# "SYNERGIES IN REGIONAL MONITORING AND RECOMMENDATIONS TO IMPROVE DATA ACCESSIBILITY, COHERENCE AND COMPATIBILITY TO ENHANCE CAPACITY TO CARRY OUT REGIONAL ASSESSMENTS"
# BALSAM WP2 ACTION/WORK PLAN: DRAFT

This is a second draft of the BALSAM WP2 action/work plan. The document is a work plan for further collaboration between HELCOM and ICES regarding monitoring data management/infrastructure and data on fish/fisheries in the Baltic. The work plan will be finalized in March 2015 and will be used by the HELCOM Secretariat to further operationalize the action points identified, in discussion with the ICES Secretariat and as advised by the HELCOM State and Conservation group. The work plan has been drafted by BALSAM WP2, with ICES as a subcontractor.

## Contents

# Executive summary

Table 1. Summary of action points.

| Action point | Issue identified | Suggested options for solutions | Body/ person responsible | Timefra me | Additional information |
|---|---|---|---|---|---|
| 2.1.a | Investigating how synergies could be achieved for fisheries and environmental monitoring | A high level cross-ministry workshop under the auspices of HELCOM and ICES should be convened to agree funding approaches, responsibilities and potential partnerships for research surveys in the Baltic Sea. | HELCOM/IC ES | 2015? | The workshop should be tasked to provide specific tangible solutions to making the integrated monitoring of state a reality. Members of the panel should come from contracting parties and be empowered to make high level recommendations |
| 2.1.b | Investigating how synergies could be achieved for fisheries and environmental monitoring | An exploratory study on the options for using new technologies and boats of opportunity (including fishing vessels) for cost efficient monitoring for the MSFD. | ICES? | 2015? | |
| 2.1.c | Investigating how synergies could be achieved for fisheries and environmental monitoring | A study group that reconciles pragmatic monitoring needs (in terms of pressure and status of the environment) with the spatial and temporal coverage of fisheries research surveys, with particular emphasis on what is required in the northern Baltic Sea and assessing all fishable habitat. | ICES? | 2015? | |
| 2.2.a | Enhancing coordination in the cross-border use of research vessels | Possibilities to further enhance cooperation in the use of research vessels should be discussed in HELCOM STATE by sharing information on planned surveys on the HELCOM platform. | HELCOM | 2015? | |
| 2.2.b | Currently the application | Possibilities to simplify access to waters/cruises | HELCOM | 2015 | |

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| | procedures according to Recommendation 12/1 are long and heavy | should be explored. The proposal of revision of HELCOM Recommendation 12/1 should be discussed in STATE. | | | |
| 3.1. | Guidelines for data management needed to ensure that COMBINE data is reported in a harmonized, comparable way to the database. | Development of data management guidelines, "toolkit", including inventory of standards and tools available, e.g. unit conversion tables. | ICES Data center | 2015? | ICES to develop guidelines, which should be presented to and adopted in HELCOM STATE? |
| 3.2.a | Discrepancies between data reported to COMBINE programme and data reported by CPs e.g. in MORE | Harmonization of monitoring station concepts and practice of labeling data to regional/national | (ICES Data center / Contracting Parties / HELCOM Secretariat) | 2015? | Data from the COMBINE database missing |
| 3.2.b | Consistent approach to labelling of assessment units needed in COMBINE | Labelling automatically all data points to HELCOM assessment units when adding to database. | ICES Data center | 2015? | |
| 3.3.a | To increase the amount of data available for regional indicators/products, other formats (besides COMBINE) could be accepted to database | Accepting data in ODV format to HELCOM database (being used in SeaDataNet and EMODnet Chemistry) | ICES Data center | 2015? | Quality control important and changes to system would be needed to accept other formats. |
| 3.3.b | To increase the amount of data available for regional indicators/products | Accepting data via web services from SDN/EMODnet to be incorporated to HELCOM database (data origin flag will be required) | ICES Data center, EMODnet portals? | 2015? | Primary data would remain at institutes connected to SDN and EMODnet, and a specific process would harvest data for a product. |
| 3.3.c | XML based outputs used in some countries nationally, not compatible with COMBINE | Explore opportunities where CPs have systems in place, to harvest data provided as XML outputs to be imported to HELCOM/COMBINE | ICES Data center, Contracting Parties | 2015? | |

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| | database | database | | | |
| 3.4.a | Reporting to COMBINE should be in line with data requirements for indicators | Definitions of data requirements for core indicators and proposals for improvements should be made | CORESET II | 2015? | |
| 3.4.b | The COMBINE reporting format should be updated based on future needs | Modification of reporting format. | ICES Data center | 2015 | ICES to update reporting format, which would then be presented to HELCOM groups? |
| 3.5.a | Currently data from EIONET not available for COMBINE and HELCOM assessments | Data reported to EEA EIONET would be incorporated in HELCOM assessment data products (with possible duplicate removal) | ICES Data center | 2015? | CPs could report to EEA and data would be incorporated into COMBINE database, but it would still be preferable to report through ICES |
| 3.5.b | Automating submission and resubmission of datasets would help ease the flow of data to COMBINE | Explore project funding opportunities to expand the automated submission/resubmission of COMBINE datasets. | HELCOM/ICES | 2015? | |
| 3.6.a | Data views for COMBINE data missing | Defining data views for data extraction and processing for core indicator requirements | CORESET II | 2015? | Agreed automated methodology needed |
| 3.6.b | Data views for COMBINE data missing | Cataloguing the data products used in the indicators to ICES geoportal. | ICES data center / HELCOM secretariat | 2015? | |
| 4.a | Fisheries data needed for salmon and sea trout indicators | WGBAST to carry out the statistical calculations needed for the salmon- and sea trout core indicators | ICES/HELCOM | | |
| 4.b | VMS data needed for HOLAS, BSPI etc. | ICES to be used by HELCOM for processing of VMS data to data products | ICES/HELCOM | | Data calls need to be very specific to the use cases |
| 4.c | Trawl survey data needed for indicators Proportion of large fish in the community and Mean maximum | Development of data products from trawl survey data by ICES to be used in HELCOM assessments. | ICES/HELCOM | | |

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| | length. | | | | |

# 1. Introduction

This action plan focuses on ways to improve integrated monitoring of the Baltic Sea as well as data infrastructure and management processes, to ensure smooth data flows from monitoring to indicators and assessments. It has been developed by the EU co-funded Baltic Sea Pilot Project: Testing new concepts for integrated environmental monitoring of the Baltic Sea (BALSAM 2013-2015)[1]. The action plan has been drafted by ICES, as a subcontractor, with the support from the WP2 task force consisting of SYKE, SMHI, IMGW and HELCOM Secretariat. The proposed action points are to be presented to relevant HELCOM and ICES working groups for further elaboration and adoption.

Coordinated monitoring of physical, chemical and biological variables of the open sea of the Baltic Sea has been carried out since 1979 e.g. within COMBINE monitoring. The Baltic Sea Action Plan (BSAP), adopted in 2007, further emphasizes the need to monitor and assess the change in the marine environment and the progress towards the visions, goals and objectives of the BSAP. The HELCOM Monitoring and Assessment Strategy was revised in 2013 to support an indicator-based monitoring and assessment approach and a regionally coordinated implementation of the BSAP and the EU MSFD. The current monitoring programmes reflect the state of the art of the HELCOM indicator system and the varied maturity of the indicators. To meet the requirements of the BSAP and the MSFD, the associated revision of existing and establishment of new HELCOM monitoring is a continuous process, which started in 2014. The HELCOM Monitoring Manual[2], which was published in October 2014, gives an overview of current environmental monitoring in the Baltic and forms a basis for future work.

