Working document 4: MSFD data work flow

# Document summary

This document aims to provide an approach to establishing a workflow among the EU level, MS, RSC and other operators like EMODnet and Copernicus in support of fulfilling the requirements of article 19.3, and also achieving greater regional coherence. At present it is not clear exactly which observations will be covered by art 19.3 and hence here we present a model that allows the MSFD process to be more informed regarding the indicators and data that support them, as well as how the underlying data can be made available. The objective is to build on existing initiatives within the RSC related to developing indicator sets related to the Commission Decision of September 2010, while at the same time allowing alternative models to be developed where this might be desirable. The paper presents a general model, as well as regionally specific models covering on going activities on D5 in HELCOM and on D8 in OSPAR. If the model presented here is accepted, specific proposals will be developed for each of the MSFD descriptors, building on the work on going in the RSC’s.

In the workshop this proposal will be discussed in smaller groups. The groups will be asked:

1. Do you agree to the model proposed where indicators are a central component?. Does it correctly reflect the roles and existing working arrangements among MS and RSC? If not, how should it be changed, or do we need to make it more regionally specific?
2. Does the model presented represent the desired continued working arrangements for fulfilling the MSFD obligations under article 19.3? If not, how should it be changed?
3. A central component to the model is the notion of a (sub)regionally agreed indicator methodology –How can this be made operational per descriptor and region?
4. Another central component of the model is sharing of observations. If other operators than the MS are to support the work under art 19.3, then relevant observations need to be made available by MS. What are barriers to sharing data?

# MSFD data flows schema

This document aims to provide a means to move forward on the future priority objectives outlined under the Common Implementation Strategy, and specifically addresses the operational objective “*the flow of data and information between the EU, Regional Sea Conventions and Member States, as well as other partners…under the Marine Strategy Framework Directive*”.

# Coherency and efficiency of processes

The future priorities paper (MSCG/10/2013/4) states that:

*each Member State sits within and shares one or more marine (sub)regions and is explicitly required by the Directive to both determine Good Environmental Status (GES) at the level of the marine (sub)region and to work with neighbouring Member States and third countries in order to implement the Directive and achieve GES. A common understanding and approach is therefore crucial to successful implementation*

This is elaborated further in the Implementation of Article 19(3) paper (MSCG/10/2013/17) that clearly draws a connection between the resulting assessment and monitoring programmes under the MSFD articles and their relationship to underlying data:

*A key element of the directive is the need for Member States to achieve* ***coherence and consistency*** *within and between the MSFD regions and subregions (Art. 5(2)). This relates inter alia to the determination of GES, to the assessments and to the monitoring, and consequently to the data needed to support these elements. Achieving consistency within and between regions and subregions in the data used for indicators and assessments will consequently be a key element in achieving overall coherence in delivery of the directive; such coherence in data will help lead to consistent outcomes for the assessments of environmental status.*

From the lessons learnt in the reporting of articles 8, 9, 10 in 2012/2013 (MSCG/10/2013/4) it is clear that Member State approaches are different and (regional) coordination is lacking in ensuring sufficient coherence and comparability. In addition, the reporting of information and methodologies is to a degree no longer state of the art, meaning that in some cases the information contained within Member State initial assessment reports has been superseded by ongoing work within the Regional Sea Conventions.

It is therefore evident that it would be beneficial to leverage the capacity of Regional Sea Conventions to gain increased coherence and consistency. However, there are large differences across Europe on how work on the regional level is organised, and it is necessary to consider regional specificities.

This is noted in the CIS (MSCG/10/2013/4), where a specific objective outlines to:

*Strengthen the regional capacities and coordination, in cooperation with the Regional Sea Conventions, to implement the MSFD;*

Within the Baltic (HELCOM) and North East Atlantic (OSPAR) regions, this capacity is already well advanced in being able to develop regional indicators in support of the 2010 Commission Decision. In this document we try to demonstrate, by examples from these regions, what elements are already in place and how these can be linked into the MSFD processes. This activity has been approached both from the viewpoint of the Regional Sea Convention linking towards MSFD processes, but also from the standpoint of the member state existing arrangements and how these can be best utilised in the MSFD through the regional seas programmes. Depending on the particular dataflow, it will also be possible to organise deliveries that build on products developed under large European Initiatives like EMODnet or Copernicus.

