



Baltic Marine Environment Protection Commission

Ad hoc Seal Expert Group
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SEAL 9-2015, 5-1

Document title	Development of a HELCOM database for seals
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Background

HELCOM has received co-financing from the EU for the BalticBOOST project. The project started in September 2015, and will finish in December 2016.

The project includes the work package 'Database and data arrangements for coastal fish, birds and seals' (WP 1.2). Partner to the project concerning seals is Sweden SMNH, Mr. Tero Härkönen and AU, Mr. Anders Galatius (subcontractor). The HELCOM Secretariat contact and coordinator for both WPs is Joni Kaitaranta.

The project aims to develop a database that will provide for the core indicator needs in the long-term. At present there are no established long-term data arrangements for seals in HELCOM, however during the HELCOM [BALSAM](#) project (2013-2015) the development of a database for seals was initiated and the [project results have been published on the HELCOM website](#). The BalticBOOST WP 1.2 tasks include developing both the database format, reporting guidelines as well as a data entry tool. These tasks are to be carried out in cooperation with HELCOM SEAL EG. The database is planned to be hosted at the HELCOM Secretariat.

The project is also to develop a system for regular data product extraction from the database based on the assessment protocols defined in the core indicators. The data products are to be extracted to the HELCOM Map and Data service.

Action required

The Meeting is invited to provide guidance to the development of a HELCOM database for seals for which the BalticBOOST WP 1.2 provides resources.

Current status of HELCOM seal databases/datasets

BALSAM project (2013-2015) contained a work package that provided distribution (GPS tracks) and abundance (counts per area) database for grey seal, harbour seal and ringed seal. The databases and resulting data products are available from [HELCOM web page](#).

Abundance data

The abundance data was made available in three excel files: one file per species. Each file contains one table which contains counts of seals aggregated to counted area (Figure 1). The files contain following variables:

Variable	Explanation	Data type
Country	Country/Countries within the counted area	Text
Area	Name of the counted area	Text
HELCOM subbasin(s)	HELCOM subbasins that are overlapping the counted area	Text
Management unit	Management unit	Text
Year	Counted year	Number
Date of survey	Date of count	Date
Count	Number of individuals counted	Number
CV	Confidence interval(?) (Only for ringed seal)	Number
Area covered	Covered area (in km ² or km) (Only for ringed seal)	Number

	A	B	C	D	E	F	G	H	I
1	Grey Seal Mout								
2	Country	Finland/Sweden		Finland/Sweden		Sweden		Finland	Est
3	area	Bothnian Bay		Sea of Bothnia		Central Sweden		thwestern Finnish Archipe	
4	HELCOM sub-basin(s)	Bothnian Bay, The Quarck		Bothnian Sea		hern Baltic Proper, Wester		Sea, Northern Baltic Pro	
5	Management Unit	Baltic		Baltic		Baltic		Baltic	
6		Date(s) of survey	Count	Date(s) of survey	Count	Date(s) of survey	Count	Date(s) of survey	Count
7	extend before this?								
8	2003		710		855		3980		6880
9	2004		1330		870		3900		7735
10	2005		1265		606		4462		8040
11	2006		789		1159		5350		9870
12	2007		1049		1834		6349		8516
13	2008		1340		2483		4721		8308
14	2009		1154		1460		5804		6701
15	2010		642		1288		7508		8361
16	2011		1667		1494		8494		5994
17	2012		1042		2647		10224		8285
18	2013		659		2014		10626		9248
19	2014		1911		2464		9573		9493

Figure 1. Screenshot of grey seal database.

The data was reported in BALSAM project until the end of 2014. Based on the reported data, time trends of seal counts can be presented by area (Figure 2).

