Coordinated assessments of marine species and habitats under the Birds and Habitats Directives and the Marine Strategy Framework Directive

Process and Technical Review: Main Report (Final)

Written by ICF in association with
MRAG, University of Hull, and partners

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Table of Contents

Executive Summary

Introduction

Monitoring and reporting on EU environmental policy provides information that is used to assess compliance with legal obligations, to help build the evidence base required for implementation and policy making, and to provide information more generally to organisations and citizens on how well policy is delivering its objectives. The streamlining of monitoring and reporting is an important part of the Commission's Better Regulation agenda.

ICF, MRAG, University of Hull and partners were commissioned by the European Commission, DG Environment, under ENV.C.2./FRA/2016/0017 to undertake a study to support the Commission's work to better coordinate assessments of marine species and habitats under the Birds and Habitats Directives (BHD) and the Marine Strategy Framework Directive (MSFD).

The overall **objective of the study** was to establish an evidence-based understanding of the current level of coordination, alignment and efficiency of the BHD and MSFD monitoring, assessment and reporting on marine species and habitats. Specifically:

- To review the *processes* involved in monitoring, reporting and assessment at the Member State level, to support the streamlining of the administrative steps across the Directives.
- To compare the *technical* aspects of the marine biodiversity assessments made by Member States under the BHD and MSFD, to support efforts to better integrate marine species and habitat assessments under the three directives.

The study provides conclusions on the gaps and inconsistencies in processes, methods and assessments, and on Member State capacity and capabilities, and makes recommendations for action at a European and Member State level.

Scope and methodology

Specific elements of reporting: The study was focussed on marine species and habitats. For the MSFD this covers descriptors D1 Birds, D1 Mammals, D1 Reptiles, D1 Fish, and D6 Benthic broad habitats. For the BHD this covers all marine birds, mammals and reptiles, as well as fish of conservation importance, and the eight habitat types for 'open sea and tidal areas'. In particular, the study focussed on the aspects that are common to both the BHD and MSFD.

Evidence base: Desk and primary research was conducted for a sample of nine Member States (Croatia, Estonia, Finland, France, Germany, Malta, Netherlands, Romania, and Spain – reflecting a balance in geography and size), drew on the latest reporting cycle (2012/13 - 2018 for the MSFD and 2019 for BHD) and the information officially submitted by Member States under the BD Article 12, HD Article 17 for the reporting period 2013-2018 submitted in 2019 and MSFD Article 17 for the period 2012 to 2018, as well as related EU level documents.

Approach to the process review: The review undertook research on the sample of Member States, as well as the four relevant Regional Sea Conventions (RSCs). For each Member State, a description and set of data flow diagrams were developed that describe the processes and data flows required to report to the MSFD and BHD as well as the interactions with their relevant RSCs. This drew on information collected from Member State reports and other sources, which was then verified and improved through discussion with Member States. Interviews with Member States were undertaken to (i) complete and verify the information collected and the draft data flow diagrams, and (ii) gather information and opinion on Member State processes, systems, communication and coordination, as well as the opportunities and barriers to improving coordination and streamlining across the Directives.

Approach to the technical review: The review focussed on all aspects of the assessment process: the selection process for marine biodiversity components (species and benthic habitats) to be assessed under MSFD and BHD; the status components (criteria/parameters) required to be used for assessing species and habitats, and the associated indicators used; approaches to indicator calculation; methods for assessing status at criterion/parameter level (based on indicators) and establishing thresholds; approaches for integration of status assessment at higher levels; scales of assessment and reporting; and guidance for monitoring and data collection. This was structured according to two levels of technical analysis:

- An EU-level review of the requirements, criteria and methodologies agreed under the three directives, in the corresponding committees and their Working Groups. The specific requirements and reporting guidance for the different directives may constrain the actual integration of the assessments. The EU-level review identified which aspects are comparable between BHD and MSFD (the 'touching points'), and therefore areas where integration is possible, and limitations to it.
- A Member State-level review and analysis of how marine monitoring and assessments were done in practice and where the synergies were between the Directives, also considering possible regional differences. This analysis was based on comparing the technical characteristics and results of the marine assessments reported by Member States under MSFD and BHD during 2018 and 2019 (the official reporting dates although some reporting was later) respectively and took into consideration all the aspects of the assessment process. This drew on information collected through (i) a desk review of information reported by the Member States in the BHD and MSFD reports, (ii) interviews with key stakeholders from the Member States.

Findings and conclusions

Gaps and inconsistencies in processes, methods and assessments

The primary barrier to greater coordination between the Directives is the non-coherence of the spatial, temporal and species/habitat reporting requirements. Member States indicated that aligning the reporting times, spatial scales and other parameters would support greater coordination and movement towards the 'one assessment' objective. Alignment of the policies would be expected to encourage Member States to further harmonise their monitoring programmes and to establish joint monitoring programmes beyond their national waters, especially for highly mobile species.

The reporting cycle: Where assessments are reused between the BHD and MSFD, whichever is reported on last may not be drawing on the most recent data available. In some cases, the same monitoring sources are drawn on, with the latest data available used for each of the Directive assessments – hence there may be discrepancies in the assessments of marine habitats and species assessments common to more than one Directive. Alignment of reporting cycles could help resolve this issue.

Nearly every Member State reported that differences in the reporting times between BHD and MSFD make it harder to reuse the assessments. This was the most common barrier to greater integration of the reporting of the directives raised by Member States. There was divergence of opinion on whether BHD data and assessments should feed MSFD or vice-versa. However, there was near universal agreement that the timing of the Directives' reporting should be harmonised.

Alignment of scales and other requirements between the Directives would support data and assessment reuse ambitions, but also bring investment implications for Member States' existing monitoring programmes, data flows and management systems, which may need to be updated. However, such upfront costs of alignment may be offset over the longer term by potential savings of more data and assessment reuse.

The biodiversity components assessed: The level of integration between BHD and MSFD varies across biodiversity components. Birds and mammals appear to be the best integrated between directives, with >50% of the species assessed under BHD also being reported under MSFD (by the Member State sample). Marine reptiles (turtles) are the least reported species by the Member State sample, with low integration between HD and MSFD assessments (e.g. MSFD assessments were only undertaken for a third of the HD turtle assessments). Marine reptiles also have the highest incidence of reported non-assessed cases (designated as 'unknown' or 'not assessed' status). This is often due to insufficient data to support the assessment, and possibly the result of these species being occasional visitors to some areas. Fish is the biodiversity component least integrated, but few fish species are included in the HD and these are migratory species or endemic coastal species that are seldom reported in MSFD assessments.

It is often the difference in the main parameters/criteria used that determine the outcome of the assessment. Due to this, outcomes for each species/habitat (favourable/good status) were sometimes contradictory between the MSFD and the HD (e.g. 49% of the assessments for marine mammals). Other influencing factors were differences in the way parameters/criteria assessments are combined to assess a species or habitat, the scale of assessment and the inclusion of the main pressures only for assessing the status under HD.

The absence of an indicator or assessment method defined by the Member State for a given criterion (e.g. mammal assessments by France) are the main reasons for the failure to assess habitat for the species, especially under MSFD, highlighting that more work is needed by Member States in this area.

The methods employed for assessing biodiversity components: HD parameters for species assessments are re-used to estimate MSFD criteria in less than a third of the assessments considered in this study. This appears to be related to data availability, which may be a limiting factor particularly for the more data-driven assessments under MSFD. Differences in the timing of assessments and incompatibilities of reporting requirements also contribute to the lack of re-use between directives.

The nature (typology) of benthic habitats differs between HD and MSFD, and this influences the integration of assessments under HD and MSFD. There is variability across Member States on how they are integrated between directives (in particular how Annex I habitats assessments are reported in MSFD, either contributing to the assessment of benthic broad habitat types, or reported separately as 'other habitat types').

The spatial scale at which the status assessment is undertaken for both species and habitats also influences the outcome, and therefore the degree of integration between BHD and MSFD.

There are gaps in the assessments of parameters/criteria reported under BHD and MSFD, the most evident ones being for the distribution (D1C4) of bird species under MSFD, the habitat (Habitat for the species/D1C5) especially of mammals and reptiles under both HD and MSFD, as well as for population demographic characteristics (D1C3) under MSFD. These are often reported as 'not assessed' or in 'unknown' status, the main reason being a lack of data to support the quantitative estimate of the indicators for these parameters/criteria. The correspondence between HD parameters and MSFD criteria is only partial for habitat assessments, possibly accounting for differences in the habitat assessments under the two directives.

The 'one out all out' (OOAO) rule is the most common approach used in both HD and MSFD to integrate the status assessments from parameter/criterion level to the species/ habitat level; this is the assessment characteristic that is probably best integrated between directives; the HD guidance gives clear direction towards using this method.

Re-use of RSC indicators and the associated thresholds is more common for mammal assessments, particularly where mammal population abundance and distribution (D1C2 and D1C4) were assessed under MSFD, but no indication of such standards was found for

correspondent HD assessments. A limitation in the direct re-use of RSC assessments for MSFD is the mismatch between the baseline-based approach used for the evaluation of many of the RSC indicators and the reference-based approach required by the MSFD. A limitation in the re-use of RSC assessments for HD is differences in the specific reporting requirements.

Capacity and capability of Member States

Data and monitoring issues: Data availability is still inadequate, meaning a status assessment of 'unknown' is frequently recorded under MSFD. In particular, an increase in monitoring effort is needed to fill this gap in the assessments, especially for marine reptiles, and with regard to bird distribution and mammal and reptile habitats under both BHD and MSFD.

Establishing monitoring programmes requires the input of complementary human capital – money, skills, time and effort – to design, test and implement and to generate time series data. A deficiency or lack of consistency in any of these human capitals creates anomalies in the monitoring, assessment and reporting. The comprehensiveness and quality of Member State monitoring programmes, and hence reporting, is hampered by insufficient budgets. Budget constraints impact on the geographic and feature scope of monitoring and on its temporal frequency and consistency. The higher variability (and possibly discrepancy) between the geographical area and time span of the assessments under BHD and MSFD occurs most often for those Member States with wider coverage within and across multiple regions.

Time-limited projects are an important data source for the Directives. However, Member States report challenges in ensuring that the scope and timescales of such projects adequately support reporting obligations, and ensuring that the systems are in place to enable continuation of the initiated monitoring over the longer term.

National coordination: The extent of internal coordination varies across Member States. Several Member States have different bodies responsible for implementing the different directives, which in some cases leads to disjointed monitoring and assessment created by competing demands. Coordination across departments and teams often occurs on an informal basis. Whilst in some cases this can work well, it presents risks to the long-term effective of coordination. Particularly when obligations and formal channels for data sharing are weak, this can hinder reuse and consistency. Some Member States report challenges in managing the flow of data from those responsible for collection up to those responsible for assessments and reporting. A large number of organisations are involved in MSFD and BHD data collection. Use of information systems can support data coordination, data sharing and more streamlined processes within a Member State.

Regional coordination: The RSCs play an important role for the MSFD as a platform to promote coordination across Member States and for the design of common frameworks. However, the extent to which they consider the requirements of the BHD, and the strength of obligation for them to do so, varies. Having international cooperation in place through RSC or other agreements such as EEAs EIONET, ACCOBAMS and ICES, promotes the standardising of methods, that lead to consistency in the data flows that is a prerequisite in the reuse of assessments. Some Member States highlighted the role of joint monitoring programmes/projects in fostering regional coordination for MSFD.

Recommendations

Recommendations for future actions to support improved BHD-MSFD integration were derived drawing on the results of this project (both the technical analysis and stakeholder interviews). These recommendations reflect the views of the study authors.[1]

[1] This document has been prepared for the European Commission. It reflects the views of the authors. The Commission cannot be held responsible for any use which may be made of the information contained therein.

Actions at European level

At the European level, changes could be made to the policies and reporting requirements, and revised and additional guidance provided to Member States on policy implementation.

Common reporting format: Develop a common reporting format/system, at least for assessment at species/habitat level and below (criteria/parameters). An initial mapping of common fields could identify potential for linkages; however, broader changes to establish greater standardization of reporting requirements across Directives would be needed to move more comprehensively towards a common reporting format or some form of linked reporting.

Align reporting cycle timings: A common assessment cycle should be adopted, with reference periods for data collection and assessment being aligned across the directives, with no lag, and the reporting deadlines harmonised. Harmonisation of reporting cycles should be undertaken in parallel to harmonisation of other aspects of the monitoring-assessment-reporting chain requirements to avoid a 'resources' bottleneck at or just prior to the assessment period. In addressing issues of reporting cycles, wider coordination consideration should be given to the beneficial use of outputs for other EU policies.

More prescriptive reuse of BHD parameters in MSFD: As a minimum, require Member States to use the same type of BHD parameter to estimate the equivalent criterion for the same species/habitat under MSFD in order to reduce differences in assessment results. Other differences between the directives (e.g. scale of the reporting unit or at which FRV/thresholds are to be estimated) may hinder the direct transfer of the BHD assessment into MSFD, and should also be resolved to enable reuse of assessments.

Harmonisation of pressures: Use of pressures should be harmonized, by (i) standardizing pressure definitions across directives (with or without the link to activities), (ii) requiring pressures to be reported at species/habitat level rather than feature level in MSFD. Requiring an additional assessment criterion D1C6 similar to 'Future prospects' to be included in the MSFD assessment of a species/habitat may also help to harmonize assessments between directives, although this might contrast with the data-driven approach of the MSFD.

Trends: The discrepancy in the nature of trends presented in MSFD and BHD should be resolved (e.g. by formally including trends in the GES assessment, as in BHD) to improve harmonization of the assessment outcomes between directives.

Spatial aggregation / disaggregation: MRUs should be ecologically meaningful, geographically coherent and internationally agreed. A clear hierarchy between MRUs under BHD and MSFD and rules for aggregating/disaggregating assessments (including data, reference conditions/thresholds, methods etc.) across scales (e.g. local, to national, to regional, to European) is required. This would improve the standardisation of approaches across Member States. Fully resolving the issue of different scales affecting assessments under the different directives requires adoption of the same scale across directives.

Guidance on benthic habitats reporting: Benthic habitats are defined differently in BHD and MSFD, with Member States adopting differing approaches. A clear protocol should be defined to standardise habitat definitions and harmonise approaches across Member States, with the ambition to ensure comparability in habitat definitions between the directives.

BHD-MSFD-RSC harmonisation: Discussions should be held between the EC, RSCs, Member States, and relevant working groups about how to further tackle the issue (i.e. a three-way BHD-MSFD-RSC harmonisation protocol) and the potential contrasting requirements. If such harmonization cannot be achieved for some aspects, then guidance

should be given to Member States about which integration (MSFD-RSC or MSFD-BHD) should be prioritized.

Training / guidance delivery to Member States: To better deliver the guidance to Member States, the EC should enable methodological seminars/workshops for the implementers (with a special focus on the ministries) leading to knowledge and skills improvement for data collection, monitoring, assessment and reporting for the Directives.

Addressing financial constraints: Opportunities should be explored to ensure that Member States are, or can be made, fully aware of how different EU funds could be used and that EU funds are as accessible (in their focus and design) as it is appropriate for them to be.

Minimising new financial burden: Changes in assessment and reporting requirements should be made mindful of any knock-on effects on, and hence additional costs of, monitoring and data collection, and should seek to create opportunities for efficiencies.

Actions at Member State level

Commonalities in reporting: As all marine bird, mammal and reptile species are to be reported under BHD, Member States should make sure that this is the case, hence all of these species reported under MSFD should also include in BHD reports, and an optimal selection of species should be done for MSFD assessments.

Individual species assessments: Member States assessments of Elements under MSFD should be undertaken using parameters defined at the individual species level, rather than for functional groups. If the latter is derived from RSC indicators that aggregate the assessment at functional group level, the data behind these RSC indicators should be disaggregated by species, where possible, to support the MSFD assessment, thus allowing some coordination with the regional assessment and, at the same time, alignment with BHD.

Reporting broad benthic habitats under MSFD: Member States should ensure that MSFD obligations for reporting on broadscale habitats (and only as additional habitats, on other habitat types) are satisfied. This is crucial to get a complete and comparable assessment of entire benthic ecosystems.

Improved biodiversity monitoring (particularly for reptiles): Data deficiencies need to be addressed to improve knowledge of the status of numerous marine species. The feasibility of non-traditional monitoring methods (e.g. telemetry and tracking methods, participatory and citizen science) should be explored along with routes (e.g. international working groups, existing monitoring networks) to establish standardised protocols for their implementation.

Efficiencies in data collection: Review opportunities to increase the use of citizen science (directly and through NGOs) to support collect of data across more fields, as well as new monitoring technologies.

Building Member State capacity: Examples of training and good practice should be shared across organisations and between Member States (e.g. by twinning, mentoring, workshop etc.), especially on a regional basis.

Member State internal cooperation: Member States should ensure that they have a formalised institutional process to unify approaches and facilitate coordination, within and across all relevant ministries/agencies.

Ensuring data flows: Explore opportunities to formalise the obligations of data providers and/or establish guiding principles that improvement the flow of data between organisations.

Final concluding remarks

Harmonisation between the Directives

- There should be more coherence between directives regarding indicators, timeframe and reporting periods, and species and habitats reported and with an emphasis on a common terminology e.g. GES/FCS etc.
- A common reporting cycle should be adopted, and so a change to the monitoring, assessment and reporting timing with either BHD being slightly before the MSFD or preferably the two harmonised.
- There should be formal coordination and cross-calibration (a) between the implementation of BHD and MSFD and the requirements of the RSC, (b) between all the marine and transitional water directives not just these two, and (c) between the four Regional Sea areas.
- The reporting requirements should be harmonised between BHD and MSFD to reduce the gaps and increase reuse of the same reported information.

Improving clarity on assessment issues/methods, improved guidance

- More guidelines/guidance and training is needed, from the top down (i.e. EC, RSCs), between countries and from more to less experienced countries.
- There should be clearer and more compatible and comparable instructions and guidelines on the interpretation of criteria and indicators, on the methods for assessment and on streamlining reporting and inputting of data, the data flow and storage.
- There should be a revision, coordination and harmonisation of habitat definitions between directives (e.g. broad and other habitats).
- There is the need to coordinate regional monitoring programmes between and within countries and regional seas, to streamline the species used or their surrogates, and to avoid double counting within and between countries because of species migrations.
- There is the need for more data to support the quantitative estimate of the indicators and their use in assessments under the directives.

Implementation issues at RSC and Member State levels

- The different spatial geographical elements (inland to marine, inshore to offshore) should be integrated to give the bigger and more complete picture and increase the geographical coherence of the directives.
- There should be a better definition of baselines and thresholds and a more standardised use of these in reporting, at least between Member States sharing the same sea basin.
- Internal coordination within Member States can benefit from formalised commitments to coordinated monitoring, assessment and reporting, supported by structures and tools to facilitate that coordination.
- Addressing financial constraints which limit the quality and comprehensiveness of monitoring, assessment and reporting should consider both opportunities for greater efficiencies (through harmonisation opportunities and alternative approaches to monitoring and cost sharing), and ensure access to available EU and other funds is maximised.
- There needs to be increased consultation and formalised involvement with stakeholders, especially those with a monitoring and assessment capability in a way that enhances available capacity and ensures data suitability and availability.

1 Introduction

ICF, MRAG, University of Hull and partners were commissioned by the European Commission, DG Environment, under ENV.C.2/FRA/2016/0017 to undertake a study to support the Commission's work to better coordinate assessments of marine species and habitats under the Birds and Habitats Directives (BHD) and the Marine Strategy Framework Directive (MSFD).

The project comprised two tasks. Task 1 reviewed the *processes* involved in monitoring and reporting at the Member State level, whilst Task 2 reviewed the *technical* aspects of marine species and habitat assessments (undertaken by Member States (MSs), and an assessment of their integration between BHD and MSFD. The report identifies gaps and opportunities for improved coordination and streamlining across the Directives.

1.1 Study context, objectives and scope

1.1.1 Study context

Environmental monitoring and reporting of EU environmental policy provides information that is used to assess compliance with legal obligations, to help build the evidence base required for implementation and policy making, and to provide information more generally to organisations and citizens on how well policy is delivering its environmental, economic and social objectives. The streamlining of environmental monitoring and reporting is an important part of the Commission's Better Regulation agenda. Whilst there have been ongoing efforts to streamline environmental monitoring and reporting – such as for the BHD – there is recognition that the current obligations, in some cases, result in unnecessary administrative burden and do not adequately satisfy the information needs. It is emphasised that implementation of the Directives by Member States is via their own enabling legislation; these are discussed further in the Project Task 2 report.

Action to improve coherence between the Birds Directive and Habitats Directive resulted in a common format and aligned reporting cycles (implemented in the 10th Article 12 report of 2008-12), providing for simultaneous analysis of the Directives. The MSFD requires Member States to establish coordinated monitoring programmes which are compatible with monitoring under other EC legislation leading to coordinated assessments, including those for the BHD. Action to support this has been ongoing for a few years, namely through the MSFD Common Implementation Strategy (CIS), but also with the 2014 HOPE conference[2], workshops[3] and joint meetings on MSFD-Nature reporting[4].

The workshops and meetings recognised that joint monitoring, and its resulting data and/or assessments, could produce compatible outcomes, save resources and allow an assessment based on a common data set. This relates to the findings on efficiency and effectiveness of the Fitness Check of Reporting and Monitoring of EU Environment Policy – that burdens can be reduced through streamlining and that improved consistency in assessment conclusions across the Directives would avoid conflicting data/positions and improve understanding and policy making. This has particular resonance in a trans-boundary context. It was recognised that the process of harmonising assessment and reporting will drive streamlined monitoring, data and information, and at the 2018 workshops discussions focussed on the need to address the reporting timelines of the Directives (including the Water Framework Directive) and to strive for common

[2] Healthy Oceans - Productive Ecosystems (HOPE), Brussels, 3-4 March

[3] E.g. Workshop on coordinated implementation of nature, biodiversity, marine and water policies, Brussels, 2-3 December 2014

[4] Joint meeting on biodiversity assessment and reporting under the Marine Strategy Framework Directive MSFD and Habitats and Birds Directives (HBD), Brussels, 23 March 2018, Brussels

assessment systems rather than linked systems. Hence the current project focusses on monitoring, assessment and reporting for the directives.

The workshops provided fora for discussions of the issues and opportunities for coordinated assessment across the Directives and allowed Member State (MS) existing practices and initiatives to be highlighted. However, they were not suited to providing the evidence base needed to develop a strategic understanding of the issues and opportunities. The present study is a direct response to this, providing an improved evidence base to support future coordination efforts.

1.1.2 Study aims and objectives

The overall objective of the study was to establish an evidence-based understanding of the current level of coordination, alignment and efficiency of the BHD and MSFD monitoring, assessment and reporting on marine species and habitats.

The specific objectives, linked one-to-one with the two study tasks, were:

- To review the processes involved in monitoring, reporting and assessment at the Member State level, to support the streamlining of the administrative steps of implementing the BHD and MSFD with regards to marine species and habitat monitoring, reporting and assessment.
- To compare the technical aspects of the marine biodiversity assessments made by Member States under the BHD and MSFD, to support efforts to better integrate marine species and habitat assessments under the three directives.

1.1.3 Study scope and definitions

The study scope is defined as:

- Specific elements of reporting: The study is focussed on marine species and habitats. For the MSFD this related to assessments made for descriptors D1 Birds, D1 Mammals, D1 Reptiles, D1 Fish, and D6 Benthic broad habitats. For the BHD this relates to all marine birds, mammals and reptiles, as well as fish of conservation importance, and the eight habitat types for 'open sea and tidal areas'. Within this, the study focusses on the aspects that are common to both the BHD and MSFD.
- Sample of Member States: The study is based on reviews of reporting in a sample of nine Member States (Croatia, Estonia, Finland, France, Germany, Malta, Netherlands, Romania, and Spain), as well as relevant EU-level guidance and other documents. The sample selected only Member States completed their latest round of reporting against all three Directives, and sought a balance of countries by geography and size.
- Reporting information: The study drew on the latest reporting cycle (2012/13 - 2018 for the MSFD and 2019 for BHD), and the information officially submitted by Member States under the BD Article 12, Habitats Directive Article 17for the reporting period 2013-2018 submitted in 2019 and MSFD Article 17 for the period 2012 to 2018 and related EU level documents.

Definitions of terms and how they are used in the report are given below:

- Assessment (e.g., species and habitats assessments under MSFD and BHD) refers generally to the full process from data collection to final reporting to the EU. The process is broken down more specifically as:
  - **Reporting:** preparing and submitting the required xml and text reports to the Commission
  - **Assessments:** the final analysis used to determine the status of habitat or species.

  - **Monitoring programmes** are the structured data collection programmes, and activities that contribute data to the assessments.
  - **Data Collection** are the activities that generate the raw data used in the assessments, such as sea surveys, species counts, transects, etc.

- Integration (of the assessments between MSFD and BHD) reflects how well the different aspects of the assessment and reporting requirement are harmonised by a Member State, towards the ideal target where they "monitor one species or habitat once and assess it once" while meeting the reporting requirements of both directives to produce a single assessment for both policy areas. Integration between assessments under MSFD and BHD is not a binary condition (integrated/not integrated), but integration can be achieved with different degrees, depending on how many aspects of the assessment process have been harmonised (e.g. species and habitats assessed, parameters/criteria and indicators, assessment methods and thresholds, spatial and temporal scales, data informing the assessment etc.).
- Indicators, Parameters and Criteria: BHD require that species/habitats assessments are undertaken and reported considering a set of predefined parameters (e.g. species range, population abundance). MSFD also requires that species/habitats assessments are undertaken according to a set of criteria (e.g. bycatch mortality rate, abundance), leaving Member States with the freedom of selecting the best way of measuring and assess that criterion. A correspondence between 'parameters' in BHD and 'criteria' in MSFD is established (see section 7.2). However, the term 'parameter' is also used in MSFD reporting to identify the different ways used to measure a criterion, whereas this distinction does not occur in BHD (for which the way to measure the parameter is predefined, e.g. using 'surface area' to measure 'range'). To avoid confusion, the term 'indicators' is used in this report to identify the ways BHD parameters and MSFD criteria are measured/estimated (see section 7.4).

1.2 Report structure

This report presents the results and conclusions from both the process and technical review. It is presented in multiple 'parts' and is supported by a separate annexes document. This report is structured as follows:

- Section 2 sets out the methodology for the study, separately for the process and technical reviews.
- Part A, covering Sections 3 to 6, sets out the results of the process review.
- Part B, covering Section 7 to 8, sets out the results of the technical review.
- Part C provides the combined conclusions and recommendations stemming from the process and technical reviews.

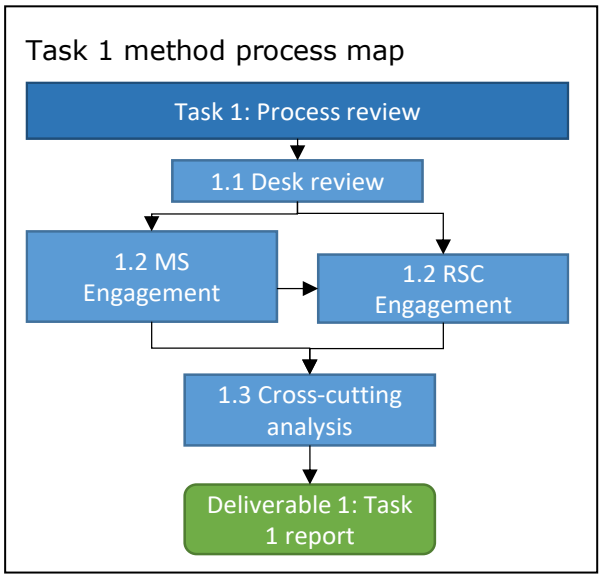
The separate annex document contains detailed data flow process diagrams for each Member State, assessments of technical characteristics as well as additional methodological materials.

2 Methodology

2.1 Task 1: Process review

2.1.1 Introduction

Task 1 undertook research on the sample of MS, as well as the four relevant Regional Sea Conventions (RSCs). A fiche was generated for each Member State that describes the processes and data flows required to report to the MSFD and BHD as well as the interactions with their relevant RSCs.



The fiche drew on information collected from Member State reports and other sources, complemented by interviews with Member States and RSCs which verified the information and gathered opinion on Member State processes and other key research questions.

The main sections of the fiche are shown in Box 1. The fiche information was used to generate process maps for each MS, and (in Task 1.3) analysed across the sample with regard to the study research questions.

Box 1 Member State Fiche Structure

Narrative Summary of processes

A description of the processes and information flows required to report to the MSFD, BHD and interactions with the RSCs, separated into reporting and assessment, monitoring programmes and data collection. An overview for the country is supplemented with narrative summary for each descriptor in the country annex.

Data Flow Diagrams

Diagrams that represent narrative summaries and show the organisations in each Member State that interact with the process. Each country has a high-level overview and then more detailed diagrams describing the flow of information for each descriptor (see separate Annex document).

A SWOT of the process

A Strengths Weaknesses Opportunities and Threat analysis was applied to the processes involved in reporting and how they may help or hinder the reuses of the assessment in each country.

2.1.2 Data collection

2.1.2.1 Desk review

For each of the nine Member States, publicly available information relating to articles 8, 9 and 10 of the MSFD updated under article 17 of the MSFD. and the most recent BHD reporting under articles 17 (HD) and 12 (BD) was reviewed and information on assessment, monitoring and data collection processes extracted[5].

For each Member State, one template was populated per MSFD descriptor and BHD reporting requirement. Completed Member State templates are presented in the country

[5] Only Member states that had completed all their reporting were considered in the study.

annexes (see separate Annex document). Each template includes information on specific assessments, monitoring programmes and data collection activities, the organisations involved at each stage, as well as details of spatial and temporal scopes. Any assumptions made whilst collecting the information were recorded, and gaps in understanding and points for clarification were documented.

To identify assessments for the MSFD, the WISE Marine Portal[6] was used to determine the features (e.g. pelagic-feeding birds), the elements (individual species), and, for each element, the parameters (e.g. abundance of breeding birds) being assessed. For the BHD, information was obtained from Article 12/17 reports found in the EEA's Eionet Central Data Repository (CDR). Information on monitoring programmes collecting data to be used in each assessment was extracted from competent authority websites or dedicated websites relating to reporting or data management in the Member States. The 'related indicator' (typically RSC indicators) in the Wise Marine portal offered another source for describing how assessments are conducted. Monitoring and sub-monitoring schemes were also identified using the BHD section 2.3 of the Member State's general report within the EEA Central Data Repository.

The available Member State information and sources became less clear moving down from assessments to monitoring programmes and to data collection. In addition to official monitoring programmes where found, any activity that contributed data to an assessment was recorded. Details on data collection were not typically provided in Member State MSFD/BHD reports. Such information was extracted from other identified sources and websites. There was variation in the extent of information available between Member States as well as within Member States covering multiple sea regions (e.g. Spain). As such there were gaps in the description of data collection processes.

The information collected through each template was used to develop draft data flow diagrams, which show how data are collected into monitoring programmes, how monitoring programmes feed into assessments, and how, ultimately, this is reported to either the MSFD, BHD or an RSC. They also indicate the key stakeholders involved at each stage.

2.1.2.2 Member State engagement

Interviews with Member States were undertaken to (i) complete and verify the information collected and the draft data flow diagrams, and (ii) gather information and opinion on Member State processes, systems, communication and coordination, as well as the opportunities and barriers to improving coordination and streamlining across the Directives. Interviews were undertaken between May and July 2020 via telephone, using a mixture of one-to-one and group interviews (depending on Member State preferences). In total, 20 interviews were conducted (Table 1).

Table 1. Task 1 process review interviews

Member State	Organisation	Interviewees
Croatia	Ministry of Environmental Protection and Energy (Water Management and Sea Protection Directorate)	1
Croatia	Ministry of Environmental Protection and Energy (Department of Environment and Nature)	2
Croatia	Institute of Oceanography and Fisheries (National Marine Reference Centre)	1
Estonia	Ministry of the Environment	3

[6] https://water.europa.eu/marine/

Member State	Organisation	Interviewees
Estonia	Estonian Environment Agency	1
Finland	Finnish Environment Institute (SYKE)	1
Finland	Parks & Wildlife Finland (Metsähallitus)	1
France	Direction générale de l'aménagement, du logement et de la nature (DGALN)	4
Germany	German Federal Agency for Nature Conservation (BfN)	4
Malta	-	0
Netherlands	Rijkswaterstaat WVL	2
Romania	Ministry of Environment, Water and Forests (Water Management Directorate)	1
Spain	Ministerio para la Transición Ecológica y el Reto Demográfico (MITERD) (Dirección General de las Costas y el Mar)	1
Spain	Ministerio para la Transición Ecológica y el Reto Demográfico (MITERD) (Dirección General de Biodiversidad, Bosques y Desertificación)	2

2.1.2.3 RSC engagement

Interviews with RSCs examined the relationship between competent authorities and RSCs, and cross-checked the information provided by competent authorities in order to strengthen the accuracy of the data flow diagrams. These interviews also elicited the opinions of RSC's on issues of cooperation and coordination. Interviews were conducted in June 2020 via telephone, with one interview for each of the four RSCs: Oslo-Paris Convention (OSPAR, North-East Atlantic), Helsinki Convention (HELCOM, Baltic Sea), Barcelona Convention (UNEP/MAP, Mediterranean Sea) (henceforth, BARCON) and the Bucharest Convention (Black Sea Commission – BSC).

2.1.3 Data analysis

Step 1: Systems analysis. A systematic comparative analysis of the data flow diagrams was undertaken. When making comparisons across the sample, consideration was given to the similarities and differences across the regional seas and the differences in size of the Member States. The comparisons include the extent that assessments were reused, and the types and number of organisations involved. Some data on spatial and temporal extent was collected but was not consistent or comprehensive enough to be included in the analysis.

Step 2: SWOT analysis. A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis for each Member State was undertaken based on the fiches and interviews.

Step 3: RSC cross-cutting analysis. An overview of RSC processes and coordination was established based on the interviews with RSCs and a review of key documents.

Step 4: Qualitative thematic analysis. Interviews with Member States were analysed to draw out key barriers, best practices and opportunities for improved coordination and streamlining.

2.2 Task 2: Technical review

2.2.1 Aspects of scope and terminology

Specific aspects of scope and terminology relevant to the Task 2 technical review:

- 'Assessment' (e.g., species and habitats assessments under MSFD and BHD) is intended to include the full process from monitoring/data collection, to producing an assessment of status (where required) and reporting this to the EU (Figure 1).
- 'Integration' (of the assessments between MSFD and BHD) reflects how well the different aspects of the assessment and reporting requirement are harmonised by a Member State, towards the ideal target where they "monitor one species or habitat once and assess it once" while meeting the reporting requirements of both directives to produce a single assessment for both policy areas. This represents the full integration between assessments and their scales, reporting period, methods and threshold values, despite the specifications of the different Directives (e.g. a different definition of status/condition (Favourable Conservation Status vs Good Environmental Status), variable overlap between MSFD criteria and BHD parameters). Integration between assessments under MSFD and BHD is not a binary condition (integrated/not integrated), but integration can be achieved with different degrees, depending on how many aspects of the assessment process have been harmonised (Figure 2). For example, the same species may have been assessed under both MSFD and HD, but different indicators may have been measured for similar criteria (MSFD) or parameters (HD). In this case, an indicator is the quantitative or qualitative character which will allow change to be detected, e.g. abundance/population size. Although this term is used more commonly in the MSFD, determining the actual or likely change in conservation status of the habitats and species is central to determining any deviation from Favourable Conservation status in a conservation objective due to a plan or project. In some cases, these relate to thresholds, the level at which a management action will be taken; however, different thresholds may have been applied for the assessment of the same indicator, or different monitoring data may have been used to support the assessments under the two directives. The degree to which integration is achieved by a Member State may vary depending on species/habitats assessed in the different regions/subregions. In addition, missed opportunities for integration may be identified, for example when a species (or habitat) has been assessed under BHD but not under MSFD.
- Considering the different levels at which BHD-MSFD integration may be achieved, a set of key questions was defined to direct the research and meet the aims of Task 2 (see Section 2.2.4.4), drawing on the project specification and discussions with the project Steering Group.

Figure 1. The general assessment flow for marine biodiversity components (species and habitats) under the MSFD and BHD

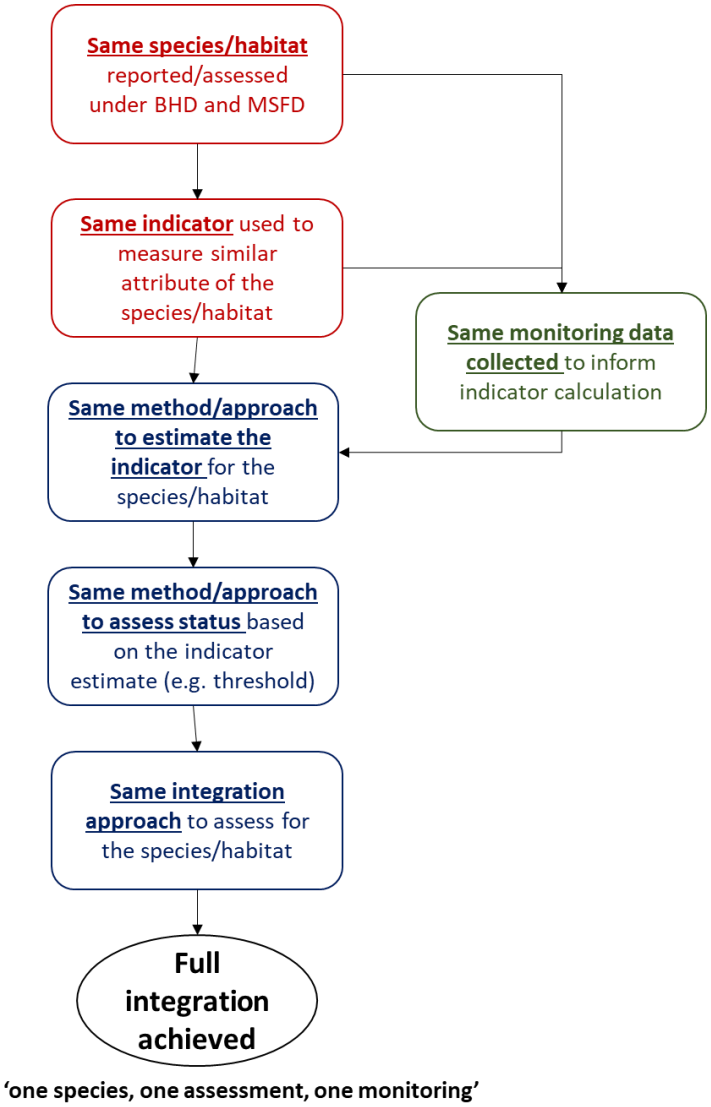
Source: modified from Palialexis et al. 2020

2.2.2 General approach

Task 2 was structured according to two levels of technical analysis:

- An EU-level review of the requirements, criteria and methodologies agreed under the three directives, in the corresponding committees and their Working Groups. The specific requirements and reporting guidance for the different directives may constrain the actual integration of the assessments. The EU-level review identified which aspects are comparable between BHD and MSFD (the 'touching points'), and therefore areas where integration is possible, and limitations to it.
- A Member State-level review and analysis of how marine monitoring and assessments were done in practice and where the synergies were between the Directives, also considering possible regional differences. This analysis was based on comparing the technical characteristics and results of the marine assessments reported by Member States under MSFD and BHD during 2018 and 2019 (the official reporting dates although some reporting was later) respectively and took into consideration all the aspects of the assessment process, as specified in Section 1.1.3. The collection of information on the assessment processes and results for each Member States was carried out in two steps:
  - A desk review of information reported by the Member States in the BHD and MSFD reports.
  - Interviews with key stakeholders from the Member State.

Figure 2. Conceptual diagram for how BHD-MSFD integration may be achieved at different levels of the assessment process.



Note: Coloured text distinguishes the three main aspects of the assessment integration, including what has been assessed and where (red), how it has been assessed (blue) and how monitoring supported the assessment (green).

2.2.3 EU-level review

The directive requirements and available EU-level guidance for reporting, assessment and monitoring under MSFD and BHD for the species and benthic habitat biodiversity components were reviewed. The information was mapped according to the following characteristics:

- **General Approach**: the general, high-level structure and approach required for Member State reporting and assessment under MSFD and BHD. These included for example aspects related to whether Member States are required to report on both data and status assessments, at what level of ecological organisation (e.g. parameter/criteria, species, species groups) Member States are required to report data and undertake status assessments, whether assessments are integrated across different levels of biological organisation (e.g. from criteria/parameters to species level and then to species group level).

- **Species-Habitat selection**: selection process for biodiversity components (species and habitats, and associated groups) to be assessed under MSFD and BHD. This included how species and habitats are defined and specified by the directives, and the criteria for their selection for assessment.
- **Status components and indicators**: Assessment criteria/parameters and associated indicators for the assessment of the biodiversity components under MSFD and BHD. This detailed the status components (criteria/parameters) required to be used for assessing species and habitats, the associated indicators used (also with reference to indicators used for Regional Sea Convention (RSC) assessments), their unit, and how they are to be reported.
- **Indicator calculation**: Guidance on methods used to calculate/estimate indicators used for the assessments. This included information about the possible differences in the evidence base used, level of standardisation, and methodological approaches and specifications (both in general and for the specific indicators for a species or habitat criterion/parameter).
- **Assessment and thresholds**: Methods for assessing status at criterion/parameter level (based on indicators) and establishing thresholds. This included the different methodological approaches required to undertake status assessment at the lowest level (criterion/parameter level for a species or habitat type), including what types of threshold values and reference values are required, how they are to be defined and used for MSFD and BHD assessments.
- **Integrated assessment**: Approaches for integration of status assessment at higher levels. This included general approaches and methodologies required to integrate the status assessment from criteria/parameter level to higher levels (species or habitat type, and, where required, species/habitat groups).
- **Scales**: Scales of assessment and reporting. This reviewed the spatial and temporal scales required for reporting and assessing species and habitats under MSFD and BHD.
- **Monitoring**: Guidance for monitoring and data collection. This included guidance on establishing monitoring programmes, their scale, methods, standardisation and monitoring methods relevant to different indicators, where these are indicated in EU-level requirements and reporting guidance.

Tabulation of this information in Excel allowed the mapping and comparison of the above characteristics between the BD, HD and MSFD. Overlaps and commonalities between the requirements of the different directives were identified in order to establish the aspects/steps of the assessment process for which the alignment between directives could be further explored at Member State level.

2.2.4 Member State-level review and analysis

2.2.4.1 Data collation from Member State reports

Evidence of how Member States have undertaken the assessment process for marine species and habitats was collected based on the information provided in the latest (2018-2019) BHD/MSFD reports and associated documentation, as also translated and interpreted by the project research team. Online portals such as WISE Marine[7] (for MSFD reporting data explorer for Article 8 (Assessments) - 2018 reporting exercise) and Eionet Central Data Repository[8] (for latest Member State reports under MSFD Art. 17, and the

[7] https://water.europa.eu/marine/data-maps-and-tools/msfd-reporting-information-products/msfd-reporting-data-explorer/msfd-a8

[8] https://cdr.eionet.europa.eu/

species and habitat factsheets and general reports from BHD reports on implementation measures) were the primary sources of evidence used for this data collation.

The full list of species/habitats reported by Member States for the selected ecological groups (marine birds, mammals, reptiles, fish, benthic habitats) were compiled to provide an overview of what has been reported overall and where.

To aid the data collection at Member State level, a tool was created in the form of a tabular questionnaire in Excel (hereafter referred to as the 'template'). The template structure was designed so that columns identified the different assessment samples (as defined at the appropriate scale, e.g. assessment of a parameter/criterion for a species/habitat or overall assessment of the species/habitat, as reported by a Member State under one directive in a given region/subregion) and rows identified the characterising variables (i.e. the questions and associated answers). Structured coding was used to record assessment characteristics in most fields (questions) of the template, i.e. the relevant information was collated according to standardised, meaningful categories identified *a priori* (designed drawing on the EU-level review), thus ensuring comparability between different templates and data subsets (i.e. between Member States, Directives, Regions/Subregions, etc.). In addition, descriptive information was also collected using open-text fields for clarifications, explanations or providing details on the different aspects of the assessment. Where possible, appropriate emergent coding were identified *a posteriori* for these latter fields, based on the information that was received for the sample of Member States, so that this information could also be used quantitatively in the cross-cutting analysis.

The template contents (questions and associated categorised answers) were devised to cover all the main aspects relevant to the marine biodiversity assessment process, as outlined in Table 2 (see Annex 11 for the detailed list of questions and categorised answers in the template).

Table 2. Content outline of the template designed for the collection of data at Member State level. The sections of the template where the specific contents were to be reported are also indicated (see template Excel file and associated instructions for details – 0).

Process	Template contents		Template section
Reporting	Who has reported	Member State	A
	Relevant Directive	MSFD, HD, BD	A
	What has been reported	Species or habitats	A, B
		Spatial and temporal scope	A, B
Assessment	How has it has been assessed	MSFD criterion/ BHD parameter assessed	C1 (+B)
		Indicator used *[name and description, source/standard, type of estimate, method for its calculation, evidence base]*	C1 (+B)
		Status assessment at criterion/parameter level *[approach type (trends, thresholds/reference condition, etc), threshold (type, method, value definition, standard, evidence base, spatial and temporal scale, and status assessment result, QA/QC]*	C1 (+B)

Process	Template contents		Template section
		Integration of status at species/habitat level *[methodological standard, integration rule]*	C2 (+B)
Monitoring & data collection	What has been monitored	Species or habitats	D
		Indicator informed	D
		Spatial and temporal scope	D
	How it has been monitored	Monitoring programme *[coordination, resource base, primary purpose, data use, spatial and temporal scale]*	D
		Data collection *[type of data, method, standard, spatial and temporal scale]*	D

The detailed collection of information for species/habitat assessments using the template was undertaken for a selection of species/habitats representative of the ecological groups of interest, and of different functional groups within these, where possible. Species/habitats were also selected taking into account their frequency of occurrence in the reported assessments, in order to maximise coverage (hence comparability) across directives, Member States and regions. The resulting selection is detailed in Annex 2.

For each Member State, templates were compiled for the assessments of the selected species/habitats, separately for the different ecological groups and directives. Where multiple assessments of the same species or habitat in different areas (e.g. regions/subregions) was undertaken by a Member State, these were included as separate samples in the template. Where assessments under MSFD were undertaken by a Member State at a spatial scale which may be a national level or may be finer than subregion (subdivision within a subregion); the assessment of one subdivision per subregion only was included in the template as representative of the subregion.

2.2.4.2 Interviews with Member State stakeholders

Interviews with Member States (competent authorities and relevant national research institutes; Table 3) were undertaken to gather information on the issues and obstacles encountered by Member States in integrating species and habitats assessments under MSFD and BHD, how these obstacles were overcome (if at all), and what is needed to do it and to better harmonise the assessments between directives. Where possible (depending on the status of template compilation), interviews were also used to clarify discrepancies in the assessments as observed from the templates.

The interviews were primarily based on a high-level discussion seeking the expert opinion of the Member States on the status and aspects of integration, as informed by their direct experience of the assessments undertaken by their respective Member State. The interview topic guide is in Annex 13.

Notes were compiled from each interview and a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis was undertaken. This information was used in support of the more detailed results obtained from the analysis of the templates, by integrating the narrative about Member State-level assessments and their integration, as well as to formulate recommendations.

Table 3. Interviewees consulted for the Technical Review

Country	Interviewees organisation (number of interviewees)
Estonia	Estonian Ministry of Environment (x1)
Finland	SYKE (x2), Finnish Parks and Wildlife (x1))
Germany	Federal Agency for Nature Conservation, Division II 3.2: EEZ Marine Protected Areas (x4)
Netherlands	n/a (*)
France	Muséum national d'Histoire naturelle (x1); Office Français de la Biodiversité (x2)
Spain	Ministry for the Ecological Transition and the Demographic challenge (x2)
Croatia	Water Management and Sea Protection Directorate, Ministry of Economy and Sustainable Development (x4)
Malta	Environment and Resources Authority (x7)
Romania	Water Management Directorate, Ministry of Environment, Water and Forest (x1)

(*) The Dutch contacts declined the interview highlighting the Netherlands had integrated monitoring and reporting approaches stemming from all three directives as far as possible, as well as with RSCs. Written comments were provided.

2.2.4.3 Data analysis

Analysis of templates

The Member State-level templates were collated into a single dataset in order to analyse and extract the relevant information from the Member State-level analysis. Overall, the dataset thus combined included a total of 174 species/habitat assessments (i.e. individual species/habitats reported by the Member States under the different directives, in some cases across multiple regions/subregions), with a total of 631 individual parameters/criteria reported overall. A total of 41 (coded) variables representing different technical characteristics of the assessments were included in the dataset.

Subsets of technical characteristics (variables) were identified in the dataset based on their ability to characterise different aspects of the assessment process. For example, the type of estimate reported, the method used for calculation and the evidence base were used to characterise how the different indicators were estimated under BHD (for the set parameters) and MSFD (for the different criteria). The comparative analysis of these subsets aimed at quantifying, where possible, the degree of overlap (or similarity) in the approaches used under the different directives, considering the technical characteristics both individually, and in combination (for the different subsets/aspects of the assessment), as a proxy for BHD-MSFD integration.

The frequency of occurrence of the different technical characteristics of the assessments of species/habitats and of their relevant attributes (parameters/criteria) was calculated across all the assessments reported by Member States for the different ecological groups under BHD or MSFD in the studied dataset (see 0).

In order to derive the similarities as objectively as possible, the similarity between BHD and MSFD was estimated for each group of technical characteristics (qualifying different methodological aspects of the assessments, as per questions in the template) using the Bray-Curtis similarity coefficient (in Primer v6; Clarke & Gorley, 2006). Similarity values were expressed as %, where 0% denoted assessment samples with no technical characteristics in common, and 100% samples with the same technical characteristics used with the same relative frequency in the assessments. As there were several cases where some technical characteristics could not be ascertained from the BHD or MSFD reports (these were recorded as 'not specified' in the template; 0), the BHD-MSFD similarity calculations were based on the relative frequency of occurrence of technical characteristics where these were specified. In this case, the similarity value better reflected the integration of different methods/approaches between BHD and MSFD assessments rather than the variability in how these were reported. Therefore, lower similarity values were used to identify methodological aspects of the assessments that were less well integrated between directives and therefore where improvements could be made.

Patterns in the BHD-MSFD similarity (integration) were explored for the different ecological groups considering the technical characteristics (individually and grouped), considering the different attributes (criteria/parameters) used by Member States to assess the species or habitats, and also exploring regional variability in the similarity values. The interpretation of these patterns of integration towards identifying areas for improvement and associated recommendations was aided by the narrative provided through the stakeholder interviews.

As BHD are more prescriptive for species/habitats to be assessed, methods etc., when assessing overlap/ level of reuse/ duplication/ integration between BHD and MSFD, this was intended as an assessment of reuse/overlap of BHD assessment species/habitats, methods and monitoring with MSFD.

Analysis of Member State interviews

The transcriptions of the interviews were analysed to determine features of Member State marine species and habitats assessments not easily identified in the template completions. The analysis was structured across three aspects: (i) success stories and strengths; (ii) impediments, problems, weaknesses & threats; (iii) opportunities leading to solutions. Common themes and differences across Member States were also drawn out. The results of this qualitative analysis are presented in Section 8.

2.2.4.4 Limitations in the evidence base

An indication of the extent to limitations in the evidence base influences the study's ability to respond to the research questions is set out in Table 4.

Table 4. Technical review research questions and evidence limitations

Technical review research questions	Evidence assessment limitations
What has been monitored/assessed and where? (biodiversity components and supporting physico-chemical data)	Information on supporting physico-chemical data collected by Member States was scarce in the BHD and MSFD reports, and therefore this aspect could not be ascertained.
What are the areas of commonality regarding species and habitats across BHD and MSFD?	-
Are there overlaps or inconsistencies between the elements monitored and assessed under the three directives?	-

Technical review research questions	Evidence assessment limitations
Where are the gaps (geographic, species, habitats, biodiversity components)? Why do they occur?	-
What are the similarities and differences in temporal and spatial scales used? Do the scales affect the assessments?	-
What indicators are being used under each of the directives? Are they the same / giving the same information? If not, could they be?	-
How do MSs integrate indicators or parameters?	-
Do MSs use the same logic and approach in determining threshold values and reference values? How do these relate between BHD and MSFD and what is done at the RSC level vs Member State level?	The review and analysis focused primarily on BHD and MSFD assessments, and the extent to which they related to methods used for RSC assessments was limited to those cases where a clear indication of reuse of RSC method was indicated by the Member State in the BHD and MSFD report.
Are monitoring methods comparable / do they generate compatible data sets?	Detailed information on monitoring (especially specification on data collected) was not always readily available and therefore uncertainty is associated with the answer to this question regarding compatibility of data sets (this was mostly inferred from comparability of methods used).
Are the timescales for data collection comparable?	Detailed information on monitoring was not always readily available and therefore uncertainty is associated with the answer to this question.
Is the collection of supporting physico-chemical data aligned with biological data collection and if not, do the data indicate whether it could be?	Supporting physico-chemical data collected by Member States were not available in the BHD and MSFD reports, and therefore this aspect could not be ascertained.
Is monitoring intensity (frequency, coverage in space and time, number of determinants, etc.,) comparable between Directives?	Detailed information on monitoring was not always readily available and therefore uncertainty is associated with the answer to this question.
To what extent are monitoring strategies and methods under BHD aligned between Member States? Can these data be harmonised for reporting at Regional Sea Level under MSFD, in terms of the parameters/indicators being measured, the spatial scale and timescale of the measurements and the criteria for favourable condition/conservation status or GES?	The review and analysis focused primarily on BHD and MSFD assessments, and the extent to which they related to RSC assessments was limited to those cases where a clear indication of reuse of RSC method was indicated by the Member State in the BHD and MSFD report. A wider review of RSC reporting requirements was not

Technical review research questions	Evidence assessment limitations
	undertaken, and therefore alignment at RSC level was limited.
What is the GES decision relationship with BHD in practical terms?	-
Are there inconsistencies in the final conclusions from the assessments? Why?	-

Part A: Task 1 Process Review

3 Summary of Member State data flow processes

This section, for each of the nine Member States, presents an overview of the processes in place to support their BHD and MSFD marine species and habitat reporting obligations. It includes: (i) an overarching data flow diagram and description of the processes of reporting and assessment, monitoring and data collection under the three Directives, and (ii) a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis of those processes.

3.1 Croatia

3.1.1 Process description

3.1.1.1 Reporting and Assessment

The Ministry of Environmental Protection and Energy is responsible for reporting and assessments under both the MSFD and BHD. The Ministry informs the European Commission when reports are available on the MSFD and BHD reporting portals.

Four bird species are reported to both the BD and the MSFD. These assessments focus on the population size and breeding of the four species for BD, with additional information on abundance and status of population provided for the assessments provided to the MSFD. A working document for each species is produced and forms the basis of the reporting to BD and MSFD.

Six assessments on selected habitats are reported to the HD and the MSFD. Three separate assessments on benthic habitats are also reported to the MSFD. 17 marine species are reported to the HD, including mammal and reptile species. Data collected for HD species are used for the MSFD.

Four assessments are reported to the MSFD D3 descriptor of commercial fish and shellfish stocks. Four assessments related to small toothed cetaceans and two assessments related to loggerhead turtles (*Caretta caretta*) are also reported to the MSFD. Data were not available on the MSFD D1 biodiversity descriptor of fish.

3.1.1.2 Monitoring programmes

There are six overarching monitoring programmes of relevance. These monitoring programmes are run by a number of different types of organisation, including non-governmental organisations (NGOs), public institutions and governmental bodies.

Within the Ministry of Environmental Protection and Energy, the Department of Environment and Nature (previously called the Croatian Agency of Environment and Nature), is responsible for the National Marine Bird Monitoring Programme. Within this programme, the Birds Directive Monitoring Programme provides data for assessments on the four species that are reported for both DB and MSFD. This is complemented by monitoring from the Seabird Conservation Network in the Adriatic (LIFE Artina) project. Within the National Marine Bird Monitoring Programme there are also two sub-monitoring programmes that give focus to pelagic-feeding birds and surface-feeding birds. These sub-monitoring programmes are run by public institutions that safeguard protected areas.

The National Marine Reference Centre, a consortium currently comprised of the Institute of Oceanography and Fisheries and the Ruđer Bošković Institute, monitors habitat condition. The National Marine Reference Centre runs a monitoring programme for habitat condition assessment and a monitoring programme on benthic communities.

Currently, there are no monitoring programmes in place to collect data for the MSFD D1 biodiversity descriptor fish. Five monitoring programmes provide data for assessments on small toothed cetaceans. The Ministry of Environmental Protection and Energy is involved in running most of these monitoring programmes. The Institute of Oceanography and

Fisheries and the Ministry of Environmental Protection and Energy are involved in three sea turtle monitoring programmes. The NGO Plavi svijet (The Blue World Institute) and their partners also run a monitoring programme on loggerhead turtles (*Caretta caretta)* through their NETCET project and monitor small toothed cetaceans through the Adriatic Dolphin Project.

3.1.1.3 Data collection

The Department of Environment and Nature has responsibility for BD data collection activities. These activities are usually outsourced to other entities or experts, typically for counts of nesting pairs. During the MSFD and BD reporting periods, the Department, through the monitoring programmes, collects data on birds from public institutions involved in protected area management.

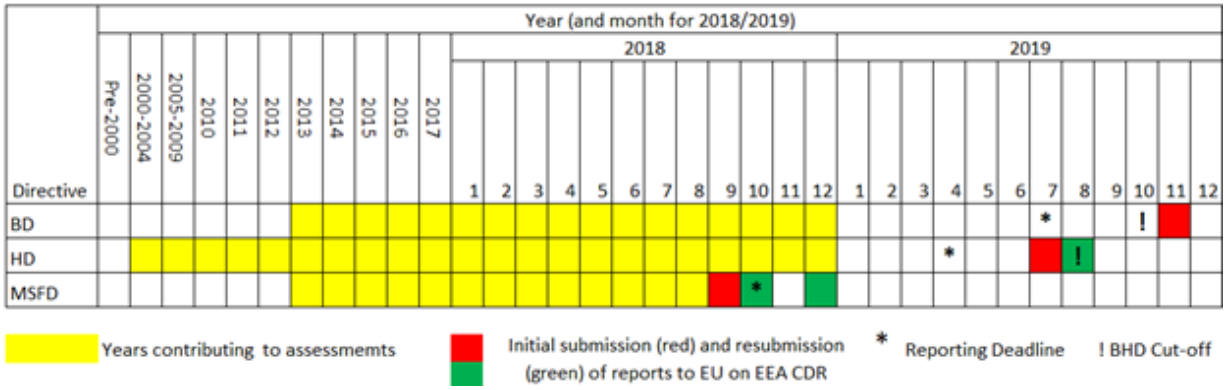
The National Marine Reference Centre collects data on habitats and D1 descriptors: birds, mammals, reptiles and benthic habitats. Activities included species counts, transects, water quality, and data on incidental bycatch of mammals and reptiles. Croatia has developed its own data portal, called MORE, that contains data collected across several monitoring programmes and projects.

3.1.1.4 Timeline

Figure 3 presents the time period of data used in MSFD and BHD assessments[9] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[10], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

In Croatia, the assessed data range is longest for the HD, with some data used in assessments going back to 2004. Assessments for MSFD and BHD use at least some data from 2018. Report submission for MSFD occurred around the deadline, whilst BHD submission occurred approximately one quarter late.

Figure 3. Timelines for assessment and reporting in Croatia

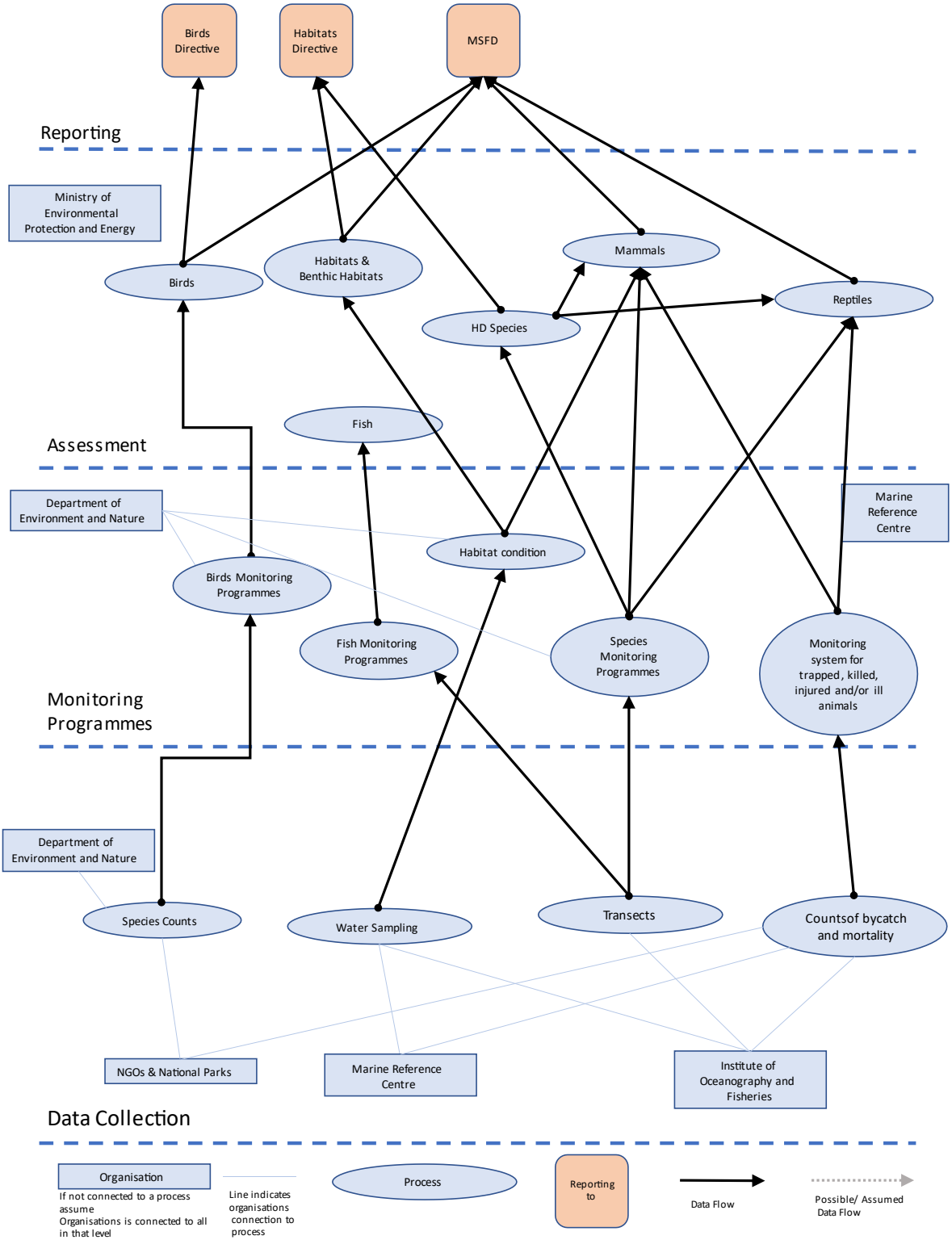


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[9] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[10] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 4. Overview Data Flow Diagram for Croatia



Note: Additional diagrams showing more detailed flow diagrams are available in the separate annex document.

3.1.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• A small number of organisations are involved in MSFD and BHD data collection, which simplifies coordination and administration. • There are examples of assessments being reused: data about benthic habitats from the HD is used for MSFD, and the same working document is used for reporting to BD and the MSFD. Data collected for HD species may be reused for MSFD reporting. • The reporting process is centralised as a single organisation (the Ministry of Environmental Protection and Energy) holds responsibility for reporting assessments to the MSFD and BHD. • Between 2012 – 2018, MSFD monitoring, and some BHD, was centralised in a single organisation (the Institute of Oceanography and Fisheries as the National Marine Reference Centre) responsible for collecting and uploading data. • The portal *MORE* is a centralised system, that contains data for marine indicators, and makes them publicly available. The data in the portal come from multiple sources and projects.	• Changing national legislation is complicated and has hindered the implementation of monitoring programmes. • A lack of financial resources restricts the scope and frequency of monitoring programmes. Scope and frequency varies with budget year to year. • Croatia is one of the Member States with highest levels of unknown data and assessment under BHD. • The *MORE* portal has limitations with regards data for the BD, and currently cannot store all the data required for the BD. • The Member State reported that differences in the reporting deadlines between the BHD and MSFD impacts the reusability of assessments.
Opportunities	**Threats**
• The *MORE* portal could be expanded to hold more data streams and be improved to better reflect the reporting needs (of the BD). • Data on fish species is collected as part of D3 but no assessment for D1 fish species has been produced. • The National Marine Reference Centre for the period 2018 – 2024 will be a consortium comprising the Institute of Oceanography and Fisheries and the Ruđer Bošković Institute. This could improve the capacity of the National Marine Reference Centre.	• As a small country cooperation is generally good between the individuals at the organisations involved, however there is limited formal coordination between the organisations. • There is no formal obligation for NGOs conducting collecting data relevant to the BHD to share the results with the Ministry of Environmental Protection and Energy. Although due to the small number of organisations involved this has not been a problem to date. It is unclear if all the data collected by NGOs is used in the national assessments and EU reporting.

• Adopt joint EU-national funding models for monitoring (as seen in e.g. WFD)	• National financing is the principal source of funding for nearly all monitoring programmes. The budget available to the Department of Environment and Nature has decreased in recent years. If monitoring funding is reduced, long-term data collection could be jeopardised. • The National Marine Reference Centre for the period 2018 – 2024 will be a consortium comprising the Institute of Oceanography and Fisheries and the Ruđer Bošković Institute. Good cooperation and coordination between the two organisations will be required to deliver the reporting requirements.

3.2 Estonia

3.2.1 Process description

3.2.1.1 Reporting and Assessments

The assessments are prepared by the Estonian Ministry of the Environment and the Estonian Environment Agency, with the exception of the fish-related assessments that are prepared by Ministry of the Environment alone.

For birds, the same assessments are used for MSFD, BD, and HELCOM. The fish assessments are reported to MSFD, HD, HELCOM and ICES. The assessments of "the status of benthic habitats" and "the state of the soft-bottom macrofauna" are used for both MSFD, HD, and HELCOM. The Distribution and abundance of seals, and the Reproductive status of seals are reported to MSFD, HD and HELCOM. There is a single assessment for Seabed loss and disturbance, that is reported to MSFD and HELCOM. The species and habitat data collected for the HD is used in the assessments for MSFD, but the differences in the assessment periods and areas make it harder to reuse.

3.2.1.2 Monitoring Programmes

There is a National Environmental Monitoring Programme that feeds six assessments across birds, mammals, fish and habitats. In addition, there is a specific MSFD monitoring programme that feeds into six assessments. In some cases these are the same assessments as in the national programme – this is the case with seals and seabed loss and disturbance.

The Estonian Environment Agency and Estonian Ministry of Environment are involved in both the national monitoring programme and the MSFD-specific monitoring programmes. For fish-related assessments, the Estonian Marine Institute at Tartu University is also involved. For birds, Bird Life Estonia are involved in some monitoring programmes.

3.2.1.3 Data collection

Data collected for the national environmental monitoring programme is intended to be used for all the directives.

For Birds, data collection activities are organised by the Environment Agency with help from volunteers from Bird Life Estonia. Data are collected from the coast on an annual basis.

For Fish, data collection is coordinated by the Estonian Ministry of the Environment Fisheries Department, with the Estonian Marine Institute collecting much of the data. There are also two international surveys that are conducted with ICES. All fish surveys are carried out annually.

For seals, data collection is coordinated by the Environment Agency which contract an NGO ProMare to collect some of the data. Data are collected annually but may be halted when there is no ice coverage.

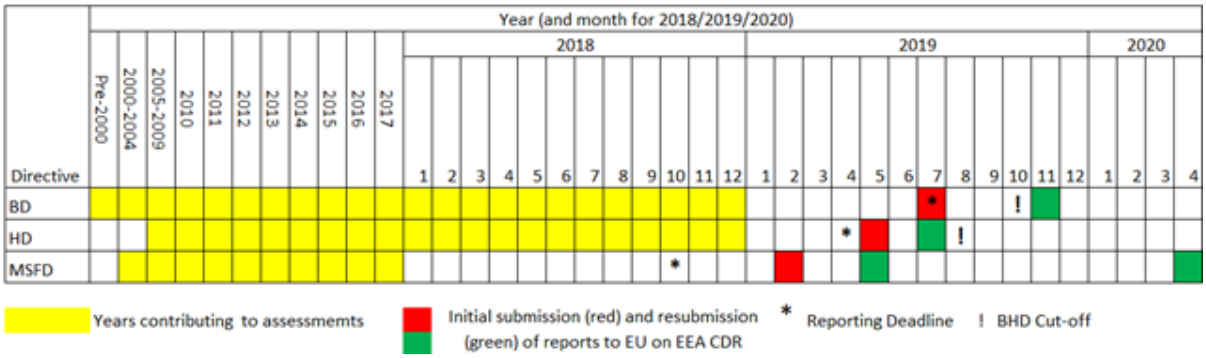
For habitats, data collection is done by the Estonian Marine Institute. Data are collected from at least three different locations within the EEZ, and are sampled annually. A total of 14 locations are sampled at least once every six years.

3.2.1.4 Timeline

Figure 5 presents the time period of data used in MSFD and BHD assessments[11] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[12], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The data period used in assessments is longest for BD, with data on some parameters / criteria coming from 1989. MSFD assessments used data from 2000 up to 2017. Both the BD and HD used more recent data from 2018. BD reporting was delivered in line with the deadline, whilst HD was delivered with a minor delay but was completed by the cut off for the second delivery at the end of August. MSFD reporting was significantly after the deadline and was not concluded until 18 months after the deadline, after the Estonian reporting for BD and HD had concluded.

Figure 5. Timelines for assessment and reporting in Estonia

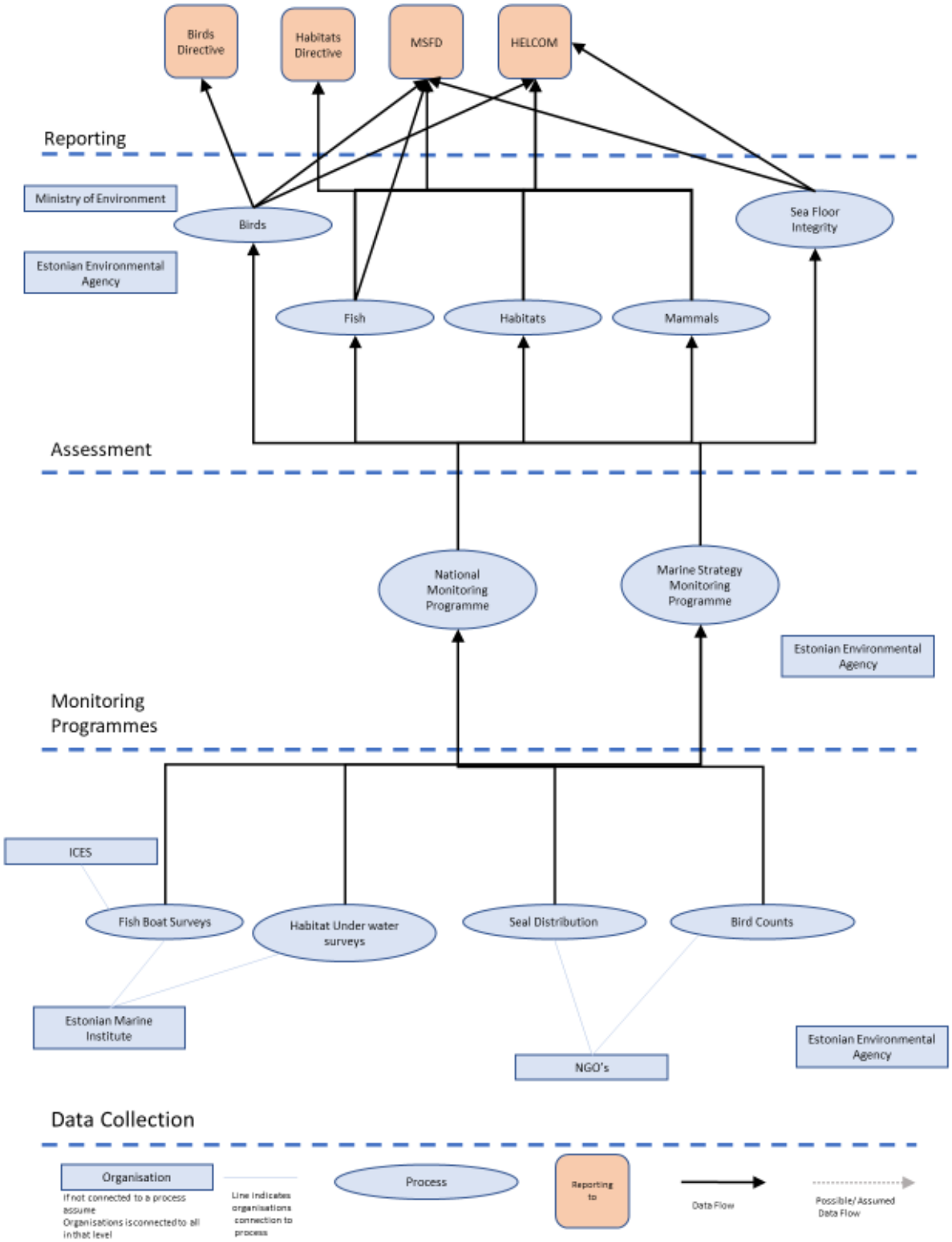


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[11] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[12] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 6. Overview Data Flow Diagram for Estonia



Note: Additional diagrams showing more detailed flow diagrams are available in the separate annex document.

3.2.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• There are many examples of assessments being reused. Usually this is BHD data being reused in MSFD as the MSFD can aggregate BHD data, but it is difficult to disaggregate MSFD data for BHD. • A single organisation (the Estonian Environment agency) is responsible for many of the processes from data collection up to the assessments. • There is good cooperation with HELCOM, with their assessment developed with regard to the MSFD. This results in the HELCOM assessments being reused for MSFD, but less so for BHD. • There is good coordination with ICES, which receives HELCOM data and holds data on behalf of Estonia. ICES provide the data centre services and facilities to store complex data that may not be available in the country. The ICES data centre allows data to be stored in a consistent way across the region enabling more comparisons to be made between data sets.	• Not all data series are as long-term as they might be. Some data are collected on a rotational basis that may leave gaps. Data can come from projects, which raises questions over the temporal consistency of the datasets. • Data outside of the national monitoring programme can be difficult to integrate into assessments – issues include data access and format. • For financial reasons data collection uses a 'rotation principle', monitoring different areas each year over the reporting period. This leads to low resolution of data in the temporal and spatial scales and less reliable assessments. • Current reporting deadlines requiring MSFD assessments before the BHD may in principle limit the reusability of BHD assessments in the MSFD; however in practice the national reporting under MSFD occurs in parallel or even later than under BHD.
Opportunities	**Threats**
• If the assessments for BHD were created before MSFD, there would be even greater opportunity to reuse the assessments (as BHD assessments are usually more detailed so it is easier to aggregate them up to use in MSFD than vice-versa). • Having a single organisation responsible for many of the processes, mean that coordination between organisations required to streamline processes is less of an issue. • Direct reporting of HELCOM assessments to the Commission is possible, but national autonomy over this process is preferred.	• Having a single organisation (the Estonian Environment Agency) responsible for so many of the processes would mean any disruption to the agency would likely have a significant impact on assessments and reporting.

3.3 Finland

3.3.1 Process description

3.3.1.1 Reporting and Assessment

The Ministry of the Environment and the Finnish Environment Institute (SYKE) are jointly involved in all assessments and reporting to the three Directives and HELCOM.

Assessments on breeding, wintering and passage bird species are conducted and reported for the BD. Assessments relevant to MSFD Descriptor 1 Birds cover the five HELCOM sub-basins and the species groups: benthic, pelagic and surface feeding birds.

Assessments of trout (*Salmo trutta trutta*), mammals, benthic habitats and sea-floor integrity are reported for the MSFD.

Assessments for the HD habitats include, for example, habitat reports on estuaries, coastal lagoons, reefs and Boreal Baltic narrow inlets. For HD 6 species are reported (3 fish and 3 mammal).

These assessments cover all marine areas of Finland, including the Åland islands.

3.3.1.2 Monitoring programmes

A number of monitoring programmes provide data for assessments that are reported for the BD. These include, for example, programmes run by the Jurmo and Hanko Bird Observatories and censuses carried out during the nesting season in Important Bird Areas (IBA). Many of the bird monitoring programmes provide data for assessments to both the BD and the birds aspect of the MSFD descriptors (especially D1 and D4).

Monitoring programmes feeding data for assessments relevant to the MSFD biodiversity (D1, benthic habitats) and sea-floor integrity (D6) descriptors also provide some of the data required for assessments reported to the HD. Four monitoring programmes provide data for assessments. SYKE holds responsibility for running these programmes, although Parks and Wildlife Finland (Metsähallitus), Åbo Akademi University (Turku) and the Geological Survey of Finland are also involved in an evaluation of marine habitats.

The Natural Resources Institute Finland (LUKE) undertakes a research and monitoring programme that contributes collected data to an assessment for the MSFD Descriptor 1 Fish, and is involved in running monitoring programmes (along with Turku University of Applied Sciences) that provide data for the assessments for the mammals MSFD group. SYKE and Regional Centres for Economic Development, Transport and the Environment (ELY) run citizen-science programmes for harbour porpoise sightings and fish incidental bycatch monitoring respectively.

3.3.1.3 Data collection

Data collection activities that feed into monitoring programmes that ultimately report to the BD and MSFD Birds descriptor include surveys and migration observation from bird observatories. The temporal and spatial scope of data collection activities varies. Surveys of wintering birds, for example, take place three times a year and cover the country in its entirety, while aerial surveys occur in January and cover archipelago areas. Data are collected by volunteers, BirdLife Finland, and through coordination by Metsähallitus and the Finnish Museum of Natural History (FMNH).

LUKE undertakes data collection that are used for the MSFD and HD on fish and mammals. Data collection activities for fish include surveys of juvenile fish in inland waters and fishing mortality in both inland and marine waters. Data collection activities for mammals contribute to both HD and MSFD and include aerial surveys of grey seals in core population areas in the outer archipelago and ringed seals in Bothnian Bay ice areas. Commercial fishers also provide incidental bycatch data from all marine areas. Both the survey data and the bycatch data feed into assessments on grey and ringed seals and harbour porpoises.

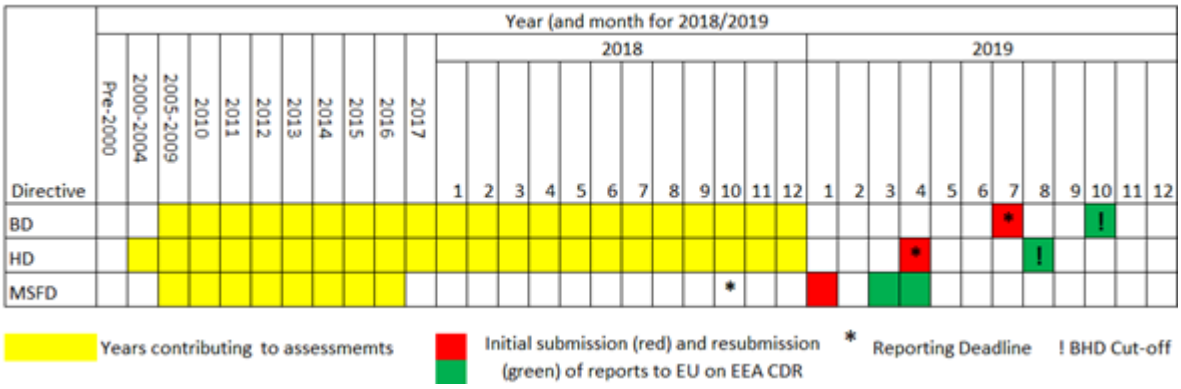
Data on benthic habitats and sea-floor integrity are collected through a range of activities including water quality sampling at monitoring stations, drop down video surveys and diving. A host of institutions and academic organisations are involved in collecting these data, including SYKE, the Finnish Meteorological Institute and Åbo Akademi University. These activities were designed under the MSFD monitoring programme and provide data that are used for reporting to both the HD and MSFD.

3.3.1.4 Timeline

Figure 7 presents the time period of data used in MSFD and BHD assessments[13] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[14], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period is longest for HD, with data from 2000 being used for some parameters or criteria. Both the BD and HD will have used data from some point in 2018. The MSFD drew on data from 2007 to 2016. The reporting was within the deadlines for both BD and HD. MSFD reporting occurred after the deadline but was concluded ahead of BD and HD reporting.

Figure 7. Timelines for assessment and reporting in Finland

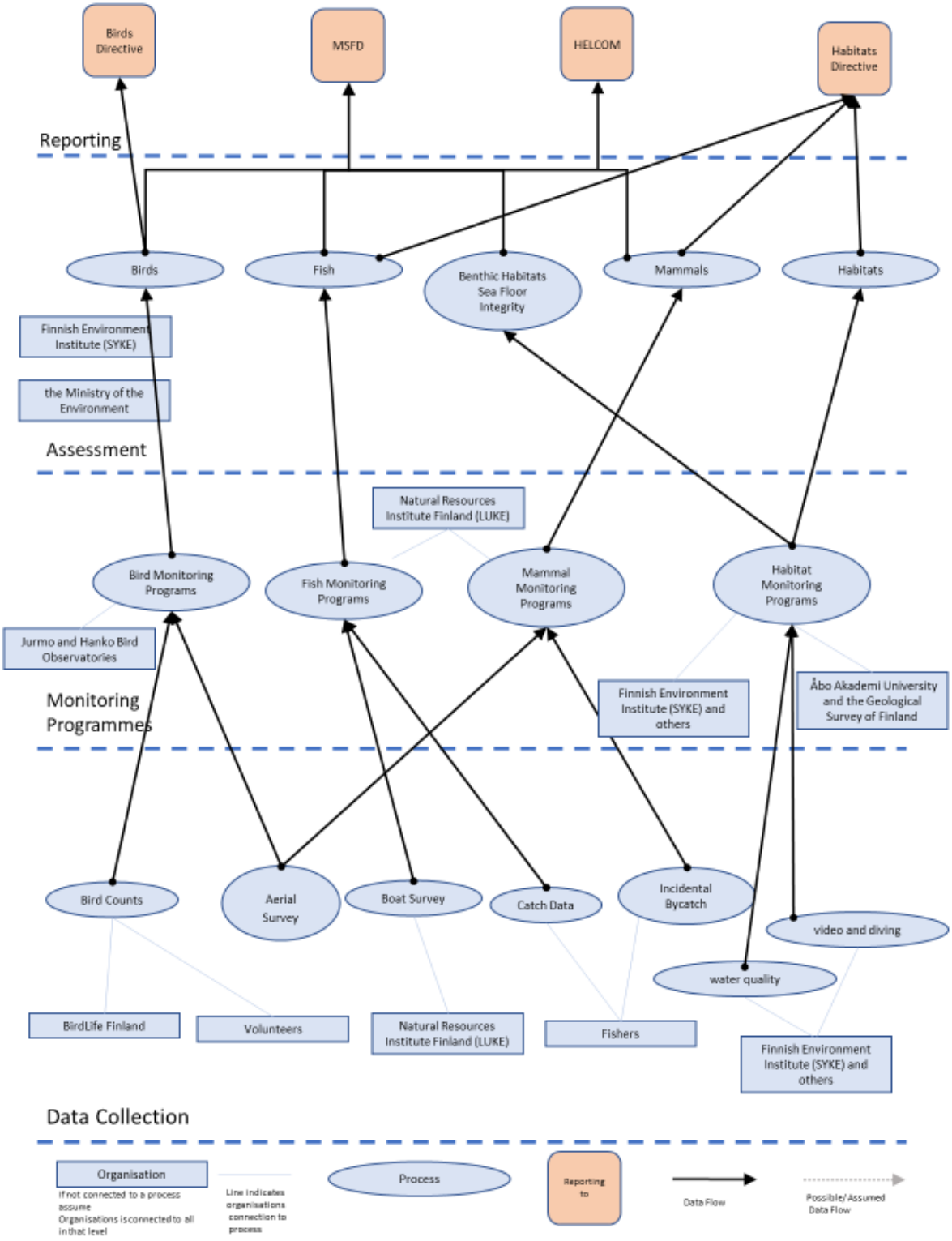


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[13] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[14] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 8. Overview Data Flow Diagram for Finland



Note: Additional diagrams showing more detailed flow diagrams are available in the separate annex document.

3.3.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• At the assessment level, the same two organisations are responsible for reporting to the BHD and MSFD. The Ministry of the Environment provides oversight, while the Finnish Environment Institute (SYKE) is involved in the production of the majority of assessments and coordinates the other partners involved. • Bird monitoring programmes are designed to align with reporting periods for all requirements with data collected either annually or every three years. The fish and some of the mammal programmes are also done annually meaning that they are available for all the reporting requirements. • HELCOM assessments are reused for MSFD reporting for mammals, fish, and sea-floor integrity. HELCOM also receives data on birds and species and habitats data, but the reuse of this data in assessments is not clear. • GIS products are being produced that have facilitated the assessment of habitats from the existing data collection programmes. The GIS products mitigate the lack of a specific monitoring programme being in place for the HD.	• There is no specific monitoring programme in place for habitats to generate the assessment for the HD. The assessments used require data from a mixture of sources such as the national inventory programme (VELMU), the WFD and expert opinion. • Volunteers that collect data for HBD may specify that it can only be used if aggregated, thereby reducing its utility to the MSFD assessments. Volunteer data collectors may also delay provision of data until they have independently published it. • The use of bird monitoring programme data for MSFD is limited because the MSFD assessment requires a finer spatial scale than does the BHD. • There is no reuse of assessments from BHD to MSFD or vice versa. However, there is reuse of data collected and monitoring programmes - for example the assessment of habits under HD and MSFD are done separately, but the HD uses data collected under the MSFD monitoring programme. • Despite there being one organisation largely responsible for the coordination of the assessments, there are still administrative barriers between departments which slow down the flow of data.
Opportunities	**Threats**
• The promotion of open data policies, particularly with the bird volunteer data collection, could improve access to and precision of data. • As more HELCOM assessments are developed there could be continued scope to reuse their assessments. • Remote sensing and continued development of GIS products may provide efficiencies in the cost of producing assessments.	• Data collection for Birds is heavily reliant on volunteers. This has caused problems, particularly regarding access to data. Although it also enables the collection of data without the need for significant funding. • Future funding is likely to be restricted, and there is pressure to reduce the amount of monitoring in the field. The pressure on field work means that current monitoring programmes are unlikely to be expanded (e.g. to cover more habitats) preventing a specific monitoring programme for HD being set up.

3.4 France

3.4.1 Process description

3.4.1.1 Reporting and Assessments

At the assessment level, there are links between HD species and MSFD species groups, with assessments from the mammal and reptile assessment of the MSFD contributing to the HD assessments, and some of the fish assessment of the HD contributing to the MSFD assessment. The marine habitats and the MSFD habitat descriptors do not have direct links, but both contribute to the OSPAR assessments. OSPAR indicators are widely used in both BD and MSFD reporting on birds, and are used in two out of the five assessments used for reporting on mammals.

The Ministry of Ecological and Social Transition is responsible for reporting MSFD and BD assessments. The French Agency for Biodiversity (Office français pour la biodiversité, OFB) is responsible for the MSFD, and the Natural Heritage Joint Service Unit (UMS PatriNat) for BHD and some aspects of the MSFD. The OFB and UMS PatriNat also report to the Regional Sea Conventions (OSPAR and BARCON).

3.4.1.2 Monitoring programmes

The bird monitoring programmes contribute data for bird assessments to BD, MSFD and the RSC and is comprised of four sub programmes: costal birds, marine breading birds, birds at sea, and stranding's. The costal and breading sub programmes contribute to both the BD and MSFD, the birds at sea is primarily used for MSFD, but contextual information is provided to the BD, stranding's is only used for MSFD. The technical coordination of the activities is done by OFB and UMS PatriNat.

PELAGIS is the only monitoring programme (including five sub-programmes) that contributes to the MSFD mammal and reptile assessments, the same monitoring programme also provides data to the HD species assessments.

IFREMER, the French Research Institute for the Exploitation of the Sea, is involved in all six fish monitoring programmes with some coordination from UMS PatriNat.

The Water Framework Directive (WFD) and regional networks such as REBENT-Bretagne include habitat surveys that contribute to the both the HD habitats assessments and the MSFD benthic habitats and sea floor integrity assessment. Sea floor integrity also uses data from the Cerema agency registry of human activities with EMODNet data products.

3.4.1.3 Data collection

For birds, the "Sea and coastal birds Observatory" provides data for all assessments related to birds, including OSPAR and the Barcelona convention. The observatory has a large number of partners, include research agencies and NGOs such as the LPO, but is managed by the French Agency for Biodiversity. The majority of the data collection activities are at least on annual basis and cover all French waters.

The PELGIS Observatory also collects data on birds, mammals and reptiles, and uses a variety of method to collect data including aerial surveys, boat surveys, and costal monitoring. Of the six data collection activities, five are done annually. The spatial coverage for four of the activities is the coastal strip of all French waters, one extends out across the whole EEZ, and one covers marine parks in the Atlantic and the Mediterranean.

For fish, the ship surveys are all coordinated by IFREMER, but they also participate in international surveys such as the International campaign of demersal trawling in the Mediterranean Sea (MEDITS) and the International Bottom Trawl Survey (IBTS) in the North Sea. All of the surveys are annual, the surveys' spatial coverage is split into smaller geographical areas such as the Bay of Biscay, or the North Sea.

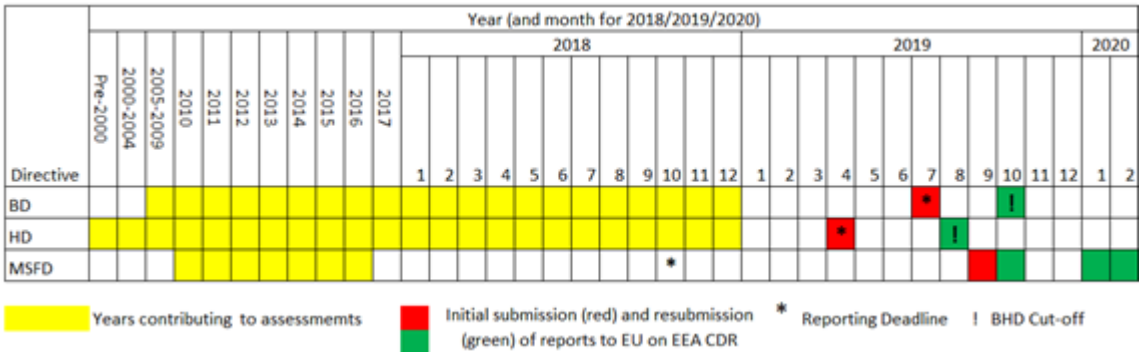
Data collected related to habitats and Sea-floor integrity (used for both HD and MSFD) come from habitat surveys conducted under the WFD (macrofauna, macroalgae, Posidonia beds, *Zostera noltei* / *Z. marina* beds) and regional networks such as REBENT-Bretagne (macrofauna, macroalgae, *Zostera marina* beds, and maerl) with the participation of universities and the National Centre for Scientific Research (Centre national de la recherche scientifique, CNRS). In addition to the surveys, data on human activities such as land reclamation is used and contributes directly to the habitat assessments. Similarly, data on extraction of marine aggregates, dredging operations etc are used in the Sea floor integrity assessments for the MSFD.

3.4.1.4 Timeline

Figure 9 presents the time period of data used in MSFD and BHD assessments[15] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[16], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period is longest for HD, with data from 1994 being used for some parameters or criteria. Both the BD and HD will have used data from some point in 2018. The MSFD draws on data from between 2010 and 2016. The reporting was within the deadlines for both BD and HD. MSFD reporting did not meet the deadlines and took place after reporting for BHD.

Figure 9. Timelines for assessment and reporting in France

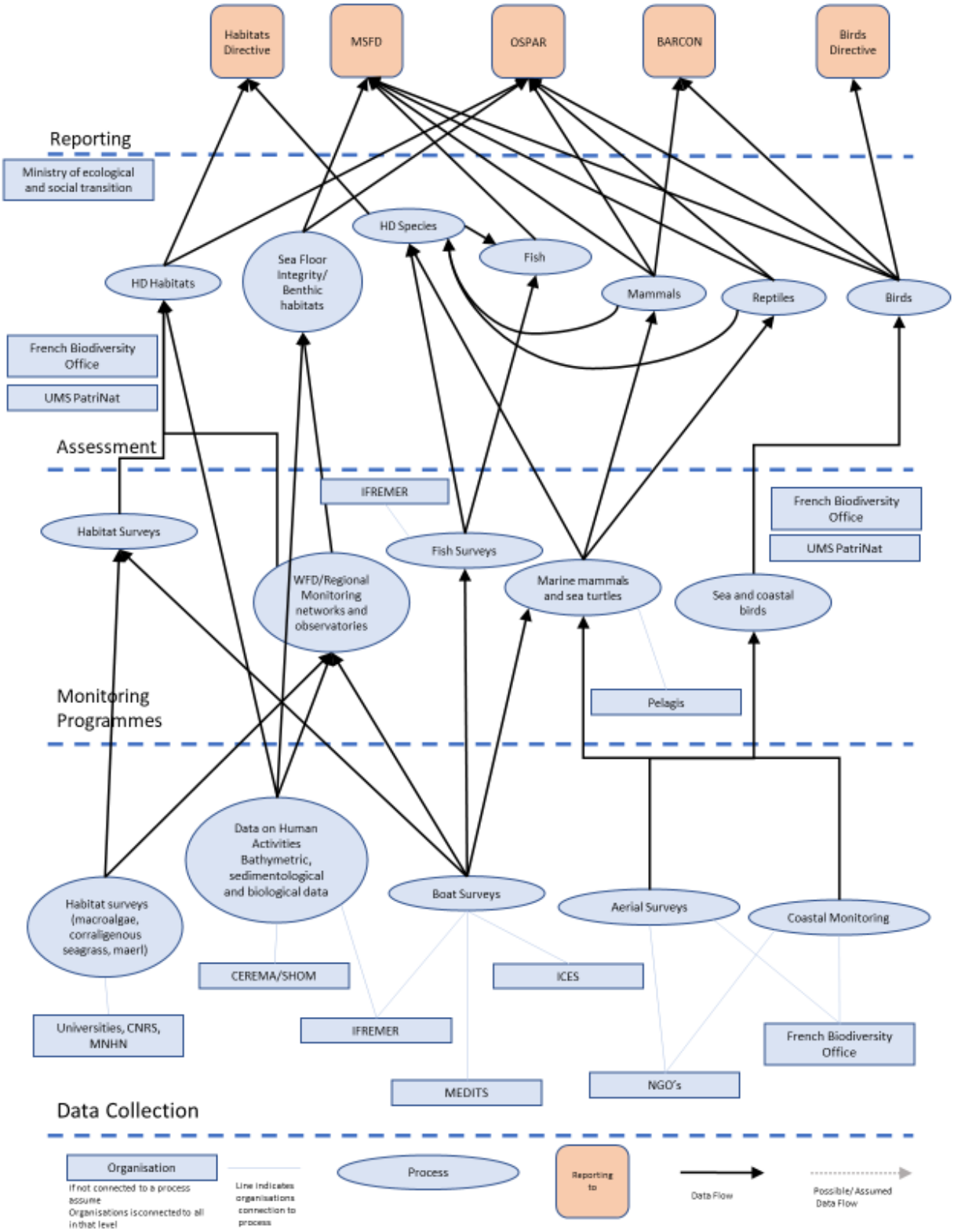


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[15] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[16] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 10. Overview Data Flow Diagram for France



Note: Additional diagrams showing more detailed flow diagrams are available in the separate annex document.

3.4.2 SWOT of process for the reuses of assessments

Strengths	Weaknesses
• A single organisation (Ministry of Ecological and Social Transition) holds national responsibility for all assessments to MSFD, BHD and the RSC. • The coordination of assessment, monitoring and data collection activities is the responsibility of two organisations, the French Biodiversity Office for MSFD, and the UMS PatriNat for BHD. • To strengthen coordination between marine habitat and species monitoring programmes and the reporting requirements of the three directives France has set up several common methodologies and integrated data collection methods such as for mammals and birds. • Assessments under the MSFD for mammals and reptiles contribute to the HD species assessments. Some of the fish assessments (for Diadromous species) in the HD are used for MSFD • A number of initiatives have been taken to improve coordination: - In addition to coordinating MSFD with the BHD, France also links to the Maritime Spatial Planning Directive and the Natura 2000 network, through a national strategy for the sea and the coast, which establishes strategic guidelines through an action plan and a monitoring framework seeking to integrate MSFD and Natura 2000 monitoring requirements. - France has a central marine environment information system ("SIMM"). The aim of the portal is to generate and share publicly available information that is needed to report on the MSFD and the maritime spatial planning directive. • OSPAR is used as the regional platform for MSFD reporting. France is working with the Barcelona Convention to ensure its requirements are in line with MSFD.	• The current reporting deadlines could in theory impact the capacity of the national evaluation teams to reuse assessments from BHD to MSFD. However, in practice France reported MSFD assessments after those for BHD. • (Some) of the assessment from the MSFD (for example some of the reptile assessments on abundance and demographics) are not used for HD due to lack of coordination between the directive evaluation teams, insufficient data sharing.

Opportunities	Threats
• There is an opportunity (and need) for increased convergence with the Barcelona Convention, and specifically through the information management system for reporting of data on indicators in the Mediterranean region being created by the Convention's Regional Activity Centre for Information and Communication (INFO/RAC). The indicators in the system initially have more overlap with MSFD, but as the system expands there may be more opportunities for coordination with BHD requirements. • Working groups within regional sea conventions could be used to further strengthen coherence and efficiencies between reporting requirements. • The coordination with other directives such as Maritime Spatial Planning Directive, and Water Framework Directive expands the opportunities for new data sources that could be used for reporting on biodiversity. • The focus of the marine environment information system ("SIMM") is more towards the MSFD and maritime spatial planning directive. There may be an opportunity to include more that could be used for BHD	• Ensuring that pre-existing monitoring programmes (not perfectly aligned with the legal requirements) fulfil the requirements of the BHD and MSFD directives may still require changes. • France has a large coast in two marine regions, resulting in a large number of data collection activities and organisations. The complexity increases the logistical burden of maintaining comprehensive monitoring systems.

3.5 Germany

3.5.1 Process description

3.5.1.1 Reporting and Assessment

The same assessments on birds in the Baltic Sea are reported to the BD, MSFD and HELCOM. Similarly, the same assessments for birds in the North Sea are reported to the BD, MSFD and OSPAR. Both sets of assessments (Baltic Sea and North Sea) cover pelagic feeding, benthic feeding, surface feeding, grazing and wading birds. An additional assessment is conducted on white-tailed eagles in the Baltic Sea. This assessment is reported to the BD and HELCOM only. All assessments are undertaken by Bundesamt für Naturschutz (BfN).

Assessments on fish are reported to the MSFD and to the HD. The BfN through the Federal Research Centre of Fish, and the German Länder (Schleswig-Holstein, Lower Saxony, City States of Hamburg and Bremen) are responsible for reporting these assessments. The BfN is also responsible for reporting assessments on mammals - these assessments are reported to the MSFD and the HD. Assessments on seals and harbour porpoises in the Baltic Sea and North Sea are reported to HELCOM and OSPAR respectively.

Numerous assessments on habitats are reported to the MSFD and the HD. Assessments on benthic habitats relevant to the Baltic Sea and North Sea are reported to HELCOM and OSPAR respectively.

3.5.1.2 Monitoring programmes

The BfN is responsible for running a monitoring programme on offshore wintering birds in the Baltic Sea. This is complemented by monitoring programmes run by Schleswig-Holstein and Mecklenburg-Vorpommern Länder on coastal wintering birds, breeding birds and white-tailed eagles in the Baltic Sea. In the North Sea, the BfN runs a monitoring programme on breeding birds. Data are also collected through three monitoring programmes on coastal wintering birds and offshore wintering birds, as well the Wadden Sea Trilateral Monitoring and Assessment Programme. These three monitoring programmes are run by German Länder (Schleswig-Holstein, Lower Saxony, City States of Hamburg and Bremen).

Monitoring of commercial fish stocks in both the Baltic Sea and North Sea feed data into assessments on fish that are reported to the MSFD. Monitoring of fish listed in annexes of the HD provide data for an assessment that is provided to the HD. The monitoring programmes are conducted by the Federal Research Centre of Fish, in conjunction with the Länder's (Schleswig-Holstein, Lower Saxony, Hamburg, Mecklenburg-Vorpommern).

A number of monitoring programmes run by BfN feed data into assessments on mammals. These include monitoring of harbour porpoises and seals. The Institute for Terrestrial and Aquatic Wildlife Research (ITAW) monitors mammal health.

In the Baltic Sea and North Sea, soft-bottom macrozoobenthos, macrophytes and physical disturbance and loss of habitat are monitored by BfN. Natura 2000 monitoring of reefs and sandbanks is also carried out.

3.5.1.3 Data collection

Aerial and ship surveys of offshore wintering birds in the Baltic Sea are conducted by BfN. Schleswig-Holstein and Mecklenburg-Vorpommern collect data on coastal wintering birds and breeding birds through land/coastal monitoring in the Baltic Sea. In the North Sea, the BfN conduct aerial counts of offshore wintering birds and German Länder undertake ground-based counts of coastal wintering birds and breeding birds. Aerial counts in the Wadden Sea are carried out through the Wadden Sea Trilateral Monitoring and Assessment Programme.

For fish, pelagic- and bottom-trawling surveys provide data for assessments reported to the MSFD and HD. River surveys of migrating fish, stow net surveys, fish catches and sturgeon river survey also provide data for the assessments reported to the HD. For mammals, data collection activities include acoustic monitoring, aerial surveys of harbour porpoises, and cetacean surveys by BfN. The Institute for Terrestrial and Aquatic Wildlife Research collects data on strandings and incidental bycatch with the Länder who also conduct surveys on the seal population.

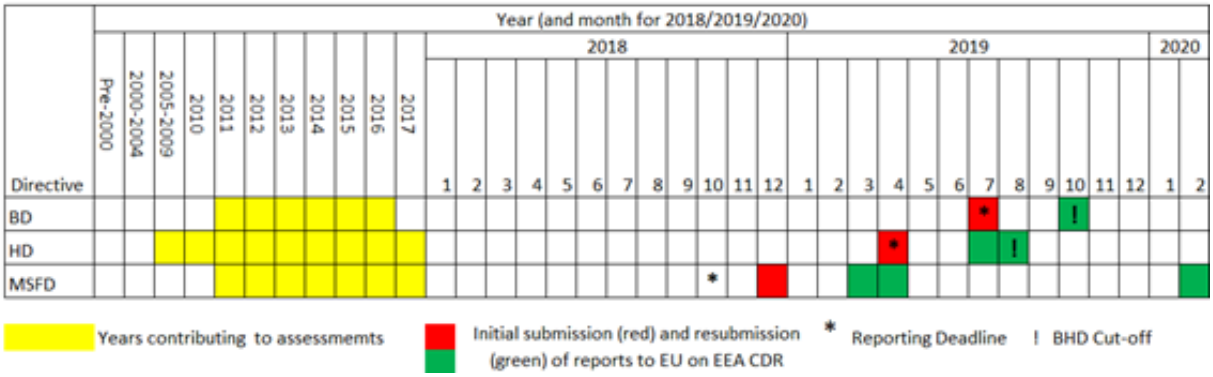
For habitats, BfN and the Länder collect data on macroalgae and angiosperms through a mixture of aerial surveys and physical sampling. The Leibniz Institute for Baltic Sea Research (IOW) collect data on soft-bottom macrozoobenthos using physical sampling. Natura 2000 monitoring of reefs and sandbanks, samples are taken annually at randomly selected sites habitats. ICES data on fisheries impact is used for the sea floor integrity assessments.

3.5.1.4 Timeline

Figure 11 presents the time period of data used in MSFD and BHD assessments[17] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[18], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The period of data used is longest for HD, with data on some parameters or criteria being used from 2006 up to 2017. The BD used data between 2011 and 2016. The MSFD data was from between 2011 and 2017. German interviewees identified the differences between the reporting deadlines and periods as a major obstacle to the reuse of assessments, for example, for the birds assessments, the same data are used, but they come from different timeframes due to the lag in assessment/ reporting. Whilst Germany submitted their original MSFD report ahead of those for the BHD, their final resubmission occurred after BHD submissions had been finalised.

Figure 11. Timelines for assessment and reporting in Germany

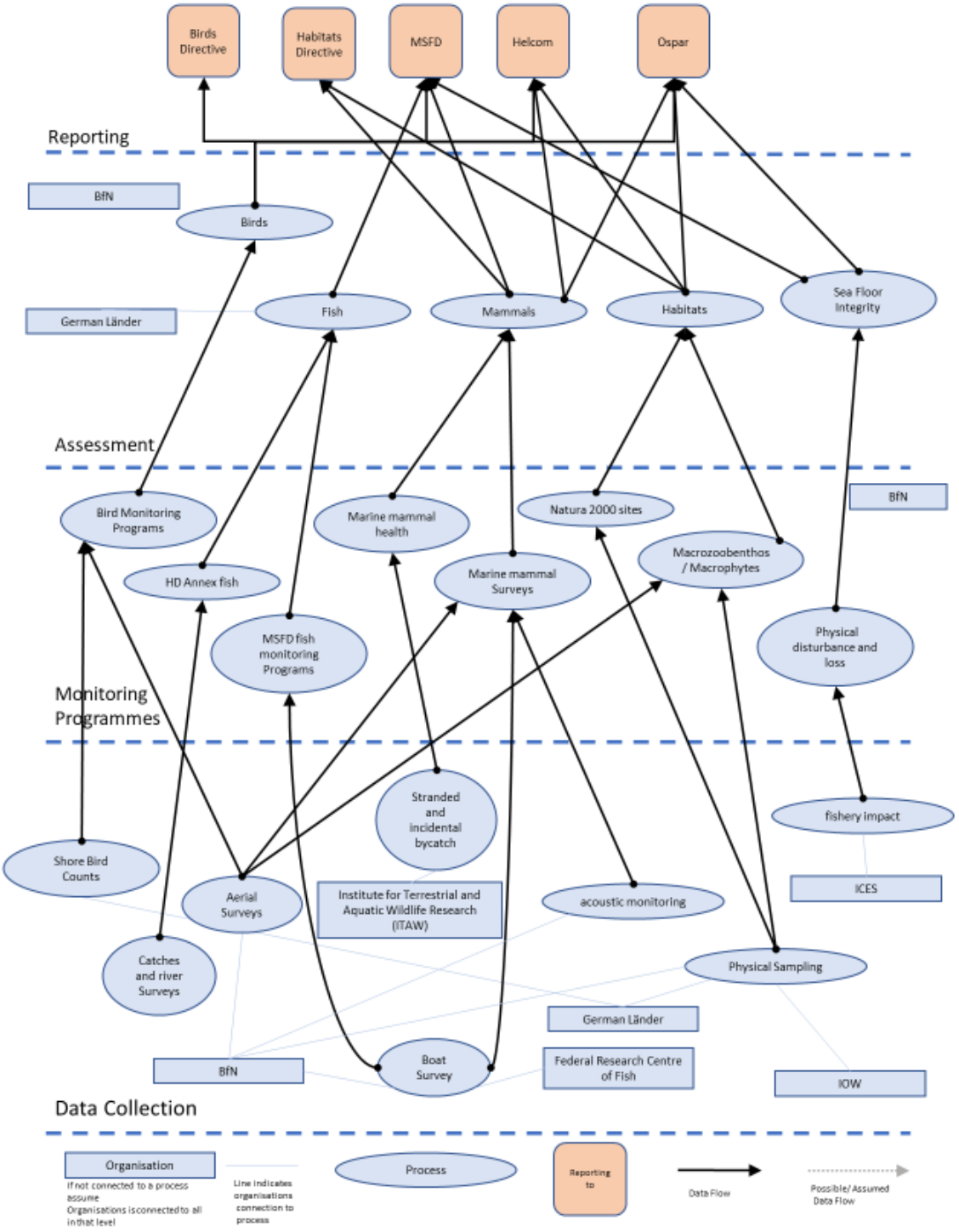


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[17] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[18] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 12. Overview Data Flow Diagram for Germany



Note: Additional diagrams showing more details are available in the annex document.

3.5.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• Better IT systems have been developed over the last years to systematically process and store the growing amount of data being collected. • There are examples of assessments being reused, e.g. HD assessments on mammals, fish, and some habitats are used in the MSFD reporting. • There is good cooperation with HELCOM and OSPAR. The RSC's indicators are reused for MSFD and BD assessments. • A single organisation (Bundesamt für Naturschutz (BfN)) coordinates the assessments to BHD and MSFD reporting.	• Coverage of data collection can vary between the federal BfN and the Länders (region government). • The Länders may add extra complexity and length to the activities required to produce the assessment and appear to have similar roles to the national agencies in many of the processes.
Opportunities	**Threats**
• The two RSCs that cover German waters both have well integrated indicators with MSFD that Germany is using. Further development of the RSC's indicators and their integration with MSFD may be beneficial.	• Reporting times differ between BHD and MSFD assessments making it harder to reuse the BHD assessments for MSFD. • Because German waters cover two sea basins, spatial coverage of BHD and MSFD assessments differ. This makes it more difficult to reuse the BHD assessments in MSFD.

3.6 Malta

3.6.1 Process description

3.6.1.1 Reporting and Assessment

All six assessments undertaken on the status of birds are reported to the BD. Two of these assessments, 'population size of breeding birds' and 'distribution range of breeding birds' are also reported to the MSFD. Three of the assessments are reported to BARCON. The Wild Birds Regulation Unit and the Environment Resources Authority are both involved in the reporting of these assessments.

The Environment and Resources Authority holds responsibility for reporting assessments on reptiles, mammals, fish, cephalopods and benthic habitats to the both the HD and MSFD. BARCON indicators are also widely used for the reptile and mammal descriptors.

The Environment Resources Authority submits the HD habitat assessments and the MSFD Benthic habitat assessments, but it does not appear they are reused between the directives.

3.6.1.2 Monitoring programmes

For the BD, the LIFE+ Malta Seabird Project (2011-2016) and the LIFE Archipelagu Garnija Project (2015-2020) provide data for assessments. This is complemented by monitoring undertaken by BirdLife Malta. In addition, independent monitoring by the National Museum of Natural History on breeding colonies feed into assessments relevant to the MSFD birds descriptor.

The MSFD reptile assessments use data from four monitoring programmes undertaken by a range of organisations including governmental and academic institutions, along with NGOs. Two of these monitoring programmes, the LIFE+ Migrate Project and the LIFE BaHAR for N2K Project also provide data for mammal.

The HD habitat and MSFD benthic assessments receive data from the Life projects and the Marine Environmental Monitoring run by the Malta Marine Monitoring Consortium (M3C) that includes KAI Marine Services, AZTI and AIS Environment Ltd.

Fish and cephalopod monitoring is carried out via the International bottom trawl survey in the Mediterranean (MEDITS). The Environment and Resources Authority, the Department of Fisheries and Aquaculture and COISPA – Tecnologia & Ricerca, an Italian non-profit organisation, are all involved in running this survey programme.

3.6.1.3 Data collection

BirdLife Malta undertakes data collection for assessments reported to the BD. Data collection activities include boat-based surveys, camera trap surveys and thermal imagining counts. These activities also provide data that are used for the MSFD bird descriptor, though additional data from fishers' logbooks and fishery observer trips are also incorporated. Data from these two activities are used in reptile and mammal monitoring. Other data collected for reptiles and mammals include: transect surveys undertaken by KAI Marine Services, strandings (for Mammals) and incidental by catch (for reptiles). Data on non-commercial cephalopods species are collected through MEDITS bottom trawl surveys. Data are collected within Malta's Fisheries Management Zone, which extends 25 nm from the coast, by the Department of Fisheries and Aquaculture. The Malta Marine Monitoring Consortium (M3C) and Fundación Oceana, through the Marine Environmental Monitoring programme, undertake various data collection activities that contribute to the HD habitats and the MSFD benthic habitats assessments, such as diving surveys, video mapping, ROV surveys and bathymetric surveys.

3.6.1.4 Timeline

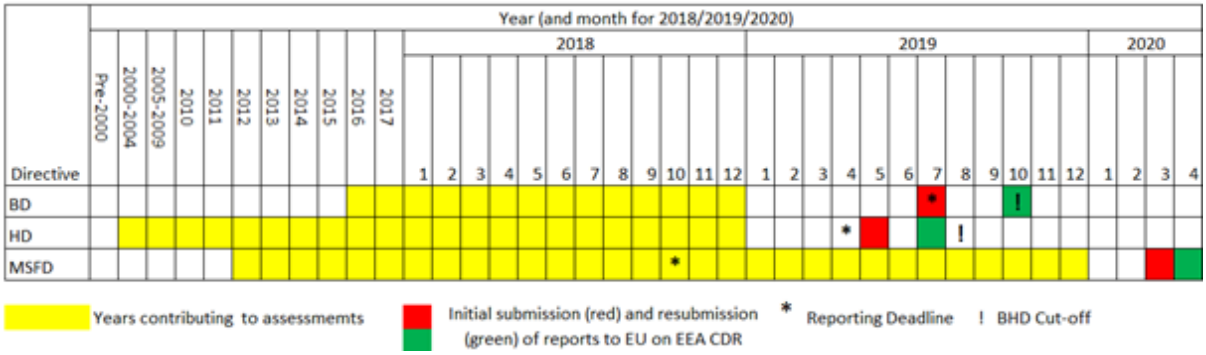
Figure 13 presents the time period of data used in MSFD and BHD assessments[19] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[20], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period is longest for HD, with data from 2004 being used for some parameters or criteria. Both the BD and HD used data from 2018 and MSFD used data from 2019 (although in both cases the latest year's data may not have been for the full year). In drawing on data from 2019, the MSFD assessment used data from after the reporting deadline – MSFD reporting was over a year late and occurred after BHD reporting. The reporting was broadly in line with the deadlines for BHD.