The aim of this action plan is to address and improve the monitoring data management and infrastructure, and to increase the availability and accessibility of data and information to the HELCOM assessment processes to follow-up the goals and objectives of HELCOM BSAP and the EU MSFD. Currently the data from COMBINE monitoring is stored at the ICES database. Also, for fisheries related data and assessments, information and products from ICES are needed.

In addition the action plan highlights the challenges faced in moving towards a more integrated monitoring approach, opportunities arising from synergies between countries and disciplines i.e. fisheries and environmental surveys, as well as harmonisation potential between Contracting Parties spanning two regional seas.

# 2. Towards further integrated monitoring

## 2.1. Synergies for environmental and fisheries surveys and monitoring needs

The HELCOM Monitoring Manual[3] was published on 15 October 2014 and as a follow-up HELCOM is developing guidelines for the scope and coverage of HELCOM monitoring of the Baltic Sea. From the MORE "Overview of current monitoring",[4] it is apparent that the coastal areas of the Baltic are

[1] http://helcom.fi/helcom-at-work/projects/balsam/
[2] http://www.helcom.fi/action-areas/monitoring-and-assessment/monitoring-manual/
[3] http://www.helcom.fi/action-areas/monitoring-and-assessment/monitoring-manual/
[4] https://portal.helcom.fi/Archive/archive2/MORE 5-2013_3-1 Overview of the current monitoring activities.pdf

monitored more frequently and at a higher spatial resolution than the offshore areas. For certain descriptors the monitoring of the offshore areas (i.e. non WFD areas) must likely improve and the existing fish surveys offer an opportunity. There also appears to be a gradient in sampling intensity from lower in the North towards higher intensity in the south.

Fish surveys are currently funded to monitor the state of the fish community. As they are currently designed, they could not be easily converted to carry out process monitoring (e.g primary or secondary production), but could be developed to increase their utility for the monitoring of state (e.g. marine litter, chlorophyll, nutrients, abundance of various other organisms, marine mammals, zooplankton etc). There are challenges to adapting the surveys, which include:

- Ensuring fish time series remain fit for purpose (no unacceptable loss of precision in time series)
- Vessel size and utility (some vessels may not be able to hold more equipment, or more staff)
- Vessel operating procedures (e.g. working hours of crew, national or institutional regulations)
- Standardising and calibrating methods and staff training if sharing monitoring of areas (each Contracting Party monitors all variables across allocated areas)
- Ensuring equitable resourcing and developing interdependency if sharing sampling/monitoring (Contracting Parties take on the responsibility for sampling/monitoring specific variables based on their available vessel/expertise) – see Box below
- Any clash of survey protocols (e.g. the act of fishing invalidates sea mammal observations for 60 minutes after fishing has ceased, or grab sampling in an area that has just been fished).

Some solutions include:

- A broad overview review workshop of “Fisheries and Environmental Monitoring Needs for the Baltic Sea” jointly hosted by ICES and HELCOM and using BALSAM, and MSFD monitoring objectives as a foundation. The workshop should be tasked to provide specific tangible solutions to making the integrated monitoring of state a reality. Members of the panel should come from contracting parties (representing appropriate ministries and institutes) and be empowered to make high level recommendations.
- HELCOM and ICES work jointly through their links with DGMARE, DGENV and member countries (Contracting Parties) to ensure that EMFF funding for the reformed CFP can be used to monitor ecosystem state, as expected through the Ecosystem Approach of European fishing policy.
- HELCOM explore the potential use of new technologies (drones, autonomous underwater samplers, vessels coupled to remote sensing, portable CTDs) on fisheries research vessels. The aim of this would be to reduce the required staffing at sea, and yet enable appropriate monitoring of state to take place.
- Fisheries research vessels increase the use of real time/underway monitoring (surface nutrients, observers, plankton samplers such as CUFES, ferry boxes) to enable monitoring of state to occur with minimum disruption of the investigations of fish.
- A robust inter calibration programme and regular at sea staff training exercises across the relevant disciplines to ensure monitoring of more state variables can take place, even using smaller vessels.

- There is less coverage by fisheries research vessels in the offshore northern Baltic (see comments below), HELCOM should explore innovative methods to collect data with/from commercial fishing vessels and recreational boats (boats of opportunity).

The fish surveys operate in specific seasons and specific areas. The trawl surveys sample stations across the southern Baltic. A crucial part of the MSFD is the need to consider a range of specific habitats and the trawl surveys, by definition only cover "fishable habitat" that is occupied by commercial offshore species. Thus any adaption of the surveys needs to consider the addition of extra stations to reflect the diversity of habitats, and probably the addition of different sampling techniques. The acoustic surveys in the autumn, cover a wider area, including the northern Baltic but only stop to carry out pelagic sampling of acoustic targets. This wider spatial coverage offers an opportunity for increased sampling of variables on the surface or in the water column, but these surveys are unlikely to provide opportunities to monitor the seabed or the benthic state.

The revision of HELCOM monitoring is an ongoing process and the minimum requirements for monitoring for the BSAP objectives and MSFD across the descriptors have not yet been defined for all indicators and supporting parameters. Thus it is at this time not possible to fully compare monitoring needs with the opportunities offered by the existing coordinated surveys of offshore fish.

The ability to observe and describe components and processes in an ecosystem depends both on their scale of the natural variation (in space and time) and the resolution at which observations are being made. This needs to be considered in the context of the objectives of the survey, to ensure that planning the survey and in the subsequent analyses is possible. A method to assess the likely opportunities for integration is the creation of a time and space scale variation matrix. The information is presented as a time/space matrix representing a map of the different scales of variation (quick vs. slow and close vs. distant) in the components and processes. The variables can be sorted along these axes. Based on this knowledge recommendations can be made about the frequency and scale of observations in time and space needed to describe the temporal and spatial variation. This can be used to provide guidelines about for which survey activities the sampling in time and space can be reduced, and for which it must be increased.

The trawl surveys in the south can increase the variables that they record, to include records on epifauna, marine litter etc. It would probably be possible to include benthos sampling using grabs or sledges. The issue of the diversity of habitats sampled would need to be assessed, with the consideration being given to the maintenance of the fish time series used in stock assessments. The proposal to create a northern Baltic trawl survey is probably relevant. Many of the fish top predators in the north Baltic are not being sampled in a way to consider the biodiversity, ecosystem function or foodweb issues. A new, or extended survey, would also allow recording of seabed litter to be carried out across the Baltic. As mentioned above, novel use of recreational boats or commercial fishing vessels could also aid in covering this gap of monitoring the offshore northern Baltic. It is currently unclear which methods should be used and whether the crustaceans should be targeted by monitoring as well.

The Monitoring Overview[5] highlighted a low number of annual samples of zooplankton and phytoplankton. This could be greatly improved through sampling of plankton (automated or manual) during the acoustic survey or working with ferry-boxes or boats of opportunity.