And more specifically in relation to the work of WG-DIKE and DIKE TG, the CIS has an operational objective:

*developing and implementing a concept and arrangements for a shared, streamlined and efficient management of data, information and knowledge between the EU, the Regional Sea Conventions and the Member States as well as other partners based on (but not limited by) the obligations under the Marine Strategy Framework Directive*

Furthermore, the CIS looks to the Regional Sea Conventions to align data flows, as well as to:

*Develop and implement a concept for shared data and information management in the marine environment building on Article 19.3 and involving the data management at the RSCs as well as ICES and other data providers which streamlines data flows*

# Understanding data and information management at the regional and European scale (in the context of MSFD)

In order to develop the regional context of data and information management further, and to form a concrete basis for elaboration in DIKE TG and WG DIKE, an explanatory set of schemas (Tables 1-4) are proposed that describe the structural elements, and the steps in the process leading from marine observations to the assessment and evaluation of measures.

This overview demonstrates that the MSFD-CIS is the overarching governing mechanism for this work, but below there are specific methodological contributions that can be brought in from other processes, where proposal for concrete indicators in support of the 2010 Commission Decision, as well as a methodology for compiling them is central. Once the indicator methodology is clear, the relation to monitoring, data, the assembly of the indicator can be identified. In this workshop we will discuss the general model and show how it can be filled using different models depending on the regional specificities. In Table 1, five boxes have been highlighted because they are relevant for the work of DIKE TSG.

Although only some of these processes are related to the work of DIKE TG/WG DIKE, it is necessary to map out the other components in order to build coherence and consistency into the development of a regional approach to the collection, assembly and production of indicators and assessment.

This approach is intended to eventually be built up on each of the 11 Descriptors, and for each region or sub-region if necessary. By doing this, the Member States through WG DIKE will be able to make the linkage between their national processes, and how their work within the Regional Sea Conventions can be integrated into the MSFD Common Implementation Strategy.

The purpose of splitting the process into separate components, is both to aid in delineation between the work of the different Commission working groups, but also to decouple the different elements allowing for the Regional Sea Conventions, EU or other projects to take responsibility for one or more of the components where they have the competence to do so, and allowing the overall process to still be governed by the relevant MSFD group. This also allows for the inclusion of distributed reporting systems, including INSPIRE (discover, view and download services), to be factored in to one or more parts of the process as they become available within the different regions. At the same time, without impeding progress towards delivering a fully described and operational workflow utilising existing systems and arrangements where they are already in place. In this way, Member states together with the EU can start to incorporate data and information harvesting from Member State services, and reduce the reliance on the traditional transmission of reports to multiple entities.

There are four elements to the process, the reasoning for making this split is that within the Regional Sea and Descriptor context, the governance, methodology and operational basis for collecting and assembling the data, producing indicators and making the assessment can be quite different. It is therefore not possible to generalise across a regional sea. For example, at the assessment level more than one Descriptor within a regional sea could be relevant, but the methodology and the operational elements could be managed by different groups/partners feeding into this.

## Outline of the workflow elements

### Structural elements of the schema

**Governance:** This denotes the oversight at national and regional level that refer upwards to the MSFD Common Implementation Strategy

**Methodology:** This specifically references the guidelines, procedures and methods for delivering the descriptor available within the RSC context, for each component in the process.