[19] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

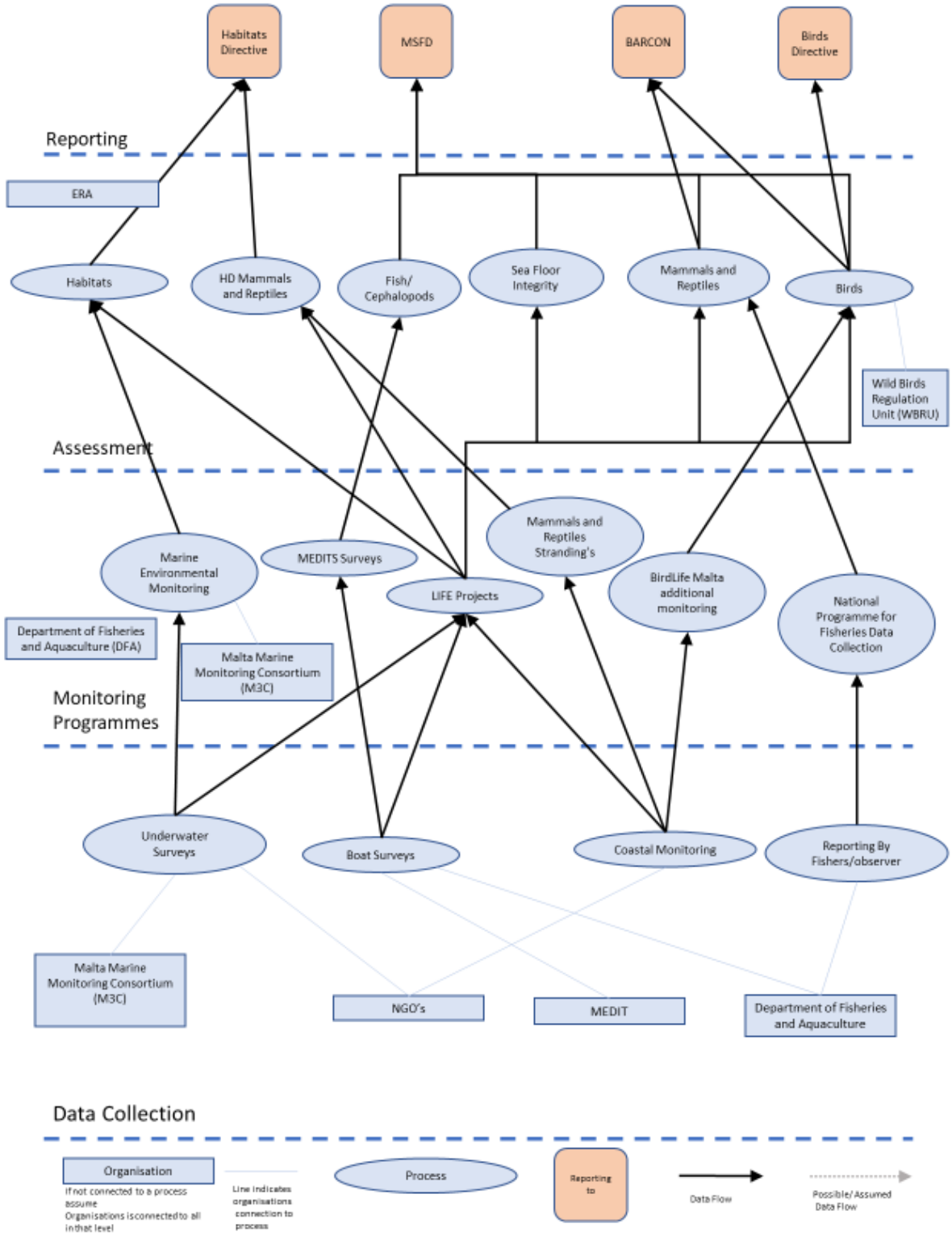
[20] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 13. Timelines for assessment and reporting in Malta



Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

Figure 14. Overview Data Flow Diagram for Malta



Note: Additional diagrams showing more detail are available in the separate annex document.

3.6.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• There are examples of assessments being reused between BD and MSFD. • Barcelona Convention indicators for mammals and reptiles are reused for MSFD assessments. • A single organisation (Environment and Resources Authority (ERA)) holds responsibility for undertaking the majority of assessments.	• No assessments are being reused between HD and MSFD. • Several of the monitoring activities are carried out through a time-limited projects, which may impact the temporal sustainability of the data collected. • No national monitoring programme is in place for wintering gull species – their assessment is therefore based on EU wide data. • MSFD reporting occurred significantly after the deadline.
Opportunities	**Threats**
• The small number of organisations in Malta should reduce the administrative barriers to streamlining processes. • There are monitoring programmes such as the Marine Environmental Monitoring that is contributing to assessments for both HD and MSFD, and so could facilitate reuse of assessments.	• The project monitoring habitats has come to an end, so it is unclear what impact that will have in producing assessments. • Datasets collected by projects may be harder to maintain, as they may not conform to national standards.

3.7 The Netherlands

3.7.1 Process description

3.7.1.1 Reporting and Assessment

The Ministry of Infrastructure and Water Management's Directorate General for Water and Soil (DGWB) is primarily responsible for the implementation of the MSFD and is jointly responsible with the Ministry of Agriculture, Nature and Food Quality's Directorate General for Nature, Fisheries and Rural Areas (DGNVLG) for policy implementation.

The Rijkswaterstaat WVL conducts an assessment on the status of marine bird populations. This assessment is conducted every three years and is reported to the BD and to OSPAR. Assessments on breeding success and marine bird abundance are reported to the birds MSFD descriptor, as well as to the BD and to OSPAR. While the assessment on breeding success covers the OSPAR southern North Sea area, the assessment on marine bird abundance covers the OSPAR greater North Sea area. Rijkswaterstaat and the Ministry of Infrastructure and the Environment are the competent authorities responsible for undertaking these assessments and report them. An assessment on incidental bycatch of birds in fisheries is also in development. This assessment will be reported to the MSFD.

Rijkswaterstaat WVL conducts assessments on the status of marine habitats and on the status of marine species populations. Both assessments are reported to the HD. The assessment on the status of marine habitats is also reported to the MSFD, while the assessment on the status of marine species populations is also reported to OSPAR.

Rijkswaterstaat Centre for Water Management and the Ministry of Infrastructure and the Environment are the competent authorities responsible for conducting assessments on fish for the MSFD. These include assessments on population abundance, habitat conditions of fish stocks and species distribution. Some of these assessments are also reported to the HD and to OSPAR.

The Rijkswaterstaat Centre for Water Management and the Ministry of Infrastructure and the Environment hold responsibility for reporting assessments on benthic habitats, sea floor integrity and mammals to the MSFD. For mammals, these include, for example, assessments on incidental bycatch of mammals, and population abundance and distribution of seals and cetaceans. The OSPAR assessment on the Abundance and Distribution of Cetaceans is used for reporting to both the MSFD and the HD.

3.7.1.2 Monitoring programmes

The Marine Information and Data Centre (IHM) coordinates all the data collection activities undertaken by the monitoring programmes. The Network Ecological Monitoring (NEM) undertakes two monitoring projects, one for breeding birds and one for water birds. Providing collected data into the assessment that is reported to the BD and to OSPAR, these monitoring projects feed data for assessments reported to the MSFD. The Monitoring Waterstaatkundige Toestand des Lands (MWTL) programme provides additional data to the assessments relevant to the birds MSFD descriptor.

NEM holds responsibility for running an underwater shore (MOO) monitoring project that provides data for assessments on the status of marine habitats (used for both the MSFD and HD) and marine species (used for HD only).

A fish monitoring programme (the WOT Visserji programme) and the MWTL programme collect data for assessments on fish. Monitoring programmes on incidental bycatch and cetaceans, for example, collect data for assessments on mammals. The Ministry of Agriculture, Nature and Food Quality hold responsibility for running a shellfish monitoring programme providing data for assessments on benthic habitats. The MWTL programme also collects data on benthic habitats.

3.7.1.3 Data collection

Data used for the assessment reported to the BD and to OSPAR are collected by volunteers through the coordination of Sovon, a non-profit organisation. Volunteers are supported by professionals. Data collection activities include producing inventories of breeding and water birds. Through the MWTL programme, breeding success counts and aircraft counts in the North Sea also provide data that are used in assessments for reporting to the MSFD. Aircraft counts occur six times a year.

Coordinated by the ANEMOON NGO, volunteers and professionals collect data through the MOO monitoring project that provide data to assess the status of marine species. The physical sampling to produce inventories of marine species covers large shallow inlets and bays in the Eastern Scheldt estuary, while the surveys cover the whole coastal regions of the North Sea.

A number of different surveys collect data under the fish monitoring programme. Conducted by Wageningen Marine Research and coordinated with ICES Working Group on Beam Trawl Surveys. These surveys include a demersal young fish survey, a sole net survey and an international bottom trawl survey. A freshwater survey is also conducted through the MWTL programme.

Several organisations collect data that are used in assessments of mammals for MSFD. Data collection activities include, for example, counts of bycatch undertaken by Wageningen University and counts of cetaceans conducted by the NGO *Rugvin* and the commercial transport company *Stella Line*. WMR also undertakes shellfish surveys for assessments on benthic habitats.

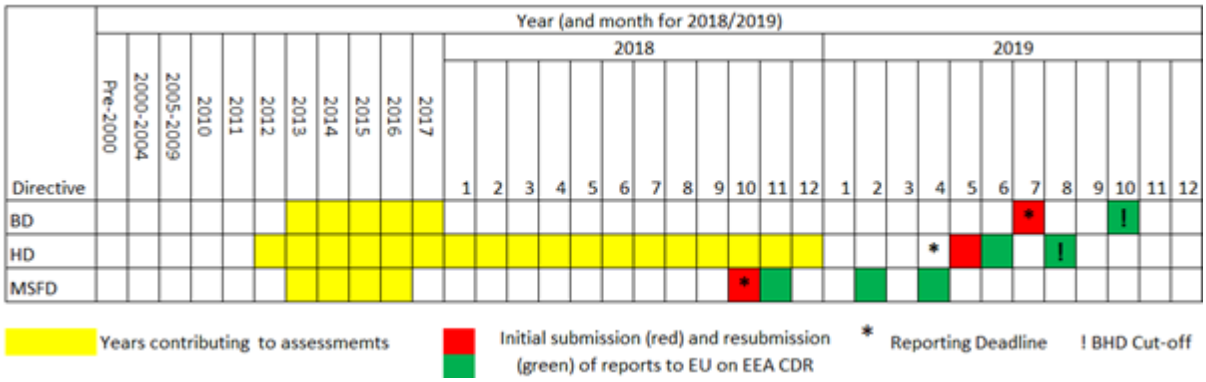
3.7.1.4 Timeline

Figure 15 presents the time period of data used in MSFD and BHD assessments[21] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[22], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period was longest for HD, which drew on data for some parameters or criteria from both earlier and more recent years (2012-2018) than do BD and MSFD assessments. The BD assessment period was between 2013 and 2017. The MSFD period was between 2012 and 2016.

Reporting was concluded with minor delays compared to deadlines and was concluded in the same order as the deadlines across the Directives would expect i.e. MSFD first and BD last.

Figure 15. Timelines for assessment and reporting in Netherlands

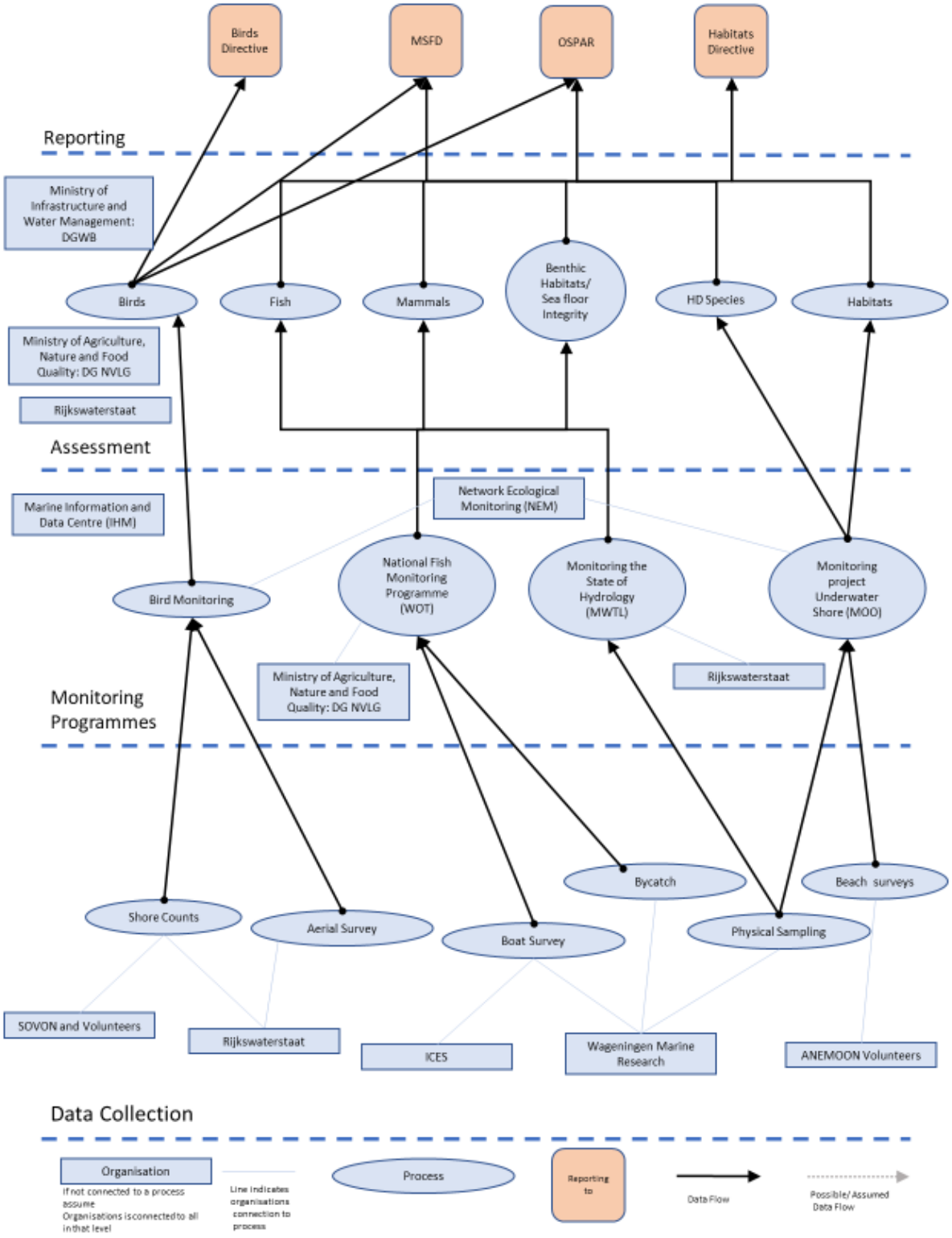


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[21] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[22] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 16. Overview Data Flow Diagram for The Netherlands



Note: Additional diagrams showing more detail are available in the separate annex document.

3.7.2 SWOT of processes for reuse and coordination

Strengths	Weaknesses
• The Marine Strategy for the Netherlands contains a summary of each descriptor of the MSFD, within each summary is a description of how the descriptor relates to the relevant OSPAR, HD or BD indicators/assessments. • The Marine Strategy includes the principle *"that data serve multiple purposes".* The Marine Information and Data Centre (IHM) is a dedicated body to achieve this principle (jointly established between the responsible ministries). • OSPAR indicators such as the population abundance of seabirds are extensively used for both MSFD and BHD assessments, ensuring consistency between the directives and RSC. • There are two core monitoring programmes that cover the majority of the information requirements for MSFD, BHD, and OSPAR. • The data are centrally collated by the IHM, and provided to the government to conduct the assessments. The data are also made publicly available through the IHM MSFD data viewer. • The automatic data collection process helps identify where the data gaps are and put in place additional actions to address data gaps. • Data collection methods and specification for the monitoring programmes are recorded in publicly available documents. The monitoring programmes are reviewed once a year. Following a review IHM will assess whether any proposed changes will impact on the reuse of data. • To facilitate data exchange and interoperability there is a national data standard *AQUO* for exchange of water related data.	• None reported.
Opportunities	**Threats**
• Continue to promote regional implementation of indicators and	• Structured central data storage requires ongoing investment. Changes in reporting requirements or indicators

processes through OSPAR and international cooperation.

- There are five levels of reporting units in OSPAR, from the convention area, down to WFD coastal regions. The Netherlands coast is entirely within one sub region of OSPAR, so there is scope to use the lower levels of reporting OSPAR units for national reporting of assessments.

may impact how data are stored and reused in the IHM data centre.

- Maintaining a data standard such as AQUO requires additional resources and administration to keep it up to date.

3.8 Romania

3.8.1 Process description

3.8.1.1 Reporting and Assessment

The Water Management Directorate of the Ministry of Environment, Water and Forests reports assessments on sea-floor integrity to the MSFD. The Biodiversity Directorate of the same ministry is responsible for habitats assessments to the HD, and benthic habitat assessments to the MSFD.

The Water Management Directorate reports assessments on fish to the MSFD, while the National Agency for Fisheries and Aquaculture reports assessments on fish to the Black Sea Commission BSC.

The Biodiversity Directorate holds responsibility for reporting assessments on birds to the MSFD. In partnership with the Ministry of Environment, Water and Forests, the National Centre for Sustainable Development submits assessments on birds to the BD.

The Water Management Directorate holds responsibility for reporting an assessment on cetacean bycatch and strandings to the MSFD and the Black Sea Commission (BSC). The Biodiversity Directorate reports an assessment on cetaceans to the HD.

3.8.1.2 Monitoring programmes

A national system for the management and monitoring of bird species feeds collected data into assessments that are reported to the BD and MSFD. The scope of this monitoring programme covers both coastal breeding colonies and coastal wintering colonies in Romanian waters of the Black Sea. The organisations involved in this monitoring programme include the National Centre for Sustainable Development, the Romanian Ornithology Society and the Association for the Protection of Birds and Nature.

The National Institute for Marine Research and Development 'Grigore Antipa' is responsible for running a national MSFD monitoring programme there is no monitoring programme dedicated to HD. This programme feeds collected data into assessments on mammals, fish, sea-floor integrity and marine habitats. The monitoring programme is supervised by the Ministry of Environment, Water and Forests.

3.8.1.3 Data Collection

The Romanian Ornithological Society and the Association for the Protection of Birds and Nature hold responsibility for collecting data on the number of pairs of breeding birds and wintering birds. Data are collected through observations made twice a year, between the months of April and June.

Grigore Antipa and the non-governmental organisation Mare Nostrum collect data on cetacean strandings and bycatch. Data are collected through the national MSFD monitoring programme. Data on fish are also collected by Grigore Antipa under the same monitoring programme. This data collection is carried out twice a year as demersal and pelagic fish surveys are conducted in both the spring and autumn.

Data relevant to habitats are collected by Grigore Antipa using a variety of different sampling methodologies, including soft sediment dredges and underwater cameras. Grigore Antipa is also involved in collecting data on sea-floor integrity through a network of sampling stations. The Institute for Research and Development for Geology and Geo-ecology also contributes to sea-floor integrity data collection.

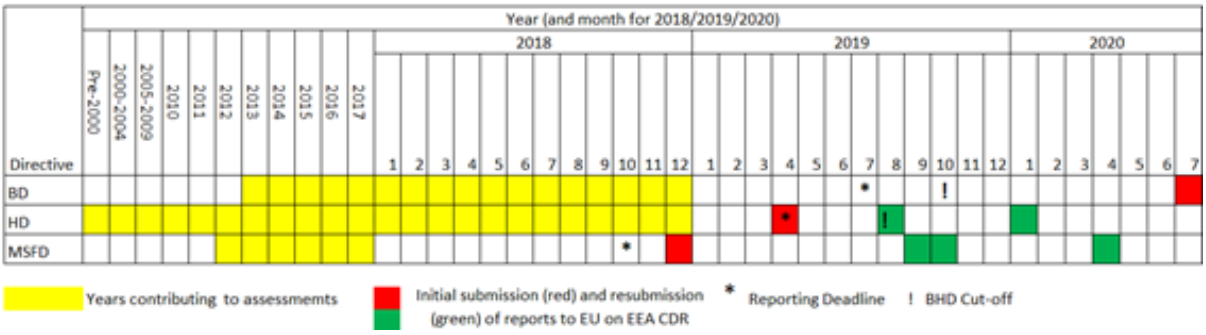
3.8.1.4 Timeline

Figure 17 presents the time period of data used in MSFD and BHD assessments[23] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[24], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period is longest for HD, with data from 2001 being drawn on for some parameters or criteria. Both the BD and HD used data from 2018, although this may not have been for the full calendar year (i.e. including December 2018). The MSFD assessments draw on data from between 2012 and 2017, stopping one year earlier than that the BHD.

The original reporting for HD met the deadline, but missed the cut off for revisions. Reporting for both the BD and MSFD missed the respective deadlines. For MSFD, reporting was not completed until April 2020 (18 months after the deadline), and for BD it was reporting was submitted in July 2020 (a year after the deadline).

Figure 17. Timelines for assessment and reporting in Romania

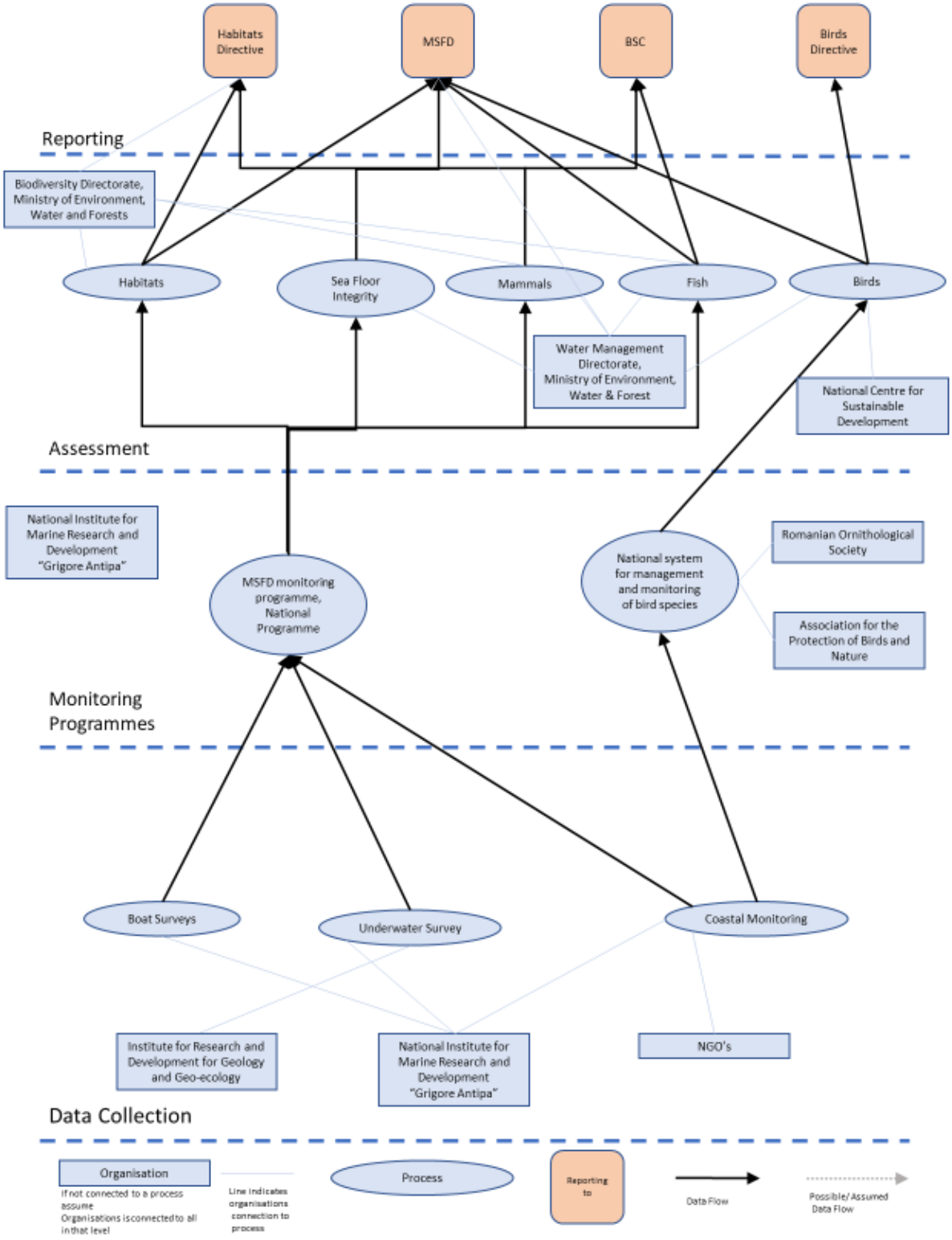


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[23] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[24] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 18. Overview Data Flow Diagram for Romania



Note: Additional diagrams showing more details are available in the annex document.

3.8.2 SWOT of process for the reuse of assessments

Strengths	Weaknesses
• A single organisation (the Ministry of Environment, Waters and Forests) is responsible for reporting assessments to MSFD and BHD. • Reporting to the Black Sea Commission is coordinated with the information requirements of the MSFD and BHD. • There are examples of assessments being reused for reporting to BHD and MSFD and to the Black Sea Commission. • Funded by the Ministry of Environment, Waters and Forests, there is a national monitoring programme that collects the data for all assessments reported to MSFD, the same programme also provides data for the HD and the Black Sea Commission. • Communication between Romania and the EC and Romania and the RSC occurs via relevant working groups, staffed by the same national experts. This ensures coordination, but may also indicate limited human resources.	• Although coordination with the Black Sea Commission is good, there could be better coordination of activities across the whole Black Sea region. This is complicated as, of the contracting parties, only Romania and Bulgaria are EU members. • Reporting across all three Directives was concluded significantly later than the deadlines.
Opportunities	**Threats**
• The Biodiversity Directorate and the Water Management Directorate are now within the Ministry of Environment, Waters and Forests. Previously they were under two different Ministries, presenting an opportunity to improve coordination between them and avoid multiple assessments of the same habitats/species. • Having one ministry responsible for the reporting of assessments, and one institute responsible for most of the monitoring programmes and data collection should reduce administrative barriers to streamlining.	• The Member State reported that current reporting deadlines impact the reusability of assessments, with the BHD reporting not matching up with the MSFD. However, there are substantial delays in the national reporting under MSFD and BD. • Bird monitoring is the only monitoring programme that is not part of the National MSFD monitoring programme. There is a risk that data collection for MSFD birds may not be so well integrated. • Accessing consistent funding to maintain comprehensive monitoring systems and to support close collaboration with Bulgaria.

3.9 Spain

3.9.1 Process description

3.9.1.1 Reporting and Assessment

The Ministry for the Ecological Transition and the Demographic Challenge (MITERD) are responsible for all reporting with the exception of some fish assessments, which are the responsibility of both MITERD and Pesca y Agricultura. Within the MITERD there are two directorates tasked with reporting to BHD and MSFD: the Directorate General of the Coasts and the Sea (DGCM) has a greater MSFD focus, and the General Directorate of Biodiversity, Forests and Desertification (DGBBD) now has a greater BHD focus with them the taking on the reporting for marine species from DGCM for future reporting.

MITERD brings together the information from the monitoring and data collection activities across the three subregions of Spain. The ministry is often involved in the monitoring and data collection activities, however this varies considerably between regions.

An assessment on demersal fish populations in the Bay of Biscay and the Iberian Coast is reported to the MSFD by MITERD and Pesca y Agricultura. Other fish population are covered under D3. Assessments of coastal fish in the Mediterranean for the MSFD is the responsibility of MITERD. The MSFD assessment for cephalopods is only produced for Bay of Biscay and the Iberian Coast sub region.

Assessments on birds in the Bay of Biscay and the Iberian Coast, Macaronesia and the Western Mediterranean Sea subregions are reported to the MSFD by DGCM of MITERD and are typically based on expert judgment with assistance from SEO Birdlife. DGCM also undertook the assessments reported to the BD using much of the same data but as a separate report.

MITERD performs the HD assessment for habitats and species. Many of the species assessments are based on expert opinion. The habitats assessment receive data from regional cartography programmes and will be supplemented in the future by IEO monitoring programmes. There is no benthic habitats assessment for MSFD, but assessments on sea-floor integrity in the Bay of Biscay and Iberian Coast and Western Mediterranean Sea subregions are produced by MITERD.

DGCM was responsible for reporting assessments on turtles in all Spanish marine waters for HD and MSFD. Expert opinion was often used to produce the assessment.

DGCM was responsible for the HD and MSFD assessments of mammals in Macaronesia and the Western Mediterranean Sea. Expert judgements are relied upon in producing assessments for HD and these assessments contribute to the MSFD assessments. In the Bay of Biscay and the Iberian Coast, the assessments are based on literature review of publications on certain species carried out by DGCM and reported to the HD. They also form the basis of MSFD reporting.

Reporting to the RSCs is done by MITERD. The reporting to MSFD on birds uses an OSPAR assessment and is only for the Bay of Biscay and the Iberian Coast sub region, as Macaronesia is outside of the convention area. The head of department on marine strategies also reported that much of the reporting to OSPAR derives from MSFD reporting, particularly on habitats. The reporting to BARCON has only recently been established. Some of the BARCON indicators are aligned with the MSFD.

3.9.1.2 Monitoring programmes

The monitoring activities in Spain vary considerably by region, and many of the assessments have to use expert judgement and literature reviews as their basis rather than monitoring programmes dedicated to a directive. More explicit monitoring programmes such as benthic transects for the HD to be conducted by IEO are being established, however they were not available for the last reporting cycles, in part due to delays in signing contracts.

For fish, monitoring is conducted through International Bottom Trawling Surveys (IBTS) in Spain's North and South Atlantic reporting areas (Bay of Biscay and Iberian Coast subregion) and the MEDITS survey in Western Mediterranean Sea. The Spanish Institute of Oceanography (IEO) are responsible for a long-term monitoring programme that feeds data into an assessment on coastal rocky infralittoral fish communities in the Western Mediterranean. Other fisheries related data is collected through commercial fisheries monitoring programmes.

Monitoring programmes that feed data into assessments for birds in the Bay of Biscay and Iberian Coast, and the western Mediterranean subregion, are conducted by the Autonomous Communities (Comunidad Autónoma) with assistance from the SEO Birdlife. In Macaronesia MITERD is also involved in a multi-annual project - 'MISTIC Seas' - with a consortium of regional partners. It provided data on the abundance and distribution of pelagic feeding birds. The MISTIC Seas project was focused on producing data to support MSFD but has been discontinued.

For mammals and turtles, there are number of regional monitoring activities that generate data used for MSFD and HD. In the Bay of Biscay and Iberian Coast subregion there is the SCANS[25] project, in the Western Mediterranean it is the ACCOBAMS[26] surveys initiative. In Macaronesia the MISTIC Seas project produced data for the assessments on mammals and turtles.

For HD species, excluding the mammals and turtles, there are some species such as *Patella ferruginean* in the Western Mediterranean that receive data from regional programs. However, assessments are often based on literature review, as is the case for *Corallium rubrum*.

There are regional mapping programmes that contribute the habitats assessments in HD and the INTEMARES project has conducted monitoring on habitats in Natura 2000 areas. The same data is used for seafloor integrity reporting under the MSFD.

3.9.1.3 Data collection

Detailed information on the data collection activities has some gaps due to; the difficult in finding the information, regional variations in Spain, and that fact that the assessments are often produced using expert judgement, so the sources of data are not always clear.

Trawl surveys collect the data for the IBTS in Bay of Biscay & Iberian Coast, and MEDITS in the Western Mediterranean. The Surveys are conducted by IEO in both regions.

Data used in assessments on birds in the Bay of Biscay and Iberian Coast, and Western Mediterranean are collected through local initiatives coordinated by SEO BirdLife and the Autonomous Communities. Bird censuses at sea conducted by MITERD also provide data. These data contribute to bird monitoring programmes that provide data for both the BD assessment and MSFD. In Macaronesia, MITERD and IEO collect data on birds through nest counts, call rates using Autonomous Recording Units and Capture-Mark-Recapture that contribute to the MISTIC Seas project.

Data collection activities relevant to mammals and turtles include boat and aerial surveys used by the SCANS (Bay of Biscay & Iberian Coast) and ACCOBAMS (Western Mediterranean) that contribute to the mammal and reptile tracking programmes that provide data to HD and MSFD. In the MISTIC Seas project (Macaronesia) line-transect distance sampling from vessel surveys and Capture-Mark-Recapture methods based on

[25] SCANS-III is a large-scale ship and aerial survey to study the distribution and abundance of cetaceans in European Atlantic waters

[26] The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) is a legal conservation tool based on cooperation. Its purpose is to reduce threats to cetaceans notably by improving current knowledge on these animals.

photo identification are collected. Strandings data on mammals is collected by autonomous communities, NGOs and rescue centres across all regions.

For HD species excluding mammals and reptiles, many species do not have direct data collection activities but will have assessment based on literature reviews. In this study only *Patella ferruginean* was recorded as having data collection activities conducted by the Andalusian Ministry of the Environment.

For HD Habitats, cartography conducted by the Autonomous Communities combined with mapping by IEO and the INDEMARES project on Natura 2000 site contribute data to the assessments. Mapping by IEO is also used in the sea floor integrity reporting.

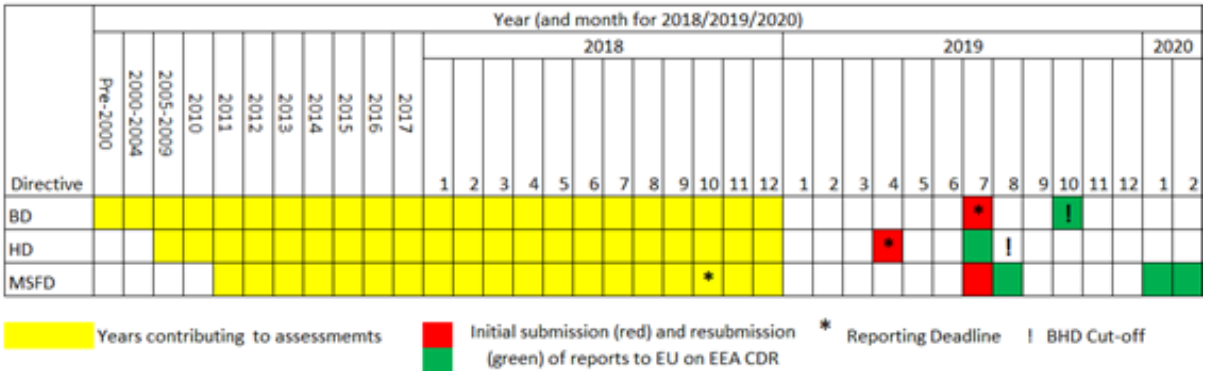
3.9.1.4 Timeline

Figure 19 presents the time period of data used in MSFD and BHD assessments[27] (in yellow), the months in which reports were submitted (original submissions in red, resubmissions in green)[28], the deadlines for original submissions (* symbol) and final cut off for resubmitting BHD reporting (! symbol).

The assessment period is longest for BD, with data from 1980 being used for some parameters or criteria. Assessments or all three directives used data from 2018 (although this may not have been for the full calendar year i.e. up to December).

The submission of reports was in line with the deadlines for BD and HD. However, reporting for MSFD late and was not concluded until February 2020, after reporting for BHD had been concluded.

Figure 19. Timelines for assessment and reporting in Spain

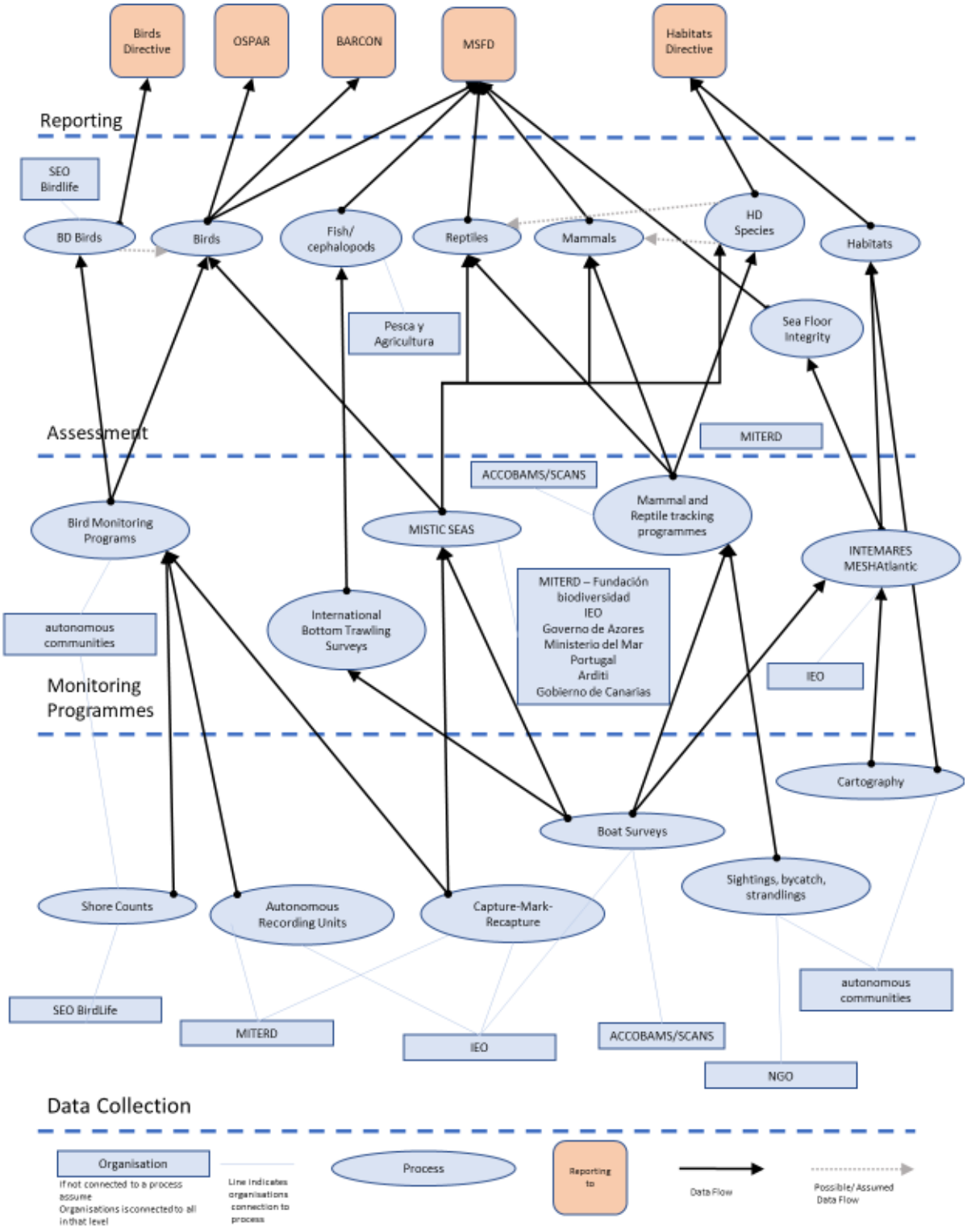


Source: The assessment period is expressed as the maximum time range of data used to measure and assess the parameters/criteria under BHD and MSFD, across all species/habitats considered, as obtained from the Member State template analysis. The months that the Member State delivered the text report and associated files relevant to each directive are from the EEA Eionet Central Data Repository. The reporting deadline and cut-off (BHD only) is as per EU guidance.

[27] The information presents years for which data were used in one or more assessment under each directive. It does not imply that data covering this whole period was used in any given assessment. The exact cut-off date for data used in the assessment was not available.

[28] Member States submit multiple report types and may resubmit reports to address quality or other issues. Hence there may be more than one submission by a Member State for each directive.

Figure 20. Overview Data Flow Diagram for Spain



Note: Additional diagrams showing more detail are available in the separate annex document.

3.9.2 SWOT analysis or coordination and reuse

Strengths	Weaknesses
• A single organisation (MITERD) holds responsibility for reporting across all Directives. • There are examples of assessments being reused between BHD and MSFD, however it varies between regions. • There is a good alignment between the reporting for OSPAR and MSFD, with OSPAR assessments derived from MSFD reporting, particularly for habitats where the indicators used for the MSFD are the OSPAR indicators. • There is good coordination in the Macaronesia subregion, where much of the data are collected for MSFD in an integrated way through a single project (MISTIC SEAS). However this project is discontinued. • Several large monitoring programmes have been established, designed to enable continuation into the future.	• Monitoring programmes have not been fully implemented on time due to administrative obstacles. • Specific contracts have to be signed between MITERD and entities responsible for carrying out monitoring programmes such as IEO; this can make consistency and coordination of data flows more difficult. • Where monitoring programmes have been established, they often do not have a sufficiently long time series available to support assessments. • There are variations in the approaches taken in different regions. Variation increases the complexity of the processes used to produce the assessments. • Reporting of assessments on birds and mammals are predominately based on expert judgement and literature review. This makes it harder to ensure consistency in the assessments over time. •
Opportunities	**Threats**
• Good practices and processes could be developed and tested in one region before being rolled out to other regions. • Establishing a permanent relationship with entities responsible for carrying out monitoring programmes could streamline data flow (rather than having specific contracts every time). • Many of the EU supported projects to assist coordination, monitoring and assessment have produced results that have been used in assessment and could form the basis of national monitoring programmes	• The current reporting deadlines impact the reusability of assessments from BHD to MSFD. • The recent transfer of responsibility for reporting of species, but not monitoring from the Dirección General de la Costa y del Mar (DGCM) to the Dirección General de Biodiversidad, Bosques y Desertificación may increase administrative barriers. • Projects such as MISTIC SEAS, INDEMARES & INTEMARES have provided many on the data and monitoring activities used in assessment. The long term continuation of these projects is a risk.

4 Systematic analysis of Member State processes

This section presents an analysis of the assessment, monitoring programme and data collection processes presented in the flow diagrams already shown in Section 2. The following analyses are provided:

- The number and type of organisations involved in assessment, monitoring programmes and data collection.
- The extent of assessment use and reuse.
- The extent to which RSC reporting is used in BHD and/or MSFD reporting.

4.1 Organisations involved

4.1.1 The number of distinct organisations involved by stage

The **number of distinct organisations** involved at each stage (Assessment, Monitoring, and Data collection) and overall is shown in Table 5.

The total number of distinct organisations involved in MSFD / BHD data collection, monitoring and assessment varies significantly between Member States – from nine in Romania to 24 in Spain. Spain and France have the highest number of organisations involved (24 and 19 respectively) – both are relatively large countries that have multiple marine regions. However, Germany is also a large country with two marine regions but has one of the fewest number of organisations involved (10).

When looking at the number of organisations at each stage of the data flow process, the number of organisations involved increases as one moves down from assessments to monitoring to data collection. This pattern is broadly consistent across all Member States in the sample.

Table 6 compares the average number of organisations involved at each stage for each of the BHD and MSFD reporting requirements. The average number of organisations involved at the monitoring and data collection stages is greatest for reptiles and fewest for cephalopods. Having more organisations may indicate that there is more complexity in the process required to produce the assessment.

Table 5. Number of distinct organisations involved in MSFD/BHD marine biodiversity data collection, monitoring and assessment

	Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Overall	14	16	17	19	10	16	12	9	24
Assessments	2	3	2	3	6	2	4	5	3
Monitoring	11	5	11	9	8	12	4	4	13
Data Collection	10	16	14	17	10	12	10	5	23

Table 6. Average number (across the nine MS) of distinct organisations involved in data collection, monitoring and assessment stages by BHD Reporting requirements / MSFD Descriptor

			GES Component					
Stage	Birds Dir	Habitats Dir	Birds	Cephalopods	Fish	Mammals	Reptiles	Benthic habitats /Sea-floor integrity
Assessments	1.5	1.4	2.0	1.0	2.7	2.0	1.8	1.8
Monitoring	3.2	3.5	4.4	2.0	2.4	3.6	5.5	4.3
Data collection	3.0	4.8	4.8	1.0	3.1	5.8	7.5	3.7

4.1.2 The types of organisations involved at each stage

The **types of organisations** involved are analysed based on the 10 categories of organisation indicated in Table 7. The number of organisations by type involved across each of the Assessment, Monitoring Programmes and Data Collection stages are shown in Table 8 to Table 10 – ordered from the most frequently occurring type across the nine Member States to the least. The tables compare the relative ranks of organisation type across the three stages, showing how the mix and diversity of organisations involved changes at each stage, adding to the complexity and challenges for coordination.

The main types of organisations involved across all stages (Assessment, Monitoring Programme, Data collection) are ministries, public agencies, research institutes /universities and NGOs. The Assessment stage is dominated by ministries and public agencies, and to a lesser extent research organisations / universities. Few other types of organisation are involved in Assessments. Both Monitoring Programmes and Data Collection are dominated by research organisations / universities and NGOs.

The total number and spread across the type of organisations both increase as one moves down the stages from Assessment to Data Collection. Some organisation types, including private entities, other and the general public, are only involved at the Data Collection stage.

Table 7. Types of organisation

Type of Organisation	Examples
Ministry	Ministry of the Environment, Ministry of Agriculture etc
Public Agency	Water Agencies, Environment Agencies, statistical agencies, conservation bodies
Local/regional government	German Länder, Autonomous communities
International	ICES, ACCOBAMS
NGO	BirdLife, Fundación Oceana
Research organisation / university	Institute of Oceanography and Fisheries, Ifremer

Type of Organisation	Examples
Projects	Malta Marine Monitoring Consortium, The City of Venice project partnership
Other	Aquaria, rescue centres
Private	Private companies, Consultants
General Public	Volunteers, Fishers

Table 8. Number of organisations involved in Assessment by organisation type (ranked from most to least)

Type of org	Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Ministry	1	2	1				3	2	2
Public Agency		1	1	2	1	2		1	
Research org/ university	1			1	1			2	
International							1		
Local/regional government					4				
NGO									1
General Public									
Other									
Private									
Projects									

Table 9. Number of organisations involved in Monitoring Programmes by organisation type (ranked from most to least)

Type of org	Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Research org/ university	2	1	4	3	2	3		2	2
NGO	4	1	3	1		3		2	1
Ministry	3	2	1			3	2		3
Public Agency	1	1	2	4	1	2	1		1
Local/regional government	1		1		5				3
International							1		3

Type of org	Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Projects	1			1		1			
Other									1
General Public									
Private									

Table 10. Number of organisations involved in Data Collection by organisation type (ranked from most to least)

Type of org	Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Research org/ university	4	2	6	9	3	2	3	2	8
NGO	3	2	1	2		3	1	3	3
Public Agency	1	7	3	4	1	1			1
Local/regional government	1	1	1		5				3
Ministry	1	2				2	2		3
General Public	1	1	3			2	2		
International		1			1		1		3
Other				2					2
Private						1	1		
Projects						1			

Table 11. Ranking of organisation types involved in Assessment, Monitoring Programmes and Data Collection (each ordered from most to least)

Assessment	Monitoring Programmes	Data collection
Ministry	Research org/ university	Research org/ university
Public Agency	NGO	NGO
Research org/ university	Ministry	Public Agency
International	Public Agency	Local government
Local government	Local government	Ministry
NGO	International	General Public

Assessment	Monitoring Programmes	Data collection
	Projects	International
	Other	Other
	General Public	Private
	Private	Projects

4.2 Extent of assessment use and reuse

Table 12 indicates for each Member State the assessments that are used to comply with each of the three Directives' reporting requirements. The matrix was produced by examining the detailed data follow diagrams contained in the annex, if any single assessment is used for more than 1 reporting requirement then will be record as an example of reuse in the matrix. The rows of the matrix will then show which directive assessments are used in against the component in the columns, the RSC assessments are in a separate row, and show if RSC assessment are reused, and the name of the RSC. If a matrix cell is blank, then there has not been reporting of that requirement for that Member State. For example, in Croatia the same assessments are used in the BD and MSFD for 4 species, together with additional bespoke BD assessments, but only MSFD assessments are used in the reporting for the Bird descriptor of the MSFD and none of the RSC assessments are reused to support reporting to the Directives. Croatia did not report on MSFD descriptors for cephalopods, fish or seafloor integrity.

The Netherlands has the highest level of assessment reuse and reused assessments reported to OSPAR across all the Directive reporting requirements. Of the larger countries, France and Germany have relatively high levels of assessment reuse and engagement with the RSC. The size of the assessment scales for the RSC may be a factor in some countries being able to reuse RSC assessments. There are instances of assessments being reused in Spain, however this is not consistent across all its marine subregions, making the levels of reuse appear higher than they actually are. Spain also does not reuse the RSC assessments to the same extent as other countries however only one of its regions (Bay of Biscay and Iberian Coast) is within OSPAR that is receiving data-based assessments.

The greatest contrast is in the Baltic region. Estonia has a high level of assessment reuse compared to Finland which, whilst having established data reuse across Directives, has a limited level of assessment reuse reported to directives.

Looking across the reporting requirements, assessments for the MSFD mammals GES Component are reused most often as are reptiles where they occur, this is followed by assessments on birds. Assessments for the Fish and Cephalopod descriptors are the least likely to be reused. For mammals, the RSCs have established methods for data collection and there are other international agreements such as ACCOBAMS and ASCOBANS that promote common standards and established data flows that support the reuse of assessments.

Table 12. Matrix of Member State and Assessments use and reuse

		Habitats Dir				MSFD GES Component				
		Birds Dir	**Habitats Species**		**Birds**	**Cephalo-pods**	**Fish**	**Mammals**	**Reptiles**	**Benthic habitats /Sea-floor integrity**
Croatia	Directive	BD/ MSFD	HD/ MSFD	HD	MSFD/ BD			MSFD/HD	MSFD/HD	MSFD
	RSC									
Estonia	Directive	BD/ MSFD	HD/ MSFD	HD	MSFD/ BD		MSFD/ HD	MSFD/HD	MSFD/HD	MSFD/HD
	RSC	HELCOM			HELCOM		HELCOM	HELCOM	HELCOM	HELCOM
Finland	Directive	BD	HD	HD	MSFD		MSFD/ HD	MSFD/ HD		MSFD
	RSC	HELCOM					HELCOM	HELCOM		HELCOM
France	Directive	BD	HD	HD/ MSFD	MSFD		MSFD/ HD	MSFD	MSFD	MSFD
	RSC	OSPAR	OSPAR		OSPAR/ BARCON			OSPAR/ BARCON	OSPAR	OSPAR
Germany	Directive	BD	HD	HD	MSFD/ BD		MSFD	MSFD/ HD		MSFD/ HD
	RSC	OSPAR/ HELCOM	OSPAR/ HELCOM		OSPAR/ HELCOM			OSPAR/ HELCOM		OSPAR/ HELCOM
Malta	Directive	BD	HD	HD	MSFD/ BD	MSFD	MSFD	MSFD	MSFD	MSFD
	RSC				BARCON			BARCON	BARCON	
Netherlands	Directive	BD/ MSFD	HD/ MSFD	HD	MSFD/ BD		MSFD/ HD	MSFD/ HD		MSFD/ HD
	RSC	OSPAR		OSPAR	OSPAR		OSPAR	OSPAR		OSPAR
Romania	Directive	BD	HD/ MSFD	HD	MSFD/ BD		MSFD	MSFD/ HD		MSFD/ HD
	RSC						BSC	BSC		BSC
Spain	Directive	BD	HD	HD	MSFD	MSFD	MSFD	MSFD/ HD	MSFD/ HD	MSFD
	RSC				OSPAR/ BARCON					

Table 13 gives an indication of the levels of reuse by country, showing the assessment process identified in the summary diagrams in section 3, and the number that have some level of reuse associated with them, either with a directive or an RSC.

Table 13. Summary of assessment reuse

		Number of Assessment processes in summary diagram	Number of processes that have reuse of assessments	% of processes that have some reuse of assessments
Croatia	Directive	6	3	50
	RSC		0	0
Estonia	Directive	5	5	100
	RSC		5	100
Finland	Directive	5	0	0
	RSC		4	80
France	Directive	7	4	57
	RSC		5	71
Germany	Directive	5	2	40
	RSC		4	80
Malta	Directive	6	1	17
	RSC		1	17
Netherlands	Directive	6	6	100
	RSC		6	100
Romania	Directive	5	4	80
	RSC		3	60
Spain	Directive	8	3	38
	RSC		1	13

4.3 Regional comparison

The alignment of reporting requirements varies between the convention areas and is examined in more detail in section 5. Reuse of assessments for regional sea conventions is lowest in the Barcelona Convention region. In the other three regions the level of reuse is similar, although there is only one country in the study sample representing the Black Sea Commission. The reuse percentage for OSPAR would be the highest, but the low level of use of RSC assessments by Spain depresses the average.

Table 14. Extent of assessments reused for RSC reporting (average across nine MS) assessment

	Average number of requirements reported on in MS	Average number times reused for RSC Assessments	% of reporting that reuse assessment for RSC
Barcelona Convention (BARCON)	6.5	1.2	19
Black Sea Commission (BSC)	5	3	60
HELCOM	6	4.3	72
OSPAR	6.5	4.2	65

5 Regional Sea Convention interactions with MSFD and BHD reporting processes

The four Regional Sea Conventions (RSCs) covering European waters are the Bucharest Convention (covering the Black Sea), the Barcelona Convention (covering the Mediterranean Sea), Oslo-Paris Convention (covering the North-East Atlantic Ocean), and Helsinki Convention (covering the Baltic Sea). They are referred to in Article 6 of the MSFD, which requires Member States to use the structures and activities of the RSC for MSFD implementation.

The RSCs aim to improve governance in each of the marine regions and to reinforce the protection of the marine environment. The MSFD includes numerous provisions which seek mutually beneficial supportive integration between MSFD and the RSCs. MSFD Art 5(2) requires Member States to ensure the implementation of the different articles is coherent and coordinated across the region or subregion and MSFD Article 6(1) requires Member States to use existing regional institutional structures, including those under RSCs, to coordinate implementation of the MSFD.

This section provides an overview for each RSC in turn, drawing on interviews conducted with each, that examines how their reporting requirements interact with the reporting requirements of the MSFD and the Birds and Habitat Directives. For each RSC it presents the relationship with MSFD, BHD and how integrated the reporting is, before presenting an overall conclusion.

5.1 Bucharest Convention (Black Sea Commission)

The Black Sea Commission has six contracting parties: Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine, of which two (Bulgaria, Romania) are EU Member States. The Commission has a permanent secretariat based in Istanbul with three staff.

5.1.1 MSFD

The Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (SAP 2009)[29] has Ecosystem Quality Objectives (EcoQs) that include, as a goal, the conservation of Black Sea biodiversity and habitats. This is implemented through the Black Sea Integrated Monitoring and Assessment Programme (BSIMAP)[30] 2017-2022. With only two of the contracting parties being EU member states, the MSFD is not legally binding for the whole convention area. However some of the other countries do has agreements to implement MSFD, such as Ukraine and Georgia, and Turkey has commitment through its status as a candidate country. Despite this, the BSIMAP has adopted the concepts "Good Environmental Status" and "Descriptors", and uses the MSFD definition of them.

5.1.2 BHD

Birds are not specifically covered under the Black Sea Commission so there is no reporting to the RSC that is comparable to the Bird's Directive. However, in cooperation with the NGO Birdlife International[31] a list of bird species, including endangered and protected species[32], has been developed that could form the basis of reporting in the future.

For the HD there are two descriptors under the Ecosystem Quality Objectives of the BSC that could potentially provide information for reporting to the Directive: 2a Reduce the

[29] https://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/bucharest/pdf/SAP2009.pdf

[30] https://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/bucharest/pdf/BSIMAP_2017_to_2022_en.pdf

[31] https://www.dogadernegi.org/en/black-sea-seabirds/

[32] https://avibase.bsc-eoc.org/checklist.jsp?region=TRan

risk of extinction of threatened species, and 2b Conserve coastal and marine habitats and landscapes.

5.1.3 Integration of reporting

The Strategic Action Plan is a legally binding document that includes the reporting requirement for the convention area. However, it has not been updated since 2009. Therefore, although MSFD concepts (as stated above) are adopted in the Strategic Action Plan, it includes no specific references to the MSFD (adopted in 2008) nor the role of the Strategic Action Plan in the MSFD implementation. At the implementation level, the terms of reference for the BSC's State of Environment report include consideration of the MSFD.

The reporting format adopted by the BSC is a hybrid of the UNEP format and the MSFD format. The secretariat tries to promote a harmonised approach with the other RSCs, and adapt them to the Black Sea. The two EU MSs (Bulgaria, Romania) are able to use information collected under the MSFD in their reporting to the RSC.

5.2 Barcelona Convention (UNEP-MAP)

The Barcelona Convention has 22 contracting parties[33], seven of which are EU Members States. The European Union is also a Contracting party. UNEP provides secretariat services to the Contracting Parties through its Mediterranean Action Plan (MAP) Coordinating Unit.

5.2.1 MSFD

The Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP) Indicators[34] were developed with regard to the MSFD descriptors and criteria. The Convention's Biodiversity Ecological Objective has five common regional indicators which are relevant to the MSFD (Habitat distributional range, Condition of the habitat's typical species and communities, Species distributional range, Population abundance of selected species and Population demographic characteristics). There are also Ecological objectives for Marine food webs and Sea-floor integrity, although the indicators for these are still being developed. Member States' national monitoring, assessment and reporting feeds both the IMAP and MSFD process requirements.

5.2.2 BHD

There is no direct relationship between the reporting requirements of the Barcelona Convention and the Habitats Directive. However, under the Barcelona Convention there is a reference list of marine habitat types which are aligned with the updated structure of the revised marine component of EUNIS habitats classification. This will enable coherent use of the habitat lists in national inventories and monitoring programmes however the EUNIS classification are not directly compatible to the habitats in the HD.

5.2.3 Integration of reporting

UNEP-MAP, through the Regional Activity Centre for Information and Communication (INFO/RAC)[35], has developed the IMAP Pilot Info System[36]. The system currently covers eleven of IMAP's 23 common regional indicators, two of which are biodiversity indicators that have the potential to be relevant to the MSFD (Habitat distributional range, Condition of the habitat's typical species and communities). These indicators have Data Standards (DS) and Data Dictionaries (DD) approved by Correspondence Groups on

[33] The 22 Contracting Parties to the Barcelona Convention are: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syrian Arab Republic, Tunisia, Turkey, and the European Union.

[34] See Annex 1. List of IMAP Ecological Objectives (EOs) and Indicators

[35] See: http://www.info-rac.org/en/projects/ecap-med-ii

[36] See: http://www.info-rac.org/en/infomap-system/imap-pilot-platform

Monitoring and EcAp Coordination Group meetings. The remaining twelve common indicators will be reported during 2021-2022.

The system was developed with the aim of maximising the harmonisation of data reported by the contracting parties to the RSC. The next QSR, due in 2023, is expected to use the monitoring data collected under MSFD and submitted to the IMAP information system.

The next QSR will occur before the next MSFD reporting, however the extent that assessments that can be reused remain to be seen.

5.3 Helsinki Convention (HELCOM)

HELCOM has ten contracting parties[37], eight of which are EU Members States and one is the European Union itself. The HELCOM Secretariat is in Helsinki, Finland and has 26 staff.

5.3.1 MSFD

At the strategic level, the goals of the Baltic Sea Action Plan[38] are aligned with the goals of the MSFD. At the implementation level, HELCOM has 8 groups for implementation of policies – of these, The Working Group on the State of the Environment and Nature Conservation is the most relevant for biodiversity-related indicators. The groups are responsible for selecting the indicators to be used in the HELCOM regional assessments. The indicator-selection process requires consensus to be reached – the Contracting Parties need to approve all information to be included in HELCOM assessments as well as the tools for conducting integrated assessments. These tools include HEAT (eutrophication) and BEAT (biodiversity) assessment tools contributing to HOLAS (Holistic Assessment), for collating and interrogating data, which are in turn used in the BAP (Baltic Action Plan). This gives the contracting parties the opportunity to integrate their MSFD requirements and data within the RSC processes and assessment products.

5.3.2 BHD

HELCOM has a platform that can be used for reporting of birds and habitats data. However, it was indicated that it is inadequate and hence is not being used. The EU Member States have requested that the platform be strengthened, to enable it to be used for collecting data that could be used for the next reporting round of the HD.

5.3.3 Integration of reporting

The timing of HELCOM's assessments have been aligned with reporting for MSFD, to the extent that they allow the assessments to be available for the EU Member State internal MSFD consultations.

HELCOM has nested scales for reporting to allow reporting at different spatial scales. However, if the data are not collected consistently across all areas it can still be difficult to complete assessments, as was the case for wintering seabirds.

For biodiversity indicators introduced relatively recently, the data flows are generally more ad hoc than some of the more established indicators (such as those used for pollution monitoring). HELCOM has adopted a set of core indicators which are being harmonised with those from the MSFD. A goal of HELCOM is to make more of these established data flows, by providing tools that contracting parties can use to report data to HELCOM annually. The EU Member States will then be able to use that data for both the future HELCOM assessments and the MSFD assessments.

[37] Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden and the European Union

[38] https://helcom.fi/baltic-sea-action-plan/

HELCOM has a monitoring manual[39] and guidelines on how data should be collected. The guidelines specify the format that data should be collected in and facilitates the incorporation of the data into assessments from across the region.

HELCOM and OSPAR are working together to create a database for seabirds data across both their areas. This will provide consistent data between the regions and would be particularly useful to EU Member States that are in both convention areas.

5.4 Oslo-Paris Convention (OSPAR)

OSPAR has 16 contracting parties[40], 10 of which are EU Member States (and one of which is the European Union). OSPAR has a secretariat of 11 staff, based in London, UK. Much of the OSPAR information is used to produce the regular Quality Status Reports for the OSPAR areas. The next QSR timing (2023) has been set to allow reuse for the MSFD Article 8 assessments due in 2024.

5.4.1 MSFD

OSPAR has an Intersessional Correspondence Group for implementation of the Marine Strategy Framework Directive (ICG-MSFD), which is a working group that provides a platform for national MSFD managers. The ICG-MSFD has a supporting/advisory role to the OSPAR Coordination Group (CoG) to "*facilitate a regionally coordinated implementation of the MSFD by making the best use of OSPAR*". The development of indicators starts with expert technical groups. Many of the experts in the groups have knowledge of the implementation of the MSFD in their respective countries. Indicators will then be considered by the thematic committees (e.g. Biodiversity Committee) and also considered by ICG-MSFD in relation to Member State implementation of the MSFD.

The existence of established monitoring programmes can influence the choice of indicators as it may not be appropriate to change a monitoring programme on the basis of a new indicator. The data needed for the indicators is described in the CEMP monitoring manuals.

5.4.2 BHD

There is no direct link between the OSPAR assessments and the BHD. There is a new OSPAR assessment system for species (including some bird species) which could be used in BHD. For habitats there is some overlap, for example maërl assessments have been used for the HD in the past.

For bird species, there has been work to improve the consistency of data collection between OSPAR, HELCOM and ICES, but the focus of the bird data has been more on MSFD reporting.

5.4.3 Integration of reporting

OSPAR plan their regional assessments to aid coordination with the MSFD. OSPAR did an Intermediate Assessment of the convention area in 2017[41]. It was timed so that it would be possible for the assessments to be reused for the MSFD. The next full Quality Status Report (QSR) is due in 2023, after which the next interim assessment will be timed to allow it to be used in the next MSFD reporting cycle.

The OSPAR biodiversity indicators[42] are well aligned with the MSFD. The goal is for OSPAR to have the indicators updated every two years so that they can be used for the OSPAR Intermediate Assessments and full QSR, as well as the MSFD. OSPAR is working to increase the automation of the data flows to the indicators, as much as possible, to

[39] https://helcom.fi/action-areas/monitoring-and-assessment/monitoring-manual/

[40] Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom, together with the European Union

[41] https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/

[42] https://www.ospar.org/work-areas/bdc/biodiversity-monitoring-assessment-1/biodiversity-common-indicators

enable their regular production. However, establishing the data flows takes time and political will.

Spatial scales can be a problem. The spatial scales of the regional assessments are not always appropriate for use at a national level. Different data collection methods used by countries can also make it hard to aggregate the data for regional assessments.

5.5 Summary

The activities of the RSCs are more integrated with the MSFD than the BHD. There are a number of reasons for this. At a strategic level, the MSFD is included in most of the RSC strategic plans, whereas the BHD are not. This is expected given that MSFD Article 5(2) and 6 expressly requires Member States to use existing regional coordination mechanisms, including the RSCs for MSFD coordination purposes, whereas there is no such equivalent requirement for the BHD. The technical working groups that implement RSC activities are typically comprised of the same experts from the Member States and signatory states involved in MSFD implementation. This creates a structured platform for the work of the RSC and the MSFD to be coordinated, in the Baltic and Atlantic the Member States have made a commitment to directly reuses RSC work for MSFD.

The timings of the RSC's QSRs are generally coordinated with MSFD reporting in order to support the reuse of RSC assessments. This is particularly the case for HELCOM, OSPAR and UNEP/MAP.

Differences in assessment scales and the spatial scales of data collection activities of the contracting parties, present problems for generating the RSC assessments. Having consistent data collection methods between the contracting parties makes the aggregation of data easier. This can be encouraged through the use of; Common indicators, agreed threshold values, integrated assessments and common guidelines and manuals, as used in HELCOM and OSPAR, or data reporting formats, as in UNEP/MAP. HELCOM also has nested scales for assessments to allow reporting at different spatial scales.

The information systems used by the RSCs to collect information for their assessments are important drivers that promote the establishment of consistent data flows. The standard procedures and processes that need to be defined as part of an information system help drive consistency in the way data are collected, making aggregation of data simpler and creating possibilities for automation. If the data flows are well established, it may be possible to collect the data for assessments more frequently. In turn, the RSC assessments could be produced more frequently so that they are available for more reporting requirements, such as the MSFD.

6 Member State interview analysis

6.1 Member State internal coordination and reuse

The processes and organisational structures in a country can have a significant impact on the ability to coordinate processes across the directives and, ultimately, the ability to reuse data and assessments.

6.1.1 Organisational arrangements for cooperation and coordination across the three Directives

Some Member States, including the Netherlands and Estonia, have one organisation that has responsibility for coordinating the data collection and monitoring programme activities that feed into assessments. These organisations promote a consistency of approach at each stage of the process required to satisfy reporting requirements under the Directives.

In other Member States there is shared responsibility across the Directives. For example, France has two organisations that coordinate the information from data collection up to assessments - one is responsible for MSFD and one for BHD, and coordination between the two is vital for the reuse of data and assessments. Germany and Spain both have devolved regions. Whilst in Germany the federal agency is generally involved at all stages of the process, in Spain the variations between regions of data collection activities are much greater, but the final assessments are all done by a single organisation.

Several Member States reported that coordination of monitoring and reporting across the three Directives 'works well'. However, coordination often relies on informal relationships between individuals and/or teams. Such coordination may not be resilient to changes in personnel or institutional priorities. Some smaller Member States considered such informal relationships as being easy to maintain, given the limited number of relevant organisations and individuals in their country. Meetings and working groups are used by some Member States to more formally support coordination. Regardless of efforts to cooperate, some Member States indicated that administrative barriers between responsible organisations can hinder coordination and the sharing of data.

The volume of information required to satisfy reporting on the Directives is significant. Member States indicated that a greater focus on what information is strictly necessary would make the job of coordinating activities across the Directives easier.

6.1.2 Structural integration supported by data portals

Having clearly defined processes, consistently applied, and effective storage of the results are the cornerstone of the "collect once, use many times" principle that is key to good data management and is a prerequisite for the streamlining of reporting.

The Netherlands has one of the highest levels of reuse of data and assessments across the Directives. A significant factor is having a "collect once, use many times" principle embedded within its national marine strategy, and, in the IHM, an organisation with the remit to deliver on that principle. The Netherlands' national marine strategy also has a section on cooperation that details how the strategy will integrate with the BHD and international cooperation through OSPAR and ICES. IHM activities include:

- the coordination of partners in the collection and processing of the marine data.
- maintaining a centralised information system to manage the data collected.
- verification of the data as it enters the system.
- making access to the data as open as possible.
- checking that changes to data collection and monitoring programmes do not threaten the reusability of the data.

France has adopted a national strategy for the sea and the coast, which implements strategic guidelines through an action plan and monitoring framework that aims to integrate MSFD and BHD monitoring requirements. Common methodologies and integrated data collection efforts have been established between directives and with other directives such as WFD and MSPD. Some Member States indicated that they would support the EU mandating such formal integration of data structures across Directives.

In France, coordination is supported by an information system on marine environment ("SIMM"), or Marine Environment Portal, which was launched by the French Biodiversity Office (OFB), the Ministry of Ecological and Just Transition, IFREMER and its partners in July 2019. This portal aims to generate and share publicly available information that is needed to report on the MSFD and BHD.

Other Member States have similarly invested in improving IT systems in order to streamline data processing and support better data access (e.g. the Croatian Marine Reference Centre collates data collected across several marine programmes and projects which feed the requirements for the Directives). Other Member States recognised the need for greater investment in data systems and improving open access data but do not have portals in place.

6.1.3 Integration from data collection to reporting

Some Member States face challenges in managing the flow of data from those responsible for collection up to those responsible for assessments, particularly where the data collection is not under the direct control/influence of a central organisation or national monitoring programme or where NGO's are involved. As shown in Section 4.1, numerous organisations are involved in data collection in each Member State, with Ministries primarily involved at the assessment and reporting stages. Issues encountered include: delays in implementing monitoring and sharing data as activity is governed by time-limited contracts that need to be renewed, rather than permanent relationships; data collection undertaken without formal obligations being in place, which can result in data collection not adequately adhering to monitoring requirements (e.g. in terms of parameters, units and sampling methods) and data formats, and presenting obstacles to data sharing.

Dependency on external actors and the ownership/control of the information is a challenge for some Member States. Finland provides an example of the issues that can be faced (particularly for rare species). There, data are collected by volunteers and researchers, who release it for nature protection purposes. But MSFD calls for publication of spatial data in defined reporting units that may not correspond to the terms set by various the data owners. Therefore, for assessments and reporting the data have been spatially generalized (to e.g. 50km x 50km squares).

6.2 Sufficiency and continuity of budgets and projects

6.2.1 Budget constraints

Budgets were commonly identified by Member States as a constraint to better monitoring and reporting. Member States indicated that the extensive requirements of the Directives to monitor marine species and habitats require significant levels of funding.

Budget constraints impact the geographic and feature scope of monitoring and its temporal frequency and consistency. Examples provided by Member States included the comprehensiveness of monitoring fluctuating from year to year, in line with available budgets, as well as monitoring programmes being designed to focus on different areas in different years.

Member States seek to fill funding gaps by drawing on private funding, EU project funding and the use of volunteers. For example, in Finland, there is extensive use of volunteers to collect data on birds. Volunteer surveys/data collection is centrally coordinated by Government and the system is reported to work well. However, there can

be issues where volunteer researchers want to use the data for their own publications prior to sharing it with Government, resulting in delays in accessing data.

Some Member States noted that private and EU funding is not always available to supplement national funding. Some Member States noted that other data obligations have established, clear EU funding streams – the example of data collected with regards the Common Fisheries Policy under the Data Collection Framework was cited – and called for a similar model of funding to be made available for MSFD/BHD marine habitat and species monitoring. Those responsible for MSFD/BHD monitoring may not be fully aware of what or how funding streams can be used. Indeed, despite the different structures and organisational arrangements to manage fisheries, the EU fisheries funds can be used for monitoring activities under the MSFD and the BHD. A range of EU funds can be used to support monitoring including LIFE, the co-financing of HD Prioritised Action Frameworks and numerous EU funded projects (such as the MISTIC SEAS example).

It was also recognised that budget constraints can act as a positive driver for efficiencies in data collection methods (e.g. adoption of remote sensing methods in place of costly intensive in-field monitoring) as well as increased reuse/sharing of data (e.g. through seeking better integration of data across the Directives and seeking opportunities for sharing of costs between Member State through joint activities) in order to reduce total cost obligations. The Commission has highlighted[43] that there is room for improvement in efficiency through joint regional monitoring programmes, assessments and programmes of measures.

6.2.2 Ensuring continuity of data from projects

Data collected through time-limited projects form an important aspect of Member State monitoring. Project-based data collection provides opportunities to fill gaps in data needs, design data collection to fulfil changing requirements, and in many cases support coordination across Member States. It is a critical source of monitoring data in some Member States (e.g. Malta).

The use of data from projects was also however identified as a potential barrier to the reuse of data and assessments. Influenced by time limited budgets, projects often run for a limited term, and so may be unable to provide the long-term data sets that are often required for assessments. The time scales of research projects may not match with the legal and reporting obligations. Projects may collect data in a method defined by the project, which may not conform to national or regional methods and this can lead to data inconsistencies or lack of acceptance from the authorities. Projects may also produce analysis and products that are used in assessments, but if the methodology used to create the product is not adequately documented, then a potential lack of transparency and data can make it harder to reproduce assessments beyond the lifespan of the project. This challenge was recognised by several Member States, and the importance of establishing projects which are designed to enable continuation of the initiated monitoring in the future was stressed.

In some cases, projects have been successfully used to fulfil multiple reporting requirements and are providing long-term continuity of data as well as supporting regional coordination. An example is the MISTIC SEAS project, which began in 2015 and is ongoing through its third continuation project. The project is co-financed by the EU. The project monitors populations of mammals, marine turtles and seabirds shared across Spain and Portugal in the Macaronesia region. Whilst set up to address MSFD obligations, it also provides data for species that are relevant to the BHD. The Commission supports open access, specifically in its funding programmes – for example, open access is mandatory for all Horizon 2020 projects.

[43] COM(2020)259 - MSFD Article 20 implementation report

6.3 Addressing structural issues at the EU level

6.3.1 Non-coherent reporting periods and scales across the Directives

All Member States identified the non-coherence of reporting periods and scales between the Directives as being primary barriers to better coordination and integration of marine species and habitat assessments.

Several Member States suggested that the reporting cycles between the MSFD and BHD should be aligned. Even where Member State data flows for the Directives are established coherently, differences in the assessment and reporting requirements and processes are problematic. Whilst Member States all make efforts to improve coordination across the Directives, these efforts were recognised as always being insufficient whilst there are fundamental structural differences in the temporal and spatial requirements of the three Directives.

Nearly every Member State reported that the differences in the reporting times between BHD and MSFD make it harder to reuse the assessments, as the gap between the respective requirements would mean that the BHD assessments would not be up to date. This was the most commonly stated barrier to greater integration of the reporting of the directives. In reality, Section 3 highlighted that despite MSFD reporting being due in advance of BHD reporting, in a number of Member States MSFD reporting actually occurred after that for BHD, and in most cases reporting for MSFD and BHD occurs after the requested deadlines.

The BHD requires reporting on individual species, whilst the MSFD requires individual species assessments then integrated into species groups. As such, data and assessments generated for the BHD can be used for the MSFD (and should be given commission decision (EU) 2017/848). In addition, whilst there is often reuse of data for BHD and MSFD Descriptor 1 and 6, several interviewees note that there are differences in the assessment and reporting requirements which mean that assessments cannot be reused.

Assessment spatial scales may vary depending on what is being assessed – e.g. small in the case of a specific habitat or large in the case of a species with a large distribution such as cetaceans. This variation can require that assessments are aggregated up to the reporting scales required in the directives.

Differing spatial reporting scales between MSFD and BHD assessments are also problematic. In this case it is the MSFD that requires more detailed data and assessments than do the BHD, with the former conducted at the level of regional or subregional sea and the latter done nationally which may span more than one MSFD region (although a regional sea assessment is done later based on the national data). The issue is most clear for countries such as France, Germany and Spain, whose marine areas cover multiple sea basins. In such cases aggregating, or disaggregating, data and assessments can be problematic as methods and frequency of data collection may vary in different areas.

Where Member States do try to reuse data and assessments, this can generate significant data processing demands in order to make it suitable for use in another directive, potentially reducing the quality of the assessments. Greater alignment may reduce data processing demands and improve quality. If reuse is achieved – through either enhanced data processing or greater alignment – this will provide savings from reduced monitoring costs.

6.3.2 Changes in reporting requirements across the Directives

The challenges Member States face in integrating data collection and reporting across the Directives are compounded by changing reporting requirements in between reporting cycles. Reporting under the BHD has been evolving during their three implementation cycles.

Establishing monitoring programmes and coherent data flows that comply to the legal obligations of the directives (e g commission decision (EU) 2017/848 on GES) takes time and resources. Where reporting requirements are changed for any given directive, associated changes – both technical and administrative – need to be made to established monitoring programmes and feed through to data collection processes. There are wider ramifications where monitoring is aligned with site and local conservation objectives and measures, as changes at the EU level result in a need for structural changes in wider aspects of conservation policy at the local level.

The challenge is compounded as the time between new decisions (such as commission decision (EU) 2017/848 on GES) being formalised and Member States have reported the time to adjust their monitoring programmes is considered to be too short. This can make it harder to implement the necessary changes within a suitable timeframe and also means that the funding necessary to address the new requirements cannot always be made available. Hence, new monitoring arrangements may be implemented part way through a reporting cycle, creating data processing issues and diminishing the quality of the final assessments. Further, it can take time before monitoring programmes are sufficiently established to produce assertive results, and longer before they provide sufficient time-series data to understand changes and trends in indicator status.

However, this does not explain the monitoring and reporting gaps observed under BH (in place since the 1980s) and HD (since the 1990s).

6.3.3 EC reporting portals

Member States indicated that there should be effort at the EU level to improve the coherence not only across the Directives' requirements but also in their reporting systems. Several initiatives have already been implemented (e.g. prefilled assessments from OSPAR and HELCOM and from WFD coastal waters directly available through the MSFD reporting system; lists of species extracted from previous reporting exercises), however many Member States prefer to re-submit new information, which is anyway needed to ensure the information is relevant for another Directive.

More generally, Member States indicated that reporting could be simplified and made more user friendly. The OSPAR data reporting system was highlighted as being relatively user friendly. It includes clear templates with drop down menus – having predefined options to select greatly facilitates the job of the reporter.

To support this, several Member States called for greater standardisation across Member States and across the Directives, through the development of more common data lists and joint indicators. Although it was also recognised that there is ecological variance across Member States that needs to be accounted for, and that efforts to increase standardisation at an EU level would have implications for Member States' own data management systems as well as their established monitoring programmes. Hence, the required improvements in the reporting systems (notably the digitalisation and interoperability of different systems, and the harmonisation of information at EU level) may bring new small changes in the reporting requirements and require further adaptability. The forthcoming ReportNet 3.0 from the European Environment Agency is supposed to develop and support all these improvements.

6.4 The role of the Regional Sea Conventions

The RSCs play an important role in enabling the coordination of MSFD monitoring and assessment across contracting parties, supported by the obligation stated in the MSFD for the RSC and Member States to do so. However, the level of integration varies between the regions, as outline in section 5. Reuse of RSC assessments is improving thanks to the efforts to align with MSFD needs. Still, the biggest issue is the harmonisation of the assessments themselves – to produce one assessment for one species or habitat that can be used for MSFD, BHD and RSC.

Working groups, as well as bi-lateral meetings, and joint monitoring projects/programmes facilitate the coordinated design of reporting requirements and their fulfilment. These activities in developing assessments and indicator help ensure that they are aligned with the MSFD and can be reused. For example, the HELCOM indicator selection process requires consensus to be reached between the Contracting Parties on the information required and tools for assessment, providing a platform for contracting parties to integrate their MSFD requirements and tools with the RSC.

The RSC assessments (particularly in Barcelona Convention, OSPAR and HELCOM) that have been developed with regard to the MSFD, promote standardised methods of data collection which make the processes and data flows consistent, and that in turn allows for the assessments to be reused. This is evidenced in the high levels of reuse of RSC assessment in the Netherlands and Estonia (see Section 0). Working to build coherence between RSC assessments and MSFD reporting is found harder in the Black Sea and capacity on the other hand in the Mediterranean where the RSC contracting parties include both EU Member States, as well as Third Countries.

The benefits of established data flows are recognised by the RSCs, who have invested in creating information systems that are able to accept data collected in Member States. The standard procedures and processes that need to be defined as part of an information system help drive consistency in the way data are collected, making aggregation of data simpler and creating possibilities for automation. In the case of OSPAR and HELCOM, these information systems are well established. The Barcelona Convention is in the process of rolling out a new information system for its 23 indicators and is working on the Data management policy.

Having data in information systems at either the national level or regionally through RSC's increases data availability for reuse and provides the opportunity to automate steps in the creation of assessments. Automating steps can enable assessments to be created more frequently, thus making the latest data available for reporting requirements. OSPAR aims to create established data flows that can produce an assessment every two years. These assessments will be available for both its own reporting requirements and for those of the Directives.

Most Member States indicated that coordination of MSFD and RSC assessments can still be improved. Whilst there are many cases of data and assessment reuse for Member States reporting to RSCs and the European Commission, spatial scales can still be a problem. The spatial scales of the regional assessments are not always appropriate for use at a national level. Different data collection methods used by countries can also make it hard to aggregate the data for regional assessments. HELCOM uses nested scales to allow reporting at different spatial scales. In addition, the MSFD requirements are more extensive than those of the RSCs and hence there cannot be a full coordination between the two. Particularly for complex topics, some Member States indicated there could be greater regional coordination.

Some Member States highlighted the role of joint monitoring programmes/projects in fostering regional coordination for MSFD. The good example of this is the launch of the Integrated Monitoring and Assessment Programme for the whole Mediterranean Sea, that was done in the Barcelona Convention. It was suggested that more EC funding to support regional projects would be beneficial, in addition to already high investment of the EC in the regional projects addressing this issue.

There is also some coordination between RSCs. For example, HELCOM and OSPAR are working together to create a database for seabirds across both their areas. This will provide consistent data between the regions and would be particularly useful to EU Member States that are in both convention areas.

There is little explicit coordination between BHD requirements and RSC assessments. As there is no explicit obligation for this to happen, little effort is put to achieving it. Some Member States recognised this as a shortcoming. However, mirroring obligations to those

in BHD can be created and do exist in RSCs' under specific instruments (e.g. SPA protocol of the Barcelona Convention).

Part B: Task 2 Technical Review

7 Technical review of the assessments

The results are reported according to the main aspects of the assessments, as reflected by the subsetting of the variables in the dataset.

7.1 What is monitored/assessed and where

7.1.1 EU-level requirements

The HD aims to achieve Favourable conservation status (FCS) for species and habitat types, i.e. a situation where the conservation objectives of a habitat type or species are met now and in the future (e.g. both quality and extent/population) and likely to continue to do so in the future (DG Environment 2017a).

The MSFD aims to achieve and therefore assess Good Environmental Status (GES), i.e. the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by present and future generations (MSFD 2008/56/EC).

Under BD there is no obligation for Member States to assess the status of bird species at the national or biogeographic region level (this is assessed at EU level using data reported by Member States). A Member State is only required to report data and trends on parameters for relevant bird species.

Status is assessed in HD and MSFD at different levels of ecological organisation (Table 15). FCS is assessed for individual parameters characterising a species or habitat type (see sections 7.2-7.6 for how this is done) and then it is aggregated/integrated (see section 7.7 for methods) at the individual species /habitat type level. MSFD requires status to be assessed and reported for individual criteria ('Criterion status'), and this to be then aggregated/integrated (see 7.7 for methods) as 'Element status', at the individual species or habitat level. Further aggregation is undertaken to assess GES at the feature level (i.e. the group of species or habitats), but this was not considered here as the GES at this level has no correspondent in HD.

A correspondence between 'parameters' in BHD and 'criteria' in MSFD is established (see section 7.2). However, the term 'parameter' is also used in MSFD reporting to identify the different indicators used to measure a criterion, whereas this distinction does not occur in BHD (for which the indicator to measure the parameter is predefined, e.g. 'surface area' to measure 'range'). To avoid confusion, the term indicators is used in this report to identify the ways BHD parameters and MSFD criteria are measured/estimated (see section 7.4).

Table 15. Levels at which species and habitat status assessments are undertaken and aggregated/integrated in HD and MSFD. Level of complexity (ecological organisation) goes from lower (1, finer ecological scale of assessment) to higher (6, coarser integrated scale of assessment). Levels that are comparable between MSFD and HD are highlighted in orange. 'Habitat' here is specifically intended as benthic habitat. See section 7.2.1 for details on MSFD criteria and BHD parameters and how they are aligned.

Level of complexity / integration	MSFD		HD	
	Species	Habitats	Species	Habitats
6	**Descriptor** (D1 Biodiversity, D6 Sea Floor Integrity[1])		-	
5	**Subtheme**		-	

	Species group (e.g. Birds, Mammals)	Habitat group (e.g. benthic habitats, pelagic habitats)		
4	**Feature**		-	
	Functional group (e.g. surface-feeding birds, small toothed cetaceans)	Groups 'Benthic habitat types' (benthic broad habitats) and 'Other habitat types'		
3	**Element**		**Species** (e.g. *Tursiops truncatus, Caretta caretta*)	**Habitat type** (e.g. Reefs, *Posidonia* beds)
	Species (e.g. *Sterna hirundo*, *Tursiops truncatus*)	Habitat type (e.g. Infralittoral rock and biogenic reef, circalittoral sand)		
2	**Criteria**		**Parameters**	
	D1C1 - D1C5	D6C3-D6C5[1]	Population, Range, Habitat for the Species, Future prospects	Range, Area covered by habitat, Structure and Functions, Future prospects
1	**Parameters** (referred to in this report as indicators)			

Notes:[1] Criteria defined for benthic habitats in Descriptor D6 Sea Floor Integrity also contribute to assess benthic broad habitats in descriptor D1. The MSFD criteria indicated in the table are: D1C1 - Mortality rate from incidental bycatch; D1C2 - Population abundance, D1C3 - Population demographic characteristics; D1C4 - Population distributional range and pattern; D1C5 - Habitat for the species; D6C3 – Extent of adverse effects on habitat from physical disturbance; D6C4 – Habitat loss due to anthropogenic pressures; and D6C5 – Extent of adverse effects on habitat condition from anthropogenic pressures (see section 7.2.1for details on criteria).

7.1.1.1 Species to assess

With specific regard to the **species** assessments, BHD and MSFD (specifically descriptor D1-Biodiversity for the latter) cover assessment of species within different groups (Table 16). An overlap exists between BHD and MSFD requirements specifically for the assessment of birds, mammals, reptiles and fish, and therefore the analysis in this project only focuses on the assessment of species within these groups.

Table 16. Species groups (marine only) to be assessed under the different directives (Marine Strategy Framework Directive, MSFD, with specific reference to descriptor D1-Biodiversity; Birds Directive, BD; Habitats Directive, HD). Groups in grey text are those that have no overlap in assessment requirements between MSFD and BHD, and therefore were not considered further in the analysis.

Species group	MSFD (D1-Biodiversity)	BD (Art. 12)	HD (Art. 17)
Birds	Yes	Yes	No
Mammals	Yes	No	Yes
Reptiles	Yes	No	Yes
Fish	Yes	No	Yes (excluding anadromous fish and lampreys*)
Cephalopods	Yes	No	No
Benthic invertebrates	No (assessed as part of the benthic habitat types)	No	Yes
Plants and algae	No (assessed as part of the benthic habitat types)	No	Yes
Plankton	No (assessed as part of the pelagic habitat types)	No	No

**Anadromous fish and lampreys are marine species, but they are normally reported as part of the assessments for terrestrial biogeographical regions rather than for marine regions (with the exception of 4 sturgeon and 2 Coregonus species, also reported in marine regions) (DG Environment 2017a), and therefore they have not been considered further in this study.*

BH and HD are more prescriptive in defining the species to be assessed, with these being listed in the directive annexes:

- BD: Specific bird species listed in Annex I (Bird species subject of special conservation measures concerning their habitat) and Annex II (species that can be hunted), with reporting of individual species being requested for a specific season (breeding, winter or passage) relevant to the species in the Member State (DG Environment 2016b, 2017b). BD requires that Member States report on all regularly occurring breeding species (e.g. a species breeding in four or more of the six years covered by the reporting period) and on all regularly occurring wintering waterbirds, especially migratory wildfowl and waders (DG Environment, 2017b). Species occurring less regularly should also be reported if their national population in the years they do occur may represent a significant proportion (e.g. > 1 %) of the overall EU population (DG Environment, 2017b).
- HD: Specific species of Community interest listed in Annex II (species conservation requires the designation of special areas of conservation), Annex IV (species in need of strict protection) and Annex V (species whose taking in the wild and exploitation may be subject to management measures). This includes the requirement that all species of seals (Phocidae, except *Phoca hispida saimensis* (Boreal)) and Cetacea amongst mammals, and all species of the turtles Cheloniidae and Dermochelyidae amongst reptiles are reported under marine regions.

The occurrence of species to be assessed under BHD within Member State territory is automatically selected, with also a vulnerability/rarity criterion being adopted for the BD (i.e. considered in danger of extinction, vulnerability to habitat changes, rarity (small populations/restricted local distribution), and specific nature of their habitats; BD). It is of note that the marine territory of a Member State is considered the same under BHD and MSFD (i.e. EEZs and extended Continental Shelf areas).

The occurrence of a species within Member State territory/assessment area is also automatically selected, even though there is no predefined list of species in the MSFD, and all the marine species (of the groups in Table 16) may potentially be assessed, provided that the relevant species groups (as per Table 1 of the EU Commission Decision 2017/848) are covered (European Commission, 2017). In turn, a set of criteria are given and agreed at regional or sub-regional level, directing the choice of Member States. In addition to the inclusion in the assessment of all mammals and reptiles from Annex II of HD, and possibly any other species in other annexes of HD, BD, CFP (Common Fisheries Policy), and international agreements such as RSCs (Regional Sea Conventions) (European Commission, 2017), the MSFD species selection by a Member State should adopt a risk-based approach, using proxies or surrogates (Cochrane et al., 2010), considering species representative of the species group, their vulnerability to key anthropogenic pressures in the assessment area, their association with a specific broad habitat type to be assessed, their presence in sufficient numbers in the assessment area, as well as practical aspects (monitoring feasibility, costs, adequate time series of the data) (European Commission, 2017).

The lists of reference species for the MSFD and included in BHD annexes have been extracted from the available guidance literature (European Commission, 2018a, 2018b; Joint Research Centre, 2018), and the degree of potential overlap between these is summarised in Table 17. All identified marine bird, mammal and reptile species can be assessed under both MSFD and BHD, whereas only a small part (30%) of the marine fish that may be assessed under MSFD may be included in marine assessments under HD. It should be noted that the actual overlap will depend on the specific selection by a Member State. In practice, Member States seem to select species from BHD for MSFD, because they have data, but to use a subset of those for which they have good data for indicators (i.e. the more common ones) (see results in section 7.1.2 for the analysed sample of Member States).

Table 17. Number of species that can be potentially assessed under MSFD and overlap with species listed in BHD annexes. Marine species only are considered. Source: European Commission 2018a, Joint Research Centre 2018.

Species group	MSFD species	MSFD species also assessed under BHD
Birds	139	91 species included in BD annexes, but all bird species to be assessed
Mammals	40	All
Reptiles	5	All
Fish	321*	61 species included in HD annexes (excluding anadromous species considered for terrestrial assessments but not in marine ones)

**The list of fish species that may be assessed under MSFD also includes commercial species that may be assessed under other descriptors than D1 (e.g. D3-Populations of commercial species).*

7.1.1.2 Habitats to assess

For the assessment of **habitats** (here intended solely to cover benthic habitats), the different scale at which habitats are defined and the different characterisation (i.e. by not uniformly using the EUNIS classification) in the directives makes it more difficult to ascertain the overlap between the requirements under MSFD and HD.

HD specifies the habitats of interest in Annex I, with six fully marine habitat types occurring in 'open sea and tidal areas' being only considered for this project[44] (Table 18). These habitats are defined at different scales, as both biotopes (e.g. Reefs, Mudflats and sandflats) or biotope complexes (e.g. Large shallow inlets and bays) (DG Environment 2017a). As a result, these habitats are not necessarily mutually exclusive. Sometimes one Annex I habitat may be a component of another Annex I habitat, so that patches of one or several Annex I habitats can occur within another Annex I habitat (e.g. sandbanks, reefs and mudflats can all be included in large shallow inlets and bays) (DG Environment, 2017a).

Of the Annex I habitats thus identified, the occurrence within the Member State territory is a criterion for selection by the Member State to undertake the assessment under HD.

[44] A requirement of this project was to include the eight HD Annex I habitats for 'open sea and tidal areas'. However, as Estuaries and Coastal Lagoons are not fully marine, these are not assessed under MSFD (European Commission 2017), and therefore these were not considered further in the analysis.

Table 18. Potential overlap between marine habitats to be assessed under MSFD and HD ('>' - Broad habitat type may include HD habitat; '<' - HD habitat may include broad habitat type). Table modified from Zampoukas et al. (2014), using broad habitat types as redefined in European Commission (2017). Use of HD Annex I habitats in MSFD is derived from Joint Research Centre (2018).

		HD - Marine habitat types listed in Annex I (*priority habitat)					
		Sandbanks (1110)	*Posidonia* Beds (1120)*	Mudflats and sandflats not covered by sea water at low tide (1140)	Large shallow inlets and bays (1160)	Reefs (1170)	Submarine structures made by leaking gases (1180)
MSFD - Habitat types (elements) under 'Benthic Broad habitats' feature	Littoral rock and biogenic reef				<	>	
	Littoral sediment			>	<		
	Infralittoral rock and biogenic reef		>		<	>	>
	Infralittoral coarse sediment	>	>		<		>
	Infralittoral sand	>	>		<		>
	Infralittoral mud		>		<		>
	Infralittoral mixed sediment	>	>		<		>
	Circalittoral rock and biogenic reef				<	>	>
	Circalittoral coarse sediment				<		>
	Circalittoral sand				<		>
	Circalittoral mud				<		>
	Circalittoral mixed sediment				<		>

	Offshore circalittoral rock and biogenic reef		>	>
	Offshore circalittoral coarse sediment			>
	Offshore circalittoral sand			>
	Offshore circalittoral mud			>
	Offshore circalittoral mixed sediment			>
	Upper bathyal rock and biogenic reef		>	>
	Upper bathyal sediment			>
	Lower bathyal rock and biogenic reef		>	>
	Lower bathyal sediment			>
	Abyssal		>	>

In MSFD, 22 habitats are specified as benthic broad habitat types for assessment (normally referred to as 'benthic habitat types', BHT), as listed in (Table 18) (European Commission 2017). In addition, Member States can report on other habitats of special scientific/biodiversity interest, as identified under HD and other EU legislation and RSCs. Specifically, HD Annex I marine habitats can be used to assess one or more of the BHT in MSFD (based on the correspondence indicated in Table 18), or they can be reported separately as 'other habitat types' (OHT) (e.g. as *Posidonia* beds, Mudflats and sandflats, Reefs) (Joint Research Centre, 2018).

Similar to HD, the occurrence of the habitat within Member State territory/assessment area is a criterion for habitat selection under MSFD. In addition, criteria similar to those for the species apply to the selection of habitats for assessment of the broad habitat types under MSFD, including the adoption of a risk-based approach, using proxies or surrogates (Cochrane et al. 2010), using habitat sub-types (particularly those under HD and the Water Framework Directive (WFD)) as proxies for the assessment of broad habitat types, and also considering habitat vulnerability to key anthropogenic pressures in the assessment area, their presence in sufficient extent in the assessment area, as well as practical aspects (monitoring feasibility, costs, adequate time series of the data) (European Commission, 2017).

Given the differences in spatial scales at which benthic habitats are defined between MSFD and HD (and also within HD), there is not a direct and unique (one-to-one) correspondence between HD Annex I habitats and benthic broad habitats in MSFD. Rather, benthic broad habitat types may include or be included in HD habitats, the actual overlap depending on the specific assessment undertaken by a Member State, as outlined in section 7.1.2 for the project sample of Member States.

7.1.1.3 Where to assess (spatial scale)

The spatial dimension at which the assessments are to be undertaken and reported differs between directives. For BD, the reporting unit is the entire European territory of the specific Member State, as the aim is to cover the distribution of the bird species in the Member State territory as a whole (as a part of the wider biogeographical distribution in Europe), irrespective of further geographical subdivisions (region/subregions, marine/terrestrial) (DG Environment, 2017b). The marine reporting unit (MRU) under HD is the Member State biogeographical or marine region in which the species or habitat occurs (DG Environment, 2016a, 2017a). HD Annex II species and BD Annex I bird species are also reported for population size and short-term trend direction, as well as Annex I habitats with regards to surface area and short term trend of surface area in good condition, inside Natura 2000 (pDCIs (pSCIs, SCIs and SACs, and SPA, respectively) network in the MRU. The scale of the MRU for assessments under MSFD varies between region, subregion and subdivision depending on the theme (species or habitats) and sub-theme (ecological groups; e.g. mammals, birds, benthic habitats) assessed and the geographic area (Table 19) (European Commission, 2018b). Reporting under both HD and MSFD is required for the part of the region/subregion included in the Member State territory.

There is a requirement that the Member State extent for reporting under Article 17 of the HD should be the same as that used for reporting under the MSFD (DG Environment, 2017a). Therefore, borders of the marine regions in HD have been delineated based on boundaries of the MSFD regions and subregions (DG Environment, 2017a), and therefore there is a spatial correspondence between units at regional scale used under both directives (Table 20). In practice many species, and certainly BHTs, would be assessed at finer scales in each MSFD region. The only difference is for Macaronesia, which is treated as a subregion of the Atlantic under MSFD, whereas it is considered as a separate region under HD (DG Environment, 2018a). In addition, there is an EU level assessment based on Member State assessments for marine regions as a whole.

Table 19. Spatial scales for species and habitat assessment and reporting under MSFD. Species and habitat groups (subthemes and features) relevant to Descriptor 1 and to the comparison with BHD are only shown.

Theme	Subtheme	Feature	Region	Subregion	Subdivision	Details
Species	Birds	Grazing birds Wading birds Surface-feeding birds Pelagic-feeding birds Benthic-feeding birds	X (in Baltic and Black Sea)	X (in Atlantic and Mediterranean)	X (in Baltic and Black Sea)	Region OR Subdivision in Baltic & Black Sea
	Mammals	Deep-diving toothed cetaceans Baleen whales	X			
		Small toothed cetaceans Seals	X (in Baltic and Black Sea)	X (in Atlantic and Mediterranean)	X (in Baltic and Black Sea)	Region OR Subdivision in Baltic & Black Sea
	Reptiles	Turtles	X (in Baltic)	X (in Atlantic and Mediterranean)	X (in Baltic)	Region OR Subdivision in Baltic
	Fish*	Coastal fish			X	
		Pelagic shelf fish Demersal shelf fish	X (in Baltic and Black Sea)	X (in Atlantic and Mediterranean)	X (in Baltic and Black Sea)	Region OR Subdivision in Baltic & Black Sea
		Deep-sea fish	X			
Habitats	Benthic habitats	Benthic broad habitats		X	X	Subdivision of region or subregion, reflecting biogeographic differences in species composition of the broad habitat type

Table 20. Overlap (in green) of regions and subregions between HD and MSFD.

		HD - Marine region					Regional cooperation*	
MSFD Region	**MSFD - Subregion**	**Marine Baltic Sea (MBAL)** (east of the Kattegat, including the Gulf of Finland and the Gulf of Bothnia)	**Marine Atlantic (MATL)** (Northern and Western Atlantic including the North Sea and	**Marine Macaronesian (MMAC)** (Exclusive Economic Zones of the Azores, Madeira, and Canary archipelagos, plus the continental shelf of Portugal)	**Marine Mediterranean (MMED)** (Mediterranean sea east of meridian line of 5° 55' W)	**Marine Black Sea (MBLS)** (Exclusive Economic Zones of Bulgaria and Romania)	Regional Sea Conventions (RSCs)	Regional Fisheries Management Organisations (RFMOs)
Baltic Sea (BAL)	-						Helsinki Convention (HELCOM)	
NE Atlantic Ocean (ATL)	(i) the Greater North Sea, including the Kattegat, and the English Channel (ANS)						OSPAR Convention	North East Atlantic Fisheries Commission (NEAFC) International Commission for the Conservation of Atlantic Tunas (ICCAT)
	(ii) the Celtic Seas (ACE)							
	(iii) the Bay of Biscay and the Iberian Coast (ABI)							
	(iv) in the Atlantic Ocean, the Macaronesian biogeographic, region, being the waters surrounding the Azores, Madeira and the Canary Islands (AMA)			(as region in HD; subregion of ATL in MSFD)			*(partial coverage of Macaronesia)*	
Mediterranean Sea (MED)	(i) the Western Mediterranean Sea (MWE)						Barcelona Convention (UNEPMAP)	General Fisheries Commission for the Mediterranean (GFCM) International Commission for the Conservation of Atlantic Tunas (ICCAT) (excluding Black Sea)
	(ii) the Adriatic Sea (MAD)							
	(iii) the Ionian Sea and the Central Mediterranean Sea (MIC)							
	(iv) the Aegean-Levantine Sea (MAL)							
Black Sea (BLA)	-						Bucharest convention (BSC)	

** Unlike HD and MSFD, assessments under RSCs and RFMOs may extend beyond EU Member State waters.*

7.1.2 Member State-level analysis

7.1.2.1 Elements (species/habitats) reported

Considering the coarser spatial scale at which BHD assessments are undertaken (whole Member State territory, irrespective of biogeographic regions for BD, and biogeographic marine regions for HD) compared to MSFD (down to subregion and also subdivision, in some cases – see section 7.1.2.7 below 'Spatial scales of assessments'), the results below have been harmonised at the scales used by BD and HD for the purpose of comparing these directives with MSFD (i.e. where subregional assessments within a region were reported by a Member State under MSFD, these were combined at regional level for comparison with HD and at whole Member State level for comparison with BD). It is emphasised that under MSFD the Member State can self-select which species they report whereas under HD/BD this is basically predetermined.

7.1.2.2 Birds

In general, the bird species monitored and reported by a Member State under MSFD were the same species as or a subset of those reported under BD, although some of the species reported in MSFD were also reported for multiple regions (by Spain, France and Germany). Exceptions were Romania, where birds were not reported under MSFD, and Finland, where birds were reported under MSFD but grouped at functional group level

(e.g. pelagic-feeding birds, surface-feeding birds) rather than as individual species based on HELCOM assessments.

On average, 65% of the bird species reported under BD were also reported under MSFD, with the maximum overlap (i.e. all BD species also reported in MSFD) observed for Estonia, and the minimum in Romania (with no birds reported under MSFD), while overlap values for the other countries ranged 60%-83%. It is of note that reports under the BD included species that are occasional, vagrant, with a scientific reserve etc. The data for these species may not be sufficient for the more quantitative assessment under MSFD, and, where this was the case, these species may have been excluded from reporting under MSFD, leading to the observed variability in the overlap between BD and MSFD.

The Scopoli's shearwater *Calonectris diomedea diomedea* is the bird species that was most commonly reported in both directives by the selected Member States. As this is a species that breeds in the Mediterranean, and all assessments reported (both under BD and MSFD) were for the breeding component of the population, the overlap occurs mainly for those Member States having territorial waters in the Mediterranean (i.e. Malta, Croatia, France and Spain). Terns (e.g. little tern *Sternula albifrons* and common tern *Sterna hirundo*) were also frequently reported in both directives, with these assessments covering various regions (e.g. Baltic, Atlantic, Mediterranean, Macaronesia), and always considering breeding colonies (although the passage stage of these species is also assessed under BD by France, Spain and Germany). The European storm petrel *Hydrobates pelagicus* and the Mediterranean or Yelkouan shearwater *Puffinus puffinus yelkouan* were also similarly frequent in being reported both under BD and MSFD, mainly in countries with marine waters in the Mediterranean (e.g. Malta and Croatia for both species) and in the Atlantic regions (e.g. Spain for *H. pelagicus*).

Examples of species for which there was no overlap between BD and MSFD reporting, in turn, are the gulls *Larus michahellis* (yellow-legged gull) and *L. melanocephalus* (Mediterranean gull). These surface-feeding species were reported by Malta only for BD (as breeding and winter season, respectively) whereas they were not reported under MSFD, where only pelagic-feeding birds were assessed. The pied avocet *Recurvirostra avosetta* (a wading bird) was also only reported under BD (as breeding, wintering and passage seasons) by Spain, Romania and France, while it was reported under both BD and MSFD by Estonia, Netherlands and Germany.

Spain was the only country that reported some species under MSFD which were not included in the BD reports of this country, namely the Sandwich tern *Sterna sandvicensis* (for Mediterranean), the European shag *Phalacrocorax aristotelis* (Atlantic and Mediterranean), the black-legged kittiwake *Rissa tridactyla* (Atlantic), the Audouin's gull *Larus audouinii* (Mediterranean), the Balearic shearwater *Puffinus mauretanicus* (Atlantic and Mediterranean), the Cory's shearwater *Calonectris diomedea borealis* (Atlantic and Mediterranean). This latter species was also included in MSFD assessments for the Macaronesia region, although it contributed to the assessment of a functional group (pelagic feeding birds grouped) rather than being assessed individually. Other species assessed as part of this group included the petrels *Bulweria ulwerii*, *Oceanodroma castro*, *Pelagodroma marina*), and none of these was reported by Spain under BD.

7.1.2.3 Mammals

In general, the selected Member States monitored and reported more marine mammal species under HD than MSFD (Table 21). On average, 53% of the species reported by MSs under HD (separately for different regions) were also reported in MSFD, with Estonia, Romania and Germany (for the Baltic region) showing the maximum overlap (i.e. all the reported HD species were also reported under MSFD). The lowest overlap in reported species between HD-MSFD was observed for France (for the Mediterranean region), Spain (for Macaronesia) and Croatia, with less than a quarter of the species reported under HD also being reported under MSFD (Table 22). Overall, Macaronesia (only represented by Spain in the sample of Member States) and the Mediterranean

(represented by Malta, Croatia, France and Spain) were the regions where the lower HD-MSFD overlap occurred (15%, and 25% of the HD species on average being also reported under MSFD, respectively) compared to the other regions (between 51% in Atlantic and 100% in Black Sea). In all countries and regions, all marine mammal species reported under MSFD were also reported under HD.

Similarly to BD, reports under the HD included species that are occasional, vagrant, with a scientific reserve etc. The data for these species may not be sufficient for the more quantitative assessment under MSFD, and, where this was the case, these species may have been excluded from reporting under MSFD, leading to the observed variability in the overlap between HD and MSFD.

Table 21. Number of marine mammal species reported in HD and MSFD and overlap between directives by Member State and region.

Country	Region	No. species reported under					% HD species in MSFD
		HD total	MSFD total	HD only	HD+MSFD	MSFD only	
MT	MED	10	3	7	3	0	30%
EE	BAL	2	2	0	2	0	100%
RO	BLA	3	3	0	3	0	100%
FI	BAL	3	2	1	2	0	67%
HR	MED	9	2	7	2	0	22%
NL	ATL	4	3	1	3	0	75%
FR	ATL	24	11	14	10	1	42%
FR	MED	11	1	10	1	0	9%
ES	ATL	25	7	18	7	0	28%
ES	MED	15	6	9	6	0	40%
ES	AMA	27	4	23	4	0	15%
DE	ATL	5	3	2	3	0	60%
DE	BAL	3	3	0	3	0	100%

Table 22. Marine mammal species frequency in being reported under both HD and MSFD directives (combining data by those Member States and regions examined in the current study; other Member States may produce different results).

Functional group	Species	no. cases where species is reported in both HD and MSFD (out of 13)	% of total cases
Small toothed cetaceans	*Tursiops truncatus*	7	54%
Small toothed cetaceans	*Phocoena*	6	46%
seals	*Halichoerus grypus*	6	46%
Small toothed cetaceans	*Delphinus delphis*	6	46%
Small toothed cetaceans	*Stenella coeruleoalba*	5	38%
baleen whales	*Balaenoptera physalus*	3	23%
Deep-diving toothed cetaceans	*Ziphius cavirostris*	3	23%
seals	*Phoca vitulina*	3	23%
Deep-diving toothed cetaceans	*Globicephala melas*	3	23%
-	All other species	≤ 2	≤ 15%

The bottle-nosed dolphin *Tursiops truncatus* was the species most frequently reported by Member States under both HD and MSFD across all regions (Table 22). This species was reported in all regions except for the Baltic. Other small toothed cetaceans frequently reported in both directives were the harbour porpoise *Phocoena* (mainly in the Atlantic, Baltic and Black Sea), the short-beaked common dolphin *Delphinus delphis* (mainly in the Atlantic, except for the North Sea subregion, Macaronesia and Black Sea), and the striped dolphin *Stenella coeruleoalba* (mainly in the Mediterranean) (Table 22). France was the only country that, in the Mediterranean region, despite reporting *T. truncatus* under HD, did not report it under MSFD. Similarly, Spain did not report *P. phocena* (in Mediterranean and Macaronesia) and *S. coeruleoalba* (in Atlantic and Macaronesia) under MSFD, despite reporting them under HD. The analysis of the details of these HD assessments, however, revealed that very limited data were available, with the overall species assessment (mainly resulting from expert judgement) being as 'Unknown' status. This probably also led to the species not being used by these Member States in the above-mentioned regional assessment under MSFD. It is of note that the species were probably selected on the basis of having sufficient information and based on a relevant indicator.

As for the other functional groups, the species most frequently reported under both MSFD and HD were the grey seal *Halichoerus grypus* for seals, the minke whale *Balaenoptera physalus* for baleen whales and the Cuvier's beaked whale *Ziphius cavirostris* for deep-diving toothed cetaceans (Table 22). Examples of species for which there was no overlap between HD and MSFD reporting are deep-diving toothed cetaceans such as the sperm whale *Physeter macrocephalus* and the false killer whale *Pseudorca crassidens*. Both these species were reported under HD by Malta, Croatia, France (all regions) and Spain (all regions), but they were not assessed under MSFD. This is likely due to the lack of data (sightings) for these species, indicated as of occasional

occurrence in the HD reports and resulting in unknown or not assessed status under this directive.

7.1.2.4 Reptiles

Of the sample of Member States, only Malta, Croatia, France and Spain monitored and reported on reptiles (turtles) under either of the directives. On average, 27% of the species reported by these Member States under HD (separately for different regions) were also reported in MSFD, with Malta showing the highest overlap (50%, 1 out of 2 HD species), followed by Spain in Atlantic and Mediterranean, with 40% (2 out of 5 HD species) in each region), whereas France did not report for reptiles under MSFD (Table 23). In all the countries and regions where reptiles were reported, all species reported under MSFD were also reported under HD (Table 23).

The loggerhead turtle *Caretta* was reported by all the above-mentioned Member States, except for France, under both HD and MSFD across all regions (Table 24). The green turtle *Chelonia mydas* and the Leatherback turtle *Dermochelys coriacea*, in turn, were only reported in both directives by Spain (in Atlantic and Macaronesia regions, respectively), despite being reported under HD by most Member States. The lack/paucity of data for these species, often resulting in the designation of unknown or not assessed status under HD (15 out of 20 assessments of these species under HD), were most likely the reason why they were not selected for assessment under MSFD rather than the species not being relevant for the assessment. A similar reason is probably behind the lack of reporting of the other two turtle species under MSFD.

Table 23. Number of marine reptile species (turtles) reported in HD and MSFD and overlap between directives by Member State and region.

Country	Region	No. species reported under					% HD species in MSFD
		HD total	MSFD total	HD only	HD+MSFD	MSFD only	
MT	MED	2	1	1	1	0	50%
HR	MED	3	1	2	1	0	33%
FR	ATL	4	0	4	0	0	0%
FR	MED	4	0	4	0	0	0%
ES	ATL	5	2	3	2	0	40%
ES	MED	4	1	3	1	0	25%
ES	AMA	5	2	3	2	0	40%

Table 24. Marine reptile species frequency in being reported under both HD and MSFD directives (combining data by Member State and region).

Functional group	Species (*priority species)	no. cases where species is reported in both HD and MSFD (out of 7)	% of total cases
Turtles	*Caretta caretta**	5	71%
Turtles	*Chelonia mydas**	1	14%
Turtles	*Dermochelys coriacea*	1	14%
Turtles	*Lepidochelys kempii*	0	0%
Turtles	*Eretmochelys imbricata*	0	0%

7.1.2.5 Fish

Eighty-nine fish species[45] were included overall in the reports across the sample of Member States. Of these, almost half were commercial species, including both bony fish (e.g. gadoids, sea bass, bluefin tuna, turbot, herring) and elasmobranchs (e.g. rays and dogfishes). All nine Member States reported fish under Descriptor 1 of the MSFD, whereas no fish species were reported for marine regions under HD by Malta, Estonia, Netherlands, France (in the Mediterranean), Spain (in the Atlantic), and Germany, and therefore these countries (or the specific regional assessment) were not considered in the analysis.

Compared to larger numbers of fish species reported under MSFD (between 0 and 44 for Spain in the Mediterranean and Atlantic respectively, with an average of 19 species per Member State), only a few fish species (1 to 3) were reported by Member States for marine regions under HD (these being mainly sturgeons, except for the grayling *Thymallus thymallus* being reported by Finland, and the spanish toothcarp *Aphanius iberus*, reported by Spain in the Mediterranean). It is of note that the HD does not purport to be a comprehensive list of all marine species. The maximum number of fish species reported under MSFD (44) was recorded for France in the Atlantic region, but only one species (the Atlantic sturgeon *Acipenser sturio*) was reported by France in this marine region under HD, and this species was not amongst those reported under MSFD.

Overall, there was no overlap between fish species reported under HD and MSFD in any of the Member States reports, again the result of very few fish species being included in the HD annexes. Therefore, **this ecological group was not considered further in the comparative analysis** of assessment methods between HD and MSFD (sections 7.2-7.8). However, it is considered that if the comparative assessment of the Directives were expanded to include the WFD then considerably more fish species would be included (i.e. fish are a biological quality element in the WFD only for fresh and transitional waters and excluding the 1nm coastal belt covered by the WFD).

7.1.2.6 Benthic habitats

The benthic habitats monitored and reported across the selected Member States included all the 6 HD Annex I habitats (reported under HD and, in some cases, also under MSFD) and the 22 benthic broad habitat types identified for reporting under MSFD. Six additional habitats were also reported for the MSFD, including 'Sublittoral coarse sediment' (reported by Germany for the Atlantic and Baltic), 'Sublittoral mud' (Germany/Atlantic),

[45] Anadromous fish and lamprey were not considered, as they are not assessed for marine regions according to HD guidance (see section 7.1.1).

and 'Baltic muddy bottoms of the aphotic zone' (Germany/Baltic), '*Zostera* beds in infralittoral' (Germany/Baltic, Romania/Black Sea), '*Cystoseira* spp. in eulittoral rockpools' and 'Pontic *Phyllophora nervosa* on vertical rock faces in the lower infralittoral' (Romania/Black Sea). The higher number of habitat types reported by Member States under MSFD compared to HD reflects the wider range of habitats that may be selected for reporting in MSFD, and which may also include the specific HD Annex I habitats (e.g. as in MSFD reports by Malta, Estonia, Netherlands and Germany), in addition to other habitats mentioned above. The only exception is for Spain as this Member State did not report on any benthic habitat under Descriptor 1 of MSFD.

When considering the overlap between habitats reported by Member States under the two directives, a direct comparison can be only made considering commonly defined habitats for the two directives (i.e. HD Annex I habitats). However, as highlighted in section 7.1.1, given the variability of scales at which habitat types are defined in the directives, it cannot be discounted that HD Annex I habitats that are not reported as such under MSFD are part of the benthic broad habitat and other habitat types reported under MSFD. For example, the Annex I habitat 'Reefs' was reported by Malta under HD but not, as such, under the MSFD. However, the 2018 MSFD report for Malta specifies that 'Algal dominated infralittoral rock and reefs' were used as a proxy for the assessment of the benthic broad habitat 'infralittoral rocks and biogenic reefs' and that this was assessed on the basis of 'reefs' as defined by the HD. As a result, in the case of Malta, a correspondence between 'Reefs', as assessed under HD, and 'infralittoral rocks and biogenic reefs', as assessed under MSFD, may be established. It is of note that information about the correspondence between Annex I habitats and benthic broad habitat types (or other habitats) was not always directly available from the analysed MSFD reports for the Member States and therefore the HD-MSFD overlap was analysed in terms of Annex I habitats also reported in MSFD (Table 25) to standardise the comparison across Member States.

Table 25. Number of marine benthic habitats reported in HD and MSFD and overlap between directives by Member State and region.

Country	Region	No. habitat types reported under					% HD habitats in MSFD
		HD total	MSFD total	HD only	HD+MSFD	MSFD only	
MT	MED	3	7	2	1	6	33
EE	BAL	4	4	0	4	0	100*
RO	BLA	5	11	5	0	11	0
FI	BAL	3	15	3	0	15	0
HR	MED	5	18	5	0	18	0
NL	ATL	4	8	2	2	6	50
FR	ATL	5	20	5	0	20	0
FR	MED	5	18	5	0	18	0
ES	ATL	4	0	4	0	0	0
ES	MED	5	0	5	0	0	0

ES	AMA	2	0	2	0	0	0
DE	ATL	4	13	2	2	11	50
DE	BAL	4	13	2	2	11	50

** Estonia only reported HD Annex habitats under MSFD.*

On average, 22% of the Annex I marine habitats reported by Member States under HD (separately for different regions) were also reported in MSFD. Estonia showed the maximum overlap (Table 25) as the only habitats reported by this country under MSFD were all the Annex I marine habitats reported under HD. In turn, there was no direct HD-MSFD overlap in habitat types reported by Romania, Finland, Croatia, and France as these countries only reported on benthic broad habitat types under MSFD (but an indirect (not explicit) overlap might occur with Annex I habitats, as mentioned in the example for Malta given above).

Of the Annex I marine habitats, 'Sandbanks which are slightly covered by sea water all the time' and 'Reefs' were those that were reported most frequently under both HD and MSFD (Table 26), namely by Estonia, Netherlands, and Germany (in both the Atlantic and the Mediterranean regions). 'Large shallow inlets and bays', 'Mudflats and sandflats not covered by seawater at low tide' and '*Posidonia* beds' were only reported in both directives by one Member State (Estonia for the former two habitats, and Malta for the latter), whereas 'Submarine structures made by leaking gases' were reported under HD (by Romania and France in the Atlantic) but not under MSFD.