[5] https://portal.helcom.fi/Archive/archive2/MORE 5-2013_3-1 Overview of the current monitoring activities.pdf

Thus opportunities exist for the fish surveys to add to the monitoring for the BSAP and MSFD in the Baltic. It is clear that the offshore north Baltic has the greater requirement for increased sampling. Sampling should be consistent and regular over the chosen sampling period and resolution. Ad hoc sampling is difficult to integrate into a monitoring programme or with ongoing parallel surveys. When the priorities have been highlighted by HELCOM, further more tangible recommendations can be made. However it should be noted that in the recent consultant report to the Commission "Scientific data storage and transmission under the future Data Collection Framework Feasibility Study"[6] the scenarios considered do not give much prominence to environmental data as part of, or a supplement to, the 'fisheries' data flows.

2.1. Action points:

a. Once monitoring objectives for the BSAP and MSFD have been defined, a high level cross-ministry workshop under the auspices of HELCOM and ICES should be convened to agree funding approaches, responsibilities and potential partnerships for research surveys in the Baltic Sea.
b. An exploratory study on the options for using new technologies and boats of opportunity (including fishing vessels) for cost efficient monitoring for the MSFD.
c. A study group that reconciles pragmatic monitoring needs (in terms of pressure and status of the environment) with the spatial and temporal coverage of fisheries research surveys, with particular emphasis on what is required in the northern Baltic Sea and assessing all fishable habitat.

## 2.2. Coordinated use of research vessels

Further coordination in the use of research vessels in the Baltic could improve the cost-efficiency and coverage of surveys. BALSAM WP5 has collected information regarding environmental research vessels and planned surveys in the Baltic on the HELCOM website. Possibilities for further coordination should be discussed in relevant HELCOM working groups.

**Regional monitoring cooperation: research vessel use Finland- Sweden**

A joint research vessel time initiative has been started in 2014? between Finland (SYKE) and Sweden (SMHI) using R/V Aranda (SYKE/Finland). This cooperation will allow Sweden to better fulfil their monitoring commitments and will also ensure SMHI and SYKE can develop and ultimately merge respective countries monitoring programmes, so as to ensure:

- Share the use (and costs) of R/V Aranda
- Coordinate sampling and monitoring activities (i.e. common monitoring expeditions)
- Share equipment, analytical methods and even staff resources
- Store and evaluate data together, and produce

*1R/V Aranda, Photo Ilkka Lastumäki*

[6] http://ec.europa.eu/fisheries/documentation/studies/scientific-data-storage/index_en.htm

common reports on the status of the seas

Initial evaluation of this cooperation will be done during the autumn of 2014, with the aim of signing an extended cooperation agreement for another 4-5 years.

2.2. Action points:

a. Possibilities to further enhance cooperation in the use of research vessels should be discussed in HELCOM STATE by sharing information on planned surveys.
b. Possibilities to simplify access to waters/cruises should be explored.

# 3. Improving reporting infrastructure and data flows

Making the optimal use of environmental monitoring, and the data derived from it, means ensuring an effective data flow at each step. From the collection, to making these data available, to the quality control, processing and publication of data products that feed indicators and assessments – all these aspects need to be considered.

This chapter focuses on providing recommendations on how to improve identified issues related to indicator data flows (a list of indicators available in Annex 2). This applies to COMBINE data currently stored at ICES data center. A specific action point addresses certain parts of the data flow process (Figure 1).

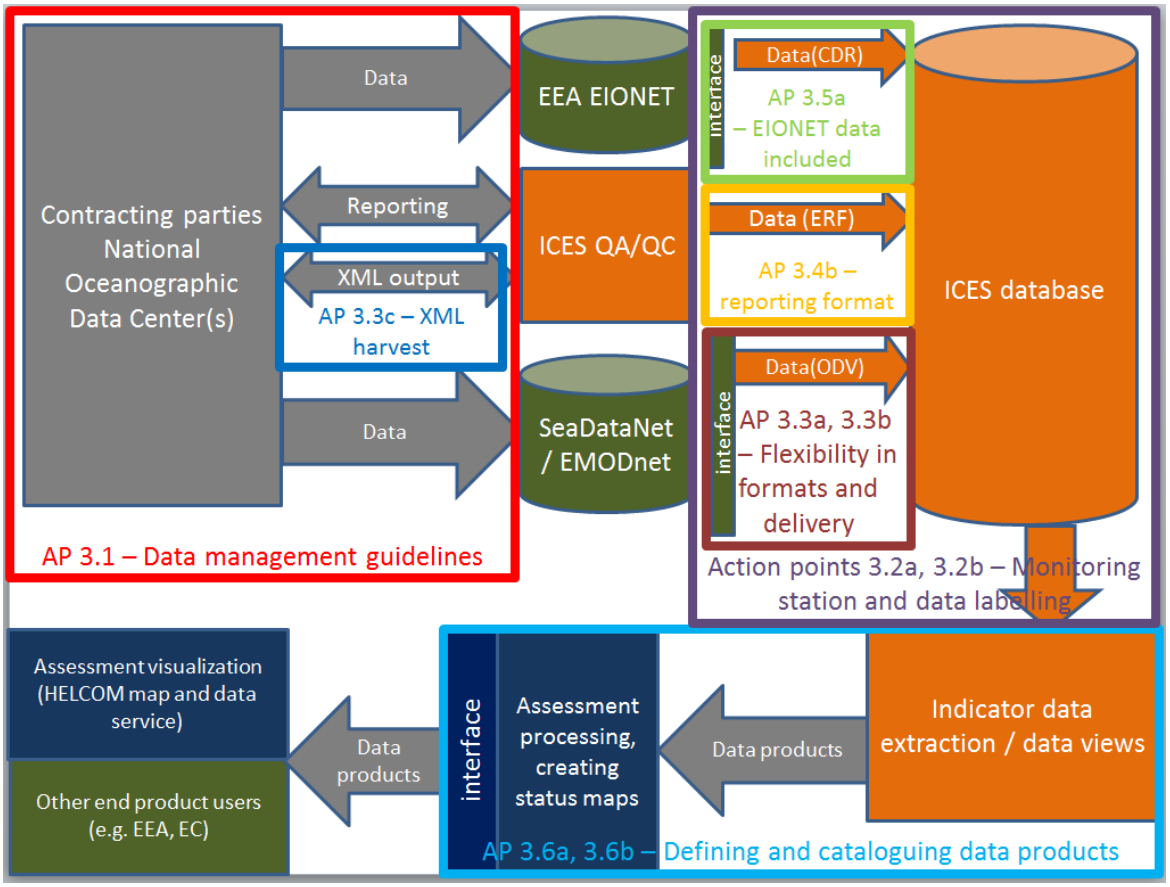

*Figure 2 Indicator data flow process for non-fisheries indicators including Action Points (APs 3.1-3.6) listed in chapter 3*

## 3.1. Data management guidelines (to supplement monitoring guidelines)

The HELCOM monitoring manual as well as guidelines, such as the COMBINE manual is an effective tool for coordinating regional monitoring across the Baltic when applied correctly and followed by Contracting Parties it helps ensure that the data are of suitable quality and comparability. The COMBINE manual is quite extensive in dealing with the scientific technical aspects of the methods of monitoring and recording of observations. However, with the increasing reliance on database and programming expertise to make data available/report these data, it is clear that a different type of supplemental guideline is needed to aid the collection and preparation of data from a more technical data management perspective and to ensure the COMBINE manual is interpreted correctly by scientific and technical staff alike.

