



Cetacean conservation in the Mediterranean and Black Seas: Fostering transboundary collaboration through the European Marine Strategy Framework Directive

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ABSTRACT

The European Marine Strategy Framework Directive (MSFD) aims at implementing a precautionary and holistic ecosystem-based approach for managing European marine waters. Marine mammals are included as a functional group for the assessment and reporting under Descriptor 1-Biodiversity. Conservation of mobile marine megafauna such as cetaceans requires transboundary cooperation, which the MSFD promotes through regional instruments, such as the Regional Sea Conventions and other regional cooperation structures such as ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area). A questionnaire survey and an exploratory analysis of MSFD implementation in the Mediterranean and Black Seas were conducted. The analysis revealed (i) the saliency of cetacean conservation, and (ii) heterogeneity among countries in the implementation of the MSFD that may hinder transboundary collaboration. ACCOBAMS can stimulate collaboration among scientists involved in cetacean monitoring and can foster transboundary initiatives that would align with MSFD objectives.

1. Introduction

Introduced in 2008, the European Marine Strategy Framework Directive (MSFD, 2008/56/EC [1]) represents the first attempt at European Union (EU) level to implement a precautionary and holistic ecosystem-based approach for the management of marine waters. With the potential to become the keystone instrument for marine conservation in Europe [2], the MSFD was built around the explicit objective of achieving and maintaining Good Environmental Status (GES) by 2020 [1]. MSFD defines GES as “the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive” [1]. Although this broad definition is open to interpretation, it aligns well with threats facing marine ecosystems (see [3,4]).

The implementation of MSFD follows a very tight timetable that, by

the end of 2015, required Member States: (i) to carry out an Initial Assessment (IA) of their marine waters; (ii) to provide an operational definition of GES; (iii) to establish Monitoring Programmes in order to assess progress towards GES; and (iv) to propose a Programme of Measures that would correct deviations from GES [1]. The spatial unit envisioned by the MSFD is ecologically coherent [5]: its scale is above that of any individual EU Member State waters and takes into consideration ecosystem boundaries. Four European Marine Regions are defined: the Baltic Sea, the North East Atlantic Ocean, the Mediterranean Sea and the Black Sea [1]. However, there is “institutional ambiguity” [6] arising either from uncertainty about the mechanisms by which supra-national conflicts will be handled and adjudicated [6]; and from the lack of clarity in the division of responsibilities between the European Commission, EU Member States, and regional (e.g. Regional Sea Conventions, RSC) and international

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agreements (e.g. the Bonn Convention on Migratory Species). This ambiguity is problematic, especially for highly mobile species such as cetaceans that illustrate some of the problems arising in the implementation of the MSFD.

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS; Fig. 1), is a daughter instrument to the Bonn Convention, focussing on cetaceans in the Mediterranean and Black Seas. The high mobility and transboundary movements of cetaceans (e.g. [7,8]) requires cooperation across national boundaries (e.g. Economic Exclusive Zones) to conduct coherent monitoring and conservation strategies [5,9,10]. Transboundary cetacean conservation is particularly challenging in the ACCOBAMS area, which includes 23 Parties (11 EU Member States and 12 non-Member States) and 5 non-Parties (1 EU Member States and 4 non-Member States) around two main Marine Regions under geopolitical stress: the Mediterranean Sea and the Black Sea [11], as well as a small portion of the Atlantic Ocean [12].

During the Fifth Meeting of the Parties to ACCOBAMS (Tangier, November 2013), Parties stressed their desire to see the work of ACCOBAMS become increasingly integrated within the MSFD. The objective of this work is to provide an overview of the MSFD implementation in the ACCOBAMS area in relation to cetaceans. To this end, a questionnaire was designed to collate information on the MSFD implementation in countries that are both EU Member States and Parties to ACCOBAMS. In particular, the questionnaire aimed at assessing the perceived importance of cetacean conservation to EU ACCOBAMS Parties, and their willingness to frame their national MSFD implementation with respect to cetaceans. Beyond the descriptive and exploratory analysis of the questionnaire responses, this exercise allowed the compilation of a set of recommendations for ACCOBAMS to live up to its coordinating role.