**Operational basis**: This denotes the actual/planned mechanisms of operation of each component in the process

**Potential Operators:** These are the bodies, organisations or projects that have been given the remit, and have the technical competence, to deliver the operational element of the specific process

### Process elements of the schema

**Data collection:** This is the basis of the monitoring programmes established at national and regional level in relation to Article 11 MSFD

**Data Assembly:** These are the existing, or planned, mechanisms to combine national datasets into regional or sub-regional harmonious datasets

**Indicator:** These are the existing, or planned, mechanisms to process the assembled data with an agreed methodology into an indicator, or set of indicators, related to the MSFD Descriptors. In some cases assembly and indicator may be in one process, but this is not true for all Descriptors/Regions

**Assessment:** The criteria for the European assessment through MSFD and the contributing methods and operations resulting from national and regional assessments

## Regional/Descriptor examples of the workflow

In the following sections are:

(1) a generic example that describes the different components in the process, and what kind of structures would be expected under each of the headings; This also denotes what kind of information/outputs would be required to be reported to the EU level to ensure coherence with the MSFD

(2) an example based on a draft outline of working arrangements in the Baltic sea related to Descriptor 5 (Eutrophication);

(3) an example based on a draft outline of working arrangements in the North East Atlantic related to Descriptor 8 (Contaminants and Effects);

(4) an example based on a draft outline of possible working arrangements in the Mediterranean sea related to Descriptor 5 (Eutrophication)

Examples (2) and (3) are generally based on existing arrangements within Regional Sea Conventions, member states and other partners. They therefore represent a more centralized method of reporting and assembling data into an indicator process. Example (4) is based on using EMODnet to provide some of the components of the process, and is therefore an example of how Member States can work in a more distributed system, but within the same regional context. Both approaches are valid as long as the MSFD reporting processes are fulfilled i.e. that the described criteria for each component are made available to the EU in their European wide assessment.

These example schemas are a starting point for discussions, and intended to be ultimately compiled for aspects of the 11 MSFD descriptors by DIKE TG in collaboration with the Regional Sea Conventions, and other partners that have competence to contribute to the process components for each of the Descriptors in the MSFD marine regions.

1. **GENERIC STRUCTURAL DATA AND INFORMATION FLOW AND SYNTHESIS FOR INDICATOR/DESCRIPTOR/REGION**

|  |  |  |
| --- | --- | --- |
| **STRUCTURAL** |  | **PROCESS COMPONENT** |
|  |  | **Data Collection**  | **Data Assembly** | **Indicator (in reference to COM decision and on-going RSC indicator activities)** | **Assessment** |
| **EU process Governance** |  | **MSFD CIS/WG-DIKE (ultimately MS Marine Directors)**Data from Member state monitoring programme(s) (art 19.3 and art 11)that provide linkage and reference to MSFD monitoring provision |  | **MSFD CIS/WG-GES (ultimately MS Marine Directors) Common understanding approach**MSFD indicators derived or adapted from Regional sea and Member state indicators that provide basis for common implementation | MS art 8 assessments,Regional assessments,EEA MSFD baseline assessment  |
| **Methodology** |  | Regional sea and member state monitoring guidelines manuals related to specific parameter(s)  |  | Specific guidelines/Manuals on indicator production methodology, including reference to MSFD marine unit and assembly method of data  | Assessment methodology as agreed in MSFD or regional context  |
|  |
| **Operational basis****Linked to monitoring guidelines and indicator methodology** |  | Member State data provision mechanism(s)* Availability
* Access rights
* Temporal coverage
* Observation frequency
* Usage rights
* Update frequency
* Format/Outputs
* Metadata
* Spatial unit(s)
 | Specifications for assembled data (input and output)* Location/Availability
* Operational portal/web service
* Usage rights
* Update frequency
* Format/Outputs
* Metadata
* MSFD Spatial unit: INSPIRE area mapping
* QC applied
 | Mechanisms to publish indicators:* Location/Availability
* New/Existing provision
* Supporting metadata
* Frequency of provision
* Spatial unit (related to MSFD units)
* Context of use (consistency with MSFD scope)
 | Definition of assessment product :* Appropriateness for MSFD output
* Adaptations needed
* Assessment scale
* Temporal scale
 |
| **Potential Operators** |  | **MS** | MS, RSC, ICES, Emodnet, Copernicus, EEA, others | MS, RSC, ICES, Emodnet, Copernicus, EEA, others | MS, RSC, EEA , others |