This would be a 'toolkit' to signpost what technology/data standards are in use, and give an inventory of tools useful for these purposes to aid the database specialists in making efficient use of the community tools i.e. there are a number of unit conversion tables and calculators, species lookups etc. that are referenced in COMBINE but could be made available in an easier way and with programming interfaces (API's) so a Contracting Party could query them directly from their own databases (see Annex 1: Data management guideline examples ). In this way the preparation of interoperable data could be handled in a consistent way across the HELCOM area.
One of the recurring problems when translating from a Contracting Party level to a regional level is the consistency of terminology and mapping from one level to another. The toolkit would also compile appropriate regional/international vocabularies for the various disciplines, and provide examples of how to implement them from a database or programmatic viewpoint. This would aid in ensuring the mappings are transparent and based on the latest information.

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| 3.1. Action point:<br><br>- Development of data management guidelines, "toolkit", including inventory of standards and tools available, e.g. unit conversion tables (ICES). |

## 3.2. Data labelling to ensure applicability to data flows

The concept of monitoring has evolved over time, and as resources become scarcer the demand to do more with less has increased. This has meant that data derived from opportunistic, project based, sporadic and remote monitoring have become an important component in what is considered applicable in an assessment dataset. This does, however, create a data management challenge as many of these data are not labelled by Contracting Parties as part of a monitoring programme, or only labelled as part of a national programme, and in some cases the data do not come directly from the contracting party. It therefore becomes increasingly difficult to relate these data to the COMBINE monitoring programme, and other monitoring programmes under EU directives etc. This was evident from the some of the differences shown in the MORE maps of overviews of monitoring stations provided by Contracting Parties and ICES in the BALSAM interim

report[7]; Not all the differences can be attributed to labelling as in the ICES station datasets 'deprecated' stations that have measurements are included, whereas MORE overview's were related to currently active stations. However, there is clear evidence that in some of the ICES prepared overviews data were 'filtered' out as they were not associated to the HELCOM COMBINE programme, or related to a HELCOM monitoring station.

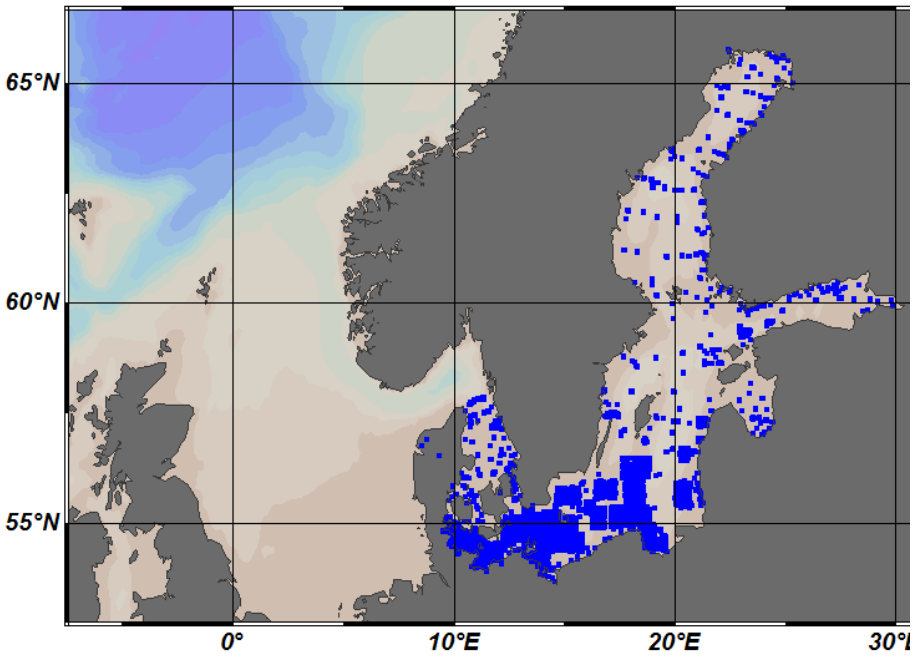
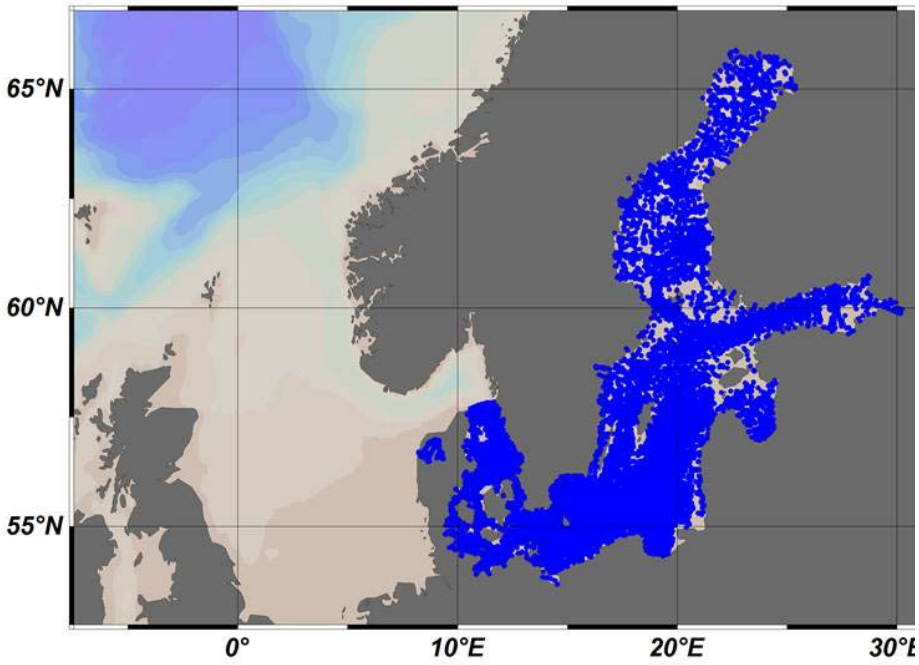



*Figure 3. BALTIC data classified using HELCOM COMBINE stations in the ICES station dictionary*




[7] https://portal.helcom.fi/meetings/BALSAM%202-2014-110/MeetingDocuments/BALSAM%20Interim%20report%20May%202014_final.pdf

*Figure 4. BALTIC data classified using HELCOM sub-basins (not linking to station dictionary)*

There is a challenge and an opportunity – changes to the monitoring programme take time to be reflected in the resultant data flow. There is therefore a pressing need to provide guidance and tools i.e. an online controlled vocabulary of monitoring stations and their attributes to aid in the management of monitoring stations at a national and regional level, as well as in the correct labelling of data. This is a challenge where new monitoring sources need to be harmonized with existing standards and methods. This is specifically important for MSFD where monitoring data derived from Article 11 will be related to the evidence base used in determining GES. ICES is leading an initiative together with SeaDataNet, EMODnet, EEA (WFD, MSFD and INSPIRE[8]) to develop a model for harmonizing monitoring station concepts and how they can be managed in a distributed network.

For HELCOM, and for MSFD reporting, a consistent approach to the labelling of assessment units will be very important. This would imply all 'relevant' data should be labelled to four HELCOM Assessment unit scales as defined in Monitoring and assessment strategy Attachment 4[9]. Shapefiles of the areas are available from the HELCOM Map service[10]. This would not be based on reported fields, but a script executed for all HELCOM data in the ICES database.

3.2. Action points:

a. Harmonization of monitoring station concepts and practice of labeling data to regional/national (ICES/Contracting Parties)
b. Labelling automatically all data points to HELCOM assessment units when adding to database (ICES).