Table 26. Number of marine benthic habitats reported in HD and MSFD and overlap between directives by Member State and region.

Annex I Habitats	no. cases where habitat is reported in both HD and MSFD (out of 13)	% of total cases
Sandbanks which are slightly covered by sea water all the time	4	31%
Reefs	4	31%
Posidonia beds	1	8%
Large shallow inlets and bays	1	8%
Mudflats and sandflats not covered by seawater at low tide	1	8%
Submarine structures made by leaking gases	0	0%

7.1.2.7 Marine Reporting Units

This section examines the spatial scale[46] of the MRUs against which Member States report on species and habitat assessments, as reflecting the BHD and MSFD

[46] For temporal scale, see sections 7.4.2 and 7.5.2.

requirements (Table 27). It is of note that the actual assessment may be based on data collected by Member States at a smaller scale within the MRU (e.g. focusing on relevant coastal colonies only for breeding birds). This latter aspect is further explored in section 7.8.2.3.

Table 27. Spatial scale of marine reporting units (MRU). Values in the table represent the proportion (%) of assessments (of individual species or habitats, within an ecological group and overall) reported by a Member State for MRUs (within national waters) at different scales under a directive. See Table 20 for region/subregion acronyms.

Ecological Group	Directive	MRU-scale	Country								
			Croatia	Estonia	Finland	France	Germany	Malta	Netherlands	Romania	Spain
Birds	BD	All MS territory	100	100	100	100	100	100	100	100	100
	MSFD	Region		100			50				
		Subregion	100			88	50	100			14
		Subdivision			100	13			100		86
Mammals	HD	Region	100	100	100	100	100	100	100	100	100
	MSFD	Region		100			50				
		Subregion	100			64	50	100			14
		Subdivision			100	36			100		86
Reptiles	HD	Region	100			100		100			100
	MSFD	Subregion	100					100			40
		Subdivision									60
Habitats	HD	Region	100	100	100	100	100	100	100	100	100
	MSFD	Region		100			58			100	
		Subregion	100			74	42	100			21
		Subdivision			100	26			100		79
Total	BD	All MS territory	100	100	100	100	100	100	100	100	100
	HD	Region	100	100	100	100	100	100	100	100	100
	MSFD	Region	0	100	0	0	58	0	0	100	0
		Subregion	100	0	0	74	42	100	0	0	21
		Subdivision	0	0	100	26	0	0	100	0	79
	Region (subregion) covered by the MS assessments		**MED** (MAD)	**BAL**	**BAL** (subdiv.)	**ATL** (ANS, ACE, ABI subdiv.); **MED** (MWE)	**BAL**; **ATL** (ANS)	**MED** (MIC)	**ATL** (ANS subdiv., ABI)	**BLA**	**ATL** (AMA*, ABI subdiv.); **MED** (MWE subdiv.)

*Macaronesia (AMA) is considered as a region in HD, and as a subregion of Atlantic in MSFD

As regards birds, despite the nominally different spatial scale relevant to BD (whole European territory of the Member State) and MSFD (region, subregion, subdivision), in some cases there was an actual correspondence between the reporting units for the Member State. For example, the Estonian marine area was referred to as the relevant spatial unit for terns and avocet assessments by Estonia (Baltic) under both BD and MSFD. Coastal sites (breeding colonies) were the areas relevant for the assessments of breeding birds (e.g. Malta in the Mediterranean, Netherlands in the Atlantic, Spain in both regions) under both directives, with the Netherlands' assessments of terns and avocet referring specifically to the boundaries of the relevant Natura 2000 areas in the Atlantic to identify the boundaries of the BD areas on / by the sea. In other cases, the different geographical reference between BD and MSFD bird assessments was evident, especially (but not exclusively) for those Member States with territorial waters in different regions. For example, the assessments of terns by France under BD referred to the whole 'Metropolitan France', across the French Atlantic and Mediterranean regions, whereas the MSFD assessments were specific to marine subregions (e.g. the French part of the Channel identifying the Atlantic Greater North Sea subregion, the Celtic Seas, and the Western Mediterranean Sea, with specific reference to the zones covered by SAMM (Suivi Aérien de la Mégafaune Marine) monitoring campaigns in these subregions for the assessments of common tern population distribution), and North and South subdivisions of the Bay of Biscay. Even in Member States covering one region only, spatial differences in the assessments under BD and MSFD were apparent from the reported information. For example, in the Baltic, Finland assessments referred to the whole Finnish populations

of terns under BD, whereas separate assessments for the three subdivisions in the national part of the Baltic Sea were conducted under MSFD.

The spatial overlap between assessments under HD and MSFD was higher for the other ecological groups (mammals, reptiles, habitats) compared to birds, even when the spatial scale of the MRU was nominally different. The areas of the Member State territorial waters covering the MRUs under both directives were generally equivalent by Croatia (in the Mediterranean Adriatic Sea), Malta (in the Malta Fisheries Management Zone, i.e. the area of the central Mediterranean Sea included within 25 nautical miles from the coast of Malta, and designated by this Member State for the implementation of the MSFD for the water column), Estonia (in Estonia marine area covering the Baltic region), Germany (separately for the national part of the North Sea and Baltic Sea for the Atlantic and Baltic regions respectively), Romania (in Romanian coastal and shelf waters within the Black Sea region), and France (for the Mediterranean in particular, with only the Western Mediterranean subregion being covered by this Member State in this region).

Differences in the spatial scale of species and habitat assessments between HD and MSFD occurred in Finland, especially for habitats, with HD assessments referring to the entire national part of the Baltic Sea, whereas MSFD assessments (of infralittoral and circalittoral rock and biogenic reef habitats) were undertaken separately for five subareas of the national part of the Baltic Sea. Similarly, French assessments of marine mammals for the Atlantic region were reported at subregional level under MSFD, based on OSPAR assessment areas corresponding to the Normandy and Brittany coast, with overlap with Greater North Sea and Celtic Seas subregions), and at subdivision level for the Bay of Biscay subregion (e.g. based on the PELGAS ('Pélagiques Gascogne') survey coverage area within the Golfe de Gascogne (i.e. syn. Bay of Biscay).The Netherlands and Spain also reported mammals at subregion level under MSFD (e.g. OSPAR greater North sea and Dutch coastal shelf in the Atlantic North Sea subregion for Netherlands; Gulf of Cadiz, northern and north-west continental shelf waters, and coastal waters of South Galicia in the Atlantic Bay of Biscay for Spain).

It is of note that BHD requires the submission of distribution maps for the species and habitats reported, in order to support the assessment of range and, in some instances of population size (where the latter assessment is based on grid coverage rather than number of individuals; see section 7.4). Therefore, even though the reported assessment refers to the regional MRU relevant to the Member State, data supporting it are reported at a smaller scale. The distribution maps were not examined as part of this project, but distribution maps are required to be at a standardised 10 km grid cell resolution, with smaller resolution (1 km or 5 km grid cells) allowed for smaller Member States (including Malta), hence it is expected that the maps submitted by the Member States met this standard.

7.2 Criteria/parameters used to assess species and habitats

7.2.1 EU-level requirements

All the directives identify attributes of the populations and habitats that are to be assessed separately and which contribute to the assessment of a species or habitat as a whole. These attributes are identified as criteria in MSFD and parameters in BHD.

MSFD distinguishes primary and secondary criteria, and state and impact criteria (European Commission, 2018a). The BHD do not prioritise parameters, although some indicators for the parameters (e.g. long-term trend) may be optional in HD. In addition, BHD species and habitat parameters are mainly state parameters, whereas impact is assessed by reporting on main pressures and threats (also reported in MSFD; see section 7.2).

A broad correspondence between MSFD criteria and BHD parameters has been established (European Commission 2020) based on the type of attribute assessed for the species or habitat. This is outlined for species and in Table 28 and Table 29.

Regarding species assessments (Table 28), a direct correspondence can be identified between attributes measured under BHD and MSFD for most of the criteria/parameters (e.g. Population Size (BD), Population (HD) and D1C2 (population abundance, MSFD) all assessing the population size of a species). An indirect correspondence (partial overlap) between Population (HD) and D1C3 (population demographic, MSFD) has been noted. In fact, despite population characteristics not being reported as a specific parameter under HD, age structure, mortality and reproduction are considered for the assessment of status for the parameter Population under HD (as deviation from normality, i.e. natural, self-sustaining population). Therefore, it is likely that the assessment of Population in HD and the criterion D1C3 in MSFD share a common evidence base, hence the indirect overlap indicated in Table 28. The only MSFD criterion that has no equivalent in BHD parameters is the impact criterion D1C1 (by-catch). Therefore, this criterion was not considered further in the BHD-MSFD comparative analysis, which only focused D1C2-D1C5.

Table 28. Overlap (green areas) between MSFD criteria and BHD parameters for marine species assessments. Biodiversity components for which the overlap is relevant are indicated in the table

Overlap between MSFD criteria and BHD parameters for species assessments		**BD - Bird population parameters**				**HD - Parameters for the conservation status assessment of species**			
		Population size	Population trend	Breeding distribution map and range size	Breeding range trend	Range	Population	Habitat for the species	Future prospects
MSFD criteria (Species groups)	D1C1-Mortality rate from incidental bycatch (D1C1) (Primary)								*MSFD biodiversity assessments address 'current status' (Art. 8(1a)) and thus do not include a criterion on Future prospects. Not relevant to MSFD-BHD comparison.*
	D1C2-Population abundance (numbers or biomass) (Primary)	overlap for Birds; assessing **population size**					overlap for mammals, reptiles and non-commercial fish; assessing **population size**		
	D1C3-Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, survival rates) (Primary for commercially exploited fish and cephalopods; secondary for other species)						overlap (partial*) for mammals, reptiles and non-commercial fish; assessing **population characteristics / condition**		
	D1C4-Population distributional range and pattern (Primary for species in HD Annexes II, IV or V; secondary for other species)			direct overlap for Birds (breeding only); assessing **species distribution**		direct overlap for Mammals, reptiles and non-commercial fish; assessing **species distribution**			
	D1C5-Habitat for the species (extent and condition) (Primary for species in HD Annexes II, IV or V; secondary for other species)							direct overlap for Mammals, reptiles and non-commercial fish; assessing **species' habitat condition**	

* Population condition/demographic characteristics are not reported *per se* under HD, but their deviation from normality (natural, self-sustaining population) is used for the assessment of favourable status (FV) of Population (as one of the conditions for FV, in addition to population size and trend).

Table 29. Overlap (green areas) between MSFD criteria and HD parameters for marine benthic habitat assessments

<table>
<tr><th colspan="2" rowspan="2">Overlap between MSFD criteria and BHD parameters for benthic habitat assessments</th><th colspan="4">HD - Parameters for the conservation status assessment of habitat types</th></tr>
<tr><th>Range</th><th>Area covered by habitat type within range</th><th>Specific structures and functions, including typical species</th><th>Future prospects</th></tr>
<tr><td rowspan="5">MSFD criteria (Species groups)</td><td>D6C4- Habitat loss due to anthropogenic pressures (Primary)</td><td colspan="2">overlap to assess habitat size</td><td></td><td rowspan="5">MSFD biodiversity assessments address 'current status' (Art. 8(1a)) and thus do not include a criterion on Future prospects. Not relevant to MSFD-BHD comparison</td></tr>
<tr><td>D6C5-Extent of adverse effects on habitat condition from anthropogenic pressures (Primary)</td><td></td><td></td><td>overlap to assess habitat condition</td></tr>
<tr><td>D6C3-Extent of adverse effects on habitat from physical disturbance</td><td colspan="3" rowspan="3">D6C1 on physical loss at seabed scale, not for individual broad benthic habitats; it shall be used for D6C4.
D6C2 and D6C3 on physical disturbance (at seabed scale, not for individual broad benthic habitats) and its adverse effects on broad benthic habitats; they shall be used for D6C5.
D6C1, D6C2 and D6C3 do not overlap with HD parameters. Not relevant to MSFD-BHD comparison</td></tr>
<tr><td>D6C1-Spatial extent and distribution of physical loss of the seabed</td></tr>
<tr><td>D6C2-Spatial extent and distribution of physical disturbance pressures on the seabed</td></tr>
</table>

For habitats (Table 29), the correlation between MSFD criteria and HD habitat parameters is established in the EU Commission Decision 2017/848 (European Commission, 2017), with DG Environment (2018a) also stating that 'D6C4 and D6C5 criteria should be considered directly equivalent to the HD criteria'. It is noted that, although there is a correspondence between MSFD D6C4 (Benthic habitat extent) and HD 'Area covered by habitat' (European Commission, 2017; DG Environment, 2018a), in that they are both assessing the extent of a habitat in relation to a reference point (i.e. how much has been lost, and whether this exceeds a threshold), even if D6C4 is reported as a state criterion (European Commission, 2018a). As evidence of the total extent of the habitat in the MRU is needed to inform both parameters (hence allowing estimation of the proportion of habitat lost due to anthropogenic activities with D6C4), this accounts for the partial overlap of these parameters between the MSFD and HD. Similar considerations apply to the correlation between MSFD D6C5 (Benthic habitat condition) and HD 'Structure and functions'. Note that state assessments and impact assessments could be regarded as assessing the same thing – i.e. whether the habitat is in good or poor state, but the impact assessment may be more focused because it can be done in relation to a specified pressure (e.g. nutrient enrichment or physical disturbance). D6C5 is also reported as a state criterion (European Commission, 2018a), even though the indicator used for it is clearly an indicator of impact (extent of habitat adversely affected by anthropogenic activities). In essence, both HD and MSFD aim to assess how much of the habitat is in good condition/status (conversely, how much is impacted) and whether this exceeds the extent threshold set.

The MSFD criterion D6C3 also informs status assessment for benthic broad habitats under Descriptor 6. However, D6C3 focuses on impact of physical pressure only, rather than on the overall anthropogenic pressures as with D1C4 and D1C5. Therefore, D6C3 was not considered further in the BHD-MSFD comparative analysis. The other MSFD criteria (D6C1 and D6C2) assess seabed integrity in general, without distinguishing between benthic broad habitats. and therefore they do not contribute to the habitat assessment under Descriptor 1. As such, they were not considered in the analysis.

7.2.2 Member State-level analysis

The number of BHD parameters or MSFD criteria that were reported by Member States in the selected dataset varied between ecological groups and directives. Under BHD, all assessments included reporting of all the parameters because they are required for species and habitats (2[47] for species in BD, and 4 for species and habitats in HD; Table 30 and Table 31). In turn, between 1 and 4[48] criteria were used to assess species and habitats under MSFD (Table 30 and Table 31). In general, the primary criteria for species groups and habitats are those that were most frequently reported for MSFD, as would be expected, although secondary criteria were also often reported (in >75% of the assessments) (Table 30 and Table 31). MSFD primary criteria were also those that directly overlap with BHD parameters as they assess similar attributes of species populations and habitats.

[47] For the purpose of the analysis Trends of the main population parameters 'Population Size' and 'Breeding distribution map & range' were considered as a component of the main parameters, although, technically, they are reported as a separate parameter under BD.

[48] For the reasons explained in 3.2.1, criteria D1C1 (for species) and D6C3 (for habitats) are not considered in this calculation.

Table 30. Frequency of species and habitat assessments under BHD and MSFD that included a given number of BHD parameters and MSFD criteria (column heading). Values in the table are number of assessments of individual species across the selected Member States (including multiple regional/subregional assessments, where relevant).

Ecol. Group	Directive	Number of parameters/criteria reported			
		1	2	3	4
Birds	BD		27	0	0
	MSFD	4	3	0	24
Mammals	HD	0	0	38	0
	MSFD	0	1	4	25
Reptiles	HD	0	0	20	0
	MSFD	0	0	0	7
Habitats	HD	0	0	30	0
	MSFD	4	8	0	0

When considering regional differences, parameters for mammals were reported under HD for all regions, while this group was reported under MSFD (considering criteria that are comparable with HD parameters, i.e. D1C2 – D1C5) for all regions except for the Black Sea (Romania). Mammal parameters/criteria were most frequently reported under both directives in the Atlantic, with also MSFD criteria being frequently reported for the Mediterranean. Reptiles (turtles) were not reported for the Baltic and the Black Sea in either directive as they do not occur there, with similar frequency of reporting for the parameters/criteria between the other regions (Atlantic and Mediterranean) in both directives. For habitat assessments, HD parameters were reported in all regions, whereas the corresponding MSFD criteria were not reported for the habitats in the Atlantic region. The HD habitat parameters were generally reported more frequently in the Mediterranean and the Atlantic, whereas the MSFD criteria were more frequently reported for habitats in the Baltic (both criteria) and in the Mediterranean (D6C4 only).

Table 31. Frequency of BHD parameters and MSFD criteria reported across all selected species and habitat assessments under BHD and MSFD (N). BHD parameters and MSFD criteria measuring similar attributes of the species or habitat (see Table 20) are clustered together for direct comparison between directives

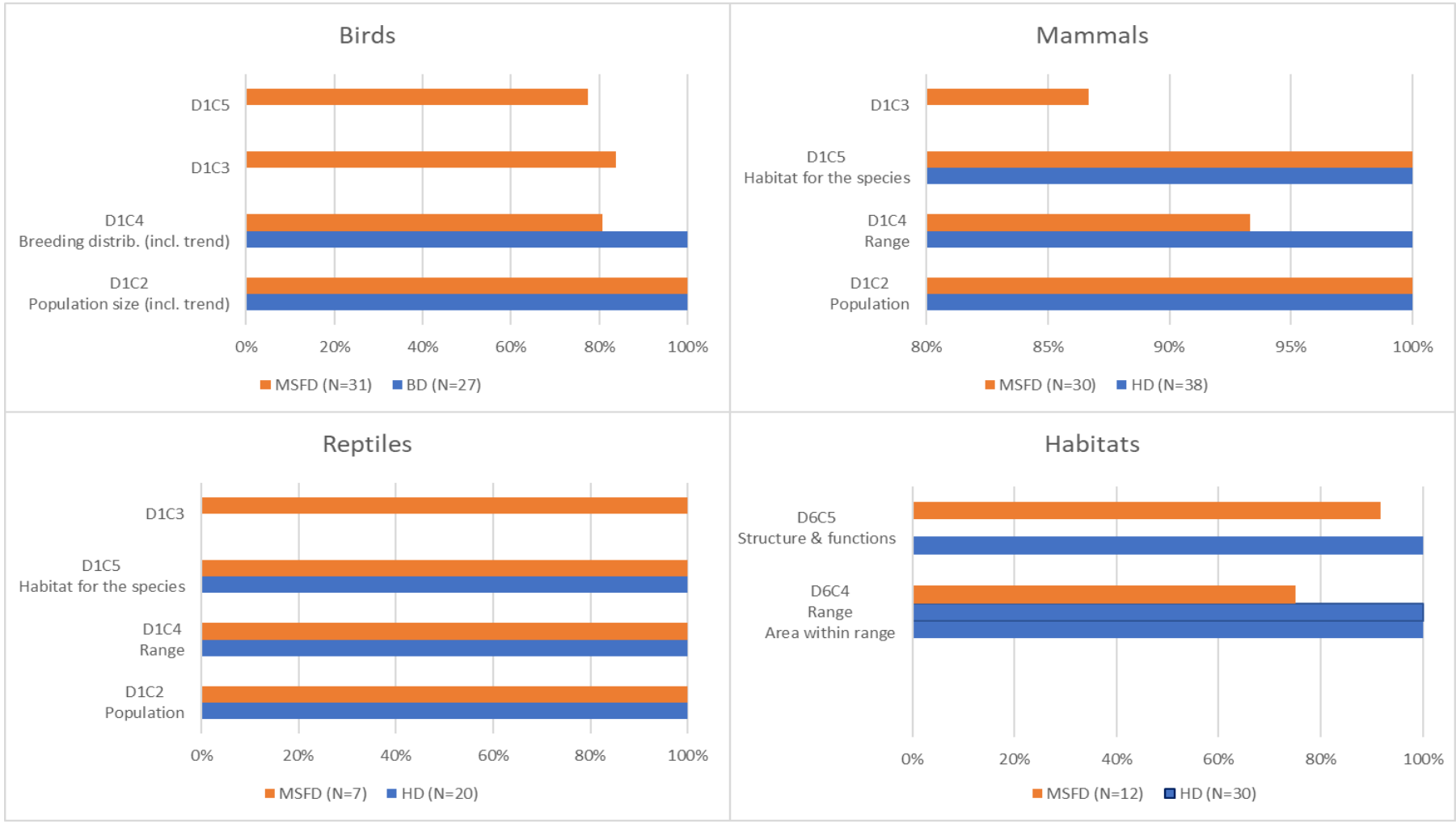


Table 32. Relative frequency (%) of BHD parameters and MSFD criteria successfully assessed (i.e. with status reported as other than 'not assessed', 'unknown' or 'contributing to assessment of other criterion'). This is calculated over the total number of assessments reported under each criterion/parameter across the selected member States.

Ecol. Group	Attribute	Directive	Parameter/Criterion	% status assessed
Birds	Population size	BD	Population Size (incl. trend)	*
		MSFD	D1C2 Population abundance	65
	Distribution	BD	Breeding distribution & Range (incl. trend)	*
		MSFD	D1C4 Population distribution range	8
	Condition (population)	MSFD	D1C3 Population demographic characteristics	23
	Condition (species' habitat)	MSFD	D1C5 Habitat for the species	0
Mammals	Population	HD	Population	47
		MSFD	D1C2 Population abundance	53
	Distribution	HD	Range	61
		MSFD	D1C4 Population distribution range	54
	Condition (species' habitat)	HD	Habitat for the species	32%
		MSFD	D1C5 Habitat for the species	43
	Condition (population)	MSFD	D1C3 Population demographic characteristics	38
Reptiles	Population	HD	Population	15
		MSFD	D1C2 Population abundance	43
	Distribution	HD	Range	35
		MSFD	D1C4 Population distribution range	71
	Condition (species' habitat)	HD	Habitat for the species	20
		MSFD	D1C5 Habitat for the species	29
	Condition (population)	MSFD	D1C3 Population demographic characteristics	0
Habitats	Habitat size	HD	Range	77

		HD	Area within range	67
		MSFD	D6C4 Habitat extent	56
	Condition	HD	Structure & functions	63
		MSFD	D6C5 Habitat condition	73

* BD does not require status to be assessed by MSs for the parameters or the species overall being reported.

Although multiple parameters and criteria are reported for species and habitats under BHD and MSFD, their status (FCS under HD, 'criteria status' under MSFD) is not always successfully assessed. In these cases, the status of individual HD parameters (BD does not require an assessment of status to be undertaken by the Member State) or MSFD criteria is reported as 'not assessed', 'unknown' or 'contributing to the assessment of another criterion'.

BHD parameters or MSFD criteria that measure condition of a species population or of its habitat are those that are less successfully assessed overall, a status being assessed for these parameters/criteria only in less than a third of the species assessments on average (Table 32). Of particular note are the criteria D1C5 for birds and D1C3 for reptiles, as all such MSFD assessments reported by the sample of Member States result in a 'not assessed' status. A low proportion (15%) of assessments with a status successfully assessed is also evident for the parameter 'Population' in HD assessments for marine reptiles, while the corresponding MSFD criterion D1C2 appears to be successfully assessed in 43% of the cases (Table 32). MSFD criterion D1C4 also appears poorly assessed for marine birds. In turn, habitat parameters and criteria appear to be successfully assessed more frequently compared to species assessments (Table 32). Overall, the higher frequency of assessments with parameters/criteria reported as 'not assessed' or in 'unknown' status occurs in the Atlantic region for reptiles (81% of the assessments with criteria 'not assessed' or 'unknown' status on average), birds (78% and habitats (40%), and in the Mediterranean region for birds (78% here as well), and mammals (67%). In turn, all the mammal species reported for the Black Sea (i.e. *Tursiops truncatus* and *Phocaena phocaena* reported by Romania) have parameters with a status successfully assessed.

According to the information gathered from HD and MSFD reports, insufficient data to support the assessment of the specific parameter/criterion, or the absence of an indicator defined for the specific criterion, are the main reasons for 'not assessed' or 'unknown' status criteria. In some cases, the lack of data may be directly associated with the transient/occasional nature of the species' occurrence in the Member State territorial waters (e.g. *Stenella coeruleoalba* and *Balaenoptera physalus* in Maltese waters).

7.3 Status assessment outcomes (including pressures)

7.3.1 EU-level requirements

HD addresses Favourable conservation status (FCS), whereas MSFD addresses Good Environmental Status (GES), as specified in section 7.1.1. The status classification (for parameters/criteria and individual species and habitats) under HD and MSFD is outlined in Table 33, with the correspondence of the potential outcomes between directives being indicated. As there is no obligation for Member States to report on the status outcome for a bird species under BD, this directive is not considered in this section.

Table 33. Status classification for parameters/criteria and species/habitats under HD and MSFD.

Type of outcome	HD	MSFD
Positive	Favourable (FV)	Good
		Good, based on low risk
Negative	Unfavourable-Inadequate (U1)	Not good
	Unfavourable-Bad (U2)	
Other	Unknown	Unknown
		Contributes to assessment of another criterion
		Not assessed
		Not relevant

In addition, pressures are reported under both BHD and MSFD, with threats also reported under BHD, although the requirements for reporting and use of such information is different between the two directives. Pressures and threats are distinguished based on a temporal basis, with pressures being current during the reporting period, and threats being pressures expected to act in the future (next two reporting periods; DG Environment 2017). Under BHD, pressures and/or threats relevant to each species/habitat reported are to be indicated and they are to be ranked according to their importance/impact (medium or high), with the indication of where the pressure occurs (e.g. whether inside the Member State or not) additionally being required for BD. The information on pressures/threats is used to assess the conservation status of 'Future prospects', an additional parameter that, along with those indicated in section 7.2, contributes to the conservation status of the species/habitat as a whole. In turn, only the main pressures are to be indicated in MSFD reports ("whenever they are considered relevant (e.g. provide the top three pressures)", based on MSFD reporting guidance), with no ranking being required. It is of note that pressures are reported at the feature level under MSFD (e.g. group of species), and therefore they do not contribute to the GES assessment for individual species and habitats. Standardised lists of pressures are provided for use by the Member States, but the definitions individual pressures in them differ between BHD and MSFD, with activities being included in the definitions of pressures/threats under BHD, whereas MSFD definitions are solely based on pressures. As a result, a one-to-one correspondence cannot often be established between the pressure items in the standardised lists for BHD and MSFD.

7.3.2 Member State-level analysis

Although BD does not require Member States to provide an assessment of status, and a comparison of status could not be undertaken between BD and MSFD for the selected bird species, it is noted that in both directives bird species were mostly reported considering the breeding population (e.g. Population Size and D1C2 assessed by measuring number of pairs in coastal breeding colonies). France and Spain were the only countries also assessing the two terns and avocet for passage and wintering under BD (the latter season only reported for avocet), with Spain also assessing *S. hirundo* as both breeding and non-breeding birds in the Atlantic assessments under MSFD (i.e. using two indicators for D1C2).

As regards MSFD status assessments, bird species were reported in 'Good' status in 42% of the assessments considered overall, with 26% of assessments being in 'Not good' status and the remaining reported as 'unknown' or 'not assessed'. Where the species status was assessed as 'good', the criterion D1C2 was mostly found in 'good' status (71% of the cases), with also D1C3 and D1C4 contributing to the good status assessment for the species, but only in 7% of the cases. When bird species were assessed as in 'not good' status, D1C2 was assessed as in 'not good' status in the majority of cases (86%), with the other criteria's status being mostly reported as 'not assessed' or 'unknown'.

S. albifrons was the species most frequently reported in 'Good' status (60% of its assessments), being reported as in 'not good' status only in 10% of the assessments. In turn, *C. diomedea* and *R. avosetta* were the species more frequently reported in 'not good' status (40% and 50% of their assessments, respectively), with a lower or similar frequency of 'good' status outcomes (20% and 50%, respectively). Regionally, bird species were more frequently reported in 'good' status in the Baltic (67% of the assessments in this region) compared to the other regions (with up to 38% of the assessments within each region reporting bird species in 'good' status).

For marine mammals, reptiles and benthic habitats, a comparison of status assessment outcomes between HD and MSFD was undertaken for the selected individual species or habitat types (Table 34). In some cases (see asterisks in Table 34) the species or habitat assessment under MSFD was undertaken solely based on criteria such as D1C1 or D6C3 that were not considered directly comparable with the HD parameters (see section 7.1.2), and this led to differences in the outcome of the assessment (e.g. *Tursiops truncatus* assessments by Romania). Therefore, these assessments were not considered relevant for the HD-MSFD comparison and they were excluded from the following analysis. The level of agreement/disagreement in the status assessed between HD and MSFD was estimated for the species and habitat assessments at the regional scale (i.e. the spatial scale of assessment common to the two directives) (Table 35). Only cases where the species/habitat was assessed in both HD and MSFD were considered.

Table 34. Status assessment outcome for species and habitats by region and subregion (where relevant) under HD and MSFD. Where MSFD assessment was undertaken in multiple subdivisions within a subregion, and the status assessed for the species differed between subdivisions, both status results are indicated

Country	Region	Subregion	Directive	Mammals					Reptiles			Habitats				
				T. truncatus	P. phocoena	S. coeruleoalba	H. grypus	B. physalus	*C. caretta*	*C. mydas**	*D. coriacea*	Sandbanks	*Posidonia* beds	Reefs	Infral. rock & reef	Circal. rock & reef
MT	MED	-	HD	Favourable		Unknown		Unknown	Favourable		not assessed	Favourable	Favourable	Favourable		
		MIC	MSFD	not assessed		not assessed			Good				Good		Good	
EE	BAL	-	HD				Favourable					Favourable		Favourable		
		-	MSFD				Good					Good		Good		
RO	BLA	-	HD	U1-unfavourable-Inadequate	U1-unfavourable-Inadequate							Favourable		Favourable		
		-	MSFD	Good*	Not good*										Not good	not assessed
FI	BAL	-	HD		Unknown		Favourable					U1-unfavourable-Inadequate		U1-unfavourable-Inadequate		
		-	MSFD				Good								Good (low risk)	Good (low risk)
HR	MED	-	HD	Favourable		Unknown		Unknown	Favourable	Unknown	Unknown	Unknown	U1-unfavourable-Inadequate	U1-unfavourable-Inadequate		
		MAD	MSFD	Good-low risk		Good-low risk			Good-low risk						Good	not assessed
NL	ATL	-	HD		Favourable		Favourable					U2-Unfavourable-Bad		U2-Unfavourable-Bad		
		ANS	MSFD		Not good		Not good					Unknown*		Unknown*		
FR	ATL	-	HD	U1-unfavourable-Inadequate	U1-unfavourable-Inadequate	Unknown	Favourable	Unknown	Unknown	Unknown	Unknown	U2-Unfavourable-Bad		U1-unfavourable-Inadequate		
		ABI	MSFD	Good	Not good	Good		Good							Unknown*	Unknown*
		ACE	MSFD	Good	Not good		Good								Unknown*	Unknown*
		ANS	MSFD	Good	Not good		Good								Unknown*	Unknown*
	MED	-	HD	Unknown		Unknown		Unknown	U2-Unfavourable-Bad	Unknown	U2-Unfavourable-Bad	U1-unfavourable-Inadequate	U1-unfavourable-Inadequate	Favourable		
		MWE	MSFD			Unknown									Unknown*	Unknown*
ES	ATL	-	HD	Unknown	U1-unfavourable-Inadequate	Unknown	Favourable	Unknown	Unknown	Unknown	Unknown	Unknown		Unknown		
		ABI	MSFD	Not good/Unknown	Not good			Not good	Unknown		Unknown					
	MED	-	HD	Unknown	Unknown	Unknown		Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown		
		MWE	MSFD	Not good/Unknown		Unknown		Not good	Unknown							
	MAC	-	HD	Unknown	Unknown	Unknown		Unknown	Unknown	U1-unfavourable-Inadequate	Unknown	Unknown		Unknown		
		AMA	MSFD	Unknown					Unknown	Unknown						
DE	ATL	-	HD		U1-unfavourable-Inadequate		Favourable					U2-Unfavourable-Bad		U2-Unfavourable-Bad		
		ANS	MSFD		Not good		Good					Not good*		Not good*		
	BAL	-	HD		U2-Unfavourable-Bad		U1-unfavourable-Inadequate					U1-unfavourable-Inadequate		U1-unfavourable-Inadequate		
		-	MSFD		Not good		Not good					Not good*		Not good*	not assessed	not assessed

* Assessment only based on criteria not directly comparable with HD parameters (D1C1 for species, D6C3 for habitats)

Table 35. Level of agreement between status assessed for species and habitats at regional scale under HD and MSFD. Values in the table are % agreement/disagreement in status assessed between HD and MSFD (derived from Table 34), only considering cases where the species was reported under both directives. Agreement/disagreement was established based on positive (+), negative (-) or other outcome (see Table 33 for details on these categories for the type of outcome).

Ecol. Group	Species/habitat	HD vs. MSFD status assessment						
		Agree +/+	Agree -/-	Agree other	Agree total	Disagree +/-	Disagree + or -/ other	Disagree total
Mammals	*T. truncatus*	17	0	17	**33**	17	50	**67**
	P. phocoena	0	80	0	**80**	20	0	**20**
	S. coeruleoalba	0	0	60	**60**	0	40	**40**
	H. grypus	60	20	0	**80**	20	0	**20**
	B. physalus	0	0	0	**0**	0	100	**100**
	Mammals mean	**15**	**20**	**15**	**51**	**11**	**38**	**49**
Reptiles	*C. caretta*	40	0	60	**100**	0	0	**0**
	C. mydas	0	0	0	**0**	0	100	**100**
	D. coriacea	0	0	100	**100**	0	0	**0**
	Reptiles mean	**13**	**0**	**53**	**67**	**0**	**33**	**33**
Habitats	Sandbanks	100	0	0	**100**	0	0	**0**
	Posidonia beds	100	0	0	**100**	0	0	**0**
	Reefs	100	0	0	**100**	0	0	**0**
	Habitats mean	**100%**	**0**	**0**	**100**	**0**	**0**	**0**

The assessment of Annex I habitats showed the highest level of agreement between HD and MSFD (Table 35), with all the assessments resulting in a positive outcome in both HD and MSFD (Table 34). When considering the possible overlap between Annex I Reef habitat assessed under HD and the infralittoral and circalittoral rock and biogenic reef broad benthic habitats assessed under MSFD, the level of disagreement in the status outcomes between the directives raised to 43% (Table 34), likely depending on the different ways these habitats are defined (and monitored) for the purpose of the assessment by each Member State. Some Member States may classify areas of their seabed as either 'broad habitat type' or 'other habitat type' (the latter possibly including Annex I habitats as defined for HD), and, as there is no overlap between these two types of habitats (different areas of the seabed are assessed), this may contribute to the different status outcome under the two directives (e.g. Germany; Germany stakeholders interview). Other Member States, instead, may incorporate Annex I habitats in the

relevant broad benthic habitat for the purpose of reporting under MSFD, with a variable degree of correspondence. For example, the high overlap in how Reef and 'infralittoral rock and biogenic reef' habitats are defined for the assessment by Malta (as mentioned before in section 7.1.2), may favour the agreement between assessments of these two habitats under HD and MSFD respectively, with a positive outcome being reported in both cases (Table 34).

As regards species, the status assessments of turtle species appear to agree between directives more frequently than for mammal species (Table 35), with only one out of the 3 turtle species considered showing a discrepancy between HD and MSFD (Table 34). This is the case for *C. mydas* assessment by Spain in Macaronesia, reported at unfavourable-inadequate status under HD, and as unknown status under MSFD. It is of note that in this case the species status appears to be mainly determined by different criteria/parameters under the different directives, namely Habitat for the species for HD and D1C2 Population abundance for MSFD, while the other parameters/criteria have status unknown (HD) or not assessed (MSFD). This has likely contributed to the different outcome between directives, with also uncertainty being associated with it due to the very limited data available for these assessments (mainly based on expert opinion).

For marine mammals, *T. truncatus* appears to more frequently present a discrepancy between HD and MSFD status assessed (Table 35), although a clear disagreement (positive outcome under MSFD, negative under HD) only occurs in the assessments by France in the Atlantic (Table 34). The discrepancy in this case appears to be mainly determined by the different assessment of the parameter/criterion for population size, with 'Population' status in the Atlantic region being reported as Unfavourable-Inadequate under HD, while D1C2 (population abundance) is reported in Good status for all the Atlantic subregions under MSFD (while the parameters/criteria for species distribution (HD Range and MSFD D1C4) are both assessed in favourable/good status, and the others as unknown/not assessed). It appears that this difference in assessment is mainly ascribed to the use of different indicators for population. The abundance (number of individuals) of the species was used under HD (as required by the directive), whereas the assessment of D1C2 under MSFD was based on the RSC assessment using the relative abundance of cetaceans within community (as % of mean annual difference in the relative abundance of the species over the assessment cycle). Monitoring data supporting both assessments appeared to come from the same national monitoring programme ('Marine mammals and marine turtles Monitoring Programme', sub-programme SP3), which is based on large-scale campaigns including the Aerial census of Marine Megafauna (SAMM) campaigns (undertaken every six years), and Megascope observation campaigns for marine megafauna from Ifremer fishing platforms (undertaken every year). However, data are aggregated over smaller MRUs (subregions) for the assessment under MSFD compared to the HD assessment, which integrated the data within France territory in the Atlantic region, and this difference in the scale at which data are aggregated for the assessment may also have contributed to the different outcome.

Regionally, the highest level of agreement on the status outcome between HD and MSFD overall appeared to be in the Baltic, with all of the species and habitats assessed for both directives showing either positive outcomes (Estonia and Finland assessments) or negative ones (Germany) in HD and MSFD (Table 34). In turn, species and habitat assessments within the Atlantic region showed the highest disagreement overall (54%), particularly regarding mammal species (see Netherland and France assessments in Table 34).

Considering the variability observed in the assessments of *Tursiops truncatus* between directives, the pressures/threats reported by Member States and relevant to this species were explored in more detail (Table 3.21). There was some variability of the assessments across Member States and between directives, although the latter may be partly ascribed to the fact that pressures reported under MSFD were referred to the whole group of small toothed cetaceans rather than to the individual species as in HD, reflecting differences in the requirements of the two directives. The comparison of pressures between directives

was also made difficult by the different coding/description of pressures for the two directives, and, in some cases, by the absence of pressures reported under MSFD (because of the absence of data or when a clear pressure relationship could not be identified). Despite these differences, in general, fishing activities appeared to commonly reported as the main pressure and/or threat for the species, mainly due to their direct impact on the species via bycatch mortality or injury, but also to their effect on prey populations and species disturbance. Pressures associated with input of litter and noise generation were also frequently identified by the Member States as relevant under both HD and MSFD.

It should be noted that, unlike in MSFD, pressures/threats reported under HD contribute to the assessment of the condition of the individual species and habitat (via the parameter 'Future prospects' (this has no correspondence with any of the criteria used in MSFD to assess individual species or habitats), and this probably contributed to the observed discrepancies in the assessment outcome between directives. For example, the unfavourable condition assessed for 'Future prospects' for *T. truncatus* by Romania contributed to the overall unfavourable condition assessed for the species under HD, as opposed to the good status assessed under MSFD.

Table 36. Pressures/Threats identified by Member States in their assessment of Tursiops truncatus under HD, and relevant identified under MSFD for the functional group this species belongs to (small toothed cetaceans). Ranking of pressures/threats according to their importance/ impact (H=high, M=medium) is shown for HD (not required for MSFD). Superscript numbers identify similarities between MSFD pressures and those reported for HD in the table.

	Malta	Romania	Croatia	France		Spain		
HD Pressures/Threats for *Tursiops truncatus*	**MMED**	**MBLS**	**MMED**	**MATL**	**MMED**	**MATL**	**MMED**	**MMAC**
C03 - Extraction of oil and gas, including infrastructure			M					
C09 - Geotechnical surveying			H					
E02 - Shipping lanes and ferry lanes transport operations	M		M					
F07 - Sports, tourism and leisure activities			M				M[4]	H[4]
F21 - Industrial or commercial activities and structures generating marine pollution (excluding marine macro- and micro-particular pollution)						M		M[7]
F22 - Residential or recreational activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam)	M[1]					H	H[5]	
F23 - Industrial or commercial activities and structures generating marine macro- and micro- particulate pollution (e.g. plastic bags, Styrofoam)	M[1]	M				H	H[5]	
F24 - Residential or recreational activities and structures generating noise, light, heat or other forms of pollution		M				M	M[5]	M[8]
F25 - Industrial or commercial activities and structures generating noise, light, heat or other forms of pollution		M	M			M	M[5]	
G01 - Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species	M	H	H			M	M[4]	M[4]
G03 - Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats		H						
G08 - Management of fishing stocks and game						H	H	H
G11 - Illegal harvesting, collecting and taking		M						
G12 - Bycatch and incidental killing (due to fishing and hunting activities)			M	H	H	H[3]	H[3]	H[3]
H02 - Military, paramilitary or police exercises and operations in the freshwater and marine environment		M						
J02 - Mixed source marine water pollution (marine and coastal)				H	H			
J05 - Mixed source excess energy								
N01 - Temperature changes (e.g. rise of temperature & extremes) due to climate change						M	M	M
N07 - Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change					M	M	M	M
MSFD Pressures for Small toothed cetaceans	**MIC**	**BLA**	**MAD**	**ABI,ACE,ANS**	**MWE**	**ABI**	**MWE**	**AMA**
No data		x	x		x			
Unknown				x				
Disturbance of species (e.g. where they breed, rest and feed) due to human presence							x[4]	x[4]
Extraction of, or mortality/injury to, wild species (by commercial and recreational fishing and other activities)						x[3]	x[3]	x[3]
Input of litter (solid waste matter, including micro-sized litter)	x[1]						(x[5])	x[6]
Litter in the environment							(x[5])	x[6]
Litter and micro-litter in species							(x[5])	x[6]
Input of other substances (e.g. synthetic substances, non-synthetic substances, radionuclides) - diffuse sources, point sources, atmospheric deposition, acute events							(x[5])	x[7]
Input of anthropogenic sound (impulsive, continuous)	x[2]						(x[5])	x[8]
All pressures related to inputs of substances, litter and energy							x[5]	

7.4 How parameters/criteria are measured: indicators

This section addresses results regarding the way BHD parameters and MSFD criteria are measured using indicators (these are also called parameters in MSFD, but the term indicator is used to avoid confusion).

7.4.1 EU-level requirements

There is detailed guidance provided at EU-level about how Member States are required to measure and report the parameters for species or habitats under BHD (see Table 37 for an outline of the indicators to be used, and Annex 14 for further details on the method and reporting guidance) (DG Environment, 2017a, 2017b). This includes protocols to follow to measure the different parameters for the different species groups and habitats (e.g. use of the standardised algorithm 'gap closure' for calculating a species distribution range area under HD, with maximum gap distance defined for different species groups) and reporting specifications for the indicators (e.g. to be reported as value achieved for the reporting period, short term and long term trend (period, direction, magnitude), with indication of whether a change occurred between reporting periods and the reason for the change). The guidance also details alternative options for the choice of indicators (e.g. population abundance may be measured as number of individuals, or using of spatial surrogates such as the number of occupied 1x1 km grids on an occupancy map), the type of estimate (see examples in Table 39), and the evidence base used (see examples in Table 40) for Member States to follow (DG Environment 2017a, 2017b). It is of note that the population units are pre-agreed but MSc can additionally report in other units if they wish. By following this guidance, indicator standardisation at EU-level is favoured.

Guidance on indicators to measure MSFD criteria is given in Commission Decision (EU) 2017/848 (European Commission 2017) (see Table 37 and Table 38 for an outline of the indicators to be used, and Annex 14 for further details on the methods for indicator calculation). General methodological standards are defined, but more freedom is left to Member States to select the specific indicator and the method for the implementation of MSFD, provided there is agreement on the approach at (sub)regional level. As the method would depend on the indicator used and its source/standardisation, no detailed guidance is given *a priori*. As a result, the indicator standardisation may occur at different levels depending on how indicators are defined and their source (e.g. EU-level standardisation, using indicators derived from other EU directives, the CFP or the WFD; regional indicators from a RSC (e.g. HELCOM, OSPAR; Table 38) or from other source (e.g. ICES, GFCM); national indicator), depending on the choice made by the individual Member State. MSFD requires standardisation of the assessment process at (sub)regional level where possible, with emphasis on regional cooperation (European Commission 2018a). Therefore, indicators and associated methods used in RSCs assessments may also be reused under MSFD (see Table 38 and Annex 14).

Table 37. EU-level guidance on indicators (type and reporting unit) to be used to estimate BHD parameters and MSFD criteria for species and habitat assessments (derived from DG Environment 2016a, 2017a, 2017b, European Commission 2017).

Attribute measured	BD	HD	MSFD
Species:			
Population size	**Population size (+trend):** • Population size (unit depending on season reported: Breeding = Breeding pairs (p) (breeding females or calling males for species with unusual/complex breeding biology or cryptic behaviour); Winter & Passage = number of individuals)	**Population (+ trend):** • Population size (number of individuals, or number of occupied 1x1km grids; an alternative unit may be used (optional) in addition to the mandatory reporting unit)	**D1C2-Population abundance:** • Species population abundance (number of individuals (count) per species) • Biomass (tonnes) per species *+ Specific indicators used in RSC (see Table 38)*
Species distribution	**Breeding distribution map and range size (+ trend):** • Surface area of the breeding distribution (km^2)	**Range (+trend)***:* • Surface area of the range within the biogeographic/marine region (km^2)	**D1C4-Population distributional range and pattern:** • Distribution (geographical area, adimensional) • Pattern (adimensional) • Range (%) *+ Specific indicators used in RSC (see Table 38)*
Population characteristics / condition	-	*(No requirement of reporting on population characteristics (as a parameter), but age structure, mortality, and reproduction are considered to assess deviation from normality (natural, self-sustaining population) for the assessment of favourable status (FV) of the parameter Population, as one of the conditions for FV, in addition to population size and trend)*	**D1C3-Population demographic characteristics:** • Body size (length, cm) or Age class structure (% abundance of age classes) • Sex ratio (ratio, adimensional) • Fecundity (breeding rate, as % colonies failing per year) • Survival/Mortality rates (ratio, adimensional) • Mammals: Blubber thickness (mean, mm) (indicator of nutritional status) *+ Specific indicators used in RSC (see Table 38)*
Species' habitat condition	-	**Habitat for the species:** • Area and quality of occupied habitat (sufficiency or not for long term survival)	**D1C5-Habitat for the species** • Extent (km^2) • Condition (e.g. as EQR, value 0-1)
Habitat:			

Attribute measured	BD	HD	MSFD
Habitat size	-	**Range + Area covered by habitat (+ trend):** • Surface area of the habitat within the biogeographic/marine region (km^2)	**D6C4- Benthic habitat extent:** • Extent of habitat loss due to anthropogenic pressures (km^2) • Proportion of natural habitat loss due to anthropogenic pressures (%)
Habitat condition	-	**Structure and functions (+ trend):** • Area in good, not-good and unknown condition (km^2) • Typical species (Y/N change compared to previous reporting period)	**D6C5-Benthic habitat condition** • Extent of habitat with adverse effects on habitat condition from anthropogenic pressures (km^2)* • Proportion of natural habitat with adverse effects on habitat condition from anthropogenic pressures (%) *(*including alteration to its biotic and abiotic structure and its functions, e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species)*

Table 38. RSC indicators relevant to MSFD criteria for species (Palialexis et al. 2019).

MSFD criteria for species	Marine birds	Marine mammals	Marine reptiles
D1C2-Population abundance	• C2.7 Abundance of breeding and of wintering waterbirds in the Baltic Sea (HELCOM core indicators) • C2.8 Marine Bird Abundance (numbers of adult birds or pairs at breeding colonies) (OSPAR) • C2.9 Population size of selected species (of seabirds) is maintained (UNEPMAP)	• C2.1 Population trends and abundance of seals (HELCOM) • C2.2 Harbour Seal and Grey Seal abundance (incl. pup production) (OSPAR) • C2.3 Pilot Assessment on Abundance and Distribution of Killer Whales (OSPAR) • C2.4 Abundance and Distribution of Coastal Bottlenose Dolphins (OSPAR) • C2.5 Abundance and Distribution of Cetaceans (OSPAR) • C2.6 Species population abundance (marine mammals, Common Indicator 4) (UNEPMAP)	• C2.10 Population abundance (Reptiles; Common Indicator 4) (UNEPMAP)
D1C3-Population demographic characteristics	• C3.4 Marine Bird Breeding Success / Failure (OSPAR) • C3.5 Population demographic characteristics (Seabirds; Common indicator 5) (UNEPMAP)	• C3.1 Reproductive status of seals (HELCOM) • C3.2 Grey Seal Pup Production (OSPAR) • C3.3 Population demographic characteristics (Common Indicator 5) (UNEPMAP)	• C3.6 Population demographic characteristics (Reptiles; Common indicator 5) (UNEPMAP)
D1C4-Population distributional range and pattern	• C4.4 Species distributional range (Seabirds; Common indicator 3) (UNEPMAP)	• C4.1 Distribution of Baltic seals (HELCOM) • C4.2 Assessing Changes in Harbour Seal and Grey Seal Distribution (OSPAR) • C4.3 Species distributional range (marine mammals; Common indicator 3) (UNEPMAP)	• C4.5 Species distributional range (Reptiles; Common indicator 3) (UNEPMAP)
D1C5-Habitat for the species	n.a.	n.a.	n.a.

Table 39. Example of type of estimates that can be used to measure population size (for species) and habitat area (for habitats) under BHD (DG Environment 2017a, 2017b).

BHD Type of estimate	Population size (HD & BD)	Habitat surface area (HD)
Best estimate	The best available single figure (including where only the maximum value of the population size is available) or interval, derived from e.g. a population census, a compilation of figures from localities, modelled population size (HD) or estimate (BD) based on population densities and distribution data or expert opinion, but for which 95 % confidence interval/limits could not be/have not been calculated.	The best available single figure (including where only the maximum value of the area covered by habitat is available) or interval, derived from e.g. a survey or a model, a compilation of figures from localities or expert opinion, but for which 95 % confidence limits could not be calculated.
Multi-year mean	Average value or interval (BD: i.e. worst and best years' estimates) where population size is monitored several times (HD) or has been estimated several years (BD) during the assessment/reporting period	-
95 % confidence interval	Estimates derived from sample surveys or a model in which 95 % confidence limits could be calculated for the best single value	Estimates derived from sample surveys or a model in which 95 % confidence interval could be calculated
Minimum	Where insufficient data exist to provide even a loosely bounded estimate, but where a population size is known to be above a certain value, or where the reported interval estimates come from a sample survey or monitoring project which probably underestimates the real population size.	Where insufficient data exist to provide even a loosely bounded surface area estimate, but where a habitat size is known to be above certain value, or where the reported interval comes from a sample survey or monitoring project which probably underestimates the real habitat size.

Table 40. Example of types of evidence base that can be used to estimate species and habitat parameters for BHD (derived from DG Environment 2017a, 2017b)

BHD methods to obtain evidence base for the assessment	Species population size (BHD)	Species range (BHD)	Habitat for the species (HD)	Habitat Structure and functions (HD)
Complete survey or a statistically robust estimate	**BD:** Sample surveys of the majority of the known distribution. Short-term trend estimated based on comparison of two estimates of population size originating from complete censuses, or dedicated population monitoring with good statistical power. **HD:** Repeated direct counts of entire population, repeated counting based on indices of species presence, or estimation from previous complete inventory updated with robust monitoring data on trends. Short-term trend estimated based on dedicated monitoring of a species' populations or a habitat with good statistical power.	**BHD:** Complete habitat mapping or data from previous habitat mapping updated with robust monitoring data on trends. Trends estimated based on comparing two range/ distribution maps based on accurate distribution data, or a dedicated monitoring of a species' or a habitat's distribution with good statistical power.	**HD:** Complete mapping or inventory of habitat for the species including assessment of habitat quality, or inventory of a species' habitats combined with robust extrapolation of habitat quality, or previous complete inventory updated with information from robust monitoring. Short-term trend estimated based on dedicated monitoring of both habitat area and quality with good statistical power.	**HD:** Complete habitat mapping including information on habitat conditions, or complete habitat mapping combined with robust extrapolation of habitat conditions or previous complete inventory updated with information from robust monitoring. Trend estimated based on dedicated monitoring of a habitat's condition with good statistical power.
Based mainly on extrapolation from a limited amount of data	**BD:** From sample surveys of a small proportion of the range, using models based on density/abundance and distribution data, or from an existing estimate updated using trend data. Trends derived from data collected only from a relatively small sample of the population, or based on insufficient sample size, or trends extrapolated from some other measurements. **HD:** Based on mark-recapture methods; using models based on abundance and distribution data; using extrapolation from sample surveys of parts of the population; or from previous inventory updated with good trend data. Trends derived from data collected from a limited number of sample sites, extrapolated from data collected for other purposes, or extrapolated from some other indirect measurements, such as availability of a habitat or land-cover changes.	**BHD:** Using modelling or extrapolation from surveys of parts of the habitat distribution; using data from previous complete habitat mapping updated with good trend data. Trends derived from species occurrence data collected for other purposes, or from data collected from only a part of the geographical range of a species/habitat, or trends based on measuring some other predictors of species/habitat distribution, such as land-cover changes or prey availability.	**HD:** Using modelling or extrapolation from detailed surveys of parts of the species' distribution. Trends derived from data collected from a limited number of sample sites; trends extrapolated from data collected for other purposes; trends extrapolated from some other indirect measurements	**HD:** Using modelling or extrapolation from detailed surveys of parts of the habitat distribution. Trends derived from data collected from a limited number of sample sites; trends extrapolated from data collected for other purposes; trends extrapolated from some other indirect measurements, such as shrub coverage
Based mainly on expert opinion with very limited data	-	-	-	-
Insufficient or no data available	-	**BD:** If the distribution map on which the estimated surface area of distribution is based (obtained through comprehensive mapping, modelling or extrapolation, or, exceptionally, expert interpretation) covers less than 75% of the presumed actual species distribution and no other data were used to fill in this gap in estimating the surface area of distribution (i.e. the resulting map is incomplete in relation to the presumed species distribution and so the surface area of distribution is underestimated).	-	-

7.4.2 Member State-level analysis

7.4.2.1 Indicators used

The lists of indicators used in the selected Member State sample to assess comparable parameters/criteria under BHD and MSFD for marine birds, mammals, reptiles and benthic habitats are reported in Table 41, along with an estimate of their frequency of use to estimate a given parameter/criterion.

MSFD showed in general a higher variety of indicators, as would be expected given the requirements of this framework directive as opposed to the more prescriptive requirements of the conservation directives BHD (section 7.4.1). There was variability across Member State assessments in how indicators were specified in the BHD and MSFD reports (e.g. as brief acronym for the parameter based on HD guidance, or full description of the indicator and its source), with indicator names also possibly differing due to translation from different languages. A perfect matching between indicators could not be always identified, but the similarity in the nature of the indicator and of the species or habitat attribute being measured was considered to assess the degree of overlap/integration between BHD and MSFD. In some cases, the reuse of HD parameters or RSC indicators to inform MSFD assessments was made explicit in the Member State report[49] and this has been captured in Table 41.

The indicators used for bird assessments most frequently characterised breeding populations, with apparent good similarity between BD and MSFD especially for estimation of parameters and criteria measuring population size. In some cases, explicit indication in the MSFD report was given of reuse of RSC indicators (e.g. OSPAR, HELCOM indicators characterising breeding bird abundance) for estimating D1C2. The BD-MSFD similarity was less pronounced for indicators used to estimate species distribution, also due to the fact that the majority (72%) of indicators reported in MSFD bird assessments for D1C4 were not estimated. The reuse of the HD parameter to estimate D1C4 was made explicit by Croatia (for the assessment of *C. diomedea*).

The majority of assessments of population size for marine mammals were based on abundance estimates (as number of individuals) in both HD and MSFD. As regards the assessment of mammal species distribution parameters/criteria, there was a good overlap between indicators used in the two directives, with reuse of HD assessments made explicit in the MSFD reports for 32% of the assessments of D1C4 (e.g. by Spain in the Atlantic (specifically in the Bay of Biscay and Iberian Coast subregion), by Germany (in both the Atlantic and Baltic regions), and Croatia for the Mediterranean). The reuse of OSPAR indicators defined for specific marine mammal species or functional groups to estimate species abundance (D1C2) and distribution (D1C4) was also made explicit in the MSFD report by France in its assessments for the Atlantic region. When considering the parameters/criteria characterising the species' habitat, the overlap of indicators as reported between HD (Habitat for the species) and MSFD (D1C5) was less evident, as Member States are only required to report a qualitative expression (as yes or no) of the sufficiency of area and quality of occupied habitat under HD. Although the data behind this judgment are not reported under HD, it certainly relies on the assessment of habitat condition (quality) and extent, which are also used as indicators for D1C5 in MSFD. The reuse of the HD parameter was made explicit in 23% of the assessments for D1C5, namely by Finland and Germany (grey seal assessments), and the Netherlands, thus covering both the Atlantic and Baltic regions.

A smaller range of indicators are used to assess turtles (marine reptiles) in MSFD compared to mammals, with a good overlap of indicators used for population size between HD (Population) and MSFD (D1C2). Considering that the assessment of the Population parameter under HD includes the consideration of elements of population

[49] It is of note that the reuse of HD or RSC assessments might have occurred in other cases, but not explicitly stated in the MSFD reports examined.

characteristics such as age structure, mortality and reproduction, some overlap may also be established with the indicators used to assess D1C3, although these indicators were not estimated in the majority (71%) of turtle assessments under MSFD. A higher similarity occurs between indicators used to assess parameters/criteria for turtle distribution under HD and MSFD, with the reuse of the HD parameter 'Habitat for the species' for estimating MSFD criterion D1C5 being made explicit for Croatia. The overlap between HD and MSFD regarding the use of indicators assessing a species' habitat is much lower than as observed for mammals, as in more than half of the turtle assessments for D1C5 an indicator was not estimated.

A direct overlap between indicators used to estimate habitat size in HD and MSFD habitat assessments is difficult to assess, given the different aspects of habitat size assessed by the HD parameters on habitat Range and Area within range (assessing the overall extent of the habitat) and the MSFD criterion D6C4 (considering habitat extent only in terms of loss due to anthropogenic activities, hence including an element of impact). However, the estimation of D6C4 likely requires the collection of evidence on habitat extent (surface area) that may also be relevant for the HD parameter. As for the assessment of habitat condition (Structure and functions in HD, D6C5 (as extent of habitat adversely affected by anthropogenic activities) in MSFD), there is a variety of indicators used both in HD and MSFD due to the different indices used to assess condition for the different habitats, which are often reused for both HD and MSFD assessments from other assessments (e.g. from WFD assessments of sedimentary habitats using M-AMBI or EI index, of algal-dominated rocky habitats (also reefs) using CARLIT index, of *Posidonia* beds using PREI index).

Table 41. Indicators reported for assessments of comparable parameters/criteria for (a) bird, (b) mammal, and (c) reptile species, and (d) habitats under BHD and MSFD. MSFD D1C3 for population demographic characteristics is also shown for mammals and reptiles, as, although this parameter is not explicitly reported under HD, these characteristics may contribute to assess favourable status for Population by characterising of deviations normality (natural, self-sustaining population). Values in parenthesis indicate % of species/habitat assessments of a given parameter/criterion using the specific indicator

a) Birds	**BD**	**MSFD**
Population size	**Population Size (+Trend)**	**D1C2**
	Abundance (breeding, number of pairs) (100%)	Abundance (breeding, number of pairs) (32%)
	Abundance (number of individuals) (37%)	Abundance of waterbirds in the breeding season (number of pairs/ratio) (10%)
		Abundance of waterbirds in the breeding season (HELCOM indicator) (16%)
		Relative abundance of breeding pairs within community (long term) (OSPAR B1, %) (43%)
		Abundance (number of individuals) (6%)
		No indicator estimated in 10% of MSFD bird assessments reported for D1C2
Species distribution	**Breeding distrib & Range (+ Trend)**	**D1C4**
	Breeding distribution range area (km^2) (100%)	Distribution range (DIST-R, breeding, km^2) (8%)
		Distribution spatial (DIST-S, taken from HD assessment, km^2) (4%)
		Relative abundance within community (short term) (%) (4%)
		Spatial distribution of birds observed at sea (number of individuals per km^2) (12%)
		No indicator estimated in 72% of MSFD bird assessments reported for D1C4

b) Mammals	**HD**	**MSFD**	
	Population	**D1C2**	**D1C3**
Population size (and characteristics)	Abundance (number of individuals) (95%) Abundance (number of map 1x1 km grid cells) (3%) *No indicator estimated in 3% of HD mammal assessments reported for Population*	Abundance (number of individuals) (57%) Relative abundance of cetaceans within community (short term trend) (MM_Abond, % of mean annual difference in the relative abundance of a species, over the assessment cycle) (7%) Relative abundance of *P. phocoena* within community (short term) (M4b_OSPAR, %) (3%) Relative abundance within community (short term) & Relative abundance within community (long term) (M3_OSPAR, %) (7%) Relative abundance within community (short term) (M4a_OSPAR, %) (7%) *No indicator estimated in 20% of MSFD mammal assessments reported for D1C2*	Age distribution (indicator taken directly from HD assessment) (15%) Age distribution (year) (31%) Size length (cm) (4%) Sex distribution (e.g. % females / males) (16%) Survival rate (SUR) (8%) Mortality rate (4%) Extreme mortality events of harbour porpoises (MM_EME, number of extreme strandings) (12%) Fecundity rate (12%) Annual gestation rate AGR (calves/year) (4%) Reproductive status of seals (proportion of females pregnant %) (4%) Breeding interval BI (year) (4%) *No indicator estimated in 31% of MSFD mammal assessments reported for D1C3*
	Range	**D1C4**	
Species distribution	Distribution range surface area (km^2) (92%) Distribution range surface area (proportion of reference range) (5%)	Distribution spatial (DIST-S, taken from HD assessment, km^2) (32%) Distribution range (DIST-R, e.g. distribution of haul-out sites, breeding sites, and foraging areas, km^2) (18%) Distribution and abundance of coastal populations of bottlenose dolphins (M4a_OSPAR, %) (7%) Distribution of Baltic seals (4%)	

b) Mammals	**HD**	**MSFD**
Condition (species' habitat)	*No indicator estimated in 3% of HD mammal assessments reported for Range*	Distribution of cetaceans (MM_Distri, % difference in the proportion of area occupied by the species over the assessment cycle) (11%) Distribution of seals (M3_OSPAR, %) (7%) Distributional pattern (DIST-P, e.g. continuous/fragmented) (29%) *No indicator estimated in 18% of MSFD mammal assessments reported for D1C4*
	Habitat for the species	**D1C5**
	Sufficiency of area and quality of occupied habitat (reported as yes/no, but requires estimation of condition/quality of species' habitat and its extent) (100%)	HAB-CON: Grey seal habitat for the species (Habitats Directive parameter) (23%) HAB-CON (unspecified) (23%) Extent (7%) PCB concentration in tissues (CONC-B-OT) (3%) *No indicator estimated in 50% of MSFD mammal assessments reported for D1C5*

c) Reptiles	**HD**	**MSFD**	
Species distribution Population size (and characteristic	**Population**	**D1C2**	**D1C3**
	Abundance (number of individuals) (95%) *No indicator estimated in 5% of HD reptile assessments reported for Population*	Abundance (number of individuals) (57%) Abundance (number of individuals per km^2) (43%)	Body Condition Index (BCI, ratio) (29%) *No indicator estimated in 71% of MSFD reptile assessments reported for D1C3*
	Range	**D1C4**	
	Distribution range surface area (km2) (100%)	Distribution spatial (DIST-S, taken from HD assessment, km^2) (14%)	

c) Reptiles	**HD**	**MSFD**
		Distribution range (DIST-R, unit unspecified) (14%) Distribution range (DIST-R, %) (43%) *No indicator estimated in 29% of MSFD reptile assessments reported for D1C4*
	Habitat for the species	**D1C5**
Condition (species' habitat)	Sufficiency of area and quality of occupied habitat (reported as yes/no, but requires estimation of condition/quality of species' habitat and its extent) (100%)	HAB-CON (unspecified) (29%) Extent (29%) *No indicator estimated in 57% of MSFD reptile assessments reported for D1C5*

d) Habitats	**HD**		**MSFD**
	Range	**Habitat area within range**	**D6C4**
Habitat conditio Habitat size n	Distribution range surface area (km^2) (93%) Distribution range surface area (proportion of reference range) (7%)	Habitat surface area (km^2) (100%)	Habitat surface area lost from anthropogenic loss (%) (22%) Extent of anthropogenic activities associated with physical loss overlapping with algal-dominated infralittoral rock (% of total habitat area lost) (22%) Extent (indicator is connected to D6C3 (physical disturbance); based on WFD data CARLIT (Cartography of Littoral) method) (11%) *No indicator estimated in 44% of MSFD habitat assessments reported for D6C4*
	Structure and functions		**D6C5**
	Indicators on the extent of habitat in given condition		Indicators of habitat quality:

d) Habitats	**HD**	**MSFD**
	Area in good/not-good/unknown condition (km^2 for area; not specified for condition) (87%)	Quality of habitat (index, including four HD parameters) (18%)
	Area in good/not-good/unknown condition (km^2 for area, Benthische habitatkwaliteit (BISI) [benthic habitat quality] for condition) (3%)	Ecological Index (EI) (9%)
	Area in good/not-good/unknown condition (km^2 for area, Ecological index EI/M-AMBI for condition) (3%)	M-AMBI* (n) (9%)
	Area in good/not-good/unknown condition (km^2 for area, WFD assessment for condition based on occurrence of detached filamentous algae) (3%)	HAB-CON (indicator is connected to D6C3 (physical disturbance); based on WFD data CARLIT (Cartography of Littoral) method) (9%)
		Indicators on the extent of habitat in given quality
		Extent (% area of MRU) achieving Threshold for Good/Moderate Status (based on PREI index - EQR as per WFD assessment) (9%)
		Extent (% area of MRU) achieving Threshold for Good/High Status (based on CARLIT index - EQR as per WFD assessment) (9%)
		State of seabed habitats (composite indicator or all broad habitats in Finland) (18%)
		No indicator estimated in 18% of MSFD mammal assessments reported for D6C5

7.4.2.2 How indicators are estimated and reported (also incl. temporal scope)

The technical characteristics of the reported indicators used to estimate parameters/criteria for species and habitats under BHD and MSFD included: the assessment period (whether including one or multiple years in one or multiple reporting cycles), the indicator source/standard (whether being defined at national, regional or EU-level), the type of estimate reported for the indicator (e.g. best value, confidence interval, mean over years or sites), the method (e.g. estimate from monitoring data, model-based, expert judgement) and the evidence base used to estimate the indicator (e.g. complete survey, extrapolation from limited data, expert opinion, insufficient data) (see Annex 11 for detailed lists of technical characteristics considered). The relative frequency of occurrence of each of these characteristics in the examined dataset is detailed in Annex 15 (A15.1).

Based on these characteristics, marine mammals showed the highest HD-MSFD similarity overall (47.1%), followed closely by habitats and birds (44-45%), whereas reptile assessments appeared to be those with the lowest integration of methods for indicator estimation (21.5% similarity overall; Table 42). The highest similarity between directives was observed on average for the indicator assessment period (70.7%), whereas the indicator source/standard was the least integrated characteristic between BHD and MSFD, with an average similarity of 15.7% across ecological groups and parameters/criteria.

For marine mammals, the method used for estimating indicators was the technical characteristic accounting for the highest similarity between the assessments under HD and MSFD (between 55% and 81% across parameters/criteria, 68.7% on average), with the direct estimate from monitoring data being the most common method for Population/D1C2, spatial-based methods for Range/D1C4 and expert judgement for Habitat for the species/D1C5 (Annex 15 A15.1). The assessment period and evidence base used to inform the indicator calculation were also consistent between directives (similarity >60%) (Table 42). The lowest level of HD-MSFD integration (16.5% similarity on average) was observed for the source/standard used to derive the indicators for mammal parameters/criteria, especially for Habitat for the species/D1C5 (8% HD-MSFD similarity; Table 42). Where specified, MSFD assessments of D1C5 were exclusively based on national indicators, whereas HD assessments of the Habitat for the species were predominantly based on EU-level defined indicators (as per HD reporting guidance, DG Environment, 2017a) and only marginally on regional (RSC) and national indicators (Annex 15 A15.1). Low similarity values were also generally observed for other technical characteristics for Habitat for the species/D1C5, with a notable complete differentiation between HD and MSFD in terms of type of estimate reported for the indicator (Table 42). This was due to different reporting requirements, where the HD report format asks for qualitative information (as 'yes' or 'no') on the sufficiency of habitat area and quality (addressed together), whereas, where an estimate was given for D1C5 under MSFD, this was generally a quantitative estimate for habitat extent and/or condition (e.g. EQR values from WFD assessments) (Annex 15 A15.1).

Marine reptile assessments showed the lowest HD-MSFD similarity in general, and especially regarding the use of source/standards to derive indicators across all parameters/criteria (0% similarity) (Table 42). While all indicators used for HD reptile assessments were based on the relevant EU-level reporting guidance (DG Environment, 2017a), a combination of regional and national-derived indicators was used for MSFD assessments (Annex 15 A15.1). It is of note, however, that the source/standard for indicators used under MSFD could not be ascertained from the MSFD reports for the majority of the assessments (Annex 15 A15.1), and the result described above for MSFD refers only to the criteria assessments of *C. caretta* by Malta, which used common Indicators as agreed at a regional scale under the Integrated Monitoring and Assessment Plan/Programme (IMAP, under the Barcelona

Convention) with further modification as necessary on the basis of the available data nationally.

The parameter/criterion Habitat for the species/D1C5 for marine reptiles also showed low HD-MSFD similarity for all the other characteristics of indicators (Table 42). Zero similarity was recorded for the type of estimate reported, due to different reporting format, as mentioned above for mammals, and different methods were used for estimating this parameter/criterion under HD (mostly based on expert judgement, with only marginal use of direct estimation or model-based methods based on monitoring data) and MSFD (spatial-based models/methods), although only a small proportion (up to 30%) of the assessments could be ascertained for this latter characteristic. As for evidence base, the low similarity (10.5%) was due to the use of a combination of types of evidence to inform HD assessments, whereas all of the MSFD reptile assessments of D1C5 where the type of evidence could be ascertained relied on complete monitoring surveys (Annex 15 A15.1).

Table 42. Similarity (%) between BHD and MSFD based on technical characteristics of the indicators reported for the different parameters/criteria in the examined species/habitat assessments.

Attribute measured	BHD Param. - MSFD Criterion	Indicator characteristic	Birds	Mammals	Reptiles	Habitats	Mean
Popul. Size	**Population parameters - D1C2**	**All characteristics (mean)**	**45.7**	**51.3**	**32.1**		**43.1**
		Assessment period	65.0	68.2	45.0	-	59.4
		Indicator source/ standard	19.8	22.2	0.0	-	14.0
		Type of estimate	35.8	48.1	58.8	-	47.6
		Method for indicator calculation	56.6	55.0	16.7	-	42.8
		Evidence base	51.5	63.1	40.0	-	51.5
Sp. Distribution	**Range parameters - D1C4**	**All characteristics (mean)**	**42.5**	**56.9**	**29.7**		**43.0**
		Assessment period	85.9	-	-	-	85.9
		Indicator source/ standard	20.0	19.2	0.0	-	13.1
		Type of estimate	47.1	57.8	60.0	-	55.0
		Method for indicator calculation	0.0	81.0	48.3	-	43.1
		Evidence base	59.3	69.5	10.5	-	46.4
Sp. habitat condition	**Habitat for the species - D1C5**	**All characteristics (mean)**		**33.1**	**2.6**		**17.9**
		Assessment period	-	-	-	-	-
		Indicator source/ standard	-	8.0	0.0	-	4.0
		Type of estimate	-	0.0	0.0	-	0.0
		Method for indicator calculation	-	70.0	0.0	-	35.0
		Evidence base	-	54.3	10.5	-	32.4
Habitat size	**Area within range - D6C4**	**All characteristics (mean)**				**44.3**	**44.3**
		Assessment period	-	-	-	66.7	66.7
		Indicator source/ standard	-	-	-	20.0	20.0
		Type of estimate	-	-	-	60.7	60.7
		Method for indicator calculation	-	-	-	43.3	43.3
		Evidence base	-	-	-	30.8	30.8
Habitat condition	**Structure and functions - D6C5**	**All characteristics (mean)**				**46.5**	**46.5**
		Assessment period	-	-	-	-	-
		Indicator source/ standard	-	-	-	27.3	27.3
		Type of estimate	-	-	-	43.8	43.8
		Method for indicator calculation	-	-	-	68.1	68.1
		Evidence base	-	-	-	46.7	46.7
Overall mean (across all parameters/criteria)		**All characteristics (mean)**	**44.1**	**47.1**	**21.5**	**45.4**	**38.9**
		Assessment period	75.5	68.2	45.0	66.7	70.7
		Indicator source/ standard	19.9	16.5	0.0	23.7	15.7
		Type of estimate	41.5	35.3	39.6	52.3	41.4
		Method for indicator calculation	28.3	68.7	21.7	55.7	46.5
		Evidence base	55.4	62.3	20.3	38.8	41.6

A difference between HD and MSFD was also notable for bird and habitat assessments, in particular regarding the indicator source/standard (similarity <20% in most assessments across ecological groups) (Table 42). BHD assessments most frequently relied on indicators as derived from EU-level guidance (DG Environment, 2017a, 2017b), whereas MSFD assessments predominantly used RSC-derived indicators for birds and national indicators for habitats (Annex 15 A15.1).

When considering regional assessments, the highest HD-MSFD[50] similarity in terms of technical characteristics of indicators was observed for assessments in the Black Sea (42.5% similarity on average), especially due to the similarity in the assessment period (50%) and the evidence base (60%), with assessments under both directives mostly relying on data from multiple years within the last monitoring period as obtained from complete monitoring surveys (Table 43, Annex 15 A15.1). However, it should be noted that this result only refers to habitats assessments[51] and with only one Member State (Romania) representing the Black Sea region in the studied sample, and therefore a higher similarity should be expected compared to the other regions where assessments from different Member States and for different ecological groups were available.

Table 43. Similarity (%) between HD and MSFD based on technical characteristics of the indicators reported for the different regions (across all parameters/criteria) in the examined species/habitat assessments.

Region	Indicator characteristic	Mammals	Reptiles	Habitats	Mean
Atlantic	**All characteristics (mean)**	**37.0**	**37.2**		**37.1**
	Assessment period	60.0	41.0	-	50.5
	Indicator source/ standard	25.0	0.0	-	12.5
	Type of estimate	13.3	74.3	-	43.8
	Method for indicator calculation	42.9	23.5	-	33.2
	Evidence base	43.7	47.2	-	45.5
Baltic	**All characteristics (mean)**	**16.7**		**42.5**	**29.6**
	Assessment period	33.3	-	76.4	54.9
	Indicator source/ standard	0.0	-	0.0	0.0
	Type of estimate	-	-	28.6	28.6
	Method for indicator calculation	-	-	67.3	67.3
	Evidence base	-	-	40.2	40.2
Black Sea	**All characteristics (mean)**			**42.5**	**42.5**
	Assessment period	-	-	50.0	50.0
	Indicator source/ standard	-	-	-	
	Type of estimate	-	-	30.0	30.0
	Method for indicator calculation	-	-	30.0	30.0
	Evidence base	-	-	60.0	60.0
Mediterranean	**All characteristics (mean)**	**30.5**	**61.3**	**30.0**	**40.6**
	Assessment period	8.3	62.1	55.6	42.0
	Indicator source/ standard	0.0	60.0	0.0	20.0
	Type of estimate	74.3	74.0	33.3	60.5
	Method for indicator calculation	30.8	58.3	33.3	40.8
	Evidence base	39.1	52.2	27.8	39.7

[50] Similarity by region was not assessed for birds, as BD assessments operate at a higher geographical scale (whole Member State territory, irrespectively of regions)

[51] Romania did not report on marine reptile species under either HD or MSFD, and its assessments for mammals under MSFD were only based on D1C1, hence not comparable with HD assessments.

Overall, assessments from the Baltic region (represented by Estonia, Finland and Germany) showed the lowest HD-MSFD similarity (21.6%), due especially to the differences in source-standards used to derive the indicators for mammals and habitats[52] under the two directives. RSCs indicators were most frequently used for mammals under MSFD, as opposed to EU-level indicators as prescribed by the HD guidance documents (DG Environment 2016a, 2017a), whereas, for habitats, reported indicators under MSFD were identified as EU-level indicators, whereas national and regional (RSCs) indicators were most frequently used under HD (Annex 15 A15.1).

7.5 Use of trends for indicator assessment

7.5.1 EU-level requirements

In BHD, trend is a (measure of a) directional change of a parameter over time (DG Environment, 2017a). In MSFD, the trend field is intended to reflect the change in status of the parameter compared with the previous 6-year reporting period (rather than a long-term trend).

Trends are an integral part of the assessments of species and habitats under BHD. In BD, trends are to be reported as individual species parameters for both population size and breeding range (BD) (DG Environment, 2016b, 2017b). In HD, trends are an integral component of the assessment of species and habitat parameters (HD), with reporting explicitly required for short and long-term trends, in terms of period, either or both direction and magnitude, as well as method and evidence base used to estimate trends (DG Environment, 2016a, 2017a). In addition, (short-term) trends are decisive for the assessment of conservation status since usually only stable or increasing trends can result in an overall Favourable conservation status (FCS) conclusion (combined with the parameter estimate being not smaller than the established relevant favourable conservation value) (DG Environment 2017a). Specific guidance is given at EU-level on how to assess trends under BHD (DG Environment 2017a, 2017b), in terms of:

- the temporal scale to be used to evaluate them (two reporting cycles for short-term trends, i.e. 12 years (corresponding to the period 2007–2018 for the last reporting cycle) or a period as close as possible; four reporting cycles for long-term trends, i.e. 24 years or a period as close as possible);
- how to distinguish trends (stable/increasing/decreasing) from fluctuations;
- the direction and % change threshold to be used in the qualification of the different status categories (e.g. a threshold change of 1% per year is used to differentiate between negative and very negative trends and therefore determining the difference between Unfavourable-inadequate and Unfavourable-bad conservation status).

The use of directional trends for the status assessment of species and habitats is contemplated for MSFD, especially where a quantitative threshold-based assessment (based on baseline or reference condition values) is not possible (European Commission, 2017, 2018a). Some context to the trends (e.g. in population abundance for D1C2) is needed to assess if a species is being impacted by anthropogenic pressures or is responding to changing climatic conditions (Palialexis et al. 2019). However, unlike BHD, there is no requirement to specifically report data on trends of the indicators estimating MSFD criteria, the only information to be provided in the MSFD report table being related to the trend in the criterion status (as stable, improving, deteriorating, not relevant or unknown) compared with the previous 6-year reporting period (European Commission, 2017, 2018a). No further detail is given on

[52] Reptiles were not reported by the Member States considered for the Baltic region.

how to measure trends. Unlike in BHD, the trend assessment is not formally integrated in the overall status assessment for a given criterion, but rather it is used to provide an additional qualifier to the assessed status (e.g. criterion currently in good status but status is improving, criterion currently in poor status but deteriorating)

7.5.2 Member State-level analysis

The technical characteristics related to the use of trends under BHD and MSFD included the assessment of whether a trend was estimated for the measured indicator (as stable, increasing or decreasing), the scale of it (short and/or long term), as well as the evidence base used to evaluate the trend (e.g. complete survey, extrapolation from limited data, expert opinion, insufficient data) (see Annex 11 for detailed lists of technical characteristics considered). The similarity between BHD and MSFD in terms of trends evaluation approaches is shown in Table 44. The detailed frequency with which these technical characteristics are used in the studied assessments are given in (Annex 15 A15.2).

Of all the ecological groups considered, marine mammals showed the highest BHD-MSFD similarity on average (72.3%), with in general a good agreement in how trends were estimated for all parameters/criteria reported. Where trends were estimated, short-term directional trends were mostly reported in both directives (mostly for the period 2007-2018 in HD, and for assessment periods between 2011/12 and 2016/18 in MSFD), and these were predominantly based on complete monitoring surveys for Population/D1C2, but also relying on extrapolation from a limited amount of data for Range/D1C4 (Annex 15 A15.2). The lower HD-MSFD similarity (27.6%) was observed for Habitat for the species/D1C5 in this ecological group, in particular associated with the different evidence base used (Table 44). Under HD trends for Habitat for the species/D1C5 were assessed mostly based on robust estimates from complete monitoring surveys, but also extrapolation from limited amount of data and, marginally, using expert opinion, whereas extrapolation from limited data and reuse of other RSCs assessments was most frequent under MSFD (Annex 15 A15.2).

Table 44. Similarity (%) between BHD and MSFD based on technical characteristics of the trends estimated for the different parameters/criteria characterising species/habitats in the assessments.

Attribute measured	BHD Param. - MSFD Criterion	Trend characteristic	Birds	Mammals	Reptiles	Habitats	Mean
Popul. Size	**Population parameters - D1C2**	**All characteristics (mean)**	**34.4**	**67.3**	**64.1**		**55.2**
		Trend evaluation	60.0	68.2	88.6	-	72.3
		Scale of trend	6.3	83.7	75.0	-	55.0
		Evidence base	36.8	50.0	28.6	-	38.5
Sp. Distribution	**Range parameters - D1C4**	**All characteristics (mean)**	**38.1**	**84.4**	**61.1**		**61.2**
		Trend evaluation	57.7	87.0	100.0	-	81.6
		Scale of trend	13.0	84.6	50.0	-	49.2
		Evidence base	43.5	81.6	33.3	-	52.8
Sp. habitat condition	**Habitat for the species - D1C5**	**All characteristics (mean)**		**65.3**	**59.4**		**62.4**
		Trend evaluation	-	68.2	53.3	-	60.8
		Scale of trend	-	100.0	100.0	-	100.0
		Evidence base	-	27.6	25.0	-	26.3
Habitat size	**Area within range - D6C4**	**All characteristics (mean)**				**34.7**	**34.7**
		Trend evaluation	-	-	-	20.0	20.0
		Scale of trend	-	-	-	73.9	73.9
		Evidence base	-	-	-	10.3	10.3
Habitat condition	**Structure and functions - D6C5**	**All characteristics (mean)**				**75.5**	**75.5**
		Trend evaluation	-	-	-	83.7	83.7
		Scale of trend	-	-	-	100.0	100.0
		Evidence base	-	-	-	42.9	42.9
Overall mean (across all parameters/criteria)		**All characteristics (mean)**	**36.2**	**72.3**	**61.5**	**55.1**	**57.8**
		Trend evaluation	58.9	74.5	80.6	51.9	63.7
		Scale of trend	9.6	89.4	75.0	87.0	75.6
		Evidence base	40.2	53.1	29.0	26.6	34.2

Table 45. Similarity (%) between HD and MSFD across regions based on technical characteristics of the trends estimated for the different parameters/criteria characterising species/habitats in the assessments.

Region	Indicator characteristic	Mammals	Reptiles	Habitats	Mean
Atlantic	**All characteristics (mean)**	**50.5**	**56.2**		**53.3**
	Trend evaluation	20.0	56.2	-	38.1
	Scale of trend	60.0	-	-	60.0
	Evidence base	71.4	-	-	71.4
Baltic	**All characteristics (mean)**	**77.4**		**58.3**	**67.9**
	Trend evaluation	83.7	-	58.3	71.0
	Scale of trend	100.0	-	-	100.0
	Evidence base	48.6	-	-	48.6
Black Sea	**All characteristics (mean)**			**33.3**	**33.3**
	Trend evaluation	-	-	33.3	33.3
	Scale of trend	-	-	-	-
	Evidence base	-	-	-	-
Mediterranean	**All characteristics (mean)**	**61.2**	**69.0**	**57.0**	**62.4**
	Trend evaluation	66.9	69.0	77.6	71.2
	Scale of trend	66.7	-	66.7	66.7
	Evidence base	50.0	-	26.7	38.4

Bird assessments were those showing the lowest similarity in terms trend

characteristics (36.2% on average; Table 44). This was mainly due to the differences in the scale of trends reported for the bird species assessments under BD and MSFD (9.6% similarity). When trends were estimated in both directives, both short-term and long-term trends were generally reported in the BD assessments, the former covering a 10-16 year period (12 years most frequently) mostly between 2006/7 and 2007/18, and the latter covering period of around about 35 years (30-39 years) mostly between around 1980 and 2016-2018. In turn, MSFD bird assessments only reported short-term trends for both D1C2 and D1C4 criteria, with the period covered only seldom specified (Annex 15 A15.2), but likely to span a 6-year period across the last two reporting cycles, as required by the MSFD (section 7.5.1).

Over all the characteristics considered, the main differences between BHD and MSFD (lower similarity) were most frequently associated with the type of evidence base used to estimate trends, especially in marine reptile and habitat assessments (Table 44). MSFD assessments of all criteria for reptile species and of D6C4 (habitat loss) for habitats were only based on complete survey/statistically robust estimates from monitoring data, whereas HD assessments for the equivalent parameters also relied on expert judgment and extrapolation from limited data (Annex 15 A15.2). This differentiation in the evidence base for trends was particularly marked in the habitat assessments for the Mediterranean (as reported by Malta and Croatia[53]) (Table 45).

When considering regional patterns in the integration of trends between directives, there was a notable differentiation for assessments in the Atlantic and Black Sea regions, in particular regarding the estimation of trends for the assessment of mammals (20% similarity) and habitats (33.3% similarity), respectively (Table 45). In the Atlantic (France, Netherlands, Germany, and Spain), although the majority of mammal assessments under both HD and MSFD estimated a directional trend, the proportion of assessments where a trend was estimated was higher in MSFD compared to HD (Annex 15 A15.2). In the Black Sea (Romania), trends were not estimated for the assessment of broad benthic habitats under MSFD, whereas a directional trend was estimated for HD assessments of Annex I habitats (Annex 15 A15.2, although it is noted that there was no known direct overlap between the types of habitats assessed under the two directives (see section 7.2.1).

7.6 Use of thresholds for indicator assessment

7.6.1 EU-level requirements

The assessment of status for parameters/criteria reported under HD and MSFD can be undertaken either quantitatively, establishing a threshold (e.g. based on baseline or reference conditions) to be used to determine the status classification, and/or qualitatively (e.g. based on directional trends) where a threshold is not defined (DG Environment 2017a, European Commission 2018a).

When considering the threshold-based approach (see section 7.5 for trends), quantitative thresholds under HD for the assessed species and habitat parameters are to be set as Favourable Reference Values (FRVs; e.g. Favourable Reference Population, FRP; Favourable Reference Area, FRA) to distinguish favourable/unfavourable conservation status under HD (DG Environment 2017a, European Commission 2020). FRVs are to be specified by Member States but for preference (without obligation) they need to be also agreed (sub)regionally (Palialexis et al. 2019).

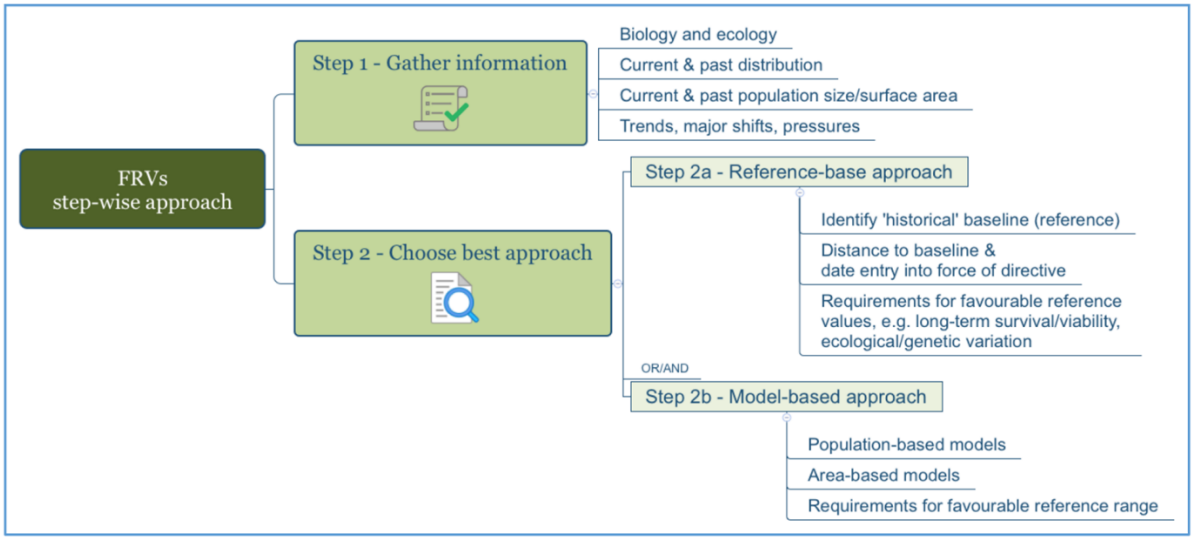
The approach to be used to establish FRVs may be model-based or reference-based, or a combination of the two (Figure 21; DG Environment 2017a). The former approach uses species-specific/habitat-specific models (e.g. population-based models such as Population Viability Analysis (PVA) and derived estimates of Minimum Viable

[53] Other countries did not report on broad benthic habitats (Spain) or on criteria DC4 and D6C5 that are comparable with parameters used under HD (France).

Population (MVP) size; potential-range methods based on distribution/habitat suitability modelling, such as MaxEnt, GAMs, Boosted Regression Trees; area-based methods such as the 'minimum dynamic area' approach) to estimate FRVs (European Commission 2020). The reference-based approach establishes a historical baseline for distribution/area/population corresponding to a documented (or perceived by conservation scientists) favourable condition of a particular species or habitat or restoring a proportion of estimated historical losses (DG Environment 2017a). It is recommended that both recent past (up to 50y before the Directive came into force) and historical past (up to last 2-3 centuries) are considered (European Commission 2020), and best expert judgement may also be used to set FRV in the absence of other data (DG Environment 2017a, 2018b).

Where it is not possible to set values, FRV operators (e.g. 'more than', 'lower than', 'approximately equal to' based on expert opinion) can be used in the HD reports to reach a decision on conservation status where possible even in absence of direct values (DG Environment 2017a). FRVs are generally used as the threshold to distinguish between favourable/unfavourable status (e.g. Population estimate ≥ FRP; Habitat in good condition (Structure & functions) >90% of habitat area; DG Environment 2017a), and to distinguish between unfavourable conservation status categories (inadequate/bad; e.g. Population more than 25% below FRR), with also thresholds for trend change magnitude (see section 7.5.1) and qualitative aspects of trends (direction) and population condition contributing to the status assessment. In some cases, additional thresholds are likely to be defined to derive a FRV, e.g. to distinguish between good and not-good condition of the habitat, as to establish whether the area of the habitat occupied by a species is 'sufficiently large' and its habitat quality is 'suitable' (for the species parameter Habitat for the species), on whether the extent of the habitat that is in good condition meets the 90% threshold recommended to determine favourable status for the habitat parameter Structure & functions (DG Environment 2017a).

Figure 21. Stepwise approach to set FRVs (from DG Environment 2017a).



As regards MSFD assessments, where a threshold-based approach is used, threshold values are to be set for the indicator measured (e.g. for D1 species criteria), and also as a proportion (%) of the MRU area/ population/ individuals/ species/ samples or area/extent samples over which the threshold value for the indicator is to be achieved, or showing adverse effects (for D1C5 in particular) (Palialexis 2018, Palialexis et al. 2019, European Commission 2020).

Thresholds for MSFD assessments may be derived from other EU legislation (e.g. WFD), regionally (e.g. from relevant RSC assessments, regional cooperation), or nationally (European Commission 2017); eventually EU or regional thresholds will be set. The GES Commission Decision 2017/848 (European Commission 2017) has aligned MSFD and HBD approaches as much as possible, by requiring that the assessment approach used under HD is applied to HD Annex species and habitats that are assessed under MSFD (for criteria that are consistent with HD parameters), thus potentially aligning MSFD threshold values with FRVs established by Member State under HD (European Commission 2017, Palialexis et al. 2019). However, aspects such as the different assessment scales required by BHD and MSFD may hinder the direct reuse of FRVs (set nationally) into MSFD assessments, where thresholds are to be set at (sub)regional (for criteria in Descriptor 1) or EU level (for D6C4 and D6C5). Therefore, threshold values could still differ between Member States in the same (sub)region and therefore further work is still required to ensure full compatibility between the policies (DG Environment 2018a).

The setting of GES threshold values should be done in relation to a reference condition (Commission decision 2017/848, Article 4(1)(c)). The latter corresponds to a condition of acceptable anthropogenic pressure or negligible impacts, and can be established based on documented conditions, either temporally (e.g. historical reference state, or past baseline based on time-series datasets of state variables best equating to 'a reference condition' or a condition with no adverse effects) or geographically (e.g. current state in areas considered substantively free from anthropogenic pressures), or based on modelling (to predict current state in the absence of pressures). When the species/habitats are not covered by other legislation (e.g. HD Annex species), the threshold value is normally established at an acceptable deviation from the reference condition, to ensure long-term viability of the biodiversity component under sustainable use (hence accepting some degree of impact).

The use in MSFD of indicators and thresholds from RSC assessments is often called for to ensure standardisation under regional cooperation. However, Palialexis (2018) and Palialexis et al. (2019) show that in many cases RSC assessments are based on comparison against a baseline (historical or modern) that identifies as specified/known state at a point in time. E.g. RSC indicators for mammals, birds and reptiles may use a historical/fixed baseline (e.g. population size in 1992, for OSPAR indicator C2.2) or a rolling/shifting/recent/modern baseline (e.g. previous 6-year cycle, for indicator C2.2; average breeding population over the last decade, for indicator C2.10; all currently available haul-out sites occupied, for indicator C4.1). These baselines do not necessarily correspond to a reference condition, and, if so, their use as thresholds may be suitable to assess achievement of environmental targets under MSFD (i.e. feasible short/middle/long term milestones to achieve (good status by approaching) reference condition; European Commission 2020), but not for GES assessment under MSFD, for which a reference condition is required (European Commission 2017).

7.6.2 Member State-level analysis

As BD does not require Member States to undertake an assessment of status for bird species, assessment approaches related to the use of thresholds are not relevant to this directive, and methods used for bird assessments under MSFD have no direct comparison with BD. Therefore, the similarity of assessment approaches was only analysed for marine mammal, reptile and habitat assessments under HD and MSFD.

The technical characteristics related to how status is assessed for the species and habitat parameters/criteria under HD and MSFD included the general assessment approach used (e.g. whether based on thresholds, trends, expert opinion). Where thresholds were used to determine favourable/good status, the type of threshold (e.g. quantitative or qualitative, given as a value for the indicator, proportion or change threshold) and the threshold value used (e.g. FRV, % EQR as deviation from reference condition), were also considered, in addition to the approach used to define the

threshold, in terms of its source/standard (e.g. derived from EU legislation, RSC assessments, defined at national level) and evidence base (e.g. monitoring data, literature, expert opinion) (see Annex 11 for detailed lists of technical characteristics considered). The detailed frequency with which these technical characteristics were used in the studied assessments is given in Annex 15 A15.3.

The approach to undertake the status assessment of the measured indicators for parameters/criteria of species/habitats, and specifically the information on the thresholds used for the status assessment (how they were derived and used) was only marginally reported in the HD/MSFD reports (Annex 15 A15.3), thus limiting the interpretation of the results obtained from the analysis of these aspects. Where it could be ascertained, the approach for status assessment was predominantly based on the use of thresholds (e.g. FCV and % change thresholds in HD) overall, with expert opinion also used in some cases, especially in habitat assessments.

Where a threshold-based approach was used, this was most frequently established as a value for the measured indicator, most often as a reference/baseline value (e.g. FRV in HD[54]), or as a deviation from an acceptable reference condition or baseline (mostly used in assessing condition of species and habitats under MSFD). Thresholds were also established in relative terms, especially under MSFD, as a proportion/% of the community (e.g. for mammal abundance indicators for D1C2) or of an area (e.g. % area covered by the species range for D1C4 for reptiles; % area lost due to anthropogenic activities for D6C4 for habitats), or as a threshold for change (e.g. for change in habitat range for D1C4 for reptiles) (Annex 15 A15.3).

Thresholds were most frequently derived at the national level, especially for mammal assessments under both HD and MSFD, although a proportion of these assessments also used regional standards to derive thresholds especially under MSFD, in agreement with the use of RSC indicators for mammal population abundance and distribution (D1C2 and D1C4) (see Section 7.4.2). Thresholds derived from other EU legislation (e.g. based on WFD assessments) were more frequently used in habitat assessments under both HD and MSFD, particularly those regarding habitat structure & functioning and D6C5, respectively. Monitoring data (alone or in combination with the use of literature and /or expert opinion) were predominantly used as evidence base to establish thresholds under both HD and MSFD assessments in general, but expert opinion alone was also frequently used especially in HD assessments for reptiles and in habitat assessments under both HD and MSFD (Annex 15 A15.3).

When looking at the similarity in the approach used between HD and MSFD to undertake the status assessment of the measured indicators for parameters/criteria of species/habitats (Table 46) the lowest HD-MSFD integration was observed overall for reptiles compared to the other ecological groups. Differences in this ecological group were particularly notable for the different approaches used to assess Habitat for the species under HD (based on trends) versus D1C5 (Habitat for the species) under MSFD (using thresholds or expert opinion) (Annex 15 A15.3). A low similarity in assessment approaches (30%) was also observed for the assessments of reptile species distribution range (Range/D1C4): although thresholds were used in both HD and MSFD assessments, their use was predominant in MSFD assessments compared to the use of expert opinion, whereas qualitative assessments were mostly reported for HD assessments. For example, Spain assessments for *Caretta caretta* in the Atlantic (ABI subregion) and the Mediterranean used a qualitative approach (trends and expert opinion) under HD, whereas a quantitative threshold was used under MSFD. Reptile assessments also showed a low similarity between HD and MSFD in terms of evidence

[54] It is of note that FRV were seldom explicitly indicated in the HD reports examined. However, the FRV operator (establishing how the parameter is compared to the current value, e.g. 'approximately equal to', 'more than') was often specified in these cases and a judgement on conservation status was achieved. Therefore, it was assumed that a FRV was implicitly defined (often being approximately equal to current parameter values) and used to assess status in these cases.

base used to set thresholds values, particularly for assessing population size (Population /D1C2) and distribution (Range/D1C4), with expert opinion alone mostly used for HD assessments, and monitoring data (alone or in combination with expert opinion and literature review) predominantly used for MSFD assessments (Table 46, 0 A15.3).

Habitat assessments, especially those regarding habitat condition (Structure & Functions/D6C5), also showed a generally low integration between HD and MSFD (Table 46). The lowest similarity (36.4%) in this case was related with the assessment approach, with MSFD assessments predominantly relying on the use of thresholds to decide on the status D6C5, whereas the use of expert opinion was most frequent for HD assessments of Structure & functions (Annex 15 A15.3).

As for regional patterns, a lower integration in assessment approaches between HD and MSFD was generally found for reptile assessments in the Atlantic region (27.8% similarity overall; Table 47), which were only reported by France (but under HD only) and by Spain (under both directives) for the Bay of Biscay and Macaronesia subregions. This result was mainly due to the difference in the evidence base used for to set threshold values (where thresholds were used) under the two directives, with HD assessments relying solely on expert opinion, whereas the assessments under MSFD using monitoring data (alone or in combination with literature and/or expert opinion) (Annex 15 A15.3).

Table 46. Similarity (%) between HD and MSFD based on technical characteristics of how the assessments are undertaken (thresholds) for the different parameters/criteria characterising species/habitats in the considered ecological groups.

Attribute measured	BHD Param. - MSFD Criterion	Trend characteristic	Mammals	Reptiles	Habitats	Mean
Popul. Size	**Population parameters - D1C2**	**All characteristics (mean)**	**64.1**	**70.7**		**67.4**
		Assessment approach	38.6	75.0	-	56.8
		Threshold type	71.1	75.0	-	73.1
		Threshold value	50.0	90.9	-	70.5
		Source/standard	85.7	100.0	-	92.9
		Evidence base	75.0	12.5	-	43.8
Sp. Distribution	**Range parameters - D1C4**	**All characteristics (mean)**	**60.6**	**37.5**		**49.0**
		Assessment approach	85.8	30.0	-	57.9
		Threshold type	41.7	20.0	-	30.9
		Threshold value	25.0	100.0	-	62.5
		Source/standard	75.3	-	-	75.3
		Evidence base	75.0	0.0	-	37.5
Sp. habitat condition	**Habitat for the species - D1C5**	**All characteristics (mean)**	**82.2**	**0.0**		**41.1**
		Assessment approach	80.0	0.0	-	40.0
		Threshold type	66.7	-	-	66.7
		Threshold value	-	-	-	-
		Source/standard	100.0	-	-	100.0
		Evidence base	-	-	-	-
Habitat size	**Area within range - D6C4**	**All characteristics (mean)**			**75.1**	**75.1**
		Assessment approach	-	-	80.0	80.0
		Threshold type	-	-	75.8	75.8
		Threshold value	-	-	100.0	100.0
		Source/standard	-	-	-	-
		Evidence base	-	-	44.4	44.4
Habitat condition	**Structure and functions - D6C5**	**All characteristics (mean)**			**46.9**	**46.9**
		Assessment approach	-	-	36.4	36.4
		Threshold type	-	-	45.4	45.4
		Threshold value	-	-	48.6	48.6
		Source/standard	-	-	57.1	57.1
		Evidence base	-	-	-	-
Overall mean (across all parameters/criteria)		**All characteristics (mean)**	**69.0**	**36.1**	**61.0**	**55.9**
		Assessment approach	68.1	35.0	58.2	54.2
		Threshold type	59.8	47.5	60.6	58.4
		Threshold value	37.5	95.5	74.3	70.4
		Source/standard	87.0	100.0	57.1	81.3
		Evidence base	75.0	6.3	44.4	41.9

Table 47. Similarity (%) between HD and MSFD across regions based on technical characteristics of the assessment approach (incl. threshold characteristics) applied to the parameters/criteria characterising species/habitats in the assessments.

Region	Indicator characteristic	Mammals	Reptiles	Habitats	Mean
Atlantic	**All characteristics (mean)**	**59.0**	**27.8**		**43.4**
	Assessment approach	66.2	50.0	-	58.1
	Threshold type	65.1	33.3	-	49.2
	Threshold value	16.7	-	-	16.7
	Source/standard	88.1	-	-	88.1
	Evidence base	-	0.0	-	0.0
Baltic	**All characteristics (mean)**	**56.6**		**51.4**	**54.0**
	Assessment approach	73.0	-	57.1	65.1
	Threshold type	66.7	-	50.0	58.4
	Threshold value	50.0	-	50.0	50.0
	Source/standard	93.3	-	50.0	71.7
	Evidence base	0.0	-	50.0	25.0
Black Sea	**All characteristics (mean)**			**50.0**	**50.0**
	Assessment approach	-	-	-	-
	Threshold type	-	-	100.0	100.0
	Threshold value	-	-	0.0	0.0
	Source/standard	-	-	-	-
	Evidence base	0.0	-	-	0.0
Mediterranean	**All characteristics (mean)**	**55.3**	**61.7**	**45.4**	**54.1**
	Assessment approach	50.0	66.7	80.0	65.6
	Threshold type	60.0	50.0	66.7	58.9
	Threshold value	66.7	80.0	10.0	52.2
	Source/standard	0.0	-	25.0	12.5
	Evidence base	100.0	50.0	-	75.0

7.7 Integration rule for species/habitat assessment

7.7.1 EU-level requirements

As Member States provide an assessment of status for individual parameters/criteria characterising different attributes of a species or habitat under both HD and MSFD, the integration of these assessments is required to express the judgment on status for a species or habitat as a whole.

Under HD, Member States are required to apply a conditional integration rule based on the parameter status classification, using the 'One-out-all-out' (OOAO) approach (Figure 22, DG Environment 2017a). As a result, the integration approach adopted by all Member States is standardised at EU-level.

Under MSFD, the requirements for integration from criterion status to element (species or habitat) status indicate that Member States should use a method standardised at EU level, or, in its absence, standardised at national level (European Commission 2018a). A set of possible integration rules is given in the MSFD reporting guidance, outlining different types of aggregation methods from Barnard & Strong (2014) (Figure 23, European Commission 2018a). However, there is also the requirement that for mammal, reptile and fish species to be assessed under HD, the same integration method as used under HD is to be used (European Commission 2018a). It is of note that the use of the same integration method does not necessarily

ensure similar results in the assessment outcome between directives, as a different combination of parameters/criteria may be integrated. For example, the OOAO rule was used by Romania in the assessment of *Tursiops truncatus* under both HD and MSFD, but a different assessment result was obtained (see section 7.3.2 for details).

Figure 22. Overall assessment of conservation status (CS) based on the status of the four parameters reported for species and habitat assessments under HD (from DG Environment 2017a).

Status of parameters	All 'favourable', or three 'favourable' and one 'unknown'	One or more 'inadequate', but no 'bad'	One or more 'bad'	Two or more 'unknown' combined with 'favourable' or all 'unknown'
Overall assessment of CS	'favourable'	'unfavourable-inadequate'	'unfavourable-bad'	'unknown'

Figure 23. Possible integration rules for MSFD (from European Commission 2018a).

Type	Code	Label	Description
Conditional Rule (CR) methods	OOAO	One-out-all-out (OOAO)	All variables have to achieve good status.
	OOAO_HIE	Hierarchical application of OOAO	'High-level integration' assessment results for three groups: biological indicators, hazardous substances, indicators and supporting indicators, each applying OOAO.
	2OAO	Two-out all-out	If two variables do not meet the required standard, good status is not achieved.
	THRES	Threshold methods	A specific proportion of the variables have to achieve good status.
	TREE	Decision tree approach	Uses specific decision rules to integrate elements into a quality assessment.
Averaging Approach (AA) methods	NHIE_NWEI	Non-hierarchical, non-weighted averaging	Combination of variables/indicators into a flat structure with no intermediate aggregation. Weightings are equal for all indicators and is atypical approach used when there is not enough information on the influence of individual indicators. This method is the most basic of quantitative aggregations, and is more common for indicator production. Averaging can be arithmetic or geometric.
	NHIE_WEI	Non-hierarchical, weighted averaging	Combination of variables/indicators into a flat structure with no intermediate aggregation. Weightings are variable between indicators and can be allocated according to multivariate analysis, expert judgement or based on theoretical assumptions regarding value.
	HIE_NWEI	Hierarchical, non-weighted averaging	The use of hierarchical approaches to structure indicator inclusion and group is very common. The added structure provides the ability to output intermediate CIs that aid in the interpretation of the overall CI/AI. The nesting of associated indicators into clusters greatly improves the clarity of the aggregation process. Weightings are equal for each indicator and typical of when there is not enough information on the influence of individual indicators.
	HIE_WEI	Hierarchical, weighted averaging	Hierarchical layers and clustering of input indicators is used to structure and order the aggregation. Weightings are variable between indicators and can be allocated according to multivariate analysis, expert judgement or based on theoretical assumptions regarding value. Weights can be applied to either individual indicators or to clustered indicators.
Non-Averaging Approach (NAA)	MULTIMETRIC	Multi-metric indices	Often hierarchically-structured and have inputs clustered by metric. Weights can be variable or equal. Calculation is undertaken with complex approaches such as summation, multiplication or bespoke formulae operations.
	MULTIVARIATE	Multivariate analyses	Use predefined statistical procedures. Commonly applied methods include Factor Analysis, Discriminate analysis and Principal Components Analysis
Other	SPATIAL	Spatial analysis	Spatial analysis where layers are combined using different functions to produce an integrated output.
	OTH	Other	Other integration methods.

7.7.2 Member State-level analysis

The technical characteristics related to the integration of parameter/criterion status assessments at species/habitat level under HD and MSFD[55] included the methodological standard used (e.g. EU-level, regional, national standard) and the integration rule applied (as per Figure 23). While these characteristics could be assessed for all assessments under HD, as they are regulated by the HD reporting guidance provided at EU-level (section 7.7.1), the information on the integration method used in MSFD assessments was often not specified in the examined MSFD reports (this also included those cases where integration was not applied because based on one criterion assessed only, or when all criteria reported were not assessed) (see Annex 15 A15.4).

The similarity between HD and MSFD in terms of integration methods used to derive a status assessment at species/habitat level is shown in Table 48. A complete similarity (100%) across all technical characteristics was observed for reptile assessments, as, following MSFD requirements, the integration method applied under MSFD reflected the EU-level approach following the One-Out-All-Out (OOAO) rule as also applied under HD (Annex 15 A15.4). Although the same requirement applies to MSFD assessments for marine mammals, it appears that a combination of EU, regional and national level approaches was applied across the examined MSFD assessments. Nevertheless, these all resulted in the adoption of the OOAO rule in all MSFD mammal assessments (where the rule was specified), as well as in HD assessments (Table 48, Annex 15 A15.4).

The highest discrepancy between integration methods used under HD and MSFD was observed for the habitat assessments (Table 48), although this result was based on a limited number of assessments in the sample considered, as in the majority of cases details of the integration method could not be derived from MSFD reports (Annex 15 A15.4). The observed discrepancy was related in particular to the assessments of Annex I Reef habitat undertaken by Estonia (Baltic), with the OOAO rule (as per EU-level standard) being applied for the HD assessment, whereas the hierarchical weighted averaging, as agreed regionally (based on the HELCOM HOLAS II BEAT 3.0 approach), was applied for the MSFD assessment. It is of note that this methodological difference did not affect the final outcome of these assessments, resulting in a favourable conservation status and a good status under HD and MSFD respectively.

It was noted that, on occasion, different integration rules were used by the same Member State for the assessment of different biodiversity components under MSFD. For example, Estonia used the OOAO rule for grey seal and hierarchical, weighted averaging for reefs and sandbanks assessments under MSFD.

Table 48. Similarity (%) between HD and MSFD based on methodological characteristics regarding how parameter/criterion assessments are integrated at species/habitat level.

Integration characteristic	Mammals	Reptiles	Habitats	Mean
All characteristics (mean)	**75.0**	**100.0**	**0.0**	**58.3**
Methodological standard	50.0	100.0	0.0	50.0
Integration rule	100.0	100.0	0.0	66.7

[55] BD is not considered here as a status classification is not reported either at parameter or species level.

7.8 How monitoring informs assessments

7.8.1 EU-level requirements

Most of the requirements and guidance given at EU-level are for reporting and assessment. There is very limited information on monitoring aspects (Table 49). More comprehensive guidance on monitoring methods and standardisation can be obtained at regional level (from RSCs; e.g. HELCOM monitoring guidance). This regional guidance was not considered in this task as it is not given at the EU-level, but it has been taken into account to categorise methodological approaches for the Member State-level assessment, using examples of data collection methods required to inform RSC indicators that may be also used to assess MSFD criteria for species (Palialexis et al. 2019; see Table 49).

Table 49. Approaches for monitoring and data collection to support BHD and MSFD implementation, as provided in EU-level guidance (derived from DG Environment 2017a, 2017b, Palialexis et al. 2019).

Attribute measured	**BD**	**HD**	**MSFD**
Species:			
Population size	**Population size (+trend):** No monitoring guidance	**Population:** No monitoring guidance	**D1C2-Population abundance:** *Mammals/turtles/birds:* • Count of pinnipedes/seals when they come ashore (haul out/resting/nursing sites) or in coastal cave surveys (Mediterranean monk seal) • Long-term telemetry to estimate at-sea usage • Mark-recapture methodologies, using Photo-ID capture-recapture methods where possible (e.g. coastal bottlenose dolphins, Mediterranean monk seals) • Records of sightings and strandings for current/historical distribution of populations • Large-scale purpose-designed systematic aerial or shipboard surveys using line-transect distance sampling methods (Buckland et al., 2001) to obtain abundance estimates (design-based estimates) • acoustic surveys • platform of opportunities (e.g. whale watching operators, ferries, cruise ships, military ships)
	MSFD and BHD can make use of same data on population size and distribution, collected by the same monitoring schemes, at least for species common to the directives		
Species distribution	**Breeding distribution map and range size (+ trend):** No monitoring guidance	**Range:** No monitoring guidance	**D1C4-Population distributional range and pattern** *Mammals:* • Seal abundance surveys often used for distribution, but with limitations (mostly coastal/haul out sites, not at-sea surveys; preferential sampling of areas known for high seal occurrence and in narrow time windows (key life-stages) - bias in seal distribution metrics)
Population characteristics / condition	-	-	**D1C3-Population demographic characteristics:** No monitoring guidance
Species' habitat	-	**Habitat for the species:** No monitoring guidance	**D1C5-Habitat for the species:** No monitoring guidance
Habitat:			
Habitat size	-	**Range + Area covered by habitat:** No monitoring guidance	**D6C4- Benthic habitat extent:** No monitoring guidance
Habitat condition	-	**Structure and functions:** Ideally, sampling should be based on statistical principles, for example stratified random sampling. There is a large literature on sampling methodologies; recent publication which focuses on habitats is Brus et al. (2011).	**D6C5-Benthic habitat condition:** No monitoring guidance

7.8.2 Member State-level analysis

The technical characteristics related to the monitoring and data collection to inform species and habitat assessments under BHD and MSFD included the assessment of the

coordination of monitoring programmes (e.g. at national, regional, or wider level), the methods used for collecting the data (e.g. remote/observation methods such as visual or acoustic surveys, removal methods, mark-recapture) and their standardisation (e.g. based on national, regional or wider standards), and the spatial and temporal scales at which the monitoring programme and the specific data collection within it are undertaken (see Annex 11 for detailed lists of technical characteristics considered).

It is of note that the information on monitoring and data collection was sparse in the BHD and MSFD reports, and therefore this was integrated by the research team through expert knowledge of the subject (of the research team themselves and in consultation with Member State stakeholders) and using other sources of information where readily available (e.g. monitoring programme descriptions from Member State documentation). Despite this, the answer 'not specified/not known' was frequent in this part of the template leading to a lower confidence in the results of the analysis compared to those presented for the assessment and reporting part of the process (sections 7.1-7.7).

7.8.2.1 Monitoring programmes coordination between BHD and MSFD

The highest level of coordination of monitoring programmes across directives was observed for the monitoring of birds in all regions[56], with the same monitoring programmes and data collection informing assessments under both BD and MSFD, especially for breeding birds (monitored in breeding colonies along the coast). In some cases, a single monitoring programme was used to collect data on the same breeding birds, as for example Estonia's National Monitoring Program (NMP, Monitoring the biodiversity and landscapes sub-program) providing counts of breeding terns and avocet for both BD and MSFD assessments in the Baltic. Similarly, data on breeding Scopoli's shearwater were collected by Malta under the monitoring programme for mobile species (seabird) breeding distribution and abundance, through a combination of visual and acoustic methods and covering all the breeding colonies in the Maltese Islands. In other cases, multiple monitoring programmes were used to collect data. For example, four nationally-coordinated monitoring programmes ('Waterfowl monitoring'; 'Finnish breeding bird surveys (Bird Atlases)'; 'Monitoring of archipelago birds'; 'Censuses carried out during the nesting time in Important Bird Areas (IBA)') were used in Finland to assess breeding terns under both BD and MSFD. In some cases, there was only a partial overlap between monitoring programmes for BD and MSFD; for example, France used the national and regional census of breeding birds (within the breeding seabirds monitoring programme) to monitor terns and the Scopoli's shearwater in both the Atlantic and Mediterranean for BD and MSFD, with additional subregional monitoring providing further data on some species (e.g. observations from oceanographic ships within the PELGAS surveys within the Bay of Biscay, and the marine megafauna aerial survey (SAMM) covering zones of the French part of the Channel identifying the Atlantic North Sea subregion, the Atlantic Celtic Sea, and the Western Mediterranean Sea, providing additional data on common tern population distribution).