1. **Drafted example from Baltic MSFD region based on HELCOM activities**

| **Region: *Baltic*** |  | **Descriptor: *Descriptor 5: Eutrophication;*** *5.1 Nutrient levels, 5.2 Direct Effects, 5.3 Indirect Effects* |
| --- | --- | --- |
|  |  | **Data Collection** | **Data Assembly** | **Indicator** | **Assessment** |
| **Governance** |  | **MSFD CIS/WG-DIKE (ultimately MS Marine Directors)**Regional sea and member state monitoring programme(s) that provide linkage and reference to MSFD monitoring provision | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**Data assembled under HELCOM Committee oversight: HELCOM MONAS and GEAR | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**Oversight by HELCOM GEAR (coordination platform for regional implementation of the MSFD) and MONAS (monitoring and assessment group ) | MS art 8 assessments,EEA MSFD baseline assessment HELCOM Baltic Assessment |
| **Methodology** |  | Regional sea and member state monitoring guidelines manuals related to specific types of data | Guidelines and procedures to be outlined under HELCOM MONAS (drafted document has already been developed between CORE EUTRO WG, ICES and HELCOM Secretariat) | * HELCOM CORE EUTRO has been developing the eutrophication indicators Core set indicators)
* CORE EUTRO 7/2013 agreed on GES boundary targets making use of the outcome of the HELCOM TARGREV project (these were approved in principle by HELCOM HOD 39/2012)CORE EUTRO 8/2013 discussed operationalization of core eutrophication indicator and prepared a draft project proposal for HELCOM EUTRO-OPER
* Making use of WFD developed indicators
* Core indicators will account for the regional component of MSFD obligations
* Guidelines and procedures to be outlined under HELCOM GEAR and MONAS as well as a relevant expert group
* Existing:
* **Nutrients**
* dissolved inorganic nitrogen (DIN) (Winter)
* dissolved inorganic phosphorus (DIP) (Winter)
* **Direct effects**
* Secchi depth (summer)
* Chlorophyll A (Summer)
* **Indirect effects**
* Oxygen debt/concentration
* class boundaries (GES/sub-GES) have been agreed upon
* **To be further developed**
* benthic invertebrates
* phytoplankton, phytobenthos
* coastal seasonal hypoxia
 | Based on HELCOM Eutrophication Assessment Tool (HEAT 3.0)* HEAT 3.0 is based on integration of indicators under criteria that reflect D5 and on the use of class boundaries (GES/sub-GES), use of indicators with linear and non-linear response under same criteria to be specified
* HEAT 3.0 User Manual (to be developed)
* Assessment scale: will be aligned to MSFD spatial units and as outlined in the revised HELCOM Monitoring and Assessment Strategy ( to be endorsed in 2013)
* Temporal scale: will be aligned to MSFD decision, indicators as well as integrations of indicators,
* wider thematic assessments will be carried out once in the six-year assessment cycle preceding initial assessments)
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|  |
| **Operational basis** |  | **Linkage to DIKE-TG**Member State data provision mechanism(s)* Provided in text based format to:
	+ ICES
	+ Or EIONET
* Usage rights: made available in accordance with open access
* Update frequency: (bi-)annual submissions/updates
* Format/Outputs: provided in text based formats
* Spatial unit: station level observations or reference to Baltic Sea assessment units as defined in the Strategy
 | Mechanism(s) to assembled data* Assembled dataset (HELCOM COMBINE + EIONET) to be available at http://www.ices.dk and also linked to HELCOM monitoring and assessment system web page (under development) and HELCOM Data and Map service
* Usage rights: Data policy is open, see http://www.ices.dk/marine-data/guidelines-and-policy/Pages/ICES-data-policy.aspx and also HELCOM Data and Information Strategy (to be endorsed as part of the revised HELCOM Monitoring and Assessment Strategy in 2013)
* Update frequency: at least annually, but potentially more frequently
* Format/Outputs: various database/text outputs available
* Metadata: ISO 19115/19139 records are available http://geo.ices.dk/geonetwork/
* Spatial unit: MSFD Baltic region, HELCOM sub-basins as outlined in the revised HELCOM Monitoring and Assessment Strategy, HELCOM monitoring stations
* QC checks will be made available online through the ICES QC reference system
 | Mechanisms to indicators:* Indicator(s) will be/are available through a HELCOM monitoring and assessment web-page (under development) and HELCOM Map and Data Service (online portal)
* Platform exists, but operationalization of these indicators with regular updates and streamlining of the process is a new development
* Frequency of provision: Indicators will most likely be updated on an annual cycle
* Spatial unit: will be aligned to MSFD regions/sub regions and as outlined in the revised HELCOM Monitoring and Assessment Strategy ( to be endorsed in 2013)
 | Definition of assessment product :* Potentially will be based on a Web based reporting tool
* Interactive components linked to HELCOM Map and Data Service (online portal)
* Update frequency: using an assessment tool will be updated with new data annually and corresponding concise web reports will be made available
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1. **Drafted example from North East Atlantic MSFD region based on OSPAR activities**