2. Materials and methods

The questionnaire (available as [Supplementary material](#)) was prepared by *Observatoire PELAGIS* (University of La Rochelle/CNRS) with the support of the ACCOBAMS Secretariat. It consisted of 29 questions about cetaceans and the implementation of MSFD with a mix of open and closed questions. Open questions aimed at identifying relevant actors involved in the national implementation of the MSFD. Closed questions dealt with understanding of how cetacean conservation was included in national legislation by Parties. EU ACCOBAMS Parties are required to comply with MSFD, but not all ACCOBAMS Parties are EU Member States - therefore, some questions were not relevant for non-EU ACCOBAMS Parties, but were asked nonetheless for completeness.

The questionnaire was sent electronically on September 26th, 2014 via the Secretariat to ACCOBAMS Focal Points. The deadline to return the questionnaire was set to September 30th, 2015. Reminders were sent in March, June and September 2015. Answers received were coded, tallied and analysed with statistical software R [13], to produce graphical summaries and descriptive statistics. All figures were generated with R package *ggplot2* [14].

The designations employed and the presentation of the information (e.g. on maps) do not imply the expression of any opinion whatsoever on the part of the authors concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

3. Results

3.1. Response rates

By September 30th, 2015, 11 Parties had returned the questionnaire (Table 1). This corresponds roughly to an average response rate of 50% among all Parties (11 answers out of 23 Parties).

Among responding ACCOBAMS Parties, eight are also EU Member

States. Return rates were 3/4 and 1/4 for EU and non-EU ACCOBAMS Parties, respectively. Among EU ACCOBAMS Parties, the two parties with the largest claimed Exclusive Economic Zone in the Mediterranean (Italy and Greece) [15] did not respond. All EU ACCOBAMS Parties with more than 3% of their claimed Mediterranean Exclusive Economic Zone designated as Marine Protected Areas¹ [16] responded.

All responding EU ACCOBAMS Parties reported their respective national implementation of the MSFD to include a specific reference to cetaceans (Fig. 2). However, only six EU ACCOBAMS Parties reported a definition of GES specific to cetaceans, a number that matched the number of EU ACCOBAMS Parties whose monitoring programmes made specific reference to cetaceans. These later EU ACCOBAMS Parties were not the same as the former: France, for example, reported that its GES definition was not specific to cetaceans, yet its monitoring programme had a cetacean-specific component. Conversely, Malta reported a GES definition specific to cetaceans but no associated monitoring programme. Only four EU ACCOBAMS Parties reported specific measures for cetaceans. All responding non-EU ACCOBAMS Parties reported to have developed a monitoring programme for cetaceans, but none reported a cetacean-specific GES definition. Among responding non-EU ACCOBAMS Parties, Ukraine reported that a programme of measures for cetaceans was currently under development. With respect to transboundary issues, only half of the Member States reported to have collaborated with other Parties at the sub-regional scale when implementing the MSFD.

3.2. Descriptors of cetacean GES

Within the MSFD, four functional groups of marine mammals (seals, baleen whales, small toothed-cetaceans and deep-diving cetaceans) are included [17] for the assessment and reporting under biodiversity descriptor (D1), but could also be referred to in four other descriptors: food web (D4), contaminants (D8), marine litter (D10) and underwater noise (D11). There was substantial variation among responding EU ACCOBAMS Parties in the number of GES descriptors dealing with cetaceans (Fig. 3). Underwater noise was perceived as a threat to cetacean GES by five EU ACCOBAMS Parties, which is about half of the respondents. Three EU ACCOBAMS Parties identified both litter and contaminants as a pressure on cetaceans. Croatia and France were the only two EU ACCOBAMS Parties to include cetaceans in all five potentially relevant state- and pressure-based descriptors (D1, D4, D8, D10 and D11).