## 3.3. Increased flexibility in data transport

The complexity of some data types and the supporting information required by COMBINE guidelines has meant that in some areas the formats are quite extensive and inflexible. However, in other areas the reverse is the case – where the data are less complex and the format is therefore less rigid and more flexible. Both situations might well be appropriate depending on the needs of the final data product output.

It is still preferable to use the specifically agreed formats and protocols under COMBINE, as these will have the quality information that the programme has agreed by design. However, there are a number of well described and controlled formats that are used in various thematic areas and by Contracting Party institutes that may be useful to be incorporated into any given data flow. SeaDataNet and EMODnet Chemistry use a well described text file format (ODV) for oceanographic and chemical datatypes that makes extensive use of controlled vocabularies. For the compilation of regional products for indicators, these formats could be used to increase the amount of data available to the system – however due regard would need to be given to the quality control aspects

[8] http://inspire-forum.jrc.ec.europa.eu/pg/pages/view/1778/environmental-monitoring-facilities

[9] http://www.helcom.fi/Documents/Action%20areas/Monitoring%20and%20assessment/Monitoring%20and%20assessment%20strategy/Monitoring%20and%20assessment%20strategy.pdf

[10] http://maps.helcom.fi/website/mapservice/index.html

of data deriving outside of the established path, and the subsequent changes to the system that would be needed. One of the challenges already faced in the COMBINE data and production of indicators are issues with conversions and translations between species/units/matrices. Using additional formats might well add to this issue (See 'Problems identified' in EMODnet Chemistry Quality Control Guidelines[11]

A more effective method for incorporating these data, could be that SeaDataNet/EMODnet provide access through web type services to query their 'regional data buffers' in order to feed these data into the regional products for indicators. The advantage would be that the project would potentially have had a degree of quality control applied to the buffer dataset in order to make an extraction. The primary data would remain in SDN and EMODnet, and then a specific process would harvest for a product and the resulting 'snapshot' would be compiled with the existing regional data sources to create a specific instance of a data product that can be clearly documented and versioned.

3.3. Action points:

a. Accepting data in ODV format to HELCOM database (ICES)
b. Accepting data via web services from SDN/EMODnet to be incorporated to HELCOM database (data origin flag will be required) (ICES, EMODnet?)

At a national level, Contracting Parties such as Sweden (SMHI), are also looking at providing XML (structured, self-described and flexible) based outputs that serve their national purposes, but would also be applicable to regional data ingestion. This approach builds on similar principles described in points 1 and 3, and makes data available to i.e. ICES as the regional thematic data centre with all the necessary codings from COMBINE. The advantage for Sweden would be that they have harmonized outputs that suit a number of purposes while still fulfilling the specific needs of each of the end use requirements. However, it should be noted that this places an additional resource burden at the regional compilation centre and the national infrastructure, where systems would need to be adapted/extended to cope with more delivery channels.

Action point:

c. Explore opportunities where CPs have systems in place, to harvest data provided as XML outputs to be imported to HELCOM database (ICES, CPs).

## 3.4. Review of existing data reporting requirements in relation to revised core indicators

The data flows made in accordance with the COMBINE monitoring manual are long established. However, with the definition of data requirements for core indicators in HELCOM CORESET II there is an opportunity to initiate a review of reported data/fields requested to ensure reporting is in line

[11] http://www.emodnet-chemistry.eu/QC_Guidelines_EMD-Chemical_version1.2.doc

with the data requirement for the indicator for e.g. hazardous substances (HELCOM and CORESET experts). CORESET II experts will define data requirements by Spring 2015 and then a review of the reporting requirement can commence.

This might reduce the complexity/amount of data that needs to be made available from the Contracting Party, and instead focus on ensuring that the fields that are necessary for the indicator are populated and in accordance with the quality control guidance. A full list of relevant indicators, and identified issues should be looked at in reviewing the requirements[12].

3.4. Action points:

a. Definitions of data requirements for core indicators and proposals for improvements (CORESET II)
b. Modification of reporting format (CORESET II, ICES)

## 3.5. Harmonized data flows for sub-programmes hazardous substances and eutrophication

It is the aim to have all hazardous substances data available through the ICES data portal using existing protocols as the preferred route. There has been a cooperation between the EEA and ICES over a number of years where data provided by Contracting Parties through ICES to fulfil HELCOM requirements, is also made available to the EEA EIONET data flow to ensure there is no duplication of reporting. It is important to stress that this mechanism works and Contracting Parties should be aware of this.

[12] http://www.emodnet-chemistry.eu/QC_Guidelines_EMD-Chemical_version1.2.doc

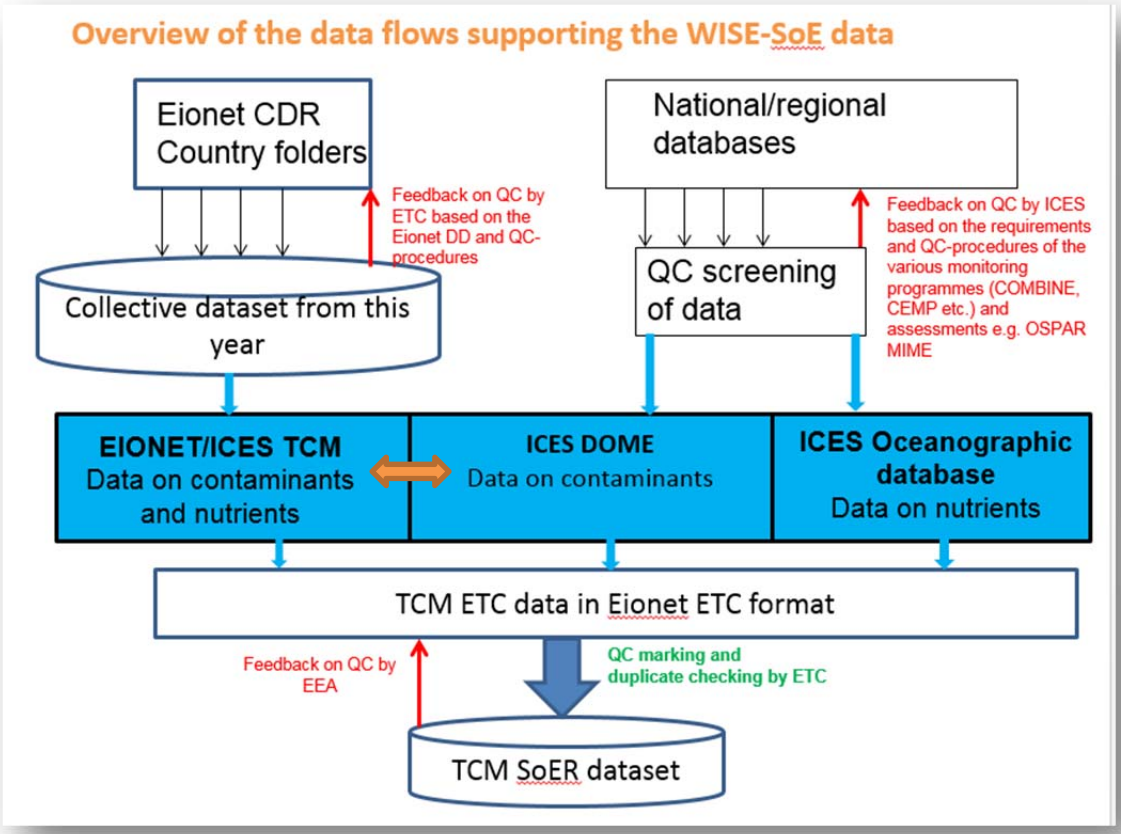



*Figure 5. Contracting Parties - EIONET - ICES data flow*

Figure 5 shows that data from national databases can flow (downwards) via the EIONET process or the HELCOM/ICES regional mechanism. This flow has avoided duplication in one direction (via the regional mechanism), but until recently it was not possible to pass information coming from the EIONET process into the regional database (ICES DOME). The orange bidirectional arrow now indicates this important change where data flowing through either pathway can be utilised by the other process.