As for mammals, the higher coordination of monitoring for both HD and MSFD appeared to occur in the Baltic and Atlantic regions. For example, mammal monitoring in Germany took place under the same programs for both Directives, including 'Harbour porpoise aerial surveys', 'Harbour porpoise, acoustic monitoring', and 'Grey seal and harbour seal', in both the Baltic and Atlantic regions. Common data collection activities (aerial survey of abundance counts during peak moulting period) were also undertaken by Estonia under the National environmental monitoring program to inform grey seal assessments in the Baltic under both HD and MSFD, with also monitoring of the species haulouts on land or ice during their moulting and pupping

[56] The Black Sea is not considered in this instance, as birds were only reported under BD by Romania, the only country representing this region.

seasons being used to inform assessments of their breeding distribution under MSFD. In the Netherlands, all counts of harbor porpoises and grey seals were carried out on behalf of the Ministry of Agriculture, Nature and Food Quality (WOT: Legislative Research Tasks) and Rijkswaterstaat (MWTL: Monitoring Water Management Status des Lands) to inform both HD and MSFD assessments. In the Mediterranean, monitoring of marine mammals and turtles at sea was often combined (e.g. France, Malta). For example, France's marine mammals and marine turtles monitoring program (sub-program 3) was used to inform assessments of mammals and turtles, based on large-scale campaigns including aerial census of Marine Megafauna (SAMM) campaigns (every six years), and Megascope observation campaigns for marine megafauna from Ifremer fishing platforms (e.g. PELGAS, CGFS, IBTS; every year), and with the additional monitoring of coastal groups of bottlenose dolphins (Gulf of Normandy-Breton, Iroise) in MPAs (sub-program 1). Systematic surveys (boat-based line transect surveys at sea) undertaken within a LIFE project (LIFE+Migrate Project, 2013-14) were used by Malta to assess distribution range and abundance of marine mammals and turtles, with additional photo capture-mark-recapture methods providing accurate abundance measures especially for the bottlenose dolphin. Incidental sightings of cetaceans and turtles during other monitoring activities (e.g. seabird or habitat monitoring) were also used to integrate the data on the occurrence of the species in Maltese waters. Information on monitoring programmes for Spain was scarce, and therefore the degree of reuse to inform both BHD and MSFD assessment could not be ascertained.

National MSFD monitoring programs were used to harmonise habitat monitoring effort and data use across HD and MSFD in the Baltic (Estonia and Finland) and Black Sea (Romania), with also other monitoring being used. Overall, both Germany and Estonia coordinated the data collection at a national level with a single monitoring program applying to both the MSFD and HD, and to both reefs and sandbanks ('Natura 2000 monitoring of reefs and sandbanks' in Germany; 'MSFD monitoring program' in Estonia). In Finland, monitoring was nationally coordinated under a broader range of programs which included monitoring of IUCN Red List habitats, Human pressures under the MSFD and parameters falling under WFD. For the Mediterranean, clear information on monitoring programs could only be obtained for Malta. A good coordination of habitat monitoring for both HD and MSFD was observed for this Member State, with seabed habitats state monitoring being undertaken via two main projects, a European Maritime and Fisheries Fund (EMFF) project "EMFF 8.3.1: Marine environmental monitoring: towards effective management of Malta's marine waters" (2017-2018), aimed at implementing and updating Malta's monitoring program in 2017-2018, and a previous LIFE project (LIFE BaĦAR for N2K project, 2015-2016) aimed at monitoring of reefs, caves and sandbanks (location, range and conservation status) in Maltese waters. Within these monitoring programs, reuse of data between HD and MSFD were relevant in particular to the assessments of *Posidonia* beds (obtained via Remote seabed (video) mapping, and SCUBA diving survey to estimate PREI index for assessing habitat condition) and reefs (as part of the broader habitat infralittoral rock and biogenic reef, through SCUBA diving surveys in shallow coastal areas and bathymetric surveys), with few additional data collection activities being also used to inform assessments under either directive instead (e.g. ROV surveys in deep sea areas for Reefs under HD; Littoral rock CARLIT (macroalgae) and organogenic trottoirs with *Lithophyllum* sp. surveys for infralittoral rock and biogenic reef under MSFD).

7.8.2.2 Data collection methods

The overall frequency with which data collection methods and standardisation were employed in the studied assessments is given in Annex 15 A15.5, Table A5.29/30). Based on this, the overall similarity between BHD and MSFD in terms of data collection characteristics supporting the assessment of species/habitats was estimated across all

species/habitats within an ecological group, and all Member States within a region (Table 50).

The method for data collection was highly consistent between BHD and MSFD across all species groups and in all regions, the similarity of method characteristics between BHD and MSFD being often >80%, with 100% similarity observed in several occasions for the type of method used (Table 50). Remote/observation surveys were the predominant method used to monitor birds, mammals and reptiles to inform both BHD and MSFD assessments, these methods including for example bird count surveys (from the land or boat) in and near coastal breeding colonies, boat-based systematic transect surveys to count megafauna (especially mammals and reptiles) at sea, aerial and acoustic surveys (e.g. with automated recoding units ARU). Opportunistic sightings during other monitoring or activities (e.g. fishing platforms) were also used to integrate assessments of species distribution and range within Member State waters. Additionally mark-recapture methods were also used for bird monitoring by Estonia (terns and avocet) and Malta (e.g. ringing and recapture of breeding and non-breeding adults and chicks of Scopoli's shearwater at the colonies) in relation to both BD (Malta) and MSFD assessments (both Member States). Species monitoring were applied by Member States most often according to national methodological standards (e.g. Finland bird monitoring, France mammal and reptile monitoring), indicating that whilst the approach to data collection may be compatible between Member States, the data standards may not, and compatibility may only be ensured between assessments of a Member State. International, regional standards were most often used for mammal assessments, with indication of use of RSCs standardized methods as a common basis for the monitoring for example by Estonia in the Baltic (HELCOM), and by the Netherlands in the Atlantic (OSPAR). Monitoring methods according to wider international standards, as defined by the international scientific literature, were used especially for bird monitoring across the Baltic and Atlantic regions by Germany, and also by Malta to standardize acoustic and systematic transect surveys assessing bird, mammal and turtle in the Mediterranean.

A higher variability in the monitoring methods and standards was observed across all regions for habitat assessments, as reflected by the markedly low HD-MSFD similarity, especially Atlantic and Mediterranean (similarity <20%) (Table 50). Remote/observation monitoring (e.g. drop-down video surveys, diving transect surveys) was predominantly used for MSFD habitat assessments, especially for hard substratum habitats (e.g. reefs), and occasionally in combination with removal methods (e.g. box corer and grab sampling in sedimentary habitats as for example sandbanks). As for HD habitat monitoring, the method type was often recorded as 'other', denoting the use of multiple monitoring methods, often in combination with the use of GIS data on human activities (Finland, Germany) or other existing spatial data obtained from various sources (e.g. management agencies, academic and research bodies; France). A partial overlap of the methods in this latter case with those used for MSFD habitat assessments cannot be excluded. Where the information about methodological standards could be obtained, national standards are mostly used for habitat monitoring under both HD and MSFD in the Baltic, Atlantic and Black Sea, with the national standard being predominant especially for MSFD assessments in the latter two regions. Monitoring methods used in the Baltic (Finland) have also been reported to follow international regional standards, whereas wider international standards (based on the wider international scientific literature) have been reported for observation/visual methods, e.g. with Malta using WFD methods such as the PREI method (*Posidonia oceanica* Rapid Easy Index; Gobert et al. 2009) for the HD and MSFD assessment of *Posidonia* beds, and the CARLIT methodology (Ballesteros et al. 2007) for the MSFD assessment of infralittoral rock and biogenic reefs, although it is of note that these methods have been calibrated specifically for the Mediterranean region.

Table 50. Similarity (%) between BHD and MSFD based on technical characteristics of the monitoring and data collection undertaken to support assessments of species/habitats in the different regions and overall (mean similarity).

Region	Indicator characteristic	Birds	Mammals	Reptiles	Habitats	Mean
Atlantic	**All characteristics (mean)**	**91.1**	**77.3**	**61.8**	**40.1**	**67.6**
	Method for data collection	100.0	97.1	100.0	18.2	78.8
	Method standard	83.3	87.5	100.0	80.0	87.7
	Spatial scale of monitoring programme	88.9	62.0	33.3	77.8	65.5
	Spatial scale of data collection	90.9	64.3	50.0	11.1	54.1
	Temporal scale of monitoring programme	90.0	77.5	50.0	28.6	61.5
	Temporal scale of data collection	93.3	75.2	37.5	25.0	57.8
Baltic	**All characteristics (mean)**	**90.0**	**84.2**		**71.4**	**81.9**
	Method for data collection	87.5	85.7	-	56.9	76.7
	Method standard	85.7	96.7	-	85.7	89.4
	Spatial scale of monitoring programme	90.5	91.4	-	57.1	79.7
	Spatial scale of data collection	100.0	94.3	-	71.4	88.6
	Temporal scale of monitoring programme	90.5	68.6	-	85.7	81.6
	Temporal scale of data collection	85.7	68.6	-	71.4	75.2
Black Sea	**All characteristics (mean)**				**100.0**	**100.0**
	Method for data collection	-	-	-	-	
	Method standard	-	-	-	100.0	100.0
	Spatial scale of monitoring programme	-	-	-	-	
	Spatial scale of data collection	-	-	-	-	
	Temporal scale of monitoring programme	-	-	-	-	
	Temporal scale of data collection	-	-	-	-	
Mediterranean	**All characteristics (mean)**	**66.7**	**67.4**	**73.5**	**58.5**	**66.5**
	Method for data collection	87.5	100.0	100.0	12.5	75.0
	Method standard	50.0	66.7	58.3	50.0	56.3
	Spatial scale of monitoring programme	60.0	55.6	80.0	75.0	67.7
	Spatial scale of data collection	92.9	75.0	77.1	100.0	86.3
	Temporal scale of monitoring programme	50.0	44.4	57.1	33.3	46.2
	Temporal scale of data collection	60.0	62.5	68.6	80.0	67.8
Overall (mean)	**All characteristics (mean)**	**82.6**	**76.3**	**67.7**	**67.5**	**79.0**
	Method for data collection	91.7	94.3	100.0	29.2	76.8
	Method standard	73.0	83.6	79.2	78.9	83.3
	Spatial scale of monitoring programme	79.8	69.7	56.7	70.0	70.9
	Spatial scale of data collection	94.6	77.9	63.6	60.8	76.3
	Temporal scale of monitoring programme	76.8	63.5	53.6	49.2	63.1
	Temporal scale of data collection	79.7	68.8	53.1	58.8	66.9

7.8.2.3 Spatial and temporal scales

The overall frequency of the different spatial and temporal scales at which monitoring programmes and data collection within them were undertaken is given in Annex 15 A15.5 (Tables A5.31/2/3/4). Based on this, Table 50 shows the overall similarity between BHD and MSFD in terms of spatial and temporal scales of monitoring programmes and data collection to support the assessment of species/habitats, across all species/habitats within an ecological group, and all Member States within a region.

When considering the spatial and temporal scales of monitoring and data collection on the whole, bird assessments in the Baltic and Atlantic where the most integrated between BHD and MSFD (similarity between 86% and 100%), followed by mammals, especially in the Baltic (similarity 69%-94%) (Table 50). For these two ecological groups, monitoring and data collection in the Mediterranean showed generally the lowest similarity in spatial and temporal scales. Bird monitoring under BD and MSFD in the Atlantic and Baltic is mostly undertaken at the national or subnational scale (e.g. Germany, Finland), with data collected covering the whole bird population within the

MRU or using representative sites (e.g. breeding colonies), and the monitoring being continued across multiple reporting cycles. The monitoring of marine mammals in the Baltic has similar characteristics, except for a higher incidence of monitoring at the regional scale, as Finland's annual monitoring of harbour porpoise and grey seal for both HD and MSFD is part of the regional coordinated monitoring under HELCOM. The higher dissimilarity between BHD and MSFD monitoring of mammals and birds in the Mediterranean was mainly ascribed to the variable temporal scale of monitoring across Member States, with longer term monitoring (repeated or continued across multiple reporting cycles) being predominant in BHD assessments, whereas MSFD assessments were also based (exclusively in the case of mammals) on monitoring within one reporting cycle (either one-off or with repeated data collection). However, where harmonisation between BHD and MSFD by individual Member States is considered, spatial and temporal scales of monitoring undertaken by a Member State for the same bird and mammal species were generally consistent between directives.

An opposite geographical pattern was observed in the harmonisation of monitoring spatial and temporal scales for reptile and habitats assessments, with the highest HD-MSFD similarity being consistently recorded for the Mediterranean, especially when considering scales of data collection (similarity 69% - 100%), whereas the lowest harmonisation was always recorded in the Atlantic (with similarity most often ≤50%, and as low as 11% for spatial scale of data collection for habitat assessments) (Table 50). However, this low HD-MSFD similarity was mostly due to the variability in temporal and spatial scales across Member State monitoring within the region rather than within the monitoring undertaken by an individual Member State, which was generally consistent between directives (e.g. Germany used the same Natura 2000 reefs and sandbanks monitoring to inform HD and MSFD, this being a monitoring program undertaken at the national scale, with focus on selected sub-habitats, and with one-off data collection within a reporting cycle).

8 Analysis of Member State Interviews

The qualitative analysis of MSFD-BHD integration, drawing on Member State interviews is presented across the following subsections:

- Success stories and strengths.
- Impediments, problems, weaknesses & threats.
- Opportunities leading to solutions.

8.1 MSFD-BHD integration - Success stories and strengths

The Task 2 interviews highlight strengths and successes in the process and technical aspects of how some Member States satisfy BHD and MSFD reporting obligations.

The smaller Member States, such as Croatia indicated that the best integration between MSFD and BHD is where data analyses and report preparation (birds, mammals and reptiles) for all three Directives (BHD and MSFD) had been by **the same (informal) groups of experts within the same authorities**. There was also the benefit of intersectoral cooperation outside of public policies. In that case the resources were more efficiently used, and data were coherent between the Directives, and because there was a small group of marine experts, proposals to formalize that cooperation on a policy level would increase the chance of success. As a further example, Romania also achieved integration between MSFD and BHD assessments as the same organization was responsible for the collection of data for all three Directives. This facilitates a better integration of data (e.g. of mammals, benthic habitats, specific marine species).

The integration of the directives to a certain level is supported by **involving the same group of experts** in the assessment process and reporting. In that way they can more readily access and use all available sources for data collection. For example, if the BHD experts themselves prepared the written reports/data analysis given that they are familiar with the methodology, content, indicators, and the status of the species/habitat as well as research papers and studies (often commissioned by the authorities) for data mining. In some cases, common reports were used to complete both portals (BHD and MSFD). In most cases, the BHD experts upload data to the BHD portal and they modified the BHD data to meet the requirements of the MSFD and send them to the national group responsible for reporting the MSFD.

As shown by Estonia, for example, benthic habitats and biotopes often have the best integration between MSFD and BHD, the likely result of these being sedentary components and hence easier to monitor and assess. However, in this particular example Estonia only reported HD types under MSFD and did not report on MSFD broad habitat types. In addition, the habitats and biotopes monitored often used the same experts in both assessments, and hence did not have any organizational (administrative) boundaries; hence the information and data are complementary for all three directives. That the monitoring and assessment had similarities and the only differences were in the reporting, worked well. Furthermore, integration of the directives occurred where the same monitoring effort and its resulting data are used for all three directives (BD and MSFD) and where the same treatment is given to the data for both the assessments.

It was emphasised that **applying the same rules for common components** of the directives aids integration, e.g. using the same criteria for population size in the BD and HD. The integration also relied on having several criteria being met but also clear rules such as if one was not met or was unknown then the final status was labelled as unknown.

The type of data produced and the means by which they are collated and analysed affects the assessment outcome. As shown by the data from the Baltic states, for mobile populations (seabirds), coordinated spatial surveys gave more

comparable data between areas rather than point survey data. For example, the incorporation of offshore wintering birds in the directives is successful in the Baltic Sea because it is well coordinated by a working group; in this case, offshore flights and data from the coast are coordinated in time and data analysed centrally.

Three examples from France demonstrate **the role that programme scale and comprehensiveness as well as organisational expertise can play** in establishing a 'single group of experts' (or similar) and hence support integration across the directives. The first example is in the assessment of marine birds in which France has launched large monitoring programmes (e.g. the D3 National and regional census of breeding birds) and in which data were reused by the MSFD and which had common experts in charge of collecting and analysing data. The coordination of this scientific group (GISOM) has also been reinforced recently, thereby producing one single point of contact for all three directives. As a second example, France has long monitored marine mammals; for example, Pelagis has been coordinating (D1 Marine Mammals) Aerial monitoring of marine megafauna for almost a decade, and has developed an expertise in this area together with the use of stranding surveys. Hence Pelagis has become the reference organisation for most issues demanding marine mammal expertise for public policies. The third example is in the assessment of *Posidonia* beds, where there is a strong integration between the HD and WFD. The WFD monitoring and data collection activities by the Water Agency are very comprehensive and exceed that required under the WFD. This produces many good data that can be reused for many different purposes. These efforts stem from the Water Agency's interest and willingness to act as a reference organisation for biodiversity issues. This has also been facilitated by the available and suitable financial resources.

As an example of a Member State which integrates as much as possible between HD and MSFD, within constraints imposed by existing obligations under different directives (e.g. timelines), **Germany has interpreted the GES Commission Decision which states that Annex I species should have the same result in MSFD as in HD**. For example, not many fish are protected under HD, so for these few protected species Germany reuses the HD assessment for MSFD assessment (HD parameters reused for specific MSFD criteria D1C2-D1C5). The same is done for mammals, and habitats (at least for reefs and sandbanks) and Germany also reuses the threshold values from HD to MSFD, but there are problems in the time lags and recording period and with scales and thresholds for MSFD that need (sub)regional approaches (see below).

Germany also considers the **integration with the RSCs (OSPAR/HELCOM)** to be a success given that all EU contracting parties of OSPAR/HELCOM should ensure that the OSPAR/HELCOM assessment has to be in line with the HD. It is noted, however, that although HD does not have a strong requirement for regional coordination, the MSFD regional coordination is a legal requirement and hence gives strong relationship between the RSCs and MSFD reports. There are no difficulties with scales or threshold values and notably one monitoring regime (of the same species and same data) is used to inform the different directives. However, Germany recognises that if they establish indicators only for parts under RSCs they may deliver different results. Currently the results between OSPAR/HELCOM and HD are the same, but if the results start to deviate then it could become a problem and discussions to avoid this have started already in the OSPAR and HELCOM mammal group. Germany takes the legally-reinforced position that if there are different results between OSPAR/HELCOM and HD assessments, the latter are those that are to be used (as indicated in the Commission Decision for MSFD on how to use it). This may be the result of Germany being legally bound by EU Directives but only a signatory to the RSC agreements. This difficulty is also exacerbated by the temporal mismatch between the MSFD and HD in assessment years / reporting period. A key issue here is the scale of assessment, as different scales for aggregation of data will lead to different assessments outcomes. Agreement on ecologically relevant scales between HBD, MSFD and RSCs would lead to ensuring harmonised assessments and avoid different outcomes.

There is a good level of integration in some countries in general and across species. For example, in Malta with the common bottlenose dolphin, *Tursiops truncatus*, the loggerhead sea turtle, *Caretta caretta* and the seagrass *Posidonia oceanica*; assessment of the latter uses a tool developed and agreed under the WFD (given that macrophytes are an ecological quality indicator). For seabirds, the MSFD and BD assessments are linked although one difference is the data used as a basis for the assessments, mainly due to the fact that in the recent reporting period, the MSFD report was submitted after BD, so it benefitted from additional data collected in additional monitoring commissioned to substantiate/validate previous data. However, it was reassuring that as this confirmed previous data, there was no major difference in the assessment.

The interviewees in Spain, as in other Member States, consider the habitat assessment and reporting to have the best integration between all three Directives despite the habitat types being much less compatible between MSFD and HD (unless ES is simply reporting HD types under MSFD), and not relevant for BD. With regard to birds, the different regional authorities in Spain are responsible for monitoring of coastal colonies, while the ministry has the task of monitoring the marine species at sea; the coastal colony information is collected through a single data call, designed to be useful for all three Directives. This way, it is all integrated, and information is used for the reporting of both the BD and the MSFD. Hence, integration is achieved in some countries in these assessments where there is the same information available for the reporting of the three directives and where the information is collected by the same people. Despite this, there has been a mismatch in the timing of reporting and the parameters reported and, in a large country such as Spain which covers two regional sea areas, it has not been possible to have the same experts working for the BHD and MSFD directives. However, as an indication of lessons learned, in the next reporting cycle, in the case of Spain, for example, the contracts will ensure those focusing on specific groups will report for the three different directives.

8.2 MSFD-BHD integration – Impediments, Problems, Weaknesses & Threats:

Most Member States interviewed indicated that there were problems preventing integration of the directives. Some of the interviewees considered it difficult to determine which assessment had the lowest level of integration within a country, as all of them had **problems due to methodological inconsistencies**.

There were **difficulties and differences in the methodological approach**, for example among Mediterranean countries, therefore preventing comparison and mutually improved measures. It was suggested that the lack of available time and effort prevented standardisation, for example, in the need for methodological improvements and harmonization of parameters and threshold values. While expert opinion is often used, there are no guidelines for assessment and consequently comparison of the data based on expert opinion. The Estonian respondents suggested that the bird assessments were the least integrated between BHD and MSFD as each has different assessment methodologies and guidelines. However, despite the GES Commission Decision being agreed for four years and available to Member States since 2016, the processes have still not yet been streamlined.

The Croatian interviewees suggested that the benthic habitats, namely the ***Posidonia* assessments, assessed by expert opinion, were inconsistent**. This was reported to be because the assessment was established through three separate procurements instead of one single procurement performed jointly by three Ministry's departments, resulting in mostly incomparable data and status for the three Directives considered here. However, there was also a national programme which collected all the data regarding *Posidonia* (with obligations for reporting to MSFD and IMAP-Barcelona Convention) in the database. This indicates the need for an improved expert

procurement and methodological framework and that the national programme should also be a model for other species and habitat types.

Also identified were the **problems of scale and area assessed**. The BD monitoring in general focuses on population status inside and outside SPAs although species having breeding populations both on inland waters and at sea/on the coast are difficult to monitor, but this is not fully compatible with the MSFD monitoring which focusses on marine monitoring and does not cover inland monitoring. However, although the MSFD focuses on marine species, it does not preclude 'terrestrial' monitoring of the population by Member State if this is needed for a sound assessment and so could be included by the Member State. This may revolve around the definition of a population for a species - MSFD allows for assessment at population level but there is the need to ensure that this also applies under the HBD. There is the need to consider populations that extend beyond waters of an MS, or beyond EU waters. The MSFD can cope with populations across Member State in EU waters, but little there is discussion on how to deal with populations that extend into non-EU waters.

As the BD data are based on trends (and not definite population abundance, i.e. counts), the monitoring can be performed in specific monitoring sites and the population trend can be estimated for the country level. Distinguishing this trend between inland and sea/coast in practice, as is required for MSFD, can be challenging. For example, this is done in Finland by estimating, and thereby making a large assumption about, population ratios between inland and sea/coast. Similarly, other countries also show that the assessments with the least integration between BHD and MSFD are for populations living both inland and at sea/on the coast: this is difficult to overcome, but possible (see the section on opportunities below). Furthermore, the characteristics of the biological component affects the results recorded – for example some offshore wintering birds are not observed in flight (e.g. as with auks and divers which have dark backs), but this is a problem to all three directives and can be remedied by boat counts. The time gap in recording also presents a problem, especially where there is a 3-year gap in data. Currently, in Finland, the bird population estimates are first made for the BD and then used for the MSFD.

The interviews indicated an impediment in the **definition of the spatial unit assessed, for example of HD biotopes compared to the MSFD broad habitats** which may be even too broad. It was considered that the HD is not clear in the defined target biotopes (the combination of the physical supporting element and the biota that colonises it; for example. rocky reefs exist but do not include the rocky shores on coast) and there are also differences in the scope and definitions (or their interpretation) of HD habitats among Member States. However, with extra effort then many HD habitats can be placed within broad habitats although there still needs to be further consideration of habitat complexes such as estuaries, lagoons and large shallow inlets and bays (although the first two of these are transitional waters and so not included in the MSFD). Marine HD habitats were also considered by the interviewees to be too abiotic (i.e. reliant on the geophysical features, compared with terrestrial biotopes) whereas the MSFD assessment of benthic habitat types inherently includes the biological components.

An impediment was identified relating to the **appropriateness of the area to be assessed**. It was emphasized that the HD assessment is made for the entire country but there is naturally so much variation in the result that the often smaller MSFD areas are more reliably assessed. It is questioned whether the HD assessment should be first made for the smaller MSFD areas and only then integrated to country level thereby leading to a better alignment. Despite this, Member States need to report HD in necessarily smaller assessment units.

In considering the **failure to reach good environmental status or favourable condition status**, the interviewees suggested that the HD combines activities and pressures whereas MSFD only uses pressures (activities are only used occasionally,

e.g. for physical loss and disturbance of habitats). Paradoxically, the HD approach was currently regarded by some respondents as being more appropriate as it may show in more detail the underlying cause but the MSFD approach could be even better if the activity behind the pressure is identified in the assessment.

International coordination in HD is a large concern, as even adjacent countries interpret the habitats and assessments differently. In MSFD the HELCOM coordination is strong but the HD lack of coordination gives strong uncertainties in the reporting of marine HD habitats.

There is **no consistent conclusion regarding the time gaps as an impediment**. For some Member States this is not really a problem for biotopes, and with the 1-year gap, it is even a benefit if the assessment is first made for MSFD and then that is used for the HD assessment. However, Finland regards this as a problem given the uncertainty of what data are used to assess the HD structure and functioning. In Finland, the assessment at species level was considered to be an impediment that there was poor coordination between the directives and the HD experts differed from those for the MSFD. Similarly, the HD conservation measures were not well-coordinated with those for the MSFD.

France gave an example where assessments undertaken had the least integration between MSFD and BHD: for **France, benthic habitats** that are not related to *Posidonia* beds. Their interviewees suggested that the MSFD has reused the WFD monitoring networks to assess benthic habitats, but this legacy was very weak from the start. The MSFD experts also put most of their efforts into developing one single indicator that could not be operationally deployed and was not able to identify which pressures to address in case of a poor environmental status. This difficulty in integrating all three directives is also due to major differences in indicators and criteria used (different surfaces, different environments, different levels of density, etc.). The interviewees considered that while there has been much academic research on benthic coastal habitats (also in relation MSFD criteria), operational monitoring is quite weak. As indicated above for other Member States, French interviewees agreed that the typology and definition of certain habitats under HD is not sufficiently specific (e.g. in the case of deep creeks and bays which may overlap defined habitats), such that they cannot establish the location of the habitats nor their components. The assessment of such habitats is done by individual experts on the basis of available data and expert judgement. The interviewees concluded that the granularity of each habitat should be improved to understand the nature of the monitoring and assessment needed, especially that leading to difficulties to aggregate the conservation status of species or EUNIS level 4 habitats to assess the conservation status of N2000 habitats.

The German interviewees identified several issues currently stopping integration, including:

- scale in relation to national borders (BD) vs. North Sea and Baltic Sea regions (MSFD);
- threshold values, trends (BD) vs. threshold values (MSFD), and
- the reporting deadline, 2019 vs. 2018, the reporting period, and differences between assessment period and reporting period.

In Germany, the least integration between BHD and MSFD was reported to be for birds. Although the Birds Directive assessments are species-specific and the same species and data are used for the MSFD assessments, the reporting times differ. However, even more importantly, the assessment areas differ as the BD requires one national assessment whereas the MSFD requires separate assessments for the North Sea and the Baltic Sea. This results in non-comparable assessment outcomes. The German respondents emphasised that, unlike the MSFD and RSC assessments, the BD does not require threshold values and uses trends for the assessments - yet another

cause of dissimilarity in the assessments. However, there being a basic difference between the BD and MSFD, they indicated that this should not be a major obstacle, e.g. in OSPAR and HELCOM all parties work together to agree threshold values or assessment scale.

A major obstacle identified by German interviewees is the reporting deadline and period, which differ between directives. For example, for the birds assessments, the same data are used, but they come from different timeframes due to the lag in assessment/reporting (i.e. the MSFD due in 2018, based on data until 2016 (which had to stop there to allow the public participation process), whereas BD was not reported until 2019). As the timings of the reporting under MSFD and HD are not harmonised, Germany then decided to use older BHD data from the 2013 national reports (containing real data up to ca. 2012) for the MSFD 2018 report. Furthermore, the 2018 HELCOM 'State of the Baltic Sea' report also refers to the HD assessment of 2013. Hence there will be discrepancies between the new 2019 BHD assessments and the old data in the MSFD 2018 reports although the EC suggest that Member States could use the same data and assessment for both 2018 and 2019 and harmonise the reporting date. Despite this, as MSFD reporting is already well-advanced then the German respondents could not affect any other option.

The type of habitats included was also a cause for concern. For example, the Maltese respondent considered a lower degree of integration for some benthic habitats and that it was more difficult to apply quantitative MSFD criteria to habitats such as reefs and caves. Work is preformed/planned in the current/next monitoring cycle to improve indicators for these cases where indicators have not been already agreed to assess quantitative status for the MSFD (e.g. bathyal/deep sea habitats). In addition, the choice of indicators needs to ensure they are fit for purpose for the specific criterion (e.g. habitat condition indicators for criteria D6C3 (which only refers to physical disturbance) and D6C4, which refers to anthropogenic pressures), hence there is the need to ensure the appropriate indicator is used. Finally, they considered that another impediment is in the definition of thresholds and that these need to be discussed at EU and regional level, e.g. for the Barcelona Convention.

Internal governmental administration differences contribute to a poor integration of the directives. The low integration and implementation between BHD and MSFD in Romania were considered to be a barrier created by the MSFD being the responsibility of the Water Management Directorate whereas the BHD is the duty of the Biodiversity Directorate, despite these being within the same Ministry. Both Directorates receive data and reports from the National Institute for Marine Research and Development (NIMRD) for mammals, marine habitats and marine fish species and so NIMRD is an important component for the integration of MSFD-BHD. The collection of data and reports is made under projects funded by the Ministry of Environment, Waters and Forests as shown, for example, by a project on the integrated monitoring programme for the Black Sea marine ecosystem as required by MSFD. In the case of birds where NIMRD is not so strong, other organisations collect and monitor data for the Ministry. There are several reasons for the poor integration, including shortage of personnel and lack of funds for data collection. The different approaches between the Directives, including the reporting period, has resulted in the integration for these elements not being harmonised.

In Spain, in part given the challenges of a sea area in two biogeographic regimes and two RSCs, integration was poor across all the groups, but in particular for habitats. This was principally because: the types of habitats to be monitored under the HD framework are different from those under the MSFD; there were different parameters and criteria, the use of trends vs threshold values, lists of species, and geographical scales for assessment – all of which hampered integration and made it more complex. Finally, they commented that there is no scientific agreement on what the thresholds should be and so they are different between regions, countries, etc.

8.3 MSFD-BHD integration – Opportunities Leading to Solutions

The above strengths/successes and weaknesses/problems point to various opportunities for improving integration, especially by taking elements of good practice from countries more experienced in marine monitoring, assessment and reporting.

Interviewees from several Member States stated that **the Directives should be more coherent** among themselves, including indicators, timeframes and species/habitats concerned/reported. Interviewees, especially those from smaller and less experienced countries such as Croatia, agreed that improvement of their knowledge and skills via workshops and seminars would improve integration of the Directives. Some countries, again such as Croatia, are producing plans for improving integration and reporting, thereby recognising the need for harmonised internal structures, especially where reporting cycles should be harmonised but such integration has to be top-down from the EC and EEA. For example, as indicated by several Member States, such as Estonia, the BHD assessment should precede that for the MSFD, so that the MSFD can benefit from the BHD. Clear and compatible guidelines and assessment methodologies should be provided, especially ensuring that specific methodologies have to be used in all three directives. There is also the need to accommodate other directive monitoring programmes (e.g. WFD) and monitoring guidelines and also to improve data management by streamlining the data flow processes, improving database interconnectivity, and widening the scope of GIS data, for example by including more spatial elements (terrestrial and freshwaters).

It is easier to aggregate than disaggregate. In Estonia, a single set of monitoring data gave input for all three directives although it was suggested that HD needs a more detailed assessment and therefore it was recommended that it should be done before MSFD which can then aggregate HD assessments. It was again noted that, at the moment, the MSFD assessment deadline is before that of the HD.

Member States could learn from other countries such as Finland, who plan to integrate monitoring further with the improved monitoring of marine SPA-areas (on the archipelagos and reef areas) which gives better data to estimate the abundance of the marine parts of the bird populations compared to the inland areas. There are plans to improve this integration in the current reporting cycle (and/or following ones) and, again for Finland, the next assessment is likely to include a new estimate for the abundance of waterbirds in inland waters which will improve the estimates of the marine waterbird trends.

Almost all Member States called for an improved integration of assessments between MSFD and BHD to overcome the different results because of differences in data. This also needs to **overcome discrepancies introduced by requirements for the Regional Sea Conventions**; for example, the HELCOM-coordinated MSFD indicator database does not include all national data due to data restrictions and hence there is a new structure for the habitat assessment planned in Finland which supports all three directives. This new plan would be based on the MSFD assessment of habitats and then used in the HD assessment, 1 year afterwards. Furthermore, the **HD habitats definitions and typology should be harmonised to those of the MSFD broad habitats** and their significance to the latter could be estimated; this may require the result to be weighted by the relative proportion of the individual habitats into the broad habitats of the MSFD (such as by weighted average integration).

The Member States often remarked on the **significant resources required to satisfy BHD and MSFD reporting requirements**, and hence challenges of insufficient expertise and manpower, although they did not differentiate amongst the relative costs of the monitoring, assessment and reporting elements. For example, the interviewees highlighted that France had spent a lot of effort to respond to the MSFD requirements which then competed against the requirements of other directives, thereby preventing prioritisation of more important environmental challenges. Despite this, France still does not have indicators, or they are still under development, and the

respondents were concerned that while the demand for new indicators is growing, the required financial resources are not increasing. Hence there are current initiatives to streamline the data collection efforts (such as for mammals) and enable integration between assessment through workshop discussions across ministerial departments.

The French interviewees acknowledged that while the MSFD is well written, some of the problems occur because the duplication with previous directives has not been removed. It would be more efficient to have **one integrated request for information and a single reporting cycle from the Ministry and Commission**.

Similarly, **greater clarity and instruction from the Commission** would help to re-orientate Member States to the most pertinent assessment needs – for example, the respondents suggested that secondary criteria could be deleted, and overlaps such as for eutrophication between the WFD and MSFD should be avoided. Despite this, the EC suggest that these aspects need to be considered in the context of the GES Decision, that has provision for use of secondary criteria based on risk (which some Member States ignore) and also that the Decision explicitly requires reuse of WFD assessments for eutrophication and contaminants for MSFD purposes (Dr D Connor, DG ENV pers. Comm.).

There is a large potential for **integrating between ecological elements, and the Regional Seas Conventions and their reporting requirements** with those of the EC. The German respondents, faced with reporting for the Baltic and North Seas, advocated the need to harmonise the reporting periods between the different RSCs and with the MSFD and considered that even if the report delivery dates are not harmonised, at least the assessment periods that are part of the reporting should be harmonised. They commented that lessons could be learned from recommendations by the HELCOM/OSPAR/ICES joint working group for birds on the way in which OSPAR contracting parties assessed bird species and how much they are aligned with MSFD.

In contrast to the other Member states, Germany took the view that it already integrated as much as possible and it also was surprised that that there is no potential to take data from MSFD reporting into BHD reporting. Indeed, in response to the question from the EC about the potential to take data from MSFD reporting into BHD reporting, again in contrast to other respondents, they considered that it should be the other way around, and that the MSFD reporting should make use of BHD reporting; this would require the timing of reporting to be harmonised. They took the view that the MSFD assessment for some species and habitats is the result from the HD-assessment (not vice versa), as clearly stated in Commission Decision (EU) 2017/848. Furthermore, they suggested that BHD reporting data are more specific and collected with field monitoring under Art. 11 HD and so in the upcoming reporting cycle BHD results should be provided directly for MSFD assessment.

Therefore, it is Germany's view and in contrast to other Member States, that there is an urgent need to **harmonise the timing of MFSD reporting and BHD reporting** in a way that newest BHD reporting results can be integrated into MSFD reporting. In the longer term, the timeframes and schedules for assessment should also be harmonised between BHD and MSFD. The necessary modifications need to be made immediately (after the 2019 BHD reports), as they will inevitably have consequences for the subsequent reports and length of monitoring periods. They emphasised that this need is/was also one of the results of the environmental monitoring and reporting fitness check.

German habitat experts have been discussing **whether some aspects of MSFD can be used for the HD assessment of habitats** (e.g. the development of indicators in the Regional Sea Convention areas). They consider that indicators developed for broad habitat types (MSFD) cannot be used in HD and that HD assessments/indicators for specific Annex I habitats should be used in MSFD (for 'other habitats'). However, they did indicate that indices for other habitat types are needed, especially as the MSFD gives the option to assess 'other habitat types' (e.g. habitat types as per HD) together

with 'broad habitat types', but again the approach differs. The German respondents indicated that the country assesses the whole of the seabed, but emphasises that an area was identified as either 'broad habitat type' or 'other habitat type' (the two types not overlapping spatially), and where 'other habitat type' is assessed (i.e. Annex I habitat), the HD assessment is used. In contrast, other MSs only report all areas as 'broad habitat types' (i.e. Annex I habitats are incorporated into the relevant broad scale habitat, as expected).

The **confusion regarding the habitats included, excluded or merged between the directives** urgently needs to be resolved. The German Task Group Benthic Habitat TGCBed is discussing points of integration for broad habitat types and other habitat types (or 'specific habitat types'). Germany distinguishes assessment for other and broad scale habitats in MSFD, where the latter is informed by HD assessment, and a hierarchical approach is used: if there is a specific habitat (Annex I) that is reported in HD, it is also reported in MSFD as a specific habitat on its own, and it is kept separate from the broad scale habitat. There is ongoing discussion whether this is correct and DG ENV consider that it is acceptable to report these separately but that the broad habitat types should cover all of the seabed, in contrast to that reported by Germany (Dr D Connor, DG ENV pers. com.).

As with France and Spain, German monitoring, assessment and reporting and their integration for the three directives has to accommodate two regional seas. In the case of the North Sea and Baltic Sea, there are different systems both environmentally and within the RSC as well as different species to be considered, but the main approach to integration and assessment is the same in the two regions. Germany reuses as much as they can from OSPAR/HELCOM assessments, e.g. birds, but for some [bird] species the OSPAR/HELCOM assessments are amended depending on national data. The OSPAR/HELCOM assessments only use bird monitoring data from onshore, whereas the German assessment also includes data from monitoring at sea although there are proposals that these latter data are also included in the next OSPAR/HELCOM assessment.

The Maltese interviews reiterated the opportunities for improvement mentioned by other Member States. These include the communication with other stakeholders, regional cooperation within Regional Sea Conventions (such as BarCON in the case of Malta), the increased knowledge for some elements or criteria (e.g. deep water habitats, structure and function), and the alignment of the assessment of pressures (in which currently the MSFD is more quantitative, whereas the BHD is more qualitative).

There is the need for a clear indication on how to interpret some criteria and to ensure that indicators are suitable (e.g. for D6C3 and D6C4). However, as indicated especially by the smaller Member States, **more assistance is needed from the EC on methodologies to use for the assessment and the guidance needs to be formalised**, for example on the approach to define and assess thresholds.

Given the above, the Maltese respondents suggest the need for **further research to increase knowledge of habitats which can then be incorporated into future monitoring programme** to fill gaps of knowledge. For example, there is the need for indicators for deep-sea habitats, and of the functioning of reefs and caves (previously there was a preliminary baseline, but this was not sufficient for assessment). Encouragingly, in Malta, a more detailed monitoring is now planned to allow a standardised definition of a baseline for these habitats and for deep-water habitats.

A mechanism is needed to support the European Commission in tackling the differences between MSFD and BHD in approaches, reporting, etc. For example, by constituting **an Ad hoc Group consisting of Experts on MSFD and BHD** that would be able to deal with the MSFD/BHD assessments and by strengthening the work on synergies between these Directives, strategic guidance and closer cooperation between the different internal administrations (dealing with the different directives)

could be achieved. This would strengthen the ongoing and future work of the Group of Experts in the various working groups and widen the legitimacy and impact of their work on streamlining and harmonisation. It is emphasised that action at the EC level will be required before further activities can be effective at national level in a Member State which may be regarded as skills-, funding and data-poor.

Most notably, the integration of assessments between the MSFD and BHD could be improved by **crosschecking the existing reporting obligations to avoid duplications**, to **synchronise the updating cycles**, and **harmonise and streamline the inputs** (e.g. status assessments under MSFD and BHD). This is important to ensure one assessment meets BHD and MSFD purposes. There is the need for a side by side comparison of the reporting fields and associated guidance and a commentary of where and how it could be aligned, ideally heading towards a common structure/format for reporting (each policy will have additional fields that are unique, but there is a lot of commonality that can be exploited).The integration of the flow of information and the reporting inputs such as in WISE, and the streamlining of various water reporting obligations would improve integration of assessments between MSFD and BHD; this could also minimise the administration costs.

Hence, and especially for Member States with a lower capability, **adequate funding is essential to achieve coordination at regional level** in the light of MSFD. In the first cycle this coordination, such as the updated programme of monitoring or setting up Programme of measures, was supported by European Commission projects. In the Black Sea area, only Bulgaria and Romania are Member States of the EU and they do not have the financial resources of more established marine monitoring states, thereby preventing a Regional Sea-wide assessment. This is important for the regional Black Sea scale as even projects that provide 80% of the funds are difficult to be undertaken by the Black Sea countries as they are unable to pay their own contribution of 20%. It is of note that a recent joint project between Romania, Bulgaria, Ukraine and Turkey, was not submitted as some countries could not provide the 20% own contribution. In addition, it was suggested that the EC could play a critical role to harmonise the three Directives and propose the creation of an ad hoc Group of Experts with appropriate funds to undertake the assessments. It is of note that these countries are required to collaborate on MSFD implementation although not necessarily at the whole Black Sea scale.

With regard to the request for additional funding by the Member State interviewees, DG ENV emphasise that Member States take on the responsibility to implement a directive and that internal funding becomes a matter of government priorities. Article 22 of the MSFD states that the implementation of the Directive shall be supported by existing EU financial instruments in accordance with applicable rules and conditions (no dedicated funds have been developed for MSFD, as for many other laws)[57]. However, the EC does actively support Member States in regional coordination through their MSFD grants (and other funding opportunities), with the prime aim of getting them to work together and to do the required developmental work to establish common assessment mechanisms (e.g. via RSCs).

Opportunities may also arise with regard to the **selection of species**, even as surrogates for other groups and to indicate the wider trends under the directives. For example, Spain has suggested that in the case of birds and mammals, it would be very important that the EC advocates selecting species to be assessed under the three directives, and perhaps there is value in designating primary species and secondary species. It is of note that Member States are already obliged to select species under MSFD, based on selection criteria of GES Decision whereas for BHD, the Member

[57] A recent audit by the European Court of Auditors recommended an increase in the use of EU funds (specifically EMFF) by Member States to protect the marine environment (Special report 26/2020).

States have to report on all species listed (which includes all wild birds, all mammals and all reptiles) rather than having an option for selection from BHD perspective.

As with other Member States, Spain also advocated that the BHD and MSFD should have the **same reporting timings** to overcome the current mismatch of one year, which hinders the use of same information for the three directives. It was suggested that ideally there should be a one-year delay in the MSFD so the three directives have the same timing such that the reporting of MSFD could directly and concurrently feed the reporting of BD and HD. However, as shown in the analysis of Member State reporting timelines in Section 3 and Table 51, some Member States delayed their MSFD reports by one or even two years i.e. until the same time or later than the BHD reporting deadline and, in some cases, the same time or later than the actual dates when the Member State submitted their BHD reports.

DG ENV considers that as MSFD requires aggregation of results from species-to-species group level, and because the MSFD is dependent of results across 11 descriptors, it is more appropriate to have individual species and habitats assessed first, hence with the assessment process going from BHD to MSFD (DG ENV pers. comm.). Despite this, if the reporting was harmonised it could actually be the same report at the same time.

There is also the need to have coherence in the geographical scale of reporting. As a further indication of the opportunities, there are plans in Spain to improve this integration in the current reporting cycle (and/or following ones) in which special efforts are being made into having horizontal monitoring programmes that allows obtaining information that can be used both for the MSFD and BHD. Furthermore, in contrast to the past, it is important the data analysis and interpretation of outputs will also be carried out by the same workers.

It is emphasised that potential improvements are ideally achieved by the ability for reporting from one directive to be directly used into the other directives, as it is already happening for the WFD reported indicators which are used directly in the MSFD reporting (the MSFD feeds from the WFD although there should only be a small overlap in the geographical area covered). Currently, it is not fully clear which field from the BHD reporting should be copy-pasted into the MSFD reporting (or vice versa). Hence it is recommended that **a guideline document of MSFD data transformation into BHD** (or the opposite), is needed, so that this is done automatically. In general, drop-down menus or specific content provided as examples would facilitate the reporting in the MSFD, and this could possibly facilitate the integration between BHD and MSFD. This could be achieved by creating a field correlation table, together with ensure each field is fully compatible across the three policies (based on the same architecture for the assessments).

With regard to the species covered by the directives, there are many **species that have supra-national distributions** and so, at least for those species, there would be needed supra-national monitoring programmes, with pooling of Member State resources, regional funding or EC funding support. This would avoid having individuals counted twice. For example, migratory species get counted once while passing through Spain, but if monitoring in Eastern Mediterranean is later in the year, they may also be counted over there, thereby creating biased information for the actual population. Therefore, it would be ideal to have a snapshot of those species at the very same time over the different countries. Double-counting can even occur at national level, when having migrating species (e.g., from North – South) but not having the monitoring programmes occurring at the same time. This double reporting has been seen between Spain-Portugal and Spain-France and collaboration and coordination using agreed protocols between Member States would help to overcome the double reporting. Therefore, there is the opportunity for the EC to improve coordination, both by providing financial support (at least for these species with supra-national distributions) or organizing regional monitoring campaigns, which could be

provided according to marine area, and with management support, in terms of organizing the monitoring timing (i.e. fixing dates for monitoring across different countries). In addition, the EC could contribute further to harmonize monitoring protocols, so all countries proceed in similar manner when monitoring.

As shown here, the Member State interviewees emphasise that greater integration between directives is needed, which is likely to require **greater guidance at EC level otherwise states will continue to implement the directives differently**, which in turn requires guided harmonisation or cross-calibration at a higher (EC) level. It is also recommended here that there is need to have a **common terminology**, for example harmonising the meaning of terms such as Good Environmental Status for the MSFD and Favourable Conservation Status for BHD, and the need to have a **common assessment** that applies to the different directives. **Clear criteria**, whether as trends or absolute indicator values and thresholds, are needed so there is a clear translation and equivalency between the directives. For example, a bird species with an acceptable trend in the BHD should comply to an acceptable index or threshold value in the MSFD. Most importantly, although implemented under different directives, the **effectiveness of the respective management measures** (carried out under the different directives) should be checked to ensure they are equivalent and **the outputs (assessment reports) under the different directives should be the same**.

9 Discussion

This section discusses the integration between BHD and MSFD assessments undertaken by Member States for marine species and habitats, as ascertained from the analysis of the Member State reports (section 7) and from discussions with the Member State stakeholders (section 8). Final conclusions and recommendations derived from the study and aimed at improving BHD-MSFD integration are given at the end (section 10 and 11).

It should be borne in mind that the results discussed here refer to a small sub-sample of Member States (9 out of 22 coastal States), and that, although these were selected to reflect the variability (size, region, etc.) present within the EU, considering the full set of Member States might highlight possibly different patterns and/or issues in the assessments. In addition, while the project was generally focused on the assessments of marine fish, birds, mammals, reptiles and benthic habitats from 'open sea and tidal areas', the detailed analysis of the technical characteristics of the assessments and their integration between BHD-MSFD was not undertaken for fish (due to the lack of species commonly assessed by Member States under both HD and MSFD), and, as for the other groups, it was undertaken on a selection of species and habitats only. Another caveat is that the analysis was primarily based on the Member States reports submitted under BD (Art. 12), HD (Art 17) and MSFD (Art. 8 and 17) in the latest reporting cycle, and therefore aspects related to how the information is provided in those reports may also have contributed to the observed results (e.g. lack of details for some aspects as for example monitoring).

9.1 What has been assessed, where and when

9.1.1 What is being monitored/assessed and where? What are the commonalities, overlaps, inconsistencies and gaps?

Adequate information on the biodiversity components monitored and assessed under BHD and MSFD was readily available from the reviewed reports produced by Member States (e.g. species or habitats assessed, parameters or criteria used). However, details on the supporting physico-chemical data were sparse and therefore this latter aspect of the assessments could not be ascertained. The EC emphasises that such parameters (temperature, salinity, pH etc) are monitored under MSFD but would not be reported against biodiversity components but rather at ecosystem level (perhaps D4) or only in monitoring programmes and used as supporting data. Some abiotic characteristics of habitats could be assessed but seem rarely to be used as indicators of habitat quality. Therefore, this section focuses solely on biodiversity components.

Both BHD and MSFD require the assessment of species of marine birds, mammals, reptiles and fish, and of benthic habitats. As conservation policies, BHD are more prescriptive in identifying specific species and habitats that are more at risk and that need protection (listed in the annexes of the directives), hence assessment. MSFD is a framework policy focusing on the sustainable use of the marine environment, and, as such, is equally prescriptive in the need for assessments but this is at a higher level of organisation for mobile species (i.e. species groups) and according to a different type of typology (i.e. linked to the structure typology of EUNIS at level 2) compared with BHD. However, it leaves more freedom in the choice of marine species and habitats to be assessed, using them more as proxies for the ecological functions, habitat associations and vulnerabilities to anthropogenic pressures relevant to the marine environment within the Member State territory. As such, a wider range of marine species and habitats can be considered for MSFD assessment compared to BHD, especially marine fish, for which few species are covered in the HD Annex II, while all marine bird, mammals and reptiles are covered by both BHD and MSFD. It is noted that there is a requirement to use the HD Annex II species for MSFD elements, and to reuse HD assessments 'wherever possible', with specific linking of the criteria, but this needs also to consider the overall requirements of the MSFD and the EC Decision

2017/848 (e.g. regional assessments to consistent methods, regionally agreed thresholds).

Under both BHD and MSFD, Member States report assessments at the individual species or habitat type level. There were only a few exceptions, always regarding birds, where MSFD assessments were reported directly for a group of multiple species (e.g. surface/pelagic feeding birds) rather than for individual species (Finland in the Baltic, and Spain in the Macaronesia subregion). In the case of Finland, this was due to the reuse of the results of HELCOM assessments undertaken at this functional group level. However, these examples are not actually conforming to MSFD reporting requirements.

Of the biodiversity components considered in this study, birds and mammals appear to be widely assessed across directives and Member States, with more than half of the species assessed under BHD also reported under MSFD by the sample of Member States. The species most frequently reported by Member States under both directives are surface feeding birds such as terns *Sternula albifrons* and *Sterna hirundo,* and the Scopoli's shearwater *Calonectris diomedea*, and small toothed cetaceans such the bottle-nosed dolphin *Tursiops truncatus*, the harbour porpoise *Phocoena phocoena*, the short-beaked common dolphin *Delphinus delphis,* and the striped dolphin *Stenella coeruleoalba.* This is possibly related with the higher detectability of these species (hence availability of data for the assessment) compared to other marine birds or mammals (e.g. baleen whales).

In turn, fish are the biodiversity component that is least integrated between HD and MSFD assessments. This component is sparsely reported by Member States under HD as there are few species under HD to be reported, and where this happens the few species reported under HD (and mentioned in the HD annexes) are migratory species (e.g. sturgeons) or endemic coastal species (e.g. the spanish toothcarp *Aphanius iberus*) that are not necessarily reported in MSFD assessments. MSFD focuses on a wider variety of marine fish species, that, although of no or limited conservation interest, reflect their higher combined relevance to biodiversity (Descriptor 1), food webs (Descriptor 4) and commercial fish (Descriptor 3), and therefore the wider perspective on environmental status used in MSFD. DG ENV suggests that MSFD fish selection has to cover the four functional groups (hence is much wider than HD), but also to follow the GES Decision selection criteria, such as well representing the functional group and representing key pressures (where threated species could be good indicators).

A low degree of species overlap (<25% reuse) between HD and MSFD also occurs for marine reptiles. In this case, as well as in all the specific cases where a bird or mammal species assessed under BHD was not assessed under MSFD, the main reason for the lack of reuse of species assessments appears to be related to limitations in data availability. In fact, the BHD species that were not reported under MSFD were mostly designated as in 'unknown' status under BHD due to insufficient data, often due to the occasional or transient nature of the species in the territorial waters of the Member State. It is of note that as MSFD indicators generally need monitoring data for solid assessments and so rare species (which by definition have fewer data) are often omitted.

As regards habitat assessments, the low overlap observed between HD and MSFD regarding the identity of habitats assessed (27% reuse) is mainly ascribed to the lack of harmonisation in the habitat definition between the two directives and to the limited spatial coverage of the marine habitats under HD. The overlap is apparent where a Member State includes HD Annex I habitats as 'other habitats' assessed under MSFD, but, most often, Member States report on the benthic broad habitat types under MSFD as required by in the GES Decision, as reporting of HD habitats is optional. Whether there is a correspondence or partial overlap between these broader habitats and the HD Annex habitats is unlikely to be consistent, as the approach to define a HD habitat

for the purpose of assessment and monitoring is left to the Member State. For example, although deviating from MSFD requirements, Germany classify areas of their seabed as either 'broad habitat type' or 'other habitat type', the latter possibly including Annex I habitats as defined for HD, whereas Malta explicitly incorporates the Annex I Reef habitat (as 'Algal dominated infralittoral rock and reefs') in the MSFD assessment of the relevant broad benthic habitat 'infralittoral rock and biogenic reef'.

Of all the Member States considered, Estonia appears to be the country where reuse of species and habitat assessments is undertaken most comprehensively. All birds, mammals and habitat types considered in the analysis for reporting under BHD are also reported under MSFD.

It is emphasised, as a limit to comparisons of species between countries, the geographical distribution of the assessments across Member States can only reflect the biogeographic distribution of the species and habitats across regions (e.g. *C. diomedea* is a species that breeds in the Mediterranean and therefore it is reported under BD and/or MSFD only by those Member States having territorial waters in this region, such as Malta, Croatia, France and Spain); similarly, *Posidonia* beds are only reported in the Mediterranean, where this seagrass species occurs). In addition, it must be considered the fact that these results are obtained for a limited number of countries.

9.1.2 What are the similarities and differences in scales used? Do the scales affect the assessments?

9.1.2.1 Spatial scale

The spatial scope of the assessments is dictated by the directive requirements. Reporting under BD refers to the whole Member State territory, reporting under HD is undertaken by biogeographic region within the Member State territory, and reporting under MSFD requires status assessment to be at ecologically relevant scale, so variously at regional, subregional or subdivision scale, depending on the species group, and a biogeographically relevant scales for seabed habitats (i.e. as subdivisions of each region or subregion). Despite this difference, the actual spatial scale of the reporting units for assessment is often consistent between directives, especially for Member States with smaller territories falling within a single region or subregion (e.g. Malta, Estonia, Croatia). In some cases, geographical subsets of the reporting unit are consistently used for assessment under two directives (e.g. boundaries of the relevant Natura 2000 areas in the Atlantic used by the Netherlands to identify the boundaries of the assessment area for terns and avocet assessments under both BD and MSFD). The higher variability (and possibly discrepancy) between the scale of the assessments under BHD and MSFD occurs most often for those Member States with wider coverage within and across multiple regions, hence encompassing multiple subregions (in some cases reflecting RSC assessment areas within a region, e.g. OSPAR assessment areas used for the French MSFD assessment of mammals in the Atlantic region) and possibly subdivisions.

Member States design their own marine reporting units (MRUs) to report MSFD assessments (within regions/subregions/subdivisions) and those units can be used for one or more biodiversity component. The assessments of highly mobile species such as mammals and reptiles often reflect such large scales, with data collected throughout the whole region/subregion via standardised transect monitoring at sea. However, the resolution and scale of the data collection (hence informing the assessment) in some instances may be smaller (e.g. BHD requires distribution maps at a standardised resolution of 10x10 km, or smaller in smaller Member States). Monitoring programmes undertaken at the national spatial scale are often used to inform the assessments under both BHD and MSFD, with the highest level of coordination observed for bird monitoring in all regions, likely reflecting the need to collect data reflecting the wider, integrated scale of BD assessments. The use of the same monitoring programme to inform both directives ensures consistency of spatial

and temporal scales of data collected for the two assessments, with aggregation or disaggregation of data (e.g. between regions and subregions) likely adapted to the specific reporting unit relevant to BHD or MSFD.

The data collection may also be restricted to areas covering only part of the MRU, although this appears to be influenced by meaningful ecological consideration of the component being assessed. For example, when assessing breeding birds (under both BD and MSFD), the monitoring focuses on the coastal colonies of the species in the Member State territory, considering that breeding pairs occur and are most efficiently assessed in these areas. Considering the conservation value of the bird species being assessed, such colonies are most often (but not necessarily always) included in special protected areas for the species, the data obtained from those areas being representative of the distribution of the resource within the Member State territory included in the relevant MRU. In some cases (e.g. monitoring of terns by France, of grey seals by Estonia), the national monitoring undertaken by a Member State to inform both BHD and MSFD was also integrated with additional monitoring providing more detailed data for specific areas (e.g. subregions) or other life stages (e.g. bird distribution at sea assessments) specifically for MSFD assessments, in line with the finer spatial dimension of the MRUs under this directive compared with BHD. Similar considerations apply to the assessments of benthic habitats (focusing the data collection in sub-areas of the MRU where the resource occurs, often included in protected areas (e.g. SACs) where the relevant Annex I habitat occur), and to marine mammals and turtles (e.g. considering the known distribution of the migration routes for species that are transient in the Member State's waters). The information examined from the Member State reports did not allow to ascertain the proportion of data used that came from protected areas.

DG ENV indicate that most birds, mammals, reptiles and fish should be assessed at a broader scale than national territory for MSFD, according to the Commission Decision 2017/848 (European Commission 2017), to respect the need to assess whole populations. The spatial scale at which habitats are delimited influences integration of assessments under HD and MSFD (as mentioned in the previous section). The respondents considered that this discrepancy needs to be resolved at both EU-level and through international cooperation, in order to clearly define the boundaries and overlap between broad benthic habitats (MSFD) and HD Annex I habitats. Clear guidance is needed on how these are to be distinguished or integrated for the habitat assessments under HD and MSFD (e.g. by using Annex I habitats as proxies for correspondent broad benthic habitats to maximise reuse of data). Support has been provided by the EC in the form of cross-walk correlations of habitat types. The possibility to develop ways to relate the habitats spatially and to reuse aspects of HD assessments was highlighted during the interview with German stakeholders that such discussions are ongoing within Task Group Benthic Habitat (TGCBed).

9.1.2.2 Temporal scope

The temporal scope of the assessments was generally consistent between BHD and MSFD, in that data from multiple years collected within or across multiple reporting cycles were used, although reptile assessments appeared to be restricted mostly to the latest reporting cycle.

Trends also contributed to the assessments, although their use is less consistent in MSFD assessments compared to BHD. This is likely due to a difference in reporting requirements (trend assessment is explicitly required by BHD reports, whereas MSFD assessments mostly rely on a threshold-based approach as well as possibly reporting trends). Short-term trends (from one 6-year cycle to another) are most often reported, denoting the data limitations to assess long-term trends for most species and habitats. However, the scale at which short/long term trends are defined may differ substantially between BHD and MSFD, especially for bird assessments. In fact, when trends were estimated in both directives, short-term and long-term trends

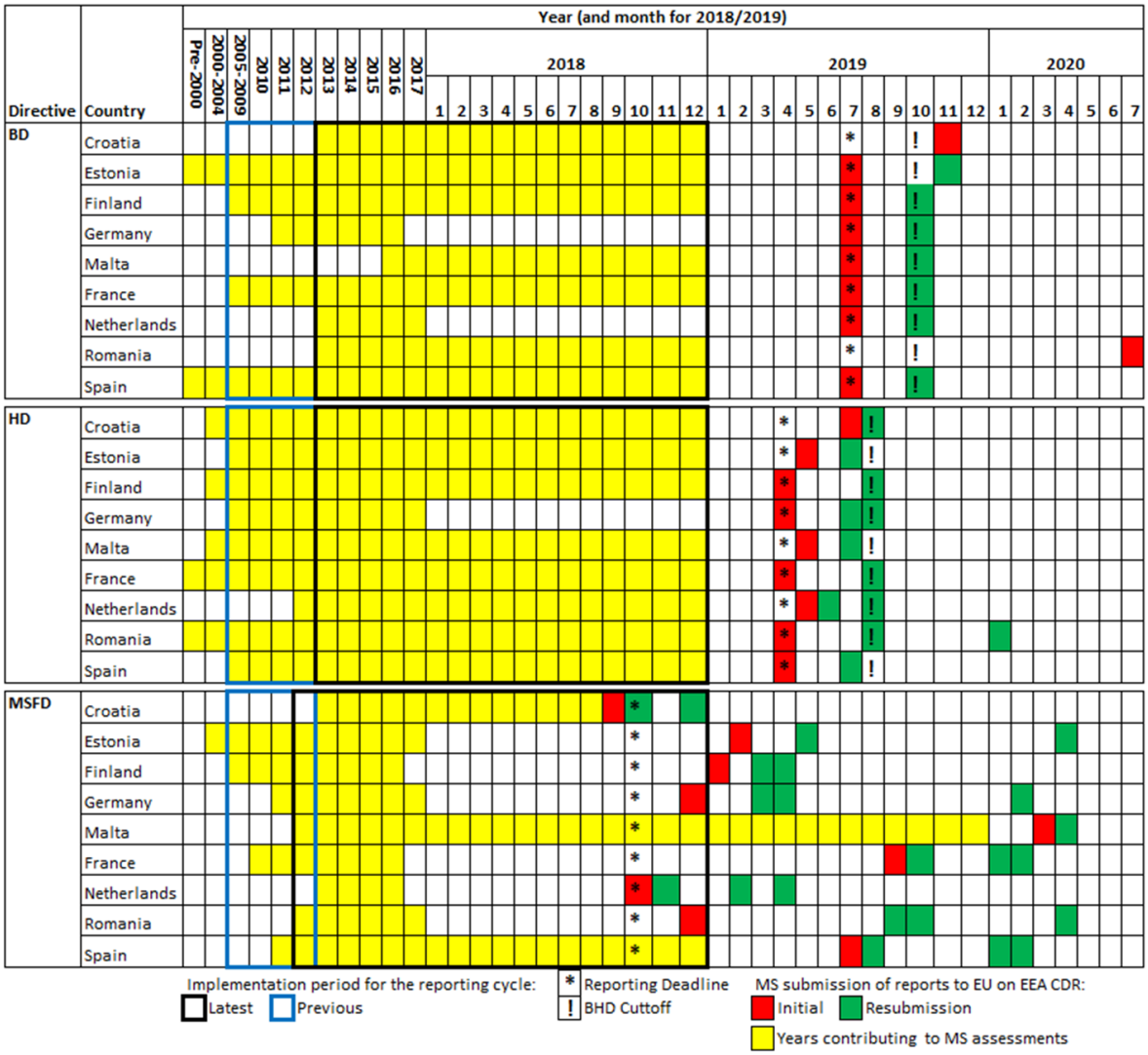
reported for population size and range distribution under the BD covered a period of 10-16 years (12 years most frequently, mostly between 2006/7 and 2007/18) and of around 35 years (30-39 years, mostly between around 1980 and 2016-2018), respectively, whereas MSFD bird assessments for comparable criteria (D1C2 and D1C4) only reported short-term trends likely to span a 6-year period across the last two reporting cycles, as required by the MSFD. The MSFD Guidance Document 14 refers to Trends in order to indicate whether there is improvement or deterioration or stability compared with the previous 6-year reporting period; the trend is particularly important in cases where a threshold value is not yet available. It is also particularly relevant given that environmental status can be slow to respond to measures and so a trend can give an indication that progress is being made towards GES, even if not yet reached.

When considering the timescales of the assessments undertaken by the Member States across all the biodiversity components in relation to the reporting dates (see Table 51 and time-line figures given for the different Member States in Section 3), a higher consistency across Member States was evident for BHD reports than for MSFD reports. Most Member States submitted their BHD reports by the reporting deadline (with resubmissions by the cut-off date). These included the assessment of data up to 2018, the length of the actual assessment period covering the full implementation period of the latest reporting cycle for BHD as a minimum (2013-2018), but often including data from previous periods (back to the early 1980s in most cases, where long term trends were assessed). The timing of report submission under MSFD was more variable across Member States, most often showing a delay in the first submission ranging between 2 months (Germany and Romania) and 17 months (Malta) after the October 2018 reporting deadline, and resubmissions up to 18 months after this deadline.

The variability in MSFD report submission timing also corresponds to a variability in the assessment periods. Member States who submitted earlier tended to include data up to 2016-2017 (e.g. Romania, Estonia, Finland, Netherlands). Later submission often allowed for the inclusion of more recent data in the assessments, up to the end of the implementation period of the latest reporting cycle (2018; e.g. Spain) and even later data (2019; e.g. Malta). Croatia was the only Member State of those considered that managed to include 2018 in the assessment period while also submitting the MSFD report by the deadline in the same year.

Additional aspects of how the temporal scale affects the integration of assessments between BHD and MSFD, with particular regard to timing issues and lag between reporting periods, were addressed during interviews with stakeholders (see section 9.4).

Table 51. Overall reporting and assessment timescales for the sample of Member States (for the most recent completed reporting/assessment period).



Note: The assessment period is expressed as maximum range of years over which the parameters/criteria were measured and assessed under BHD and MSFD across all species/habitats considered, as obtained from the template analysis. The actual reporting period is given as the time range over which each Member State has delivered the text report and associated files relevant to each directive (source: Eionet, DG Environment). The reporting deadline is as per EU guidance.

9.1.3 What is the MSFD's GES Decision relationship with BHD in practical terms? Are there inconsistencies in the final conclusions from the assessments? Why?

The comparison of status assessment outcomes between directives was undertaken for HD and MSFD. BD does not require the bird species status to be assessed by Member States, hence no comparison of status was undertaken for BD and MSFD.

For habitat assessments, where the same HD Annex I habitat was assessed by a Member State under both HD and MSFD, in general the habitat status outcomes were fully consistent between directives. In contrast, some variability was observed when comparing possibly similar (but not exactly corresponding) habitats such as HD Annex I habitats and MSFD broad benthic habitats. These discrepancies were likely

affected by the different spatial scale at which these different habitats are defined (and hence assessed) under the two directives.

For species assessments undertaken under both HD and MSFD, almost half of the assessments for mammal species and a third of the assessments of reptile species appeared to be inconsistent between directives. For mammals, most of the inconsistencies occurred in the assessment of *T. truncatus*, and especially in cases where assessments were based on population size and they were reported at the subregion (e.g. France/Atlantic subregions), or subdivision level (e.g. Spain/subdivisions within subregions in the Atlantic and Mediterranean) under MSFD, compared to the regional assessment within national territory under HD. This suggests that the scale at which the assessment is undertaken greatly influences the status assessment outcome, and therefore the degree of integration between BHD and MSFD. In the case of the assessment of *T. truncatus* by France in the Atlantic region, the use of different indicators for population size also contributed to the observed inconsistency on the assessment results between HD and MSFD. It was noted that this difference was ascribed to the use in MSFD of the indicator derived from RSC assessments, hence showing how the regional coordination of MSFD with RSC assessments may hinder the integration between BHD and MSFD (as also observed when RSC assessments for groups of species are used in MSFD; see section 9.1.1). In turn, the discrepancy observed between HD and MSFD status assessment outcomes for reptiles was mainly due to the assessments of *C. mydas* by Spain (in Macaronesia) and the discrepancy being ascribed to a difference in the main parameter/criterion (Habitat for the species for HD and D1C2 Population abundance for MSFD) that determined the assessment result for the species.

The BHD also requires Member States to report on pressures and threats, and these effectively contribute to the overall conservation status assessment of a species or habitat, via the additional parameter 'Future prospects' (which is based on current status, reported pressures and threats, and measures being taken for each of the other three parameters). There is not an equivalent criterion defined for Descriptor 1 in MSFD, where pressures are only reported at the feature level (i.e. for the functional group of species or habitats), but they do not directly contribute (as a specific criterion) to the status assessment at species/habitat level. This difference between directive requirements is one additional element that may lead to inconsistencies in the assessment results for the same species between directives, as evident for example for the assessments of *T. truncatus* by Romania (see section 7.3.2 for details).

9.2 How assessments have been conducted (assessment methods/approaches)

9.2.1 What indicators are being used under each of the directives? Are they the same / giving the same information? If not, could they be?

Under both BHD and MSFD, Member States undertake assessments of species/habitats by using characterising parameters (BHD) and criteria (MSFD) that are measured and reported using appropriate indicators. Under HD and MSFD, these are assessed to obtain a categorisation of the status (conservation status and environmental status, respectively).

9.2.1.1 Correspondence between reported BHD parameters and MSFD criteria.

The species assessments under MSFD use a range of criteria defining the state of populations (D1C2-D1C5) and impact on them (bycatch as D1C1). The state criteria are those that have a direct correspondence with parameters used under BHD for species assessments, and particularly measures of population size/D1C2, distribution range/D1C4, and habitat for the species/D1C5.

For benthic habitats, characteristics such as distribution, range and condition are assessed under both HD and MSFD. HD parameters characterise the habitat state (e.g. its distribution range and area) together with the impact (on structure and functions). MSFD criteria mainly address anthropogenic impacts on the habitat (habitat loss or adversely affected in D6C4 or D6C5, respectively). Therefore, the correspondence between HD parameters and MSFD criteria for benthic habitats is only approximate, possibly accounting for differences in the habitat assessments under the two directives but additional to the different definitions in habitat typology between the directives.

9.2.1.2 Reuse of indicators between BHD-MSFD and from other assessments.

Member State reports demonstrate that HD parameters for species assessments are occasionally reused to estimate MSFD criteria (in less than a third of the assessments). In particular, to characterise the distribution (D1C4) or habitat (D1C5) of mammal species (e.g. assessments by Germany for grey seal), or the population size of reptile species. However, a wide range of indicators is used across Member States for MSFD species assessments, with indicators from RSC assessments also being explicitly used particularly in the Atlantic (to assess bird abundance, and mammal abundance and distribution) and in the Baltic (for mammal abundance and distribution). These may not show an exact correspondence with BHD parameters (e.g. being based on relative rather than absolute abundance estimates), but they are likely to be informed by similar type of data (e.g. counts of individuals of the mammal species sighted at sea).

There is no direct reuse of HD assessments of habitat range and area to inform MSFD habitat assessments of D6C4. This is partly due to the lack of an exact correspondence between HD parameters and MSFD criteria for benthic habitats, as mentioned above. Another reason is that the habitats assessed under HD and MSFD mostly do not correspond to each other. However these assessments require similar data (e.g. habitat extent), hence the overlap of monitoring programmes collecting data to inform both directives. This overlap is only related to the assessment of Annex I habitats when these are also reported by a Member State under MSFD (this only occurred with 4 out of the 9 Member States considered in this study). In these cases, reuse of data and assessments from other assessments (e.g. WFD ecological status assessments) was often observed with regard to the parameter/criterion addressing the habitat condition/quality under both directives (Structure and functions in HD, D6C5 in MSFD).

9.2.1.3 Gaps in the assessments

While the BHD species parameters required are always estimated in the BHD reports, there are several gaps in the estimation of indicators for criteria reported under MSFD. The most prominent gaps in MSFD assessments are for the distribution (D1C4) of bird species, and the habitat (D1C5) of mammal and reptile species. These are often reported as 'not assessed' under MSFD. The habitat for the species (D1C5) is also the parameter/criterion most often reported as in 'unknown' status by Member States under both MSFD and HD directives and across all biodiversity groups.

Reported information under MSFD and BHD tends to focus on population size for marine species and more rarely considers whether the habitat is being damaged (e.g. loss of haul out, breeding and feeding sites, exclusion from some areas due to underwater noise) and links to human activities that are deteriorating the habitat of the species.

Of all the biodiversity components considered, marine reptiles are the least reported species, with the highest incidence cases designated as 'unknown' or 'not assessed' status. These cases are particularly evident for parameters/criteria assessing the species' habitat under both HD and MSFD (Habitat for the species/D1C5), as mentioned above, but also for population demographic characteristics (D1C3) and population size (especially under HD).

The lack, or inadequacy, of the data available is the main reason for gaps in assessments. The lack, or inadequacy, of data is probably influenced by the distribution of the species and their variable occurrence and detectability in the territorial waters of Member States (e.g. transient/occasional nature of *Stenella coeruleoalba* and *Balaenoptera physalus* in Maltese waters). Regional patterns in species distributions are also reflected in the distribution of the assessments (e.g. reptiles were not reported in the Baltic and Black Sea, as they are rarely present in these regions).

The absence of an indicator or assessment method defined by the Member State may also be a reason for gaps in assessments. In particular this appears to be the case for the species habitat criterion D1C5 under MSFD (e.g. mammal assessments by France).

These findings highlight the need to improve monitoring data collection and method standardisation to support the assessments under both BHD and MSFD, particularly for bird distribution, mammal habitats, and reptile parameters/criteria overall. Effective regional coordination would be needed to improve the standardisation of methods for assessment and monitoring to fill gaps of knowledge; for example, through continuous and enhanced collaboration with organisations such as ACCOBAMS and ASCOBANS who are already engaged in monitoring marine mammals.

The higher incidence of assessments gaps in MSFD assessments compared to HD, may be a result of the more quantitative assessment approach of the MSFD. Lack of sufficient data is more likely to be an impediment to assessment where a quantitative estimate of the indicator is required, as under MSFD, compared to the qualitative assessment of trends, mostly based on expert judgment, as often used under HD (although these also often result in the designation of 'unknown' conservation status under HD). The difference in approaches to assessment is also evident in the reporting requirements of the two directives. For example, Habitat for the species is reported under HD as a qualitative expression (as yes or no) of the sufficiency of area and quality of occupied habitat. In turn, more quantitative indicators of habitat condition/quality and extent are required for assessing D1C5 under MSFD (although the detailed nature of these indicators is often unspecified in the MSFD reports).

9.2.2 How do Member States integrate indicators or parameters?

Both HD and MSFD require that the status assessments undertaken for the parameters or criteria of a species or habitat are integrated at the whole species/habitat level (with further integration at functional group level under MSFD, but this was not considered here as it is not comparable with HD assessments).

The 'one out all out' (OOAO) rule is the most common approach used in both HD and MSFD to integrate the status assessments from parameter/criterion level to the species/habitat level. This is the assessment characteristic that is probably best integrated between directives. The HD guidance gives clear direction towards using this method, through the provision of an algorithm to follow in order to combine conservation status assessment results between parameters into an overall conservation status for the species and habitat. A wider choice of integration methods is allowed in the MSFD, but the OOAO is the only method used in mammal and reptile assessments where integration is required (i.e. where multiple criteria are assessed for the species). The GES Decision requires the use of HD methods for all HD species. The OOAO approach is also used to aggregate assessment results under other legislation (e.g. integration of ecological status assessment between biological quality elements in a water body under the Water Framework Directive), and therefore familiarity of the Member States with this approach may have favoured its use.

The above considerations apply especially to the assessments of marine mammal and reptile species. The information on integration rules provided in MSFD habitat reports was scarce, and therefore an assessment of the degree of harmonisation between directives for this biodiversity component could not be undertaken. However, in some

instances (e.g. Reef assessments by Estonia) the integration method used under MSFD (hierarchical weighted average) differed from the one applied under HD (OOAO), as the former was derived from a regional approach used under RSCs assessment (specifically following the HELCOM HOLAS II BEAT 3.0 approach). Although in this instance there was no evidence of an effect of the different integration rule on the overall outcome for the habitat status assessment (resulting in a favourable conservation status and a good status for the Reef habitat under HD and MSFD respectively), the degree to which this choice may affect the designation of status for species and habitats is unclear. Therefore, if using a precautionary approach, efforts should be made to ensure standardisation of the integration rule between directives. As this is clearly defined under HD, MSFD assessments could adopt the same approach for integration to ensure the same outcomes.

9.2.3 Do Member States use the same logic and approach in determining threshold values and reference values? How does this relate between BHD and MSFD and what is done at the RSC level vs Member State level?

The HD and MSFD reports for species and habitat assessments did not often detail the criteria and approaches for estimating thresholds. Despite the reporting format being standardised at EU-level, the information regarding thresholds was often not given in the standardised HD and MSFD reports (fields left blank), without any indication of the reason why. For example, in the HD species and habitat reports, Favourable Reference Values (which should be used as thresholds for the assessments, according to HD reporting guidance) were seldom specified, but their use was inferred from the indication of FRV operators (e.g. an operator 'approximately equal to' suggested that the FRV was set to a value comparable with the one estimated for the parameter in the reporting period). Therefore, a higher degree of expert knowledge and judgment was used by the team of experts in interpreting and evaluating the information provided in the HD and MSFD reports regarding this aspect of the assessments.

Where the information gathered on the assessment approach allowed a comparison of the use of thresholds between HD and MSFD assessments, reptile assessments showed again the lowest level of integration between directives compared to the other biodiversity components. This was mainly due to a higher incidence of the use of expert opinion to establish thresholds for the species parameters under HD, especially for the population size and range parameters, which often resulted in the designation of an 'unknown' status for the parameters and for the species as a whole. Monitoring data (alone or in combination with expert opinion and literature review) were predominantly used to establish thresholds for MSFD assessments of reptile species instead, although it is of note that MSFD assessments were only undertaken for a third of the HD turtle assessments. MSFD assessments were mostly reported for those turtle species with higher abundance/occurrence in the country territorial waters, hence with better data availability, although in the majority of cases this was still inadequate to allow a status assessment other than 'unknown' under MSFD, thus again emphasising the need to improve monitoring effort to fill this gap in the assessments.

As regards the harmonisation of the use of thresholds between HD and MSFD assessments and with the RSC assessments, it is of note that the information gathered about the reuse of RSC thresholds was limited to those cases where this was made explicit by the Member State in the BHD and MSFD report. These were mostly related to mammal assessments, where RSC indicators and the associated thresholds for mammal population abundance and distribution (D1C2 and D1C4) were used under MSFD, although no indication of such standards was found for correspondent HD assessments, with FRV apparently established primarily based on national standards (although this was seldom specified in the Member State reports). A limitation in the reuse of RSC thresholds for HD may be ascribed to the specific reporting requirements, where the required indicator for HD parameters (e.g. population size as

number of individuals) may differ from the RSC indicators assessing similar population characteristics (e.g. relative abundance of *P. phocoena* within community), even though they may be supported by common monitoring data (e.g. mammal assessments in the Baltic). A limitation in the direct reuse of RSC thresholds for MSFD may be ascribed to a mismatch between the baseline-based approach used for the evaluation of many of the RSC indicators (i.e. with comparison against a historical or modern baseline that identifies as specified/known state at a point in time; Palialexis 2018, Palialexis et al. 2019) and the requirements of the MSFD for an approach based on reference conditions (i.e. with comparison against a threshold that is set based on an acceptable level of deviation from a reference condition (a state where impacts are negligible), thus reflecting sustainable use of the environment while ensuring long-term viability of the biodiversity component). As highlighted by the European Commission (2017), the use of (baseline-based) thresholds may be suitable to assess achievement of environmental targets under MSFD (i.e. feasible short/middle/long term milestones to achieve good status by approaching a reference condition), but not for GES assessment under MSFD, for which a reference condition is required.

9.3 Monitoring to support assessments

9.3.1 Are monitoring strategies, methods, spatial and temporal scales, and intensities comparable across the directives and Member States? Do they generate compatible data sets? Can greater harmonisation be achieved?

Analysing monitoring programmes undertaken by Member States in detail was not within the scope of this project, and information on monitoring was extracted mainly from the Member State reports, together with literature cited therein and as integrated through stakeholder interviews. The information on monitoring (especially specifics on data collected) was not always readily available in the Member State reports used in this study, and a degree of expert knowledge and judgment had to be used by the study team in assessing this aspect of the assessments compared to others. Details on the supporting physico-chemical data were particularly sparse and therefore this aspect of the assessments could not be undertaken.

A clear effort was observed for Member States to optimise monitoring strategies such that data could be collected simultaneously to inform assessments of both BHD and MSFD. The highest level of coordination was observed for the monitoring of birds in all regions. Harmonised BHD-MSFD monitoring programmes were mostly coordinated at national level. A single national monitoring programme covering multiple years within the latest reporting cycle, and often continuing from previous monitoring was used, although the integration of multiple monitoring projects was more frequent in the studied Members States, likely reflecting the ways funding was sourced.

These monitoring projects often focused on specific species or habitats, different survey areas within the territorial waters, different years within the reporting period, and different monitoring platforms. For example, the French national and regional census of breeding birds to monitor terns and the Scopoli's shearwater in both the Atlantic and Mediterranean for BD and MSFD was integrated with observations from oceanographic ships within the PELGAS surveys within the Bay of Biscay, and the marine megafauna aerial survey (SAMM) covering zones of the French part of the Channel in the Atlantic North Sea subregion, the Atlantic Celtic Seas subregion, and the Western Mediterranean Sea subregion, providing additional data on common tern population distribution. Maltese monitoring also relied on multiple LIFE projects (e.g. LIFE BaĦAR for N2K project, 2015-2016) combined with a European Maritime and Fisheries Fund (EMFF)-funded project (2017-2018) to collect data on multiple species and habitats with different methods (e.g. scuba diving, remote video seabed mapping), within the latest reporting period, and which informed both BHD and MSFD assessments. In some cases, the use of smaller scale (spatial and temporal) monitoring (i.e. focusing on a specific survey area, or undertaken as a one-off within

the reporting cycle) has been used as a way to further integrate MSFD assessments, likely reflecting the need for assessment at a finer scale (subregion/subdivision) under this directive, compared to BHD.

Although multiple methods may be used by a Member State to collect data on the same habitat or species, the variety of methods appear to be consistent between directives, possibly due to the high incidence of common monitoring programmes informing multiple directives. The methods used are generally consistent across Member States, reflecting monitoring standards associated with the specific biodiversity components being assessed. As a result, remote/observation surveys are predominantly used to monitor birds, mammals and reptiles (e.g. boat-based systematic transect surveys, acoustic surveys), and benthic habitats (e.g. scuba diving, especially for reefs) to inform both BHD and MSFD assessments, with opportunistic sightings (during other surveys or activities, e.g. fishing) also being used to qualitatively integrate the data on megafauna distribution and range. Although national standards have been reported to inform monitoring methods in most of cases, on occasion a clear reference to the use of RSC standardized methods (e.g. for mammal monitoring in the Baltic and Atlantic) or internationally accepted methods (e.g. for birds) was made.

9.4 Key issues raised in interviews

In general, and across the interviewees from the different Member States, the integration between MSFD and BHD assessments was judged as being moderate with some ranked as good. However, most countries agree on the need to further harmonise BHD and MSFD. The respondents from several of the Member States acknowledged the large effort and resources mobilised in implementing the directives, especially the MSFD since 2012.

The respondents requested that greater instruction, direction or guidance from EU, RSC or higher national levels would support enhanced integration. The ability to harmonise the mechanisms and outputs of monitoring, assessment and reporting is highly dependent on the instructions provided to the Member States. Some countries, such as Malta, considered the instructions from the EC to be appropriate and adequate and thereby facilitate the integration of MSFD-BHD (e.g. by establishing equivalence between MSFD criteria and BHD parameters). However, they still had to take their own initiatives to integrate the two processes further and, in the MSFD report, report and explain possible deviations from the HD assessment. Germany was considered by its respondents to have a high level of integration in part attributed to the adequacy of instructions received from the EC, the clarity of the assessment instructions, and the information and data available inside the country. This contrasted with opinion from several other countries which considered poor and unclear instructions from, especially the EC, and the lack of data at the Member State to be reasons for poor integration of the directives.

The tripartite links and coordination between the EC, the Member States and the RSCs also influence the implementation of the directives. For example, in the case of the Barcelona Convention (BarCon), the HD reports are at the national level and despite the need for regional cooperation being highlighted, there is no integration at regional level (e.g. for the bottle-nosed dolphin *Tursiops truncatus*) and so no population-wide assessment. The ecosystem approach is implemented by BarCon to align with MSFD (with similar objectives, albeit adapted to the Mediterranean) and a species approach is adopted by BarCon thereby tending towards the aims for the HD. Effort is made, albeit unsuccessfully, to ensure monitoring is agreed at the regional scale with coordination meetings, using IMAP (Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria) (DG ENV note that BarCon have agreed monitoring protocols and are developing data standards for transmission of data from country level to their INFORAC system.) Moreover, there are anomalies due to differences in scale requirements. Although

marine mammals are assessed for HD (e.g. *Tursiops* is in favourable status in Maltese waters), the interviewees indicated that they are reported as 'not assessed' for MSFD because of the mismatch between the spatial scale of monitoring and assessment and region/subregional scale of assessment required by MSFD.

Organisational barriers limit integration between MSFD and BHD assessments. There is insufficient coordination between competent authorities, including between national central bodies and the regions. Several countries had different bodies responsible for the different directives which led to disjointed monitoring and assessment created by competing demands. The MSFD and BHD are reported under different departments (e.g. in Spain), and there are no instructions for specific coordination. Therefore, coordination is often only carried out because of the willingness of people working under the different teams. Coordination and integration should be formally established so that it is not dependent on the continuation of informal working relationships of individuals.

As an example of a relatively small country and with a lower level of resources, the Estonia data were both fragmented and lacking and the monitoring, assessment and reporting were the responsibility of different organisations. Some data are covered by national monitoring, whereas other data come from projects which limits accessibility. There is also a lack of experts and manpower in some topics and problems of distribution of activities inside and between organisations.

Malta achieves a high level of integration as the same datasets and same elements are used as much as possible although there are some uncertainties and limitations in the data yet to be addressed. It is an advantage that discussions are undertaken in an inter-ministerial committee and there is a common authority (the ERA) that handles both MSFD and BHD and where the teams easily share information (hence leading to the optimisation of resources/ manpower).

In the case of Germany, integration is in large part achieved as the monitoring and assessment of biodiversity components in both the BHD and the MSFD are Federal competencies although the remainder of the MSFD is implemented under other bodies.

The Netherlands has strategic documents and integrated monitoring and reporting approaches stemming from all three directives, as far as possible, as well as being regionally coordinated with the OSPAR. The Netherlands considers it has optimally coordinated both monitoring and assessment for the MSFD with the BHD and also with the WFD and CFP. They consider that even with the further elaboration of any gaps/developments, the links between the various guidelines / agreements will always be safeguarded.

Differences in directive requirements. The nature of the directives and their data and information requirements hampers integration and streamlining. Whereas the MSFD relies on quantitative data/assessments, the HD Art 17 relies on more qualitative data/assessment. Furthermore, there are different approaches, types and definitions of habitats and timeframes to respond to the requirements of MSFD and BHD, leading to concerns becoming exacerbated where different organisations are involved. The inconsistencies between the directives were also seen in that some species are only reported under one directive. For example, under the Birds directive all species need to be covered whereas under the MSFD it is possible to choose; however, there are several recommendations (taking species from Annex II of the HD) and Commission Decision (EU) 2017/848 for the MSFD allows a choice of species as the most representative for each assessment area.

Different time schedules for the different directives were identified by all Member States as a large impediment to integration. The differences make it difficult to organise monitoring and assessments. This is despite the overall aim to produce the same information for the national government, the RSC (OSPAR and HELCOM in the case of Germany) and the EC. It also prevents data being used in different reports and

inhibits the ability to produce a long-term dataset on biodiversity (e.g. on species, ecological functional group, broader ecosystem compartment etc) which requires monitoring to be organised with an adequate frequency and duration. Several countries expressed the desire to use, and effectiveness of using, the assessments of the BHD for MSFD (as done currently), but indicated that the time lag between BHD and MSFD reporting periods (e.g. MSFD 2012-2018, BHD 2013-2019) makes this difficult and that the more recent BHD data cannot be used for MSFD.

Data and indicator limitations and incoherence. There is a lack of data which may be the result of data being difficult to gather or collate, because there are incomplete methods and activities to collect data, or that the data are not exchanged or harmonised between its sources (e.g. from MPA, HD, WFD, MSFD). It was suggested that, despite a large amount of effort (and research projects such as DEVOTES cataloguing the indicators; Texeira et al. 2016), several of the descriptors still do not have an indicator, thereby limiting a common assessment and implementation. Of further concern, in some cases, was the lack of monitoring programmes in place to generate data at the local level as the result of a lack of funding for HD monitoring.

Despite reporting often being carried out by different Member State bodies, there are not many mismatches across the Directives. This is partly because many species are stated as 'not assessed' or 'unknown' status/trends. Despite this, it is possible that the different data sets (especially in the case of birds) may have been used between the BHD and MSFD. For example, in the BD, wintering, breeding and passage individuals are covered whereas for the MSFD, it is possible that only a subset may have been selected for the reporting.

In Malta, a single monitoring programme (with the exception of seabirds) aimed at collecting data to inform multiple policies (MSFD, HD, WFD) and criteria were aligned between directives. This allowed Malta to present synergies in reporting for MSFD and BHD at the 2018 joint meeting on biodiversity assessment and reporting under MSFD and BHD.

Differences in spatial extent of reporting for the different directives also leads to concerns. For example, anadromous fish are monitored in the inland waters and are assessed under HD but are not monitored in the sea (due to lack of resources). Similarly, for some birds, the assessment area is wider under BD; for example, in the Baltic Sea, the sea eagle also breeds on the shores of lakes, which can be hundreds of km away from the sea and so not included in the assessment areas for the MSFD but are used in BD.

9.4.1 Interview-based summary of successes and weaknesses in integration

The successes and the weaknesses of the integration of the directives as identified by the interviewees from the Member States are summarised below:

Successes:

- Where the information for both directives is prepared by the same authorities
- In areas where the same experts are involved in all aspects from monitoring to reporting
- By having intersectoral cooperation of outside bodies
- By the smaller countries with fewer experts achieve better integration
- In countries which have better monitoring methods suitable for mobile species and in which the methods are linked to those desired by the RSCs
- Ensuring that the data for one directive are used for the other (i.e. reuse of data between the directives through shared monitoring and assessment)

- In cases where national decisions have been agreed on how to use Regional Sea Convention information
- By having monitoring programmes linking BHD, MSFD and RSC and also links with WFD
- By ensuring that data are collected once with coordinated monitoring

Weaknesses:

- All monitoring, assessments and reporting have methodological inconsistencies
- There is a lack of clarity in the instructions at each stage (monitoring, assessment and reporting) and there are no guidelines for the use of expert opinion in assessments despite the requirement for it; there is poor coordination between experts
- There are differences in the procedures and outcomes between Member States which are adjacent or even within the same Regional Sea area
- The least integration occurs in information and methods for highly mobile species such as turtles
- There is a poor linkage of the ecology in the different areas, e.g. bird data inland vs at sea are not combined
- Differences in reporting periods and deadlines for different directives; there is too long a time gap in data collection which increases incompatibility, although BHD data collected before MSFD would be most appropriate
- There is an inconsistency in habitat/biotope types and their definitions within and between directives e.g. HD biotopes and MSFD broad habitats - it is difficult to aggregate habitats and marine HD biotopes are too dependent on physical characteristics rather than the biota
- There is a problem that HD combines activities and pressures but MSFD has pressures (but used in descriptors other than D1).
- There is an inconsistency in the area assessed within a country (HD covers the whole marine region of a country (with high variability, and even covering 2 marine regions/RSC areas) cf. MSFD for a region) and between adjacent countries and within and between regional seas re. biotopes and assessment
- The indicators and thresholds are not fit for purpose or are poorly defined and the definitions of thresholds have not been harmonised at EU and RSC levels; there is a difficulty in equating trends for HD with thresholds/absolute values for MSFD; where trends were used in the MSFD this has not been standardised
- There is a poor reporting of background knowledge for an area regarding the physico-chemical conditions supporting and explaining the biological features
- Implementation of the different directives by the Member State comes under the remit of different agencies/authorities thereby increasing incompatibility, inconsistencies and cost
- The data from some research projects have not been used consistently if at all

Part C: Conclusions and Recommendations

10 Conclusions

10.1 Gaps and inconsistencies in processes, methods and assessments

The primary barrier to greater coordination between the Directives is the non-coherence of the spatial, temporal and species/habitat reporting requirements. Member States indicated that aligning the reporting times, spatial scales and other parameters would support greater coordination and movement towards the 'one assessment' objective. Alignment of the policies would be expected to encourage Member States to further harmonise their monitoring programmes and to establish joint monitoring programmes beyond their national waters, especially for highly mobile species.

10.1.1 The reporting cycle

Nearly every Member State reported that the differences in the reporting times between BHD and MSFD make it harder to reuse the assessments. This was the most common barrier to greater integration of the reporting of the directives raised by Member States.

Where assessments are reused between the BHD and MSFD, whichever is reported on first may not be drawing on the most recent data available. In some cases, the same monitoring sources are drawn on, with the latest data available used for each of the Directive assessments – hence there may be discrepancies in the outcomes of the assessments of marine habitats and species which are common to more than one Directive. Discrepancies are highlighted for each habitat and species in Palialexis and Boschetti (2018)[58]. Alignment of reporting cycles would resolve this issue.

Most interviewees from the Member States indicated that it is most appropriate for data and assessments for MSFD to feed into BDH reporting but this view was not universally held. In Germany, BHD assessments feed into MSFD reporting, with MSFD assessments drawing on data from the previous BHD reporting round.

Whilst there was divergence of opinion on whether BHD data and assessments should feed MSFD or vice-versa, there was near universal agreement that the timing of the Directives' reporting should be harmonised. Aligning the three Directives to the same reporting timetable should negate disagreements over directional flow of data and assessments between the Directives – where this reflects alignment of the whole reporting cycle, not only final reporting dates.

Alignment of scales and other requirements between the Directives would support data and assessment reuse ambitions. It may have short-term investment implications for Member State's existing monitoring programmes, data flows and management systems, which may need to be updated. Over the longer term, more significant cost savings from more data and assessment reuse would be expected.

10.1.2 The biodiversity components assessed

Fish is the biodiversity component least integrated between HD and MSFD assessments (although very few fish species are included in the HD), whereas birds and mammals appear to be better integrated.

A low integration between HD and MSFD was frequently observed for marine reptiles (turtles) compared to the other biodiversity components. Although MSFD assessments were only undertaken for a third of the HD turtle assessments.

[58] Palialexis, A. and Boschetti, S. T. (2018), Review and analysis of Member States' 2018 reports Descriptor 1: Species biological diversity, EUR 30664 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-79-34256-4, doi:10.2760/27700, JRC124085

Despite their high public awareness, marine reptiles are also the least reported species by the selected Member States, with the highest incidence of non-assessed cases (designated as 'unknown' or 'not assessed' status), possibly the result of them being occasional visitors to some areas.

The scale at which short/long term trends are defined may differ substantially between BHD and MSFD, especially for bird assessments, and hence Member States will do what they consider most appropriate.

It is often the difference in the main parameters/criteria used that determined the outcome of the assessment (see sections 7.3.2 and 9.1.3). Outcome for each species/habitat (favourable/good status) was sometimes contradictory between the MSFD and the HD. This was the case in 49% of the examined assessments for marine mammals, 33% of the examined assessments for marine reptiles, and 43% of the examined assessments for benthic habitats (when the assessments of broad benthic habitats such as infralittoral and circalittoral rock and biogenic reef under MSFD are also considered for comparison with the assessments of Annex I habitat Reef under HD). The parameters/criteria used, the integration of parameters/criteria, the scale of assessment and the inclusion of the main pressures only for assessing the status under HD may be the explanatory factors.

There were insufficient data in some cases due to the transient/occasional nature of the species occurrence in the Member State territorial waters (e.g. *Stenella coeruleoalba* and *Balaenoptera physalus* in Maltese waters); however, even qualitative and ad hoc information about these species is valuable to get an overall biodiversity indication at the EU level.

The absence of an indicator or assessment method defined by the Member State for a given criterion (e.g. mammal assessments by France) are the main reasons for the failure to assess habitat for the species, especially under MSFD, highlighting that more work is needed by Member States in this area.

10.1.3The methods employed for assessing biodiversity components

The lack of reuse of species assessments appears to be related to limitations in data availability as well as the differences in the timing of assessments and incompatibilities of reporting requirements.

The nature (typology) of benthic habitats differs between HD and MSFD, and this influences the integration of assessments under HD and MSFD. There is variability across Member States on how they are integrated between directives (in particular how Annex I habitats assessments are reported in MSFD, either contributing to the assessment of benthic broad habitat types, or reported separately as other habitat types). This discrepancy needs to be resolved both at EU-level and through regional or subregional cooperation.

Clear guidance is needed on how the broad benthic habitats (MSFD) and HD Annex I habitats are to be distinguished or integrated for the habitat assessments under HD and MSFD.

The contradictory outcomes (favourable/good status) observed in 43% of the examined assessments for benthic habitats between directives (as mentioned in the previous section) were likely to be affected by the different typology at which these different habitats are defined (and hence assessed) under the two directives.

The spatial scale at which the status assessment is undertaken for both species and habitats also influences the outcome, and therefore the degree of integration between BHD and MSFD.

There are gaps in the indicators for parameters/criteria reported under BHD and MSFD, the most evident ones being for the distribution (D1C4) of bird species under MSFD, the habitat (Habitat for the species/D1C5) especially of mammals and reptiles

under both HD and MSFD, as well as for population demographic characteristics (D1C3) under MSFD (see section 7.4.2 for details). This was most often due to a lack of data to support the quantitative estimate of the indicators.

The correspondence between HD parameters and MSFD criteria is only partial for habitat assessments, possibly accounting for differences in the habitat assessments under the two directives.

The 'one out all out' (OOAO) rule is the most common approach used in both HD and MSFD to integrate the status assessments from parameter/criterion level to the species/habitat level; this is the assessment characteristic that is probably best integrated between directives; the HD guidance gives clear direction towards using this method.

The OOAO is the only method used in mammal and reptile assessments where integration is required.

Efforts should be made to ensure standardisation of the integration rule between directives if using a precautionary approach; as this is clearly defined under HD, MSFD assessments could adopt the same approach for integration.

A limitation in the direct reuse of RSC assessments for MSFD is the mismatch between the baseline-based approach used for the evaluation of many of the RSC indicators and the reference-based approach required by the MSFD. A limitation in the reuse of RSC assessments for HD is differences in the specific reporting requirements.

10.2 Capacity and capability of Member States

10.2.1.1 Data and monitoring issues

Data availability is still inadequate, meaning a status assessment of 'unknown' is frequently recorded under MSFD (see section 7.2.2). An increase in monitoring effort is needed to fill this gap in the assessments, especially for marine reptiles.

There is the need to **improve monitoring data collection** to support the assessment of bird distribution and mammal and reptile habitats under both BHD and MSFD, and of habitats under MSFD.

The comprehensiveness and quality of Member State's monitoring programmes, and hence reporting, is hampered by **insufficient budgets**. Budget constraints impact on the geographic and feature scope of monitoring and on its temporal frequency and consistency. Examples provided by Member States included the comprehensiveness of monitoring fluctuating from year to year, in line with available budgets, as well as monitoring programmes being designed to focus on different areas in different years in order to effect coverage of a Member State's geographical area. Most interviewed Member States identified budget constraints as a key reason for deficiencies in their monitoring and, hence, assessment and reporting. The extent and significance of these deficiencies can vary as national budgets for MSFD and BHD reporting fluctuate. It is of concern that budget restrictions may increase in the coming years, as the result of national budgets being diverted to the repercussions of the Covid-19 pandemic.

The higher variability (and possibly discrepancy) between the geographical area and time span of the assessments under BHD and MSFD occurs most often for **those Member States with wider coverage within and across multiple regions.** The latter generally incurs a greater cost and as the bodies responsible for the different regions within a Member State which covers multiple regions (e.g. Spain, France, Germany) are in different areas then there are no economies of scale.

Changes in reporting requirements, such as the timing and spatial coverage, have implications for monitoring programme design (and potentially data flows), which increases the funding needed and undermines efforts to generate time-series data. In addition, for MSFD the time between publishing new requirements and the time when

Member States are required to implement monitoring and reporting can be insufficient to allow the necessary resources to be mobilised in order to design and enact the necessary changes to established monitoring and reporting.

Establishing monitoring programmes requires the input of complementary human capital – money, skills, time and effort to design, test and implement and well to generate time series data. **A deficiency or lack of consistency in any of these human capitals creates anomalies in the monitoring, assessment and reporting** – this was particularly raised by Member States with a lesser history and capability of marine monitoring and reporting, such as Romania and Bulgaria, compared to the more-established Member States.

Time-limited projects are an important data source for the Directives (e.g. problem-orientated studies (such as Environmental Impact Assessments and Strategic Environmental Assessments), academic studies, FP/H2020 research projects, industry assessments). Where these are successfully continued through multiple project phases, this arrangement works well. However, funding for future phases is often uncertain and not always available. Other issues include the objectives and time scales of research projects not matching with the legal and reporting obligations; projects collecting data using methods that do not conform to national or regional methods leading to data inconsistencies or lack of acceptance from the authorities. Despite this, projects may also produce analysis, narrative and products that are useful and used in assessments. However, if the methodology and raw data used to create the product are not adequately documented, this can make it harder (or impossible) to reproduce assessments beyond the lifespan of the project. This challenge was recognised by several Member States, and the importance of establishing systems which are designed to enable continuation of the initiated monitoring in the future was stressed.

10.2.1.2 National and regional coordination

The extent of formal **internal coordination varies across Member States.** Several Member States have different bodies responsible for implementing the different directives, which in some cases leads to disjointed monitoring and assessment created by competing demands. Regardless of the distribution of responsibilities, administrative barriers can occur both between and within organisations involved (at any stage from data collection to reporting) and can inhibit coordination. Differences in the Directives' reporting cycles were suggested to be unhelpful to communication and coordination across the Directives.

Coordination across departments and teams often occurs on an informal basis – based on the wider knowledge, relationships and willingness of the individuals involved. Whilst some Member States consider such informal mechanisms to work well, the situation presents risks to the long-term effectiveness of coordination, especially if there is turnover of staff. Some Member States have a single organisation whose role is to coordinate monitoring and reporting across the Directives. The Netherlands Marine Information and Data Centre (IHM) provides a good example of an organisation whose role is to coordinate many of the processes required to produce the assessments in a way that enables them to be reused. In Malta, discussions are undertaken in an inter-ministerial committee and there is a common authority (the ERA) that handles both MSFD and BHD and where the teams easily share information (hence leading to the optimisation of resources/ manpower). In Member States with multiple relevant jurisdictions, monitoring/reporting units and regional seas, the need for formal arrangements to govern coordination are arguably even more important.

Particularly **when obligations and formal channels for data sharing are weak, this can hinder reuse and consistency**. Some Member States report challenges in managing the flow of data from those responsible for collection up to those responsible for assessments and reporting. A large number of organisations are involved in MSFD and BHD data collection. Establishing formal obligations and full adherence to open data principles can help address this issue.

Use of information systems can support data coordination, data sharing and more streamlined processes within a Member State. Having access to the core data (quantitative and qualitative information) and its synthesis, collation and use (e.g. in trends and indicators) within an information system can support the identification of commonalities across the Directives, draw together data from multiple monitoring programmes and projects, and improve access to data across organisations, supporting greater opportunities for reuse. The creation of information systems also encourages processes to be standardised. There are several examples of national systems in the study, such as France, the Netherlands and Croatia, that may be considered as best practices. However, creating country-specific databases can compound problems, such as hampering regional assessments, if they are not compatible and allow easy export to European and RSC systems such as the EMODnet portal.

The RSCs play an important role for the MSFD as a platform to promote coordination across Member States and for the design of common frameworks. However, the extent to which they consider the requirements of the BHD, and the strength of obligation for them to do so, varies.

Having international cooperation in place through RSC or other agreements such as EEAs EIONET, ACCOBAMS and ICES, promotes the standardising of methods, that lead to consistency in the data flows that is a prerequisite in the reuse of assessments. Effective regional coordination, both within and between the RSC, would be needed to improve the standardisation of methods for assessment and monitoring.

Some Member States highlighted the role of **joint monitoring programmes/projects in fostering regional coordination for MSFD**. A good example of this is the launch of the Integrated Monitoring and Assessment Programme for the whole Mediterranean Sea, that was done in the Barcelona Convention. Member States suggested that more European funding to support regional projects would be beneficial. However, the EC suggests that Member States should explore other funding mechanisms and opportunities for cost-efficient monitoring through joint programmes and risk-based approaches to prioritising monitoring under the MSFD.

11 Recommendations

Recommendations for future actions to support improved BHD-MSFD integration were derived drawing on the results of this project (both the technical analysis and stakeholder interviews)[59].

11.1 Actions at European level

European level recommendations are divided into those requiring actions concerning the policies and their reporting requirements to improve their alignment, and actions concerning the development of the guidance given to Member States on policy implementation.

11.1.1 Changes to policies and reporting requirements

COMMON REPORTING FORMAT

> **Action:** Develop a common reporting format/system, at least for assessment at species/habitat level and below (criteria/parameters). This should support greater reuse and reduce administrative burdens. An initial mapping of common fields could generate some potential for linkages; however, broader changes to establish greater standardization of the reporting requirements across the Directives would be necessary to move more comprehensively towards a common reporting format or some form of linked reporting. The common reporting format would have data fields shared between BHD-MSFD (e.g. within comparable parameters/criteria) and others specific to either directive (e.g. trends for BHD, by-catch criterion for MSFD). Where data fields are shared, a review of the guidance and format for their content might be needed to improve harmonisation (e.g. to harmonise parameters allowed under MSFD with fixed/prescribed parameter under BHD).

ALIGN REPORTING CYCLE TIMINGS. Different time schedules for the different directives were identified by all Member States as a large impediment to integration. The flow of data between the directives and the implications of differing time schedule varies across Member States.

> **Action:** A common assessment cycle should be adopted, with reference periods for the data collection and assessment being the same between the directives, with no lag, and the reporting deadlines harmonised. For example, the next reporting cycle could be 2019-2024 for both Directives, with reporting deadlines being also aligned for both BHD and MSFD (e.g. in late 2025, or in line with the RSC assessment process), and with the following reporting cycle being 2025-2030. Harmonisation of reporting cycles should be undertaken in parallel to harmonisation of other aspects of the monitoring-assessment-reporting chain requirements to avoid a 'resources' bottleneck at or just prior to the assessment period. In addressing issues of reporting cycles, wider coordination consideration should be given to the beneficial use of outputs for other EU policies.

MORE PRESCRIPTIVE REUSE OF BHD PARAMETERS IN MSFD. The current requirement for MSFD is to use the assessments under BHD, with a clear equivalence between BHD parameters and MSFD criteria (e.g. HD 'Population' parameter to assess D1C2). This is to be done 'wherever possible', thus leaving the Member States the freedom to choose. Hence it is not always implemented, possibly leading to differences in the assessment results (see example in section 7.2.2 and associated point below regarding harmonization with RSCs).

> **Action:** Requirement of reuse of BHD assessments should be more prescriptive in MSFD. There should be the requirement to use at least the same type of BHD

[59] Disclaimer: This document has been prepared for the European Commission. It reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

parameter to estimate the equivalent criterion for the same species/habitat under MSFD. It is acknowledged that differences between the directives (e.g. scale of the reporting unit or at which FRV/thresholds are to be estimated) may hinder the direct transfer of the BHD assessment into MSFD, and therefore resolving these issues will be paramount to allow reuse of assessments. In the longer term, there should be an alignment between the Directives (with the involvement of RSCs) for the geographical scale of the assessment to make it meaningful for each population or functional group.

PRESSURES. Pressures (as the mechanism of change and separate from activities) are reported and used differently, and this contributes to discrepancies between assessments under BHD and MSFD (see example in section 7.2.2). In BHD: pressure and threats are specifically linked to the associated activities; they are to be listed and ranked for each species/habitat; they contribute (along with conservation measures) to the parameter 'Future prospects' which is assessed for conservation status and integrated with the other parameters (population, range, etc.) for the assessment of the species/habitat. In MSFD: pressures are defined without specific link to activities; they are used in other descriptors, and indeed are the main topic of some Descriptors (e.g. D2, 3, 5, 6, 7, 8, 9, 10 and 11), but in Descriptor 1, the relevant pressures (no rank) are to be listed at feature level, not for the individual species/habitat.

Action: Use of pressures should be harmonized, by (i) standardizing the pressure definitions across directives (with or without the link to activities), (ii) requiring pressures to be reported at species/habitat level rather than at feature level in MSFD. Requiring an additional assessment criterion D1C6 similar to 'Future prospects' to be included in the MSFD assessment of a species/habitat may also help to harmonize assessments between directives, although this might contrast with the data-driven approach of the MSFD.

TRENDS. Although trends are currently included in the MSFD reporting format, these mainly refer to trends in the status of an individual criterion for the species/habitat (looking back at previous assessments) rather than covering trends in the measured parameters as in BHD. Unlike in BHD, trends are not used to inform the status assessment at criterion level in MSFD, but rather they qualify such status (for communication only). This discrepancy between BHD and MSFD may contribute to the differences in the overall assessment of a species/habitat.

Action: This discrepancy should be resolved (e.g. by formally including trends in the GES assessment, as in BHD) to improve harmonization of the assessment outcomes between directives.

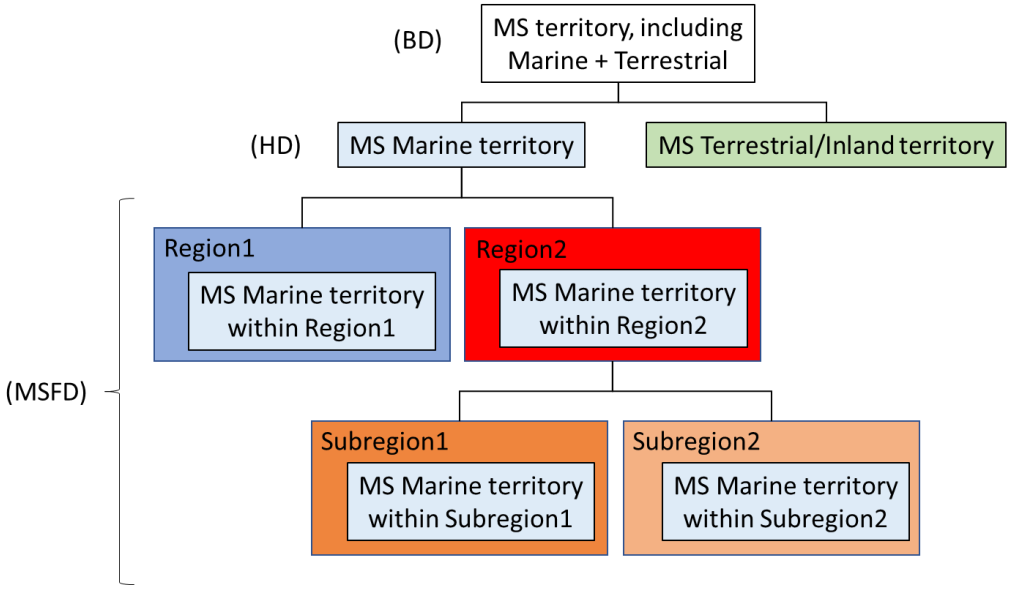
11.1.2Guidance to Member States on policy implementation

SPATIAL AGGREGATION/DISAGGREGATION. BHD and MSFD require assessments to be undertaken at different geographical scales (different reporting unit, all Member State territory for BD, Member State territory in marine region for HD, region/subregion/subdivision for MSFD). This leads to differences in the assessment outcome even when the same species/habitat is assessed using the same method (e.g. using HD approach), as the data will need to be aggregated/disaggregated differently. There may also be spatial differences in data availability (e.g. localised monitoring data in parts of a Member State territory might weigh differently in the national, subregional or wider scale assessments).

Action: First, Member States should be able to delineate and report a set of MRUs that is ecologically meaningful, geographically coherent and internationally agreed (at regional scale) – a good example being the Baltic Sea. Then, establish a clear hierarchy between MRUs under BHD and MSFD (Figure 24 provides an illustrative example – but specifics may differ between Member States, and RSC geographical scales should also be considered), and establish clear rules for aggregating/disaggregating assessments (including data, reference

conditions/thresholds, methods etc.) across scales (e.g. local, to national, to regional, to European). This would not resolve the issue about different scales possibly affecting assessments under the different directives – this can only be resolved by using the same scale across directives – but it will improve the standardisation of approaches across Member States and potentially save resources in data collection and monitoring.

Figure 24. Example of nesting of spatial reporting units under between directives.



GUIDANCE ON BENTHIC HABITATS REPORTING: Benthic habitats are defined differently in BHD and MSFD. Although these differences may not be resolvable in the short term, a clearer top-down direction to Member States is needed about the way Annex I habitat assessments are to be reused and reported in MSFD. Some guidance of corresponding habitat classifications (including MSFD and HD) has been produced by the European Environmental Agency. At present, different Member States appear to adopt different approaches, e.g. by using Annex I habitats (or specific sub-types of these habitats) to assess broad benthic habitat types in MSFD (e.g. reefs in Malta), or by reporting Annex I habitats separately (as 'other habitat types' following the MSFD Commission Decision 2017/848), but considering these as non-spatially overlapping with the benthic habitat types (e.g. Germany). This likely limits the alignment of habitat assessments between Member States.

Action: A clear protocol should be defined, in collaboration with relevant benthic habitat working groups, in collaboration with relevant benthic habitat working groups, so that this aspect is standardised and harmonisation across Member States improves. A longer-term aim should be to ensure comparability in habitat definitions between the directives otherwise these difficulties will continue.

PRIORITISE MSFD HARMONISATION WITH BHD VS RSC. Under MSFD there is a legal requirement for reusing BHD assessments ('wherever possible') and for regional coordination with RSCs (MSFD Art 5(2) and 6, Commission Decision 2017/848). The latter has led to efforts towards reuse of RSC assessments under MSFD (which appears to be stronger for mammals in the studied Member States). However, given differences between BHD and RSC assessments, this may hinder the BHD-MSFD integration (see example in section 7.3.2, where the use of RSC assessment was the cause of discrepancy between HD and MSFD assessment results (*T. truncatus* assessed by France in the Atlantic region)).

Action: Discussions should be held between the EC, RSCs, Member States, and relevant working groups about how to further tackle the issue above, e.g. establishing a three-way (BHD-MSFD-RSC) harmonization protocol, although it could be challenging to meet contrasting requirements. If such harmonization cannot be achieved for some aspects, then guidance should be given to Member States about which integration (MSFD-RSC or MSFD-BHD) should be prioritized.

TRAINING/GUIDANCE DELIVERY TO MEMBER STATES.

Action: To better deliver the guidance to Member States, the EC should enable methodological seminars/workshops for the implementers (with a special focus on the ministries) leading to knowledge and skills improvement for data collection, monitoring, assessment and reporting for the Directives.

FINANCIAL CONSTRAINTS. Member States monitoring and reporting is negatively impacted by challenges regarding the sufficiency of resources, time, people and workloads, and the quality and comprehensiveness of the data requirement for assessments. Access to a more reliable, larger funding base, and/or greater efficiency (e.g. through an increase in reuse across the directives) in data collection and assessment processes, would provide greater certainty for Member States when planning monitoring and provide improved assessments and hence evidence over time.

Action: It may be possible for established EU funds to be better exploited to support marine assessments for environmental policy (e.g. fisheries or cohesion funds, LIFE programmes). Opportunities should be explored to ensure that Member States are, or can be made, fully aware of how different EU funds could be used and that EU funds are as accessible (in their focus and design) as it is appropriate for them to be.

Action: Where changes are to be made to any aspect of the reporting requirements (with possible effects on monitoring and assessment resources), they should be made sufficiently far in advance as to ensure that the required funding and changes in technical and logistical arrangements can be made by Member States in good time and should seek to create opportunities for efficiencies.