3.3. Governance

The main mode of governance adopted by EU ACCOBAMS Parties was an inclusive consultation of non-governmental actors during the write-up of the MSFD reporting documents. Among EU ACCOBAMS Parties, inclusive working groups with many stakeholders were preferentially mobilized at the beginning of the MSFD cycle (IA, GES definition), and were less involved in the elaboration of the programmes of monitoring and measures.

3.4. Monitoring and measure programmes for cetaceans

For the monitoring programmes, EU and non-EU respondents reported on the inclusion of both existing schemes and the creation of new ones (Fig. 4). Only Cyprus reported the implementation of a completely *de novo* monitoring programme for cetaceans, while Malta and Slovenia did not plan to develop any new actions. An overall similar pattern was apparent from non-EU Parties answers. In contrast, the content of the programme of measures was unclear for most responding EU ACCOBAMS Parties. Among available responses, most

¹ Figures for 2013.

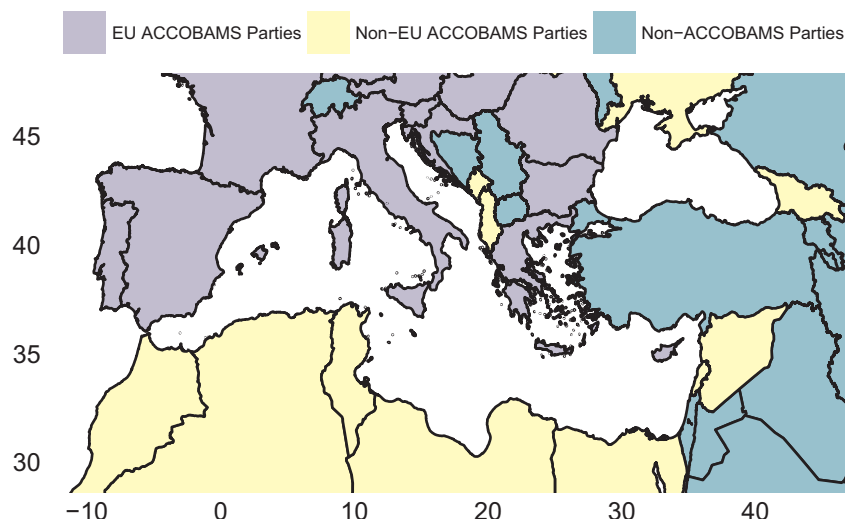


Fig. 1. Map of the ACCOBAMS agreement area. ACCOBAMS Parties being EU Member States (EU Member States) are in blue and ACCOBAMS Parties Non-EU Member States in yellow. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.).

Table 1
Returned questionnaires by September 30th, 2015.

ACCOBAMS Parties	EU MS	Returned
Bulgaria	EU	no
Croatia	EU	yes
Cyprus	EU	yes
France	EU	yes
Greece	EU	no
Italy	EU	no
Malta	EU	yes
Portugal	EU	yes
Romania	EU	yes
Slovenia	EU	yes
Spain	EU	yes
Albania	Non-EU	yes
Algeria	Non-EU	no
Egypt	Non-EU	no
Georgia	Non-EU	no
Lebanon	Non-EU	yes
Libya	Non-EU	no
Monaco	Non-EU	no
Montenegro	Non-EU	no
Morocco	Non-EU	no
Syria	Non-EU	no
Tunisia	Non-EU	no
Ukraine	Non-EU	yes

EU ACCOBAMS Parties reported that few new measures would be included. By September 2015, only Croatia reported its intention to add new measures to existing ones.