With updates to the EIONET data dictionary the data fields that are necessary for COMBINE reporting are now part of EIONET reporting. This means a Contracting Party can report to the EEA if they prefer and the data will be incorporated to the ICES COMBINE database, however it would still be preferable to report through ICES directly as then there is a clear communication link between data provider and data processor and as noted in point 3 - issues with conversions and translations between species/units/matrices might be exacerbated by using additional formats.

In addition, CP's have indicated that in addition to the automated data checking facilities offered for COMBINE, the ability to automate the submission and resubmission of datasets, especially spanning multiple years, would help ease the flow of data. ICES currently has a pilot of automated resubmissions in operation for OSPAR CP's under the CEMP programme. ICES and HELCOM are discussing opportunities to incorporate the expansion of this facility for submissions and resubmissions for the HELCOM CP's.

3.5. Action points:

a. Data reported to EEA EIONET would be incorporated in HELCOM assessment data products (with possible duplicate removal) (ICES)

b. Explore project funding opportunities to expand the automated submission/resubmission of COMBINE datasets (HELCOM/ICES).

## 3.6. Harmonized regional product data views

With the end goal of having a regionally harmonized data catalogue – a well described collection of datasets that are consistent across the descriptor/Baltic sea available at your fingertips, and data products derived from it in mind. The latter part of this is not fully realised for biological communities, biological effects and hazardous substances. While it is currently possible to derive a regional dataset for assessment, the process is manual and not to a well-documented and transparent methodology.

This is an area that is well developed in fisheries i.e. the trawl survey data products defined by expert groups and delivered through the DATRAS web portal. This is also being developed in EUTRO-OPER for eutrophication.

The main output of the 'views' would be an agreed automated methodology for making a harmonized view of the HELCOM dataset available in a well described data product catalogue that can be referred to in an indicator factsheet i.e. through a URI or digital identifier (DOI) in order that it is clear what evidence base was used for an indicator in a very direct way. It would be necessary to involve the experts in CORESET II to define the criteria for data extraction and manipulation in order to implement these procedures directly against the database and make views available from the web portals. To this end, a workshop between CORESET II and BALSAM WP2 has been planned for February 2015 (Helsinki), where these criteria and operational arrangements can be discussed and documented. A starting point could be to look at the views of the data products developed by OSPAR MIME for their hazardous substances assessment (See Annex 3: Harmonized 'views' of sub-programme datasets), as well as the conversion factors adopted (See QA/QC guidelines example in Annex 1: Data management guideline examples).

3.6. Action points:

a. Defining data views for data extraction and processing for core indicator requirements (CORESET II)
b. Cataloguing the data products used in the indicators to ICES geoportal (ICES/HELCOM secretariat).

# 4. Current and future data needs for HELCOM core indicators and HELCOM assessments related to fisheries

Data-processing is needed for some of the fish indicators and the possibilities for ICES groups to carry out some of these tasks are under discussion, e.g. WGBAST could carry out the statistical calculations needed for the salmon- and sea trout core indicators (Table 1).

VMS (Vessel Monitoring Systems) and Fisheries Logbook data are intended to be used for the HELCOM HOLAS II project, for the Baltic Sea Pressure Index (BSPI), and periodically for the Cumulative impacts on benthic biotopes core indicator. VMS/Logbook data processing can be requested from ICES working groups (WGSFD). In this case the resulting information products should be delivered in a GIS format so that it can be merged with other pressure datasets that are included in the BSPI. More explicit needs requiring processing and resolution should be based on the recommendations from the core indicator task managers. It should be noted that the data calls[13] facilitated by ICES for these intended activities need to be very specific to the use cases, and that the ambitions of Contracting Parties/HELCOM have to be balanced against privacy and commercial concerns from the data providers, in most cases the fisheries control authority of the countries concerned.

Data from trawl survey data (BITS, BIAS) are needed for the core indicator Proportion of large fish in the community and the candidate indicator Mean maximum length (MML) of the fish community. Demersal data can be requested from ICES WGBIFS. Trawl survey data/processing might be requested from ICES WGs.

For the candidate indicator "Fishing mortality in the fish stocks", it was agreed in CORESET II that such a pressure indicator will not be further developed in the project. The information is reported by CPs to ICES and it is proposed that if ICES develops or has already developed appropriate indicators and assessments methods, they could be considered for use e.g. in the HOLAS II project.

The coastal fish database contains data on national gill-net monitoring conducted within the HELCOM FISH-PRO II project. Currently the data is stored in national databases from which extractions of data are made for assessments. A requirement for an operational indicator would be to have an accessible database, and well described and available data products. Possible action for fulfilment of these data management and availability needs for the coastal fish data should be discussed within HELCOM FISH-PRO.

**Table 1. Core/Candidate indicators, for which fisheries data will be needed:**

| Indicator | Task Manager in Lead (CORESET II) | Current data flow | Problems identified | Options for solutions for future data needs |
|---|---|---|---|---|
| (Core) Abundance of salmon spawners and smolt | Tapani Pakarinen | Data is compiled annually by WGBAST and the group subsequently carries out the estimates based on the salmon smolt production model | -Weakness of data: "The smolt production is modeled based on different methods in different rivers and the applicability of the model parameters estimated in the northern rivers may not be directly transferable to the southern rivers. The same applies to estimates on post-smolt survival and number of ascending adult spawners." | WGBAST could carry out the statistical calculations needed for the salmon- and sea trout core indicators |
| (Core) Abundance of sea trout | Tapani Pakarinen (Chair of WGBAST) | Data is compiled annually by WGBAST and the group subsequently carries out the | -The intensity and period during which monitoring has been going on, varies between countries (ICES 2008). | WGBAST could carry out the statistical calculations needed for the salmon- and sea trout |