11.2 Actions at Member State level

ALL RELEVANT MARINE BIRD, MAMMAL AND REPTILE SPECIES REPORTED UNDER ONE DIRECTIVE TO BE REPORTED UNDER THE OTHERS. Not all species reported under BHD are reported by Member States under MSFD. Sometimes this is expected given the lack of sufficient/adequate data that is required to support the more quantitative assessments under the MSFD, but in other cases the missing species are not justified. This can be particularly hard for those species that are transient or occasional in the Member State waters (but for which reporting is nevertheless required under BHD, albeit possibly on a reduced form). However, there were occasions where some species were reported under MSFD but not under BD (e.g. birds in the Mediterranean region of Spain).

Actions: As all marine bird, mammal and reptile species are to be reported under BHD, Member States should make sure that this is the case, hence all these species reported under MSFD should also include in BHD reports, and an optimal selection of species should be done for MSFD assessments

INDIVIDUAL SPECIES ASSESSMENTS. In some cases (e.g. birds for Finland and for the Macaronesia region of Spain), MSFD reporting was undertaken for groups of species rather than for species individually, thus not matching the BHD approach. It is understood that assessment at the species level may preclude the direct transfer of some RSC indicators into MSFD (as some of these indicators report on functional groups of species rather than for individual species).

> **Action:** Member States should ensure that the assessment of Elements under MSFD is undertaken using parameters defined at the individual species level, rather than for functional groups. If the latter is derived from RSC indicators that aggregate the assessment at functional group level, the data behind these RSC indicators should be disaggregated by species, where possible, to support the MSFD assessment, thus allowing some coordination with the regional assessment and, at the same time, alignment with BHD.

REPORTING BROAD BENTHIC HABITATS UNDER MSFD. The main obligation under MSFD is to report (broad) benthic habitat types (BHTs), with the possible addition of other habitat types (OHT). In one instance, the Member State (Estonia) only reported OHT (namely Annex I habitats; e.g. reefs and sandbanks) but no BHTs under MSFD. Another country (Spain) did not report on any benthic habitats (BHT or OHT).

> **Action:** All Member States should ensure that MSFD obligations for reporting on BHTs (and only as additional habitats, on OHT) are satisfied. This is crucial to get a complete and comparable assessment of entire benthic ecosystems.

IMPROVED BIODIVERSITY MONITORING, WITH A SPECIAL FOCUS ON REPTILES. The situation of numerous marine species inhabiting EU waters (including some charismatic species) is still completely unknown. Reptiles appear to be the group for which assessments appear less comprehensive and less integrated between directives and regions, with less harmonisation in the Mediterranean, compared to other groups. Often the discrepancies originate from a deficiency in the data available for reptile species which inhibit more quantitative assessments (MSFD). Monitoring of this biodiversity component is most commonly undertaken by Member States using 'traditional' observation-based techniques/approaches.

> **Action:** The feasibility of monitoring methods alternative to the 'traditional' methods (e.g. telemetry and tracking methods, participatory and citizen science) should be explored, taking into consideration their use in the long term (to provide consistent results across reporting periods), and their possible intercalibration with existing data from more 'traditional' methods. Cooperation between Member States, regional/international working groups, and also through existing monitoring networks (ACCOBAM etc.) would be required to ascertain feasibility and agree on standardised protocols for implementation. It is understood that efforts towards this action have started in 2019 (e.g. the Sea Turtle Expert Group aiming to provide a harmonised set of assessments for HD, MSFD and RSC making use of all available data for the Mediterranean and Northeast Atlantic regions).

EFFICIENCIES IN DATA COLLECTION. At a local level, and also with increasing limitations on resources, there will need be an increasing role for stakeholders and public consultation, awareness and dissemination with a special focus on scientific institutions and NGOs operating with raw data and with an ability to protect natural areas. For example, citizen science can extend the role of volunteers in the community. There is also a need to take advantages of advance on technologies, such as remote sensing technologies, to benefit from the potential efficiencies that they offer.

> **Action:** Review opportunities to increase the use of citizen science (directly and through NGOs) to support collect of data across more fields, as well as new monitoring technologies. Develop best practices and mutual learning opportunities to build Member State capacity in managing and making the best use of citizen science and technological opportunities.

BUILDING MEMBER STATE CAPACITY. It was apparent that human complementary assets and capital were inadequate to cope with current or future demands of monitoring, assessment and monitoring and to respond to changes in these activities

when dictated by the EC. The skills, energy, time or funding were lacking, particularly in areas with a lesser history of marine monitoring, assessment and reporting.

> **Action:** Examples of training and good practice should be shared across organisations and between Member States (e.g. by twinning, mentoring, workshop etc.), especially on a regional basis. The ministries or outsourced lecturers can organize workshops/seminars for them to present and discuss possible integration elements within the Member State. Member States should create an internal capability in national integration of strategically supporting policy development and defining cooperation mechanisms. This could include exploring new technologies in monitoring and data collection and in sharing best practice followed by an obligation and incentives to implement these aspects especially for species and habitats of interest.

MEMBER STATE INTERNAL COOPERATION. The level and coherence of national governance / institutional structures and responsibilities varies across Member States and in some cases needs to be improved or at least more formally established. Institutional barriers have a negative impact on coordination across the directives, and successful but informal coordination may not be resilient to changes in staff or priorities. Insufficient vertical coordination and formal obligations – between organisations involved in data collection and those involved in assessments – presents risks to consistent, sufficient data provision.

> **Action:** Member States should ensure that they have a formalised institutional process to unify approaches and facilitate coordination, within and across all relevant ministries/agencies. This would as a minimum provide an opportunity for improved communication in Member States where insufficient communication channels are a key barrier to coordination, and in Member States with effective but informal or flexible arrangements it would improve the resilience of the coordination process (e.g. to changes in staff and priorities). Member States should recognise the potential benefits of coordinated internal strategies that formally lay down the foundations for coordinated monitoring and data sharing / management across the directives, as well as establish formal mechanisms for communication between the departments/ organisations responsible for each of the directives.
>
> **Action:** Explore opportunities to formalise the obligations of data providers, or establish guiding principles that improvement the flow of data between organisations.

11.3 Final concluding remarks

11.3.1 Harmonisation between the Directives

- There should be more coherence between directives regarding indicators, timeframe and reporting periods, and species and habitats reported and with an emphasis on a common terminology e.g. GES/FCS etc.
- A common reporting cycle should be adopted, and so a change to the monitoring, assessment and reporting timing with either BHD being slightly before the MSFD or preferably the two harmonised.
- There should be formal coordination and cross-calibration (a) between the implementation of BHD and MSFD and the requirements of the RSC, (b) between all the marine and transitional water directives not just these two, and (c) between the four Regional Sea areas.
- The reporting requirements should be harmonised between BHD and MSFD to reduce the gaps and increase reuse of the same reported information.

11.3.2 Improving clarity on assessment issues/methods, improved guidance

- More guidelines/guidance and training is needed, from the top down (i.e. EC, RSCs), between countries and from more to less experienced countries.
- There should be clearer and more compatible and comparable instructions and guidelines on the interpretation of criteria and indicators, on the methods for assessment and on streamlining reporting and inputting of data, the data flow and storage.
- There should be a revision, coordination and harmonisation of habitat definitions between directives (e.g. broad and other habitats).
- There is the need to coordinate regional monitoring programmes between and within countries and regional seas, to streamline the species used or their surrogates, and to avoid double counting within and between countries because of species migrations.
- There is the need for more data to support the quantitative estimate of the indicators and their use in assessments under the directives.

11.3.3 Implementation issues at RSC and Member State levels

- The different spatial geographical elements (inland to marine, inshore to offshore) should be integrated to give the bigger and more complete picture and increase the geographical coherence of the directives.
- There should be a better definition of baselines and thresholds and a more standardised use of these in reporting, at least between Member States sharing the same sea basin.
- Internal coordination within Member States can benefit from formalised commitments to coordinated monitoring, assessment and reporting, supported by structures and tools to facilitate that coordination.
- Addressing financial constraints which limit the quality and comprehensiveness of monitoring, assessment and reporting should consider both opportunities for greater efficiencies (through harmonisation opportunities and alternative approaches to monitoring and cost sharing), and ensure access to available EU and other funds is maximised.
- There needs to be increased consultation and formalised involvement with stakeholders, especially those with a monitoring and assessment capability in a way that enhances available capacity and ensures data suitability and availability.

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ANNEXES

Annex 1 Croatia data flow summary

See separate Annexes document.

Annex 2 Estonia data flow summary

See separate Annexes document.

Annex 3 Finland data flow summary

See separate Annexes document.

Annex 4 France data flow summary

See separate Annexes document.

Annex 5 Germany data flow summary

See separate Annexes document.

Annex 6 Malta data flow summary

See separate Annexes document.

Annex 7 Netherlands data flow summary

See separate Annexes document.

Annex 8 Romania data flow summary

See separate Annexes document.

Annex 9 Spain data flow summary

See separate Annexes document.

Annex 10 Template for MS-level technical data collection

See separate Annexes document.

Annex 11 Selection of species and habitats for the technical analysis

See separate Annexes document.

Annex 12 Member State interview analysis topic guides

See separate Annexes document.

Annex 13 Indicator methods (EU level guidance)

See separate Annexes document.

Annex 14 Technical characteristics of assessments (frequency)

See separate Annexes document.

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Process and Technical Review: Annexes

Written by ICF in association with
MRAG, University of Hull, and partners

May 2021

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Directorate C – Quality of Life

Unit C.2 – Marine Environment & Water Industry

European Commission

B-1049 Brussels

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Table of Contents

Introduction

ICF, MRAG, University of Hull and partners were commissioned by the European Commission, DG Environment, under ENV.C.2/FRA/2016/0017 to undertake a study to support the Commission's work to better coordinate assessments of marine species and habitats under the Birds and Habitats Directives (BHD) and the Marine Strategy Framework Directive (MSFD).

The project comprised two tasks. Task 1 reviewed the *processes* involved in monitoring and reporting at the Member State level, whilst Task 2 reviewed the *technical* aspects of marine species and habitat assessments (undertaken by Member States (MSs), and an assessment of their integration between BHD and MSFD. The report identifies gaps and opportunities for improved coordination and streamlining across the Directives.

This document presents the annexes to the main report.

Annex 1 Croatia data flow summary

A1.1 Birds Directive

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	✓
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.1.1 Data flow description

The Ministry of Environmental Protection and Energy of Croatia collects information about the indicator bird species according to the Birds Directive Monitoring Programme. There are four bird species related to MSFD which are also part of the BD: Phalacrocorax aristotelis, Calonectris diomedea diomedea, Larus audouinii and Puffinus yelkouan.

The Programme envisages an assessment of the bird population and breeding. These data collection is an obligation of the public institutions for protected areas management and conservation in Croatia. Regarding marine birds Monitoring Programme implementation, there are: National Park Brijuni, National Park Kornati, National Park Krka, Park of Nature Telascica, Park of Nature Vransko jezero, Park of Nature Mljet, Park of Nature Lastovsko otocje. Additionally, there is the Department of Ornithology at the Croatian Academy of Science and Arts.

Currently, the Monitoring Programme consists of two major components: M1. Birds Directive Monitoring Programme and M2. LIFE Artina – Seabird Conservation Network in the Adriatic project. The previous one is part of the National Monitoring Programme, while the last one is 5-year project financed by the LIFE Programme run by NGO BIOM

along with partners: NGO Sunce, NGO BirdLife from Malta and the Park of Nature Lastovsko otocje. The National Monitoring Programme is focused on the mentioned four bird species unlike the NGO BIOM's project that does not include activities for the Phalacrocorax aristotelis population monitoring. It is not clear the reason for that. The spatial scope for the M1 Monitoring Programme is Eastern coast of the Adriatic Sea - coastal line, islands, reefs and rocks where birds breed as opposite to the M2 LIFE Artina project that covers two SPA marine areas Lastovsko otočje and Pučinski otoci.

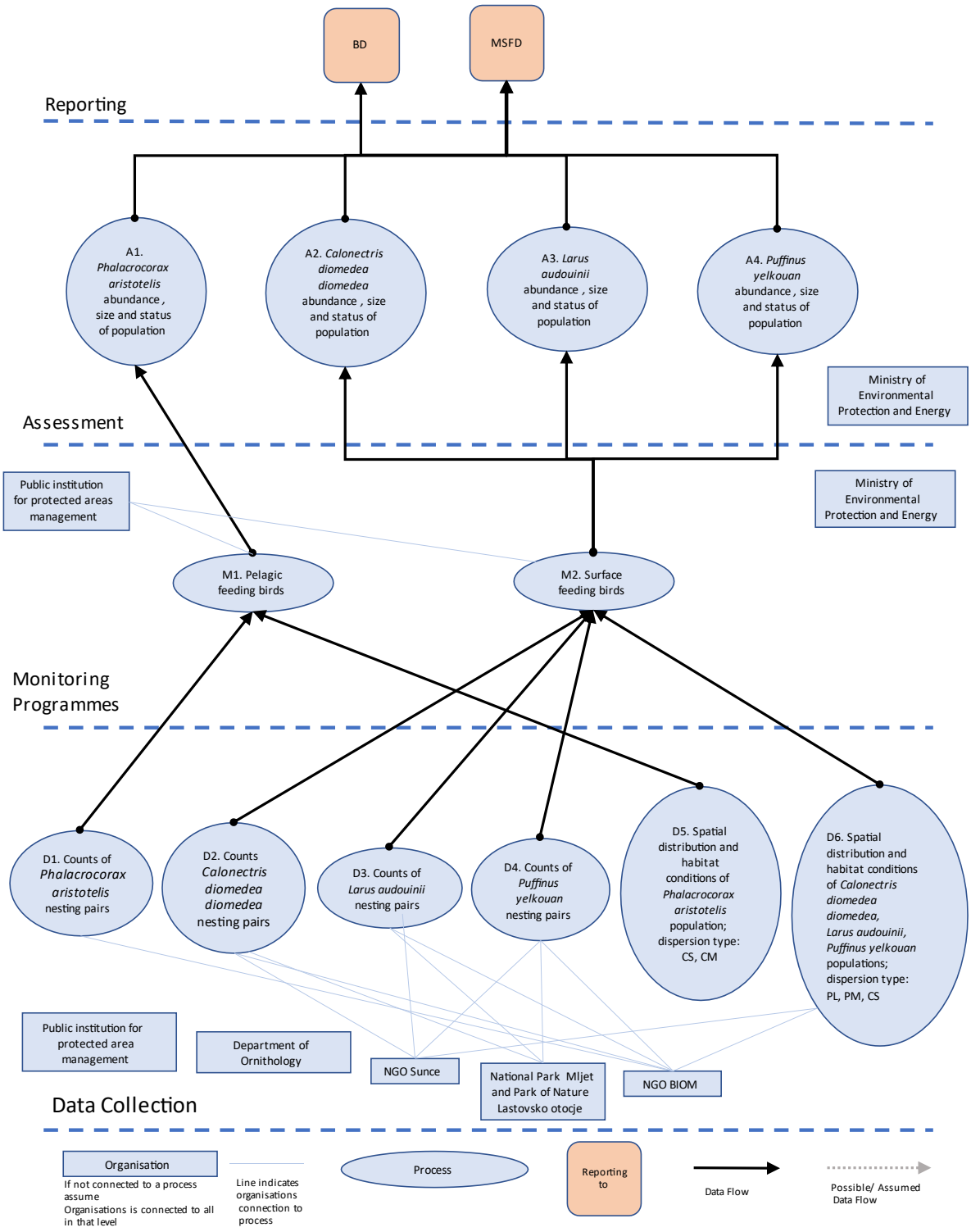
While the public institutions for the protected areas management outsource experts and organisations for data collection, the Department of Ornithology and NGOs collect data by

Regarding the data collection, the monitoring providers estimate size of population and of colonies, their nests' location and distribution.

From the assessed documentation it is not clear is there a procedure, a system, a platform or similar, on the data application by data provider to the Ministry. Likewise, it is not clear whether there are consequences for the data not sharing to the Ministry. NGO BIOM reports to the Ministry of Environmental Protection and Energy. Eventually, the Ministry of Environmental protection and Energy reports the collected data to the BD.

According to the National Marine Strategy updated in 2019, the bird data for D1 indicator are the same as for BD. However, there is a gap in that the document, which envisages parameters such as: population size and distribution and demographic data on the condition of the population refers to the BD as a source, while data for the BD species contain only nesting population size while other parameters are estimations.

A1.1.2 Data flow diagram



A1.2 Habitats Directive

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	✓
Marine region		Mediterranean
Sub region/s		Adriatic Sea

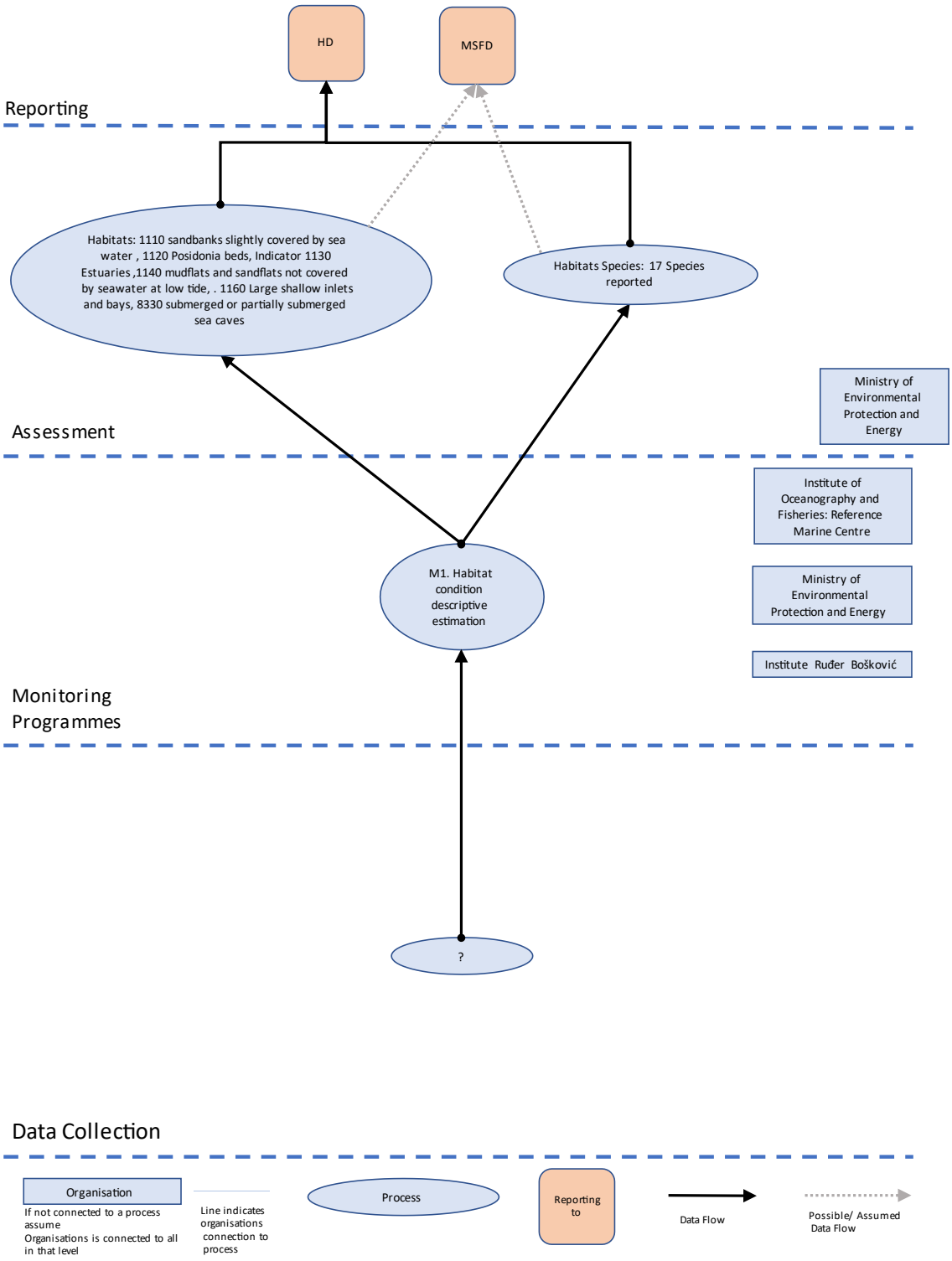
A1.2.1 Data flow description

The Ministry of Environmental Protection and Energy, as the National Reference Centre for MSFD, established the Marine Reference Centre (MRC) (2018 – 2024) at the Institute of Oceanography and Fisheries in collaboration with the Institute Ruđer Bošković http://www.haop.hr/hr/novosti/odreden-referentni-centar-za-more. The MRC monitors and evaluates the state of the marine environment, fisheries, mariculture and sea-bathing quality, as well, according to the monitoring programs developed under specific regulations and international agreements. The MRC Programme is a follow-up of the previous Project Jadran (1998-2015) https://jadran.izor.hr/jadran/index.htm.

Under the Habitat Directive, the MRC provides only estimation in a form of the qualitative description of the selected indicator habitats: Indicator 1110 Sandbanks which are slightly covered by sea water all the time MMED; Indicator 1120 Posidonia beds (*Posidonion oceanicae*) MMED; Indicator 1130 Estuaries MMED; Indicator 1140 Mudflats and sandflats not covered by seawater at low tide MMED; 1160 Large shallow inlets and bays MMED; Indicator 8330 Submerged or partially submerged sea caves MMED.

The MRC delivers the expert opinion to the Ministry of Environmental Protection and Energy and to the MSFD/Habitat Directive.

A1.2.2 Data flow diagram



A1.3 MSFD D1 Birds

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.3.1 Data flow description

The Ministry of Environmental Protection and Energy, with the mandate to report to the MSFD, collaborates with Croatian national parks and parks of nature institutions which are obliged to participate in the assessment and monitoring processes of indicator bird species and to report the results back to the Ministry. The agency involved in the monitoring programme in 2013-2018 was HAOP (currently affiliated to the Ministry without a legal status as the department).

The Croatian Marine Strategy anticipates the assessment of population, abundance, distribution, population state and mortality rate for four bird species: Phalacrocorax aristotelis, Calonectris diomedea diomedea, Larus audouinii, Puffinus yelkouan.

There are two monitoring programmes under the National Monitoring Programme: Pelagic-feeding birds, Surface-feeding birds. The National Monitoring programme is focused on all of four indicator species.

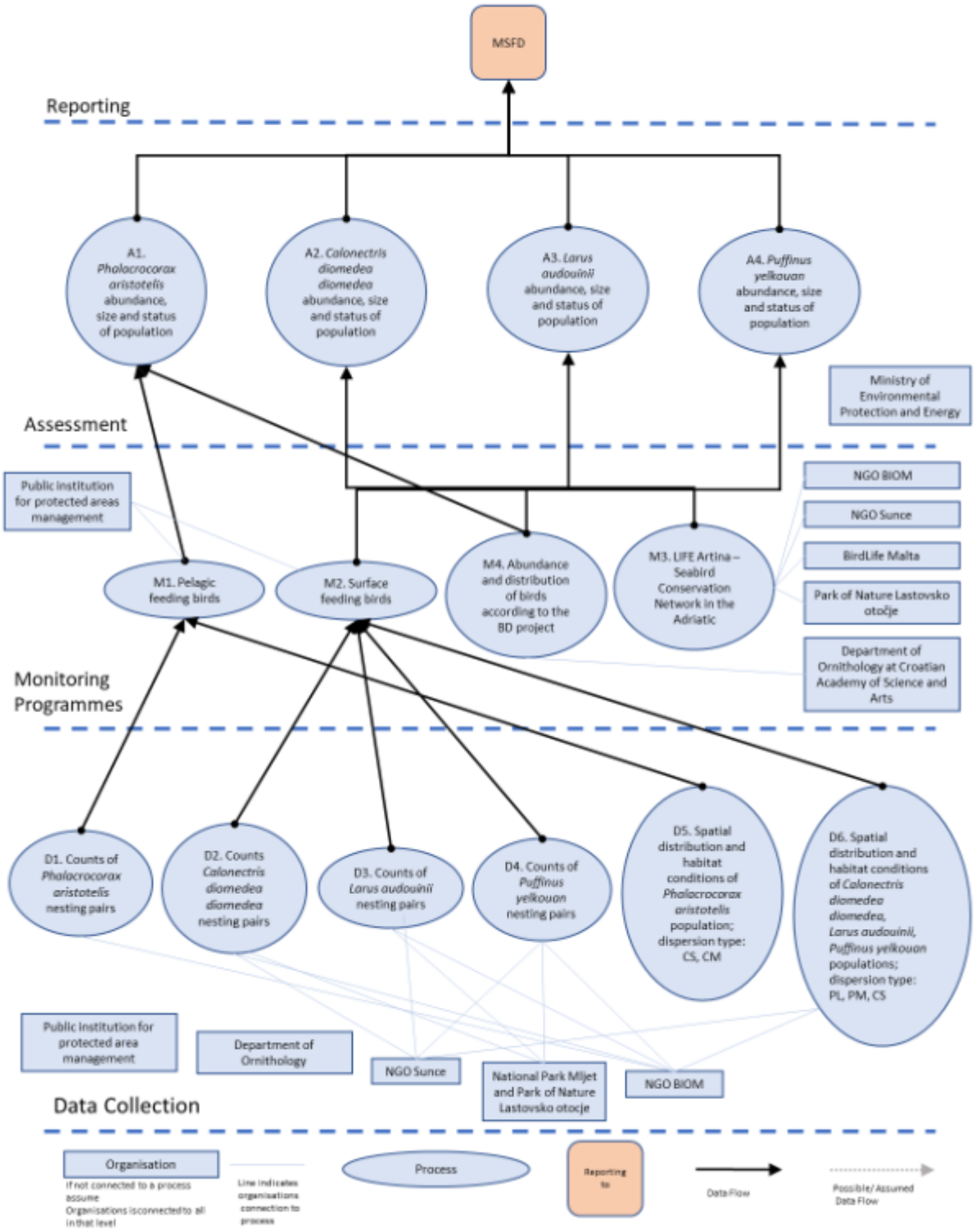
Data collection is focused on the Adriatic Sea coastal line, islands, reefs and rocks of the Southern Adriatic for surface feeding birds that nest on islands (Sv. Andrija, Kamik, Palagruža and several islands of Lastovo archipelagos; islands of Korčula, Mljet, Lastovo and peninsular Pelješac). Pelagic feeding bird data collection extends

along the eastern Adriatic coast, with the most abundant area the Zadar Archipelagos (Mid-Adriatic).

Organisations involved in data collection data (Public institution for protected areas management National Park Brijuni, National Park Mljet, National Park Kornati, Park of Nature Telascica, Park of Nature Lastovsko otocje;) report to the Ministry of Environmental Protection and Energy, which reports for the MSFD.

There is no bycatch reported by fishing vessels or by citizen alert.

A1.3.1.1 Data flow diagram



A1.4 MSFD D1 Mammals

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.4.1 Data flow description

The Government of the Republic Croatia established the Marine Reference Centre (2012-2016; 2018 – 2024) at the Institute of Oceanography and Fisheries in collaboration with the Institute Ruđer Bošković (http://www.haop.hr/hr/novosti/odreden-referentni-centar-za-more). Its role is to support the Ministry of Environmental Protection and Energy to deliver MSFD and other marine monitoring programmes.

The Institute uploads data to the MSFD Portal https://wise-test.eionet.europa.eu/marine and informs the Ministry that the data are available on the portal, the Ministry passes the information to the European Commission.

For the assessment of the Small-toothed cetacean abundance, distribution, age and mortality rate, the Institute of Oceanography and Fisheries collates data from the NGO Plavi svijet, from bycatch reported by fishing vessels and by citizen alert (Ministry of Agriculture database) and from their own research activities (http://baltazar.izor.hr/azopub/bindex) . An assessment report is produced every six years.

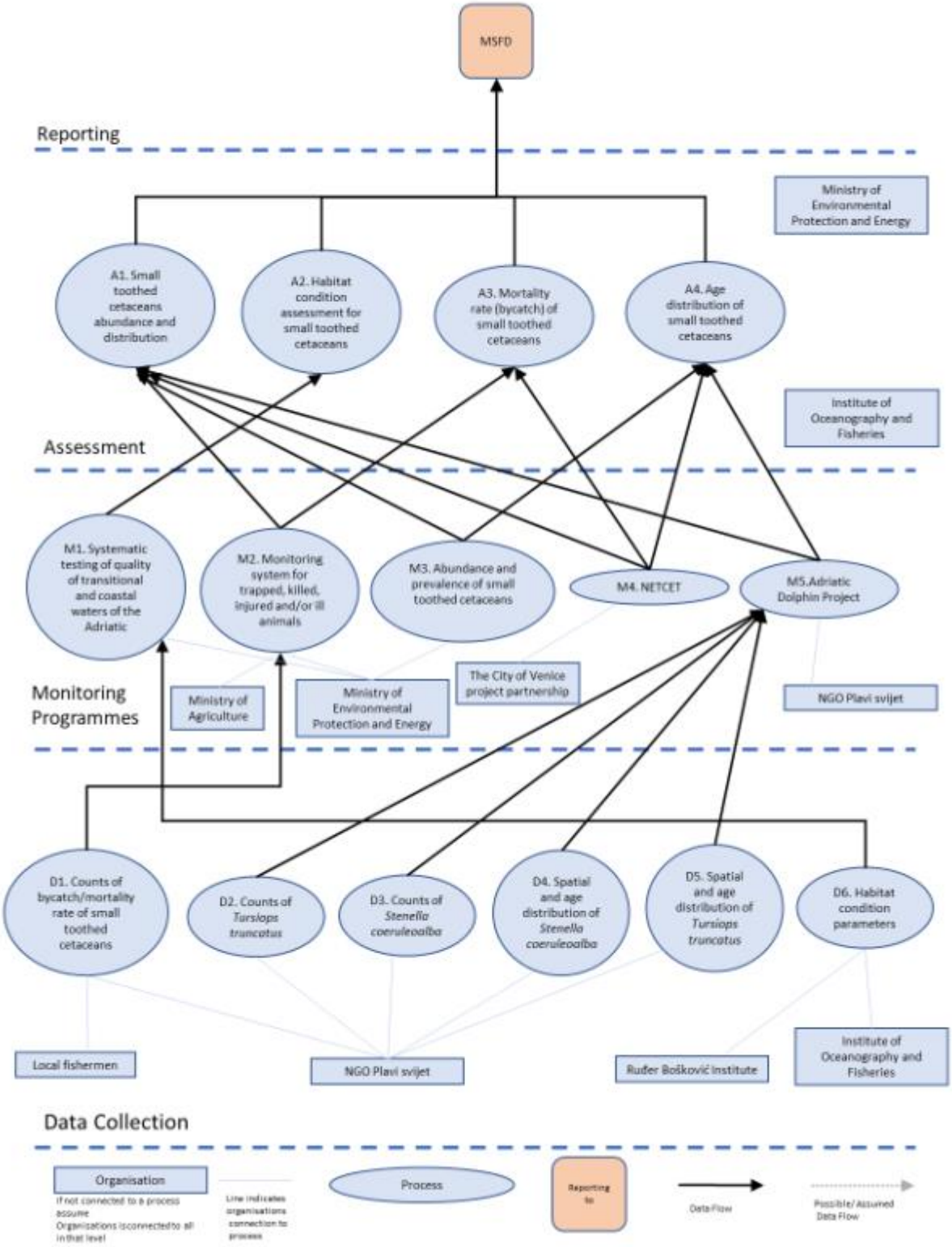
There are five monitoring programmes in the Adriatic Sea related to the mammal status: M1. Systematic testing of quality of transitional and coastal waters of the Adriatic (by the Ministry of Environmental Protection and Energy); M2. Monitoring system for trapped, killed, injured and / or ill of strictly protected animals (by the Ministry of Agriculture; Ministry of Environmental Protection and Energy); M3. Abundance and Prevalence of small toothed cetaceans (Ministry of Environmental Protection and Energy); M4. NETCET project. (by the partnership: City of Venice, University of Padua, City of Pescara, Cetacea Foundation, ISPRA, State Institute for Nature Protection of Croatia, Blue World Institute, Herpetofauna Albanian Society, Association for Protection of Aquatic Wildlife of Albania, Institute for Marine Biology of Montenegro, University of Primorska, WWF Italy, Marine Educational Centre Pula) and M5. Adriatic Dolphin Project (by NGO Plavi svijet).

Data collection activities for mammals in the Adriatic Sea are conducted six type of projects: D1) Counts of bycatch/mortality rate of small toothed cetaceans; D2) Counts of *Tursiops truncatus*; D3) Counts of *Stenella coeruleoalba*; D4) Spatial and age distribution of *Stenella coeruleoalba*; D5) Spatial and age distribution of *Tursiops truncatus* and D6) Habitat condition parameters.

The NGO Plavi svijet (https://www.blue-world.org/) collect data on D1-D5. The Institute of Oceanography and Fisheries is responsible for D6. Additionally, local fishermen should report bycatch to the Ministry of Agriculture (D1).

Usually, the NGO Plavi svijet provides data to the Ministry and/or to the Institute of Oceanography and Fisheries, who are then responsible for uploading data to the marine wise portal.

A1.4.2 Data flow diagram



A1.5 MSFD D1 Fish

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	X
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.5.1 Data flow description

The Ministry of Environmental Protection and Energy published a new strategic document as an update of the Marine and Coastal Environment Management Strategy, which contains the report on the current status of assessment types and species relevant to articles 8, 9 and 10 of the MSFD.

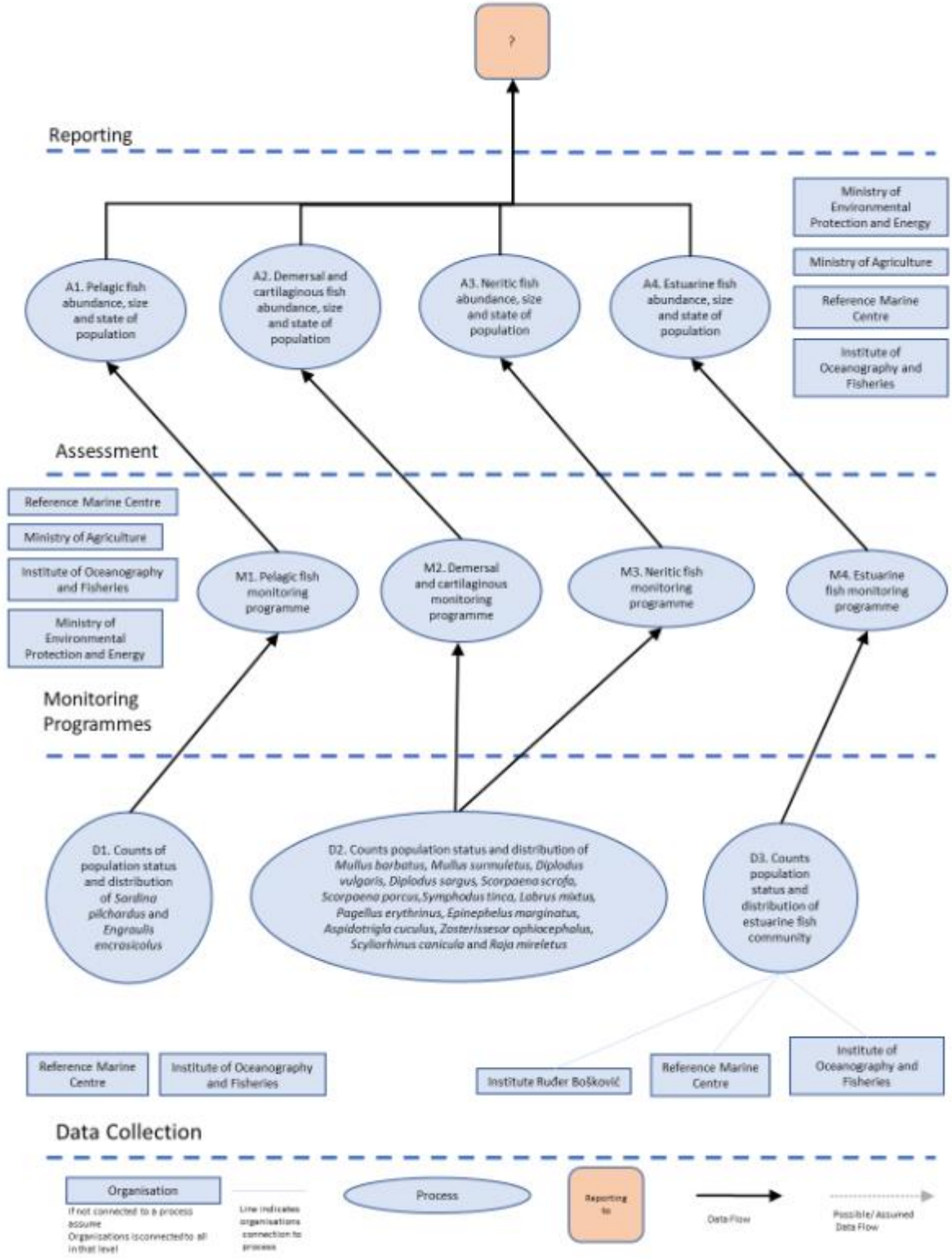
For Adriatic Sea fish abundance, distribution, population status and ecosystem structure, the document prescribes categories of fish that should be included in the monitoring: pelagic, demersal and cartilaginous fish, neritic and estuarine fish as well; namely *Sardina pilchardus* and *Engraulis encrasicolus, Mullus barbatus, Mullus surmuletus, Diplodus vulgaris, Diplodus sargus, Scorpaena scrofa, Scorpaena porcus,Symphodus tinca, Labrus mixtus, Pagellus erythrinus, Epinephelus marginatus, Aspidotrigla cuculus, Zosterissesor ophiocephalus, Scyliorhinus canicula* and *Raja mireletus.* The species of estuarine fish are not specified. Regarding the parameters for each category, the Report listed abundance, population status and distribution of species to collect twice per year.

The Ministry of Environmental Protection and Energy does not current collect data for D1 descriptor of fish biodiversity. Instead, there is D3 descriptor under regular monitoring. Therefore there no data are available for the MSFD D1 fish descriptor.

Nevertheless, the Ministry of Environmental Protection and Energy prescribed the Protocol of notification and response for severely injured, ill or dead marine animals (marine mammals, sea turtles and cartilaginous fish) (HAOP, 2018) http://www.haop.hr/hr/tematska-podrucja/prirodne-vrijednosti-stanje-i-ocuvanje/ukljucite-se-u-zastitu/protokoli-za-0. According to the Protocol, wounded or dead cartilaginous fish specimen should be recorded.

During their regular activities, fishing vessels larger than 10 meters are obliged to prepare and deliver reports on the catch and bycatch.

A1.5.2 Data flow diagram



A1.6 MSFD D1 Reptiles

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.6.1 Data flow description

The Government of the Republic Croatia established the Marine Reference Centre (2012-2016; 2018 – 2024) at the Institute of Oceanography and Fisheries in collaboration with the Institute Ruđer Bošković (http://www.haop.hr/hr/novosti/odreden-referentni-centar-za-more). Its role is to support the Ministry of Environmental Protection and Energy to deliver MSFD and other marine monitoring programmes.

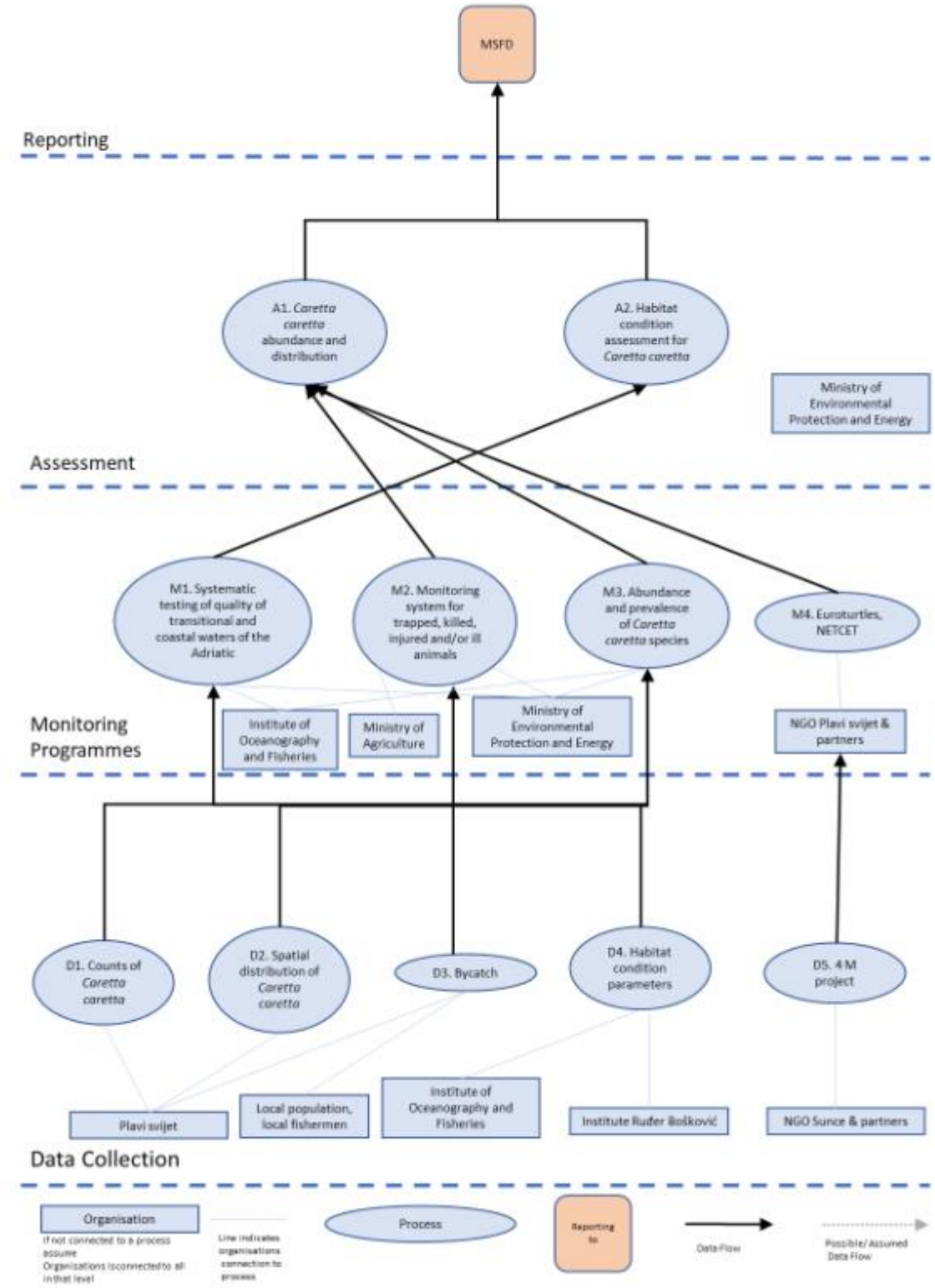
The Institute uploads the data to the Water Directive and the MSFD Portal (https://wise-test.eionet.europa.eu/marine) and informs the Ministry that the data are available on the portal; the Ministry reprts the information to the European Commission.

D1 reptiles assessments include: A1. *Caretta caretta* population status, abundance, distribution; and A2. Habitat condition assessment for *Caretta caretta.* The Institute of Oceanography and Fisheries collects data from the NGO Plavi svijet, from bycatch reported by fishing vessels and by citizen alert (Ministry of Agriculture database) and from their own research activities (http://baltazar.izor.hr/azopub/bindex) . The assessment report is available every six years.

Caretta caretta is the only reptile species monitored in the Adriatic Sea through the MSFD D1 descriptor. There are four monitoring programmes related directly or indirectly to it: M1. Systematic testing of the quality of transitional and coastal waters of the Adriatic (part of the Water Directive; delivered by the Institute of Oceanography and Fisheries and Ministry of Environmental Protection and Energy); M2. Monitoring system for trapped, killed, injured and / or ill of strictly protected animals (Ministry of Agriculture, Ministry of Environmental Protection and Energy); M3. Population status, abundance and prevalence of *Caretta caretta* species (Ministry of Environmental Protection and Energy); M4. Euroturtles, NETCET (NGO Plavi svijet & partners).

Reptile data collection in the Adriatic Sea is mostly undertaken by NGOs: Plavi svijet collect data on abundance and distribution of the Adriatic sea turtles, as well as on dead specimens (D1-D3). The Institute of Oceanography and Fisheries collects data on habitat condition regarding water quality in the Middle and Southern Adriatic Sea. The Ruđer Bošković Institute collects the same data in the Northern Adriatic Sea (D4). The NGO Sunce, through the project '4M', undertook data collection for sea turtles in the Adriatic (D5).

A1.6.2 Data flow diagram



A1.7 MSFD D1 Benthic habitats

Country:		Croatia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	x
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		Mediterranean
Sub region/s		Adriatic Sea

A1.7.1 Data flow description

The Ministry of Environmental Protection and Energy, as the National Reference Centre for MSFD, established the Marine Reference Centre (MRC) (2018 – 2024) at the Institute of Oceanography and Fisheries in collaboration with the Institute Ruđer Bošković (http://www.haop.hr/hr/novosti/odreden-referentni-centar-za-more). The MRC monitors and evaluates the state of the marine environment, fisheries, mariculture and sea-bathing quality, according to the monitoring programs developed under specific regulations and international agreements. The MRC Programme is a follow-up of the previous Project Jadran (1998-2015) (https://jadran.izor.hr/jadran/index.htm). This chapter defines Assessment of soft and hard substrates condition and biogenic communities' indicators. Regarding the monitoring programmes, there is the Monitoring Programme for Habitat Condition Assessment – Quantitative Data Collection approach and Benthic Communities Monitoring programme.

The MRC collects samples of sea water according to the sampling protocol for: environmental, biological, fishery indicators, as well as chemical, physical and all other parameters. For benthic communities, there are counts on variety of species, number of individuals, area coverage, and abundance.

The environmental indicators represent a quantitative assessment of ecological status of transitional, coastal and offshore waters; quality of the cultivated marine organisms and its sea quality; river influx WEU7; hot spots; marine organisms list in the main Croatian ports; waste in sea and submarine noise.

The biological indicators contain assessments of: biological quality of transitional waters – phytoplankton WEC1a; biological quality of transitional waters – fish WEC1d; biological quality of transitional waters – classification (ecological status) WEC1e; biological quality of coastal waters – phytoplankton WEC2a; biological quality of coastal waters – macroalgae WEC2c; biological quality of coastal waters – fish WEC2d; introduction and spread of invasive species; Phytoplankton algae in transitional and coastal waters and sea – WEU14; biological quality of sea WEC6.

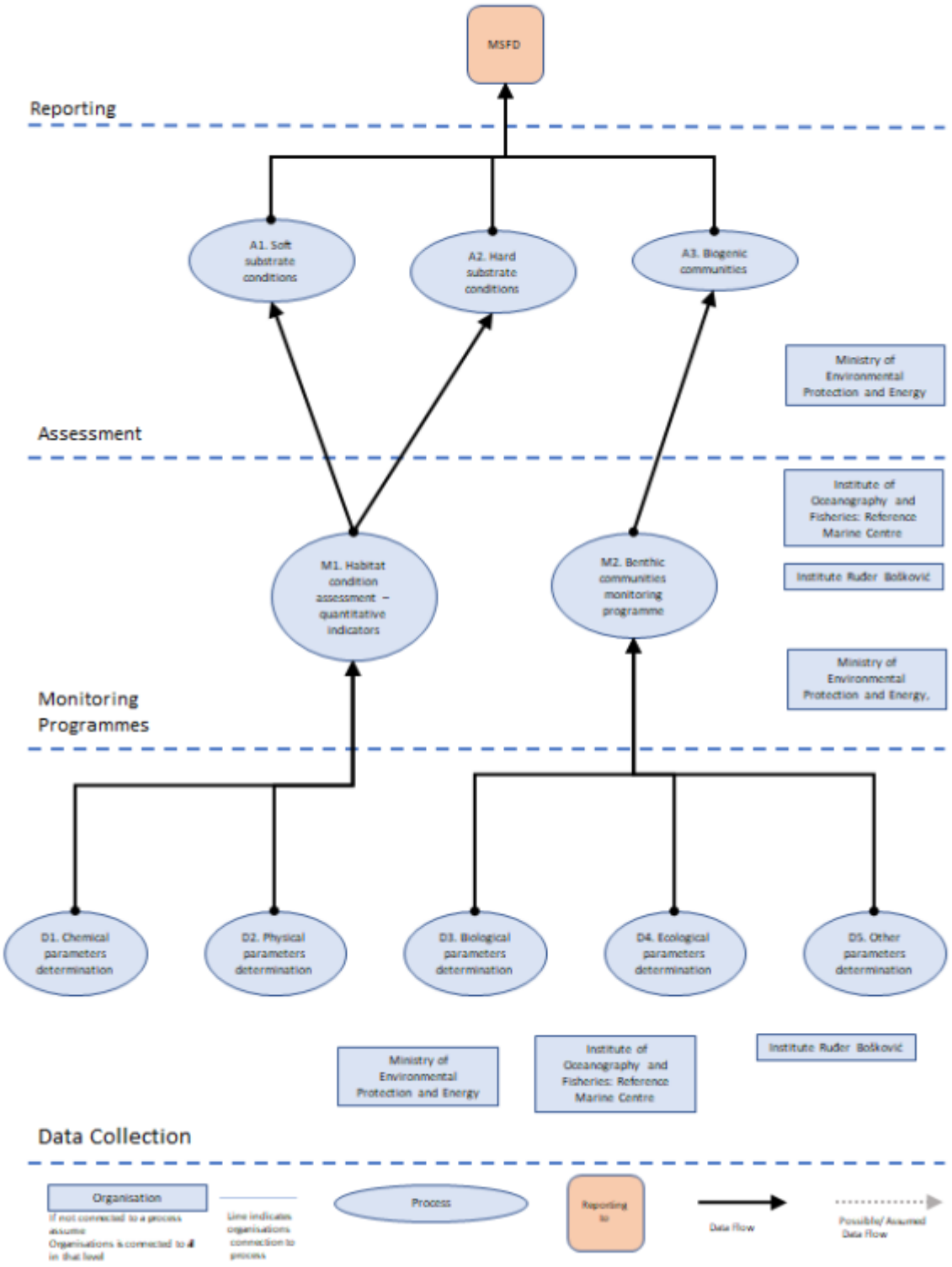
Chemical indicators are composed of: hazardous substances in marine sediment WHS5; hazardous substances in marine organisms WHS6; eutrophication status; suspended matter in sea water (total, inorganic, organic); low oxygen concentrations in the bottom layer or oxygen saturation WEU15.

There are only two physical indicators: temperature, salinity and density of sea water and sea level change.

Other indicators include: accidental pollution of the Adriatic Sea and coast; sea pollution from maritime transportation; sea-bathing water quality.

Following data analyses, the MRC delivers results indicating the status of benthic habitat condition of the indicator species in the Adriatic Sea.to the Ministry of Environmental Protection and Energy.

A1.7.2 Data flow diagram



Annex 2 Estonia data flow summary

A2.1 Birds Directive, Habitats Directive

Country:		Estonia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	x
	Habitats Directive	x
Marine region		Baltic Sea
Sub region/s		HELCOM Gulf of Riga, Gulf of Finland, Northern Baltic Proper, Eastern Gotland Basin

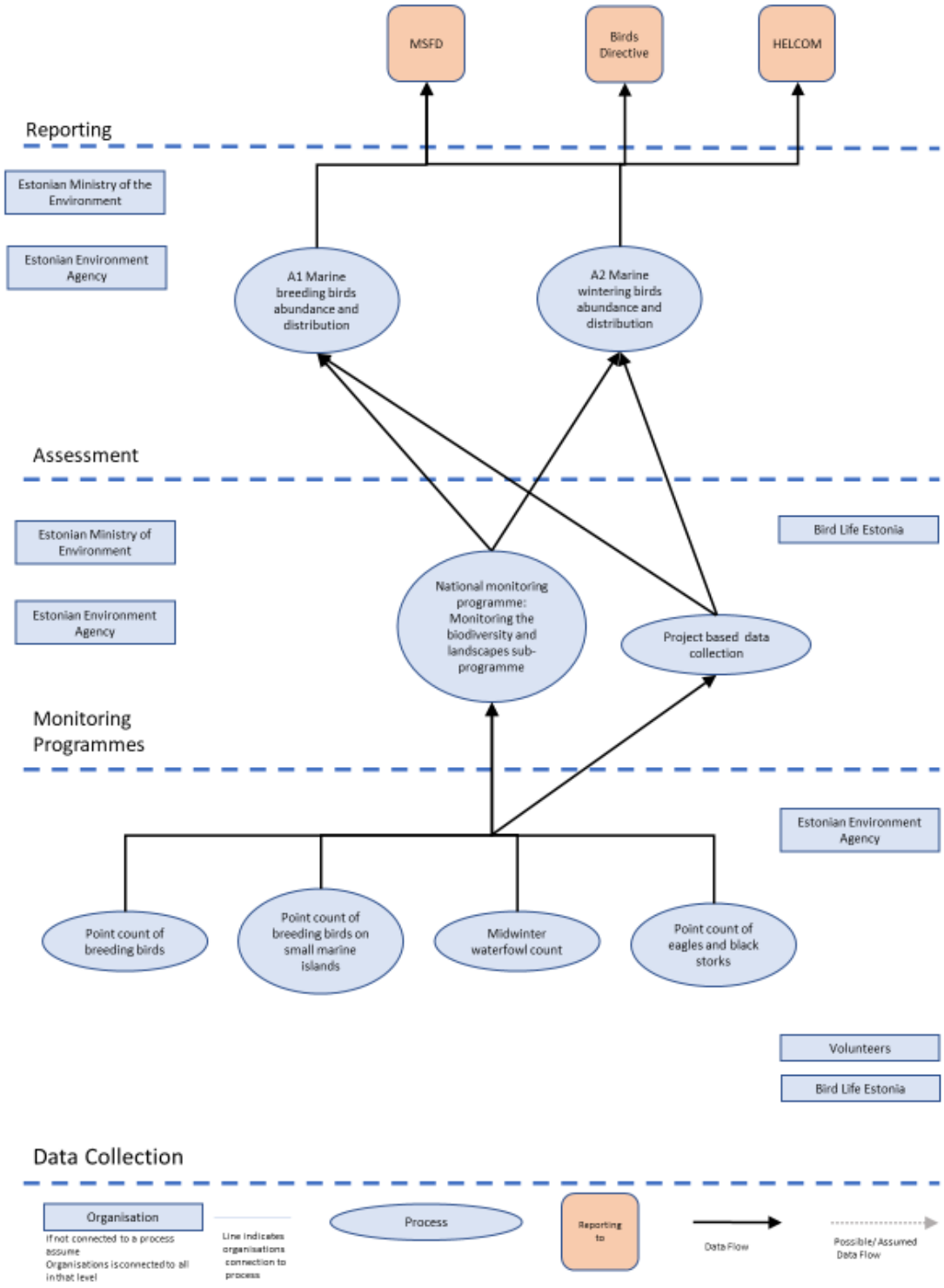
A2.1.1 Data flow description

Data collection is coordinated by the Estonian Environmental Agency, which contracts BirdLife Estonia through a procurement process and as well as using volunteers coordinated by the Estonian Environmental Agency. Information is collected on breeding birds on coastal grasslands, breeding birds on marine islets, midwinter water bird counts and point counts of white-tailed eagles.

The data collected are submitted to the Monitoring the biodiversity and landscapes sub-programme of the national environmental monitoring programme. A lot of data is collected through different projects such as pan-Baltic bird counting as well as volunteer monitoring.

Data collected are used to produce assessments of national trends that are reported to the Birds Directive, HELCOM and MSFD D1 on the abundance and distribution of breeding and wintering waterfowl.

A2.1.2 Data flow diagram



A2.2 MSFD D1 Mammals, Habitats Directive

Country:		Estonia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	x
Marine region		Baltic Sea
Sub region/s		Ringed seal: HELCOM Gulf of Riga; Grey seal: Baltic Sea

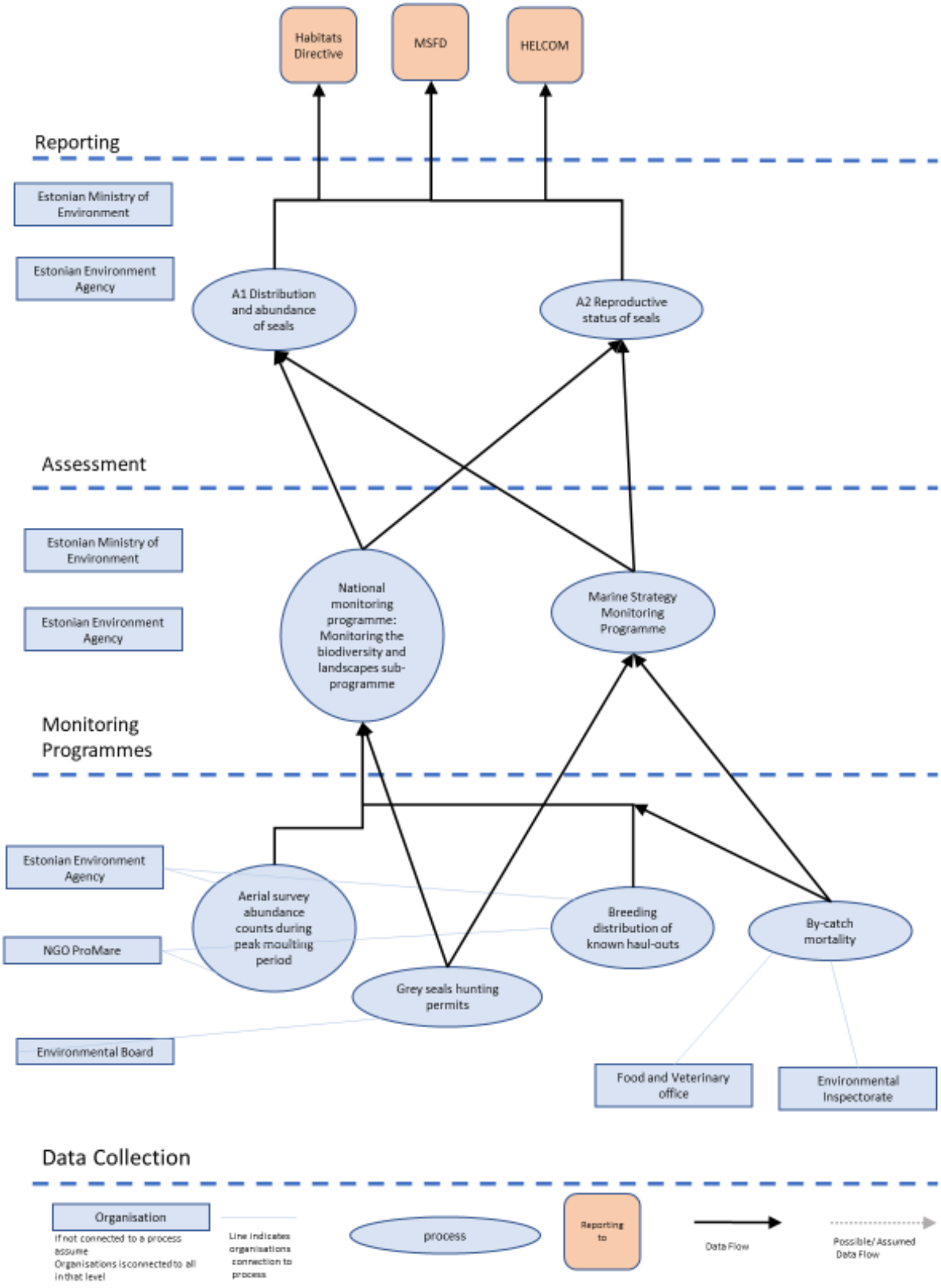
A2.2.1 Data flow description

Data collection is coordinated by the Estonian Environmental Agency, which contracts NGO ProMare through a procurement process. Data are collected on the abundance and distribution of seals through aerial surveys during the peak moulting period of the known haul-outs. However, distribution and abundance of ringed seals have large gaps in long-term data because of warm winters (no ice-cover) and their breeding success thus can't be assessed according to the existing methodology.

The data collected are submitted to the national environmental monitoring programme - monitoring the biodiversity and landscapes sub-programme, and are also used in the MSFD monitoring programme. Currently circa 50 grey seals are permitted to be hunted annually but in reality, a maximum of 20 seals are hunted on average. Hunting data are collected by the Environmental Board. Data on by-catch mortality are collected by the environmental inspectorate. These data are used in the MSFD monitoring program.

Data collected are used to produce assessments of national trends that are reported to the Habitats Directive, HELCOM and MSFD D1 on the abundance and distribution of seals

A2.2.2 Data flow diagram



A2.3 MSFD D1 Fish, Habitats Directive

Country:		Estonia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		Baltic Sea
Sub region/s		HELCOM Gulf of Riga, Gulf of Finland, Northern Baltic Proper, Eastern Gotland Basin

A2.3.1 Data flow description

Data collection is coordinated by the Estonian Ministry of the Environment Fisheries Department and is mainly conducted by the Estonian Marine Institute on the grounds of scientific research.

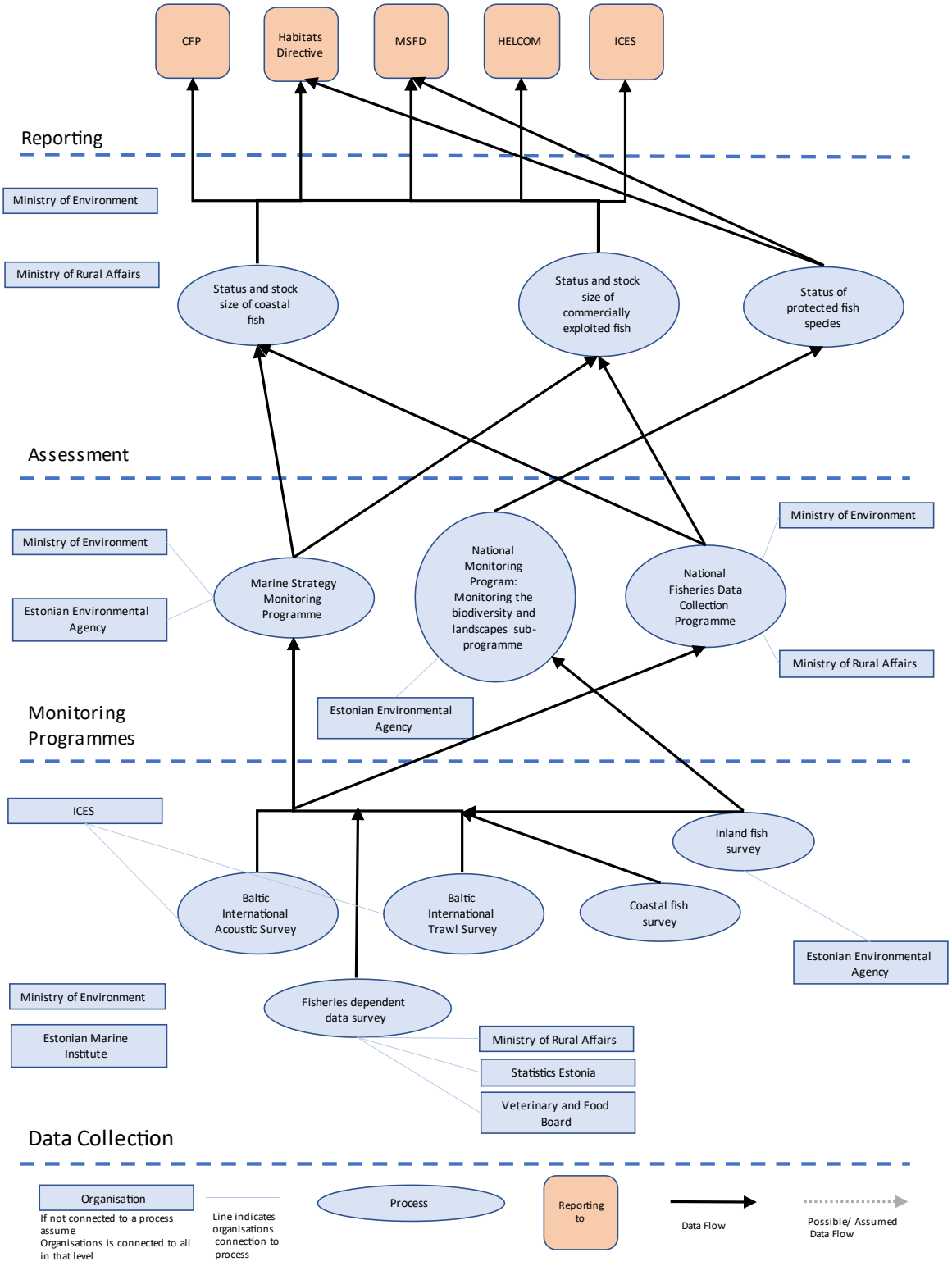
Data are collected under the National Fisheries Data Collection Program, Baltic International Trawl Survey, Baltic International Acoustic Survey, Coastal fish survey, National fisheries survey, Fisheries dependent data survey and River fish survey. The Baltic International acoustic survey collects data on sprat and herring. The Baltic International trawl survey collects data on cod, flounder and other less numerous bottom dwelling fish. Both surveys are coordinated by ICES. Coastal fish survey collect data on perch, pikeperch, flounder, eel, cyprinids and alien species. Data on diadromous species are collected from river fish surveys under the National monitoring program which is coordinated by the Estonian Environmental Agency. No data on diadromous species are collected from the coastal waters.

All of these data (besides data from river fish survey) are collected in the framework of the Estonian Work Plan for data collection for the fisheries and aquaculture sectors, which is coordinated by the Environmental Ministry. These data are used in the MSFD monitoring program which is coordinated by the Environmental Agency.

Data collected are used to produce assessments of national trends, calculations of exploitation rates and catch limitations of coastal and commercially exploited fish that

are reported to MSFD, HELCOM, Habitats Directive, WFD, ICES, as well as Common Fisheries Policy

A2.3.2 Data flow diagram



A2.4 MSFD D1 Benthic habitats, Habitats Directive

Country:		Estonia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	x
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		Baltic Sea
Sub region/s		HELCOM Gulf of Riga, Gulf of Finland, Northern Baltic Proper, Eastern Gotland Basin

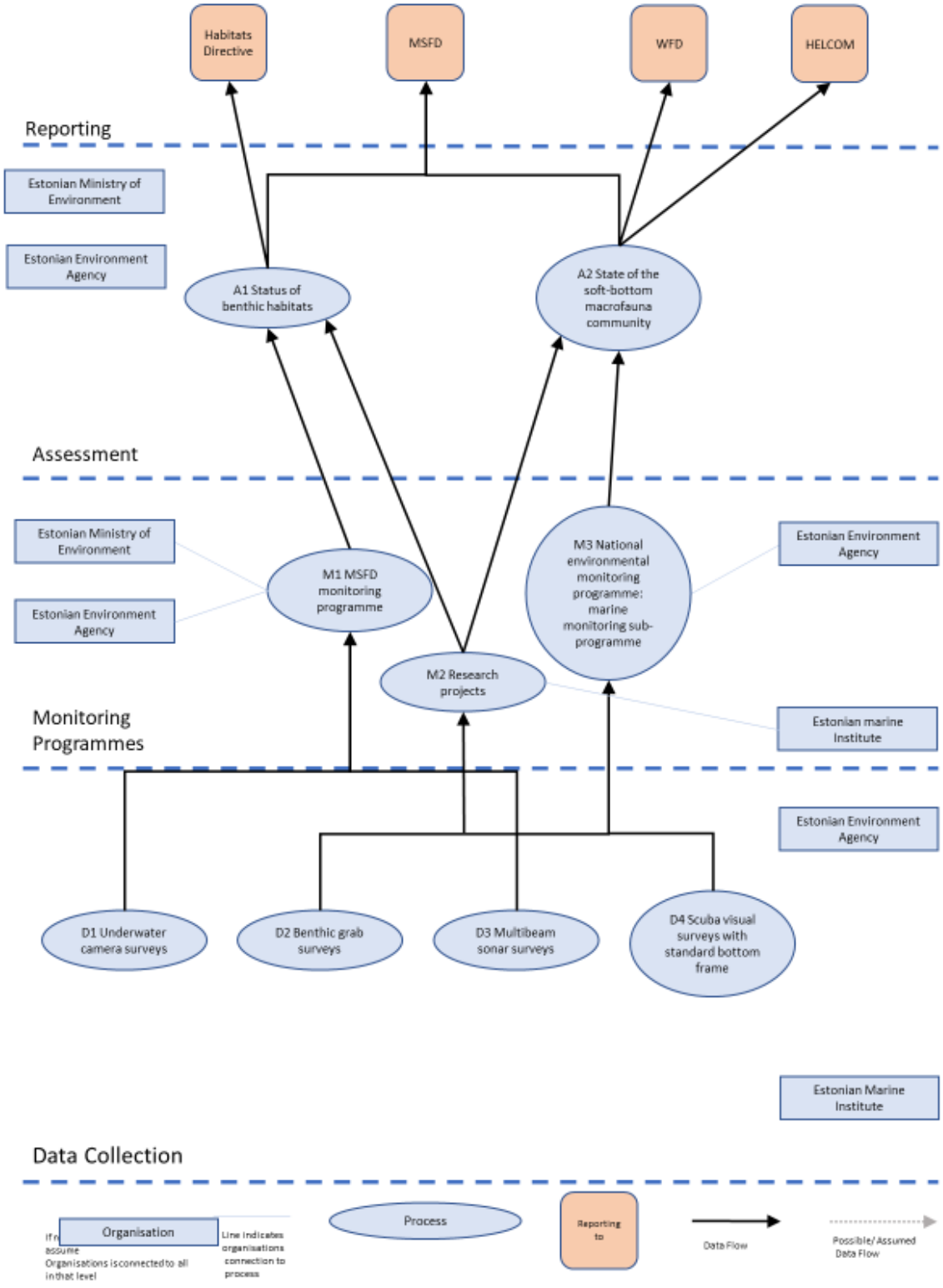
A2.4.1 Data flow description

Data collection is coordinated by the Estonian Environmental Agency in collaboration with the Estonian Ministry of the Environment, which contracts the Estonian Marine Institute through a procurement process. Data are collected in situ using underwater camera surveys, benthic grab surveys, multibeam sonar surveys and scuba diver visual surveys coupled with standard bottom frame sampling.

These data are used in the MSFD monitoring program as well as the national environmental monitoring program - marine monitoring sub-program. The data for HD habitats are collected through projects. Only a marine strategy specific monitoring program for the benthic habitats exists at the moment.

The data collected are used to produce assessments of national trends that are reported to the Habitats Directive, HELCOM and MSFD on the status of benthic habitats. Some data collected for the national marine monitoring sub-program are used to assess the status of soft-bottom macrofauna community under WFD

A2.4.2 Data flow diagram



A2.5 MSFD D6 Sea-floor integrity, Habitats Directive

Country:		Estonia
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	x
	Birds Directive	
	Habitats Directive	x
Marine region		Baltic Sea
Sub region/s		HELCOM Gulf of Riga, Gulf of Finland, Northern Baltic Proper, Eastern Gotland Basin

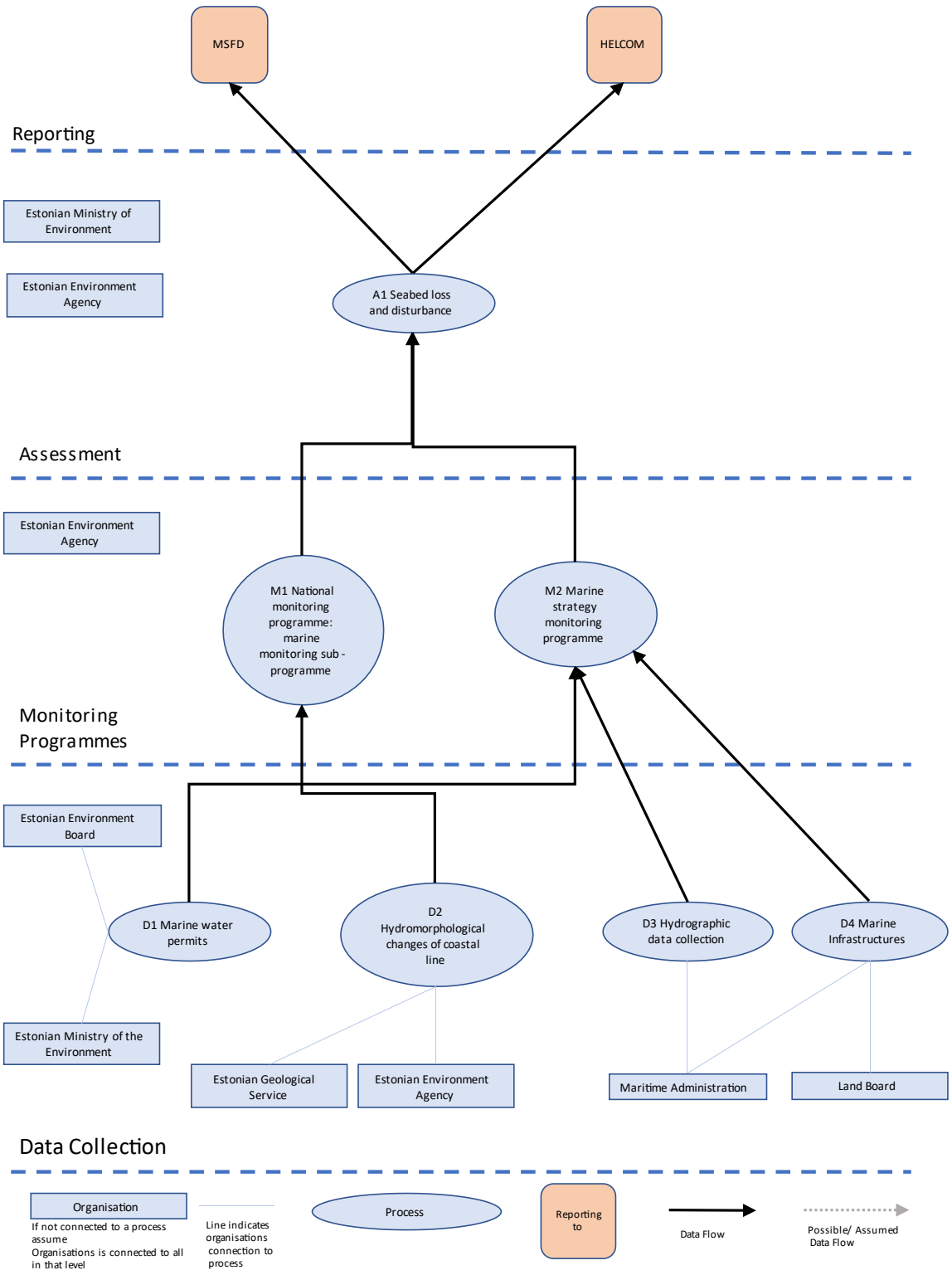
A2.5.1 Data flow description

Permits on the use of marine resources are issued by the Estonian Environmental Board. Data on the permits are stored in an open database. Data on the changes of the coastline are collected by the Estonian Geological Service annually in the frame of the Marine monitoring sub-program of the National monitoring program, which is coordinated by the Estonian Environmental Agency. Data collection on hydrographic changes is carried out by the Maritime Administration. Data on the marine infrastructures are collected by the Maritime Administration and reported to the Land Board to produce maps.

All data collected are used in the MSFD monitoring program.

These data are used to produce assessments of national trends that are reported to MSFD and HELCOM on the status of seabed loss and disturbance. Assessments are organized by the Estonian Ministry of the Environment through procurement process.

A2.5.2 Data flow diagram



Annex 3 Finland data flow summary

A3.1 Birds Directive

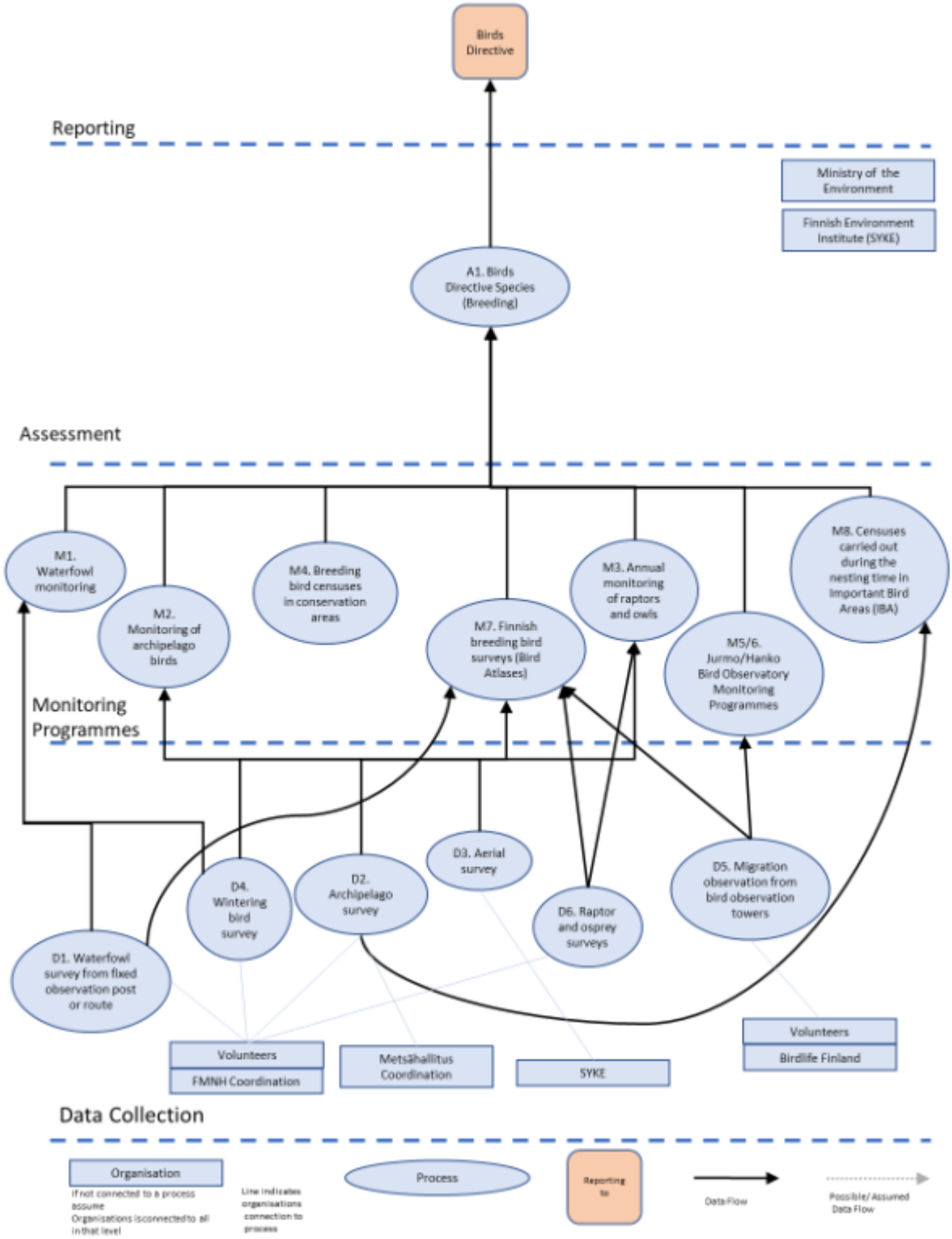
Country:		Finland
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	✓
	Habitats Directive	
Marine region		Baltic Sea
Sub region/s		

A3.1.1 Data flow description

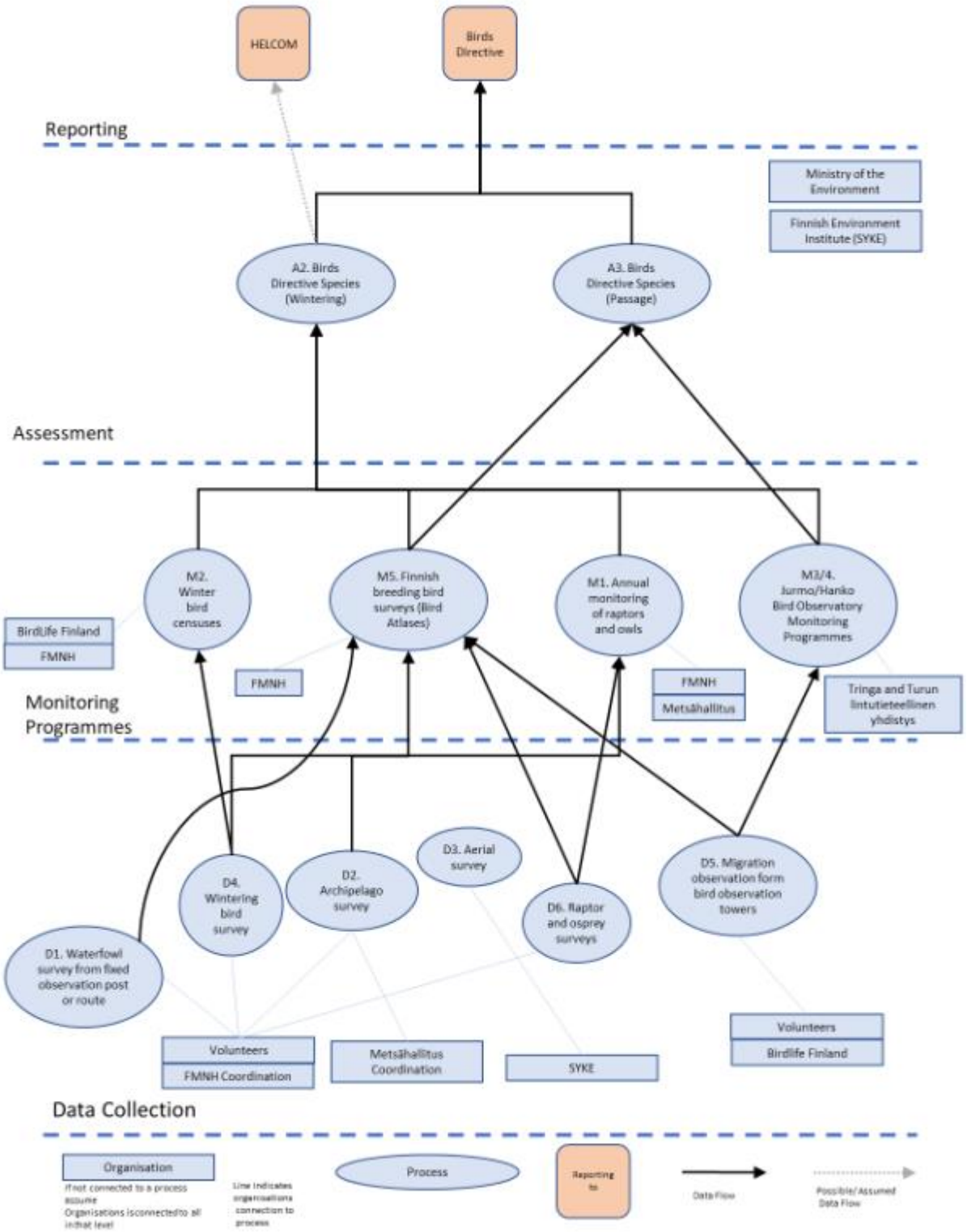
Some monitoring programmes and their data collection methods have been left out, as they are not relevant for marine species. These include land birds monitoring programme by FMNH and BirdLife Finland, Game triangle surveys and Northern Lapland grouse monitoring by LUKE, Agricultural environments bird monitoring by LUKE, Inland waters bird monitoring etc

A3.1.2 Data flow diagram

Assessment 1



Assessments 2 and 3



A3.2 Habitats Directive

Country:		Finland
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		Baltic Sea
Sub region/s		

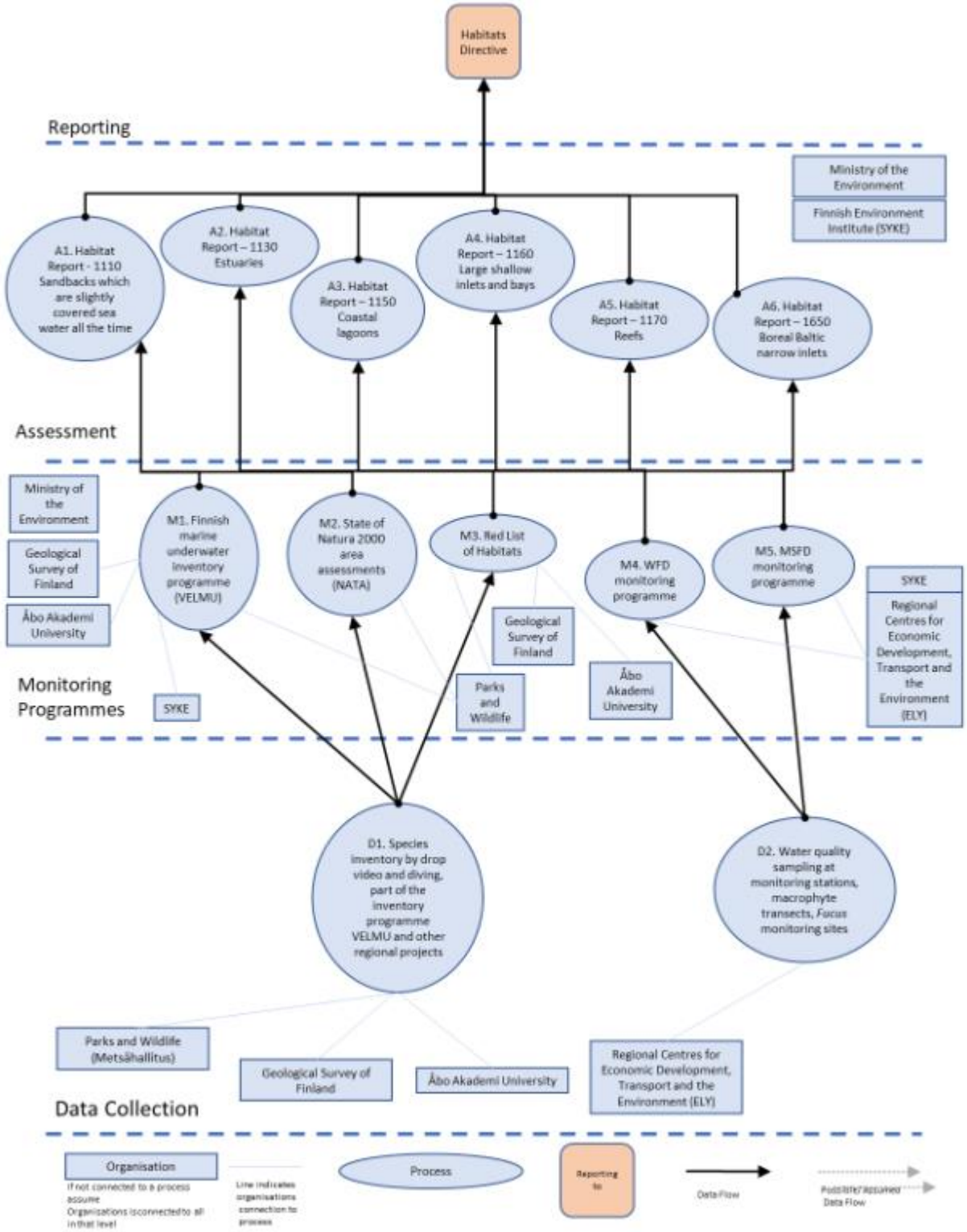
A3.2.1 Data flow description

For the Habitats Directive marine habitats, no monitoring programme exists. The information for the reports is gathered separately for each reporting round (every 6 years) using scientific publications, WFD and MSFD monitoring data, the national underwater marine inventory programme VELMU and related projects, other processes such as NATA (the state of the Natura 2000 areas evaluation process), the Red List of Habitats and expert opinion. The need for a proper monitoring programme was acknowledged during and after at least the two previous reporting rounds (2013 and 2019), but it has not been developed yet.

Other M4 (monitoring for other aspects of WFD) and M5 (MSFD) data sources are not listed in this description because they are numerous. The assessments only used the WFD ecological status assessment and the MSFD status as general sources for trends in change of environmental status and background information for the structure and function of the habitats.

D3 is a separate exercise done to estimate lost habitat area (both coastline and seafloor) for the "bay-type" habitats. Data used include HELCOM HOLAS physical loss data, CORINE 2018 land cover data, national maritime traffic lanes and shoreline constructions data, building data and other human pressure data e.g. from aerial photography. Using this, a percentage of lost habitat was calculated for the three habitats.

A3.2.2 Data flow diagram



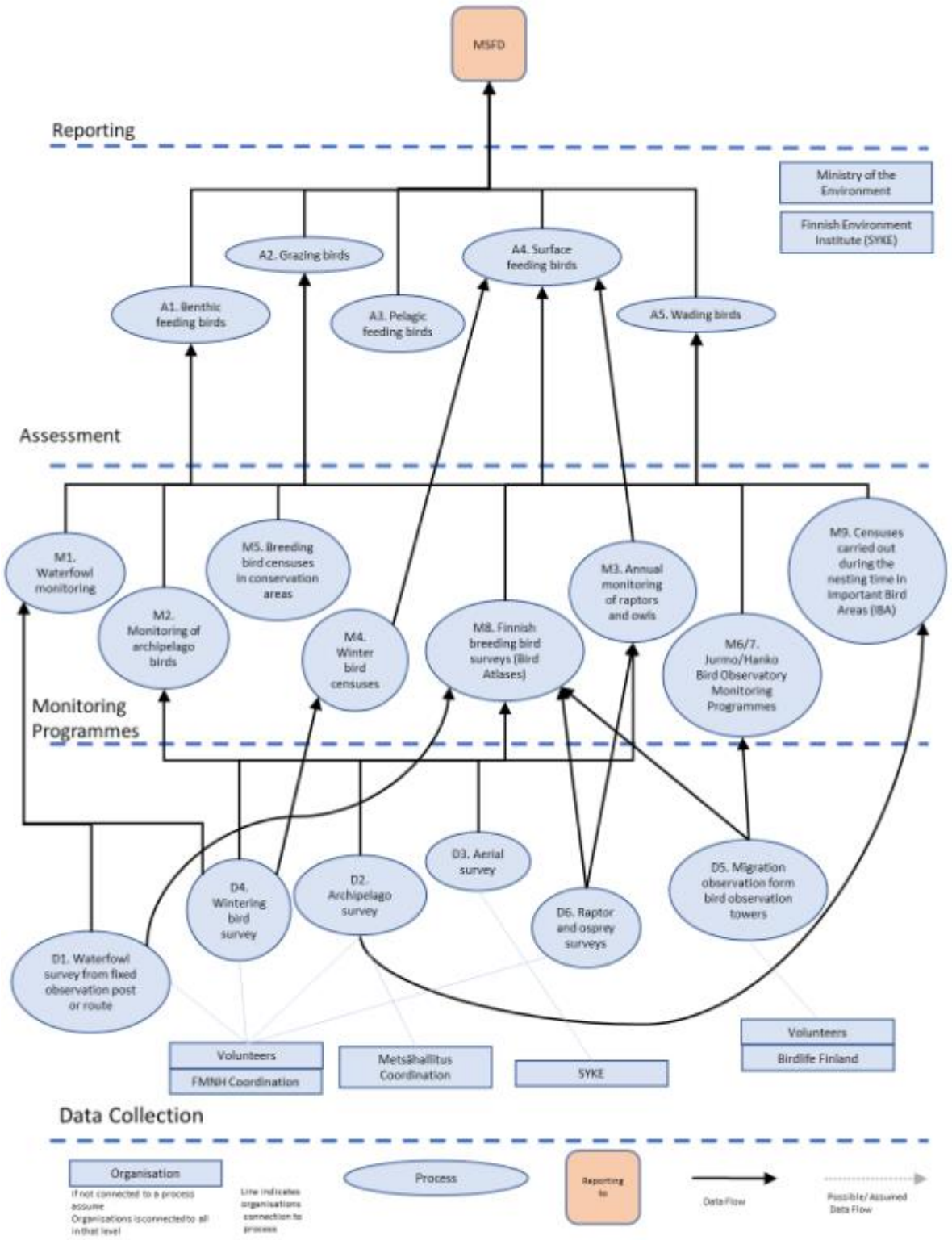
A3.3 MSFD D1 Birds

Country:		FINLAND
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	X
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Baltic Sea
Sub region/s		

A3.3.1 Data flow description

n/a

A3.3.2 Data flow diagram



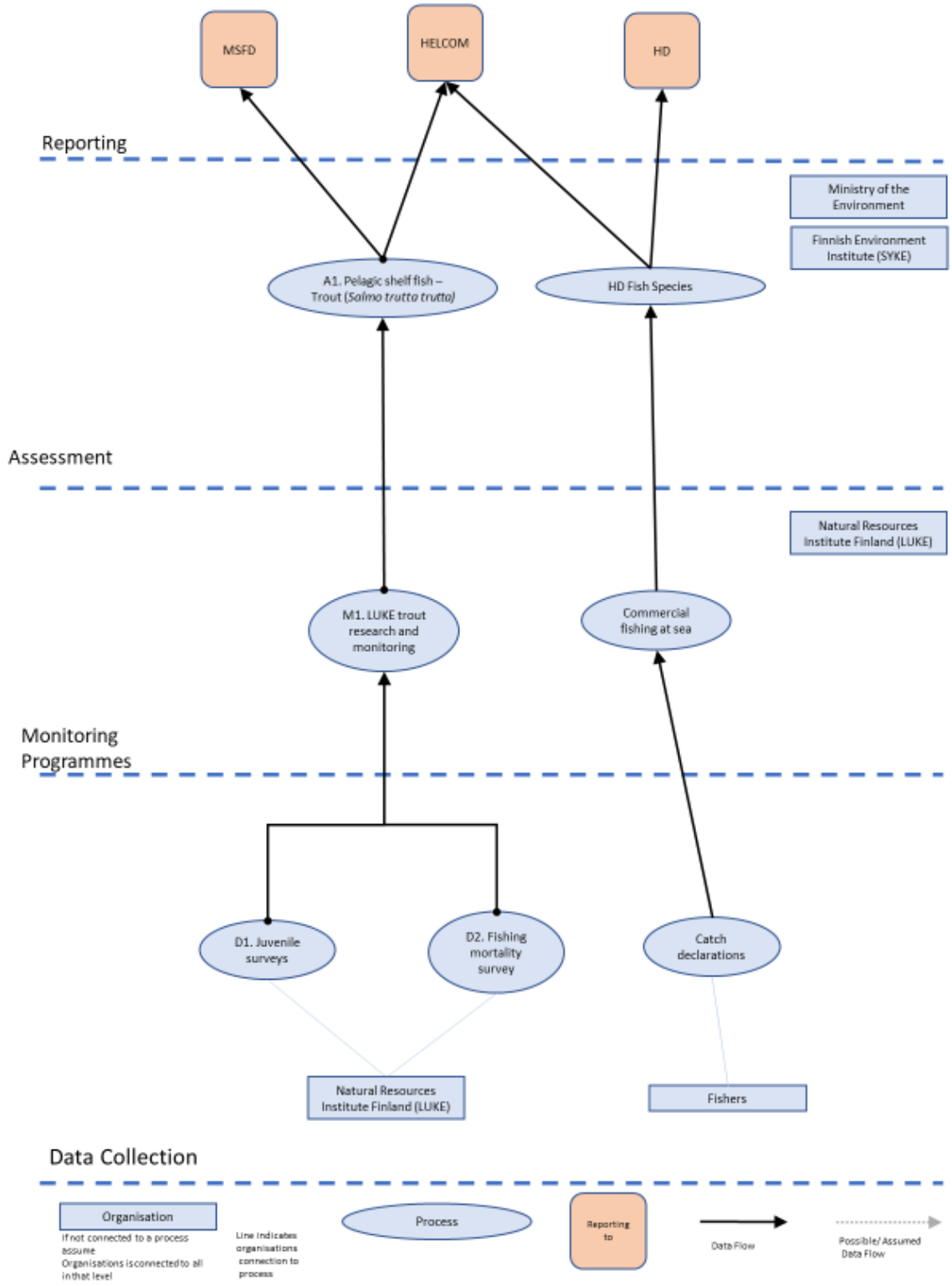
A3.4 MSFD D1 Fish

Country:		FINLAND
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	X
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Baltic Sea
Sub region/s		

A3.4.1 Data flow description

Trout (Salmo trutta trutta) is assessed for MSFD using 1. Mortality rate / Mortality rate from fishing, 2. Abundance and 3. Distribution (range). Data for these is from research and monitoring by the Natural Resources Institute Finland (Luke). As the (sea) trout is an anadromous species that migrates to fresh water (rivers) for breeding, the surveys assessing the fecundity rate are done in rivers and streams where the juvenile fish spend their first years. Extensive fish stocking is also performed, and mortality rates are assessed from the amounts of marked stocked fish caught.

A3.4.2 Data flow diagram



A3.5 MSFD D1 Mammals

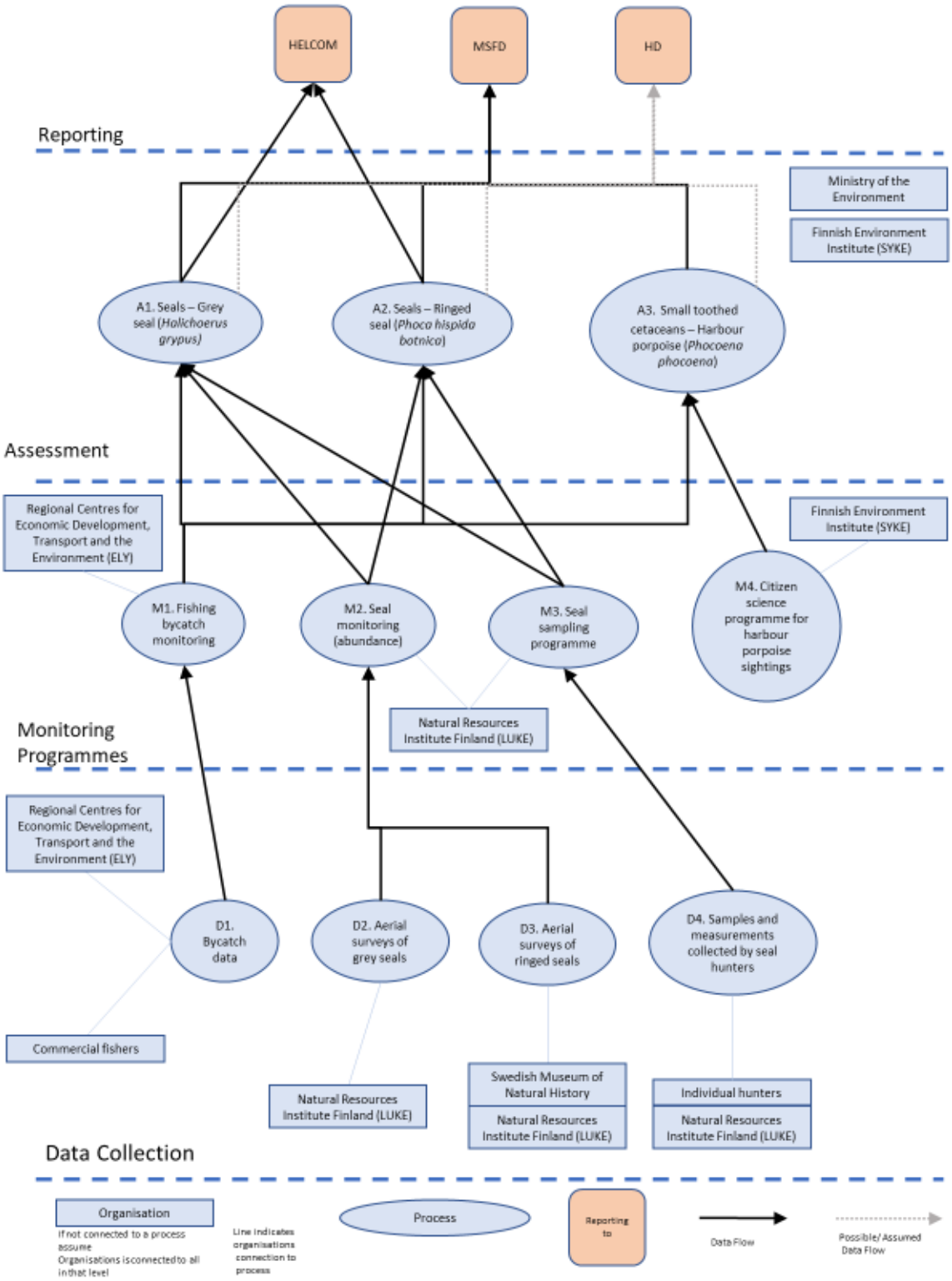
Country:		FINLAND
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	X
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Baltic Sea
Sub region/s		

A3.5.1 Data flow description

For harbour porpoise the assessment consists of reporting on mortality rate / mortality rate from fishing, abundance and distribution (range). Fishing mortality is being monitored through commercial fishing reporting requirements, but abundance and distribution are derived from the citizen science (collecting sightings) and acoustic monitoring in projects such as BIAS and SAMBAH which have already ended.

For seals there are monitoring programmes in place.

A3.5.2 Data flow diagram



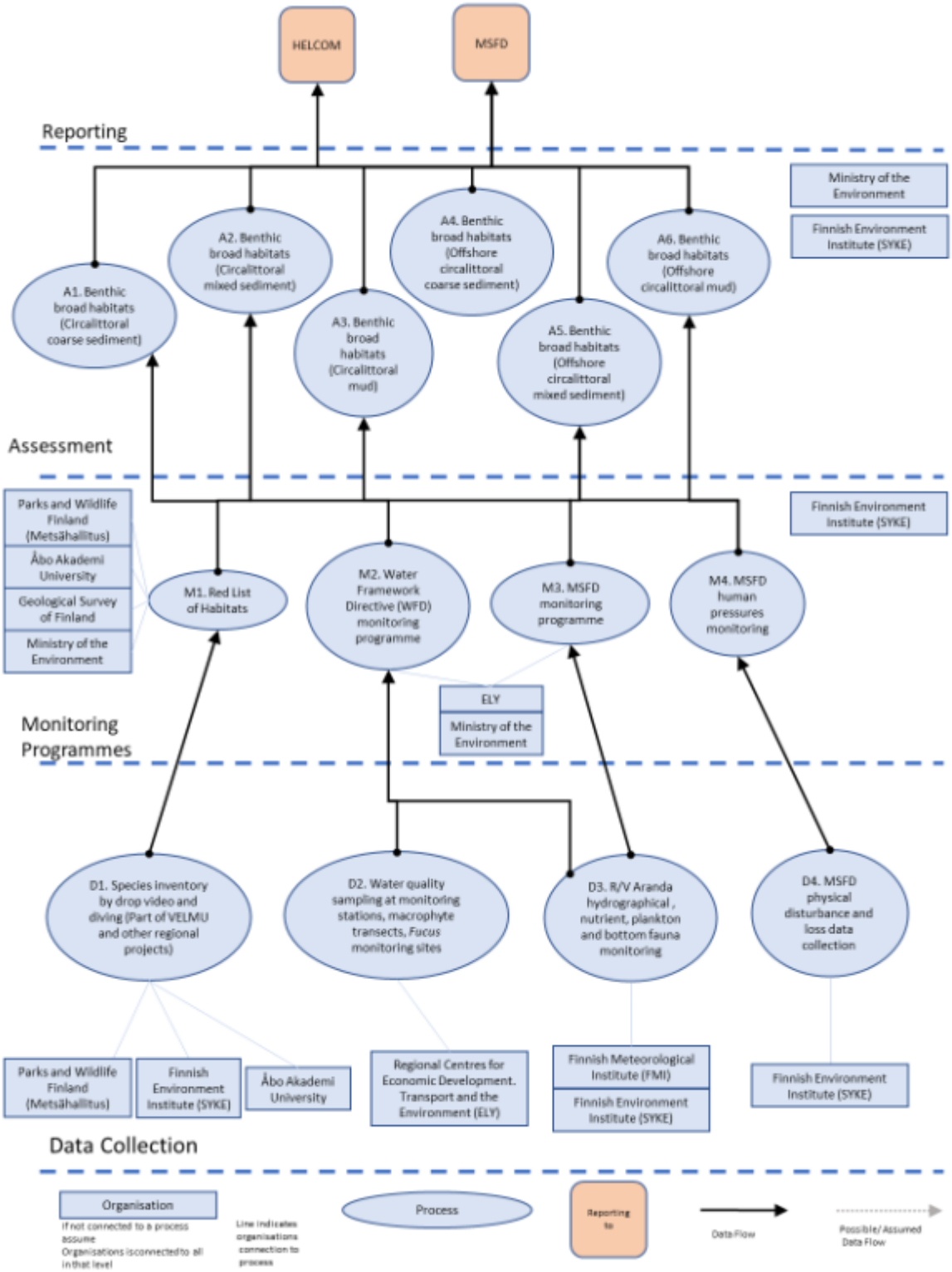
A3.6 MSFD D1 Benthic habitats and D6 Sea-floor integrity

Country:		FINLAND
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	X
	D6 on Sea-floor integrity	X
	Birds Directive	
	Habitats Directive	
Marine region		Baltic Sea
Sub region/s		

A3.6.1 Data flow description

Finland reported D6 Sea-floor integrity and D1 Benthic habitats using the same report. SYKE does the reporting (with the Ministry of the Environment coordinating) and Parks & Wildlife Finland (Metsähallitus) is also involved. The assessments use various data sources such as MSFD monitoring data by the R/V Aranda, information (including assessments of the ecological status) from the WFD monitoring programme and other available sources such as species and habitat data from surveys (VELMU) and the Red List if Habitats assessments. The R/V Aranda monitoring was established before the MSFD, but nationally the data gathered now serves MSFD reporting as well.

A3.6.2 Data flow diagram



Annex 4 France data flow summary

A4.1 Birds Directive

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	x
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.1.1 Data flow description

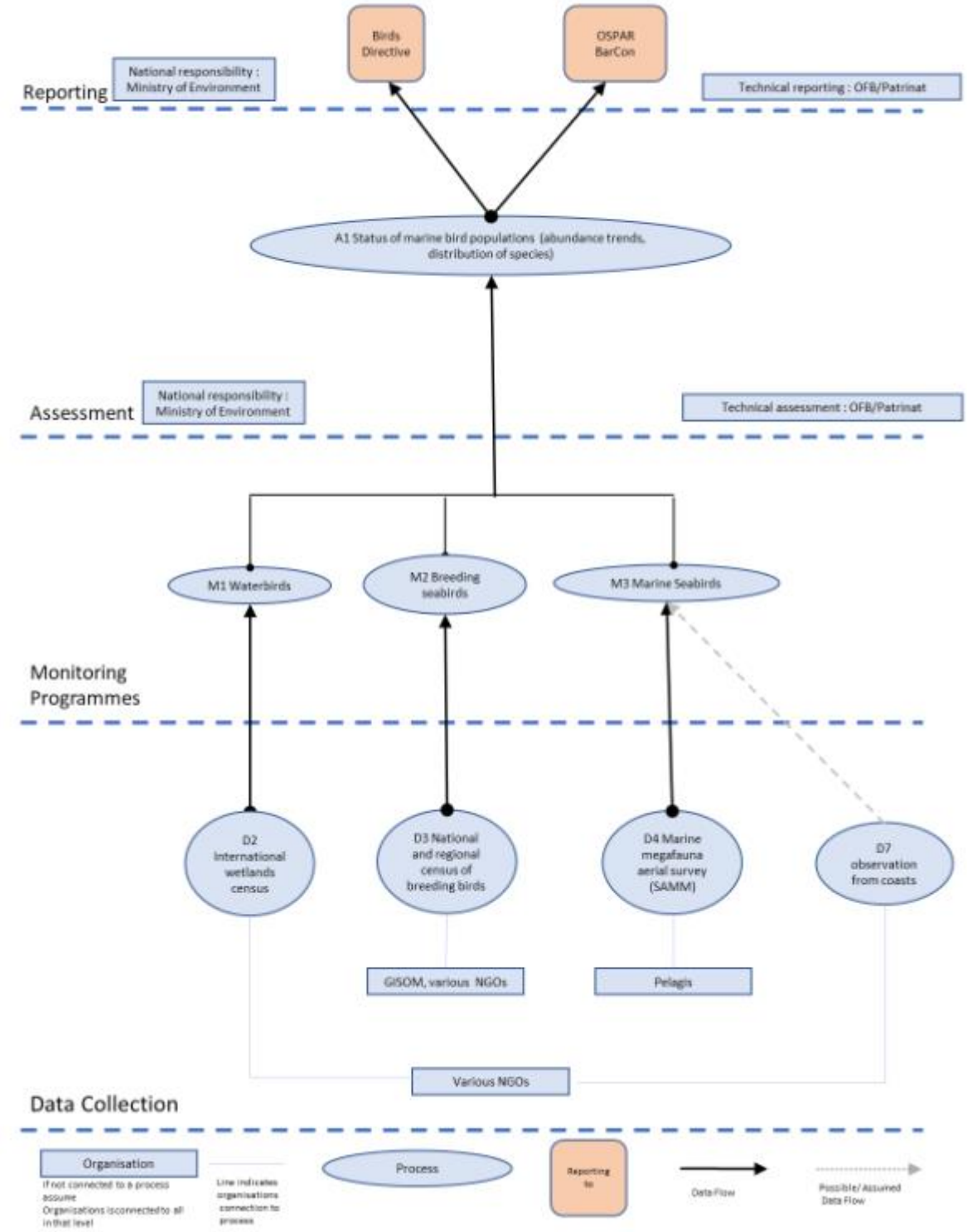
Monitoring of marine birds is conducted through two main monitoring programmes: Aerial monitoring of marine megafauna in mainland France (SAMM) and the National marine bird network (RESOM) and Marine Bird Observatory.

The Marine Bird Observatory centralises all the news and studies carried out by partners, public and non-governmental organizations (NGOs), managers of marine protected areas, scientists, research institutes, etc. and encourage the sharing of experiences and good practices on marine birds.

These monitoring programmes aim to inform the state of marine bird populations (trends, distribution of species) which is reported every three years. The last factsheet is available on INPN-MNHN's website[1].

[1] https://inpn.mnhn.fr/docs/N2000_EC/Note_synthese_2019_DO.pdf

A4.1.2 Data flow diagram



A4.2 MSFD D1 Birds

Country:		France
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

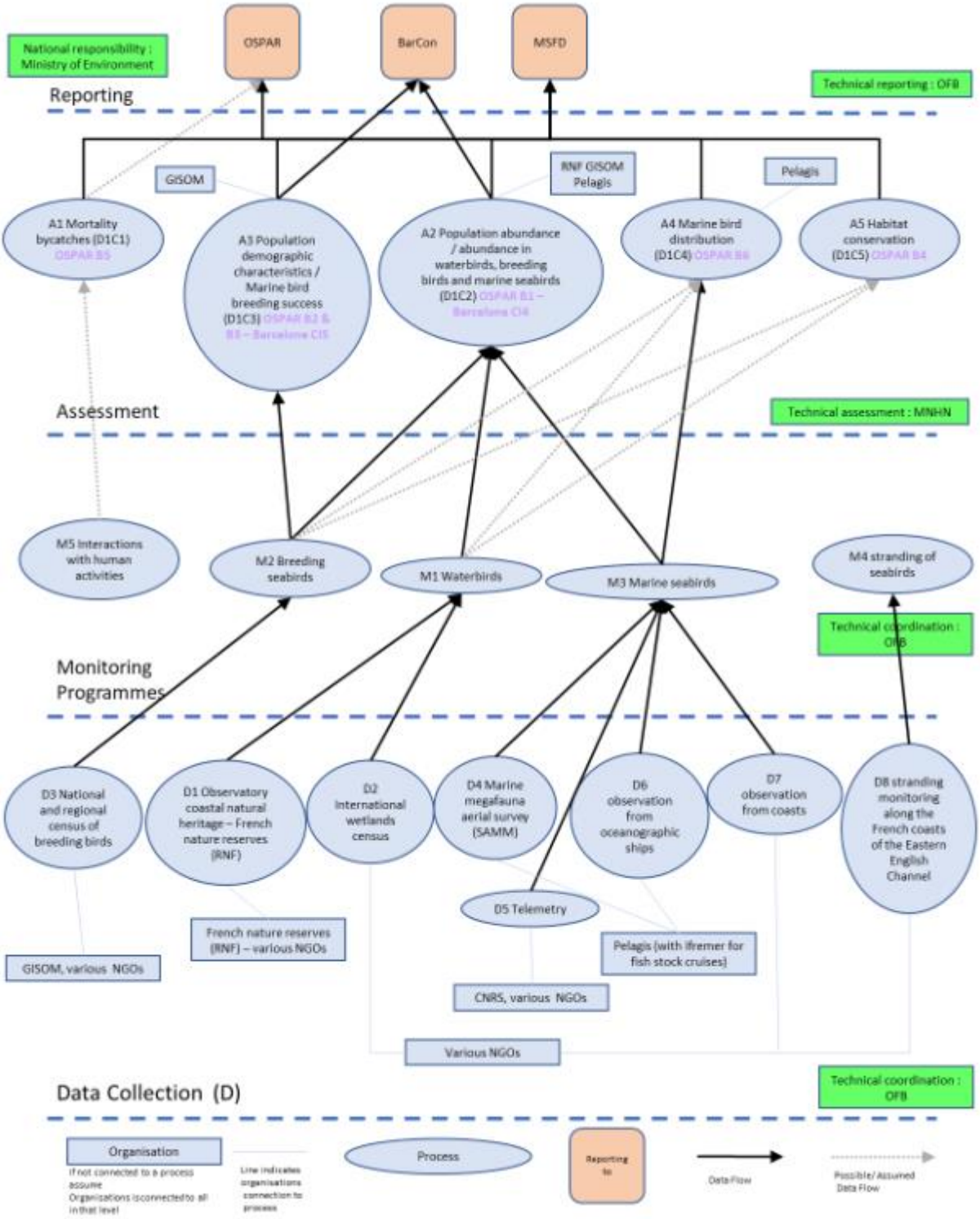
A4.2.1 Data flow description

The PELAGIS Observatory (Observation Systems for the Conservation of Mammals and Marine Birds (UMS 3462)), brings together observation and expert programmes for the conservation of populations of mammals and seabirds, as well as the management of their associated databases. It is managed by the CEBC research laboratory (CNRS & University of La Rochelle). There are two main data collection activities for marine birds: annual aircraft and ship counts. The aircraft counts feed into the Aerial monitoring of marine megafauna in mainland France (SAMM) while ship counts are driven by PELGAS, a monitoring programme primarily designed to monitor pelagic fish populations. It is assumed that the national bird protection association also has a role in marine birds inventories, although the latest information dates back from 2015 and it is uncertain whether inventories have been continued since then and whether these are still used for MFSD reporting purposes.

The Sea and coastal birds Observatory centralises all the news and studies carried out by partners, public and non-governmental organizations (NGOs), managers of marine protected areas, scientists, research institutes, etc. and encourage the sharing of experiences and good practices on marine birds.

The achievement of good ecological status (BEE) under the "Seabirds" component of descriptor 1 is defined according to two primary criteria (D1C1: mortality; D1C2: abundance) and three criteria secondary (D1C3: breeding success; D1C4: distribution; D1C5: habitat conservation). Only the criteria C2, C3 and C4 are informed by data monitoring and collection efforts.