GREY SEAL

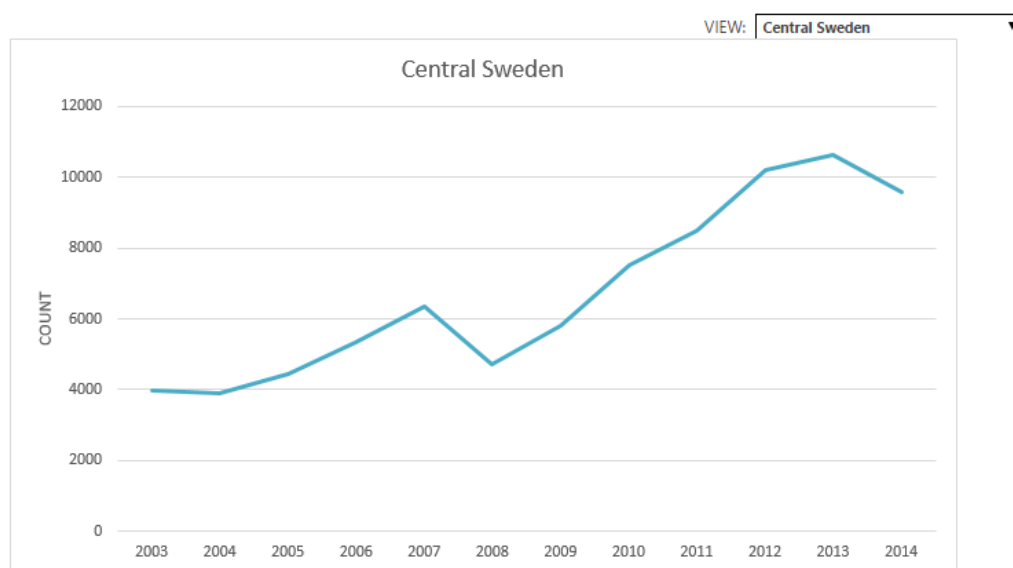


Figure 2. Grey seal counts in Central Sweden area 2003-2014.

Distribution data (GPS tracks)

Distribution data (GPS tracks) was made available from Finland, Estonia, Sweden and Denmark via the BALSAM project based on data collected with seals equipped with GPS tracking devices. The reported data was pointwise observations of seals containing following variables:

Variable	Explanation	Data type
ID	ID of a grid cell based on EEA 5x5 km grid	Number
XMIN	Grid cell bounding box minimum value of X-coordinate	Number
YMIN	Grid cell bounding box minimum value of Y-coordinate	Number
Lat	Latitude coordinate (WGS 84 decimal degrees) of seal individual	Number
Lon	Longitude coordinate (WGS 84 decimal degrees) of seal individual	Number
Species	Species of seal individual: Ph / Hgm	Text
Age	Age of seal individual: Adult / Subadult / Juvenile	Text
Month	Month of observation	Number
Event		Number

For visualisation purposes, the (GPS point data was gridded to 5x5 km grid cells (Figure 3).

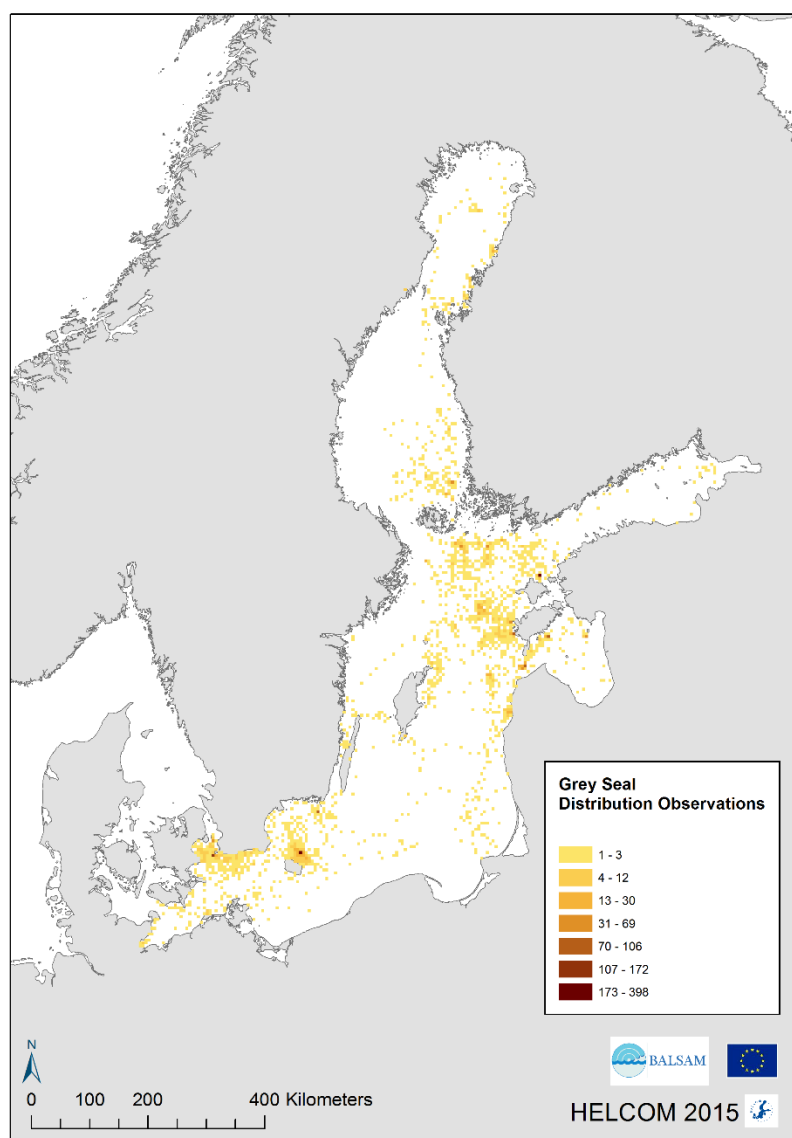


Figure 3. Grey seal distribution based on reported information.