| **Region: *NE Atlantic*** |  | **Descriptor: *Descriptor 8: Contaminants and effects;*** *8.1 Concentration of contaminants, 8.2 Effects of Contaminants* |
| --- | --- | --- |
|  |  | **Data Collection** | **Data Assembly** | **Indicator** | **Assessment** |
| **Governance** |  | **MSFD CIS/WG-DIKE (ultimately MS Marine Directors)**Regional sea and member state monitoring programme(s) that provide linkage and reference to MSFD monitoring provision | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**Committee oversight: OSPAR HASEC assisted by OSPAR MIME | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**Oversight of indicator assessments by OSPAR HASEC and OSPAR MIME | MS art 8 assessments,EEA MSFD baseline assessment * OSPAR HASEC/MIME
* annual roll-over OSPAR CEMP Assessment for common indicators under D8
* assessment criteria as established for CEMP
 |
| **Methodology** |  | Regional sea and member state monitoring guidelines manuals related to specific types of data* OSPAR CEMP Guidelines
 | * OSPAR CEMP Guidelines and procedures for Contracting Parties reporting data as documented on the OSPAR and ICES Marine Data portal site.
 | **Existing:*** [to be inserted after agreement by OSPAR 2013]
* Based on WFD developed indicators
* Will account for MSFD obligations
* Guidelines to be developed further under OSPAR MIME
 | * 2012-2015 parallel trial application of integrated Guidelines (combining chemical and biological effect data) which could provide integration across entire D8
* Need identified for improved assessment criteria (EAC) for some contaminants
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|  |
| **Operational basis** |  | **Linkage to DIKE-TG**Member State data provision mechanism(s)* Provided in text based format to:
	+ ICES
	+ Or EIONET
* Usage rights: made available in accordance with open access
* Update frequency: annual submissions/updates
* Format/Outputs: provided in text based formats
* Spatial unit: station level observations
 | Mechanism(s) to assembled data:* Data assembled under OSPAR commissioned to ICES
* Assembled dataset to be available at http://www.ices.dk and also linked to OSPAR CEMP assessment tool
* Usage rights: Data policy is open, see http://www.ices.dk/marine-data/guidelines-and-policy/Pages/ICES-data-policy.aspx and OSPAR data policy
* Update frequency: currently annually, but potentially flexible
* Format/Outputs: various database/text outputs available
* Metadata: ISO 19115/19139 records are available http://geo.ices.dk/geonetwork/
* Spatial unit: MSFD North-East Atlantic Region region, OSPAR Regions, OSPAR monitoring stations
* QC checks will be made available online through the ICES QC reference system
 | Mechanisms to indicators:* Frequency of provision: Indicators will most likely be updated on an annual cycle
* Spatial unit: will be aligned to MSFD regions/sub regions
 | Definition of assessment product :* Annual assessment undertaken by OSPAR MIME using its CEMP Web based assessment and map visualisation tool