A4.2.2 Data flow diagram



A4.3 MSFD D1 Mammals

Country:		France
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	**x**
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.3.1 Data flow description

Since its launch in 2015, the "Monitoring programmes for marine mammals and marine turtles" is sub-divided into five programmes:

Coastal groups of bottlenose dolphins (SP1)

Seal population census (SP2)

Marine mammals and turtles at sea (SP3)

Stranding programme (SP4)

Interactions between marine mammals and turtles and human activities (SP5)

These sub-programmes are conducted by Pelagis and the French Agency for Biodiversity and involve a variety of organisations from national marine reserves to

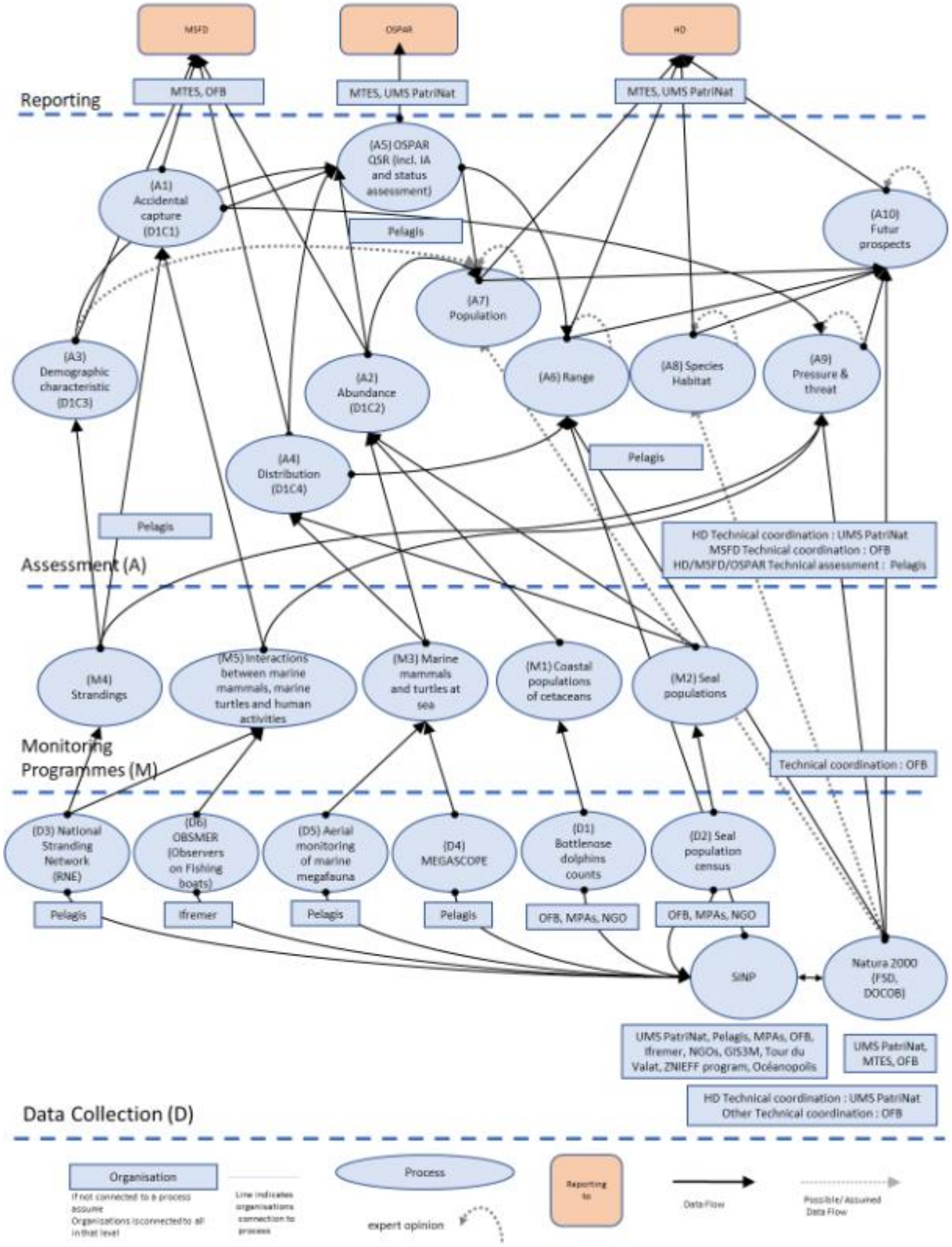
public agencies (e.g. Ifremer), observatories, scientific institutions (CEBC-CNRS), and NGOs.[2]

In total, these monitoring programmes rely on 10 different data collection measures including cetacean counts, seal population census, the National Stranding Network (RNE), MEGASCOPE campaigns (including PELMED, PELGAS, EVHOE, CGFS, IBTS), aerial monitoring of marine megafauna in mainland France (SAMM), and OBSMER.

These campaigns are designed to inform the good ecological status (BEE) under the "marine mammals" component of descriptor 1, which is informed by four primary criteria (Mortality by accidental capture (D1C1), Abundance (D1C2), Distribution (D1C4), Habitat condition and extent (D1C5)) and one secondary criterion (Demographic characteristics (D1C3)).

[2] https://www.ifremer.fr/sextant_doc/dcsmm/documents/Programme_surveillance/FichesPedagogiquesPdS/fiche%20p%C3%A9dagogique%202017-%20PdS%20Mammif%C3%A8res%20marins%20et%20tortues%20marines-%20VF.pdf

A4.3.2 Data flow diagram



A4.4 Habitats Directive

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.4.1 Data flow description

List of habitats of Community interest considered for France

HABITAT	
Code	Intitulé de l'habitat
1110	Bancs de sable à faible couverture permanente d'eau marine
1120	Herbiers à Posidonia (*Posidonion oceanicae*)
1130	Estuaires
1140	Replats boueux ou sableux exondés à marée basse
1150	Lagunes côtières
1160	Grandes criques et baies peu profondes
1170	Récifs
1180	Structures sous-marines causées par des émissions de gaz
8330	Grottes marines submergées ou semi-submergées

"Data Collection D7" includes various programmes such as (non-exhaustive list):

TEMPO network (Posidonia meadows monitoring network) [Andromède Océanologie]

RSP Corse (Posidonias Surveillance Network) [GIS Posidonie, Univ. Corsica]

SURFSTAT network (Surface analysis network for marine habitats) [Andromède Océanologie]

Monitoring EBQI Posidonia (Ecosystem-Based Quality Index) [GIS Posidonie]

RECOR (CORraligenous assembly monitoring network) [Andromède Océanologie]

Fauna Flora Monitoring [Normandy Coast Monitoring Unit]

Atlantic intertidal macroalgae monitoring [Univ. Western Brittany]

Subtidal macroalgae monitoring [MNHN Concarneau]

Monitoring of Mediterranean mediolittoral biocenoses - CARLIT (CARtografia LIToral) [Mediterranean Institute of Oceanology]

Pinna nobilis monitoring [Mediterranean Institute of Biodiversity and Marine and Continental Ecology)

Different Corallium rubrum monitoring [AMPs]

Atlantic maerl tracks [Univ. Western Brittany]

In "Monitoring", WFD and REBENT-Bretagne have been separated because:

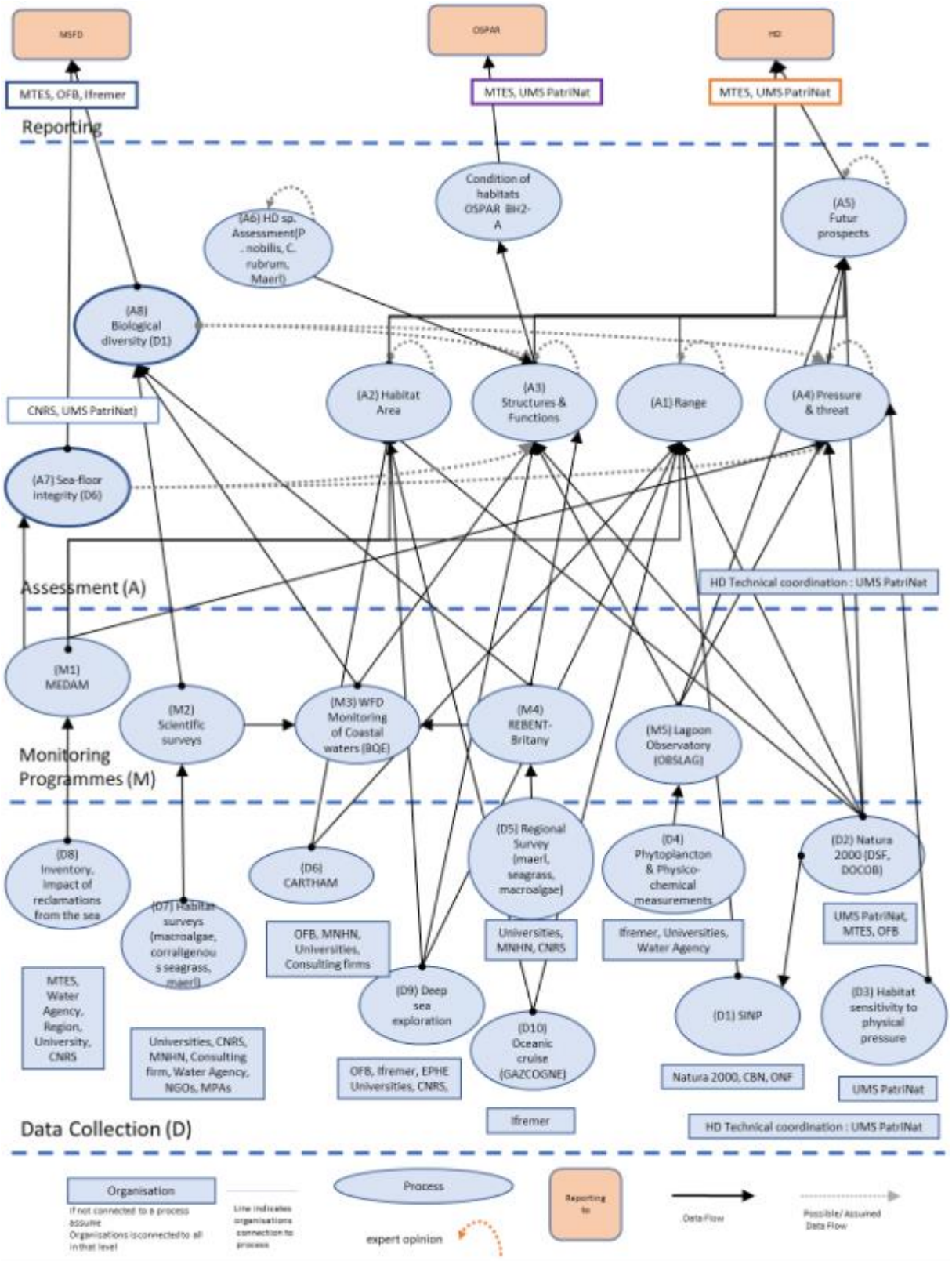
the WFD is a national network, the REBENT-Bretagne is regional,

some protocols of REBENT-Bretagne are more complete than those of the WFD,

the sampling frequencies are more sustained in the REBENT-Bretagne (every year, against every 3 years for the WFD).

These two networks mainly consist of stationary monitoring. REBENT-Bretagne has not carried out any surface monitoring since 2014. The only surface monitoring of the WFD concerns herbaria which have stationary monitoring (Zostera marina and Z. noltei).

A4.4.2 Data flow diagram



A4.5 MSFD D1 Fish

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.5.1 Data flow description

Ifremer is the main body in charge of collecting data on fish stocks and habitat condition in France. Ifremer conducts various annual campaigns and surveys across the Atlantic coast, North Sea and Mediterranean Sea. These campaigns include PELGAS, Channel Ground Fish Survey (CGFS), Nursery-dedicated surveys (spawning surveys), International Bottom Trawl Survey (IBTS), EVHOE, MEDITS, and PELMED. All campaigns are carried out on board vessels and involve a range of techniques ranging from trawling to hydrological surveys, acoustic surveys or simple observations. These campaigns are designed to inform the good ecological status (BEE) under the "birds" and "cephalopods" component of descriptor 1, and in particular criteria D1C2 representing fish abundance. The ecological state of fish stocks is also informed by criteria D3C1 such as fishing mortality rate (D3C1), and spawning stock biomass (SSB) (D3C2). The criteria is also informed by data arising from ICES and ICCAT.

There is insufficient data to inform the other primary criterion (D1C1: accidental capture) and the three other secondary (or primary if for commercial fish stocks, or species covered by BHD) criteria (D1C3: demographic characteristics; D1C4: distribution; D1C5: habitat condition and extent). In the absence of operational data and / or indicators, the method used by the MNHN is based exclusively on bibliographic synthesis work, as exhaustive as possible, of the various diagnoses and expert reports likely to provide information on the ecological status of the species selected for each of the categories. This information is relevant for informing one or more criteria (D1C2, D1C3, D1C4), or even for informing a "global" ecological state or

a trend in the evolution of the species, and is developed for individual fish species and validated by a panel of experts.[3]

According to the 2019 report published by IFREMER et al, there are similarities between the criteria reported under the MSFD and HD:

D1C2 and D1C3 are informed by the "population" criteria under the HD.

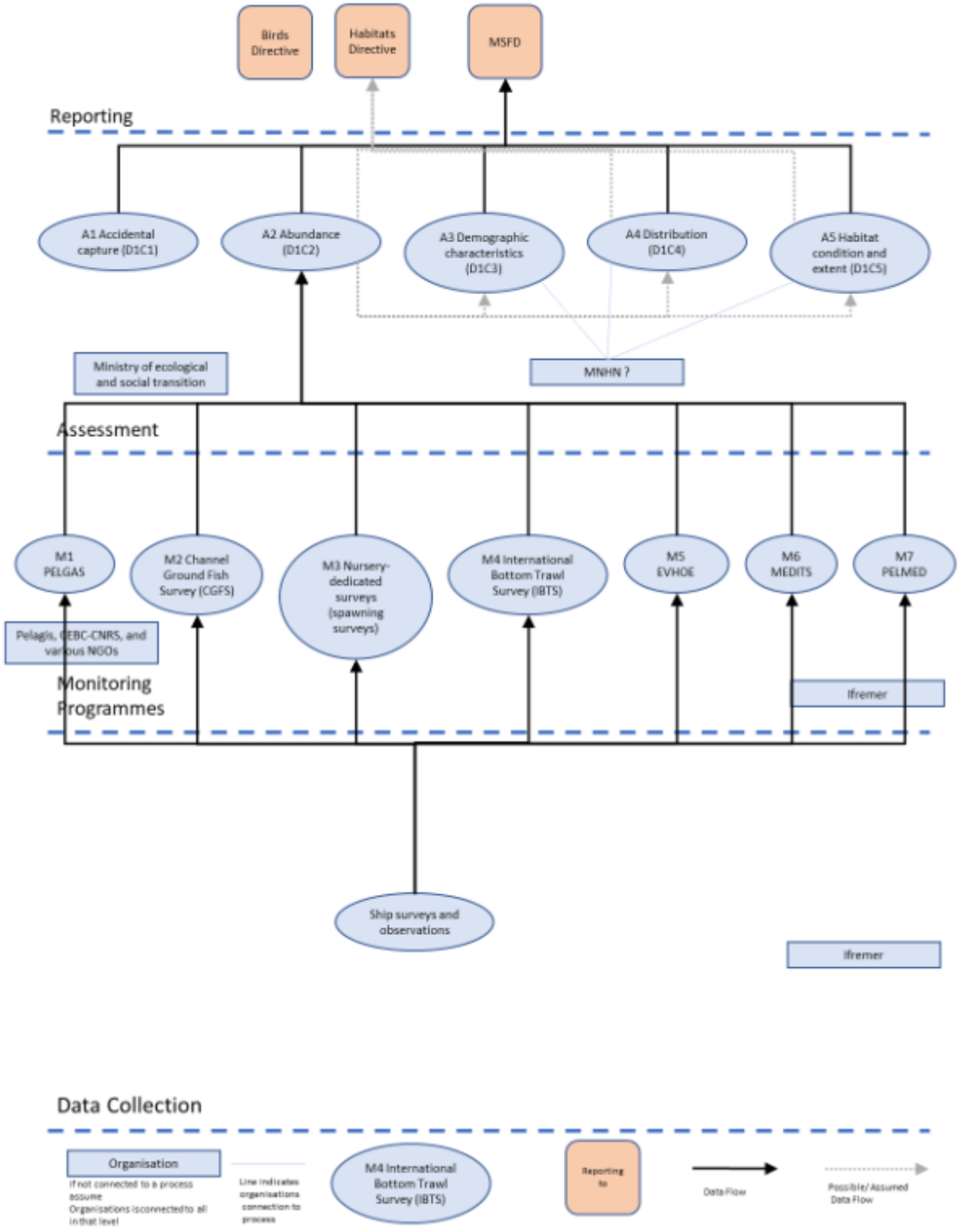
D1C4 is informed by the "distribution" criteria under the HD.

D1C5 is informed by the "habitat of species" criteria under the HD.

The assessment of a species state is informed based on the "One-out all out" approach in line with HD.

[3] https://archimer.ifremer.fr/doc/00490/60197/63743.pdf

A4.5.2 Data flow diagram



A4.6 MSFD D6 Sea-floor integrity

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	x
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.6.1 Data flow description

Sea-floor integrity is informed by three primary indicators including:

Spatial extent and distribution of "physical loss" (D6C1)

Spatial extent and distribution of "physical disturbance" (D6C2)

Spatial extent of benthic habitats undergoing physical disturbances (D6C3)

Criteria D6C1 and D6C2 assess the pressures "physical loss" and "physical disturbance" respectively.

D6C1 is informed by sub-indicators linked to four activities: coastal structures, extraction of marine aggregates, dredging operations, immersion of dredged material. D6C2 is informed by indicators linked to seven activities: coastal structures, extraction of marine aggregates, dredging operations, immersion of dredged material, professional drag fishing (abrasion), mooring activities (abrasion), aquaculture. D6C3 is informed by the results of D6C2 and by EMODnet for 15 different benthic habitats.

The information of each sub-indicator emerges from databases and monitoring programmes including:

Hydro-morphology monitoring data driven by the Water Framework Directive (2000/60 / EC)

Data concessions and research permits concerned by an exploitation of marine aggregates

RasterMarine SHOM product

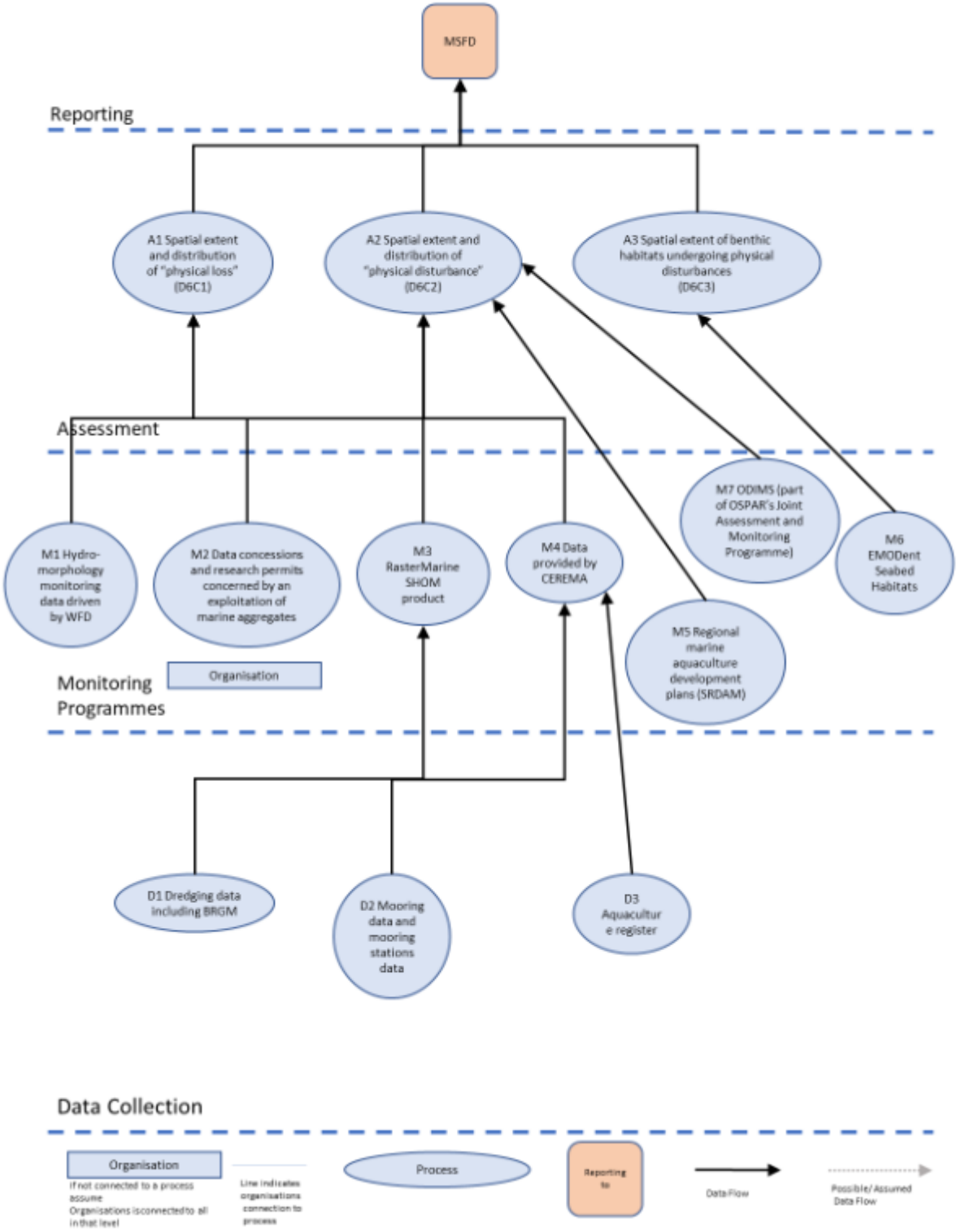
Data provided by CEREMA

Regional marine aquaculture development plans (SRDAM)

EMODnet

ODIMS (part of OSPAR's Joint Assessment and Monitoring Programme)

A4.6.2 Data flow diagram



A4.7 MSFD D1 Benthic habitats

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats/	X Species
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.7.1 Data flow description

Assessment & reporting

Sea-floor integrity is informed by three primary indicators including: spatial extent and distribution of "physical loss" (D6C1), spatial extent and distribution of "physical disturbance" (D6C2), and spatial extent of benthic habitats undergoing physical disturbances (D6C3). The GES of benthic habitat is also determined based on two criteria: criterion D6C4 which assesses the extent of the loss of the type of habitat resulting from anthropogenic pressures , and criterion D6C5 which provides information on the extent of the harmful effects on the state of the type of habitat considered.

In the 1st cycle, based on the work of Laurand et al. 2013 (in Guérin et al., 2013) and BRGM (2013), the monitoring programme "Benthic habitats and seabed integrity" was subdivided into 15 sub-programmes (SP), broken down according to three themes: state of benthic habitats (SP1 to SP7), pressures and impacts of activities on habitats (SP8), and activities and uses generating potential pressures on habitats (SP9 to SP15) to feed the assessment of Descriptors 1 and 6.

Monitoring & data collection

In its 2015 version, the "Benthic Habitats" (SP1 to SP7) monitoring programme concerned 20 data collection measures. The majority of them relate to medio-littoral habitats and coastal infralittoral and circalittoral habitats of soft substrate (SP2 and

SP3). These results reflect the current distribution of existing systems in mainland France. This indicator was mainly calculated on the basis of stationary data relating to the benthic macrofauna, acquired within the framework of the WFD.

D6C1 is informed by sub-indicators linked to four activities: coastal structures, extraction of marine aggregates, dredging operations, immersion of dredged material. D6C2 is informed by indicators linked to seven activities: coastal structures, extraction of marine aggregates, dredging operations, immersion of dredged material, professional drag fishing (abrasion), mooring activities (abrasion), aquaculture. D6C3 is informed by the results of D6C2 and by EMODnet for 15 different benthic habitats.

The information of each sub-indicator emerges from databases and monitoring programmes including:

Hydro-morphology monitoring data driven by the Water Framework Directive

Data concessions and research permits concerned by an exploitation of marine aggregates

RasterMarine SHOM product

Data provided by CEREMA

Regional marine aquaculture development plans (SRDAM)

EMODnet

ODIMS (part of OSPAR's Joint Assessment and Monitoring Programme)

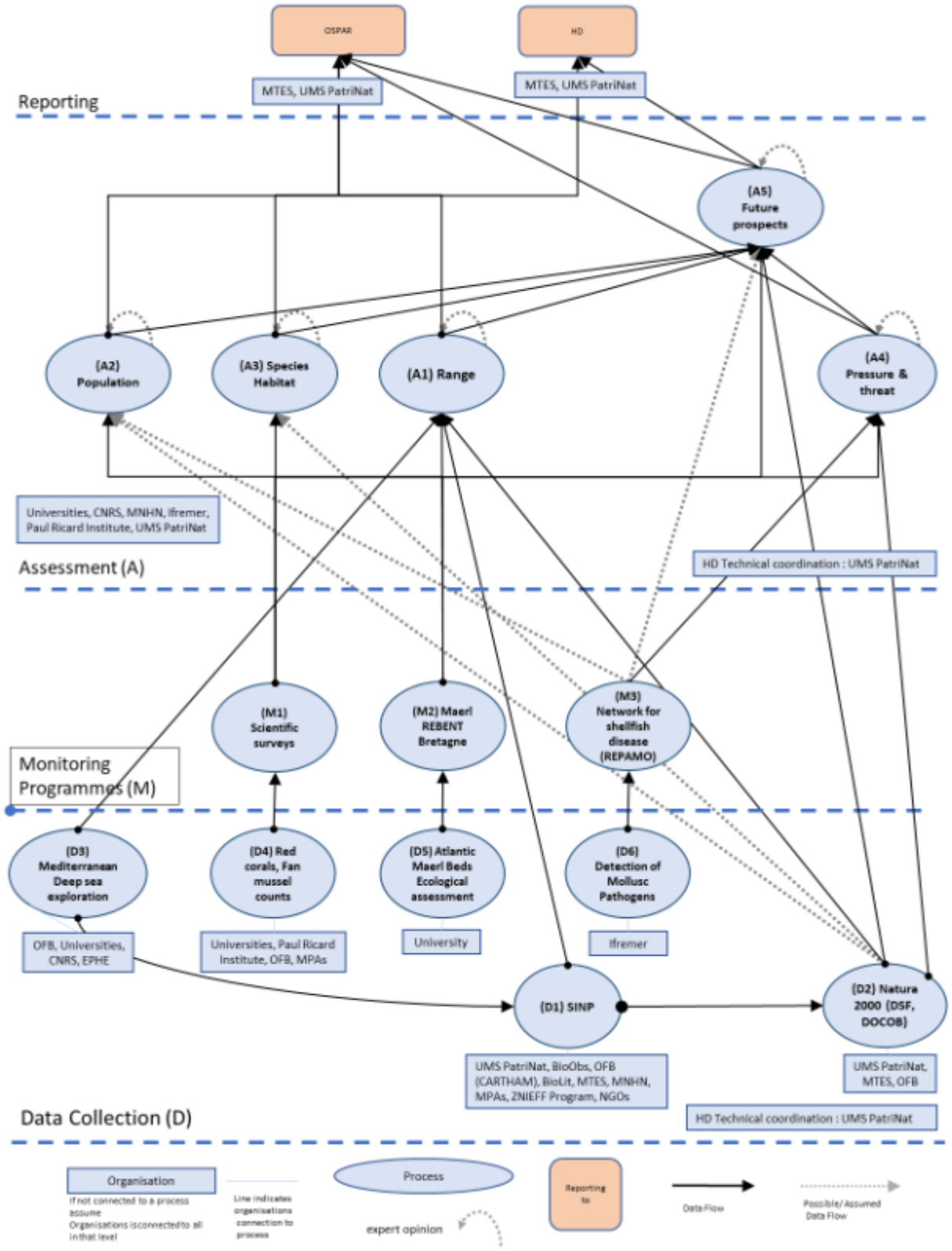
Key references:

https://archimer.ifremer.fr/doc/00490/60202/63771.pdf

https://www.ifremer.fr/sextant_doc/dcsmm/documents/Evaluation_2018/Synthese/Doc_60192_Synthese_4_facades.pdf

AFB, 2019. Analysis of the links with the other EU directives, the International Agreements and the other Member States. Benthic habitats and sea floor integrity.

A4.7.2 Data flow diagram



A4.8 MSFD D1 Reptiles

Country:		France
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	X
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats/	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		Bay of Biscay & Iberian Coast

A4.8.1 Data flow description

Additional notes

Species concerned: Caretta caretta (Appendices II and IV), Chelonia mydas (Appendices II and IV), Dermochelys coriacea (Appendix IV), Lepidochelys kempii (Appendix IV)

No monitoring system dedicated to HD or RSC reporting existed for sea turtles before the establishment of the MSFD, but they can be shared in the future

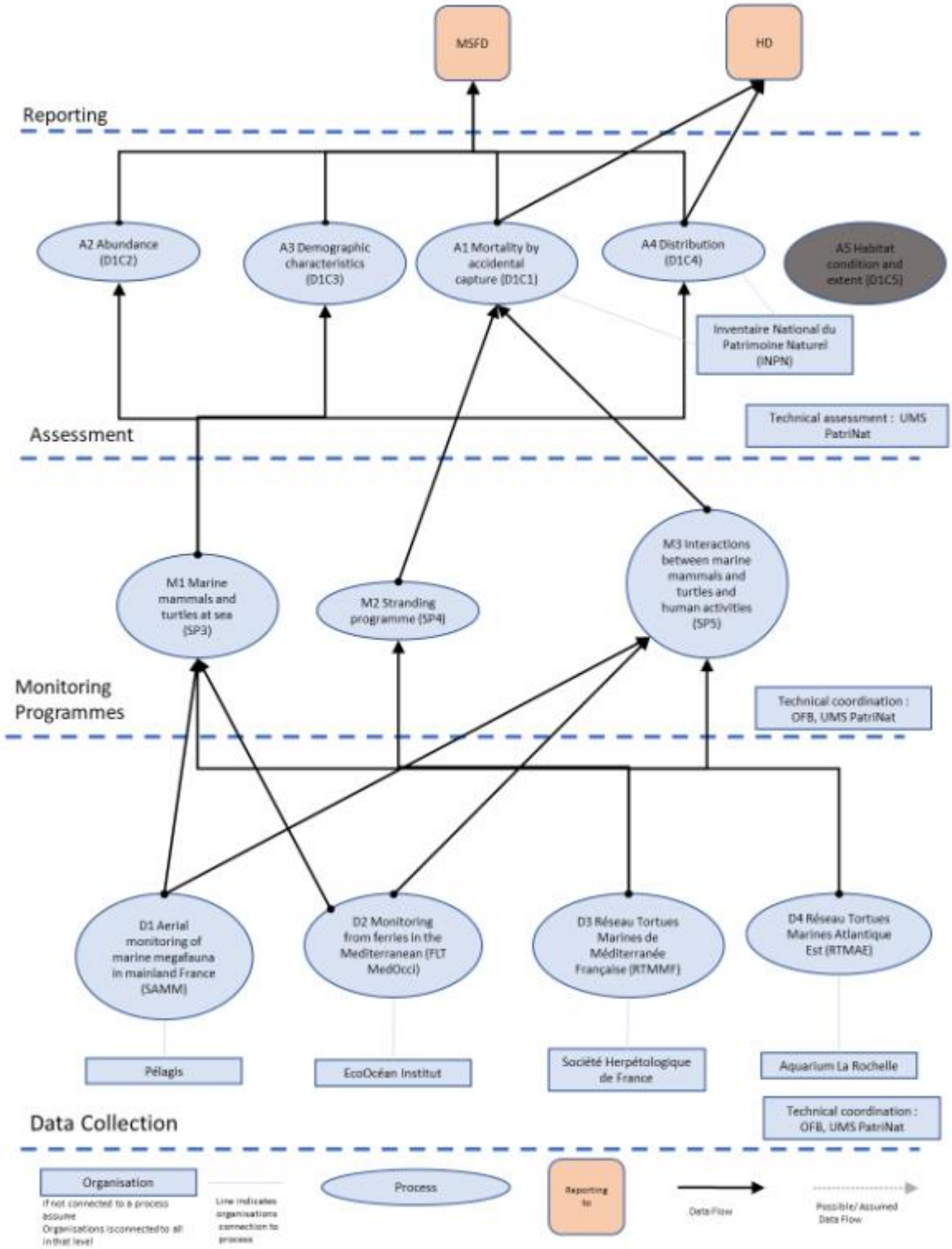
Evaluation dates of the different directives and RSC do not match

Relevance of common mechanisms to be deepened at national and supranational level; future contribution from France: the results of the study on the D1 indicators will be decisive for clarifying proposals for new measures or adaptations, and for answering the question of usable data and the estimation of the cost of the new propositions

Possible non-use of certain data from the MSFD for the HD due to the non-coordination of the evaluation teams, the non-synchronicity of the evaluations, as well as a lack of dedicated banking tool

The knowledge acquisition requested for the MSFD and the environmental objectives of the Action Plan for the Marine Environment (PAMM) would also be useful for the HD and RSC assessments (Barcelona and OSPAR)

A4.8.2 Data flow diagram



Annex 5 Germany data flow summary

A5.1 MSFD D1 Birds and Birds Directive

Country:		Germany
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	X
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	X
	Habitats Directive	
Marine region		Germany (BD) / North Sea and Baltic Sea (MSFD)
Sub region/s		North Sea (and Baltic)

A5.1.1 Data flow description

Bird monitoring in Germany is divided between the North Sea and Baltic Sea, where several actors collect data under the coordination of BfN and German state authorities. The data supports assessments under MSFD, BD, HELCOM, OSPAR and Waddensea cooperation.

Presentation of bird monitoring and assessments is difficult as it can be shown as many ways as there are assessments. However, Germany collects bird data from wintering birds (coasts and offshore), migratory birds (spring, autumn), moulting birds (late summer) and breeding birds. These are collected from the coastal waters of German states (Schleswig-Holstein, Mecklenburg-Vorpommern, Lower Saxony and the two city-states Hamburg and Bremen) as well as the offshore waters of the federal state. The species-specific data from all seasons or specific seasons is used under different assessments.

North Sea monitoring focuses on breeding birds (there are more marine birds breeding in that area), and Baltic Sea monitoring focuses on wintering birds (the area is the main wintering ground for northern species).

The internationally synchronized midwinter waterbird counts are considered to be the most synchronized surveys in German coastal and offshore waters and cover all wintering species in the Baltic Sea and the North Sea after about January 15th.

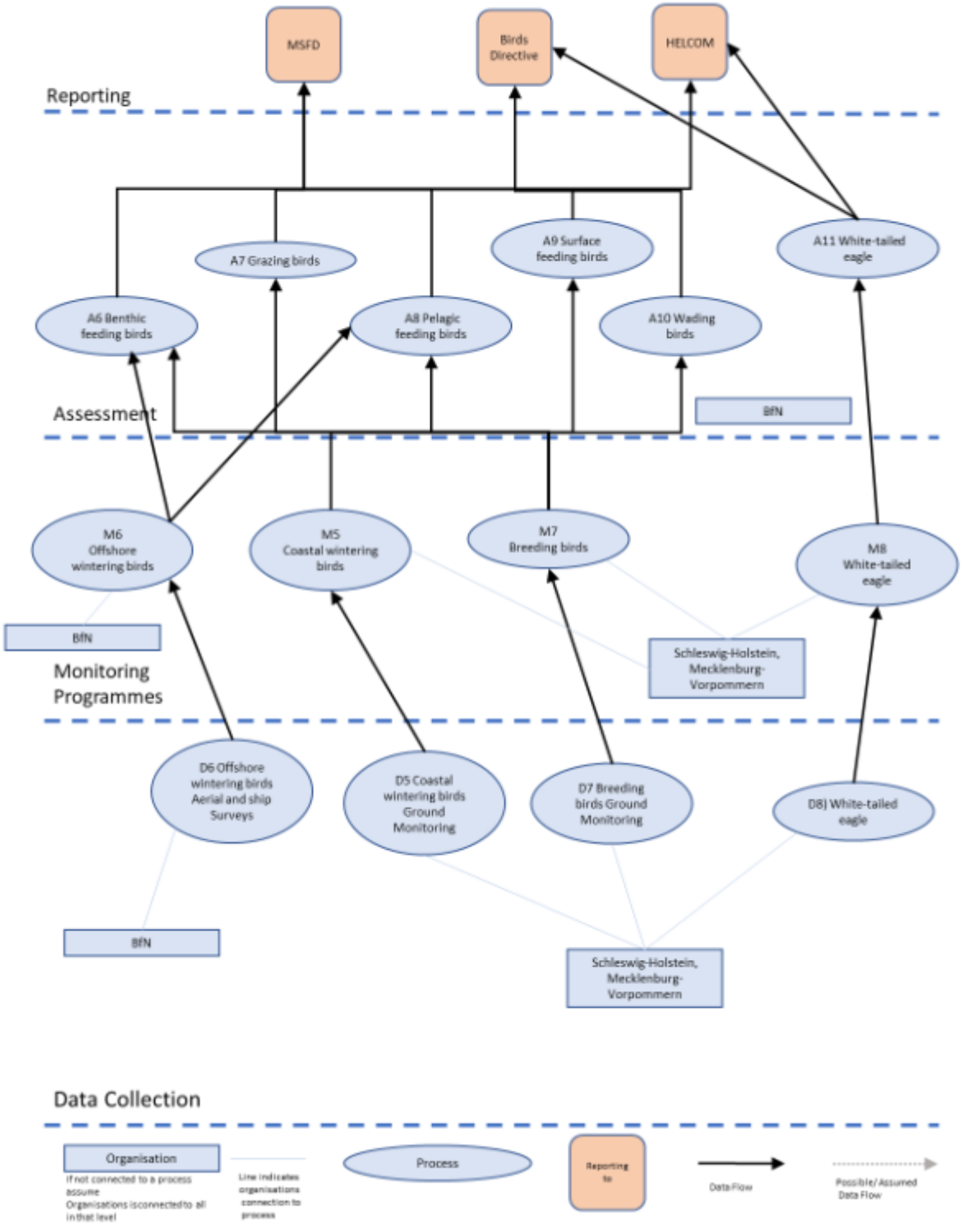
Birds Directive assessments are species-specific. The same species are used for MSFD assessments. However the reporting times and the assessment areas differ (Birds Directive requires one national assessment whereas MSFD requires separate assessments for the North Sea and the Baltic Sea. Hence the assessment outcomes are not comparable.

According to Nehls et al. (2008[4]) special emphasis in the North Sea is given to aerial surveys in the SPA Eastern German Bight and bordering SPAs in coastal waters (twice annually) and a complete coverage of the entire German North Sea is done by aerial surveys once every six years. In the Baltic Sea, complete aerial surveys are conducted annually and accompanied by ship surveys in the SPA Pomeranian Bay. Here, additional aerial surveys are required in spring to cover maximum seaduck numbers and in summer to cover moulting Common Scoter.

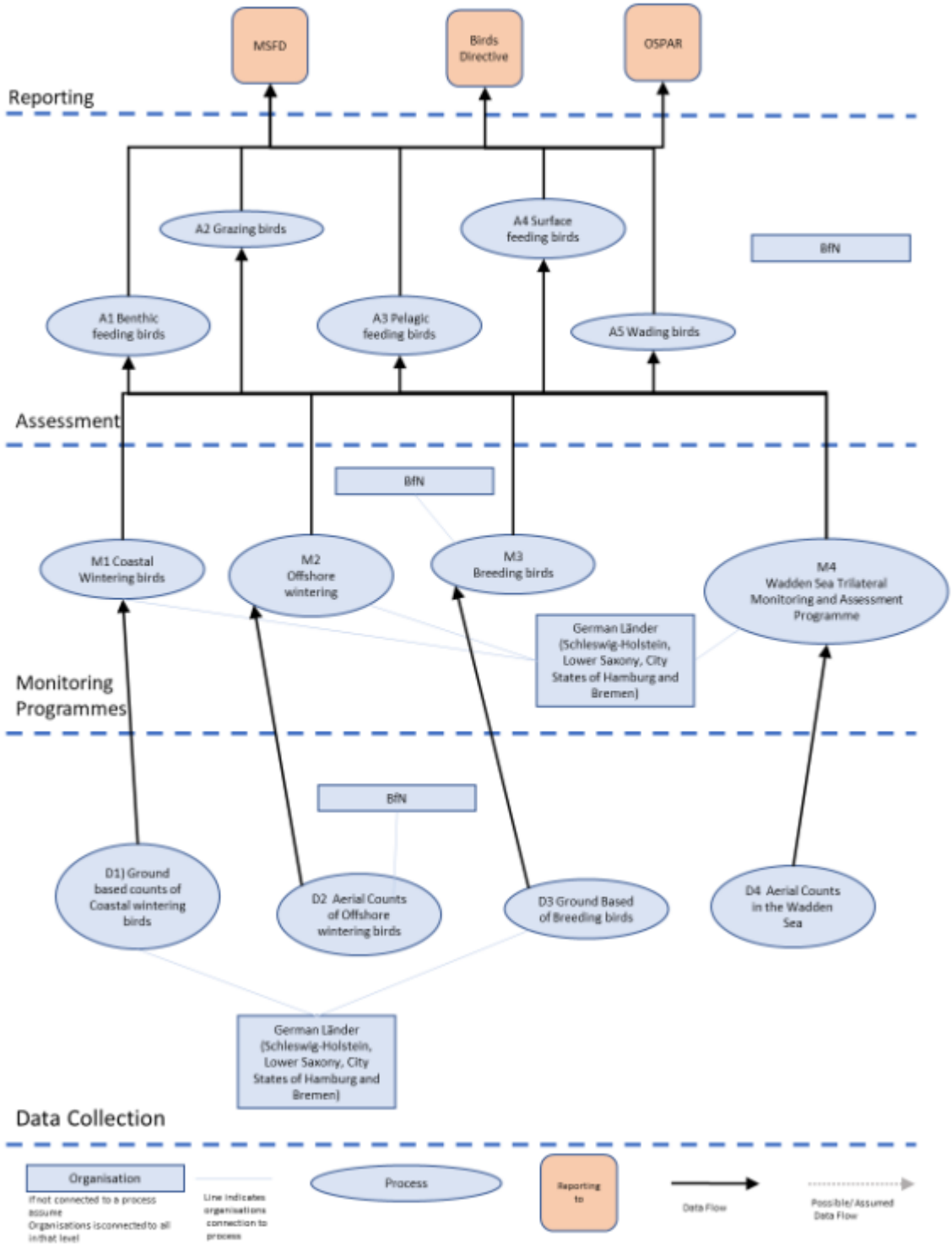
[4] https://www.bfn.de/fileadmin/MDB/documents/themen/meeresundkuestenschutz/downloads/Monitoringberichte/Natura-2000-Monitoring-AWZ.pdf

A5.1.2 Data flow diagram

Baltic Sea



North Sea


MSFD
Birds Directive
OSPAR
Reporting
A2 Grazing birds
A4 Surface feeding birds
BfN
A1 Benthic feeding birds
A3 Pelagic feeding birds
A5 Wading birds
Assessment
BfN
M1 Coastal Wintering birds
M2 Offshore wintering
M3 Breeding birds
M4 Wadden Sea Trilateral Monitoring and Assessment Programme
German Länder (Schleswig-Holstein, Lower Saxony, City States of Hamburg and Bremen)
Monitoring Programmes
BfN
D1) Ground based counts of Coastal wintering birds
D2 Aerial Counts of Offshore wintering birds
D3 Ground Based of Breeding birds
D4 Aerial Counts in the Wadden Sea
German Länder (Schleswig-Holstein, Lower Saxony, City States of Hamburg and Bremen)
Data Collection
Organisation
If not connected to a process assume Organisations is connected to all in that level
Line indicates organisations connection to process
Process
Reporting to
Data Flow
Possible/Assumed Data Flow

A5.2 MSFD D1 Mammals

Country:		GERMANY
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	X
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	X
Marine region		Marine Atlantic and marine Baltic (HD) / North Sea and Baltic Sea (MSFD)
Sub region/s		

A5.2.1 Data flow description

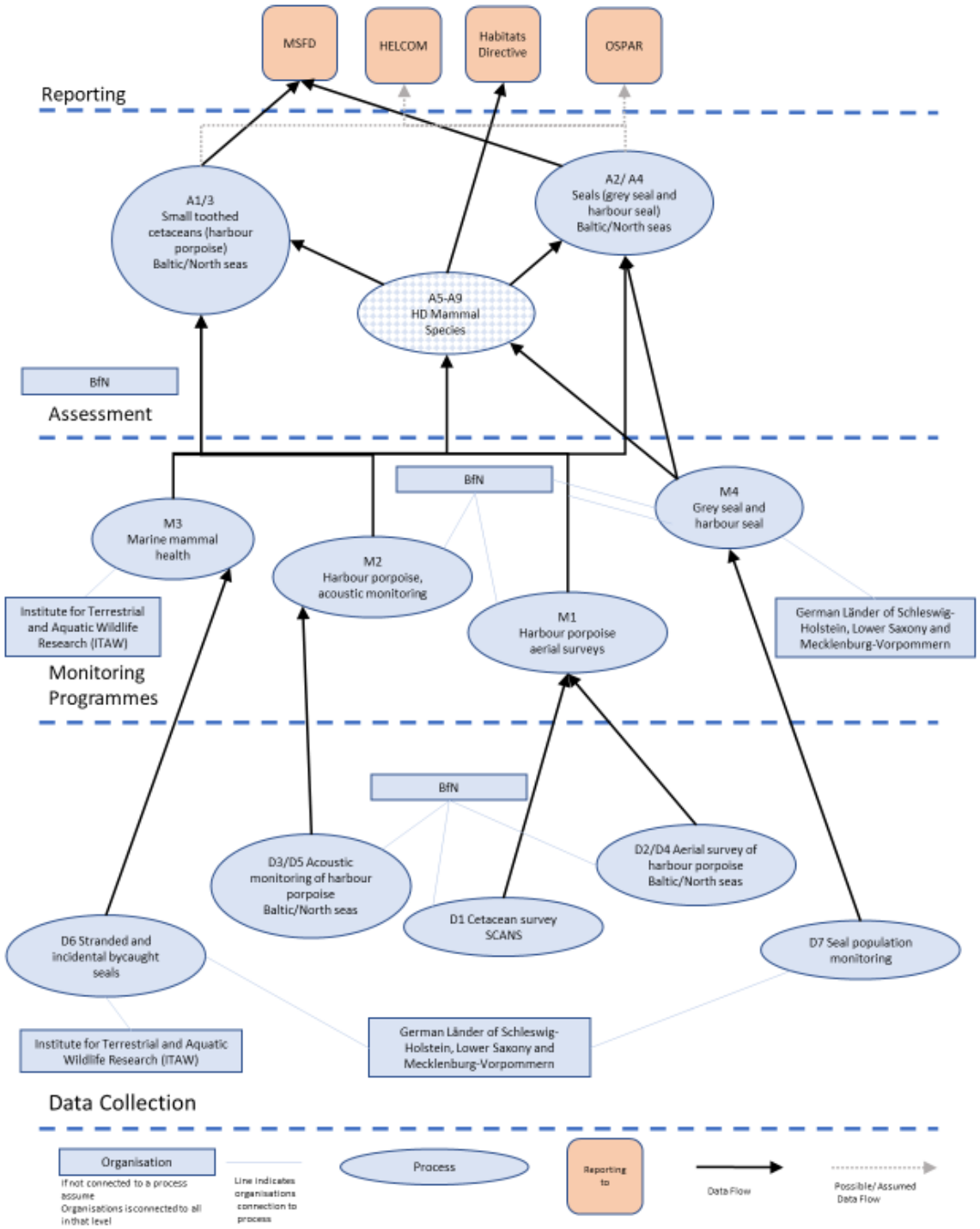
The German mammal monitoring focuses on harbour porpoise, which is monitored in the North Sea and Baltic Sea by aerial surveys and acoustic monitoring. Other cetaceans are observed and recorded as they are seen and reported under the HD (and Minke whale also in the next MSFD). The monitoring is coordinated by BfN.

Seals occur mainly in the North Sea area but monitoring also undertaken in the Baltic Sea. The monitoring is coordinated by the Länder and put together by BfN for national reports.

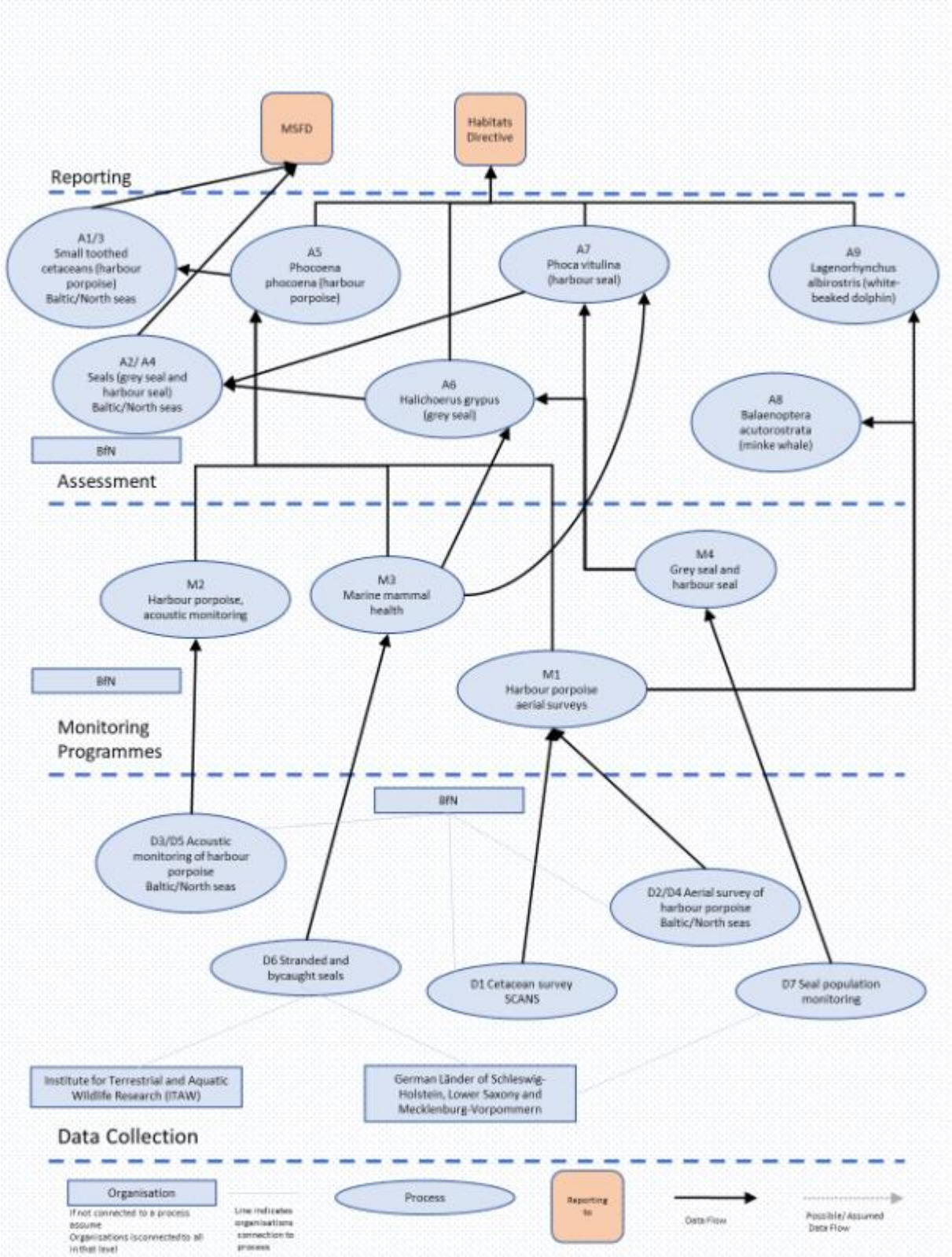
Health monitoring is part of both HD and MSFD and consists of data from stranded and bycaught individuals. It is coordinated by ITAW in co-operation with the Länder.

Monitored data is assessed for MSFD, HD, OSPAR and HELCOM. The difficulty is in the temporal mismatch between the MSFD and HD in assessment years / reporting period. There are no difficulties with scales or threshold values.

A5.2.2 Data flow diagram



Expanded assessments A5 to A9 from above



A5.3 MSFD D1 Fish

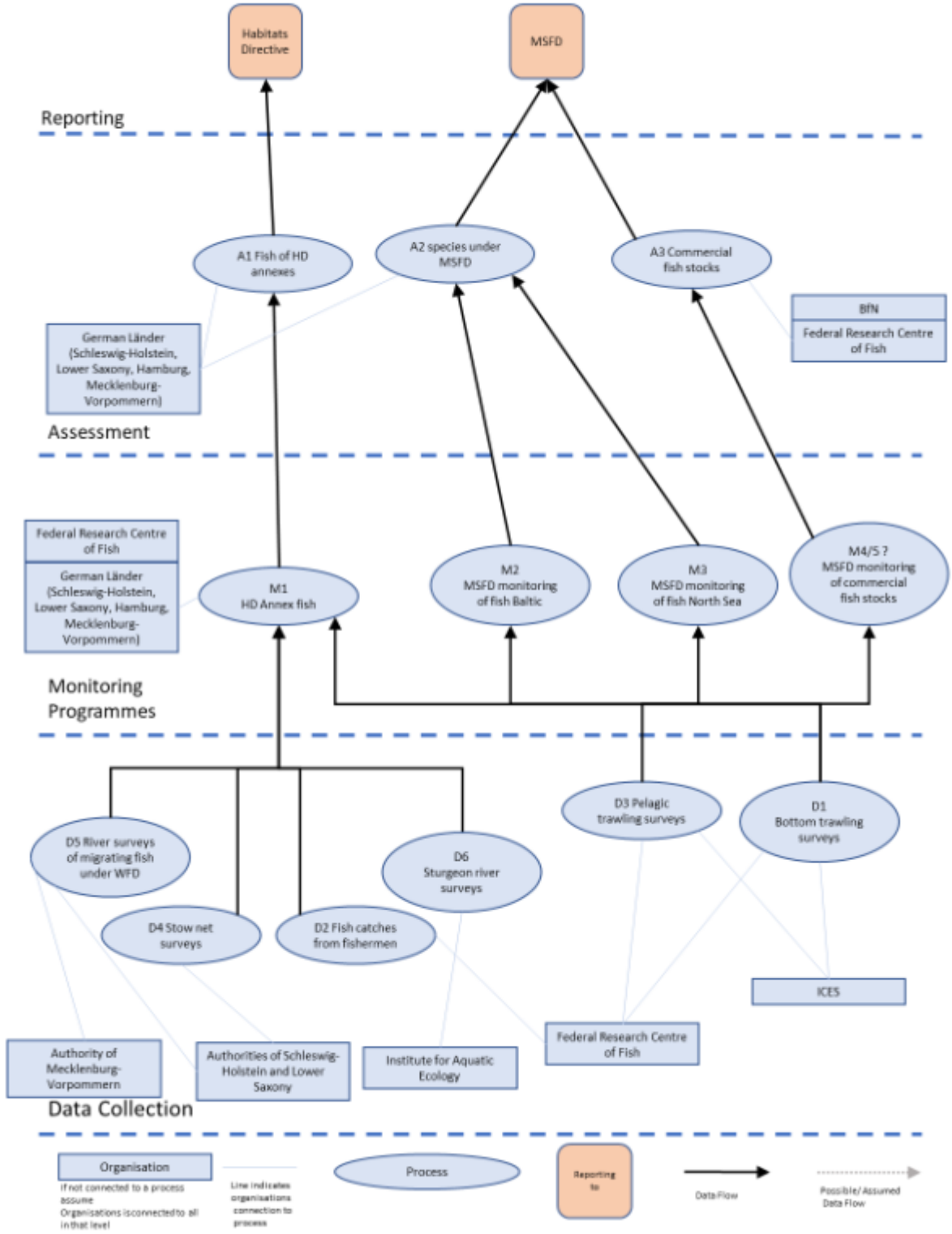
Country:		GERMANY
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	X
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Baltic Sea Atlantic
Sub region/s		

A5.3.1 Data flow description

German fish assessments for the Habitats Directive and MSFD are carried out by data from riverine, coastal and offshore surveys. Main bulk of data collection is from the ICES bottom-trawling and pelagic trawling surveys but some coastal netting efforts, fishermens' catch records and riverine surveys complement those.

BfN is the organization coordinating the assessments to HD and MSFD reporting, but the data and specific assessments are made by the German Länder (coastal waters, rivers), Federal Research Centre of Fish, Institute for Aquatic Ecology and ICES.

A5.3.2 Data flow diagram



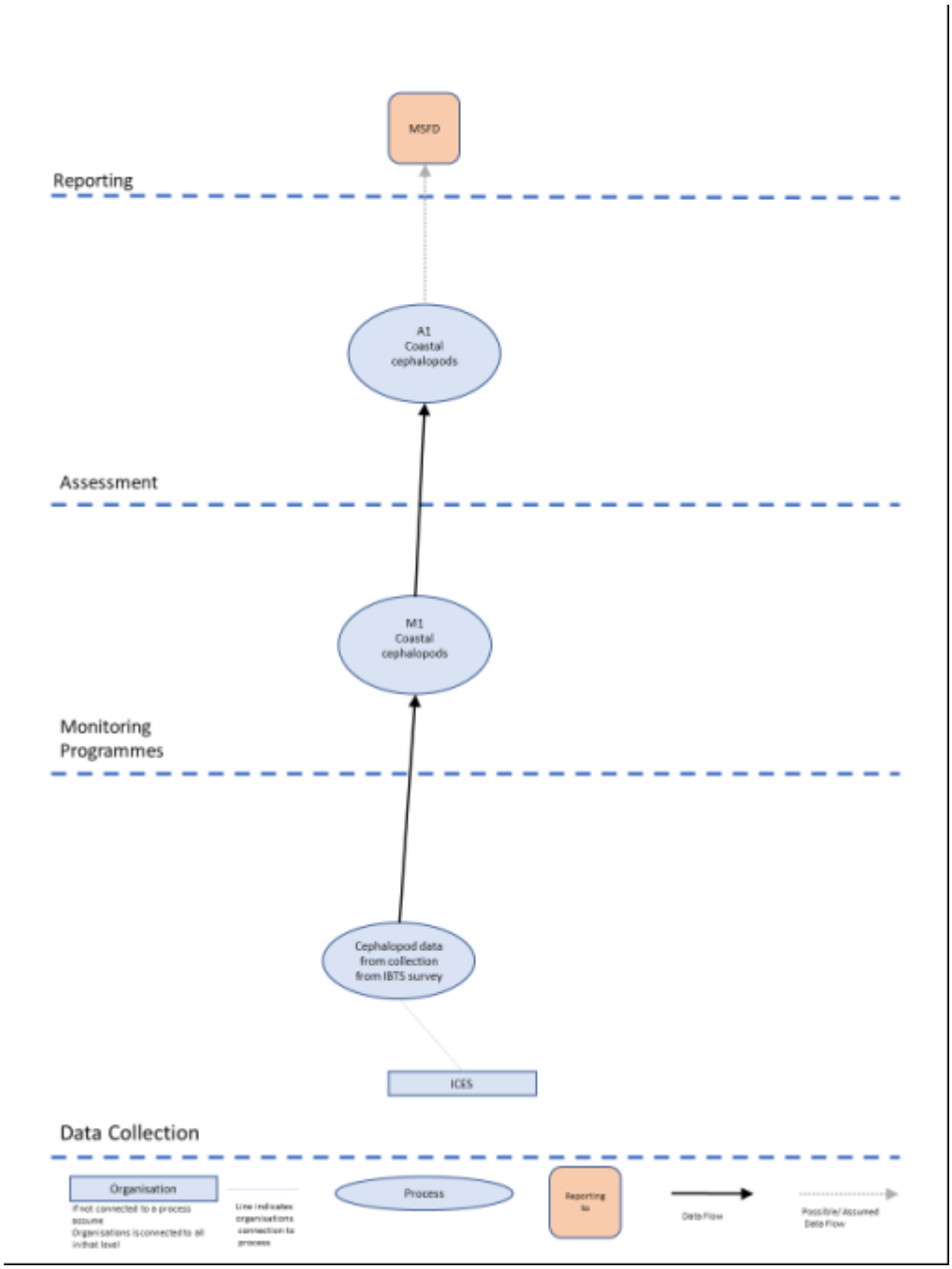
A5.4 MSFD D1 Cephalopods

Country:		Germany
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	X
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE ATLANTIC
Sub region/s		

A5.4.1 Data flow description

n/a

A5.4.2 Data flow diagram



A5.5 MSFD D1 Benthic habitats, D6 Sea-floor integrity, Habitats Directive

Country:		Germany
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	

	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	X
	D6 on Sea-floor integrity	X
	Birds Directive	
	Habitats Directive	X
Marine region		Marine Atlantic and marine Baltic (HD) / North Sea and Baltic Sea (MSFD)
Sub region/s		

A5.5.1 Data flow description

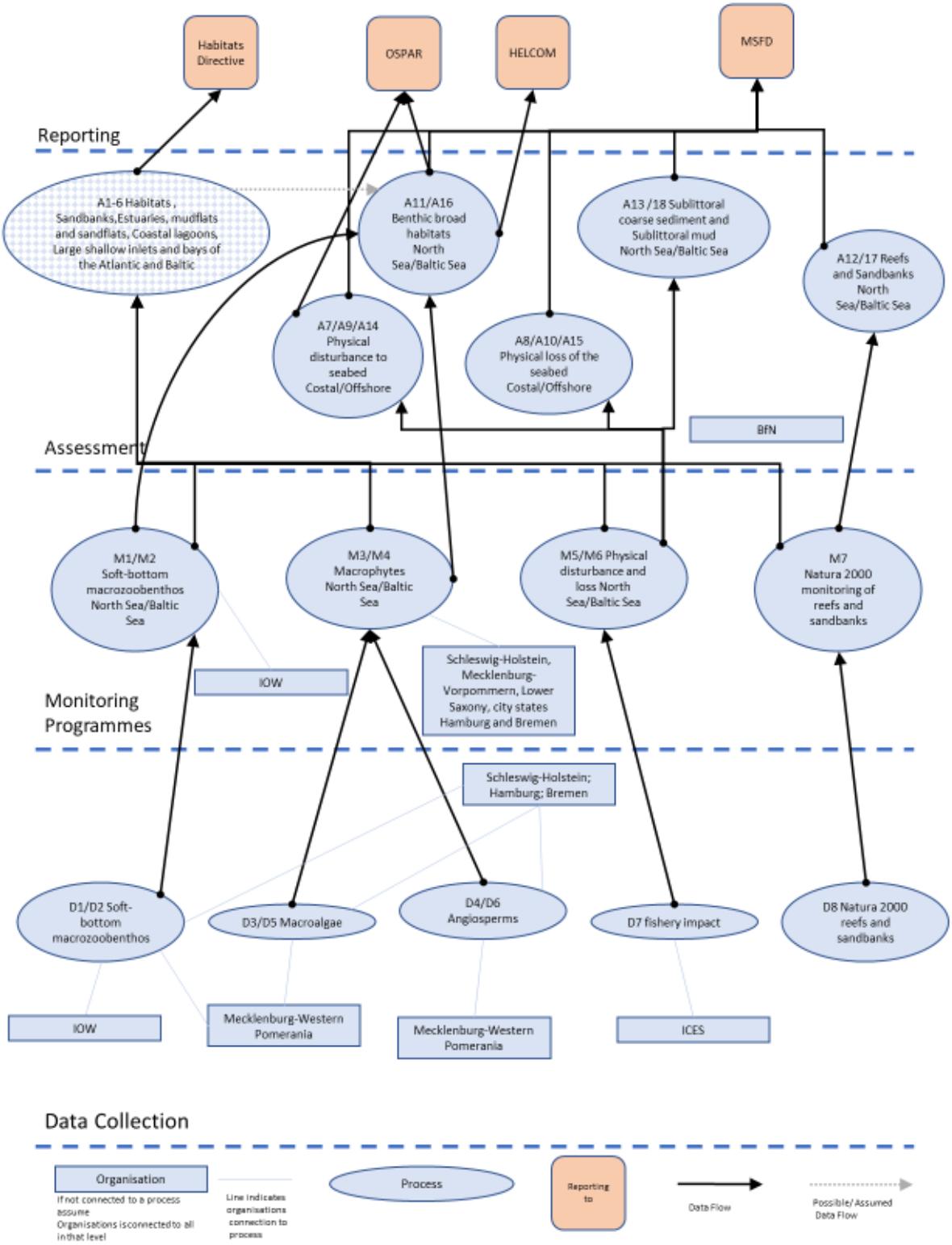
The benthic habitats assessments are made from several data sources. Procedures for data collection, monitoring and assessments are still partly under development.

The HD habitats are monitored offshore (mussel beds, sandbanks) by BfN. The coastal monitoring by the Länder is not properly in place. Results from the Water Framework Directive monitoring and assessments are used to assess the coastal Annex I habitats (mudflats, estuaries, lagoons; and coastal mussel beds and sand banks).

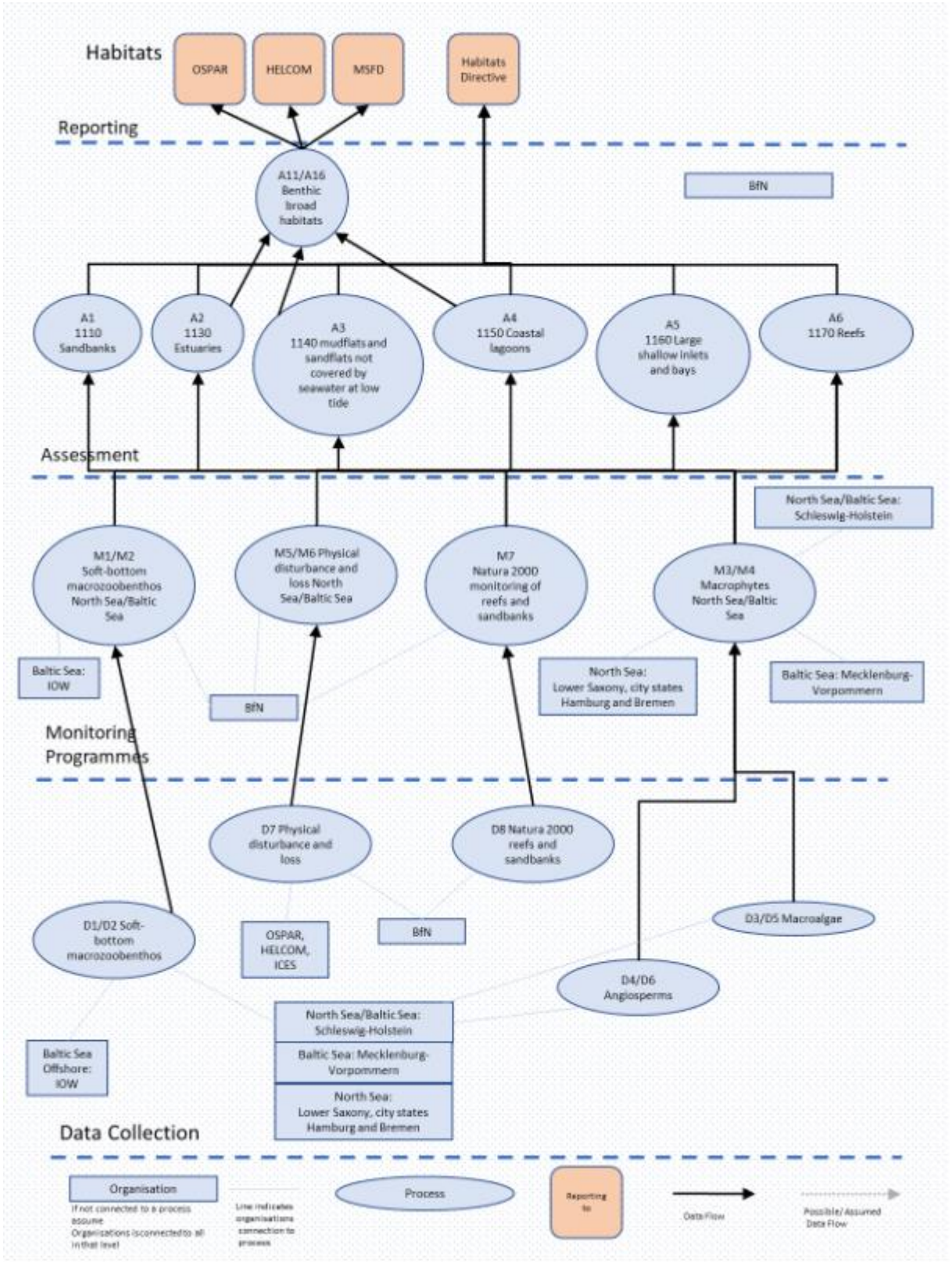
There is no set procedure in the EU for how to assess MSFD D6 and therefore its data collection, monitoring and assessments are not self-explanatory. ICES, OSPAR and HELCOM-coordinated assessments of impacts of bottom-touching fishing gears are used as the main data source for D6C1-C3, the OSPAR and HELCOM indicators are used to assess D6C3 and D6C5, the assessments of WFD are used to support the coastal broad habitats under D6C5. The HD habitat assessment for some coastal HD habitats results are used to support the D6C5 assessment. HD habitats Sandbanks and Reefs, as well as other special habitats under OSPAR and HELCOM have been included in the overall assessment of benthic habitats with their conservation status in the biogeographical region.

Monitored data is assessed for MSFD, HD, OSPAR and HELCOM. The difficulty is in temporal mismatch between the MSFD and HD in assessment years / reporting period. There are no difficulties with scales or threshold values between MSFD and HD.

A5.5.2 Data flow diagram



Assessments A1 to A6 Expanded from diagram above



Annex 6 Malta data flow summary

A6.1 Birds Directive

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	x
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.1.1 Data flow description

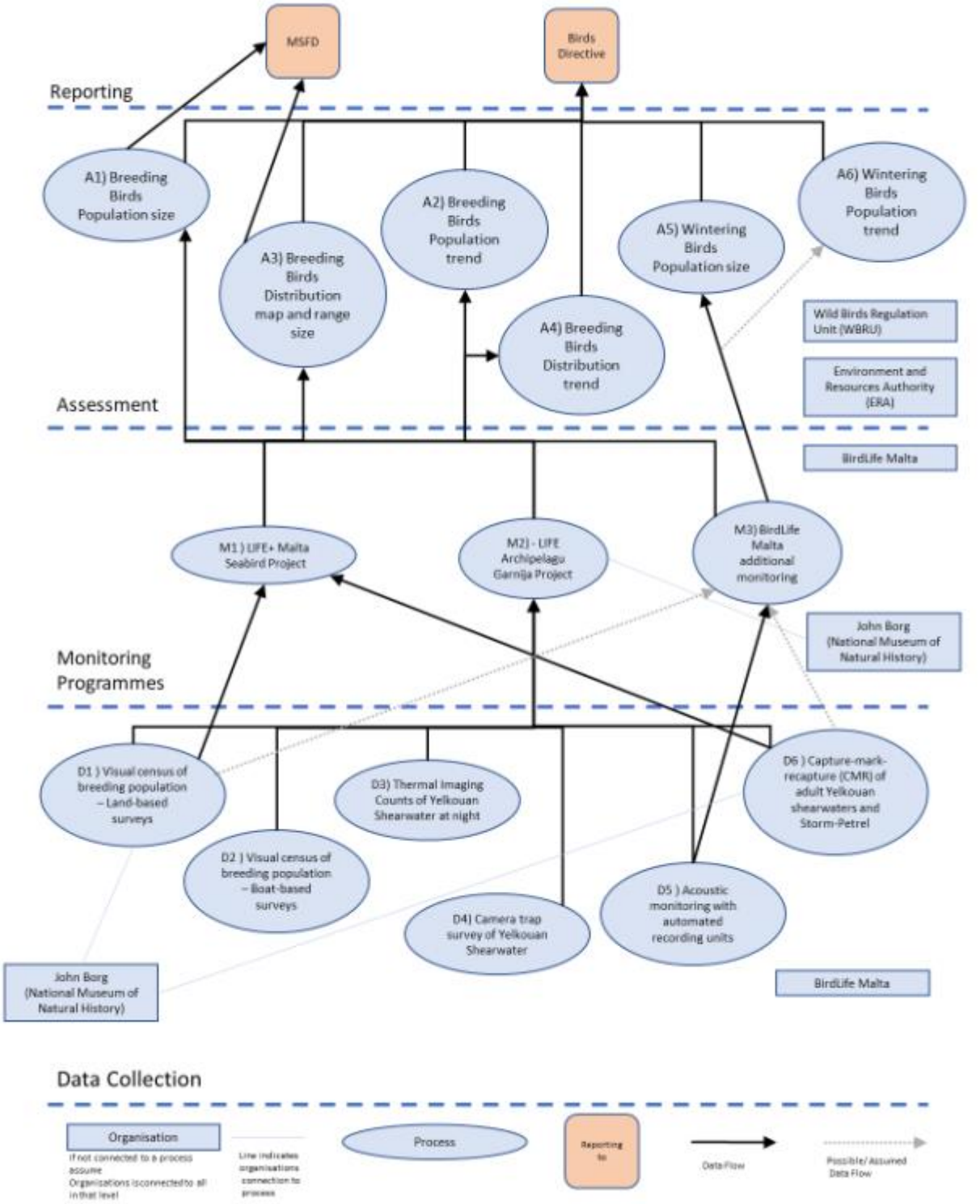
Bird population size and trend, and distribution map and range are reported for three breeding bird species and a wintering gull species. The three breeding birds are the same pelagic feeding species as in MSFD D1 Birds, with the number of breeding pairs being used for both MSFD (abundance) and BD (population size), as well as the breeding distribution. Government authorities/departments such as ERA and the Wild Birds Regulation Unit (WBRU; a Department of the Ministry for the Environment, Sustainable Development and Climate Change) are responsible for the reporting on birds.

The monitoring within the last reporting period is delivered via the ongoing LIFE Arċipelagu Garnija project (2015-2020), as integrated with survey data from a previous project LIFE+ Malta Seabird Project (2011-2016). An NGO dedicated to the protection of wild birds and their habitats (BirdLife Malta) is responsible for these projects, and for birds monitoring in Malta in general. The assessments cite also the use of Breeding Bird Atlases for 2008 and 2018, which are also produced by BirdLife Malta.

The data on breeding seabirds were collected by BirdLife Malta for the coastal breeding colonies through visual census (land- and boat-based surveys), thermal, video or acoustic surveys, and capture-mark-recapture surveys.

There is no national monitoring programme for the wintering gull species, and therefore that species is assessed based on EU wide.

A6.1.2 Data flow diagram



A6.2 MSFD D1 Birds

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.2.1 Data flow description

Malta has an MSFD monitoring programme for Seabirds, including five monitoring subprogrammes of which the monitoring of breeding distribution and abundance, population characteristics, distributional range (limited to breeding range in the last reporting period), by catch informs the assessment of D1-Birds. Government authorities/departments are responsible for these monitoring programmes, including ERA and the Wild Birds Regulation Unit (WBRU; a Department of the Ministry for the Environment, Sustainable Development and Climate Change) for breeding distribution, abundance and population characteristics. Fisheries (assumed to indicate the Fisheries Resource Unit (FRU; also, a Department of the Ministry for the Environment, Sustainable Development and Climate Change) are responsible for the monitoring of bycatch data.

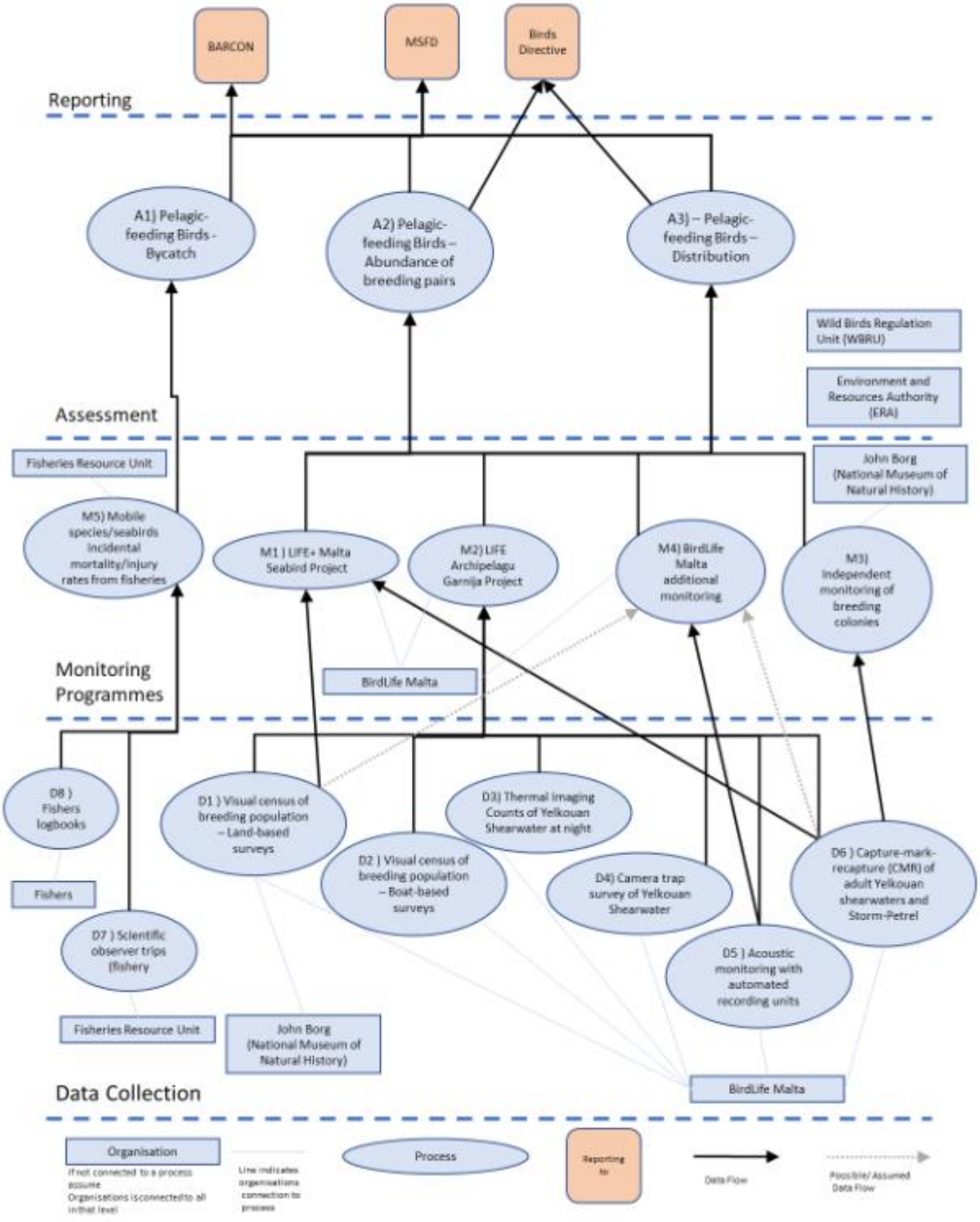
The data collection on seabird breeding distribution, abundance, population condition and range for the last monitoring cycle has been delivered through a series of surveys of the breeding colonies, including visual census (land- and boat-based surveys), thermal, video or acoustic surveys, and capture-mark-recapture surveys. These have been undertaken by an NGO organisation dedicated to the protection of wild birds and their habitats (BirdLife Malta), and delivered via the ongoing LIFE Arċipelagu Garnija project (2015-2020), as partly integrated with survey data from a previous project LIFE+ Malta Seabird Project (2011-2016). Additional data have also been collected by

an independent researcher (John Borg) affiliated to the National Museum of Natural History, Mdina.

Data on bycatch are collected through scientific observer trips (possibly undertaken by the FRU – to be confirmed) and fishers' logbooks, as part of the Malta's yearly National Programme for Fisheries Data Collection (Multi-Annual programme).

These monitoring programmes underpin the assessment of abundance (of breeding pairs), distribution and bycatch of pelagic-feeding birds (including Scopoli's shearwater, European Storm-petrel, and Yelkouan Shearwater), which are assessed individually by ERA and reported to the European Commission as part of the MSFD and to the UN Environment/Mediterranean Action Plan (UNEP/MAP) for the Barcelona Convention.

A6.2.2 Data flow diagram



A6.3 MSFD D1 Cephalopods

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	x
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

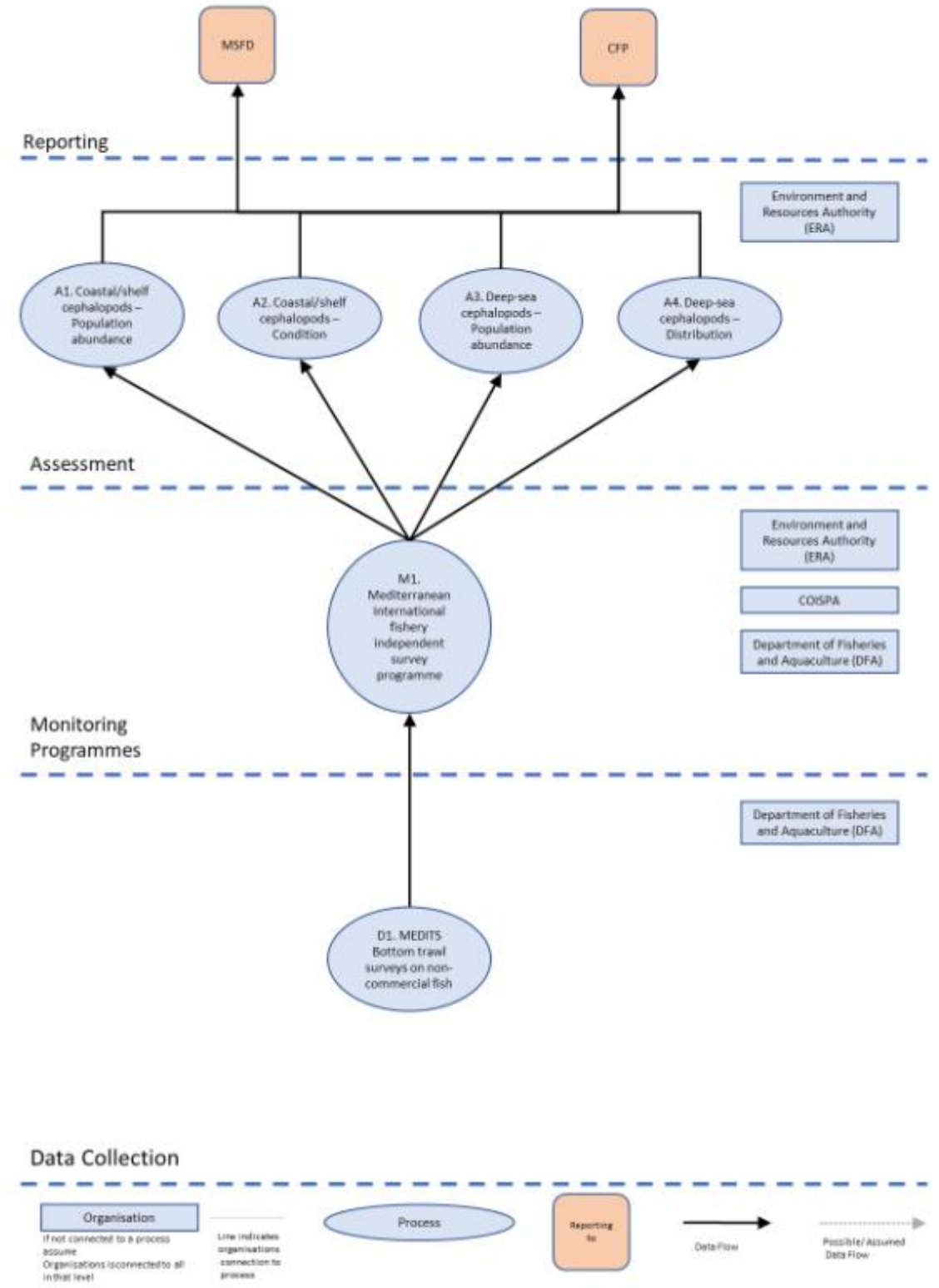
A6.3.1 Data flow description

Malta's assessments for D1-Cephalopods address the population abundance (using Biomass index as proxy), condition (as 95% percentile of length distribution) and distribution (as biomass distribution) of coastal/shelf and deep-sea (non-commercial) species within Malta's Fisheries Management Zone (assessments of other fish species have been reported under D3). The Government's Environment and Resources Authority (ERA) is responsible for these assessments and reporting to the European Commission as part of the MSFD and to the CFP.

An international fishery independent monitoring programme is undertaken in the Mediterranean, the Mediterranean International Bottom Trawl Survey Programme (MEDITS), as coordinated by COISPA, an Italian non-profit organisation. Malta joined MEDITS in 2000, and MEDITS data collected annually between 2015 and 2017 were used to inform the 2018 assessment. The Department of Fisheries and Aquaculture (DFA) is responsible nationally for the MEDITS surveys in the GSA 15 (Malta).

This monitoring programme provides data on catches, biomass, population condition (size, maturity etc) for commercial and non-commercial species (fish and cephalopods), but only data on non-commercial cephalopods were used in the 2018 updated assessments for D1-Cephalopods

A6.3.2 Data flow diagram



A6.4 MSFD D1 Fish

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

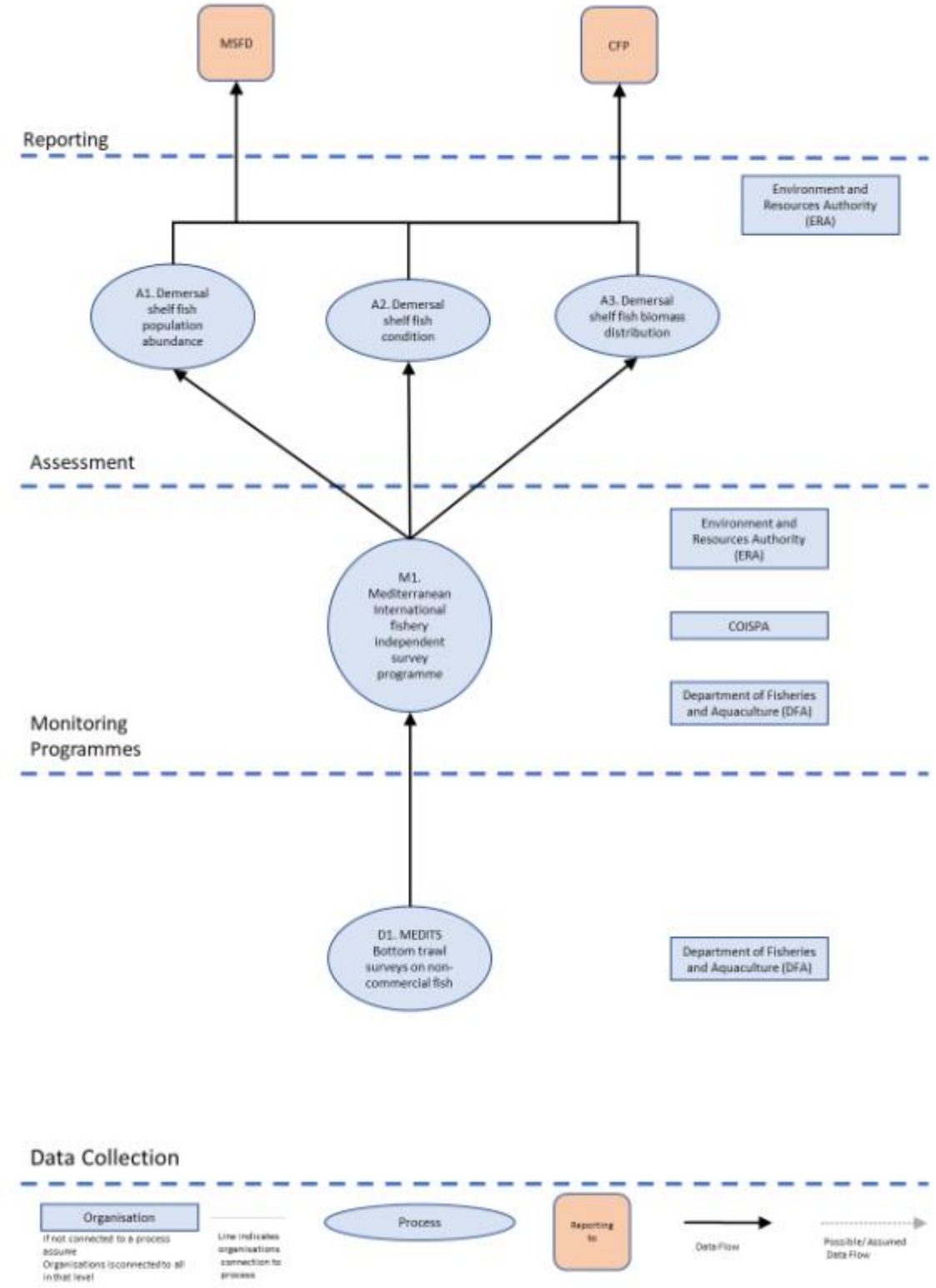
A6.4.1 Data flow description

Malta's assessments for D1-Fish address the population abundance (using Biomass index or LPUE as proxy), condition (as 95% percentile of length distribution) and distribution (as biomass distribution) of demersal fish (non-commercial) species within Malta's Fisheries Management Zone (assessments of other fish species have been reported under D3). The Government's Environment and Resources Authority (ERA) is responsible for these assessments and reporting to the European Commission as part of the MSFD and to the CFP.

An international fishery independent monitoring programme is undertaken in the Mediterranean, the Mediterranean International Bottom Trawl Survey Programme (MEDITS), as coordinated by COISPA, an Italian non-profit organisation. Malta joined MEDITS in 2000, and MEDITS data collected annually between 2015 and 2017 were used to inform the 2018 assessment. The Department of Fisheries and Aquaculture (DFA) is responsible nationally for the MEDITS surveys in the GSA 15 (Malta).

This monitoring programme provides data on catches, biomass, population condition (size, maturity etc) for commercial and non-commercial species (fish and cephalopods), but only data on non-commercial fish were used in the 2018 updated assessments for D1-Fish.

A6.4.2 Data flow diagram



A6.5 MSFD D1 Mammals

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.5.1 Data flow description

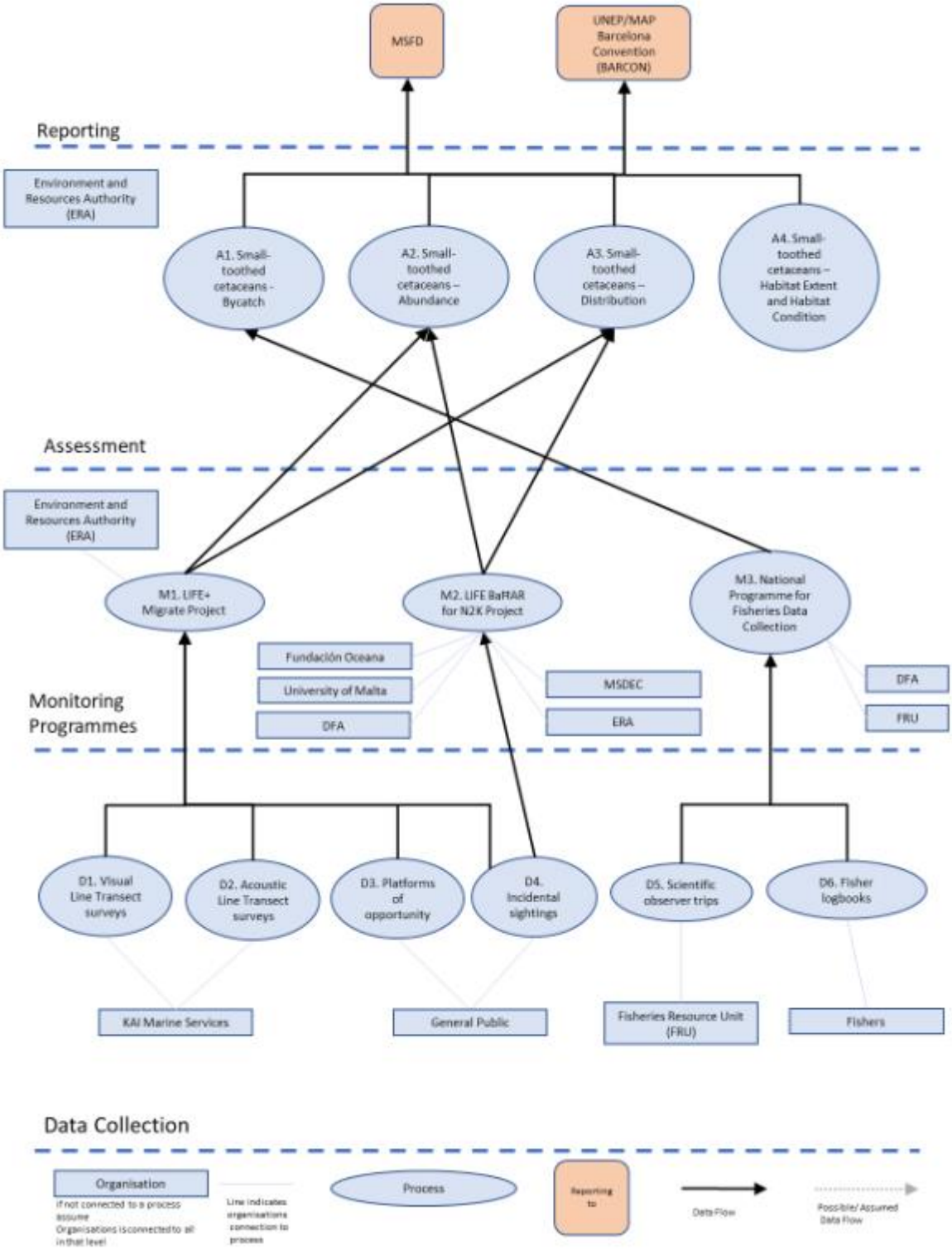
Malta has an MSFD monitoring programme for Marine Reptiles & Marine Mammals, including 5 monitoring subprogrammes of which the monitoring of distributional range and abundance informs the assessment of D1-Mammals. The data collection for the last monitoring cycle has been delivered mainly through visual transect surveys undertaken in the LIFE+Migrate Project, as complemented by occasional sightings in LIFE BaĦAR for N2K. An NGO / marine services company (KAI Marine Services) was responsible for the data collection, with coordination provided by Malta's Environment and Resources Authority (ERA, as former MEPA). Sighting data from volunteers were also collected, under MEPA/ERA coordination (and training).

Data on bycatch of cetaceans (and marine reptiles) for Maltese fisheries are collected through scientific observer trips (possibly undertaken by the Fisheries Resource Unit of the Ministry for the Environment, Sustainable Development and Climate Change – to be confirmed) and fishers logbooks, submitted to the Malta's yearly National Programme for Fisheries Data Collection (Multi-Annual programme).

These monitoring programmes underpin the assessment of abundance and distribution of small toothed cetacean species, and specifically common dolphin, striped dolphin, and bottlenose dolphin, which are assessed individually by ERA and reported to the European Commission as part of the MSFD and to the UN Environment/Mediterranean Action Plan (UNEP/MAP) for the Barcelona Convention. Fisheries monitoring provides

assessment of the bycatch of the three species, also delivered by ERA as part of the MSFD and the Barcelona Convention.

A6.5.2 Data flow diagram



A6.6 MSFD D1 Reptiles

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.6.1 Data flow description

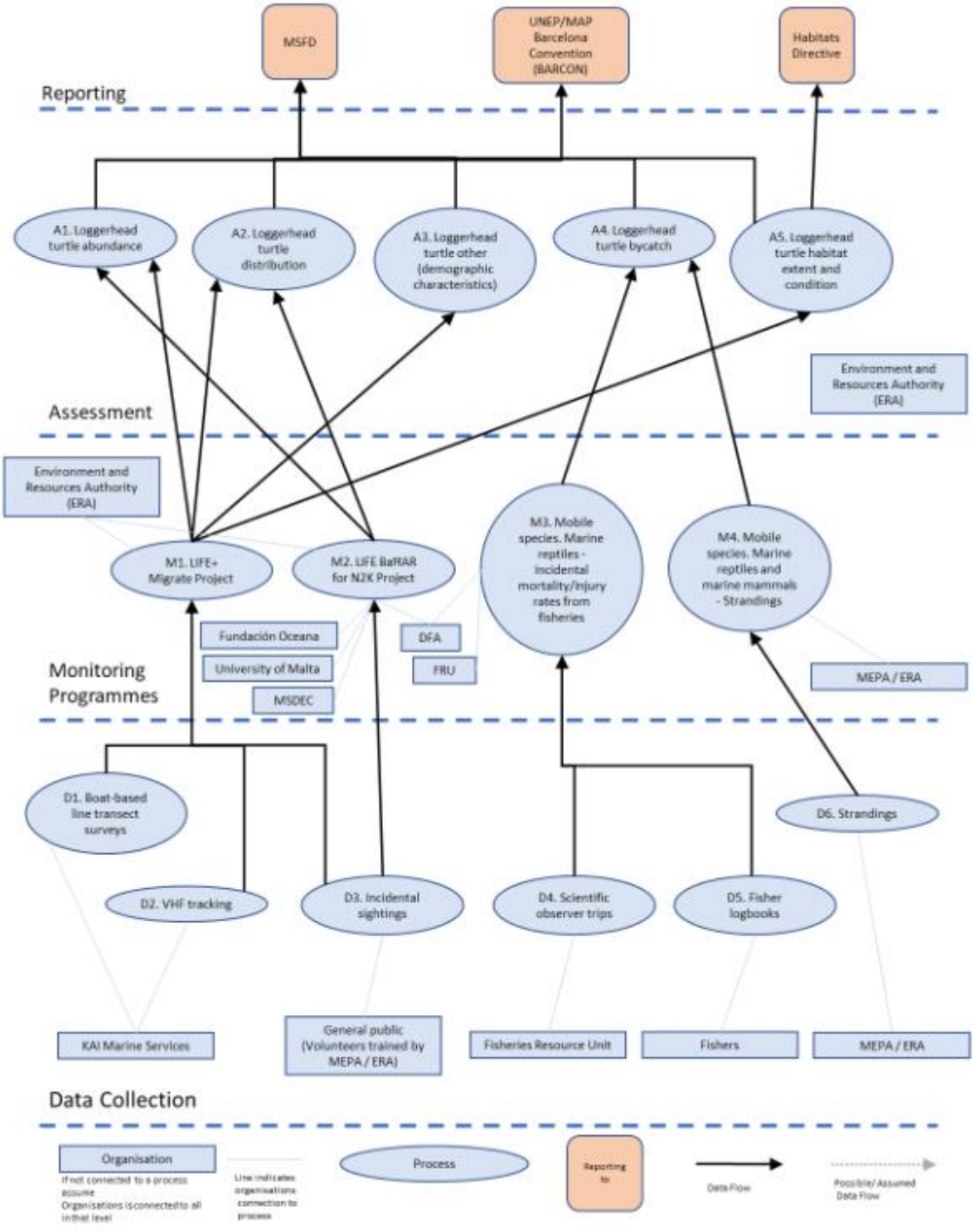
Malta has an MSFD monitoring programme for Marine Reptiles & Marine Mammals, including 5 monitoring subprogrammes of which the monitoring of distributional range and abundance, population characteristics, by catch and strandings informs the assessment of D1-Reptiles. The data collection for the last monitoring cycle has been delivered mainly through visual transect surveys undertaken in the LIFE+Migrate Project, as complemented by occasional sightings in the same project and in LIFE BaĦAR for N2K. An NGO / marine services company (KAI Marine Services) was responsible for the data collection, with coordination provided by Malta's Environment and Resources Authority (ERA, as former MEPA). Sighting data from volunteers were also collected, under MEPA/ERA coordination (and training).

Data on bycatch of marine reptiles for Maltese fisheries are collected through scientific observer trips (possibly undertaken by the Fisheries Resource Unit of the Ministry for the Environment, Sustainable Development and Climate Change – to be confirmed) and fishers logbooks, as part of a monitoring programme for incidental mortality/injury rates from fisheries (it is to be clarified whether this is part of the Malta's yearly National Programme for Fisheries Data Collection (Multi-Annual programme)). Data of turtle strandings on Malta's shores are also collected by MEPA/ERA for the assessment of fishery-related mortality.

These monitoring programmes underpin the assessment of abundance and distribution of loggerhead turtle, which are assessed individually by ERA and reported to the European Commission as part of the MSFD and to the UN Environment/Mediterranean Action Plan (UNEP/MAP) for the Barcelona Convention. Fisheries and stranding monitorings provide assessment of the bycatch mortality of the three species, also delivered by ERA as part of the MSFD and the Barcelona Convention.

As for the assessment of the habitats for the species (extent and condition), monitoring and data collection within the above-mentioned LIFE projects for the abundance and distribution are currently used to infer the species habitat, with also additional data collected from VHF tracking (by KAI Marine Services within Life+Migrates). However, these are not sufficient to assess habitat extent and conditions, and ERA advocates further studies and long-term monitoring (not specified) to undertake this assessment.

A6.6.2 Data flow diagram



A6.7 Habitats Directive

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.7.1 Data flow description

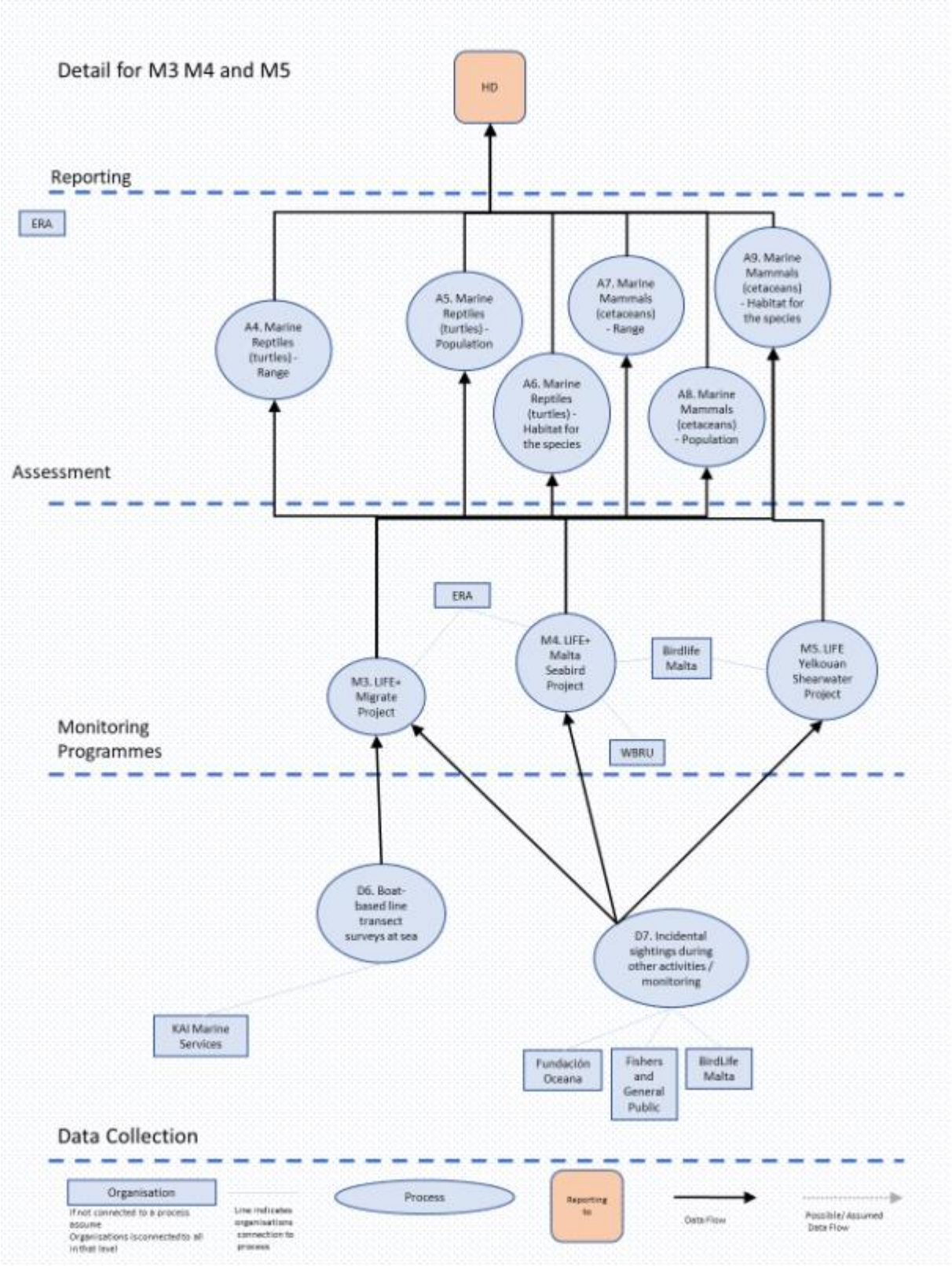
Malta's assessments for the Habitats Directive include 4 marine habitats and 20 species, of which 2 are marine reptiles (turtles) and 10 are marine mammals (cetaceans). The remaining species are benthic invertebrates or coralline algae (maerl), and have not been considered further here. The assessments include range (for both habitats and species), area (habitats only), structure and functions (including typical species, for habitats only), population and habitat for the species. All these assessments are undertaken by the Government's Environment and Resources Authority (ERA) and reported together to the European Commission as part of the Article 17 reporting for the HD.

The monitoring for the last reporting cycle was undertaken within a series of European- co-funded projects, including LIFE projects targeting specific habitats (LIFE BaĦAR for N2K, 2015-2016), turtle and cetacean species (LIFE+ Migrate Project, 2013-2014), and the EMFF 8.3.1 (2017-2019) aimed at providing a monitoring programme that informs assessments for the MSFD, WFD and HD. These monitoring projects were coordinated by ERA, with the contribution of other Government departments (the Department of Fisheries and Aquaculture, the Ministry of Sustainable Development, the Environment and Climate Change), and the University of Malta. NGO organisations (Fundación Oceana) and environmental consultancies

(KAI Marine Services, AZTI and AIS Environment Ltd. as part of the Malta Marine Monitoring Consortium in EMFF 8.3.1) were also involved in the data collection, through ROV surveys, SCUBA diving surveys, bathymetric surveys, boat-based transect surveys within the Malta's Fisheries Management Zone.

Species data have also been collected opportunistically, mainly in the form of turtle and cetaceans sightings, and they have been also used to inform the species assessment. These data were collected from monitoring programmes targeting seabirds (LIFE+ Malta Seabird Project and LIFE Yelkouan Shearwater Project), as coordinated by the NGO Birdlife Malta. Additional data for species assessments (particularly with regard to threats) were obtained from the ERA programme recording strandings of turtles and cetaceans on Malta's shores, as well as the Rescue, rehabilitation and release program for injured by-caught turtles, undertaken the NGO Nature Trust - FEE Malta.

A6.7.2 Data flow diagram


Detail for M3 M4 and M5
HD
Reporting
ERA
A4. Marine Reptiles (turtles) - Range
A5. Marine Reptiles (turtles) - Population
A6. Marine Reptiles (turtles) - Habitat for the species
A7. Marine Mammals (cetaceans) - Range
A8. Marine Mammals (cetaceans) - Population
A9. Marine Mammals (cetaceans) - Habitat for the species
Assessment
ERA
M3. LIFE+ Migrate Project
M4. LIFE+ Malta Seabird Project
Birdlife Malta
M5. LIFE Yelkouan Shearwater Project
WBRU
Monitoring Programmes
D6. Boat-based line transect surveys at sea
D7. Incidental sightings during other activities / monitoring
KAI Marine Services
Fundación Oceana
Fishers and General Public
BirdLife Malta
Data Collection
Organisation
Process
Reporting to
Data Flow
Possible/ Assumed Data Flow

A6.8 MSFD D1 Benthic habitats, MSFD D1 Sea-floor integrity

Country:		Malta
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	(x)
	D6 on Sea-floor integrity	x
	Birds Directive	
	Habitats Directive	
Marine region		Mediterranean
Sub region/s		Ionian Sea & Central Mediterranean Sea

A6.8.1 Data flow description

Malta's assessments for D1/D6- Benthic broad habitats include the extent of habitat adversely affected by disturbance (physical or other), the extent of habitat lost and the habitat condition (assessed based on the extent of habitat achieving the WFD threshold Good/High Status), for each of 7 broad habitat types. All these assessments are undertaken by the Government's Environment and Resources Authority (ERA) and reported together to the European Commission as part of the MSFD.

The monitoring for the last reporting cycle was undertaken within two main European projects, a LIFE project (LIFE BaĦAR for N2K) aimed at gathering data on Annex I marine habitats (reefs, caves and sandbanks) to improve the N2K network of protected sites within Malta's Fisheries Management Zone, and an EMFF environmental monitoring project (EMFF 8.3.1) aimed at implementing and updating Malta's monitoring programme. Both projects were coordinated by ERA, with the contribution of other Government departments (the Department of Fisheries and Aquaculture, the Ministry of Sustainable Development, the Environment and Climate Change), and the University of Malta. NGO organisations (Fundación Oceana) and environmental consultancies (AZTI and AIS Environment Ltd. as part of the Malta Marine Monitoring Consortium in EMFF 8.3.1) were also involved in these programmes, and collected the data for the assessments through ROV surveys, SCUBA diving surveys, bathymetric surveys, benthic grab surveys, remote mapping (video) surveys, and visual

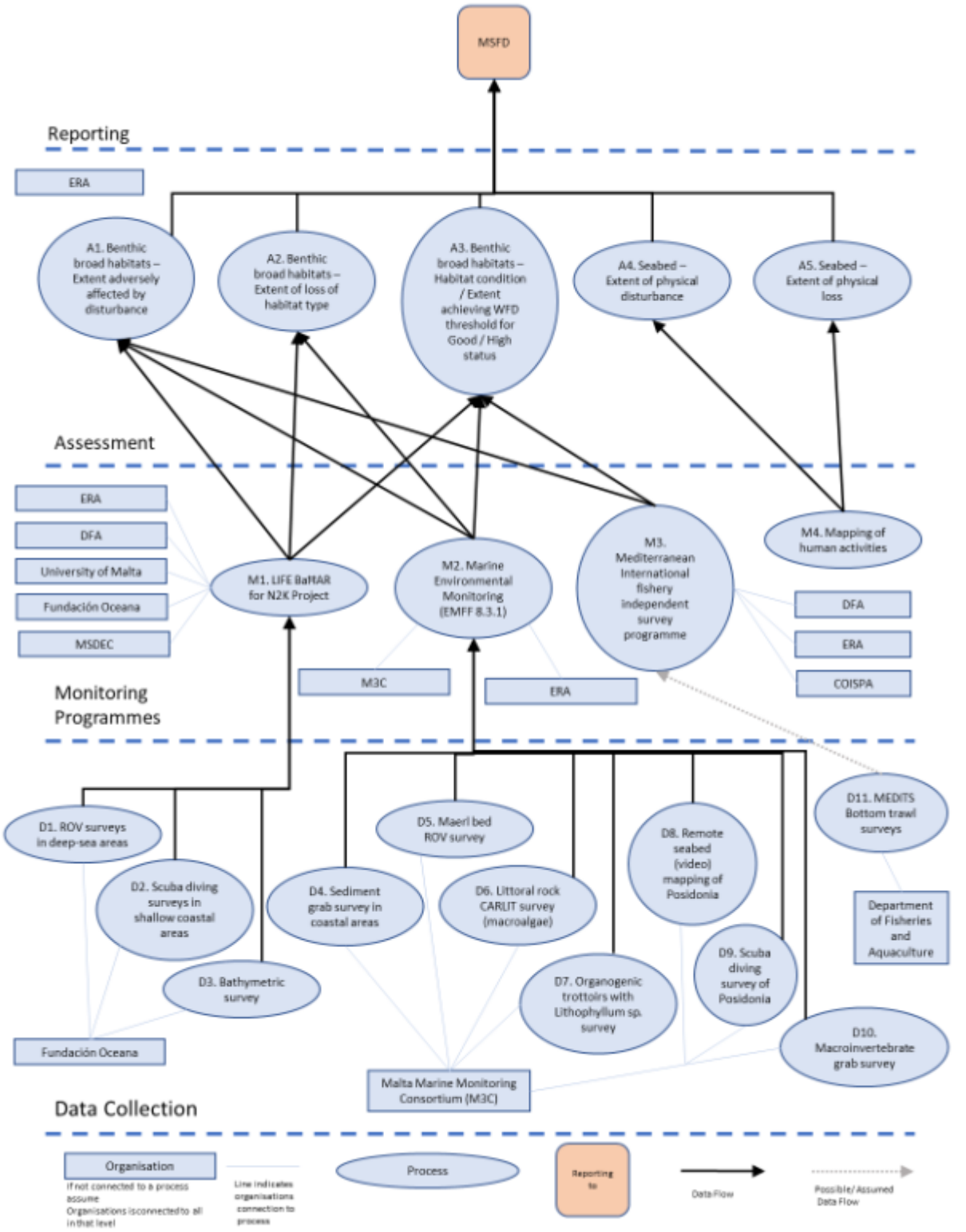
observations (CARLIT methodology) undertaken between 2015 and 2018 in different habitats within Malta's Fisheries Management Zone.

An international fishery independent monitoring programme is undertaken in the Mediterranean, the Mediterranean International Bottom Trawl Survey Programme (MEDITS), as coordinated by COISPA, an Italian non-profit organisation. Malta joined MEDITS in 2000, and MEDITS data collected annually between 2015 and 2017 were used to inform on the typical species of Shelf sublittoral and Upper Bathyal sediment habitats for the 2018 assessment. The Department of Fisheries and Aquaculture (DFA) is responsible nationally for the MEDITS surveys in the GSA 15 (Malta).

These monitoring programmes provide data on habitat distribution and extent, and community characteristics to be used for the 2018 updated assessments of MSFD D1/D6 – benthic broad habitats. They also provide data for HD and WFD assessments.

The MSFD D6 assessment also includes the extent of physical disturbance and loss of seabed, although this is not related to a specific habitat but to the seabed in general. The assessment and reporting to MSFD is undertaken by ERA, with the assessment being based on the mapping of human activities (e.g. Coastal and marine applications for development; Aquaculture farms, Trawling Zones and Fishing Effort; Bunkering and waiting areas, Marina concessions, Official and organised mooring zones, Vessels data, Wreck conservation areas; Exploratory oil wells) in Malta's waters (area designated for hydrocarbon exploration and exploitation). The data for this mapping are obtained by different CAs (e.g.; as part of their remits, e.g. from marine licencing and planning (ERA, Planning Authority, Authority for Transport in Malta, Continental Shelf Department) or fishery management (Department of Fisheries and Aquaculture).

A6.8.2 Data flow diagram



Annex 7 Netherlands data flow summary

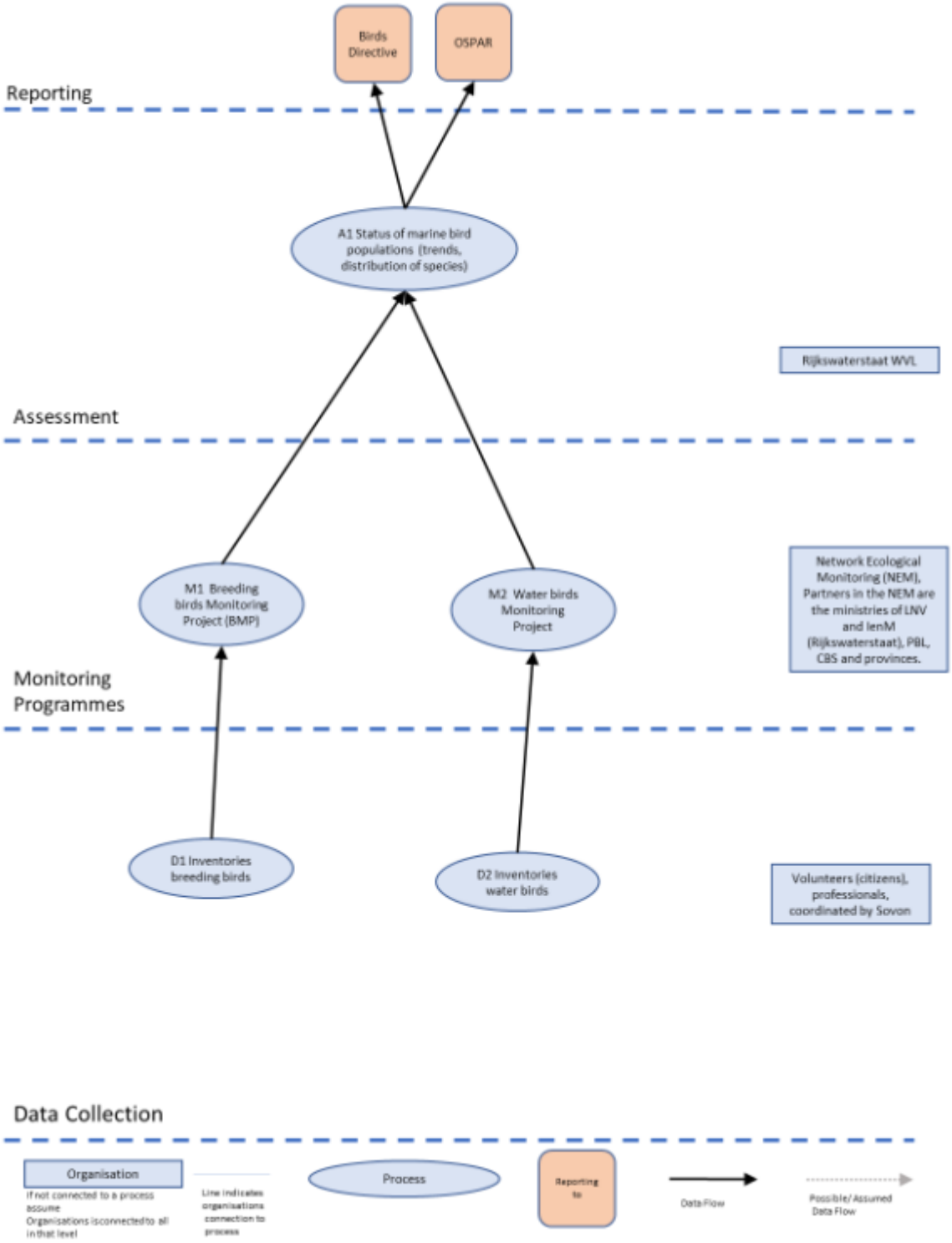
A7.1 Birds Directive

Country:		Netherlands
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	x
	Habitats Directive	
Marine region		
Sub region/s		NE Atlantic: Greater North Sea

A7.1.1 Data flow description

The main activities for assessing the status and trends of marine bird species targeted by the directive are described under "D1 Birds".