Seal health and reproductive status

Currently there is no database on seal health and reproductive status data. Processed data on blubber thickness is collected for the seal health indicator and pregnancy rates for the reproductive status indicator. The current data collection is based on national data from Sweden and Finland but in future evaluations will include also German, Estonian and Polish data. Initiatives have been taken to compile national data annually by the HELCOM Seal Expert Group.

Options for further development within BalticBOOST project

Requirements

The BalticBOOST WP 1.2 tasks include developing:

- Database format
- Reporting guidelines
- Data entry tool
- System for regular data product extraction from the database based on the assessment protocols defined in the core indicators. The data products are to be extracted to the HELCOM Map and Data service.

Database format

Abundance data

Current data structure used in BALSAM database (Figure 1 screenshot from excel file) is targeted for reporting of aggregated data using predefined seal monitoring areas. These areas are not consistent with HELCOM subbasins (e.g. area "Central Sweden" falls partly into HELCOM subbasins "Åland Sea", "Northern Baltic Proper" and "Western Gotland Basin". The management units are aggregations of HELCOM subbasins thus providing even more coarse spatial scale than HELCOM subbasins. The database is providing data to indicators on population trends, abundance and distribution of seals.

By requiring reporting of coordinates of point observations (count sites/haul-out sites) the pointwise data can be aggregated and analysed on any aggregation level (5x5/10x10 km grid, HELCOM subbasins, Seal monitoring areas, Seal management units) as needed. Reporting of point observations would also make possible mapping of seal distribution based on seal counts.

Development suggestion regarding data format:

Adjust the current data format to enable reporting of pointwise abundance observations with coordinates. This would allow visualization of abundance per HELCOM subbasin as map products. The resulting increase of the detail level of reported data would allow abundance counts to be summed up to different aggregation levels (Area, HELCOM subbasin, Management unit) as needed. In addition the format would be adjusted to suit tabular database approach (e.g. areas as rows and numeric fields accept only numbers) and harmonize with other relevant formats and vocabularies (e.g. OSPAR).

Preliminary draft format: Green rows represent new/modified variables.

Variable	Explanation	Data type
Species	Counted species	Text
Lat	Latitude coordinate (WGS 84 decimal degrees) of count site	Number
Lon	Longitude coordinate (WGS 84 decimal degrees) of count site	Number
Area	Name of the area where counts site falls into	Text
Country	Country of the counts site	Text
HELCOM subbasin	HELCOM subbasin where counts site falls into	Text
Management unit	Management unit where counts site falls into	Text
Year	Counted year	Number
Date of survey	Date of count	Date
Count	Number of individuals counted	Number
CV	95 % Confidence	Number
Method	Counting method	Text

Estimate	Estimated or actual count	Yes/No
Area_line	Area covered (km)	Number
Area_poly	Area covered (km2)	Number

Distribution data (GPS tracks)

Current data structure used in BALSAM database for GPS tracks is targeted for reporting of GPS tracks in 5x5 km grid including also pointwise coordinates. Thus the pointwise data can be aggregated and analysed on any aggregation level (5x5/10x10 km grid, HELCOM subbasins, Seal monitoring areas, Seal management units) as needed. Therefore no major changes are suggested for the data format, except possible harmonisation with other relevant database e.g. by making use of controlled vocabularies for species name. Distribution GPS data is providing supporting information to indicators on population trends, abundance and distribution of seals.

Preliminary suggested data format for distribution (GPS tracks) data:

Variable	Explanation	Data type
ID	ID of a grid cell based on EEA 5x5 km grid	Number
XMIN	Grid cell bounding box minimum value of X-coordinate	Number
YMIN	Grid cell bounding box minimum value of Y-coordinate	Number
Lat	Latitude coordinate (WGS 84 decimal degrees) of seal individual	Number
Lon	Longitude coordinate (WGS 84 decimal degrees) of seal individual	Number
Species	Species of seal individual: Ph / Hgm	Text
Age	Age of seal individual: Adult / Subadult / Juvenile	Text
Month	Month of observation	Number
Event		Number

Seal health and reproductive status

Currently there is no established database format available for seal health and reproductive status data.

To support the indicator updating work, a format for reporting blubber thickness observations should be developed based on data needs of the indicators (Nutritional status of marine mammals and Reproductive status of marine mammals). The first step is to agree on required parameters and metadata.

Reporting guideline (Abundance data)

HELCOM Seal monitoring guideline would be completed by adding the data format and reporting guideline.

Data entry tool (all databases)

Data entry and visualisation tool will be developed and hosted by the Secretariat. The solution will be based on Oracle database and accessible online. Data entry tool can be form-based or excel import, depending on amount of number of rows typically reported.

Visibility of the data can be controlled, e.g. reported raw data can be restricted to be visible only for the logged in user and only aggregated reports made publicly available.

System for regular data product extraction (all databases)

Based on the reported information, the data can be extracted and joined to HELCOM subbasins map to enable spatial display of reported information.

Interactive reports can be used for time series visualisation of reported data variables e.g. by management unit, by year etc.