[13][13] http://ices.dk/marine-data/tools/Pages/Data-calls.aspx

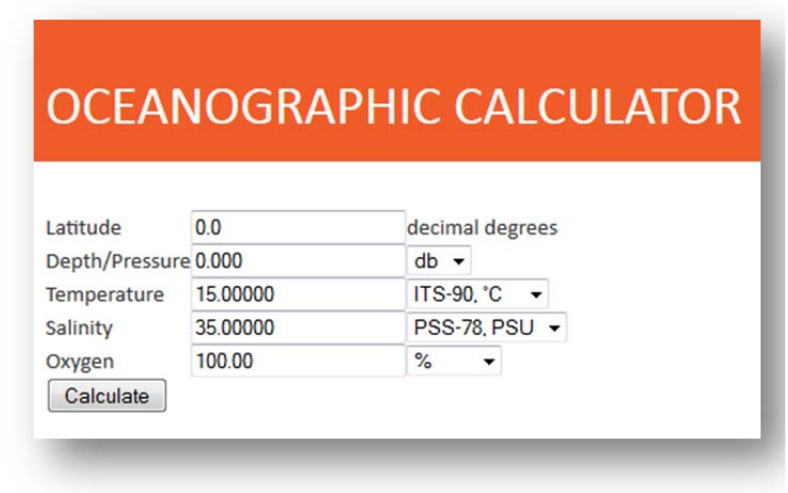
| | | | | |
|---|---|---|---|---|
| spawners and parr | | estimates based on the salmon smolt production model | - No data were available from Latvia, Lithuania and Germany.<br>-criteria for selecting the appropriate streams for monitoring need to be defined | core indicators |
| (Core) Cumulative impact on benthic biotopes | Kai Hoppe | The indicator is built on several spatial data-layers. Data streams for all the different layers and data-types is currently being clarified. | -benthic biotope distribution maps haven't got the needed spatial resolution in all areas<br>- processing the VMS-data appropriately has encountered some problems | Development of joint concepts and assessment methods between OSPAR and HELCOM are under discussion, and the option of having especially development of data-flow and processing for VMS-data through ICES could be explored, e.g. using WGSFD |
| (core) Proportion of large fish in the community | Christian Pusch, Thurid Otto for demersal<br>Michele Casini for pelagic | Pelagic and demersal data. Demersal data comes from BITS- and pelagic from BIAS trawl surveys. | -unclear which frequency and locations the demersal data covers<br>-For pelagic data there is no common database. WGBIFS pools abundance estimates, but calculations and raw data is stored and processed nationally making it difficult to compare estimates from different countries for the purpose of a common indicator. | The option could be explored that WGBIFS could process the demersal data reported by countries to the DATRAS database. The H2020 project AtlantOS includes a work package to build an acoustics (detailed and product data) at ICES. This could be the best fit for regionally pooled pelagic data in the Baltic, but will need specific consideration in addition to the AtlantOS activity which is focused on the NE Atlantic.<br>Common processing "protocols" should be considered, to enable regional estimates. |
| (candidate) Mean maximum length (MML) of the fish community | Michele Casini | Pelagic and demersal data. Demersal data comes from BITS- and pelagic from BIAS trawl surveys. | -unclear which frequency and locations the demersal data covers<br>-For pelagic data there is no common database. WGBIFS pools abundance estimates, but calculations and raw data is stored and processed nationally making it difficult to compare estimates from different countries for the purpose of a common indicator. | The option could be explored that WGBIFS could process the demersal data reported by countries to the DATRAS database.<br>Pelagic data pooling or common processing "protocols" should be considered, to enable regional estimates. |
| (core) Abundance of coastal key fish species, Abundance of key coastal fish functional groups | Jens Olsson | National monitoring, data extracted to assessments, national databases. | -Data is not available in a common database, but reported to the annual HELCOM FISH-PRO meetings where the processing protocols are agreed and an overview of available data is compiled.<br>-Not all CPs monitoring | To be clarified within FISH-PRO how data could be hosted and processed in the future and assess the related costs-benefits. |
| Number of Drowned mammals and waterbirds in fishing gears | Sven Koschinski<br>Volker Diersche | | | To be filled in after MARMONI conference |

4. Action Points:

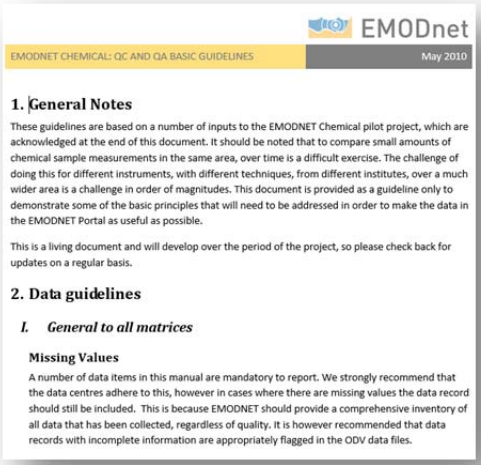
a. WGBAST to carry out the statistical calculations needed for the salmon- and sea trout core indicators (ICES/HELCOM)
b. ICES to be used by HELCOM for processing of VMS data to data products
c. Development of data products from trawl survey data to be used in HELCOM assessments.

# Annex 1: Data management guideline examples

For example the Oceanographic calculator referenced in COMBINE could be developed to provide web services that any database/application could query. This would ensure all data flowing from contracting parties to the HELCOM data flows followed the same guideline on conversions for regional use (this would still allow other conversion approaches) http://ocean.ices.dk/Tools/Calculator.aspx




For example, under the EMODnet Chemistry project where many of the data managers dealing with infrastructure are not knowledgeable on the specific challenges with marine chemistry – a simplified QA and QC manual was created in order to help in identifying the relevant information to be included in data files and what conversions to apply in order that a practical approach to harmonization could be achieved.


EMODnet

EMODNET CHEMICAL: QC AND QA BASIC GUIDELINES — May 2010

**1. General Notes**

These guidelines are based on a number of inputs to the EMODNET Chemical pilot project, which are acknowledged at the end of this document. It should be noted that to compare small amounts of chemical sample measurements in the same area, over time is a difficult exercise. The challenge of doing this for different instruments, with different techniques, from different institutes, over a much wider area is a challenge in order of magnitudes. This document is provided as a guideline only to demonstrate some of the basic principles that will need to be addressed in order to make the data in the EMODNET Portal as useful as possible.

This is a living document and will develop over the period of the project, so please check back for updates on a regular basis.

**2. Data guidelines**

*I. General to all matrices*

**Missing Values**

A number of data items in this manual are mandatory to report. We strongly recommend that the data centres adhere to this, however in cases where there are missing values the data record should still be included. This is because EMODNET should provide a comprehensive inventory of all data that has been collected, regardless of quality. It is however recommended that data records with incomplete information are appropriately flagged in the ODV data files.