A7.1.2 Data flow diagram



A7.2 Habitats Directive

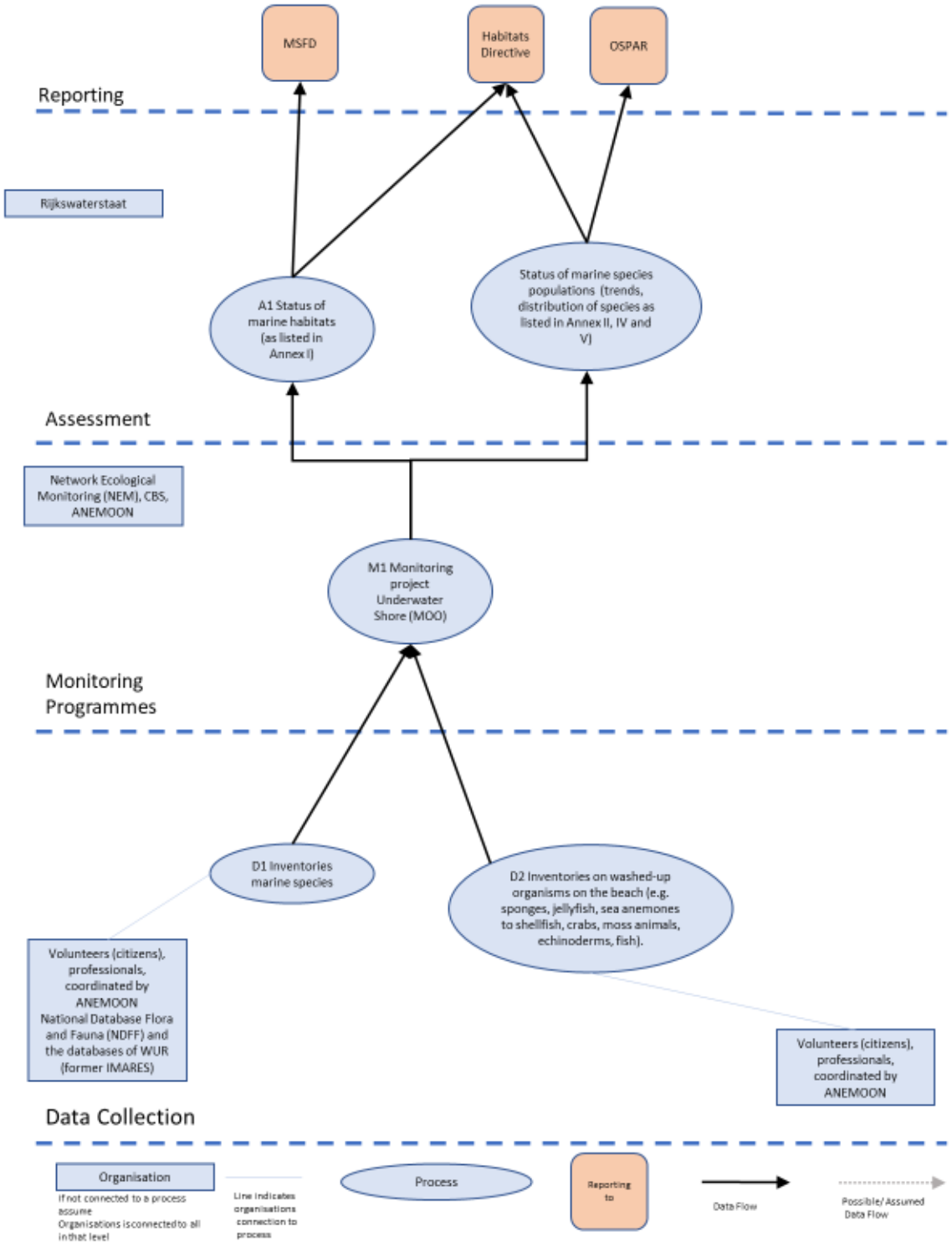
Country:		Netherlands
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	x
Marine region		NE Atlantic
Sub region/s		Greater North Sea

A7.2.1 Data flow description

ANEMOON is the main body in charge of collecting data feeding into the monitoring programmes emerging from the HD. Monitoring of marine habitats is regulated in the Network Ecological Monitoring (NEM) through the Monitoring project Underwater Shore (MOO) and the Beach-washing system Monitoring Project (SMP). The monitoring of the NEM is geared to the information required for reporting for the HD as well as BD. Monitoring programmes aim to inform the status of marine species populations (trends, distribution of species as listed in Annex II, IV and V) and the status of marine habitats (as listed in Annex I).

The typical species of both H1110A (Permanently flooded sandbanks, tidal area) and H1110B (Permanently flooded sandbanks, North Sea coastal zone) are only followed in the North Sea coastal zone, because it is not possible to mobilize volunteers in the Wadden Sea region. For the habitat type H1110B, use is made of the SMP. For both MOO and SMP, ANEMOON is working on further expanding these monitoring networks, both in terms of the number of observers and the number of monitoring locations. For the habitat types H1130 (Estuaries), H1140 (Mud and Sand Slabs) and H1170 (Reefs of open sea), the ANEMOON Foundation cannot determine reliable trends of typical species

A7.2.2 Data flow diagram



A7.3 MSFD D1 Birds

Country:		Netherlands
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats	
Marine region		NE Atlantic: Greater North Sea
Sub region/s		OSPAR Greater NorthSea (L1.2), OSPAR Southern NorthSea (L2.2.5)

A7.3.1 Data flow description

Assessment & reporting

GES for seabirds is determined to a large extent by the population abundance (D1C2). A new feature is that breeding success (D1C3) and the mortality rate from incidental bycatch of birds in marine fishing (D1C1) are also specifically considered for the MSFD.

GES for the population abundance is measured by OSPAR and the Birds Directive requirements. This means that population abundance in the southern North Sea of at least 75% of the bird species in each 'functional group' must be above the threshold value in 1992 (OSPAR). The objective of the Birds Directive is 'to maintain the populations of all wild bird species in the EU at a level which corresponds to their ecological, scientific and cultural requirements, or to adapt the population of these species to that level'. This description is regarded as comparable with the term 'favourable conservation status' in the Habitats Directive.

Monitoring & data collection

The populations of seabird species are determined mainly on the basis of aerial counts (by Rijkswaterstaat). Counts ("trektellingen") by volunteers from the coast (seabird migration counts) and data from the Breeding Bird Monitoring Programme are also used.

The monitoring of breeding success among birds has an early-warning function[5] and is therefore an important addition to the instruments for monitoring trends in bird populations. Changes in populations generally occur over longer periods and are therefore slower to provide insight into reactions to external pressures. GES is achieved if breeding failure does not occur in more than three of every six years (OSPAR indicator). In the Wadden Sea area, there has been a reproduction monitoring survey since 2004 (for the Ministry of Agriculture, Nature and Food Quality).

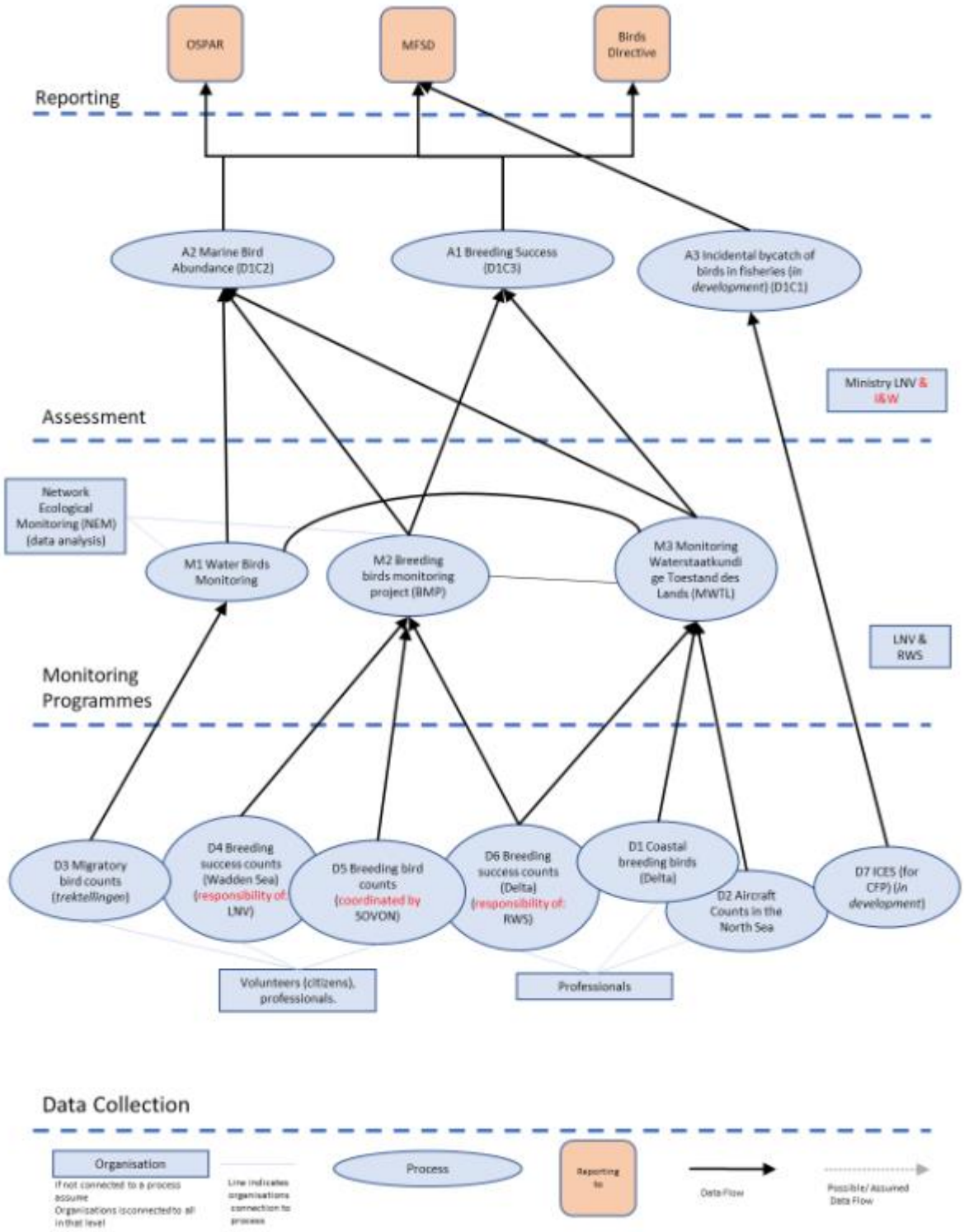
Bird counts and breeding bird inventories are usually performed by volunteers under the leadership of Sovon, but can also be supported by professionals such as for coastal breeding birds in the Wadden Sea. The data collected is submitted to the water birds monitoring programmes and the breeding birds project (BMP) of the Ecological Monitoring Network (NEM). The aircraft counts are ordered by Rijkswaterstaat under the MWTL programme.

The birds monitoring efforts for 2020-2026 will be different from those conducted in the previous reporting period in a number of aspects: the number of offshore counts will be increased from four to six per year, and the coastal counts are also being refined for greater spatial coverage. Also, since there was no permanent survey in place elsewhere along the Wadden Sea coast, a survey to monitor breeding success will be launched for the purposes of the MSFD in 2020. If possible, it will be combined with an initiative by provinces and regional land managers in the South-West Delta.

At international level, a system for monitoring incidental bycatch of protected species, including sea birds, is being developed as required by the CFP (under ICES' leadership). No indicator has been formulated for birds yet.

[5] For the mating period and for the area where the relevant species reside during the mating period, in any case.

A7.3.2 Data flow diagram



A7.4 MSFD D1 Mammals

Country:		Netherlands
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	**x**
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Greater North Sea
Sub region/s		OSPAR Greater NorthSea (L1.2), OSPAR Southern NorthSea (L2.2.5)

A7.4.1 Data flow description

Assessment & reporting

Achieving GES for marine mammals is measured by population size, demographics, distribution and habitat. The population trends for harbour porpoise (*Phocoena phocoena*), common seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) must be at least stable (OSPAR indicator) and their population abundance must correspond with the Favourable Reference Population (FRP) in the Habitats Directive (D1C2). For seals, the extent to which GES has been achieved is also measured by the number of pups that are born (D1C3). The average number of pups must not decline by more than 1 per cent a year. For the grey seal, this indicator corresponds with the OSPAR indicator for the North Sea. There is no OSPAR indicator for pup production of the common seal, but data are reported at national level (this is illustrated by the additional arrow on the diagram).

The distribution (D1C4) of harbour porpoise, common seal and grey seal has to comply with the Favourable Reference Range (FRR) in the Habitats Directive. Their

distribution is not specifically monitored; marine mammals are very mobile and the observed distribution will depend entirely on the extent of the research. It is therefore assumed that both the FRR and the distribution range of the three species encompass the entire DCS (including the coast, the Wadden Sea and the Delta Waters).

The extent and the condition of the habitats of marine mammals (D1C5) must be at least maintained. The assessment is linked to reporting for the Habitats Directive. However, there is still considerable uncertainty regarding the quality of the habitats, mainly because the impact of various pressures, both now and in the future, is unknown.

Monitoring & data collection

All surveys of cetaceans and seals are carried out for the Ministry of Agriculture, Nature and Food Quality (WOT) and Rijkswaterstaat (MWTL).

For the monitoring of cetaceans, including harbour porpoise, OSPAR and ASCOBANS are developing a SCANS survey programme[6] for the entire North Sea with measurements at least once every six years. The Netherlands supplements this monitoring with surveys at Dutch Continental Shelf (DCS) level.

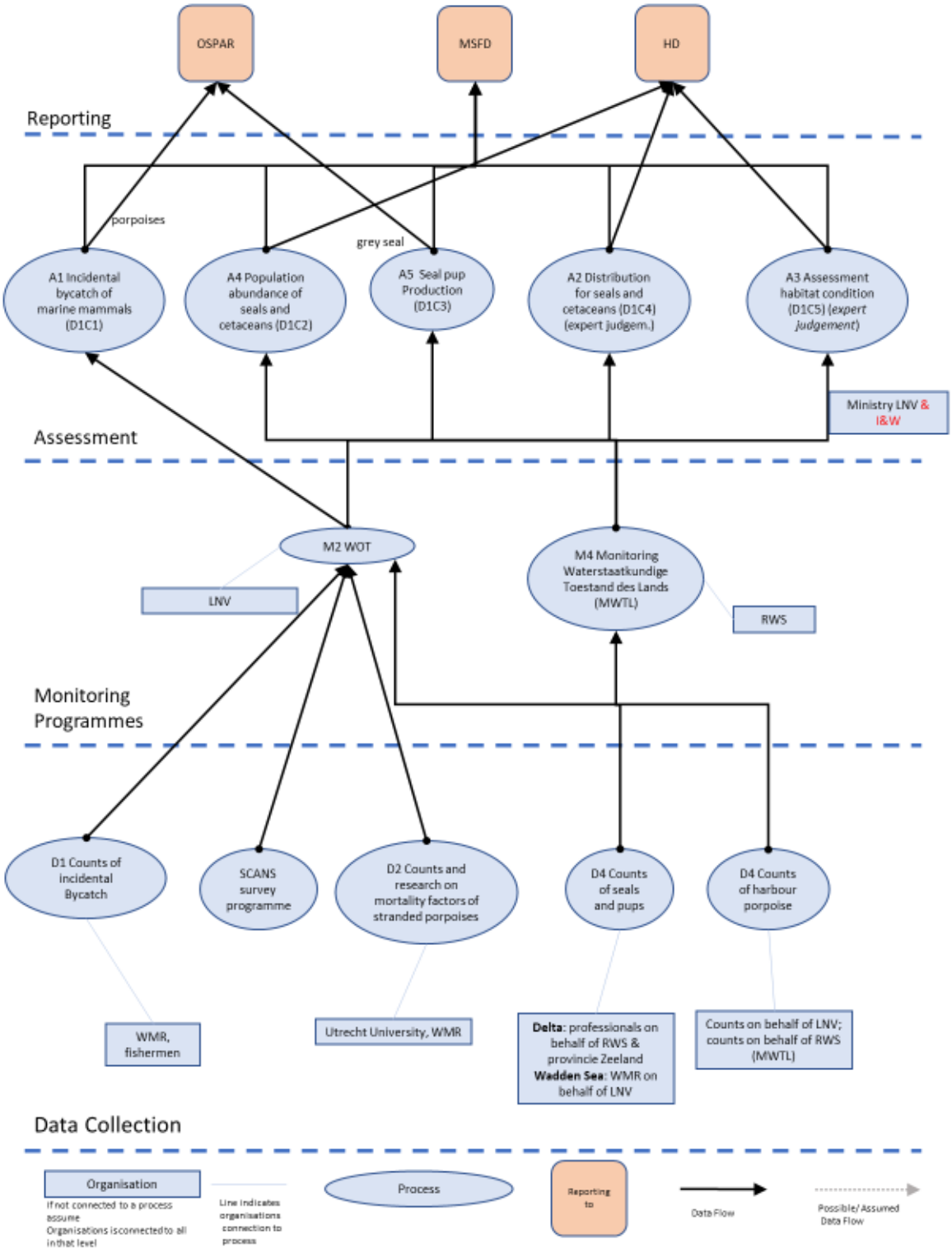
The monitoring of seals is part of OSPAR and the Habitats Directive and also adheres to the trilateral agreements on the Wadden Sea (under the Convention on the Conservation of Migratory Species of Wild Animals, also known as the Bonn Convention).

The seal counts are conducted several times each year and this frequency has not changed since 2014. The surveys of harbour porpoises will be arranged differently (over the years and within a year) in order to produce a better estimate of the population.

Studies are being carried out as part of a number of major projects, such as the Offshore Wind Ecological Programme (Wozep), to increase knowledge of the effects of offshore windfarms on the habitats of marine mammals (D1C5). Also, there is a monitoring survey (for the Ministry of Agriculture, Nature and Food Quality) to ascertain the cause of death of a subset of stranded porpoises, which may be extended to encompass seals in future (this is led by Utrecht University with support from WMR). For the new reporting period (2020-2026), international efforts are also underway to further develop a system of monitoring incidental bycatch of protected species, including harbour porpoises and seals (D1C1), as required by the EU's Common Fisheries Policy (CFP). There is already an OSPAR indicator for incidental bycatch of porpoises, but not yet for seals.

[6] Small Cetaceans in European Atlantic waters and the North Sea

A7.4.2 Data flow diagram



A7.5 MSFD D1 Fish

Country:		Netherlands
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic
Sub region/s		NE Atlantic: Greater North Sea

A7.5.1 Data flow description

Assessment & reporting

The MSFD provides that the population abundance of vulnerable fish species must be sufficient to ensure their long-term viability (D1C2). For commercially exploited species, GES is reached if the requirements for the fish mortality rate and spawning stock biomass are met (corresponding with the GES for D3C1 and D3C2, respectively).

Separate descriptions of good environmental status have been defined for non-commercially exploited species (including sharks and rays), fish species referred to in the Habitats Directive (migrant fish species) and other vulnerable species. The data used for the assessment of vulnerable species are collected by means of the fisheries monitoring for the CFP. OSPAR's indicator for vulnerable species is then used to determine whether good environmental status has been achieved. There is no assessment or specific monitoring for sharks and rays. Precautionary measures to improve the status of these species have been adopted in the Dutch National Action Plan for Sharks and Rays. Experts assess the population abundance (D1C2) and the distributional range of migrant fish species according to the reference values in the Habitats Directive (D1C4), based on the available data from fisheries monitoring (salmon and eel traps) in the inland waters. If necessary, they also use data generated by the Network Ecological Monitoring (NEM).

To determine the 'demographic characteristics´ (D1C3) of the fish population, the distribution by size of the fish community is assessed using OSPAR's Large Fish

Indicator (LFI). The necessary data are collected for the assessment of fish stocks in accordance with the CFP.

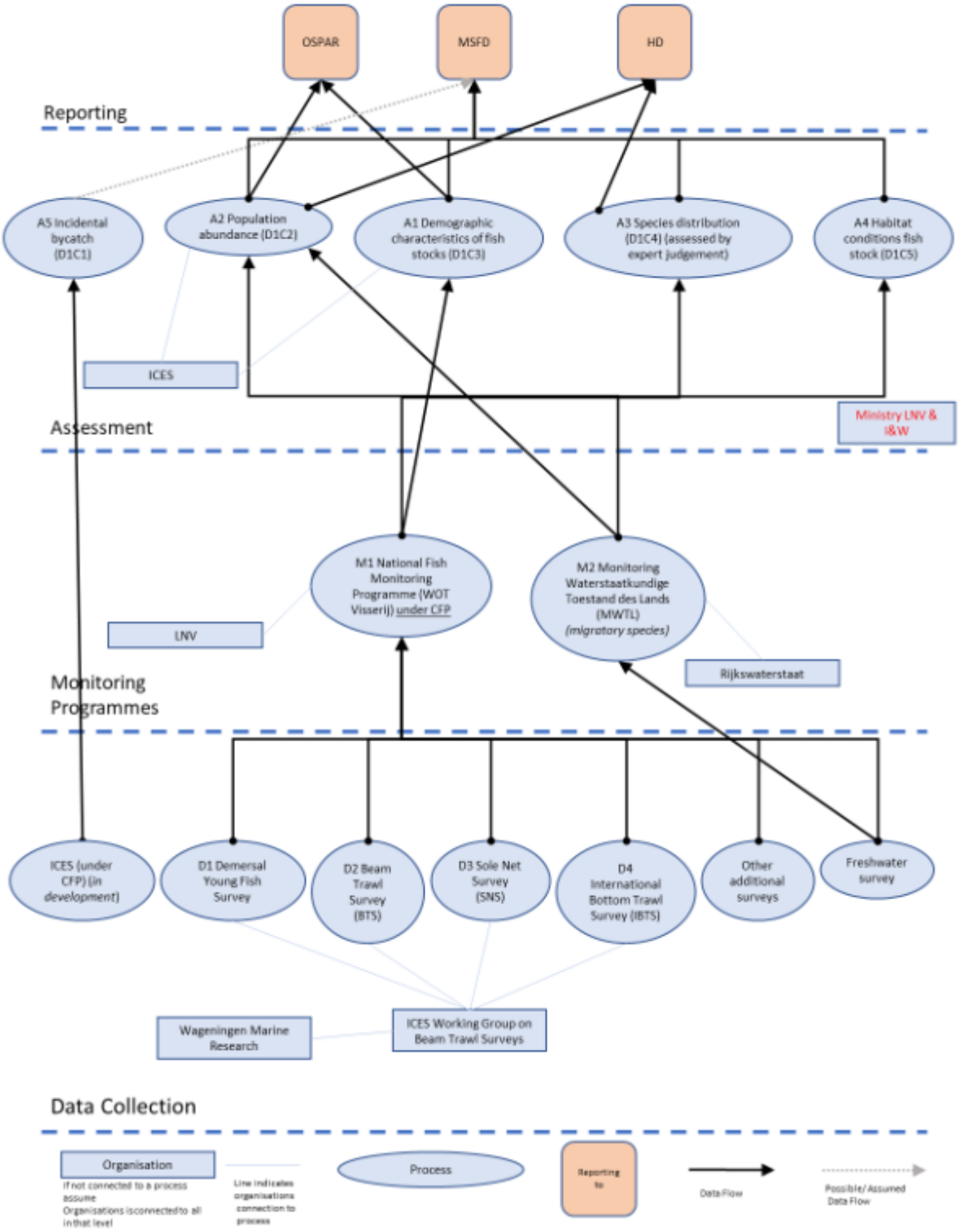
The quality of the habitat for fish is also important for the MSFD (D1C5). The specific requirement is to reduce the barriers in migration routes for migrant species. The monitoring and assessment of this criterion corresponds with the WFD. The mortality rate of all non-commercially exploited fish species as a result of incidental bycatch must be lower than levels which threaten the species (D1C1). No indicator has yet been formulated for this criterion. The CFP does provide for mandatory registration, but that has still to be fully implemented in practice.

Monitoring & data collection

The vast majority of the necessary data are delivered by the monitoring surveys in the context of the CFP. The most important surveys are the demersal young fish survey, the beam trawl survey, the sole net survey, and the international bottom trawl survey. Changes in the monitoring and further elaboration of indicators occur within that framework.

Indicators for the criteria D1C1, D1C2 and D1C3 have to be defined not only for fish species, but also for cephalopods. This has not yet been done, partly because so little information is available about these species. Research will be conducted into the possibility of formulating these indicators in 2020.

A7.5.2 Data flow diagram



A7.6 MSFD D1 Benthic habitats

Country:		Netherlands
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	x
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		
Sub region/s		NE Atlantic: Greater North Sea

A7.6.1 Data flow description

Assessment & reporting

The aim of the MSFD is to improve the quality of seafloor habitats. Also, there must be no significant decline in the extent of those habitats. Results from the MSFD monitoring programme show whether good environmental status has been achieved and highlight the pressures and their impact. In contrast to the other descriptors, the connected pressure and associated activities are explicitly mentioned: the disturbance of the seabed must not increase.

The monitoring and assessment of the quality of habitats at DCS level largely corresponds with the Habitats Directive (national level) and Natura 2000 (area level). The quality of habitats is determined on the basis of the presence of benthic species. The assessment is focused on a set of species that is indicative of the structure and function of the habitat, species that are sensitive to disturbance by human activities, and species that are indicative of recovery (the so-called BISI indicator). Monitoring in both closed and non-closed areas indicates the effectiveness of measures.

At the level of the North Sea region, the assessment of the quality of habitats is linked to the OSPAR indicator, whereby the quality is shown by a diversity indicator.

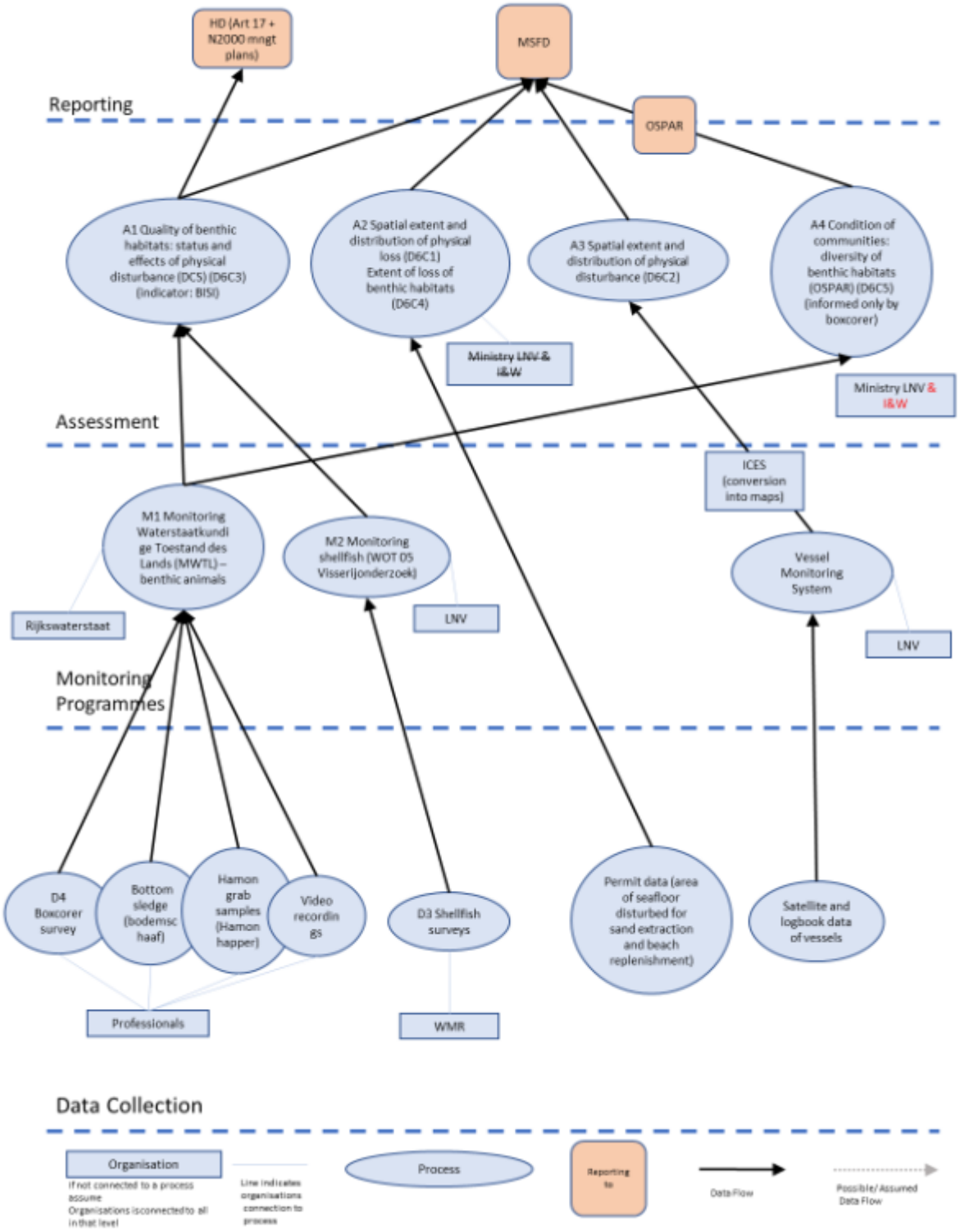
Monitoring & data collection

Benthic animals are sampled in Rijkswaterstaat's MWTL monitoring programme and the shellfish monitoring WOT for the Ministry of Agriculture, Nature and Food Quality.

The MWTL encompasses a series of surveys including boxcorer survey, bottom sledge, Hamon grab and video recording. Since its introduction in 2014, the MSFD monitoring programme has been revised and expanded to match the modified boundaries of the protected (closed) areas.

The level of disturbance of the seabed by fisheries is derived from data collected under the CFP by the EU-Vessel monitoring system (VMS). ICES has adopted a standard protocol for converting the VMS and logbook data into maps showing the spatial extent and distribution of fisheries pressure. Any changes in the spatial extent of the seabed and habitats are regulated via licences and can therefore be analysed through administrative records. Data generated by the licensing procedure are used to determine the area of the seafloor disturbed for sand extraction and beach replenishment. There is no indicator yet for sand extraction.

A7.6.2 Data flow diagram



Annex 8 Romania data flow summary

A8.1 Birds Directive

Country:		Romania
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	X
	Habitats Directive	
Marine region		Black Sea
Sub region/s		37.4.2 (GSA 29)

A8.1.1 Data flow description

Data collection is coordinated by the Competent Authority, the Ministry of the Environment, Waters and Forests. Other organisations participating in the coordination and monitoring are:

1) the National Centre for Sustainable Development (CNDD),

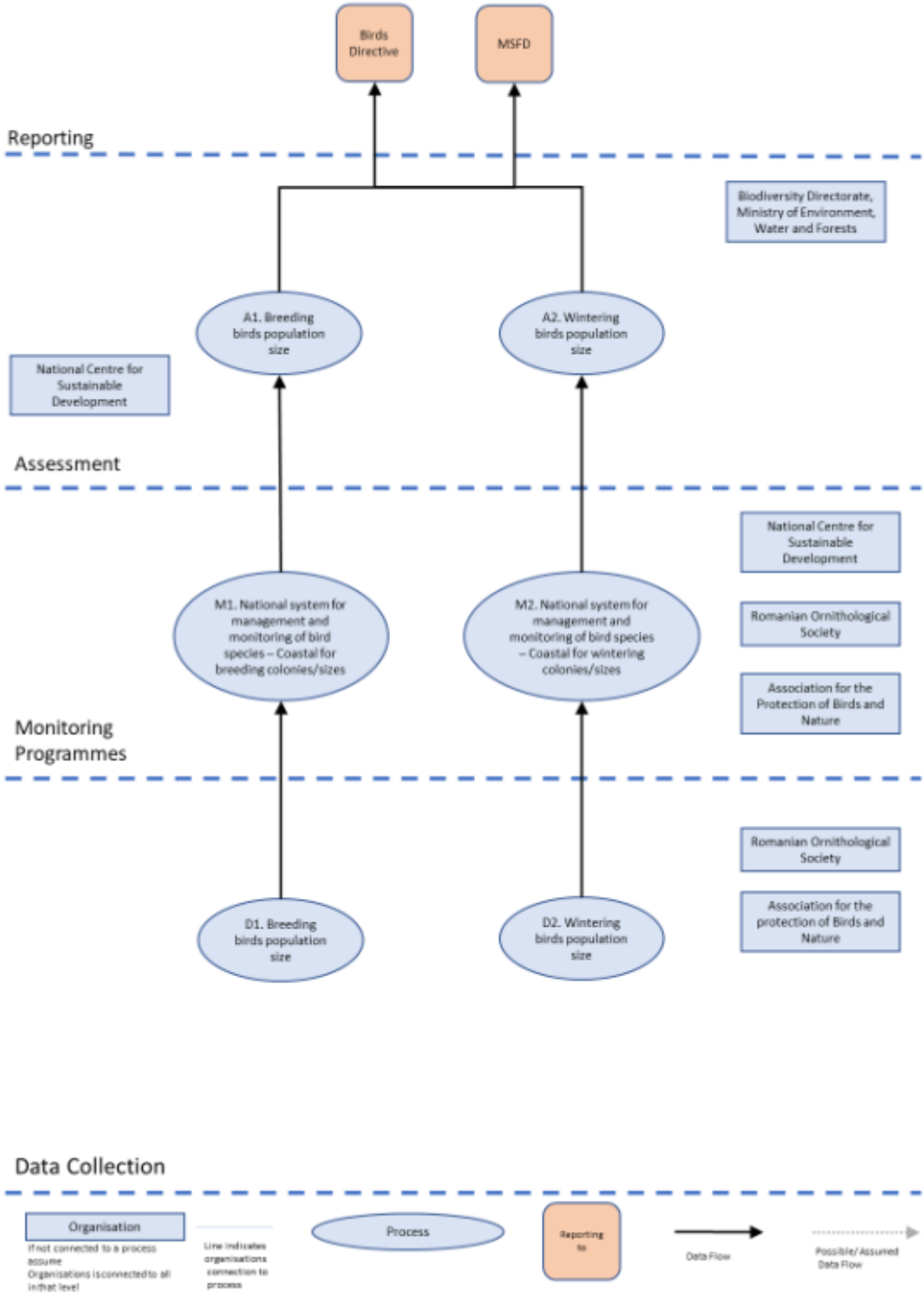
2) the Romanian Ornithological Society (SOR / BirdLife Romania) and

3) the Association for the Protection of Birds and Nature "Milvus Group".

Observations are made twice a year: the first between April 15 and May 15, the second between May 16 and June 15. There must be a minimum interval of 14 days between the two observations.

Romania submits reports to the European Commission on the Birds Directive through the National Center for Sustainable Development (CNDD) in partnership with the Ministry of the Environment, Waters and Forests.

A8.1.2 Data flow diagram



A8.2 Habitats Directive

Country:		Romania
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	X
Marine region		Black Sea
Sub region/s		37.4.2 (GSA 29)

A8.2.1 Data flow description

Responsibility for marine benthic habitats data collection and reporting under the Habitat Directive is with NIMRD „Grigore Antipa".

Depending on habitat type, different sampling methodologies are used. Usually, for soft sediments dredges, Van Veen grab and underwater cameras are used. For hard substrates seafloor photography, quadrat sampling and SCUBA searches are performed.

Data monitoring is supervised by the Competent Authority, the National Agency for Environmental Protection (**ANPM**). Other participants are the **NIMRD "Grigore Antipa"**, the National Institute for Research and Development on Marine Geology and Geo-ecology – **GeoEcoMar** and the Romanian Water National Administration (**Dobrogea-Littoral Water Basin Administration**).

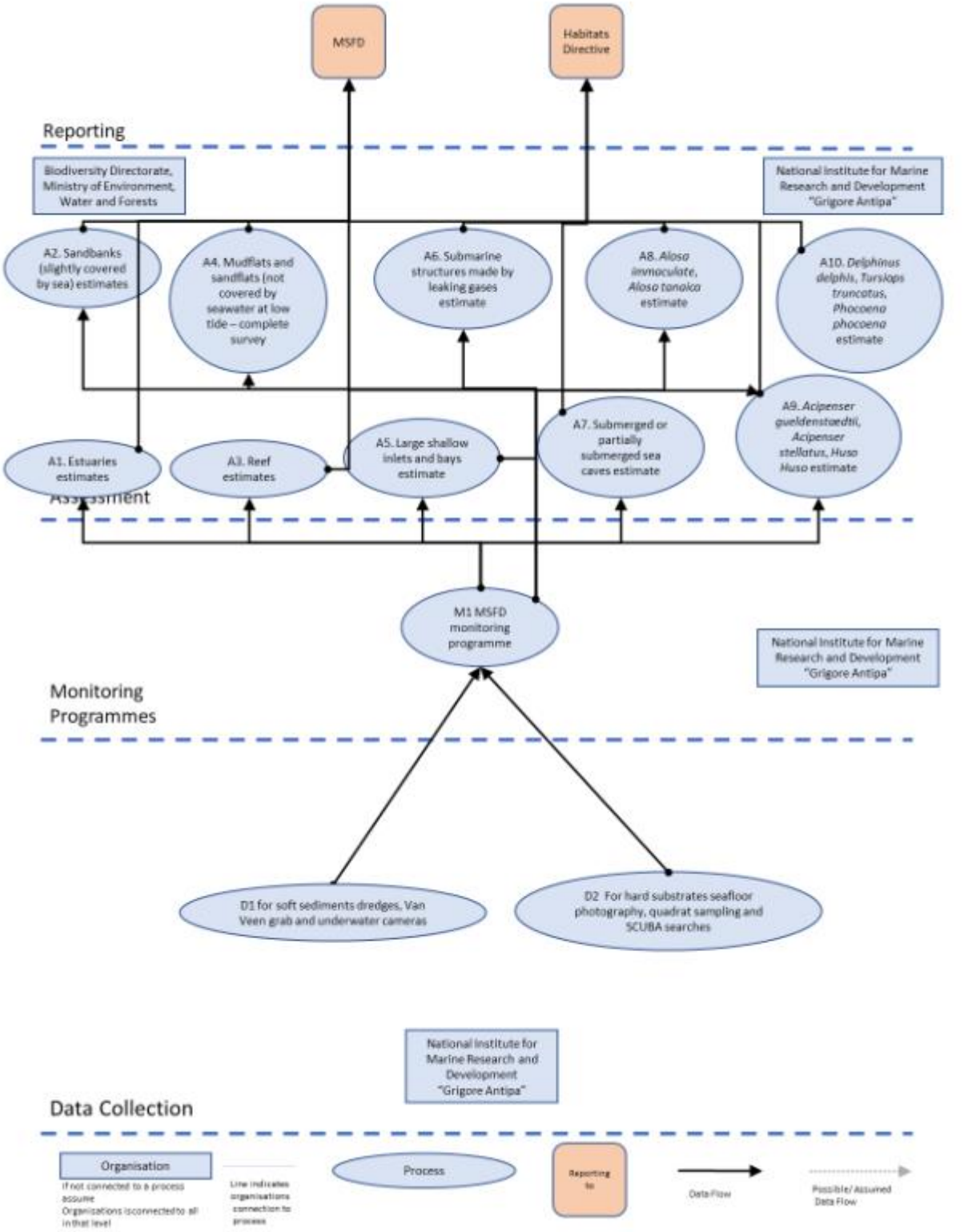
NIMRD is the Romanian National scientific institute responsible for the implementation of the Marine Strategy Framework Directive (MSFD) and the focal point within the Black Sea Commission for: Biodiversity, Pollution, Land-based sources of pollution, ICZM, Fisheries and other marine living resources.

GeoEcoMar represents the focal point of national excellence in research and consultancy on marine, coastal, river and lacustrine geology, geophysics and geoecology, as well as a reference centre for Marine and Earth Sciences.

The Romanian Water National Administration (**Dobrogea-Littoral Water Basin Administration**) manages the marine waters and coastal zone, and participates in organising exercises with the Civil Protection County Inspectorate on oil spill response on shore.

The data collected are submitted to the National Agency for Environmental Protection (ANPM), an arm of to the Ministry of the Environment, Waters and Forests. Romania submits reports to the European Commission on the Habitats Directive through ANPM.

A8.2.2 Data flow diagram



A8.3 MSFD D1 Mammals

Country:		Romania
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	**x**
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Black Sea
Sub region/s		37.4.2 (GSA 29)

A8.3.1 Data flow description

The main organization for mammals monitoring is the NIMRD "Grigore Antipa". It covers dolphin monitoring of the National Program for the Integrated Monitoring of Marine Waters (National Program for Data Collection - bycatch section) in the Romanian coastal and shelf waters. NIMRD is the Romanian National scientific responsible for the implementation of the Marine Strategy Framework Directive (MSFD) and the focal Point within the Black Sea Commission for: Biodiversity, Pollution, Land-based sources of pollution, ICZM, Fisheries and other marine living resources, as well focal point for ACCOBAMS.

Other organizations involved in the current programme are the NGOs "Mare Nostrum" and "Oceanic Club", which deal with the monitoring of stranded dolphins (alive or dead) along Romanian beaches. Besides biometric measurements, usually performed on the dead individuals, accidental catches are also monitored in order to assess the fisheries impact on mammals 'population (impact parameters). The programme also refers to the human activities which impact on the mammals' population, but this needs significant improvement before it can be considered it generates reliable data.

Data are reported (generally as processed data sets) through the Competent Authority (Department for Waters, Forests and Fisheries of the Ministry of the Environment, Waters and Forests,) to MSFD, the Black Sea Commission (BSC), through the Advisory

Group on Conservation of Biological Diversity (CBD)[7]. Data/information coming from the programme are also included in the Marine Mammal DataBase (MMDB) for the Romanian Black Sea coast, with interface with the Mediterranean Database of Cetacean Strandings (MEDACES) for data transmission (achieved in the period of Life project "Conservation of dolphins from Black Sea Romanian waters") and also in different projects databases (e.g. ACCOBAMS).

The spatial allocation of where monitoring is required is depicted in the following table.

	EEZ	12 nm zone	Coastal waters	Transitional waters
MSFD	x	x	x	-
Habitats Directive	x	x	x	x
BSC	x	x	x	x

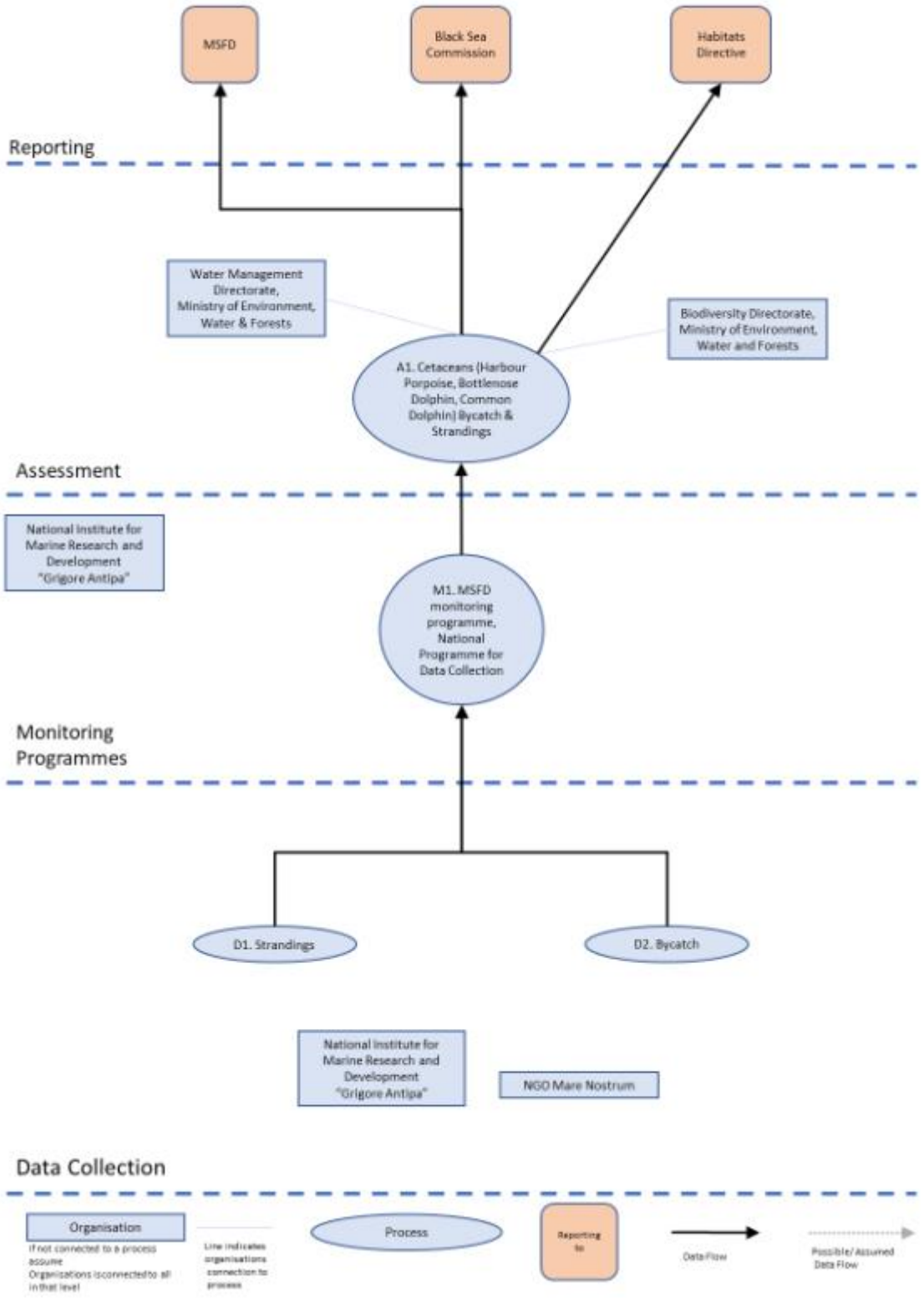
The programme is focused on monitoring of marine mammals encountered in the Black Sea: *Delphinus delphis*, *Tursiops truncatus*, and *Phocoena phocoena*.

GES criteria and indicators used are Descriptor 1 (species distribution, population size, habitat condition) and Descriptor 4 (abundance/distribution of key trophic groups/species).

The assessment of the ecological status of marine mammal populations was made on the basis of criterion D1C1 - Mortality by accidental catches. The abundance data and by-catches were taken from Birkun et al., 2014, a study which was also contributed to by experts from NIMRD "Grigore Antipa".

[7]: http://www.blacksea-commission.org/_ag-tor-cbd.asp

A8.3.2 Data flow diagram



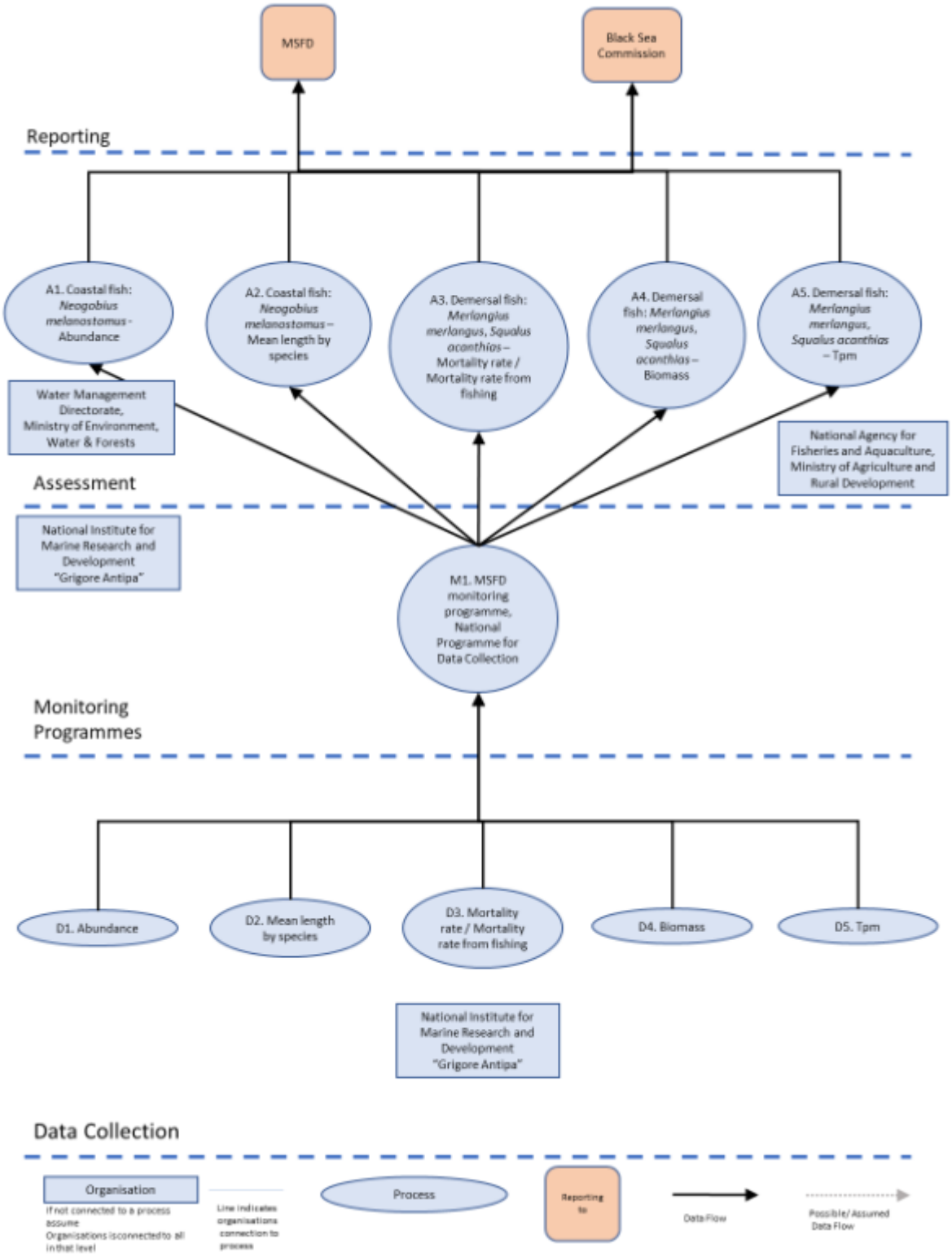
A8.4 MSFD D1 Fish

Country:		Romania
Descriptor/ BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	X
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Black Sea
Sub region/s		37.4.2 (GSA 29)

A8.4.1 Data flow description

Data collection is coordinated by the NIMRD "Grigore Antipa". There is one main data collection activity for marine fish, carried out twice a year (a spring demersal and pelagic survey and an autumn demersal and pelagic survey), every year, since 2008. The data are analysed and processed by the NIMRD "Grigore Antipa". The data collected are submitted to the National Agency for Fisheries and Aquaculture Authority (NAFA) for submission to the Black Sea Commission (BSC), GFCM and JRC (DG MARE). The fish monitoring programme produces an assessment of national trends that is reported to STECF-EWG / BS, GFCM. Assessments of marine fish abundance, mean length by species, Mortality rate / Mortality rate from fishing (F), Biomass and Tpm are also produced using analytical indicators. These data are reported to the MSFD.

A8.4.2 Data flow diagram



A8.5 MSFD D6 Sea-floor integrity

Country:		Romania
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 on Biodiversity – pelagic habitats	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	X
	Birds Directive	
	Habitats Directive	
Marine region		Black Sea
Sub region/s		37.4.2 (GSA 29)

A8.5.1 Data flow description

Data collection is coordinated by the Ministry of the Environment, Waters and Forests and three institutes are involved:

The Institute for Marine Research and Development (**NIMRD**) "Grigore Antipa" in Constanta,

The Institute for Research and Development for Geology and Geoecology **GeoEcoMar** which belongs to the Ministry of National Education and

the Romanian Water National Administration - **RWNA** (Dobrogea-Littoral Water Basin Administration) of the Ministry of the Environment, Waters and Forests.

The following data collection activities take place (per institution involved):

NIMRD is involved in the monitoring of:

Zoobenthos. Monitoring network comprises 45 sampling stations (bottom depths within 5 – 60 m), covering RO coastal and, partially, shelf waters (either waters strongly affected by the Danube's inputs and coastal activities or marine waters, less affected by human activities). Parameters monitored include biological (macro- and meiozoobenthos community composition, abundance (ind/m^2) and biomass (g/m^2);

habitat extent (mapping) for targeted habitat(s) (NATURA2000); habitat distribution – 6 monthly) and chemical (DO, salinity, TOC in bottom waters – seasonally).

Macroalgae. 12 sampling stations, in the coastal waters, are selected for macroalgae monitoring (carried out in summer).

GeoEcoMar contributes through a sampling network that includes 45 stations, bottom depths within 15 – 200 m, covering the entire RO shelf. Biological and chemical parameters are monitored with a frequency 2 times/year (or more – project based). **RWNA** - carries out monitoring activities mainly dealing with the land-based pressures and related impacts. Sampling network comprises 35 stations covering transitional and coastal waters. Zoobenthos (macrozoo- and meiobenthos community composition, abundance (ind/m^2) and biomass (g/m^2)) are monitored twice per year. Chemical characteristics of habitats are also assesed by measuring DO, salinity and TOC in bottom waters

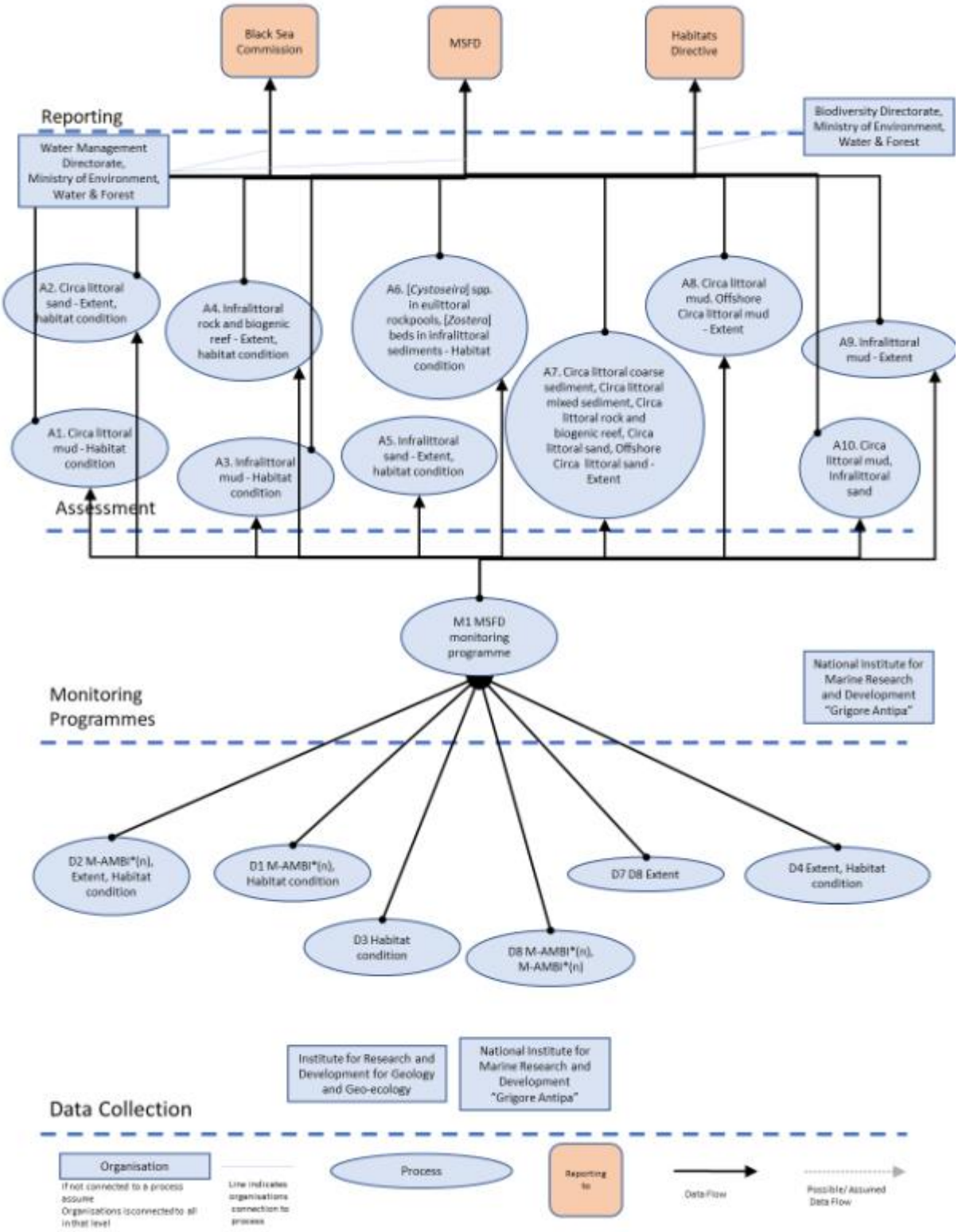
Data are reported (either as processed data or data products) through the competent authority to the European Environmental Agency, the Black Sea Commission[8] (through the Advisory Group on the Conservation of Biological Diversity), etc. Data are also reported (either as metadata or data) in databases belonging to other projects (SeaDataNet, PERSEUS, HYPOX, SESAME, COCONET, MISIS, EMODNET) from where can be accessed in accordance with the terms of such project.

The spatial allocation of where monitoring is required is depicted in the following table.

	EEZ	12 nm zone	Coastal waters	Transitional waters
MSFD	x	x	x	-
WFD	-	-	x	x
Habitats Directive	x	x	x	x
BSC	x	x	x	x

[8] or Commission on the Protection of the Black Sea against Pollution

A8.5.2 Data flow diagram



Annex 9 Spain data flow summary

A9.1 MSFD D1 Birds

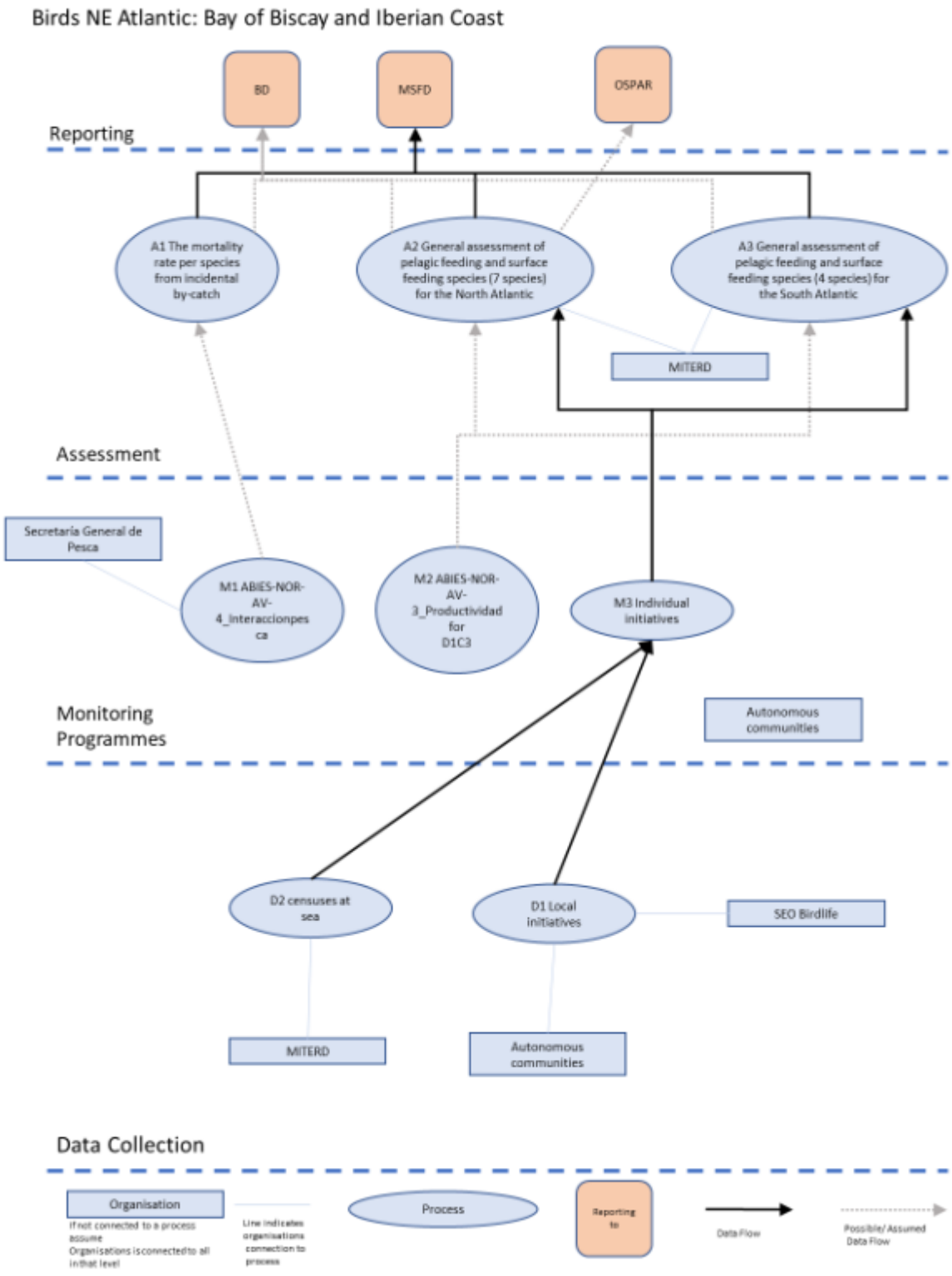
Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay and Iberian Coast
Sub region/s		

A9.1.1 Data flow description

The establishment of new monitoring programmes for birds to collect data on D1C1 and D1C3 is expected. These programmes are ABIES-NOR-AV-4_Interaccionpesca and ABIES-NOR-AV-3_Productividad. At present, the monitoring and data only come from local and individual initiatives, possibly having long term data.

No information was available for the South Atlantic, except for D1C1, where the status for the species considered is unknown. No links are made with the Birds Directive in the reporting.

A9.1.2 Data flow diagram



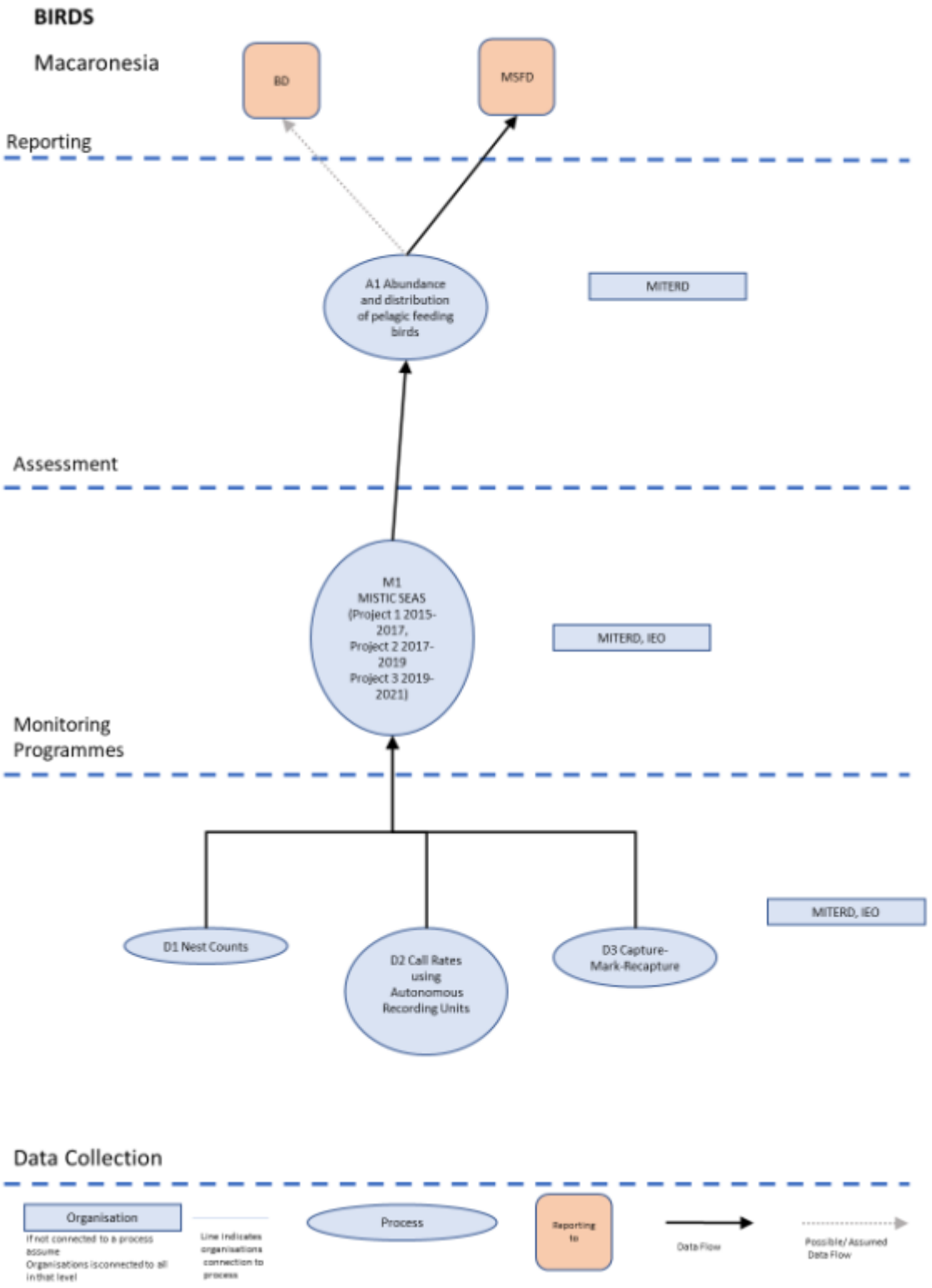
A9.2 MSFD D1 Birds (Macronesia)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Macaronesia
Sub region/s		

A9.2.1 Data flow description

Monitoring of bird species in Macaronesia has been conducted in the context of the MISTIC SEAS project. Whilst in its third phase (MISTIC SEAS III), it is unclear whether this project will continue into the future. The project focuses on pelagic feeding birds, and criteria D1C2 and D1C4 (abundance and distribution ranges, respectively). For some species, reference to MISTIC SEAS is not made, so the sources of the underlying data is not clear. The status for some of criteria is not assessed. No links are made with the Birds Directive in the reporting.

A9.2.2 Data flow diagram



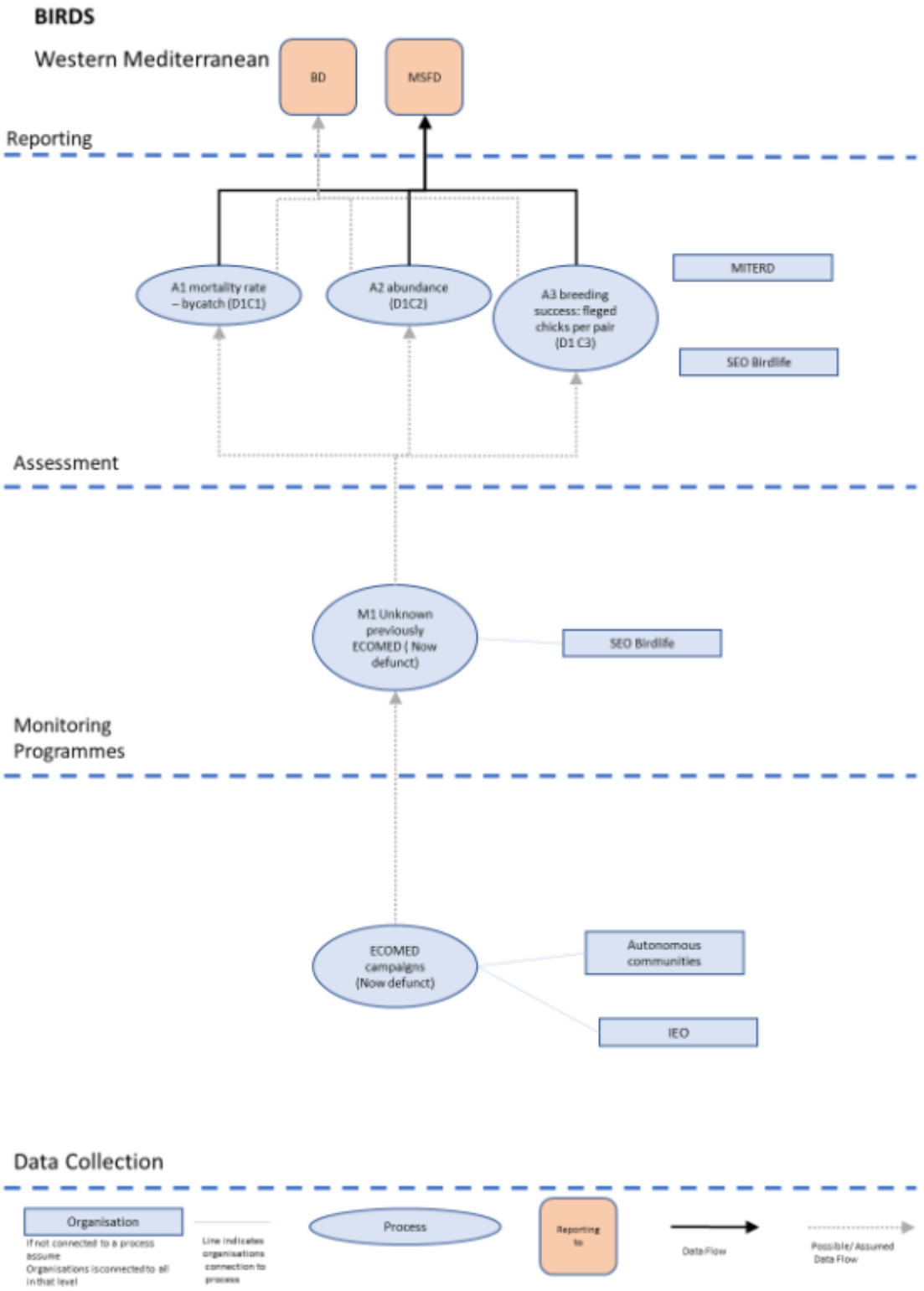
A9.3 MSFD D1 Birds (Western Mediterranean)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	x
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Western Mediterranean
Sub region/s		Levantino Balear and Estrecho de Alborán

A9.3.1 Data flow description

Monitoring of bird species in the Western Mediterranean was in the past carried out through the ECOMED campaigns. These campaigns no longer operate. The source of data currently used is not clear. Data mainly refer to that needed to perform the assessment of D1C1, D1C2, and D1C3. The spatial and temporal scope of the data, and who is responsible for collecting the data, is not clear. For the assessment, reference conditions are provided and the assessment in some cases performed. SEO Birdlife is the author of this section of the report, but it is not clear whether SEO Birdlife has been responsible for performing the assessment. In addition, it is also unclear as to why the status of some of the criteria result on "unknown". No links are made with the Birds Directive in the reporting.

A9.3.2 Data flow diagram



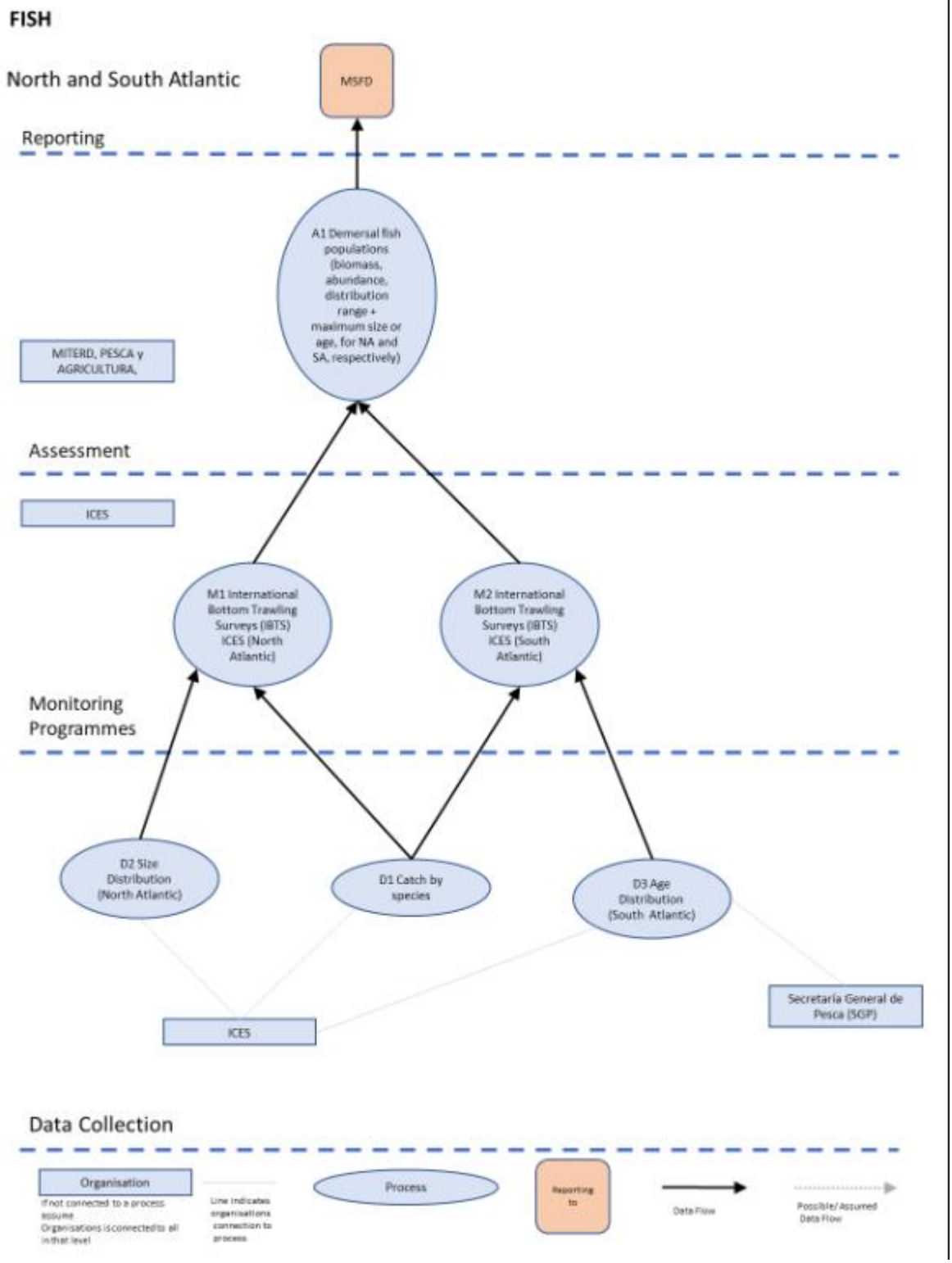
A9.4 MSFD D1 Fish (NE Atlantic)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		**A9.4.1** NE Atlantic: Bay of Biscay & Iberian Coast
Sub region/s		North and South Atlantic demarcation

A9.4.2 Data flow description

For the Bay of Biscay and Iberian Coast, the following criteria have been assessed: D1C2 and D1C3. D1C1 has been considered not adequate for assessment, as the data collected are species that are under the clear effect of trawling fisheries (whether that is the fisheries objective or not), and therefore, it is considered inappropriate to include them. The data collected is different for the North Atlantic and South Atlantic, as the species groups used are different (due to differences in the area) - for D1C3 in the North Atlantic size is used, whereas in the South Atlantic, it is the age distribution. The monitoring is carried out in the context of ICES, and the assessment performed in the context of the MSFD.

A9.4.3 Data flow diagram



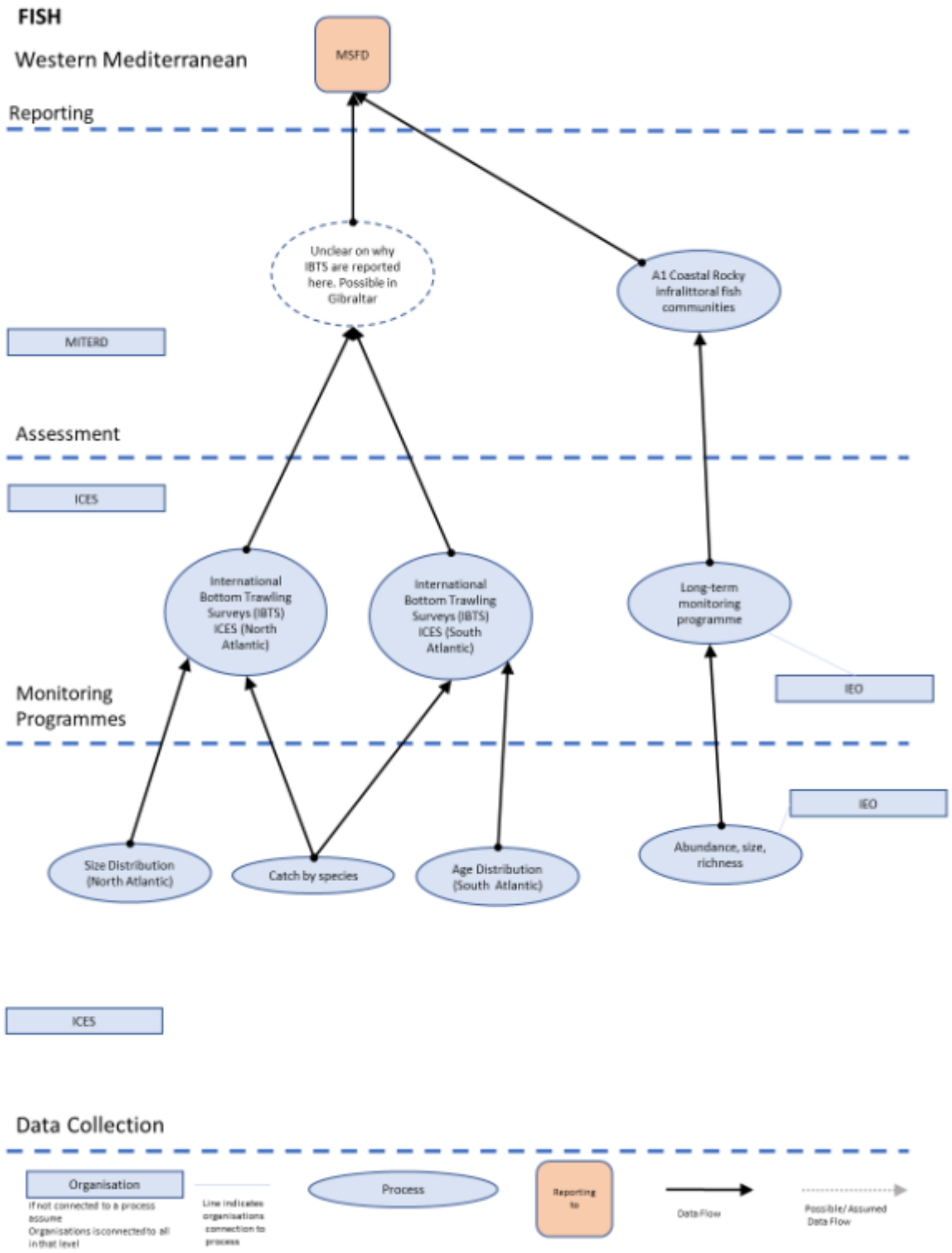
A9.5 MSFD D1 Fish (Western Meditarranean)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	x
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		**A9.5.1** Western Mediterranean
Sub region/s		Levantino Balear

A9.5.2 Data flow description

For the Western Mediterranean Coastal fish communities are monitored and assessed. The reporting system references the data to the International Bottom Trawling Surveys, assumed to be an error, which are carried out in the context of ICES (and apply to the Bay of Biscay and Iberian Waters). The actual reporting document refers to the Rocky infralittoral fish communities surveys, reefing to both D1C2 and D1C3, hence it is expected that the International Bottom Trawling Surveys were not used in this region. D1C1 is not assessed, indicating the same justification given for the Bay of Biscay. However, this justification does not seem to be adequate, as it is referring to other types of fish, which are not affected by bottom trawling.

A9.5.3 Data flow diagram



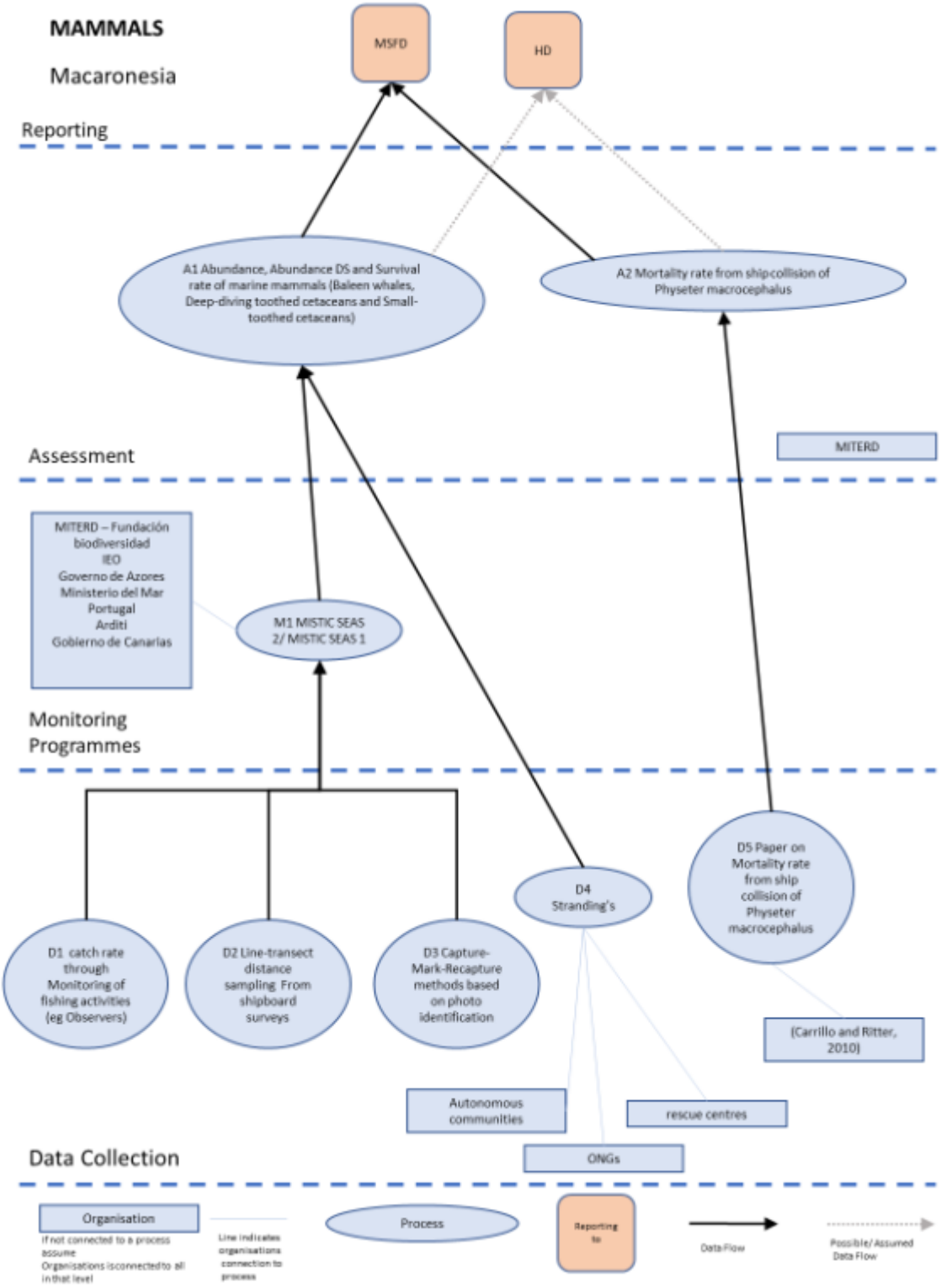
A9.6 MSFD D1 Mammals

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Macaronesia
Sub region/s		

A9.6.1 Data flow description

The data used in the assessment derive from MISTIC SEAS II project. But it is also said that the assessment carried out under this programme is not included in the assessment. Therefore, it is unclear whether additional data are included, or if this is the data used, but the assessment is not performed. The focus is on six species of marine mammals, and the MISTIC SEAS II project is the "Coordinated monitoring and assessment of marine biodiversity in Macaronesia". There is also some additional data collected on "Baramientos", which is actually used to perform GES assessment of cachalots (Carrillo and Ritter, 2010).

A9.6.2 Data flow diagram



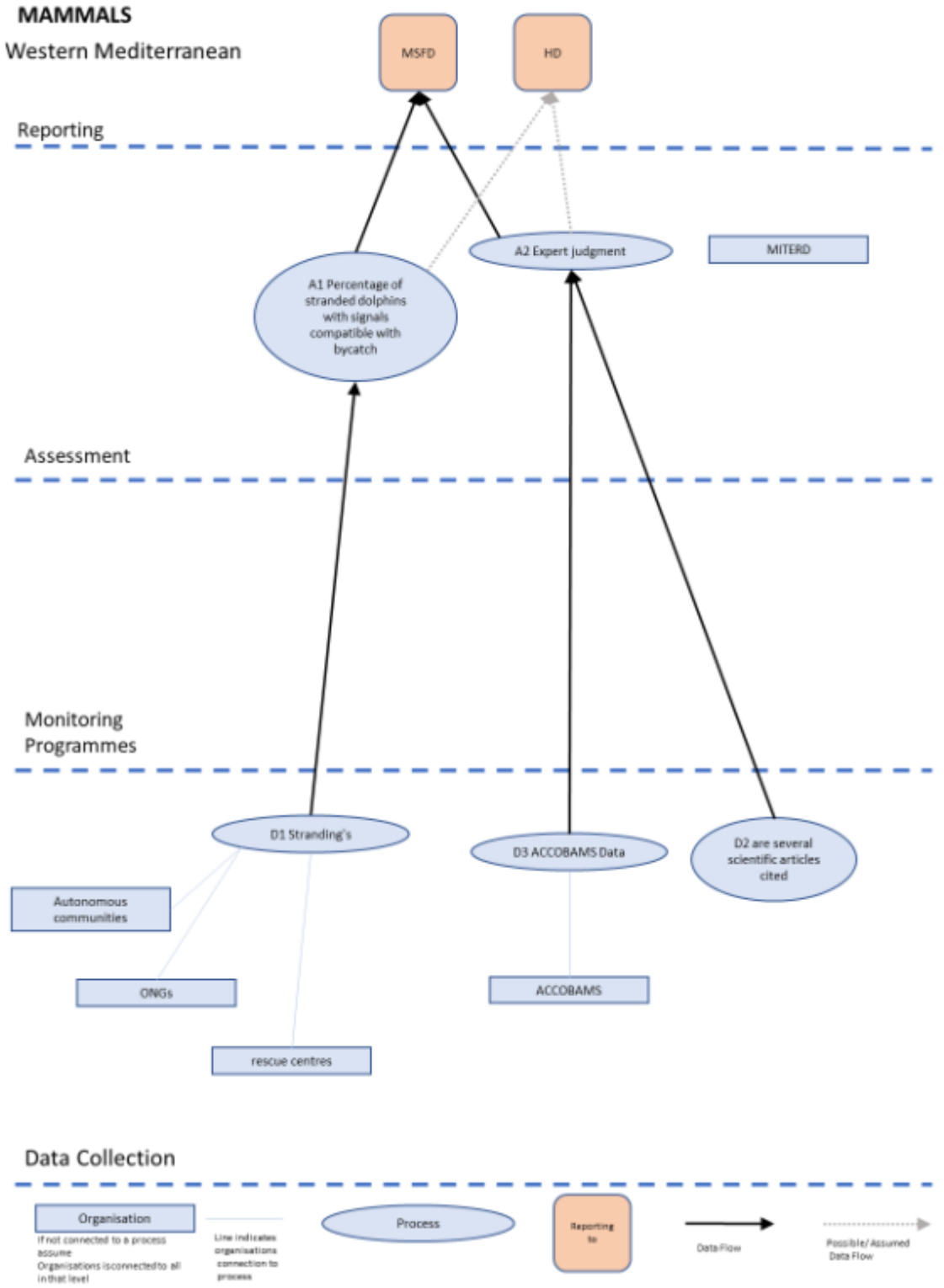
A9.7 MSFD D1 Mammals (Western Mediterranean)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Western Mediterranean
Sub region/s		Strait and Alboran and Levantino Balear demarcation

A9.7.1 Data flow description

MITECO use of research literature to perform the assessment, but the lack of coherence in methods, techniques, etc. across studies does not allow adequate assessments to be conducted. Therefore, in general, it is concluded that the status of marine mammals in this area is unknown. Only the abundance of stranded dolphins is assessed. Overall, the data appear insufficient and not coherent, because of the lack of a dedicated monitoring programme.

A9.7.2 Data flow diagram



A9.8 MSFD D1 Mammals (NE Atlantic - North)

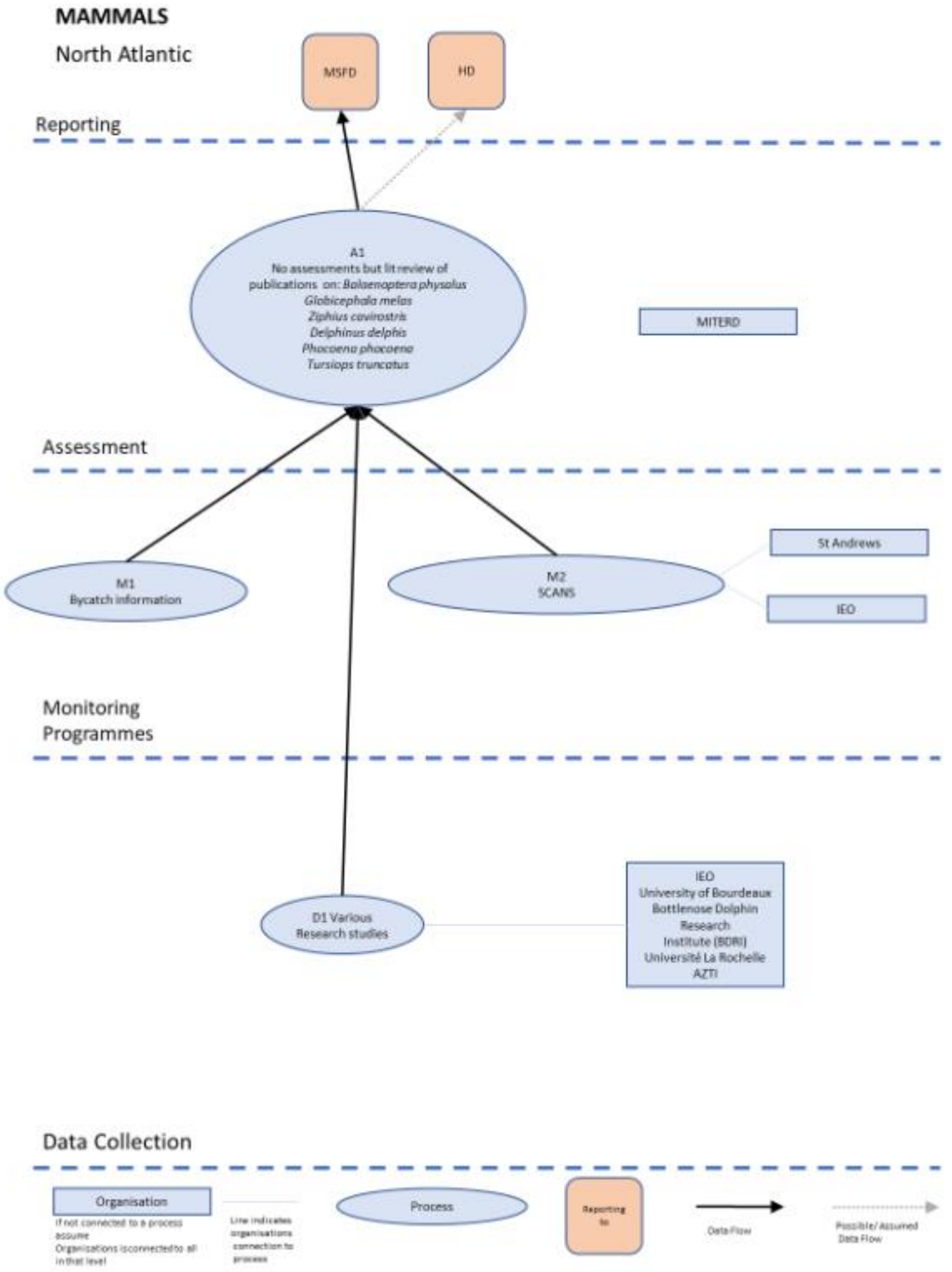
Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic Bay of Biscay and Iberian Coast
Sub region/s		Bay of Biscay and Iberian Coast North-Atlantic Demarcation

A9.8.1 Data flow description

For the marine mammals in the North Atlantic demarcation the reporting is based on literature review rather than any specific monitoring programmes.

Information is provided for six species (including baleen whales, deep-diving toothed cetaceans, and small toothed cetaceans). This information is available for a limited time period and the spatial scale is not fixed. Some of the studies do not differentiate between demarcations, and some other studies have very limited geographical scope.

A9.8.2 Data flow diagram



A9.9 MSFD D1 Mammals (NE Atlantic – South)

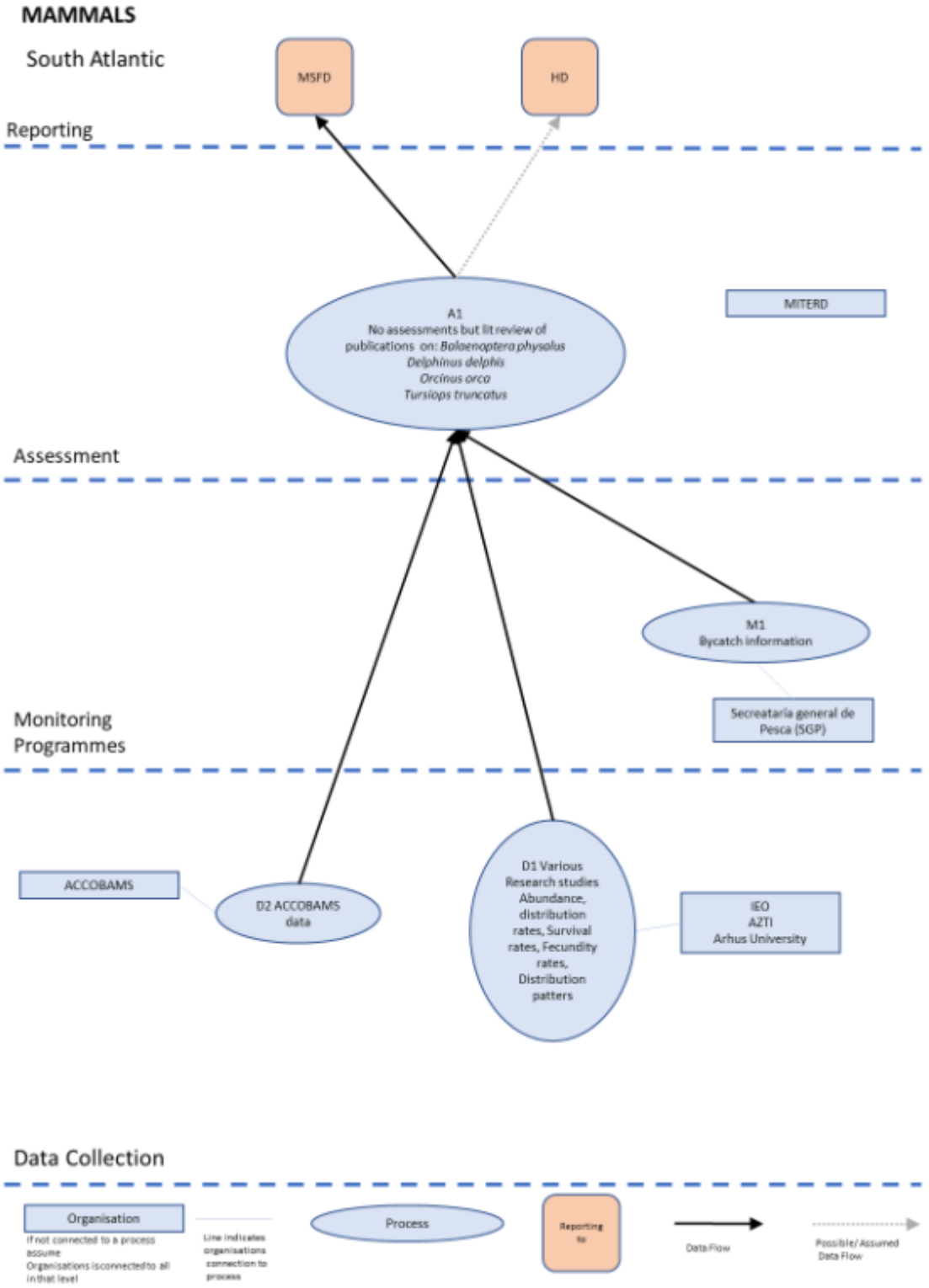
Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	x
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Spain / NE Atlantic: Bay of Biscay & Iberian Coast
Sub region/s		South-Atlantic Demarcation (ABI-ES-SD-SUD)

A9.9.1 Data flow descriptionis

For the marine mammals in the South Atlantic demarcation the reporting seems to be based on literature review rather than on specific monitoring programmes.

Information provided belong to five species (including baleen whales and small toothed cetaceans). This information is available for a limited time series and the spatial scale is not fixed. It is possible that some of the data are collected in collaboration with the tuna fisheries, but is not clearly identified.

A9.9.2 Data flow diagram



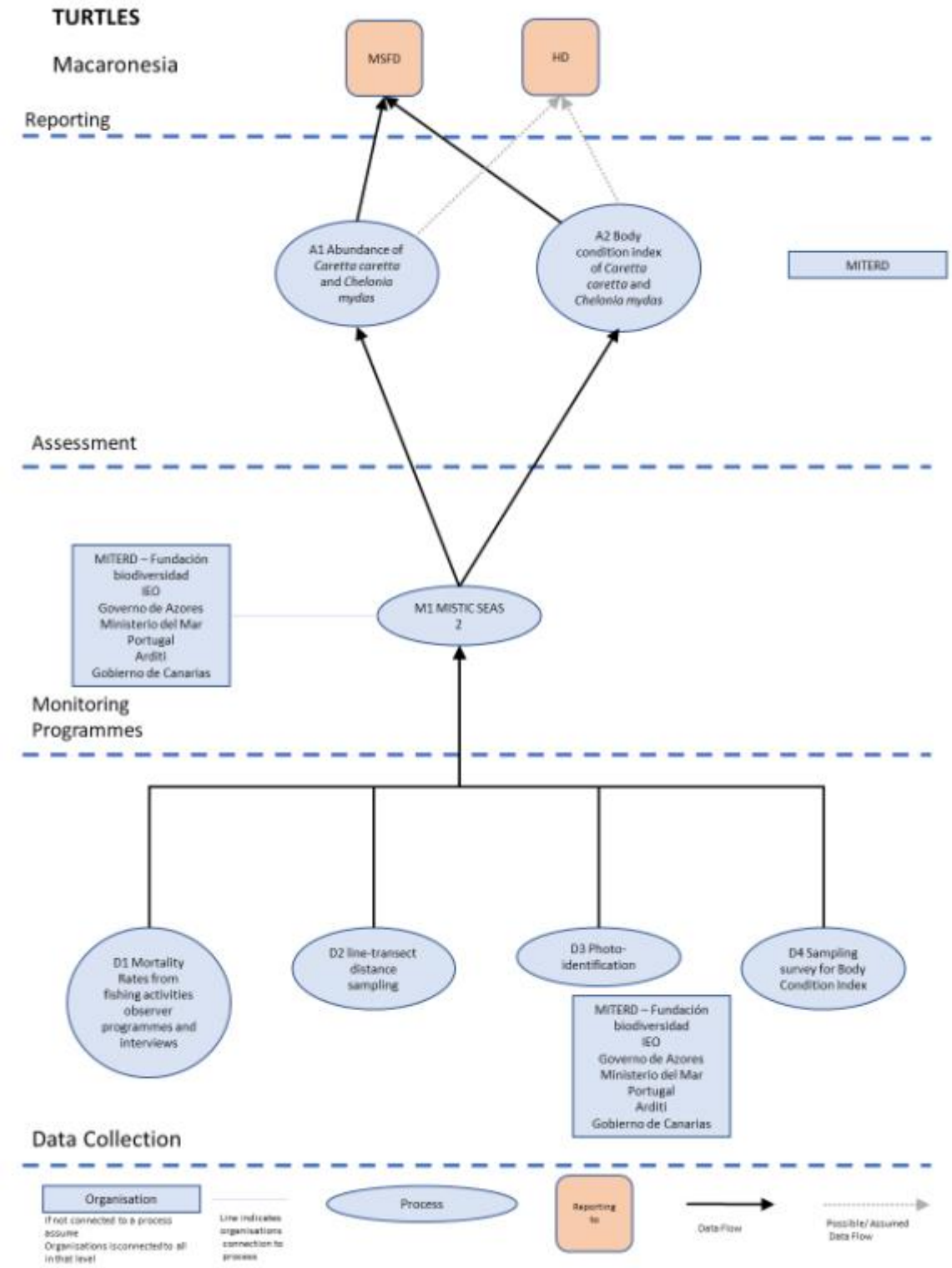
A9.10MSFD D1 Reptiles (Macronesia)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Macaronesia
Sub region/s		

A9.10.1 Data flow description

Data sources for the assessment are not clear. Some data may come from the MISTIC SEAS project. However the assessment carried out under this programme is not included in the assessment. The focus is on two species, and the MISTIC SEAS project is the "Coordinated monitoring and assessment of marine biodiversity in the Macaronesia".

A9.10.2 Data flow diagram



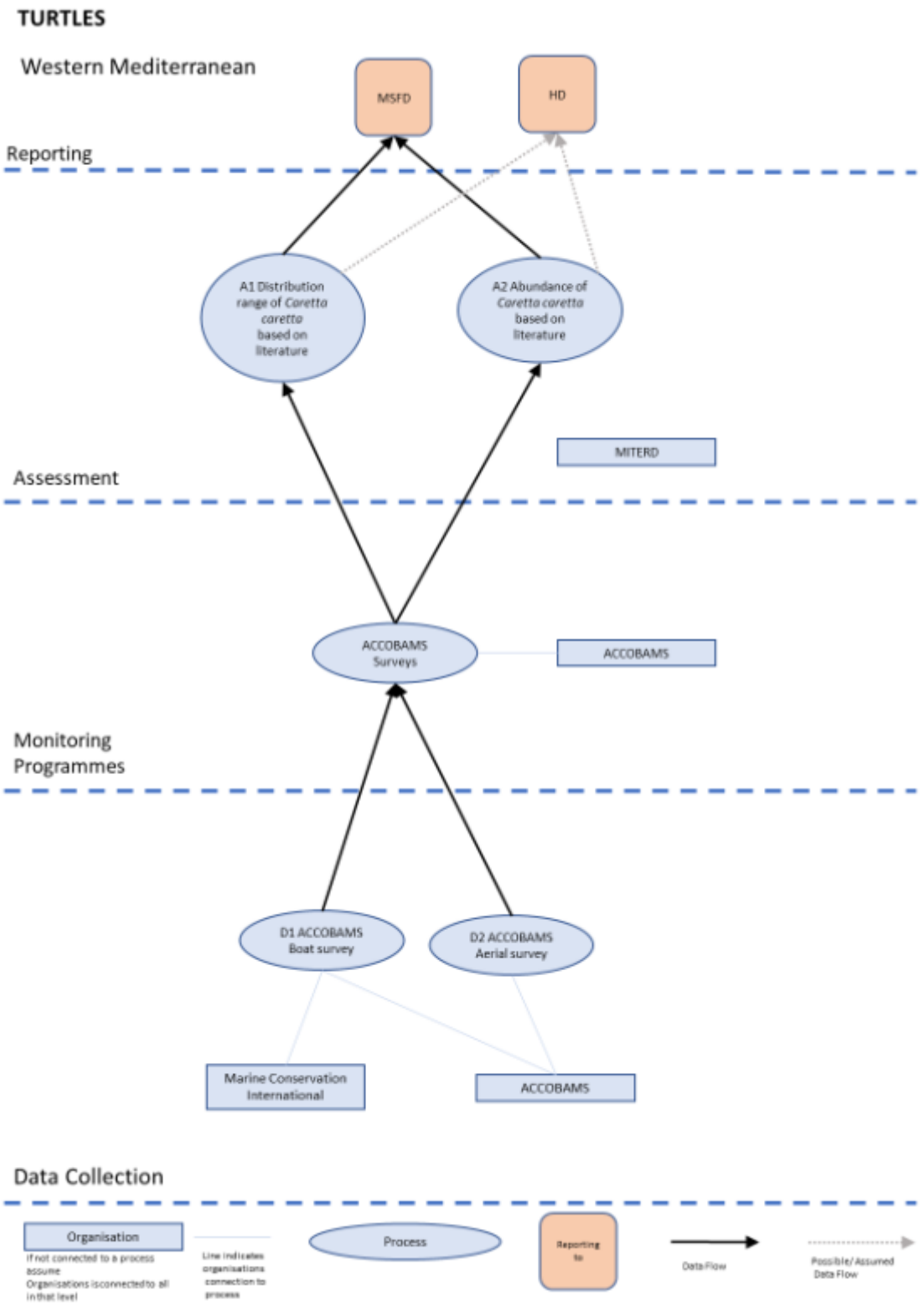
A9.11MSFD D1 Reptiles (Western Mediterranean)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		Western Mediterranean
Sub region/s		Strait and Alboran and Levantino Balear demarcation

A9.11.1 Data flow description

There is no specific turtles monitoring programme. The most relevant data have been collected through the ACCOBAMS Survey Initiative, despite its main focus being marine mammals in the Mediterranean - it also collects information on turtles as well as other ecosystem components. Other data used in the reporting is taken from available literature.

A9.11.2 Data flow diagram



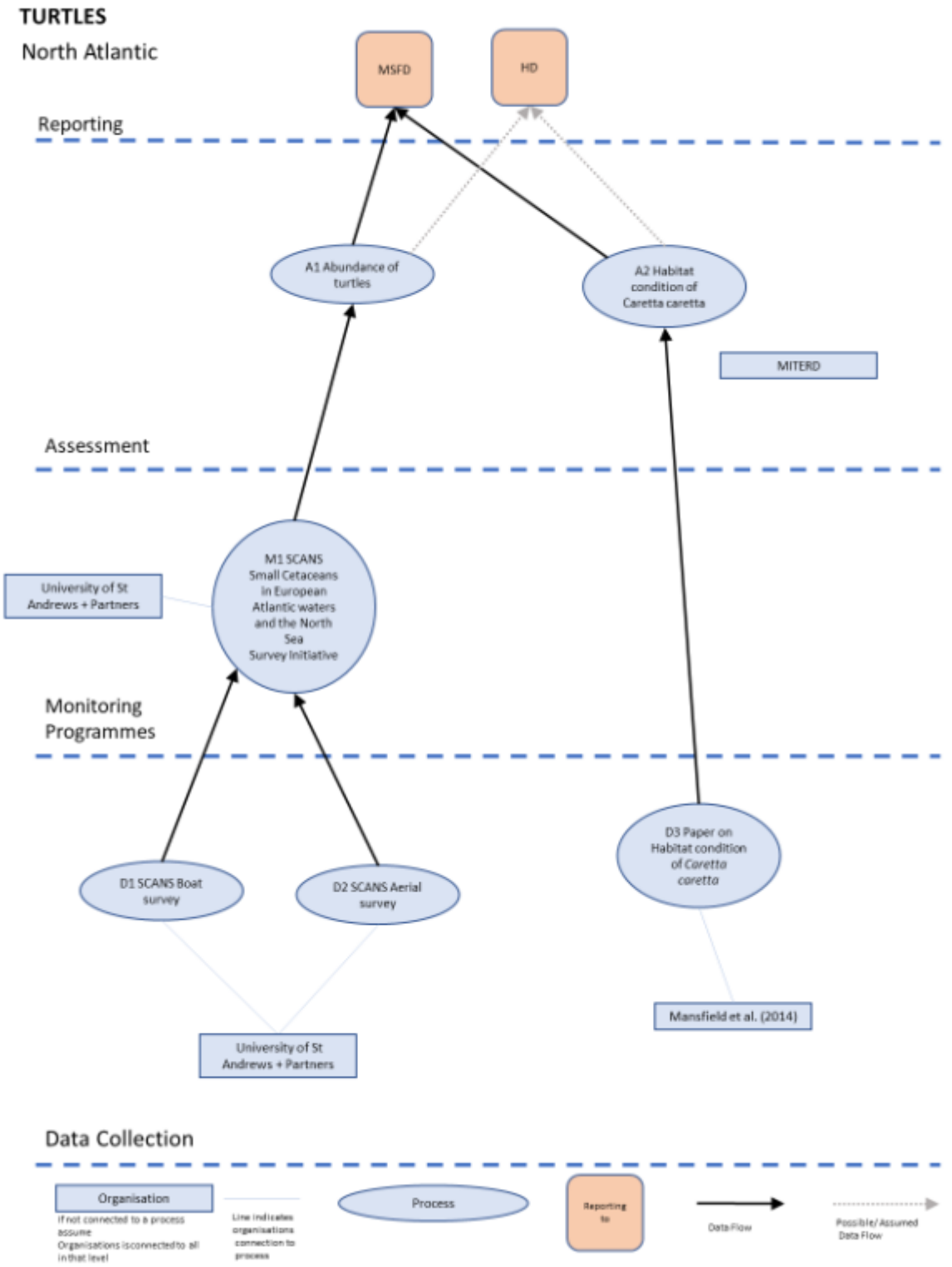
A9.12MSFD D1 Reptiles (NE Atlantic – North)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay & Iberian Coast
Sub region/s		North Atlantic demarcation

A9.12.1 Data flow description

There is no specific turtles monitoring programme. The most relevant data have been collected through the ACCOBAMS Survey Initiative, despite its main focus being marine mammals in the Mediterranean - it also collects information on turtles as well as other ecosystem components. Although it is not clear why ACCOBAMS should have data for the North Atlantic demarcation (since it seems not to be covered by the ASI). This information has not been used for the assessment. Other data used in the reporting is taken from available literature.

A9.12.2 Data flow diagram



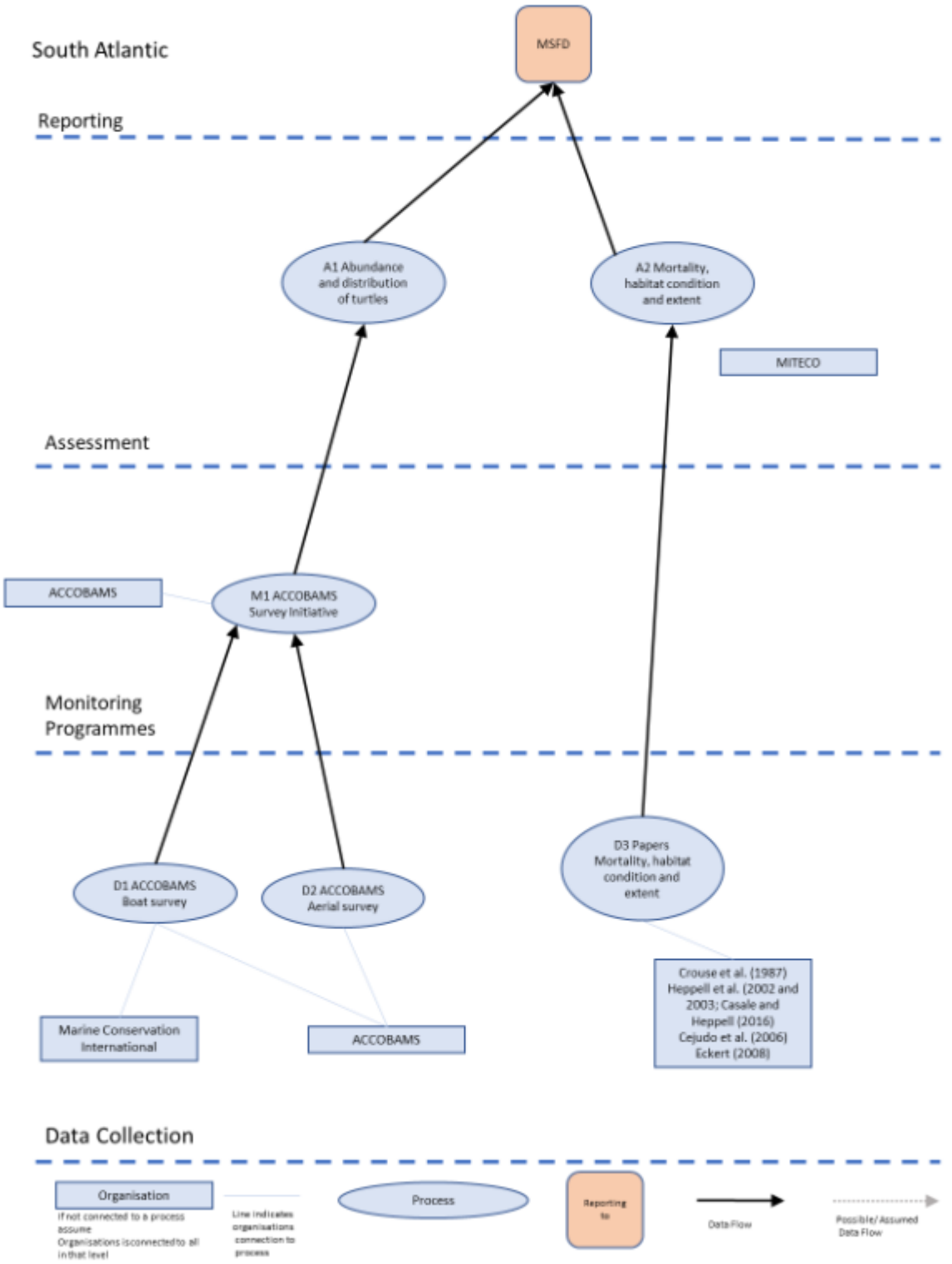
A9.13MSFD D1 Reptiles (NE Atlantic – South)

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	x
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay & Iberian Coast
Sub region/s		South Atlantic

A9.13.1 Data flow description

There is no specific turtles monitoring programme. The most relevant data have been collected through the ACCOBAMS Survey Initiative, despite its main focus being marine mammals in the Mediterranean - it also collects information on turtles as well as other ecosystem components. Although it is not clear why ACCOBAMS should have data for the North Atlantic demarcation (since it seems not to be covered by the ASI). This information has not been used for the assessment. Other data used in the reporting is taken from available literature.