4. Discussion

Among the 23 Parties of the ACCOBAMS agreement, 11 returned the questionnaire with information on the current state of the MSFD implementation process. Response probability was correlated with the proportion of claimed Exclusive Economic Zone designated as Marine Protected Areas, suggesting that marine conservation is an important issue for EU ACCOBAMS Parties that returned the questionnaire. An exploratory analysis revealed several prominent features of the MSFD implementation within ACCOBAMS Parties, whether they are EU Member States or not. The most prominent feature is substantial heterogeneity among Parties with respect to cetaceans. This heterogeneity was manifest in the *modus operandi* underlying the national transposition of the MSFD, the reported ambition of the programmes of monitoring and of measures, and the perceived importance of cetaceans

as a component of GES as reflected in their inclusion in other descriptors beyond the biodiversity descriptor (D1).

Part of this heterogeneity may stem from the ambiguous framing of some of the questionnaire questions, which might have been interpreted differently by different respondents. Some questions dealt with cetaceans only within the MSFD, whereas others considered the MSFD in general, but the two types of questions were not clearly distinguished in the questionnaire. This might have had the unfortunate effect of eliciting different understanding of the questions among respondents. However, substantial underlying heterogeneity in MSFD implementation is genuinely present. An in-depth analysis of the first phase of implementation of the MSFD by the European Commission identified a lack of coherence between EU Member States, and a lack of consistency within EU Member States “turning a comprehensive, holistic process in a series of unrelated reporting exercises” [18]. This conclusion echoes reservations that were voiced early on the inherent ambiguities built in the MSFD [6,10]. On a more optimistic note, the adaptive nature of the MSFD, which requires a revised assessment every 6 years, should provide the opportunity to remove these ambiguities in future revisions.

With respect to governance, EU ACCOBAMS parties mobilized, via workshops or direct consultation, many non-governmental stakeholders (Non-Governmental Organizations, academics, industries, ...) for the IA and GES definition, but fewer of those participated in the elaboration of the programmes of monitoring and measures. This pattern may reflect the willingness of national governments to favour a broad and transparent consultation of stakeholders at the onset of the MSFD implementation, which progressively ebbed due to timing constraints or expert fatigue with the numerous meetings required by the process. Another non-exclusive interpretation is that the programme of measures is intended to have legal teeth [2] and may limit economic activities in order to maintain or restore GES, making national managers reluctant to take action. The programme of measures is expected to be more politically sensitive than the programme of monitoring, and to require numerous negotiations and trade-offs with economic actors [10,11]. The tight timing constraints for MSFD implementation by Member States may have limited negotiation opportunities, resulting in minimalistic versions of most programmes of measures for the time being (Fig. 4).

The overall picture among Parties' answers to our cetacean-specific questionnaire is consistent with the Commission's conclusions on the EU-wide MSFD implementation. A striking example of among-Member States heterogeneity is the erosion of the perceived important role of marine mammals as marine biodiversity descriptor from the Initial