**See http://www.emodnet-chemistry.eu/QC_Guidelines_EMD-Chemical_version1.2.doc**

# Annex 2: Non-fisheries indicators with a data link to ICES

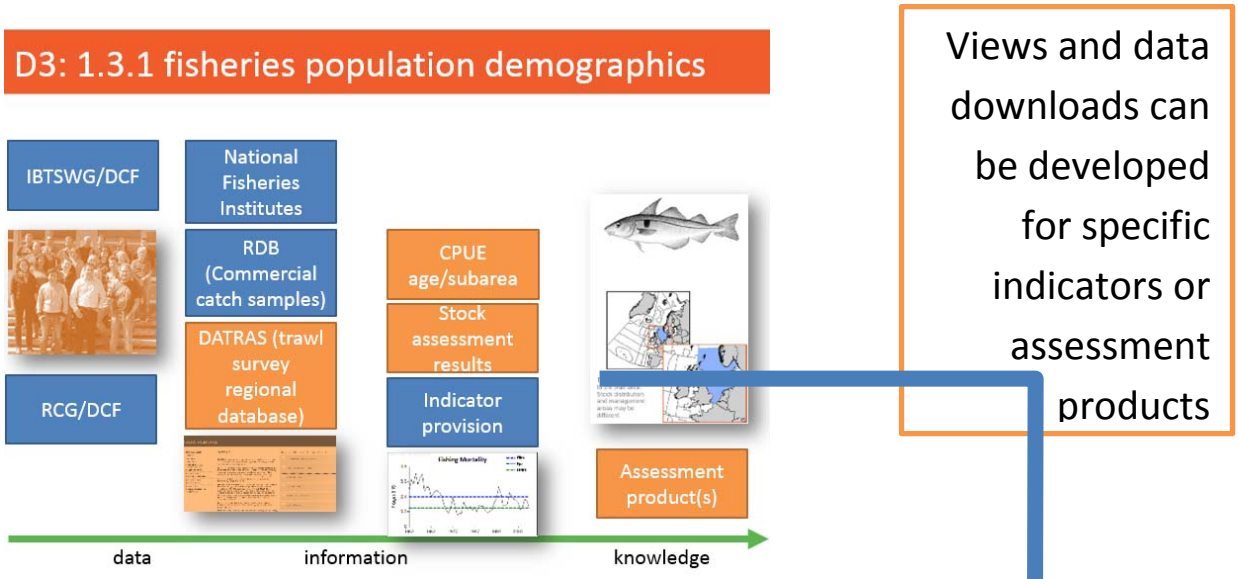
| Indicator | Task Manager in Lead (CORESET II) | Current data flow/needs | Problems identified | Options for solutions for future data needs |
|---|---|---|---|---|
| (Core) Polybrominated biphenyl ethers (PBDE): BDE-28, 47, 99,100, 153 and 154 | Jaakko Mannio | From ICES DOME database. The sum of six BDE or any of six congeners, are calculated per sample. | All status concentrations are converted to wet weight basis, if the lipid weight percentage was available (otherwise the data was omitted). | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| Polychlorinated biphenyls (PCB) and dioxins and furans: CB-28, 52, 101, 118, 138, 153 and 180: WHO-TEQ of dioxins, furans –dl-PCBs | Detlef Schults-Bull | From ICES DOME database. | Data to the status maps was converted to lipid-based concentration and omitted if no lipid weight percentage was provided. | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| Hexabromocyclododecane (HBCDD) | Sara Danielsson | From ICES DOME database. lipid weight in trends is used | A discussion is needed to agree on species and matrixes (or to agree on conversion factors when different approaches are used), and also to agree on assessment units. Data is reported to ICES but it is necessary to consider data quality assurance and arrangement for how the assessments should be carried out. | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| Perfluorooctane sulphonate (PFOS) | Sara Danielsson | From ICES DOME database. Time series graphs use annual averages. The data is in wet weight basis. | A discussion is needed to agree on species and matrixes (or to agree on conversion factors when different approaches are used), and also to agree on assessment units. Data is reported to ICES but it is necessary to consider data quality assurance and arrangement for how the assessments should be carried out. | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| Polyaromatic hydrocarbons and their metabolites: US EPA 16 PAHs / selected metabolites | Ulrike Kammann (for fish) | From ICES DOME database. GES Boundaries (OSPAR) in µg/kg dw | ? | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| Metals (lead, cadmium and mercury) | Martin Larssen, Sergey Ermakov | From ICES DOME database. Conversions of data to wet-weight –based or dry-weight -based concentrations were made by the lipid weight or dry weight percentage to have the same unit as the GES boundary | "The sampling of several species may be seen as an advantage, but the comparability of status classes and concentrations is difficult between different species as seen in the case of mercury." "The conversion factors from tissue-specific concentrations to whole fish concentrations require careful thinking, but may be the right direction to go in future. More studies are, however, required to solve geographical and species-specific differences in conversion factors." | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| TBT and imposex | Jakob Strand | From ICES DOME database. | ? | To be filled in at the |

| | | | | |
|---|---|---|---|---|
| | | For status maps: mean concentration. Conversion from wet weight –based concentrations to dry weight were made if dry weight % was provided | | BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| (pre-core) Lysosomal Membrane Stability - a toxic stress indicator | Kari Lehtonen | The indicator is not contaminant specific, and it can be measured in any species. Monitoring is established in DK and will be included in monitoring in FI. the method is e.g. recommended as biological effect methods by ICES | ? | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| (pre-core) Reproductive disorders: Malformed eelpout and amphipod embryos | Brita Sundelin | The indicator is used and monitored nationally in DK and SE. Technical guidelines for monitoring and assessment methodology is available for both species. Data is submitted to ICES | ? | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| (core) Zooplankton mean size and total abundance | Elena Gorokhova | The indicator is applicable in all areas where HELCOM COMBINE monitoring is implemented | ? | To be filled in at the BALSAM/CORESET meeting 2-4 February in the HELCOM Secretariat |
| State of the soft-bottom macrofauna communities | - | The indicator is applicable in all HELCOM areas and close to operational for open sea areas relying on COMBINE sampling. Sampling and evaluation in coastal areas requires additional work due to varying national practices. | | To be filled in after the CORESET II meeting on benthic indicators 10-12 February, Gdynia, Poland |
| Trends in arrival of new NIS | Maiju Lehtiniemi | The indicator is based on observations of invasive species stemming from environmental monitoring carried out by countries partially in the COMBINE programme and partly through work on port sampling for ballast water managements. | | Including more coastal monitoring information in the indicator and linking different datasources would improve the indicator confidence. |

# Annex 3: Harmonized 'views' of sub-programme datasets

Also see the OSPAR MIME http://dome.ices.dk/osparmime/main.html

Below is an example of data>information from fisheries, with specific standard data outputs for assessment, including statistics and graphical products.




| FishStock | Stock Description | Species | Eco Region | Assessment Year | Assessment Key |
|---|---|---|---|---|---|
| anb-8c9a | Black-bellied anglerfish (Lophius budegassa) in Divisions VIIIc and IXa | Lophius budegassa | Bay of Biscay and Iberian Sea | 2014 | 4138 |
| ane-bisc | Anchovy in Subarea VIII (Bay of Biscay) | Engraulis encrasicolus | Bay of Biscay and Iberian Sea | 2014 | 5313 |
| anp-8c9a | White anglerfish (Lophius piscatorius) in Divisions VIIIc and IXa | Lophius piscatorius | Bay of Biscay and Iberian Sea | 2014 | 4136 |
| bli-5b67 | Blue ling (Molva dypterygia) in Subdivision Vb, and Subareas VI and VII | Molva dypterygia | Widely distributed and migratory stocks | 2014 | 4034 |
| boc-nea | Boarfish in the Northeast Atlantic | Capros aper | Widely distributed and migratory stocks | 2014 | 5411 |
| bss-47 | European seabass in Divisions IVbc,VIIa and VIId-h (Irish Sea, English Channel and southern North Sea) | Dicentrarchus labrax | Celtic Sea and West of Scotland | 2014 | 4251 |
| cod-2224 | Cod in Subdivisions 22-24 (Western Baltic Sea) | Gadus morhua | Baltic Sea | 2014 | 3988 |
| cod-2532 | Cod in Subdivisions 25-32 (Eastern Baltic Sea) | Gadus morhua | Baltic Sea | 2014 | 4089 |
| cod-347d | Cod in Subarea IV (North Sea), Divison VIId (Eastern Channel) and IIIa West (Skagerrak) | Gadus morhua | North Sea | 2014 | 4121 |
| cod-7e-k | Cod in Divisions VIIe-k (Celtic Sea cod) | Gadus morhua | Celtic Sea and West of Scotland | 2014 | 4231 |
| cod-arct | Cod in Subareas I and II (Northeast Arctic cod) | Gadus morhua | Barents Sea and Norwegian Sea | 2014 | 4063 |
| cod-farp | Cod in Subdivision Vb1 (Faroe Plateau) | Gadus morhua | Faroe Plateau Ecosystem | 2014 | 4255 |
| cod-iris | Cod in Division VIIa (Irish Sea) | Gadus morhua | Celtic Sea and West of | 2014 | 4237 |