A9.13.2 Data flow diagram



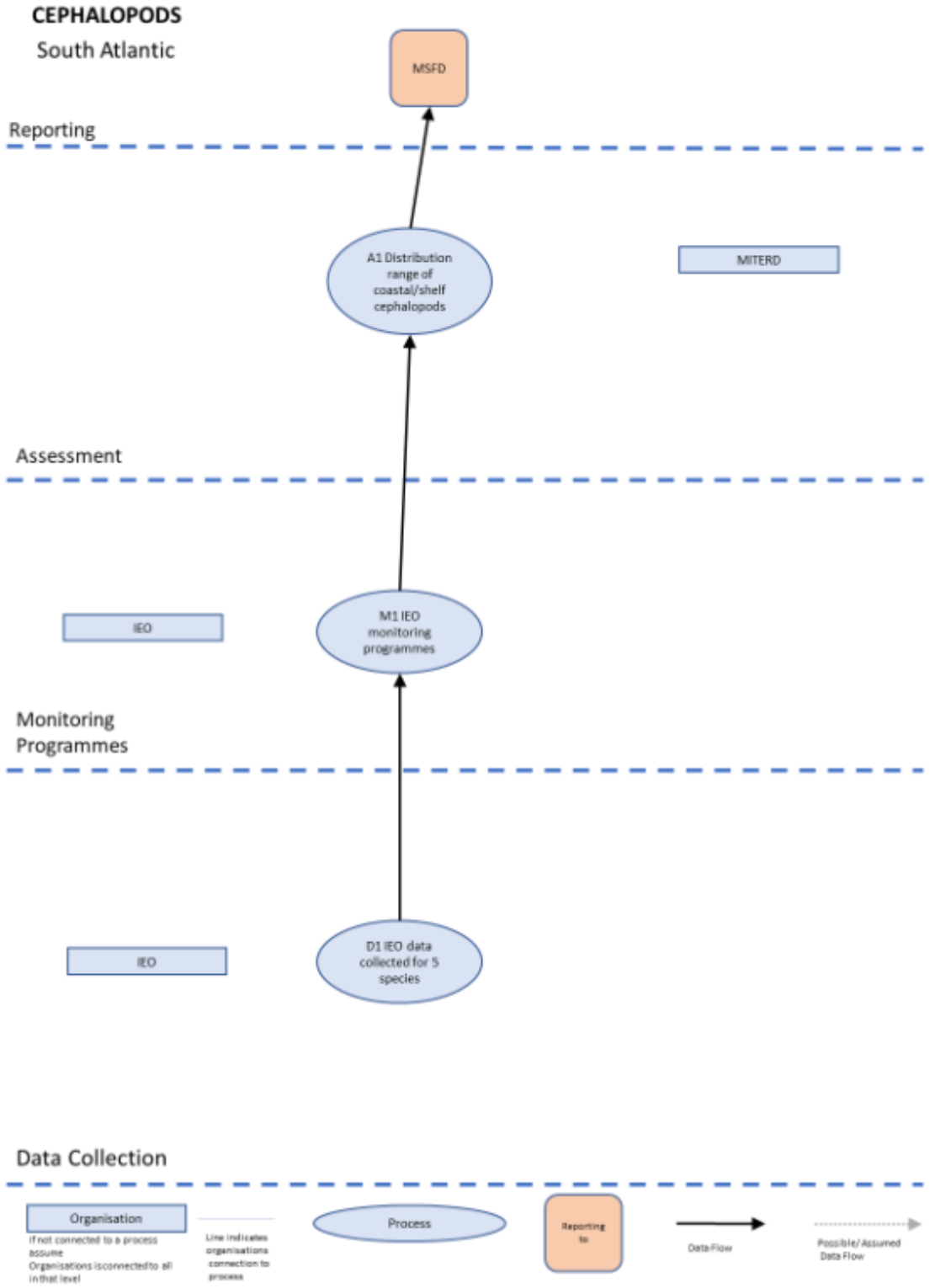
A9.14MSFD D1 Cephalopods

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	x
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay & Iberian Coast
Sub region/s		South Atlantic demarcation

A9.14.1 Data flow description

For the South Atlantic demarcation, the focus is on coastal cephalopods. D1C1 is not assessed (as indicated for the north demarcation). For other criteria there is long-term monitoring, possibly in the context of fisheries although this is not clear. Information at the level of species is not provided (despite citing five different species of cephalopods). Only information at the "coastal cephalopods" level is reported, for which the D1C4 Distribution range is the only criteria assessed.

A9.14.2 Data flow diagram



A9.15MSFD D1 Benthic habitats

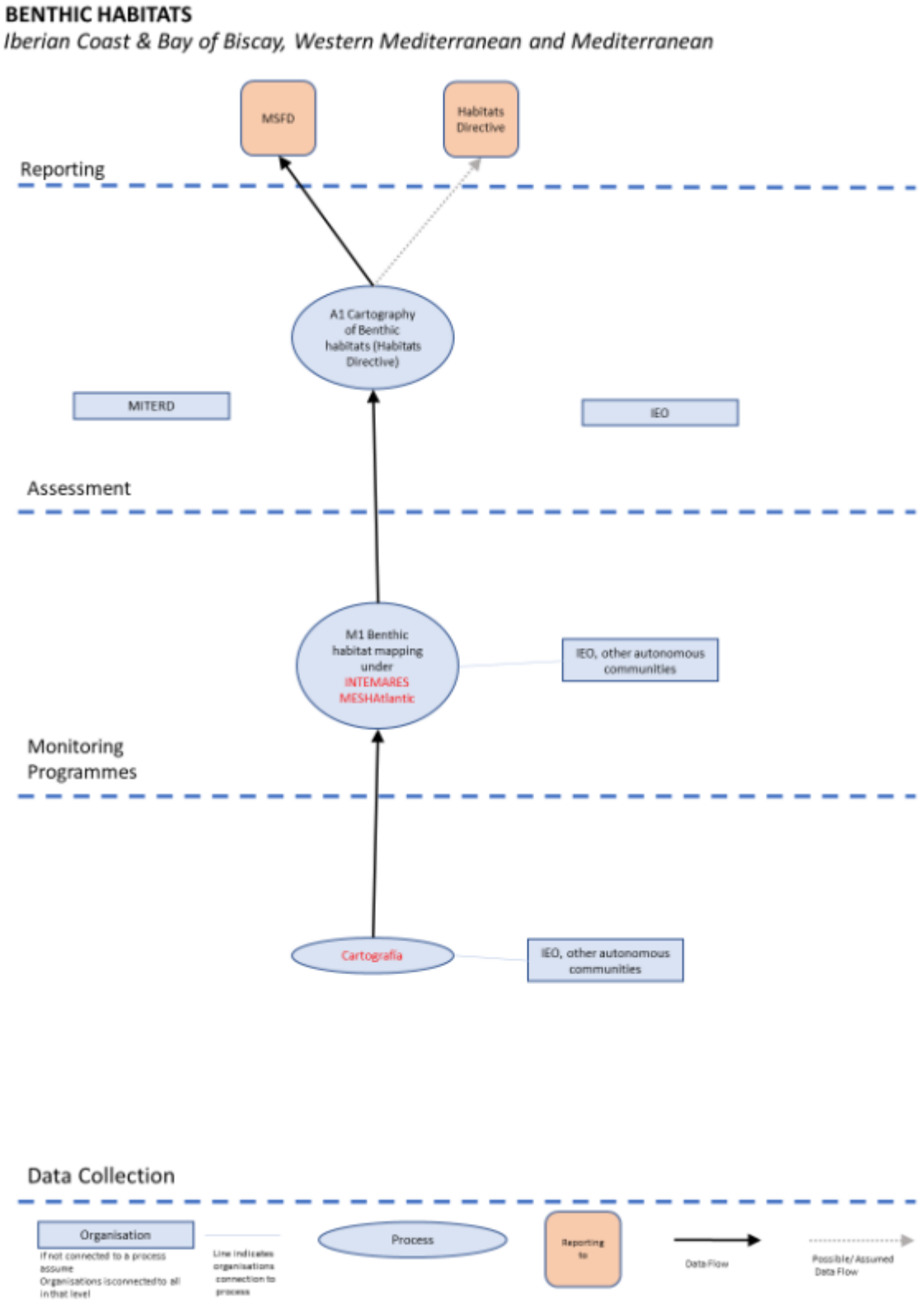
Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	X
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay & Iberian Coast, Western Mediterranean, and Mediterranean
Sub region/s		

A9.15.1 Data flow description

Data on benthic habitats are compiled for the Iberian Coast & Bay of Biscay, Western Mediterranean and Mediterranean demarcation (3/5 demarcations), although an assessment has not yet been conducted. Much of the cartographic data is generated in the context of the Habitat Directive (although this is somewhat unclear), and more specific information focuses on the following habitats: 1170. Reefs, 1180. pockmarks y 8330. Submerged or semisubmerged caves. There is information regarding the "mapping" or cartography of benthic habitats, but there is no information collected on the functioning or structure of the habitats. This is the information reported under D6C3, D6C4, and D6C5. A monitoring programme will is expected to be established to support this. It is not clear which organisations are involved.

There is a clear link with the Habitats Directive.

A9.15.2 Data flow diagram



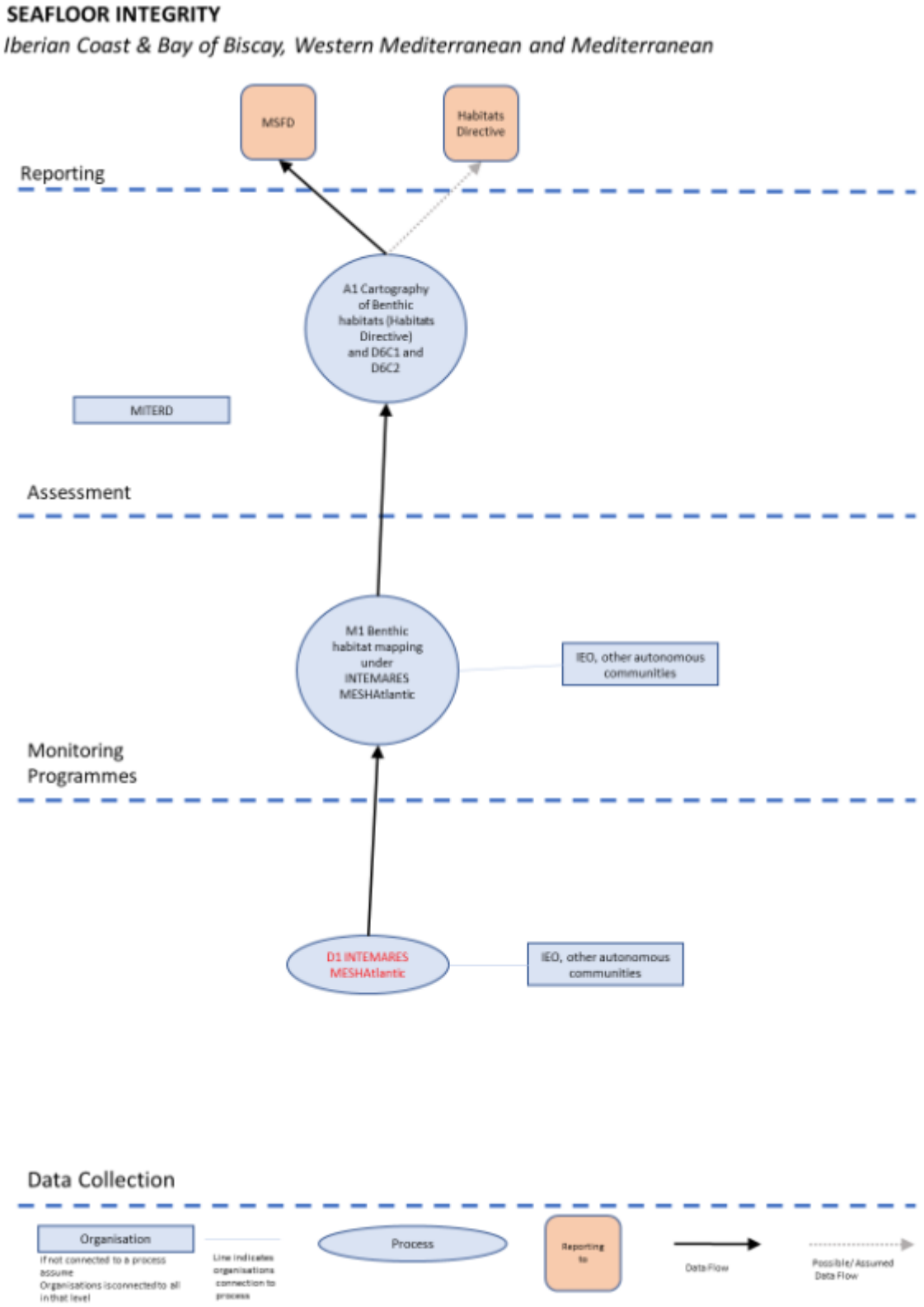
A9.16MSFD D1 Sea-floor integrity

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	X
	Birds Directive	
	Habitats Directive	
Marine region		NE Atlantic: Bay of Biscay & Iberian Coast, Western Mediterranean, and Mediterranean
Sub region/s		

A9.16.1 Data flow description

An assessment has been conducted but the "conclusion" is that the status for the criteria D6C1 and D6C2 is unknown, due to the lack of reference conditions. Indicators used stem from OSPAR, but they are applied to the Iberian Coast & Bay of Biscay, Western Mediterranean and Mediterranean. Data refer to benthic habitat maps (reported in the Benthic habitat sheet), and different activities (fondeo, dredging, land reclamation, etc.). For D6C1 fisheries have not been included, and therefore, the assessment is incomplete. For D6C2 the main issue is the lack of reference conditions. It is unclear where information regarding the activities/pressures come from and how the information is used. It is also unclear which organisations are, and for what period data are available.

A9.16.2 Data flow diagram



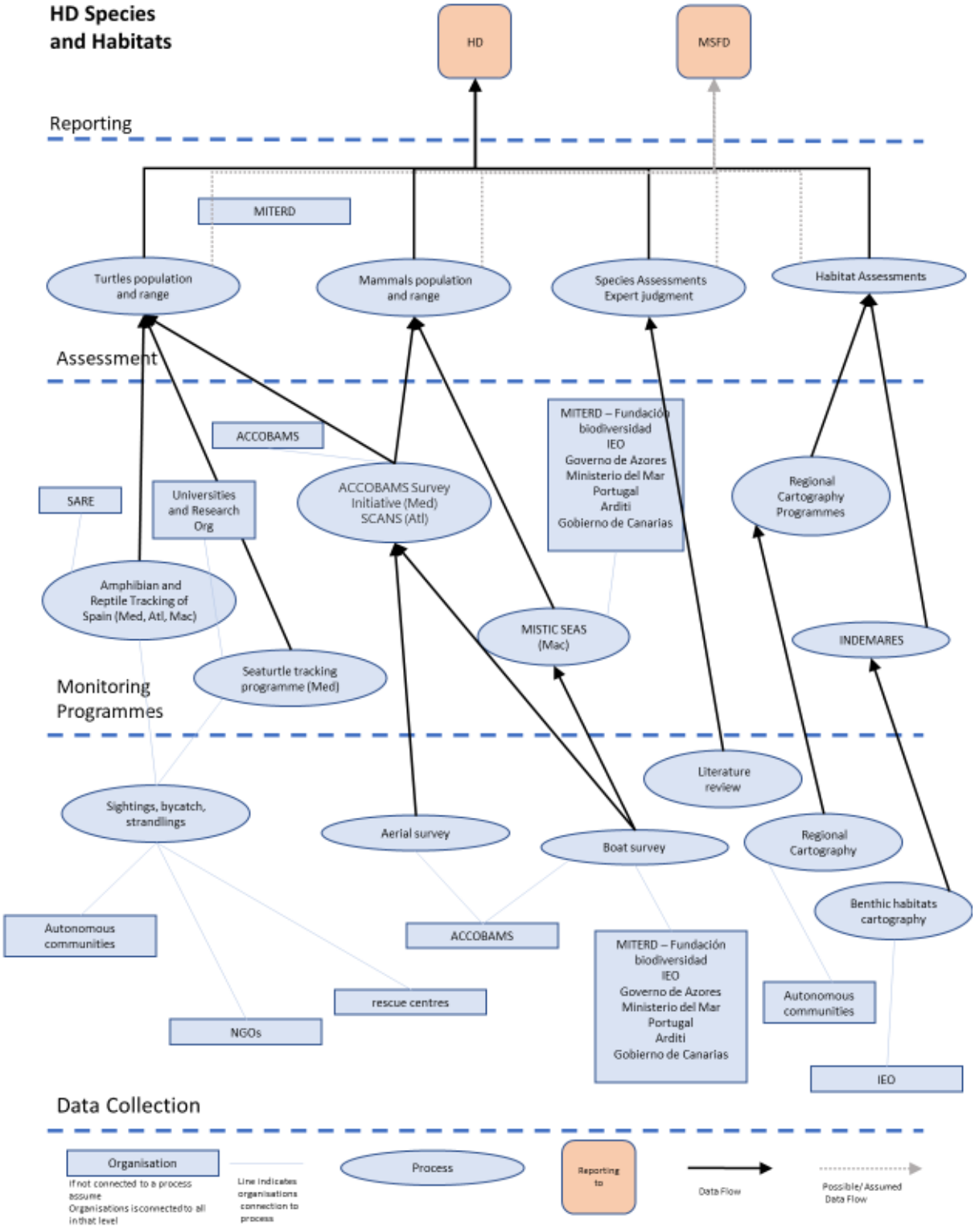
A9.17Habitats Directive

Country:		Spain
MSFD Descriptor / BHD reporting requirement:	D1 on Biodiversity – birds	
	D1 on Biodiversity – mammals	
	D1 on Biodiversity – reptiles	
	D1 on Biodiversity – fish	
	D1 on Biodiversity – cephalopods	
	D1 Biodiversity – benthic habitats	
	D6 on Sea-floor integrity	
	Birds Directive	
	Habitats Directive	X
Marine region		Bay of Biscay & Iberian Coast, Western Mediterranean, and Macaronesia
Sub region/s		

The "Ministerio para la transición ecológica y el reto demográfico" (the Ministry for the ecological transition and the demography challenge), is the competent authority for the implementation of the Habitat Directive (*https://www.miteco.gob.es/es/costas/temas/proteccion-medio-marino/biodiversidad-marina/espacios-marinos-protegidos/red-natura-2000-ambito-marino/red-natura-2000-ambito-marino.aspx*)

There are several species that are assessed, however, there is no mention to specific monitoring programmes. For example, Pinna nobilis or Lithophaga lithophaga are assessed, but apart from the extensive literature review, there is no specific mention to monitoring programmes. Marine mammals and turtles have some specified programmes but assessment also uses literature reviews.

There are 8 habitats for which Spain reports the focus for monitoring has so far focused on the cartography there are several monitoring-assessment programmes run by the Autonomous Communities. Data from the INDEMARES projects is also used in the assessments


HD Species and Habitats
HD
MSFD
Reporting
MITERD
Turtles population and range
Mammals population and range
Species Assessments Expert judgment
Habitat Assessments
Assessment
ACCOBAMS
MITERD – Fundación biodiversidad IEO Governo de Azores Ministerio del Mar Portugal Arditi Gobierno de Canarias
SARE
Universities and Research Org
ACCOBAMS Survey Initiative (Med) SCANS (Atl)
Regional Cartography Programmes
Amphibian and Reptile Tracking of Spain (Med, Atl, Mac)
MISTIC SEAS (Mac)
INDEMARES
Seaturtle tracking programme (Med)
Monitoring Programmes
Literature review
Sightings, bycatch, strandlings
Aerial survey
Boat survey
Regional Cartography
Benthic habitats cartography
Autonomous communities
ACCOBAMS
MITERD – Fundación biodiversidad IEO Governo de Azores Ministerio del Mar Portugal Arditi Gobierno de Canarias
rescue centres
Autonomous communities
NGOs
IEO
Data Collection
Organisation
If not connected to a process assume Organisations is connected to all in that level
Line indicates organisations connection to process
Process
Reporting to
Data Flow
Possible/ Assumed Data Flow

Annex 10 Template for MS-level technical data collection

The template is made up of multiple sections (as separate tabs):

Section A ('Relevant elements') provides guidance on which elements (marine species and habitats) are to be considered in the template for a given MS.

Section B ('General info') indicates what information is covered in the template, also reporting details on who has filled in the template.

Section C ('Assessment') requires input of information on the assessments for the MSFD Descriptor / BHD reporting requirement covered by the template. This section consists of two tabs (C1 and C2) addressing different levels of the technical assessment.

Section D ('Data collection & Monitoring') requires input of information on the monitoring and data collection used to support the assessments reviewed in Section C.

In Sections B- D, a series of numbered topics and sub-topics have been identified that can apply to both MSFD and BHD assessments. For most of these you are required to select the statement that best characterises the specific aspect you are assessing, by using the provided drop-down lists (cells where drop-down list is used are highlighted in pale blue). Additional fields (marked by text in yellow in the template) require that you input the information as free text (e.g. name of an indicator, brief description of a method, details or comments to clarify answers in drop-down list).

All fields in the template should be completed, bearing in mind that the answer "Not specified / Don't know" is also included as an option for where the information cannot be found in the examined sources (although you should try to keep the 'Don't know answers' to a minimum, if possible). Where there is uncertainty about the response given, please provide a comment about it in the relevant field marked as 'Details and comments'.

Once completed, each spreadsheet should be saved using the relevant Member State code name, followed by the MSFD Descriptor / BHD reporting requirement as in these examples: MT-MSFD D1-Mammals (MSFD assessments on mammals for Malta), ES-HD habitats (HD habitats assessments for Spain). Please note that, where a MS has reported for species/habitats in multiple marine regions, relevant assessments for the different regions (based on guidance in Section A) are to be included in the same template.

A10.1Section B: General info

In this section, the information on what is being reported in the template is collected:

Country: Select (from drop-down list) the country the template refers to.

MSFD Descriptor/ BHD reporting requirement: Tick the requirement the template relates to. Each requirement will have its own template, as relevant for the specific Member State.

Biogeographic / Marine region/subregion: Tick all the marine regions/subregions covered by the MS assessments for the specific MSFD Descriptor/ BHD reporting requirement, as relevant. Where the Entire European territory of the MS is the spatial unit for the assessment (e.g. for BD), select 'Yes' from the drop-down list. Multiple regions can be ticked and included in the same template.

Please provide details on expert(s) who completed this template: We require here for you to indicate the main expertise of the person(s) who have completed the template. Completing sections C-D of the template requires some level of expert judgment to interpret the data and information provided in the different reports for the different directives in a standardised way (following the template format). The

knowledge of the expertise of the person(s) who complete the template may allow a better understanding of possible biases and differences across templates.

A10.2Section C: Assessment

This section consists of two sub-sections (tabs C1 and C2) addressing the different levels (ecological scales) of the status assessment: from the assessments at the criterion (MSFD) or parameter level (BHD), as based on the estimate and assessment of specific indicators for a species or habitat (C1), to their integration at the individual species or habitat level[9] (C2).

A10.2.1 C1 Assessment of criteria/parameters

This section requires information on technical aspects of the assessments the MS have undertaken for the different MSFD criteria or BHD parameters (using relevant indicators) for individual species or habitats. Information on the different aspects of these assessments are to be inputted throughout the different fields in a column. Different columns will need to be created to review separately the assessments of each combination of MSFD criterion or BHD parameter (to be specified in point 1.4 of the template) for a given Species (or Habitat) (point 1.3) in a Marine region/subregion (point 1.1).

Guidance on what information is required by each of the template fields and how it is to be inputted (e.g. as free text or using drop-down lists) is given in the tables below (in italics). Template fields with yellow text are those requiring you to provide information as free text, whereas the others have predefined drop-down list of options to select from.

1. Assessment scope & result

1.1 Marine Region/Subregion	*Indicate the Marine Reporting Unit (MRU) the reported assessment in the column refers to for the specific criterion/parameter, as specified in the MSFD/BHD report.*
1.2 Species/habitat	*Indicate relevant element (species or habitat) the information reported in the column refers to, with specific reference to the selection of species/habitats as indicated in section A.*
1.3 MSFD Criterion/ BHD parameter	*Indicate which MSFD criterion or BHD parameter assessed for the selected species/habitat the information reported in the column refers to. Choose from drop-down list between:* a) D1C2-Population abundance (MSFD criterion, species) b) D1C3-Population demographic characteristics (MSFD criterion, species) c) D1C4-Population distributional range and pattern (MSFD criterion, species) d) D1C5-Habitat for the species (MSFD criterion, species) e) D6C4- Habitat loss due to anthropogenic pressures (MSFD criterion, habitats) f) D6C5-Extent of adverse effects on habitat condition from anthropogenic pressures (MSFD criterion, habitats) g) Population size (BD parameter) h) Population trend (BD parameter) i) Breeding distribution map and range size (BD parameter)

[9] The MSFD also integrates status assessments from species or habitat level into species or habitat groups (GES achieved). This higher level of integration is not required in BHD assessments, and therefore has not been considered further in the templates.

	j) Breeding range trend (BD parameter) k) Range (HD parameter, species) l) Population (HD parameter, species) m) Habitat for the species (HD parameter, species) n) Range (HD parameter, habitats) o) Area covered by habitat type within range (HD parameter, habitats) p) Specific structures and functions, including typical species (HD parameter, habitats) *Where more than one criterion/parameter has been reported by the MS for the same species/habitat, these should be indicated in separate columns.*
1.4 Criterion/ Parameter Status	*Indicate what is the resulting status reported for the criterion/parameter for the species/habitat in the region. Choose from drop-down list between:* a) Good (MSFD) b) Good, based on low risk (MSFD) c) Not good (MSFD) d) Contributes to assessment of another criterion (MSFD) e) Not assessed (MSFD, BD) f) Not relevant (MSFD) g) Unknown (MSFD, HD) h) Favourable (FV; HD) i) Unfavourable-Inadequate (U1; HD) j) Unfavourable-Bad (U2; HD) *For MSFD, this information is provided as 'Criteria status' in the data table 'Element Status, Criteria Status, Parameter assessments and Related indicator' in the MSFD reporting data explorer.* *For HD, this information is provided in the table 'Conclusions' (section 11 of species reports, section 10 of habitat reports) within the species/habitat reports.* *For BD, MS are not required to provide an assessment of the species parameters, and therefore point 'e) Not assessed (MSFD, BD)' should be selected from the drop-down list.* *Please note that the template should be completed for any criterion/parameter that has been reported by the MS, even if the result was 'Not assessed'.* **If 'Not assessed' or 'Unknown' -– why?** *Please give the reason why the criterion/parameter was not assessed or the results was reported as unknown, if provided in the report* **Other comments.** *Add any other comment or explanation you may feel is needed.*

2. Assessment cross-reference with Task 1

This part is to allow us to link the results of Task 2 with those of in Task 1, where the assessments, monitoring and data collection processes for a MS have been identified in the first place.

2.1 Assessment name	*Cross-reference here the assessment name/ID as reported in the relevant template completed for Task 1 (e.g. Marine Mammals (cetaceans) - Range (A7), Population (A8), Habitat for the species (A9)).* *Note that multiple criteria/parameters or species/habitats might cross-reference to the same assessment ID, depending on how assessments were identified for the MS in Taks 1.*

3. Indicator measured (MSFD indicator / BHD parameter)

This part gathers information on what indicator has been used to measure the MSFD criterion or BHD parameter for the selected species/habitat, and the method used to calculate it.

3.1 Indicator name	*Give name of the indicator.* *See examples given in the Glossary (section 1.3 of this document).* ***Note: This filed is automatically marked as "n/a" if the indicator was not assessed (as per answer at point 1.4). If this is the case, the other fields for the specific indicator in this section can be left blank.***
3.2 Indicator description	*Give a brief description of the indicator used.*
3.3 Reporting unit	*Insert unit the indicator is reported on (e.g. km², %, breeding pairs)*
3.4 Spatial scope	*Indicate what is the spatial scope/scale at which the reported indicator has been measured. If this information is not available in the reports, write 'Not specified/Don't know'.*
3.5 Temporal scope	*Indicate what is the temporal scope/scale at which the reported indicator has been measured. If this information is not available in the reports, write 'Not specified/Don't know'.*
3.6 Additional notes/details on spatial/temporal scope	*Add details/comments on spatial and temporal scope, if needed to explain answers at the points above.*
3.7 References/Links	*If possible, give references or links where the information on the indicator has been sourced from (optional)*
3.8 Indicator source/standard	*The source/standard of the specific indicator. Choose from drop-down list between:* EU-level indicator *(e.g. indicator assessment from EU-level guidance or sourced from the CFP or the WFD)* Regional indicator used by RSCs *(e.g. 'HELCOM', 'OSPAR', 'BARCON', 'BSC')* Regional indicator from other source *(e.g. MS in (sub)region', 'ICES', 'GFCM')* National indicator Not specified / Don't know Other *(please specify below)* **Details and comments**. *Please give details in indicator standard where possible (e.g. correspondent RSC indicator)*

3.9 Type of estimate	*What type of estimate has been used to report the indicator. Choose from drop-down list between:* Best point estimate (no confidence interval) *(indicator/parameter reported as single value or interval, derived from e.g. a survey or a model, a compilation of figures from localities, or expert opinion, but for which confidence interval/limits or other measure of variability around the estimate could not be/have not been calculated.)* Temporal mean (e.g. multi-year) *(as single value or interval; e.g. from multi-year data)* Spatial mean (e.g. multi-site) *(as single value or interval; e.g. from multi-site data)* Minimum *(where insufficient data exist to provide even a loosely bounded estimate, but where the indicator value is known to be above a certain value, or where the reported interval estimates come from a sample survey or monitoring project which probably underestimates the real indicator value).* Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please provide details (e.g. on period over which temporal mean, trend or changes are estimated; type of point estimate or interval estimated; other method used) or comments (e.g. where the you feel the categorisation above doesn't completely fit with the specific indicator)*
3.10 Method for indicator calculation	*Method used to calculate the indicator. Choose from drop-down list between:* Direct estimate from monitoring data (design-based method) Model-based method based on monitoring data Trend-based approach Spatial-based model/method Algorithm-based method Expert judgement Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please provide details on the method used or add comment (e.g. where the method used integrates more than one of the above approaches).*
3.11 Method standard	*Methodological standard used for the indicator calculation. Choose from drop-down list between:* EU level (e.g. algorithm provided by EU-level guidance) Regional level (e.g. RSCs) Other international level (e.g. peer reviewed method used internationally) National level Not specified / Don't know **Details and comments.** *Please provide details or add comment.*

3.12 Evidence base used to estimate the indicator	*What type or data/evidence has been used as a basis for the indicator calculation. Choose from drop-down list between:* Complete survey or a statistically robust estimate from monitoring data collected by the Member State *(e.g. complete population count or complete habitat mapping, combined with robust extrapolation of habitat quality/conditions where relevant; dedicated monitoring of a species' populations or a habitat with good statistical power; estimate from previous complete inventory updated with robust monitoring data)* Based mainly on extrapolation from a limited amount of data collected by the Member State *(e.g. extrapolation from sample surveys of parts of the population or the habitat (e.g. data from only a part of the geographical range of a species/habitat; sub-habitats used as proxies for the broad habitat); using models based on density/abundance and distribution data; mark-recapture methods; data from limited number of sample sites; trends extrapolated from data collected for other purposes or from some other indirect measurements)* Based mainly on expert opinion with very limited data Estimate taken from other assessments (e.g. RSCs) Insufficient or no data available Not specified / Don't know **Details and comments.** *Please give details on the type of evidence/data used to calculate the indicator or add comment.*

4. Trend of indicator/parameter

This part gathers information on whether trends have been assessed for the indicator/parameter as part of the assessment, and their nature.

4.1 Is trend estimated?	*Choose from drop-down list between:* a) No b) Yes (as direction only) c) Yes (as direction and magnitude) d) Yes (as magnitude of change only) x) Not specified / Don't know ***Note: Answer should be "No" if the indicator was not assessed (as per point 1.4). If the answer is "No", then leave all the other fields in this section blank.***
4.2 Scale of trend estimated	*Temporal scale of the trend(s) estimated for the indicator/parameter. Choose from drop-down list between:* a) Short term b) Long term c) Both x) Not specified / Don't know z) Other *(please specify below)* **Details and comments.** *Please provide details (e.g. about the temporal scale of the short and/or long term trend estimated) or add comment.*

4.3 Evidence base used to define trend	*What type or data/evidence has been used as a basis for estimating the trend. Choose from drop-down list as in point 3.11.* **Details and comments.** *Please give details on the type of evidence/data used to estimate the trend or add comment.*

5. Assessment of criterion/parameter using indicator

This part gathers information on how the indicator/parameter has been assessed to determine status (Criterion status in MSFD, or Favourable Conservation Status at parameter level in HD; this part is not directly relevant to BD, as no assessment of status is required there to MSs).

5.1 Assessment approach	*High-level approach used to assess the criterion/parameter (based on indicator). Choose from drop-down list between:* Not assessed (if so, go to Point 6) *(this answer should be consistent with the one given at point 1.4)* Quantitative: Threshold based (using baseline/reference conditions) Qualitative: Trend-based (where quantitative threshold is not defined) *(e.g. using direction and rate of change or direction of change only)* Qualitative: Expert opinion Not specified / Don't know Other *(please specify below)* ***Note: Answer should be "Not assessed" if the indicator was not assessed (as per point 1.4). If this is the case, then you can leave the other fields in this section blank.*** **Details and comments.** *Please give details on the assessment approach used for the indicator or add comment (e.g. where another approach or a combination of the above has been used).*
5.2 Use of threshold for determining good/favourable status	*Where defined, the type of threshold used to assess good/favourable status Choose from drop-down list between:* Quantitative: Threshold value, defined for the indicator/parameter Quantitative: Proportion threshold value *(defined for the proportion of MRU area/ population/ individuals/ species/ samples or area/extent samples over which the threshold value is to be achieved or in good/not good condition)* Quantitative: Change threshold *(defined for the magnitude of change in trend-based approach)* Qualitative threshold Not specified / Don't know Not applicable/ Not relevant *(where threshold has not been defined, as per answer to point 5.1)* Other *(please specify below)* **Details and comments.** *Please give details about the threshold (if any) used for the indicator or add comment (e.g. if multiple types of thresholds have been used in the assessment of the criterion/parameter, e.g. combining threshold values for the parameter with threshold for trend changes).*

5.3 Approach for setting threshold value	*Approach used by the MS to set the threshold value. Choose from drop-down list between:* Reference point/baseline approach *(where the threshold is established at the reference value or as an "acceptable" deviation the reference/baseline value)* Temporal trends or tipping points *(e.g. an analysis for changes in status)* Level of adverse effects *(as biological/ecological effects on the condition of an organism or habitat; e.g. thresholds for physical disturbance effects)* Not specified / Don't know Not applicable/ Not relevant (*where threshold has not been defined, as per answer to point 5.1)* Other *(please specify below)* **Details and comments.** *Please give details of the approach selected above or alternative approach used, or add comment (e.g. if multiple approaches may apply to different types of thresholds defined for the same indicator/parameter).*
5.4 Threshold value	*Threshold value defined as… Choose from drop-down list between:* Favourable Reference Value (for HD species/habitats) Other reference/desired value Acceptable deviation from reference condition (e.g. %, EQR) Acceptable deviation from baseline value (e.g. %) Not specified / Don't know Not applicable/ Not relevant *(where threshold has not been defined, as per answer to point 5.1)* Other *(please specify below)* **Details and comments.** *Please give details on the answer selected or add comment.*
5.5 Threshold source/standard	*Source/standard of the threshold/reference used to assess the indicator. Choose from drop-down list between:* Derived from EU-level guidance Derived from other relevant EU legislation (e.g. from WFD, HD, CFP) Regional/subregional level (e.g. from RSC assessments, regional cooperation) National level (national policy process) Not specified / Don't know Not applicable/ Not relevant *(where threshold has not been defined, as per answer to point 5.1)* Other *(please specify below)* **Details and comments.** *Please give details or add comment.*
5.6 References/Links	*If possible, give references or links where the information on threshold reference value has been sourced from.*
5.7 Basis for setting reference	*Basis for setting the reference for threshold-based assessment. Choose from drop-down list between:*

	Reference-based*: considering historical distribution/ area/ population when the species/habitat was supposed to be in favourable conditions. Reference can be set:* Reference-based, as historical reference condition (negligible impacts) *(historic conditions, based on various evidence about conditions before there was significant anthropogenic activity or anthropogenic pressure);* Reference-based, as geographical reference condition (current state, negligible impacts) *(current conditions, in areas considered substantively free from anthropogenic pressures)* Reference-based, as baseline (fixed reference point/past state) *(Past date/period, based on time-series datasets of state variables, which indicate conditions best equating to 'a reference condition', or a condition with no adverse effects)* Model-based: *Modelling using species-specific/habitat-specific models, to predict current state in the absence of pressures. Reference can be set:* Model-based, using population-based models *(applied to the studied species population, e.g. PVA, MVPs)* Model-based, using potential-range methods *(distribution/habitat suitability modelling, e.g. MaxEnt, GAMs, Boosted Regression Trees)* Model-based, using area-based *methods (e.g. 'minimum dynamic area' approach[10])* Not specified / Don't know Not applicable/ Not relevant *(where indicator has not been assessed (as per point 5.1), a threshold value has not been defined or it is not based on the definition of a reference condition)* **Details and comments.** *Please give a brief description of the approach being used (e.g. which model, which geographical reference) or add comment.*
5.8 Evidence base used for setting reference	*Source of the evidence used to set the reference. Choose from drop-down list between:* Monitoring data (time series, spatial data) Literature Expert opinion Not specified / Don't know Not applicable/ Not relevant *(where indicator has not been assessed (as per point 5.1), a threshold value has not been defined or it is not based on the definition of a reference condition)* Other *(please specify below)* **Details and comments.** *Please give details or add comment.*
5.9 Temporal scale at which threshold/ reference value is defined	*Temporal scale considered to define the threshold/reference (based on how it has been defined and data/evidence used for it). Choose from drop-down list between:* Historical past (*e.g. up to last 2-3 centuries)*

[10] See Background document for MSFD on determination of GES and its links to assessment and setting of environmental targets [EC, 2020. *Background document for the Marine Strategy Framework Directive on the determination of good environmental status and its links to assessments and the setting of environmental targets.* Commission Staff Working Document accompanying the Report from the Commission to the European Parliament and the Council on the implementation of the Marine Strategy Framework Directive (Directive 2008/56/EC). Document {SWD(2020)60} - {SWD(2020)61})

	Recent past *(baseline defined at a specified time in the past e.g. when a policy or programme was adopted)* No temporal scale Not specified / Don't know Not applicable/ Not relevant *(where indicator has not been assessed (as per point 5.1), or a threshold value has not been defined)* **Details and comments.** *Please give details on the temporal scale or add comment.*
5.10 Spatial scale at which threshold/reference value is defined	*Spatial scale considered to define the reference (based on how it has been defined and data/evidence used for it). Choose from drop-down list between:* National, at biogeographic level (within region/subregion) National level, covering several biogeographic regions Supranational level Not specified / Don't know Not applicable/ Not relevant *(where indicator has not been assessed (as per point 5.1), or a threshold value has not been defined)* **Details and comments.** *Please give details or add comment.*
5.11 Reference value standardisation	*Level at which the reference value used by the MS has been standardised/agreed. Choose from drop-down list between:* Agreed at EU-level Agreed at Regional/subregional level At National level Not specified / Don't know Not applicable/ Not relevant *(where indicator has not been assessed (as per point 5.1), a threshold value has not been defined or it is not based on the definition of a reference condition)* Other *(please specify below)* **Details and comments.** *Please give details or add comment.*
5.12 Other thresholds/ reference values used in the assessment	*If needed, add here a brief description or comment on thresholds/reference values other than those described above and on the methods used to establish them (e.g. to define population or habitat condition)*

6. Confidence/uncertainty assessment

This part gathers information on whether confidence/uncertainty on the assessment is reported. *This is distinguished in confidence in the data used to calculate the indicator, the method applied and the status assessment process (thresholds etc). For each of these aspects, a distinction is made between confidence reported quantitatively (e.g. measure of error, confidence interval, or other uncertainty measure) or qualitatively, or not reported.*

7. Additional comments

Please provide any additional information not covered above and may be useful for this technical assessment

A10.2.2 C2 Assessment of species/habitat status

This section of the template requires information on technical aspects of the status assessments at species/habitat level, specifically on the method(s) used to combine the status assessments across criteria/parameters into a status assessment for the species/habitat. Assessments of different species (or habitats) within a given MRU are to be inputted as separate columns. Different columns will need to be created to review separately the integrated assessment for a given Species (or Habitat) (point 8.2) in a Marine region/subregion (point 8.1) (these should find a match with points 1.1 and 1.2 in C1).

8. Assessment scope and result

8.1 Marine Region/Subregion	*Indicate the Marine Reporting Unit (MRU) the reported integrated assessment in the column refers to for the given species/habitat, as specified in the MSFD/BHD report. This should match with the regions indicated in point 1.1 of C1.*
8.2 Species/habitat	*Indicate relevant element (species or habitat) the information reported in the column refers to, with specific reference to the selection of species/habitats as indicated in section A. This should match with the species/habitats indicated in point 1.2 of C1.*
8.3 Species/habitat status	*Indicate what is the resulting status reported for the species/habitat in the region. Choose from drop-down list between:* a) Good (MSFD) b) Good, based on low risk (MSFD) c) Not good (MSFD) d) Not assessed (MSFD, BD) e) Not relevant (MSFD) f) Unknown (MSFD, HD) g) Favourable (FV; HD) h) Unfavourable-Inadequate (U1; HD) i) Unfavourable-Bad (U2; HD) *For MSFD, this information is provided as 'Element status' in the data table 'Element Status, Criteria Status, Parameter assessments and Related indicator' in the MSFD reporting data explorer.* *For HD, this information is provided as 'Overall assessment of Conservation Status' within the table 'Conclusions' (section 11 of species reports, section 10 of habitat reports) in the species/habitat reports.* *For BD, MS are not required to provide an assessment of the species, and therefore point 'd) Not assessed (MSFD, BD)' should be selected from the drop-down list.* *Please note that the rest of this section should only be completed only for those species/habitats that have been assessed and for which an integration approach has been applied.* **If 'Not assessed' or 'Unknown' – why?** *Please give the reason why the species/habitat was not assessed (e.g. due to lack of enough data or too high*

	uncertainty for the indicator assessments) or the results is unknown, if provided in the report. **Other comments.** *Add any other comment or explanation you may feel is needed.*

9. Integration approach

This part gathers information on the approach used to integrate the status assessments from criterion/parameter level to species/habitat level.

9.1 Methodological standard	*Source/standard of the integration rule applied to assess status at species/habitat level. Choose from drop-down list between:* EU-level approach (e.g. integration rule from EU-level guidance) Based on regional agreement National approach Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give some detail on integration method standard or add comment.*
9.2 Integration rule	*Type of integration rule applied (modified from Barnard & Strong, 2014). Choose from drop-down list between:* Conditional rule: One-Out-all-Out (OOAO) *(all indicators have to achieve good/favourable status)* Conditional rule: Hierarchical application of the OOAO Conditional rule: Two-Out-all-Out (*if two indicators in good/favourable status, the good/favourable status for the species/habitat is not achieved)* Conditional rule: Threshold methods *(a specific proportion of the indicators have to achieve good/favourable status)* Conditional rule: Decision tree approach *(uses specific decision rules (e.g. algorithm) to integrate indicators' status into an integrated assessment).* Averaging approach: non-hierarchical, non-weighted averaging *(NHIE_NWEI) (combination of variables/indicators into a flat structure with no intermediate aggregation. Weightings are equal for all indicators; the most basic of quantitative aggregations; averaging can be arithmetic or geometric)* Averaging approach: non-hierarchical, weighted averaging *(as in NHIE_NWEI, but with variable weightings between indicators, as allocated according to multivariate analysis, expert judgement or based on theoretical assumptions regarding value)* Averaging approach: hierarchical, non-weighted averaging *(HIE_NWEI) (hierarchical approaches used to structure indicator inclusion in the integrated assessment (e.g. indicators nested into clusters), with output of status assessments at intermediate level; equal weightings for each indicator)* Averaging approach: hierarchical, weighted averaging *(as in HIE_NWEI, but with variable weightings between indicators (or clustered indicators), as allocated according to multivariate analysis, expert judgement or based on theoretical assumptions regarding value)*

	Non Averaging Approach: Multimetric indices *(Calculation is undertaken with complex approaches such as summation, multiplication or bespoke formulae operations; Weights can be variable or equal; Often hierarchically-structured and have inputs clustered by metric)* Non Averaging Approach: Multivariate analysis *(Use predefined statistical procedures, e.g. Factor Analysis, Discriminate analysis and Principal Components Analysis)* Spatial Analysis *(where layers are combined using different functions to produce an integrated output)* Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give brief description of integration method used or add comment.* *For MSFD, this information is provided as 'Integration Rule Type Criteria' (and associated description) in the grey data table at the top of the MSFD reporting data explorer. Note that tables for different features (i.e. species or habitat groups) and different regions are displayed in separate pages.* *For HD, the default answer should be '*a) Conditional rule: One-Out-all-Out (OOAO)*', as prescribed by EU-level guidance, unless otherwise specified in the HD species/habitats reports.* *For BD, MSs are not required to provide an assessment of the species, and therefore point '*d) Not assessed (MSFD, BD)*' should be selected from the drop-down list.*
9.3 References/Links	*If possible, give reference or link where the information has been sourced.*
9.4 Additional comments	*Please give any additional information on the integration approach relevant to this assessment, if needed.*

A10.3Section D: Data collection & monitoring

This section addresses the technical aspects of the data collection and monitoring programmes implemented by the Member State to collect data for the assessment of each indicator (with specific reference to the monitoring of species/habitats and associated indicators/parameters included in section C).

The data sources for this section may highly vary with Member State. Information or links to specific monitoring programmes and data collection may be available in the text and data reports as used for section C. Alternatively, you might need to source the information from websites for the specific Member State or for the relevant monitoring programme. Key sources for this information have likely been identified during Task 1. Sources reporting on the actual monitoring implemented by the MS in the latest reporting cycle 2013/14-2018/19 should be used.

Information on the different data collection processes is cross-referenced with those reported for Task 1. Individual data collection processes within specific Monitoring programmes are to be inputted as separate columns. The links with the species/habitats for which data are collected are established through cross reference to specific indicators/parameters using column numbers as reference ('Column#' as given automatically at the top of the template in section C1). Where the same data collection process is used to provide data to assess multiple species/habitats or indicators/parameters, a single column can be used to report information on the

specific data collection in this section of the template, with reference to multiple indicators/parameters as numbered columns from section C1 given in point 10.3.

10. Data collection ID

This part identifies the specific data collection process for which information is reported in the column, also including the species/habitats, region and cross-reference to the indicators/parameters in C1 for which the data collection is relevant.

10.1 Marine Region/Subregion	*Indicate the Marine Reporting Unit (MRU) the data collection in the column refers to for the given species/habitat(s). This should match with the reported regions indicated in point 1.1 of C1.*
10.2 Name/ID cross-reference with Task 1	*Cross-reference here the name/ID of the data collection process as reported in the relevant template completed for Task 1 (e.g. Visual Line transect surveys (D1), Acoustic Line transect surveys (D2), Incidental sightings (D4)).*
10.3 Species/habitats	*Indicate which of the reported element (species or habitats) the data collection process in the column refers to.* *If the data collection provides data for assessing multiple species/habitats, all of them can be included here, and the information in the column would refer to characteristics of the data collection that are relevant to all the species indicated. Where the data collection process varies with the species/habitat, these should be indicated in separate columns.*
10.4 Indicator(s)/parameter(s) informed by the monitoring (Column # from C1 - Row4)	*Indicate which of the indicators/parameters reported for the species/habitats in the marine region (as per fields above) are informed by the data collection reported in the column (indicators/parameters can be cross-referenced using 'Column#' from section C1 of the template).* *If the data collection provides data for assessing multiple indicators/parameters, they can be included in the same column. Otherwise, where the data collection process varies depending on the indicator/parameter, include them in separate columns.*

11. Monitoring programme

This part identifies the monitoring programme under which the specific data collection process is undertaken. Where different data collection processes (in different columns) are undertaken within the same monitoring programme, this part may be copied across the relevant columns. Where the same type of data collection process is undertaken under different monitoring programmes, this should be reported as separate columns, as the information about the monitoring programme would differ, as well as some information about the data collection itself (e.g. scales, design).

11.1 Name/ID cross-reference with Task 1	*Cross-reference here the name/ID of the monitoring programme as reported in the relevant template completed for Task 1 (e.g. LIFE+*

	Migrate project (M1), National Programme for Fisheries Data collection (M3)).
11.2 Description	*Please give a brief description of the monitoring programme*
11.3 References/Links	*Please give references or links where the information on the monitoring programme has been sourced from*
11.4 Coordination	*Level of coordination of the monitoring programme as a whole.* *Choose from drop-down list between:* Monitoring programme fully or partly coordinated internationally across regions/subregions Monitoring programme fully or partly coordinated internationally within a region/subregion Monitoring programme undertaken and coordinated at national level Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details on the above (e.g. coordination level, scale etc.)*
11.5 Monitoring basis	*Resource basis for the monitoring programme.* *Choose from drop-down list between:* Financed monitoring programme Volunteer programme Not specified / Don't know **Details and comments.** *Please give details on the above.*
11.6 Primary purpose	*The primary purpose the monitoring programme has been designed for.* *Choose from drop-down list between:* Providing data for assessments under the specific EU Directive this template refers to (MSFD, HD or BD) Providing data for assessments under other EU legislation between MSFD and BHD Providing data for assessments under EU legislation other than MSFD and BHD (e.g. WFD, CFP) Providing data for assessments under RSCs agreements Providing data for management Research Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details (which directives, regional conventions, management purpose, etc.)*
11.7 Data use	*The data obtained from the monitoring programme may be used for other purposes than the primary one the monitoring programme*

	was designed for (as indicated above). Here how the data collected are used is recorded. Choose from drop-down list between: Species/habitat assessments under the specific EU Directive this template refers to (MSFD, HD or BD) Species/habitat assessments under other EU legislation between MSFD and BHD Species/habitat assessments under EU legislation other than MSFD and BHD (e.g. WFD, CFP.) Species/habitat assessments under Regional convention(s) Inform management Research Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details*
11.8 Spatial scale	*Spatial scale of the monitoring programme as a whole. Choose from drop-down list between:* Subnational *(covering only part of a MS MRU relevant to the feature/element being assessed, e.g. MPA only)* National Subdivision Region/Subregion Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details on the scale (e.g. which area, region; please also specify whether data collection is only undertaken in areas with specific characteristics, e.g. MPAs)*
11.9 Temporal scale	*Temporal scale of the monitoring programme as a whole. Choose from drop-down list between:* Within a reporting cycle Across multiple reporting cycles (e.g. long term monitoring programme) Not specified / Don't know **Details and comments.** *Please give details on the duration and frequency of the monitoring programme (e.g. which year(s) the monitoring programme covers in the latest monitoring cycle, frequency and when it started for long term monitoring)*

12. Data collection approach

This part identifies the approach and methods used for the specific data collection process.

12.1 Type of data collected	*Please give a brief description of what type of data are collected, distinguishing between the data* **used for the assessment of the indicator** *for the given species/habitat(s), and* **other additional data** *collected (e.g. for other species/habitat not assessed for*

	MSFD/BHD purposes, supporting environmental data or pressure/activity data not used for the specific indicator calculation). Please include both quantitative and qualitative data.
12.2 Method	*Broad categories for monitoring methods used to collect the data for the assessment (modified from JRC 2014 - technical guidance monitoring MSFD).* *Choose from drop-down list between:* Observer based based(visual) methods *(e.g. distance sampling (e.g. line transects) or mapping surveys, undertaken by divers, submersibles (ROV/towed/drop video), boat, aerial or plane-based; ground-based surveys incl. colony counts, nest counts, etc.)* Removal methods *(e.g. removal/sampling of a species/habitat component; e.g. fish sampling (CPUE, target or bycatches), grab sampling)* Mark-recapture *(e.g. PIT/satellite/other tagging, photo ID, ringing)* Repetitive surveys for occupancy estimation *(e.g. by divers, based on fisheries data, repetitive sledge samples, shipboard or aerial, in marine caves, beaches)* Not specified / Don't know Other *(please specify below) (e.g. acoustic shipboard line transect surveys, tracking, sightings, based on recording and examination of bycaught or stranded animal; methods based on fishery dependent data)* **Details and comments.** *Please briefly give details on the method used.*
12.3 Method standard	*Methodological standard used for the data collection.* *Choose from drop-down list between:* National standard International standard - regional International standard – wider Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details*
12.4 References/Links	*If possible, give references or links where the information on the monitoring programme has been sourced from.*
12.5 Spatial scale (incl. species/habitat representation)	*Spatial scale at which data collection is undertaken, in relation to how the species/habitat feature within a MS marine reported unit is represented by it.* *Choose from drop-down list between:* Whole habitat/species population in the MRU monitored (complete survey) *(whole habitat or species population is monitored, where it occurs within the MRU part for the MS)* Part of habitat/species in the MRU is monitored - selected sites *(e.g. areas of special ecological value (MPAs), areas under higher pressures (risk-based selection))*

	Part of habitat/species in the MRU is monitored - selected sub-habitats/life stages *(e.g. adults, breeding colonies, selected sub-habitats used as proxies for the broad benthic habitat type)* Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details on the spatial scope, resolution, criteria used for the selection of sites, sub-habitats etc.*
12.6 Temporal scale	*Temporal scale at which data collection is undertaken.* *Choose from drop-down list between:* One-off monitoring within reporting cycle Repeated monitoring within reporting cycle Repeated monitoring across reporting cycles Seasonal monitoring Not specified / Don't know Other *(please specify below)* **Details and comments.** *Please give details on the duration and frequency of the data collection (which year(s), season/months, etc)*

Annex 11 Selection of species and habitats for the technical analysis

Species of birds, mammals and reptiles that were representative of different functional groups and of the assessments undertaken across the Member States, were selected from those most frequently reported in both BHD and MSFD in order to undertake the comparative analysis of detailed assessment and monitoring methods between BHD and MSFD (sections 3.2-3.8 of the report). The selected species were: four marine bird species (the surface-feeding little tern *Sternula albifrons* and common tern *Sterna hirundo*, the pelagic/surface feeding Scopoli's shearwater *Calonectris diomedea diomedea*, and the wading pied avocet *Recurvirostra avosetta*), five marine mammal species (the small toothed cetaceans bottle-nosed dolphin *Tursiops truncatus*, harbour porpoise *Phocoena phocoena*, and striped dolphin *Stenella coeruleoalba*, the grey seal *Halichoerus grypus*, and the (Northern) fin whale *Balaenoptera physalus*), and three marine reptiles (the loggerhead turtle *Caretta caretta*, the green turtle *Chelonia mydas* and the leatherback turtle *Dermochelys coriacea*).

Similarly, marine benthic habitats representative of different habitat types defined in the HD and MSFD and of the assessments undertaken across the Member States were selected from those most frequently reported in both HD and MSFD. As a result, the three Annex I marine habitats selected were: 'Sandbanks which are slightly covered by sea water all the time' (1110), 'Reefs' (1170) and '*Posidonia* beds' (1120). The broad benthic habitats 'Infralittoral rock and biogenic reef' and 'Circalittoral rock and biogenic reef' were also included in the selection to represent possible overlap with 'Reef' habitats, considering the variability at which habitats Are defined in the directives.

The frequency of reporting of these species and habitats across the studied Member States is outlined in Table 1.

Table 1. Number of assessments reported under BHD and MSFD by MSs for selected species/habitats by region (ATL, Atlantic Sea; BAL, Baltic Sea; BLA, Black Sea; MED, Mediterranean Sea; as BD reports are at the whole country scale, no division in regions is given for BD). Totals by ecological group and by directive (across all regions/subregions) are also given. The number in parenthesis is the number of MSs them (out of the 9 MSs selected in this study) reporting overall on a species/habitat under a given directive

Ecological Group	Functional group	Species/Habitat	BD	HD					MSFD				
			BD Total	ATL	BAL	BLA	MED	HD Total	ATL	BAL	BLA	MED	MSFD Total
Birds	Surface-feeding birds	*Sterna hirundo*	8 (8)						7	3		2	12 (6)
		Sternula albifrons	8 (8)						5	3		2	10 (6)
		Calonectris diomedea diomedea	4 (4)						1			4	5 (4)
	Wading birds	*Recurvirostra avosetta*	7 (7)						2	2			4 (3)
	Birds total		**27**						**15**	**8**		**8**	**31**
Mammals	Small-toothed cetaceans	*Tursiops truncatus*		3		1	4	8 (5)	5			3	8 (4)
		Stenella coeruleoalba		3			4	7 (4)	1			4	5 (4)
		Phocaena phocaena		5	2	1	1	9 (6)	6	1			7 (4)
	Seals	*Halichoerus grypus*		4	3			7 (6)	4	3			7 (5)
	Baleen whales	*Balaenoptera physalus*		3			4	7 (4)	2			1	3 (2)
	Mammals total			**18**	**5**	**2**	**13**	**38**	**18**	**4**		**8**	**30**
Reptiles	Turtles	*Caretta caretta*		3			4	7 (4)	2			3	5 (3)

		Chelonia mydas		3			3	6 (3)	1				1 (1)
		Dermochelys coriacea		3			4	7 (4)	1				1 (1)
	Reptiles total			**9**			**11**	**20**	**4**			**3**	**7**
Habitats	*Annex I habitats*	*Sandbanks (1110)*		5	3	1	4	13 (9)		1			1 (1)
		Posidonia beds (1120)					4	4 (4)				1	1 (1)
		Reefs (1170)		5	3	1	4	13 (9)		1			1 (1)
	Benthic broad habitats	Circalittoral rock and biogenic reef								2	1	1	4 (4)
		Infralittoral rock and biogenic reef								2	1	2	5 (5)
	Habitats total			**10**	**6**	**2**	**12**	**30**		**6**	**2**	**4**	**12**

Annex 12 Member State interview analysis topic guides

A12.1Task 1 process review topic guide

Stage 1: Introduction

You should very briefly explain the purpose of the study to ensure that the interviewee understands the context of the interview. This should draw on the information sheets that you have already provided to the interviewee and can also draw on the inception report – if you feel unable to do this please contact the Project Manager for assistance.

Stage 2: Data flow diagrams

You should discuss each diagram in turn (as appropriate for the person being interviewed), focussing on those with the greatest uncertainties. Please consider the following general questions as a guide, supported by any more specific questions that have arisen from your research on gaps and uncertainties.

1. Are there any assessments that are missing?
2. Are all relevant stakeholders relevant to the data collection process, monitoring programmes and assessments captured?
3. Is each stakeholder listed connected to the correct process?
4. Is the relationship between assessments and reporting accurate?
5. Are there any monitoring /sub monitoring programmes that are missing?
6. Is the relationship between monitoring programmes and assessment accurate?
7. Are any of the assessments, monitoring programmes or data collection activities not connected to anything else either above or below in the template, if not why not?
8. Is any additional data collected? If so, what monitoring programmes does this feed into?
9. Is the relationship between data collection and monitoring programmes accurate?

Use the answers to these question to update the templates, if you want to update the diagram as well, you can either directly using PowerPoint, or using a pen on the original and scanning the results.

Stage 3: General questions on process and coordination, and opportunities and constraints

The aim of these questions is to gather a more qualitative understanding of processes, systems, communication and coordination, as well as the opportunities and barriers to improving coordination and streamlining.

10. What aspects of the data flow process works well? Why? What aspects could be improved? Why?
11. Has these been any effort to coordinate data collection, monitoring and assessment across the Directives? If not, why not? If yes, what has been done, how well has it worked, why?

Is there more detail available on the temporal spatial scales of monitoring programmes and data collection? Do the temporal scales have an impact on the production of assessments? Do they have an effect on producing coordinated assessments across the Directives? If there are negative effects, how could these be overcome?

- What is the interaction between assessments and Regional Seas Conventions?

- What is the process for reporting to RSC?
- Is the information provided to the RSC coordinated with the information for reporting to the Commission/EEA?
- What are the areas where it works well? Why?
- What are the areas where it works less well? Why
- How do you engage with the RSC and associated MS on reporting issues? How well does this process work? Why?

12. What do you think the opportunities are to better coordinate or streamline the BHD and MSFD implementation processes?
13. What do you think the barriers are? How could these be overcome?

A12.2Task 2 technical review topic guide

What we mean by 'integration' of assessments

The integration of the biodiversity (species and habitats) assessments between MSFD and BHD reflects how well the different aspects of the assessment[11] are harmonised by a Member State, towards the ideal target where they "monitor one species (or habitat) once and assess it once" while meeting both directives' requirements. This represents the full integration between assessments, albeit within the limits set by the specifications of the different Directives (e.g. a different definition of status/condition, variable overlap between MSFD criteria and BHD parameters).

The integration between assessments under MSFD and BHD is not a binary condition (integrated/not integrated), but integration can be achieved with different degrees, depending on how many aspects of the assessment process have been harmonised. For example, the same species may have been assessed under both MSFD and HD, but different indicators may have been measured for similar criteria (MSFD)/ parameters(HD) (e.g. abundance/population size), or different thresholds may have been applied for the assessment of the same indicator, or different monitoring data may have been used to support the assessments under the two directives. The degree to which integration is achieved by a Member State may vary depending on the species/habitats assessed in the different regions/subregions. In addition, missed opportunities for integration may be identified for example when a species (or habitat) has been assessed under BHD but not under MSFD.

General questions for the interview

MSFD-BHD integration

What do you consider is the level of integration between MSFD and BHD assessments as currently undertaken by your country? (please tick one)

5 High level of integration		4 Moderately high level		3 Moderate level of integration		2 Moderately low level		1 Low level of integration		Not integrated at all	

Is the reason for your answer related to (Tick all that apply):

[11] 'Assessment' is intended to include the full assessment process from monitoring/data collection, to producing an assessment of status (where required) and reporting this to the EU.

The instructions received from the EC?

The clarity or ambiguity of the monitoring instructions?

The clarity or ambiguity of the assessment instructions?

The clarity or ambiguity of the reporting instructions?

The information and data available inside your country?

The level of capability and expertise (from all sources) accessible in your country?

The manpower and other resources available for completing the assessment from obtaining data to reporting?

The level of governance / institutional structures and responsibilities?

Other *(please explain)* _____

MSFD-BHD integration - Success stories (strengths):

Which assessments undertaken by your country have the best integration between MSFD and BHD? (if any)

How do you think integration is being achieved in these assessments? Why is it so?

MSFD-BHD integration – Impediments (weaknesses & threats):

Which assessments (e.g. of mammals, birds, benthic habitats, specific species or habitats) undertaken by your country have the least integration between BHD and MSFD?

Why are they not better integrated?

What is currently stopping the integration for these elements?

MSFD-BHD integration – Opportunities:

Where integration between MSFD/BHD assessments is low, what are the opportunities for improving it?

Are there plans in your country to improve this integration in the current reporting cycle (and/or following ones)? If so, what are they?

What would improve integration of assessments between MSFD and BHD and what barriers would need to be overcome?

Additional questions may be formulated by the interviewer during the interview to obtain clarifications on specific discrepancies (if occurring) in the assessment results and methods reported by the Member State under BHD and MSFD.

Annex 13 Indicator methods (EU level guidance)

Table 2. EU-level guidance on methods that can be used to estimate indicators for BHD parameters and MSFD criteria (derived from DG Environment 2017a, 2017b, European Commission 2018a, Palialexis 2018, Palialexis et al. 2019).

Attribute measured	BD	HD	MSFD
Species:			
Population size	**Population size (+trend):** Specific method only given, for population trend: • Standardised method to combine older sources of population trend information with recent trend (e.g. from monitoring scheme) is given in guidance to estimate longer term trends (since c.1980) [13] • Criteria to distinguish stable/increasing/decreasing trends (incl. thresholds) given in guidance [13]	**Population:** • Mammals, turtles and sturgeons reported as individuals (intended as adult/mature individuals) • Other fish can be reported using the spatial surrogates for population size (1x1 km grids) (any individual, not just adults) • For wide-ranging highly mobile marine species (e.g. whales, dolphins, turtles), use population estimates from: i) regional marine Agreements such as ACCOBAMS and ASCOBANS; ii) Regional Sea Conventions (OSPAR, Helsinki, Barcelona, Bucharest); or any other estimates made in cooperation between Member States sharing the same population (e.g. SCANS; Hammond et al. 2013) if available. Each Member State should report the results for their territory (i.e. a respective proportion of the regional population). • FV assessment of Population also considers Population condition (see below)	**D1C2-Population abundance:** *Examples of methods for RSC indicators calculation [20]:* • Abundance estimates from transect survey data (design-based method) or from density surface models (model-based method, also for distribution) (C2.5 OSPAR, C2.6 UNEPMAP, mammals) • Most of abundance indicators used in RSC assessments assess indices of population abundance as species population abundance relative to the population size at a base time (baseline) (see also trends below) • Trends identified as deviation from set baseline value (rolling/modern vs. fixed/historical baseline, with method for estimate adapted accordingly) for a species, e.g. Population models, standard regression methods (GLMs, GAMs) on count data to estimate abundance trend and magnitude/indices of deviation from baseline (C2.2 OSPAR, mammals; C2.7 HELCOM birds); • Power analysis for detecting trends in density or abundance (C2.5 OSPAR, C2.6 UNEPMAP, mammals) • Species Trends Analysis Tool for birds (BirdSTATs) (C2.9 UNEPMAP birds), based on monitoring count data series (suitable for use in all European countries participating in the Pan European Common Bird Monitoring Scheme (PECBMS)) • Linear trend based on arithmetic methods (for data available at low frequencies, e.g. every 6 years) (C2.9 UNEPMAP birds)

Attribute measured	BD	HD	MSFD
Species distribution	**Breeding distribution map and range size (+ trend):** • Calculated based on the map of the distribution (confirmed/probable/possible presence, if also modelling, extrapolation or expert opinion were used) • Based on 10x10 km grid resolution (5x5km or 1x1km for Malta, Canary, Madeira, Azores and other small MS/territories) (standardised grid for MSs from portal) • No standardised algorithm for range size calculation as for HD - no specific method specified	**Range** • Calculated based on the map of the actual (or presumed, if also modelling, extrapolation or expert opinion were used) distribution • Based on 10x10 km grid resolution (finer resolution can be used for localised species with very small range) [10] • Standardised algorithm ('gap closure') used for the calculation; Maximum gap distance defined for different species groups [10]	**D1C4-Population distributional range and pattern:** *Examples of methods for RSC indicators calculation [20]:* • Based on presence/absence data over standardised grid maps: FAO/GFCM 30x30nm or European Bird Census Council 50x50km grid maps (C4.3 UNEPMAP, mammals); European (ETRS) 10x10km grid map (C4.5 UNEPMAP reptiles) • Range Tool software and algorithm providing a standardised process for bird and turtle range calculation. The resulting range map is a combination of the automated procedure completed by expert judgement (C4.4 UNEPMAP seabirds, C4.5 UNEPMAP reptiles) • Standard regression methods (GLMs, GAMs) on species presence/absence data and Power analysis for detecting trends (C4.3 UNEPMAP, mammals)
Population characteristics / condition	-	*(No requirement of reporting on population characteristics (as a parameter), but age structure, mortality, and reproduction are considered to assess deviation from normality (natural, self-sustaining population) for the assessment of favourable status (FV) of the*	**D1C3-Population demographic characteristics:** *Examples of methods for RSC indicators calculation [20]:* • Deviation from set baseline value for a species established based on standard regression methods (GLMs, GAMs) on pup production data (C3.2 OSPAR, mammals)

Attribute measured	BD	HD	MSFD
		parameter Population, as one of the conditions for FV, in addition to population size and trend)	• Population Viability Analysis (PVA, model-based) to assess population growth (C3.5 UNEPMAP, seabirds)
Species' habitat condition	-	**Habitat for the species:** • The Report format asks for information on the sufficiency of habitat area and quality (addressed together). Spatial organisation (occupancy of the habitat by the species) is also considered. These questions are aimed at identifying species for which habitat area and/or habitat quality is a limiting factor for not achieving Favourable conservation status • Indices/measures of the habitat quality: reproductive success; abundance or density (but may be misleading, e.g. due to seasonal fluctuations) • Spatial organisation and fragmentation (Spatial arrangement of habitat patches) is also considered • For generalist species, it is less likely that habitat area is limiting factor, and assessment should mainly focus on habitat quality	**D1C5-Habitat for the species** No detailed guidance given on method (it would depend on indicator used and its source/standardisation)
Habitat:			

Attribute measured	BD	HD	MSFD
Habitat size	-	**Range + Area covered by habitat:** • Range calculated based on the map of the actual (or presumed, if also modelling, extrapolation or expert opinion were used) distribution • Standardised algorithm ('gap closure') used for the calculation of range • Range and Area covered by habitat based on 10x10 km grid resolution (finer resolution can be used for localised habitats with very small range) [10]	**D6C4- Benthic habitat extent:** No detailed guidance given on method (it would depend on indicator used and its source/standardisation)
Habitat condition	-	**Structure and functions:** No specific method on how to assess good condition of habitat, but indication that habitat in good condition would have: • typical species overall in favourable conditions (not threatened) at least in the habitat • fragmentation or other conditions not impacting significant on ecological processes (Example of detailed guidance/manuals on assessing habitat condition are given for Spain, Italy and UK in Table 29 of [10]) • Typical species are species which occur regularly in the habitat type (as opposed to occasionally occurring species) and are species which are good indicators of favourable habitat quality. The list of 'typical species' chosen for the purpose of assessing conservation status should ideally remain stable over the medium	**D6C5-Benthic habitat condition** No detailed guidance given on method (it would depend on indicator used and its source/standardisation)

Attribute measured	BD	HD	MSFD
		to long term, i.e. across reporting periods. This can include any species (any group, also other than Annexed species)	

Annex 14 Technical characteristics of assessments (frequency)

A14.1How indicators are estimated and reported

A14.1.1 Frequency by parameter/criterion

Table 3. ***Indicator temporal scale (by parameter/criterion)****: relative frequency (%) of temporal scales at which indicators have been reported for different parameters/criteria under BHD-MSFD. The categories account for assessments covering 1 or more (>1) reporting periods, including or not (prev.) the last one (i.e. 2013-2018 for BHD, 2012-2018 for MSFD), and 1 or more (>1y) years within or across periods. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed*

Assessment period (indicator calculation)	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size +Trend	D1C2	Breeding distrib & Range	D1C4
a) 1 reporting period (last), 1y				
b) 1 reporting period (prev.), 1y				
c) 1 reporting period (last), >1y	86%	58%	63%	60%
d) 1 reporting period (prev.), >1y				
e) >1 reporting periods (incl. last), >1y	7%	42%	26%	40%
f) >1 reporting periods (prev.), >1y	7%		11%	
g) not specified				

Assessment period (indicator calculation)	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) 1 reporting period (last), 1y	8%						
b) 1 reporting period (prev.), 1y	3%						
c) 1 reporting period (last), >1y	42%	37%	31%		32%		37%
d) 1 reporting period (prev.), >1y							3%
e) >1 reporting periods (incl. last), >1y	32%	63%	69%		68%		60%
f) >1 reporting periods (prev.), >1y	16%						
g) not specified				100%		100%	

Assessment period (indicator calculation)	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) 1 reporting period (last), 1y	5%						
b) 1 reporting period (prev.), 1y	5%						
c) 1 reporting period (last), >1y	45%	100%	86%		100%		100%
d) 1 reporting period (prev.), >1y							
e) >1 reporting periods (incl. last), >1y	45%						
f) >1 reporting periods (prev.), >1y							
g) not specified			14%	100%		100%	

Assessment period (indicator calculation)	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) 1 reporting period (last), 1y	13%				
b) 1 reporting period (prev.), 1y					
c) 1 reporting period (last), >1y	17%		44%		45%
d) 1 reporting period (prev.), >1y					
e) >1 reporting periods (incl. last), >1y	70%		44%		55%
f) >1 reporting periods (prev.), >1y					
g) not specified		100%	11%	100%	

Table 4. ***Indicator source/standard (by parameter/criterion)****: relative frequency (%) of the types of source/standard used to derive indicators reported for different parameters/criteria under BHD-MSFD. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Indicator scource/standard	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size +Trend	D1C2	Breeding distrib & Range	D1C4
a) EU-level indicator	55%	10%	59%	
b) Regional indicator (RSCs)	7%	55%		12%
c) National indicator	17%		19%	4%
d) Regional + National		23%		4%
e) not specified	21%	13%	22%	80%

Indicator scource/standard	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) EU-level indicator	55%			55%		55%	
b) Regional indicator (RSCs)	8%	19%	4%	5%	14%	5%	
c) National indicator	5%	39%	39%	5%	38%	5%	23%
d) Regional + National	3%	10%	4%	3%	7%		
e) not specified	29%	32%	54%	32%	41%	34%	77%

Indicator scource/standard	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) EU-level indicator	55%			55%		55%	
b) Regional indicator (RSCs)							
c) National indicator							
d) Regional + National		14%			14%		
e) not specified	45%	86%	100%	45%	86%	45%	100%

Indicator scource/standard	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) EU-level indicator	53%	53%		53%	
b) Regional indicator (RSCs)					9%
c) National indicator	13%	13%	22%	20%	55%
d) Regional + National					
e) not specified	33%	33%	78%	27%	36%

Table 5. ***Indicator type of estimate (by parameter/criterion)****: relative frequency (%) of the types of estimate used to report on indicators for different parameters/criteria under BHD-MSFD. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Type of estimate	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size +Trend	D1C2	Breeding distrib & Range	D1C4
a) Best estimate (single value and/or min-max range; no confidence interval)	78%	18%	56%	4%
b) Temporal mean (e.g. multi-year)	6%	24%		4%
c) Spatial mean (e.g. multi-site)		24%	26%	12%
d) Mean (not specified)	3%		4%	
e) Minimum	6%			
f) Estimate with/or Interval (e.g. 95% C.I.)				
g) No numerical estimate required, qualitative				
h) Other	3%	3%		4%
i) not specified	3%	30%	15%	76%

Type of estimate	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Best estimate (single value and/or min-max range; no confidence interval)	34%	17%	26%	21%	21%		17%
b) Temporal mean (e.g. multi-year)	6%	7%	4%	5%	4%		
c) Spatial mean (e.g. multi-site)		17%	4%	3%	11%		
d) Mean (not specified)							
e) Minimum	3%						
f) Estimate with/or Interval (e.g. 95% C.I.)	53%	10%	11%		11%		
g) No numerical estimate required, qualitative						100%	
h) Other	3%	17%		3%	14%		
i) not specified	3%	33%	56%	68%	39%		83%

Type of estimate	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Best estimate (single value and/or min-max range; no confidence interval)	45%	71%	14%	10%	43%		14%
b) Temporal mean (e.g. multi-year)	5%	14%					
c) Spatial mean (e.g. multi-site)					14%		
d) Mean (not specified)	10%						
e) Minimum	15%						
f) Estimate with/or Interval (e.g. 95% C.I.)	10%						
g) No numerical estimate required, qualitative						100%	
h) Other					14%		
i) not specified	15%	14%	86%	90%	29%		86%

Type of estimate	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Best estimate (single value and/or min-max range; no confidence interval)	77%	37%	22%	44%	9%
b) Temporal mean (e.g. multi-year)					
c) Spatial mean (e.g. multi-site)	10%		22%		18%
d) Mean (not specified)					
e) Minimum	7%				
f) Estimate with/or Interval (e.g. 95% C.I.)				3%	
g) No numerical estimate required, qualitative					
h) Other		13%		15%	18%
i) not specified	7%	50%	56%	38%	55%

Table 6. ***Method for indicator calculation (by parameter/criterion)****: relative frequency (%) of the methods used to estimate indicators reported for different parameters/criteria under BHD-MSFD. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Method for indicator calculation	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size +Trend	D1C2	Breeding distrib & Range	D1C4
a) Direct estimate from monitoring data	44%	35%	56%	
b) Model-based method based on monitoring data		13%		
c) Spatial-based model/method		23%		20%
d) Algorithm-based method (e.g. WFD indices)				
e) Expert judgement	13%		11%	
f) A combination of methods	9%	13%		
g) not specified	34%	16%	33%	80%

Method for indicator calculation	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Direct estimate from monitoring data	26%	23%		13%	10%	8%	
b) Model-based method based on monitoring data	3%	6%	15%	3%	10%		
c) Spatial-based model/method	3%	26%	15%	29%	24%		6%
d) Algorithm-based method (e.g. WFD indices)							
e) Expert judgement	18%	3%	7%	5%	7%	13%	13%
f) A combination of methods				5%		5%	6%
g) not specified	50%	42%	63%	45%	48%	74%	74%

Method for indicator calculation	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Direct estimate from monitoring data	10%	71%		5%	43%	5%	
b) Model-based method based on monitoring data	10%			15%		5%	
c) Spatial-based model/method				40%	29%		14%
d) Algorithm-based method (e.g. WFD indices)							
e) Expert judgement	35%					20%	
f) A combination of methods	5%						
g) not specified	40%	29%	100%	40%	29%	70%	86%

Method for indicator calculation	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Direct estimate from monitoring data				9%	
b) Model-based method based on monitoring data					
c) Spatial-based model/method	40%	30%	11%	9%	
d) Algorithm-based method (e.g. WFD indices)				6%	18%
e) Expert judgement	20%	13%		27%	18%
f) A combination of methods	7%	23%	22%	18%	18%
g) not specified	33%	33%	67%	30%	45%

Table 7. ***Indicator evidence base (by parameter/criterion)****: relative frequency (%) of the types of evidence base used to estimate indicators reported for different parameters/criteria under BHD-MSFD. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Evidence base for indicator calculation	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size +Trend	D1C2	Breeding distrib & Range	D1C4
a) Complete survey/statistically robust estimate from monitoring data	52%	55%	59%	20%
b) Based mainly on extrapolation from a limited amount of data	18%		19%	
c) Based mainly on expert opinion with very limited data	27%		22%	
d) Estimate derived from other assessments (e.g. RSCs)		21%		
e) Insufficient or no data available	3%			
f) not specified		24%		80%

Evidence base for indicator calculation	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Complete survey/statistically robust estimate from monitoring data	58%	50%	35%	21%	36%	16%	13%
b) Based mainly on extrapolation from a limited amount of data	24%			26%	11%	13%	
c) Based mainly on expert opinion with very limited data	13%			8%		8%	3%
d) Estimate derived from other assessments (e.g. RSCs)							7%
e) Insufficient or no data available	5%	13%	15%	16%	14%	61%	10%
f) not specified		37%	50%	29%	39%	3%	67%

Evidence base for indicator calculation	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Complete survey/statistically robust estimate from monitoring data	20%	14%		10%	57%	10%	14%
b) Based mainly on extrapolation from a limited amount of data	20%	14%		25%		5%	
c) Based mainly on expert opinion with very limited data	55%			35%		40%	
d) Estimate derived from other assessments (e.g. RSCs)							
e) Insufficient or no data available	5%			25%		40%	
f) not specified		71%	100%	5%	43%	5%	86%

Evidence base for indicator calculation	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Complete survey/statistically robust estimate from monitoring data	20%	20%		10%	9%
b) Based mainly on extrapolation from a limited amount of data	27%	50%	33%	37%	27%
c) Based mainly on expert opinion with very limited data	33%	7%		13%	
d) Estimate derived from other assessments (e.g. RSCs)					18%
e) Insufficient or no data available	7%	13%		40%	
f) not specified	13%	10%	67%		45%

A14.1.2 Frequency by region

Table 8. ***Indicator temporal scale (by region)****: relative frequency (%) of temporal scales at which indicators have been reported under HD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The categories account for assessments covering 1 or more (>1) reporting periods, including or not (prev.) the last one (i.e. 2013-2018 for BHD, 2012-2018 for MSFD), and 1 or more (>1y) years within or across periods.*

Assessment period (indicator calculation)	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) 1 reporting period (last), 1y	10%						8%	
b) 1 reporting period (prev.), 1y								
c) 1 reporting period (last), >1y	10%		17%	67%			4%	100%
d) 1 reporting period (prev.), >1y								
e) >1 reporting periods (incl. last), >1y	30%	100%	33%		50%		38%	
f) >1 reporting periods (prev.), >1y								
g) not specified	50%		50%	33%	50%		50%	
Assessment period (indicator calculation)	**Reptiles**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) 1 reporting period (last), 1y								12%
b) 1 reporting period (prev.), 1y								4%
c) 1 reporting period (last), >1y	28%						20%	15%
d) 1 reporting period (prev.), >1y								
e) >1 reporting periods (incl. last), >1y	22%	50%					30%	19%
f) >1 reporting periods (prev.), >1y	8%							12%
g) not specified	50%	50%					50%	50%
Assessment period (indicator calculation)	**Habitats**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) 1 reporting period (last), 1y							6%	
b) 1 reporting period (prev.), 1y				5%				
c) 1 reporting period (last), >1y	28%		40%	18%	50%	100%	28%	75%
d) 1 reporting period (prev.), >1y			20%					
e) >1 reporting periods (incl. last), >1y	72%		40%	27%	50%		17%	
f) >1 reporting periods (prev.), >1y								
g) not specified				50%			50%	25%

Table 9. ***Indicator source/standard (by region)****: relative frequency (%) of the types of source/standard used to derive indicators reported under HD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Indicator source/standard	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) EU-level indicator	50%		67%				50%	
b) Regional indicator (RSCs)				50%				
c) National indicator	17%	67%	33%		100%			33%
d) Regional + National								
e) not specified	33%	33%		50%			50%	67%
Indicator source/standard	**Reptiles**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) EU-level indicator	55%						60%	47%
b) Regional indicator (RSCs)	5%	100%						
c) National indicator							40%	
d) Regional + National	5%							
e) not specified	35%							53%
Indicator source/standard	**Habitats**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) EU-level indicator				42%			67%	
b) Regional indicator (RSCs)	12%		33%					
c) National indicator	36%		50%		27%			
d) Regional + National	3%				13%			14%
e) not specified	48%		17%	58%	60%	100%	33%	86%

Table 10. ***Indicator type of estimate (by region)****: relative frequency (%) of the types of estimate used to report on indicators under HD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Type of estimate	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Best estimate (single value and/or min-max range; no confidence interval)	36%		50%		40%		41%	43%
b) Temporal mean (e.g. multi-year)								
c) Spatial mean (e.g. multi-site)	9%	33%					5%	
d) Mean (not specified)								
e) Minimum							9%	
f) Estimate with/or Interval (e.g. 95% C.I.)	5%							
g) No numerical estimate required, qualitative								
h) Other	18%		25%		20%		9%	29%
i) not specified	32%	67%	25%	100%	40%		36%	29%

Type of estimate	Reptiles							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Best estimate (single value and/or min-max range; no confidence interval)	17%	17%					18%	11%
b) Temporal mean (e.g. multi-year)							18%	
c) Spatial mean (e.g. multi-site)	2%							
d) Mean (not specified)								
e) Minimum								3%
f) Estimate with/or Interval (e.g. 95% C.I.)	15%	33%					9%	24%
g) No numerical estimate required, qualitative	35%	33%					45%	35%
h) Other	2%	17%						
i) not specified	29%						9%	27%

Type of estimate	Habitats							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Best estimate (single value and/or min-max range; no confidence interval)	9%		29%	16%	17%	33%	22%	30%
b) Temporal mean (e.g. multi-year)			29%	3%				10%
c) Spatial mean (e.g. multi-site)	12%		14%		6%			10%
d) Mean (not specified)							7%	
e) Minimum				10%				
f) Estimate with/or Interval (e.g. 95% C.I.)	15%			3%	11%		4%	
g) No numerical estimate required, qualitative				35%			33%	
h) Other	9%				22%			10%
i) not specified	55%		29%	32%	44%	67%	33%	40%

Table 11. ***Method for indicator calculation (by region)****: relative frequency (%) of the methods used to estimate indicators reported under BHD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Method for indicator calculation	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Direct estimate from monitoring data	10%		10%					
b) Model-based method based on monitoring data								
c) Spatial-based model/method	20%		40%				19%	17%
d) Algorithm-based method (e.g. WFD indices)	10%							33%
e) Expert judgement	20%	33%	30%				19%	
f) A combination of methods	10%	33%	20%		33%		24%	
g) not specified	30%	33%		100%	67%		38%	50%

Method for indicator calculation	Reptiles							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Direct estimate from monitoring data	6%						43%	20%
b) Model-based method based on monitoring data	3%							
c) Spatial-based model/method	22%							20%
d) Algorithm-based method (e.g. WFD indices)								
e) Expert judgement	13%	100%					29%	8%
f) A combination of methods	9%							
g) not specified	47%						29%	52%

Method for indicator calculation	Habitats							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Direct estimate from monitoring data	6%		25%	10%	18%	22%		33%
b) Model-based method based on monitoring data	15%		13%	5%	12%		11%	
c) Spatial-based model/method	24%		13%	19%	18%		22%	22%
d) Algorithm-based method (e.g. WFD indices)								
e) Expert judgement	3%		13%	19%	12%		28%	
f) A combination of methods	6%						6%	
g) not specified	47%		38%	48%	41%	78%	33%	44%

Table 12. ***Indicator evidence base (by region)****: relative frequency (%) of the types of evidence base used to estimate indicators under BHD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Evidence base for indicator calculation	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data	6%		20%				15%	20%
b) Based mainly on extrapolation from a limited amount of data	39%	33%	40%		50%		19%	20%
c) Based mainly on expert opinion with very limited data	17%		10%		50%		27%	
d) Estimate derived from other assessments (e.g. RSCs)		33%						
e) Insufficient or no data available	28%		10%				27%	
f) not specified	11%	33%	20%	100%			12%	60%

Evidence base for indicator calculation	Reptiles							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data	23%	33%					57%	30%
b) Based mainly on extrapolation from a limited amount of data	16%	67%					14%	7%
c) Based mainly on expert opinion with very limited data	14%						29%	7%
d) Estimate derived from other assessments (e.g. RSCs)								
e) Insufficient or no data available	30%							41%
f) not specified	18%							15%

Evidence base for indicator calculation	Habitats							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data	29%		67%	21%	25%	20%		29%
b) Based mainly on extrapolation from a limited amount of data	9%			16%			28%	14%
c) Based mainly on expert opinion with very limited data	3%			32%			44%	
d) Estimate derived from other assessments (e.g. RSCs)	3%		17%					
e) Insufficient or no data available	6%		17%	21%	17%		28%	
f) not specified	50%			11%	58%	80%		57%

A14.2How trends are estimated and reported

A14.2.1 Frequency by parameter/criterion

Table 13. ***Trends estimation (by parameter/criterion)****: relative frequency (%) of trend estimation for the assessment of different parameters/criteria under BHD-MSFD. The category 'No' includes cases where the trend was not reported or, if reported, it was reported as 'unknown', 'uncertain', or 'not relevant' (hence not estimated); the category 'not specified' includes cases where the information was not clear from the MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Trend estimated?	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size Trend	D1C2	Breeding distrib Range Trend	D1C4
a) No	34%	36%	15%	16%
b) Yes (direction)	16%	18%	30%	8%
c) Yes (direction + magnitude)	50%	6%	56%	4%
d) not specified		39%		72%

Trend estimated?	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) No	53%	16%	26%	47%	28%	55%	10%
b) Yes (direction)	42%	48%	19%	53%	41%	42%	26%
c) Yes (direction + magnitude)	5%	13%	11%		10%		3%
d) not specified		23%	44%		21%	3%	61%

Trend estimated?	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) No	60%	71%	29%	60%	43%	80%	14%
b) Yes (direction)	40%	29%		40%	29%	20%	29%
c) Yes (direction + magnitude)							
d) not specified			71%		29%		57%

Trend estimated?	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) No	3%		56%	28%	36%
b) Yes (direction)	90%	93%	11%	72%	45%
c) Yes (direction + magnitude)	7%	7%			
d) not specified			33%		18%

Table 14. ***Scale of trends (by parameter/criterion)****: relative frequency (%) of temporal scales at which trends are estimated for the assessment of different parameters/criteria under BHD-MSFD. The % frequency is calculated only considering the assessments for which a trend was estimated. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Scale of trend estimated	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size Trend	D1C2	Breeding distrib Range Trend	D1C4
a) Short term	5%	25%	13%	33%
b) Long term			13%	
c) Both	71%		74%	
d) not specified	24%	75%		67%

Scale of trend estimated	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Short term	78%	74%	63%	85%	73%	100%	56%
b) Long term		11%	13%		13%		
c) Both	22%	5%		15%			
d) not specified		11%	25%		13%		44%

Scale of trend estimated	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Short term	75%	100%		50%	100%	100%	50%
b) Long term							
c) Both	25%			50%			
d) not specified							50%

Scale of trend estimated	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Short term	59%	53%	100%	74%	100%
b) Long term					
c) Both	21%	23%			
d) not specified	21%	23%		26%	

Table 15. ***Trend evidence base (by parameter/criterion)****: relative frequency (%) of the types of evidence base used for evaluating trends in the assessments of different parameters/criteria under BHD-MSFD. The % frequency is calculated only considering the assessments for which a trend was estimated. The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Evidence base for trend estimation	Birds			
	Popul. Size		Sp. Distribution	
	BD	MSFD	BD	MSFD
	Population Size Trend	D1C2	Breeding distrib Range Trend	D1C4
a) Complete survey/statistically robust estimate from monitoring data	32%	29%	43%	67%
b) Based mainly on extrapolation from a limited amount of data	14%		30%	
c) Based mainly on expert opinion with very limited data	14%		26%	
d) Estimate derived from other assessments (e.g. RSCs)		14%		
e) Insufficient or no data available	27%			
f) not specified	14%	57%		33%

Evidence base for trend estimation	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Complete survey/statistically robust estimate from monitoring data	44%	89%	50%	25%	40%	31%	
b) Based mainly on extrapolation from a limited amount of data	22%			55%	47%	25%	33%
c) Based mainly on expert opinion with very limited data	22%			10%		6%	
d) Estimate derived from other assessments (e.g. RSCs)							33%
e) Insufficient or no data available		11%				25%	
f) not specified	11%		50%	10%	13%	13%	33%

Evidence base for trend estimation	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Complete survey/statistically robust estimate from monitoring data	25%	100%		25%	100%	25%	50%
b) Based mainly on extrapolation from a limited amount of data	25%			13%		50%	
c) Based mainly on expert opinion with very limited data	38%			38%			
d) Estimate derived from other assessments (e.g. RSCs)							
e) Insufficient or no data available						25%	
f) not specified	13%			25%			50%

Evidence base for trend estimation	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Complete survey/statistically robust estimate from monitoring data	10%	20%	100%	9%	20%
b) Based mainly on extrapolation from a limited amount of data	52%	40%		35%	
c) Based mainly on expert opinion with very limited data	38%	27%		30%	40%
d) Estimate derived from other assessments (e.g. RSCs)					
e) Insufficient or no data available		13%		17%	
f) not specified				9%	40%

A14.2.2 Frequency by region

Table 16. ***Trends estimation (by region)****: relative frequency (%) of trend estimation for the assessments reported under HD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not clear from the MSFD report, often corresponding to indicators that were not measured or not successfully assessed*

Trend estimated?	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) No	43%	12%	17%				79%	28%
b) Yes (direction)	50%	36%	67%	57%	100%		21%	22%
c) Yes (direction + magnitude)	3%	3%	17%	29%				11%
d) not specified	3%	48%		14%				39%
Trend estimated?	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) No	56%	50%					64%	17%
b) Yes (direction)	44%						36%	33%
c) Yes (direction + magnitude)								
d) not specified		50%						50%
Trend estimated?	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) No	21%		25%	50%	33%	100%	18%	33%
b) Yes (direction)	71%		75%	25%	67%		71%	50%
c) Yes (direction + magnitude)	7%						12%	
d) not specified				25%				17%

Table 17. ***Scale of trends (by region)****: relative frequency (%) of temporal scales at which trends are estimated under BHD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed*

Scale of trend estimated	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Short term	83%	43%	100%	67%	50%		67%	50%
b) Long term		14%						
c) Both		14%			50%		33%	
d) not specified	17%	29%		33%				50%
Scale of trend estimated	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Short term							100%	
b) Long term								
c) Both								
d) not specified								
Scale of trend estimated	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Short term	44%		100%		100%		62%	100%
b) Long term								
c) Both	22%						31%	
d) not specified	33%						8%	

Table 18. ***Trend evidence base (by region)****: relative frequency (%) of the types of evidence base used for evaluating trends in the assessments reported under BHD-MSFD in the different regions (across all criteria and species within an ecological group; birds are not considered as BD assessments are not undertaken separately for regions). The category 'not specified' includes cases where the information was not found in the BHD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Evidence base for trend estimation	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data	33%	27%	50%	22%			67%	33%
b) Based mainly on extrapolation from a limited amount of data	44%	18%	17%	33%	50%			
c) Based mainly on expert opinion with very limited data			17%		50%		33%	
d) Estimate derived from other assessments (e.g. RSCs)		9%		11%				33%
e) Insufficient or no data available		9%		11%				
f) not specified	22%	36%	17%	22%				33%
Evidence base for trend estimation	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data							67%	
b) Based mainly on extrapolation from a limited amount of data							33%	
c) Based mainly on expert opinion with very limited data								
d) Estimate derived from other assessments (e.g. RSCs)								
e) Insufficient or no data available								
f) not specified								
Evidence base for trend estimation	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Complete survey/statistically robust estimate from monitoring data	8%		29%				27%	100%
b) Based mainly on extrapolation from a limited amount of data	38%		43%		100%		40%	
c) Based mainly on expert opinion with very limited data	23%		29%				27%	
d) Estimate derived from other assessments (e.g. RSCs)								
e) Insufficient or no data available	31%						7%	
f) not specified								

A14.3How status is assessed (thresholds)

A14.3.1 Frequency by parameter/criterion

Table 19. ***Approach to determine status (by parameter/criterion)****: relative frequency (%) of types of approach used to determine FCS/GES for parameters/criteria of species/habitats under HD-MSFD. The category 'not specified' includes cases where the information was not found in the HD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Assessment approach to detemine favourable conservation/good environmental status	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Threshold-based	11%	50%	23%	29%	41%		3%
b) Trend-based	3%	10%			7%	3%	
c) Expert opinion	18%	3%	4%	5%	3%	21%	13%
d) Qualitative (not specified)							
e) Other	8%			5%	3%		
f) not specified	61%	37%	73%	61%	45%	76%	83%

Assessment approach to detemine favourable conservation/good environmental status	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Threshold-based	50%	43%		15%	57%		14%
b) Trend-based						5%	
c) Expert opinion		14%			14%		14%
d) Qualitative (not specified)				35%			
e) Other							
f) not specified	50%	43%	100%	50%	29%	95%	71%

Assessment approach to detemine favourable conservation/good environmental status	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Threshold-based	40%	40%	22%	18%	36%
b) Trend-based					
c) Expert opinion	37%	33%	22%	41%	
d) Qualitative (not specified)			11%		9%
e) Other	13%	27%		6%	18%
f) not specified	10%		44%	35%	36%

Table 20. ***Type of threshold used (by parameter/criterion)****: relative frequency (%) of types of threshold used to assess parameters/criteria of species/habitats under HD-MSFD. The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment (see Table 19), or where no information about thresholds was found in the HD/MSFD report.*

Threshold type	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Quantitative, Indicator threshold value	16%	27%	19%	29%	17%	5%	7%
b) Quantitative, Proportion threshold value		13%					
c) Quantitative, Change threshold	3%	10%	4%		24%		
d) Qualitative threshold	8%	10%		3%	10%		3%
e) Other							
f) not specified / not relevant	74%	40%	77%	68%	48%	95%	90%

Threshold type	Reptiles						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Quantitative, Indicator threshold value	50%	43%		15%	14%		14%
b) Quantitative, Proportion threshold value					43%		
c) Quantitative, Change threshold							
d) Qualitative threshold		14%			14%		14%
e) Other							
f) not specified / not relevant	50%	43%	100%	85%	29%	100%	71%

Threshold type	Habitats				
	Habitat size			Habitat condition	
	HD		MSFD	HD	MSFD
	Area within range	Range	D6C4	Structure and functions	D6C5
a) Quantitative, Indicator threshold value	33%	37%	22%	15%	45%
b) Quantitative, Proportion threshold value	3%	3%	11%		
c) Quantitative, Change threshold					
d) Qualitative threshold				18%	
e) Other					18%
f) not specified / not relevant	63%	60%	67%	68%	36%

Table 21. ***Threshold value (by parameter/criterion)****: relative frequency (%) of the way threshold values are specified for the assessment parameters/criteria of species/habitats under HD-MSFD. The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds values were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Threshold value as…	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Favourable Reference Value	8%	7%		29%	3%		7%
b) Other reference/desired value		3%	4%		3%		
Acceptable deviation from ref.cond./baseline (e.g. %, EQR)	3%	17%	15%		7%		
d) Other							
e) not specified / not relevant	89%	73%	81%	71%	86%	100%	93%
Threshold value as…	**Reptiles**						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Favourable Reference Value	50%	29%		15%	14%		14%
b) Other reference/desired value							
Acceptable deviation from ref.cond./baseline (e.g. %, EQR)							
d) Other	5%						
e) not specified / not relevant	45%	71%	100%	85%	86%	100%	86%
Threshold value as…	**Habitats**						
	Habitat size			Habitat condition			
	HD		MSFD	HD	MSFD		
	Area within range	Range	D6C4	Structure and functions	D6C5		
a) Favourable Reference Value	53%	57%	22%	12%	18%		
b) Other reference/desired value							
Acceptable deviation from ref.cond./baseline (e.g. %, EQR)				3%	18%		
d) Other					27%		
e) not specified / not relevant	47%	43%	78%	85%	36%		

Table 22. ***Threshold source/standard (by parameter/criterion)****: relative frequency (%) of the types of source/standard used to define thresholds for the assessment of parameters/criteria of species/habitats under HD-MSFD. The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Threshold source/standard	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Derived from EU-level guidance/legislation							
egional/subregional level (e.g. RSCs, regional cooperation)	5%	17%	7%	5%	7%		
c) National level (national policy process)	11%	33%	30%	11%	31%	8%	17%
d) Other	3%			3%			
e) not specified / not relevant	82%	50%	63%	82%	62%	92%	83%
Threshold source/standard	**Reptiles**						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Derived from EU-level guidance/legislation							
egional/subregional level (e.g. RSCs, regional cooperation)							
c) National level (national policy process)							
d) Other	5%	29%		5%			
e) not specified / not relevant	95%	71%	100%	95%	100%	100%	100%
Threshold source/standard	**Habitats**						
	Habitat size			Habitat condition			
	HD		MSFD	HD	MSFD		
	Area within range	Range	D6C4	Structure and functions	D6C5		
a) Derived from EU-level guidance/legislation	7%	7%		15%	36%		
egional/subregional level (e.g. RSCs, regional cooperation)					9%		
c) National level (national policy process)	7%			6%			
d) Other	10%	10%			18%		
e) not specified / not relevant	77%	83%	100%	79%	36%		

Table 23. ***Threshold evidence base (by parameter/criterion)****: relative frequency (%) of the types of evidence base used to set threshold/reference values for the assessment of parameters/criteria of species/habitats under HD-MSFD. The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Evidence base to set threshold/reference value	Mammals						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD		HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Monitoring data	8%	20%		8%	18%	5%	
b) Expert opinion	3%			3%		5%	
c) Literature and/or Expert opinion + monitoring data							
d) not specified / not relevant	89%	80%	100%	89%	82%	89%	100%
Evidence base to set threshold/reference value	**Reptiles**						
	Popul. Size (+cond.)			Sp. Distribution		Condition (sp. habitat)	
	HD	MSFD	MSFD	HD	MSFD	HD	MSFD
	Population	D1C2	D1C3	Range	D1C4	Habitat for the species	D1C5
a) Monitoring data		29%		5%			
b) Expert opinion	35%			10%			
c) Literature and/or Expert opinion + monitoring data	5%	14%			43%		
d) not specified / not relevant	60%	57%	100%	85%	57%	100%	100%
Evidence base to set threshold/reference value	**Habitats**						
	Habitat size			Habitat condition			
	HD		MSFD	HD	MSFD		
	Area within range	Range	D6C4	Structure and functions	D6C5		
a) Monitoring data	10%	10%		7%			
b) Expert opinion	13%	10%	22%	7%			
c) Literature and/or Expert opinion + monitoring data	7%	10%					
d) not specified / not relevant	70%	70%	78%	87%	100%		

A14.3.2 Frequency by region

Table 24. ***Approach to determine status (by region)****: relative frequency (%) of types of approach used to determine status reported under HD-MSFD in the different regions (across all criteria and species within an ecological group). The category 'not specified' includes cases where the information was not found in the HD/MSFD report, often corresponding to indicators that were not measured or not successfully assessed.*

Assessment approach	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Threshold-based	19%	33%	33%	40%			17%	19%
b) Trend-based	4%	8%					4%	13%
c) Expert opinion	15%	3%	56%	20%	50%			19%
d) Qualitative (not specified)								
e) Other			11%	10%			13%	
f) not specified	62%	56%		30%	50%		65%	50%
Assessment approach	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Threshold-based	30%	30%					24%	33%
b) Trend-based	5%							
c) Expert opinion								17%
d) Qualitative (not specified)	25%						12%	
e) Other								
f) not specified	40%	70%					65%	50%
Assessment approach	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Threshold-based	19%		29%	33%	67%		29%	33%
b) Trend-based								
c) Expert opinion	38%		43%				29%	33%
d) Qualitative (not specified)								17%
e) Other	19%		29%	33%			14%	
f) not specified	24%			33%	33%	100%	29%	17%

Table 25. ***Type of threshold used (by region)****: relative frequency (%) of types of threshold used to assess status under HD-MSFD in the different regions (across all criteria and species within an ecological group). The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment (see Table 24), or where no information about thresholds was found in the HD/MSFD report.*

Threshold type	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Quantitative, Indicator threshold value	19%	18%	38%	33%			21%	23%
b) Quantitative, Proportion threshold value		11%						
c) Quantitative, Change threshold	4%	13%		25%				
d) Qualitative threshold	8%	8%	13%	17%				15%
e) Other								
f) not specified / not relevant	69%	50%	50%	25%	100%		79%	62%
Threshold type	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Quantitative, Indicator threshold value	40%	10%					27%	29%
b) Quantitative, Proportion threshold value		20%						14%
c) Quantitative, Change threshold								
d) Qualitative threshold								14%
e) Other								
f) not specified / not relevant	60%	70%					73%	43%
Threshold type	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Quantitative, Indicator threshold value	25%		25%	33%	50%	50%	35%	33%
b) Quantitative, Proportion threshold value			8%					17%
c) Quantitative, Change threshold								
d) Qualitative threshold	25%		17%					
e) Other				33%				
f) not specified / not relevant	50%		50%	33%	50%	50%	65%	50%

Table 26. ***Threshold value (by region)****: relative frequency (%) of the way threshold values are specified for the assessment reported under HD-MSFD in the different regions (across all criteria and species within an ecological group). The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds values were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Threshold value as…	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Favourable Reference Value	20%		38%	14%			20%	14%
b) Other reference/desired value				14%				
c) Acceptable deviation from ref.cond./baseline (e.g. %, EQR)	4%	22%						7%
d) Other								
e) not specified / not relevant	76%	78%	63%	71%	100%		80%	79%
Threshold value as…	**Reptiles**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Favourable Reference Value	40%						25%	29%
b) Other reference/desired value								
c) Acceptable deviation from ref.cond./baseline (e.g. %, EQR)								
d) Other							6%	
e) not specified / not relevant	60%	100%					69%	71%
Threshold value as…	**Habitats**							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Favourable Reference Value	38%		40%	33%	50%		43%	
b) Other reference/desired value								
c) Acceptable deviation from ref.cond./baseline (e.g. %, EQR)							5%	33%
d) Other				33%		50%		
e) not specified / not relevant	63%		60%	33%	50%	50%	52%	67%

Table 27. ***Threshold source/standard (by region)****: relative frequency (%) of the types of source/standard used to define thresholds for the assessment reported under HD-MSFD in the different regions (across all criteria and species within an ecological group). The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Threshold source/standard	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Derived from EU-level guidance/legislation								
b) Regional/subregional level (e.g. RSCs, regional cooperation)	5%	9%	17%	29%				
c) National level (national policy process)	10%	32%	33%	43%				15%
d) Other							6%	
e) not specified / not relevant	86%	59%	50%	29%	100%		94%	85%
Threshold source/standard	**Reptiles**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) Derived from EU-level guidance/legislation								
b) Regional/subregional level (e.g. RSCs, regional cooperation)								
c) National level (national policy process)								
d) Other		25%					8%	
e) not specified / not relevant	100%	75%					92%	100%
Threshold source/standard	**Habitats**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) Derived from EU-level guidance/legislation	15%		36%	25%			7%	33%
b) Regional/subregional level (e.g. RSCs, regional cooperation)						50%		
c) National level (national policy process)	8%		27%					
d) Other				25%			20%	
e) not specified / not relevant	77%		36%	50%	100%	50%	73%	67%

Table 28. ***Threshold evidence base (by region)****: relative frequency (%) of the types of evidence base used to set threshold/reference values for the assessments reported under HD-MSFD in the different regions (across all criteria and species within an ecological group). The category 'not specified / not relevant' includes cases where status was 'not assessed', thresholds were not used for the assessment, or where no information about thresholds was found in the HD/MSFD report.*

Evidence base to set threshold/reference value	Mammals							
	Atlantic		Baltic		Black Sea		Mediterranean	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Monitoring data		18%		17%	100%		6%	8%
b) Expert opinion			29%					
c) Literature and/or Expert opinion + monitoring data								
d) not specified / not relevant	100%	82%	71%	83%			94%	92%
Evidence base to set threshold/reference value	**Reptiles**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) Monitoring data		10%					6%	14%
b) Expert opinion	40%						13%	
c) Literature and/or Expert opinion + monitoring data		20%					6%	14%
d) not specified / not relevant	60%	70%					75%	71%
Evidence base to set threshold/reference value	**Habitats**							
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) Monitoring data			33%				5%	
b) Expert opinion	8%		33%	25%			11%	
c) Literature and/or Expert opinion + monitoring data							16%	
d) not specified / not relevant	92%		33%	75%	100%	100%	68%	100%

A14.4How status is integrated at species/habitat level

Table 29. ***Methodological standard for integration****: relative frequency (%) of the types of methodological standard used for integrating parameter/criterion assessments at species/habitat level under HD-MSFD. The category 'not specified / not relevant' includes cases where the species/ habitat status was 'not assessed', integration was not needed (only one criterion assessed for the species/habitat), or where no information about integration was found in the MSFD report.*

Methodological standard for integration	Mammals		Reptiles		Habitats	
	BD	MSFD	BD	MSFD	BD	MSFD
a) EU-level approach	100%	23%	100%	14%	100%	
b) Based on regional agreement		13%				17%
c) National approach		7%				17%
d) Regional approach adapted nationally		3%				
f) not specified / not relevant		53%		86%		67%

Table 30. ***Integration rule****: relative frequency (%) of the types of integration rules as applied to obtain status assessments at species/habitat level under HD-MSFD. The category 'not specified / not relevant' includes cases where the species/ habitat status was 'not assessed', integration was not needed (only one criterion assessed for the species/habitat), or where no information about integration was found in the MSFD report.*

Integration rule	Mammals		Reptiles		Habitats	
	BD	MSFD	BD	MSFD	BD	MSFD
a) Conditional rule (based on OOAO)	100%	67%	95%	57%	100%	
b) Hierarchical, weighted averaging						17%
c) not specified / not relevant		33%	5%	43%		83%

A14.5How species/habitats are monitored

A14.5.1 Frequency by region and overall

Table 31. ***Data collection method (by region and overall)****: relative frequency (%) of methods used to collect data and support assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Method for data collection	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD
a) Remote/observation methods	83%	75%	100%	88%			50%	78%	77%	78%
b) Removal methods										
c) Mark-recapture				13%				11%		7%
d) Repetitive surveys for occupancy estimation					100%				5%	
e) Other										
f) not specified	17%	25%					50%	11%	18%	15%
Method for data collection	**Mammals**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Remote/observation methods	68%	69%	86%	100%	100%		80%	63%	74%	79%
b) Removal methods			14%						3%	
c) Mark-recapture										
d) Repetitive surveys for occupancy estimation	5%	8%							3%	4%
e) Other										
f) not specified	26%	23%					20%	38%	21%	17%
Method for data collection	**Reptiles**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Remote/observation methods	100%	75%					86%	100%	92%	86%
b) Removal methods										
c) Mark-recapture										
d) Repetitive surveys for occupancy estimation										
e) Other										
f) not specified		25%					14%		8%	14%
Method for data collection	**Habitats**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Remote/observation methods	17%	100%	75%	33%	50%		9%	33%	40%	36%
b) Removal methods	25%		13%	56%			9%		16%	36%
c) Mark-recapture										
d) Repetitive surveys for occupancy estimation										
e) Other	50%		13%	11%	50%		55%		32%	7%
f) not specified	8%					100%	27%	67%	12%	21%

Table 32. ***Method standard for data collection (by region and overall)****: relative frequency (%) of method standards used for data collection to support assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Method standard for data collection	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD
a) National standard	23%	36%	67%	57%			14%	38%	30%	37%
b) International standard - regional	23%	14%		14%			14%		13%	11%
c) International standard - wider	23%	21%	33%	29%				13%	22%	22%
d) not specified	31%	29%			100%		71%	50%	35%	30%
Method standard for data collection	**Mammals**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) National standard	28%	33%	20%	14%	100%		20%	13%	23%	22%
b) International standard - regional	17%	33%	80%	71%				13%	23%	43%
c) International standard - wider							10%	13%	3%	4%
d) not specified	56%	33%		14%			70%	63%	52%	30%
Method standard for data collection	**Reptiles**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) National standard	50%	33%					38%	20%	38%	17%
b) International standard - regional								20%		17%
c) International standard - wider							13%	20%	8%	17%
d) not specified	50%	67%					50%	40%	54%	50%
Method standard for data collection	**Habitats**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) National standard	36%	100%	71%	57%	100%	100%	10%		45%	50%
b) International standard - regional	9%		14%	29%					9%	17%
c) International standard - wider			14%	14%			10%	33%	9%	17%
d) not specified	55%						80%	67%	36%	17%

Table 33. ***Spatial scale of monitoring programme (by region and overall)****: relative frequency (%) of spatial scales of monitoring programmes supporting assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Spatial scale of monitoring programme	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD
a) Subnational	36%	25%	50%	43%			29%		43%	24%
b) National	45%	50%	33%	43%	100%		43%	75%	43%	52%
c) Subdivision			17%	14%					5%	4%
d) Region/Subregion										
e) not specified	18%	25%					29%	25%	10%	20%
Spatial scale of monitoring programme	**Mammals**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Subnational		8%						25%		8%
b) National	42%	62%	80%	71%	100%		50%	63%	47%	67%
c) Subdivision	5%	8%					10%		6%	4%
d) Region/Subregion	42%	8%	20%	29%			30%		38%	13%
e) not specified	11%	15%					10%	13%	9%	8%
Spatial scale of monitoring programme	**Reptiles**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Subnational										
b) National	50%	33%					71%	80%	58%	67%
c) Subdivision							14%		8%	
d) Region/Subregion		67%						20%		33%
e) not specified	50%						14%		33%	
Spatial scale of monitoring programme	**Habitats**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Subnational										
b) National	70%	100%	100%	57%		100%	67%	100%	80%	73%
c) Subdivision										
d) Region/Subregion	20%			43%			22%		10%	27%
e) not specified	10%				100%		11%		10%	

Table 34. ***Spatial scale of data collection (by region and overall)****: relative frequency (%) of spatial scales of data collection supporting assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Spatial scale of data collection	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD
a) Whole habitat/species population in the MRU	23%	29%					14%	38%	13%	22%
b) Selected sites	54%	50%	100%	100%			14%	50%	57%	63%
c) Selected sub-habitats/life stages	8%								4%	
d) not specified	15%	21%			100%		71%	13%	26%	15%
Spatial scale of data collection	**Mammals**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Whole habitat/species population in the MRU	26%	38%	80%	86%			36%	33%	34%	54%
b) Selected sites	47%	15%	20%	14%	100%		36%	11%	44%	13%
c) Selected sub-habitats/life stages										
d) not specified	26%	46%					27%	56%	22%	33%
Spatial scale of data collection	**Reptiles**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Whole habitat/species population in the MRU	22%	75%					50%	67%	31%	71%
b) Selected sites	22%	25%					25%	17%	23%	14%
c) Selected sub-habitats/life stages	44%						13%		31%	
d) not specified	11%						13%	17%	15%	14%
Spatial scale of data collection	**Habitats**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Whole habitat/species population in the MRU			57%	29%					19%	18%
b) Selected sites	73%		29%	57%		100%	70%	50%	52%	55%
c) Selected sub-habitats/life stages	9%	100%	14%	14%					10%	18%
d) not specified	18%				100%		30%	50%	19%	9%

Table 35. ***Temporal scale of monitoring programme (by region and overall)****: relative frequency (%) of temporal scales of monitoring programmes supporting assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Temporal scale of monitoring programme	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD	BD	MSFD
a) Within a reporting cycle	8%		33%	43%	100%			38%	18%	24%
b) Across multiple reporting cycles	75%	75%	67%	57%			63%	38%	68%	56%
c) not specified	17%	25%					38%	25%	14%	20%
Temporal scale of monitoring programme	**Mammals**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Within a reporting cycle	33%	50%	40%	71%			40%	75%	29%	61%
b) Across multiple reporting cycles	56%	33%	60%	29%	100%		50%		61%	26%
c) not specified	11%	17%					10%	25%	10%	13%
Temporal scale of monitoring programme	**Reptiles**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Within a reporting cycle	50%	33%					57%	80%	50%	67%
b) Across multiple reporting cycles	50%						43%		50%	
c) not specified		67%						20%		33%
Temporal scale of monitoring programme	**Habitats**									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) Within a reporting cycle	17%	100%	100%	86%			18%	50%	45%	73%
b) Across multiple reporting cycles	42%			14%	100%		36%		32%	9%
c) not specified	42%					100%	45%	50%	23%	18%

Table 36. ***Temporal scale of data collection (by region and overall)****: relative frequency (%) of temporal scales of data collection supporting assessments of species and habitats under BHD and MSFD, in the different regions and overall (across all species/habitats within an ecological group). The category 'not specified' includes cases where the information was not found.*

Temporal scale of data collection	Birds									
	Atlantic		Baltic		Black Sea		Mediterranean		Overall	
	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD	HD	MSFD
a) One-off monitoring within reporting cycle	7%	8%						22%	4%	7%
b) Repeated monitoring within reporting cycle	21%	23%		14%			22%	22%	13%	19%
c) Monitoring continued (across reporting cycles)	36%	31%	33%	29%			11%	11%	29%	26%
d) Seasonal monitoring	21%	15%	67%	57%			11%		29%	22%
e) Other										
f) not specified	14%	23%			100%		56%	44%	25%	26%
Temporal scale of data collection	**Mammals**									
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**		**Overall**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) One-off monitoring within reporting cycle	14%	13%					18%	22%	9%	12%
b) Repeated monitoring within reporting cycle	14%	27%	40%	71%			27%	22%	21%	38%
c) Monitoring continued (across reporting cycles)	52%	27%	60%	29%	100%		27%		53%	23%
d) Seasonal monitoring	5%	7%						11%	3%	8%
e) Other										
f) not specified	14%	27%					27%	44%	15%	19%
Temporal scale of data collection	**Reptiles**									
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**		**Overall**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) One-off monitoring within reporting cycle	22%	25%					22%	33%	14%	29%
b) Repeated monitoring within reporting cycle	11%	25%					33%	33%	21%	29%
c) Monitoring continued (across reporting cycles)	22%						11%		21%	
d) Seasonal monitoring								17%		14%
e) Other	33%						11%		21%	
f) not specified	11%	50%					22%	17%	21%	29%
Temporal scale of data collection	**Habitats**									
	Atlantic		**Baltic**		**Black Sea**		**Mediterranean**		**Overall**	
	HD	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**	**HD**	**MSFD**
a) One-off monitoring within reporting cycle	18%	100%	43%	29%			18%	33%	27%	33%
b) Repeated monitoring within reporting cycle	18%		57%	43%			18%	33%	32%	33%
c) Monitoring continued (across reporting cycles)				14%	100%				5%	8%
d) Seasonal monitoring	18%			14%			9%		9%	8%
e) Other										
f) not specified	45%					100%	55%	33%	27%	17%

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