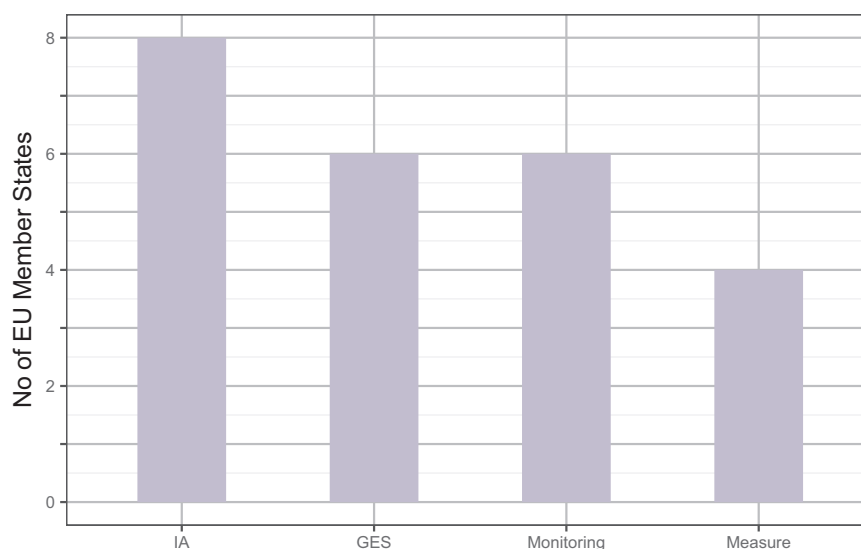


Fig. 2. Overview of EU ACCOBAMS Parties reporting documents with a cetacean-specific chapter/table/report produced during the national implementation of the MSFD. IA: Initial Assessment; GES: Good Environmental Status; Monitoring: Programmes of monitoring; and Measure: Programme of measures.

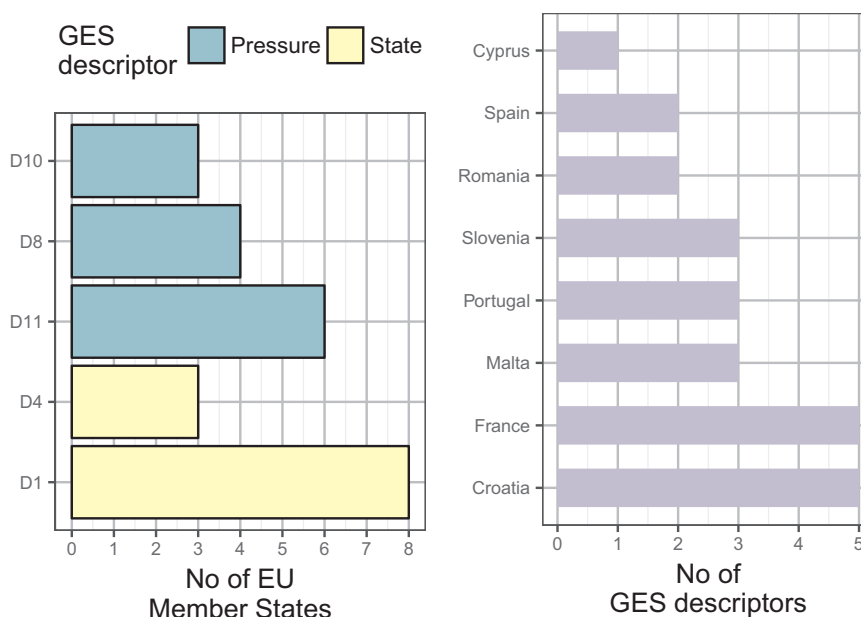


Fig. 3. GES Descriptors in which cetaceans are included. Left panel: number of EU ACCOBAMS Parties that referred to cetaceans in each GES descriptor. Right panel: number of GES descriptors for each EU ACCOBAMS Parties).

Assessment to the programme of measures (Fig. 2). This heterogeneity highlights the risks of undermining the effort of the most pro-active Parties if these efforts are not implemented at the regional level [10,19].

Finally, only half of the Member States reported to have collaborated with other Parties at the sub-regional scale. This gap contradicts the spirit of the MSFD, which seeks to transcend national boundaries to better reflect ecological processes acting on different scales. On the other hand, the ambition of non-EU Parties to implement the MSFD process is to be praised. However, for these efforts to bear fruit, they should capitalize on greater regional cooperation [20,21].