Appropriateness for WISE-Marine output* Assessment scale: will be aligned to MSFD spatial units
* Temporal scale: will be aligned to MSFD decision, data selection for biota indicators can be restricted seasonally (summer/winter in relation to spawning season)
* Metadata: provided within the CEMP assessment tool
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1. **Drafted example from Mediterranean MSFD region**

| **Region: *Mediterranean*** |  | **Descriptor: *Descriptor 5: Eutrophication;*** *5.1 Nutrient levels, 5.2 Direct Effects, 5.3 Indirect Effects* |
| --- | --- | --- |
|  |  | **Data Collection** | **Data Assembly** | **Indicator** | **Assessment** |
| **Governance** |  | **MSFD CIS/WG-DIKE (ultimately MS Marine Directors)**National/sub-Regional Monitoring Programme(s) for Marine Coastal Waters, MEDPOL (Barcelona Convention) and RADMED (Spain), Research projects | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**Data assembled nationally by MS (SIDIMAR and National Node for WISE- SoE, NODCs, Quadrige) and coordinated regionally under EMODNet Chemistry and SeaDataNet (SDN) | **MSFD CIS/WG-GES (ultimately MS Marine Directors)**MSFD Indicator and MS indicator implemented for Mediterranean Region | MS art 8 assessments,EEA MSFD baseline assessment GES Definition and Environmental targets determination according to MSFD |
| **Methodology** |  | National MS monitoring guidelines manuals related to specific types of data | Guidelines and procedures as defined by EMODNet/SDN infrastructure using SDN Common Vocabularies, SDN Metadata Formats, SDN Data Transport Formats and Quality Control  | * has been developing the eutrophication indicators TRIX INDEX for Trophic levels measurement (Vollenweider et al. 1998)
* Making use of WFD developed indicators: Chl as Biomass Indicator and related Classification criterion for different typologies of coastal waters.
* Core indicators will account for the regional component of MSFD obligation
* Existing:
* **Nutrients (monthly)**
* **Direct effects** (Chlorophyll a, monthly)
* **Indirect effects** (Oxygen debt/concentration, monthly)
* **To be further developed:**
	+ phytoplankton, (Shift of the floristic composition – ratio variation of the main taxonomic groups)
	+ bottom waters coastal seasonal anoxia/hypoxia
 | Based on:* Temporal scale: will be aligned to MSFD decision, indicators as well as integrations of indicators,
* wider thematic assessments will be carried out once in the six-year assessment cycle preceding initial assessments

EMODNet Chemistry will provide test case using HEAT Tool with thresholds limits as defined for the Med to check if the data coverage is appropriateAssessment criteria proposed for Good Environmental Status definition:1. Surface nutrient concentration (geometric annual mean + standard error evaluated over 6 years period) should not exceed specific threshold values for each assessment areas or subregions. Threshold values and metric to be used for such indicator will be finally established by 2018 as a consequence of more data and validation of the approach.
2. Surface Chlorophyll a concentration (geometric annual mean + standard error evaluated over 6 years period) should not exceed specific threshold values for each assessment areas or subregions. Threshold values and metric to be used for such indicator will be finally established by 2018 as a consequence of more data and validation of the approach.
3. Parameters and threshold values for phytoplankton composition and abundance for each subregions will be finally defined by 2018 as a consequence of more data and validation of the approach.
4. Threshold values for dissolved oxygen difference with respect to 100% for each subregions will be defined by 2018 as a consequence of more data and validation of the approach.
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| **Operational basis** |  | **Linkage to DIKE-TG**MS provide data according to the National implementation of WFD, coupled with research programs | **Mechanism(s) to assemble data*** Data provided by MS are available through EMODNet Chemistry at http://www. emodnet-chemistry.eu
* Usage rights: following SDN Data policy (http://www.seadatanet.org/Data-Access/Data-policy)
* Format/Outputs: SDN format (ODV spreadsheet, NetCDF, Ascii Medatlas)
* Metadata: ISO 19115/19139 records with information on ownership, spatial and temporal coverage, usage rights following SDN schemes
* Spatial unit: MSFD Mediterranean region
* QC protocols are available online through EMODNet portal <http://www.emodnet-chemistry.eu> under the section Metadata & Data
 | **Mechanisms to indicators:*** Indicator(s) will be/are available through implementing and integrating the Monitoring activities
* Spatial unit: will be aligned to MSFD subregions and assessment areas
 | EMODNet Chemistry will provide the following products to be used by the authorities in charge of the assessment:* Diva interpolated maps
* Time series plots
* Coastal visualisations, through GIS representations of assessments.
 |