information in 500 m resolution. The products are provided operationally and are available for users shortly after the SAR data is available.
<b>QA/QC</b>	It follows nationally accredited methods and results are compared internationally.
<b>Frequency</b>	<u>Ice Thickness Charts</u> are operationally produced every time a SAR image has been received, using the latest available ice chart as an input.
<b>Spatial Scope</b>	Whole Baltic Sea.
<b>Spatial resolution</b>	The algorithm, which combines SAR data and ground truth, provides ice thickness information in 500 m resolution.

## 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.

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**Monitoring requirements**

To produce a comprehensive overview for the [HELCOM Environment fact sheet Ice Season](#):

Maximum extent of sea ice in the Baltic should be monitored with Baltic wide comprehensive earth observations (Synthetic-aperture radar (SAR)) during winter season. Temporal frequency of observations should be at least once a week. Spatial coverage should be the whole Baltic Sea and resolution 1 km.

Sea ice thickness in the Baltic Sea should be monitored with earth observation data combined with in-situ measurements of ice thickness.

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**Gaps**

There are no gaps, the monitoring covers the whole Baltic Sea with sufficient spatial and temporal resolution.

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### 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 the MSFD under Article 9 and 11.

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<b>Adequate data?</b>	Yes
<b>Established methods for assessment?</b>	Yes
<b>Adequate understanding of GES?</b>	Yes
<b>Adequate capacity to perform assessments?</b>	Yes

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### Assessment of natural variability ([Q5e](#))

Expert opinion.

DATA PROVIDERS AND ACCESS

<b>Data access point</b>	National databases
<b>Data type (Q10c)</b>	Data products Modelled data
<b>Data availability (Q10c)</b>	Data: <a href="#">SAR-Based Ice Thickness Charts</a> from Finnish Meteorological Institute and <a href="#">Ice Conditions</a> from Finnish Meteorological Institute.  Aggregated data products: annual <a href="#">HELCOM environment fact sheet</a> and <a href="#">MyOcean catalogue</a> .
<b>Data access (Q10c)</b>	Open access
<b>INSPIRE standard (Q10c)</b>	
<b>When will data become available? (Q10c)</b>	
<b>Data update frequency (Q10c)</b>	Weekly, Yearly
<b>Describe how the data and information from the programme will be made accessible to the EC/EEA</b>	Weekly update cycle of operational data, annual HELCOM environment fact sheet assessment.
<b>Contact points in the Contracting parties</b>	Contact point to national monitoring programmes will be added
<b>Data is used in the following Baltic Sea Environment Fact Sheets (BSEF)</b>	Ice season

REFERENCES[FMI Polar View Products](#)[SMHI Polar View Products](#)[MyOcean catalogue](#).