4.1. Current shortcomings and challenges

Evaluating GES in European waters faces many obstacles, including technical ones such as defining aggregation rules, or the spatial and temporal scales of assessment [22]. One pressing practical challenge is establishing coherent monitoring strategies for highly mobile species

that would contribute to a robust science-based evaluation of GES [9,10]. One of the overarching issues is a lack of scientific coherence in the implementation of the monitoring strategy, which undermines the ability of countries to assess the status of cetacean populations in the Mediterranean and Black Seas. A strategy defined at too fine a geographical scale (e.g. Exclusive Economic Zone) is inappropriate to monitor and assess the status of highly mobile species such as cetaceans [5,6]. For example, in the Eastern North Atlantic and the North Sea, the SCANS surveys covered coastal and offshore waters from Norway down to Portugal [23]. This collaborative endeavour used a standardized methodology, resulting high data quality, robust results and useful inferences. The third survey conducted during the summer 2016 will inform, among others, the MSFD descriptors for marine mammal abundance [24]. The SCANS surveys further illustrate the importance of coherent spatial scales for mobile species. For MSFD, at the very least, this should relate to MSFD marine sub-regions or regions. For example, large-scale aerial surveys for cetacean abundance estimation conducted in the Adriatic Sea, which is a sub-region of the Mediterra-

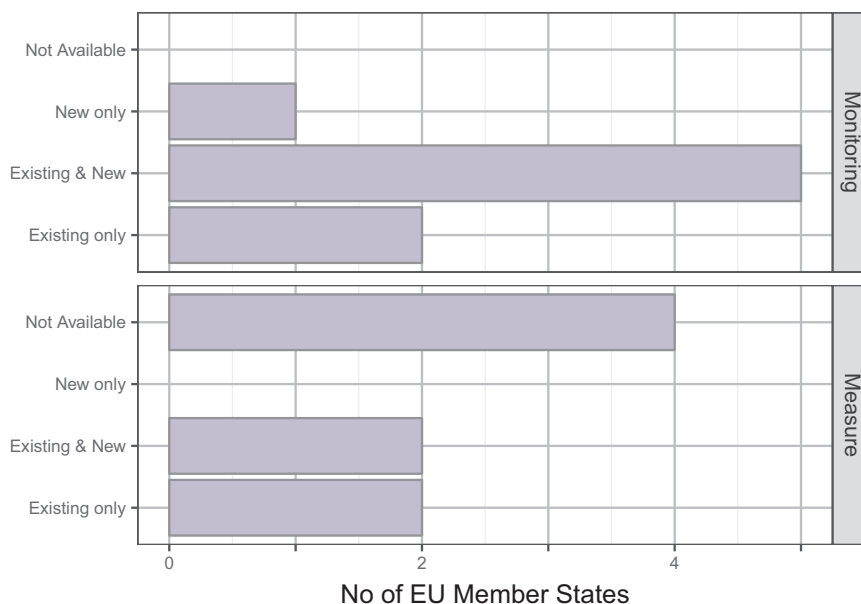


Fig. 4. Profiles of the monitoring programmes and the programmes of measures reported by responding EU ACCOBAMS Parties.

nean Marine Region, provide an example of recent transboundary collaboration [25].

Although it is the responsibility of individual EU Member States to develop and implement the MSFD in the waters under their jurisdiction, the success of monitoring strategies and conservation measures at such large scales cannot exist without policy coordination or cooperation between EU Member States. For example, bycatch is a serious threat to marine biodiversity [3] and currently the greatest threat to marine mammals worldwide [26,27]. An attempt by the United Kingdom to ban seabass pair trawling to mitigate dolphin bycatch in the Channel was thwarted by neighbouring EU Member States. A national ban was enforced in 2004 but its legal scope was restricted to United Kingdom fishermen [19], because EU Member States do not have exclusive fishing rights within their Exclusive Economic Zone. Although an EU Member State was attempting to establish a measure needed to achieve GES of transboundary cetacean populations, its efforts were undermined by other EU Member States sharing the same ecosystem and whose fishing fleets affected the same cetacean populations. Without explicit coordination mechanisms, EU Member States may have more incentives to favour their own interest than to respect the holistic spirit of an ecosystem-based approach to marine conservation [28,29]. The importance of aligning all stakeholder interests for transboundary conservation to work is critical [5]. The United Kingdom ban, which predates the MSFD, stresses both the potential coordinating role that international agreements are expected to play, and the current loopholes that must be addressed [6,10,19,21,28]. This example relates to a Marine Region where institutional ambiguity is deemed moderate and all countries are EU Member States [6]. Greater challenges are expected in other Marine Regions with more complicated geo-political situations such as the Mediterranean or Black Seas [11].

Beyond European directives, the effective conservation of cetacean populations in the Mediterranean and Black Seas depends also on the coordination and, preferably, the cooperation of EU Member States and non-EU states via existing regional conservation instruments such as ACCOBAMS. This would increase coherence and decrease heterogeneity, while providing an incentive to both non-EU ACCOBAMS Parties and ACCOBAMS Range states to align with EU Member States. For example, such convergence was apparent from the answers by Ukraine, which indicated its willingness to implement a MSFD-like process for marine conservation between 2015 and 2019. However, the “institutional ambiguity” intrinsic to the current implementation of the MSFD [6] threatens to undermine these efforts unless regional conservation

instruments harness the current challenges and live up to their expected coordination role [21].

4.2. Recommendations

In relation to cetaceans and other highly mobile marine species, the MSFD currently appears to be implemented backwards: the monitoring strategies of cetacean population should have been defined firstly at MSFD marine (sub)region scales, and then set out in each national programme, rather than attempting to shoehorn multiple national initiatives into a single assessment. Transboundary conservation is most cost-efficient when there is true coordination between countries [30].

Future evaluations of cetacean populations and the related implementation of MSFD need a more coherent approach. The latter should be carried out at transnational scales, which would have the further benefit of fulfilling national reporting duties to the European Commission. For instance, a large synoptic survey of the entire Mediterranean Sea, such as the proposed “ACCOBAMS Survey Initiative” [31] is highly recommended to provide the needed information on abundance and distribution of cetacean populations at a spatially coherent scale. Such data acquisition scheme is scientifically more robust than trying to aggregate multiple independent evaluations from different countries or areas, which are sometimes conducted at different temporal scales (see also [22]). A robust dataset collected under a well-planned study design can provide better assessments with smaller uncertainties than a roundup of numerous but disparate data collected under very different schemes [32]. The MSFD does not require inter-calibration or sampling harmonization exercises between EU Member States to ensure data comparability [21], but rely on good practices and common understanding that make use of “best available science” [17]. Transboundary initiatives on data acquisition should more explicitly consider the development of integrated/joint monitoring actions for marine mammals (e.g. stranding networks, coordinated abundance and distribution surveys, studies of habitat use, pollution and epidemics, etc).

ACCOBAMS can stimulate collaboration among marine mammal scientists involved in MSFD monitoring programmes for cetaceans to foster such transboundary initiatives and avoid wasteful duplication of monitoring efforts [33]. Marine mammal experts should promote to their respective governments the monitoring of cetaceans at regional, rather than national scales. To this end, monitoring programmes of EU

Member States within MSFD marine regions should be primarily driven by scientific objectives rather than funding opportunities, although it is often the other way around. Adequate long term funding is an important predictor of conservation success and species recovery [34].

5. Conclusion

The MSFD is an ambitious, adaptive conservation instrument for marine conservation [2], whose potential for transboundary collaboration has yet to be fully grasped. Regional agreements can probably be the most efficient tool to materialize and boost transboundary collaboration [35], while accommodating particular regional requirements. For example, Parties to the Barcelona Convention, one of the 4 European RSCs, agreed in early 2016 on an Integrated Monitoring and Assessment Programme as part of an ecosystem approach to the management of human activities in the Mediterranean marine and coastal environment. This initiative will build on relevant existing monitoring and assessment practices, including the MSFD. In this context, ACCOBAMS can be a driving force to fulfil MSFD monitoring expectations and bring together all countries bordering the Mediterranean and Black Seas to improve cetacean conservation.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.marpol.2017.05.012>.

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