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Table of Contents

1. Executive Summary

These Guidelines are part of an effort jointly undertaken by the RAC/SPA and the Secretariat of ACCOBAMS to support the relevant national authorities in the Mediterranean countries and the rest of the ACCOBAMS area in the promotion, establishment and management of protected areas for cetaceans. The impetus for such effort was provided by a recommendation from the Contracting Parties to the Barcelona Convention adopted during their 14th Ordinary Meeting in Portoroz, Slovenia, in 2005.

Whether MPAs are appropriate tools for the conservation of cetaceans has been the subject of considerable debate. Before establishing protected areas for cetaceans, careful consideration should be given to whether such areas are likely to achieve the intended goals. The main argument against using protected areas for cetaceans is that it is difficult to encompass within a single area the year-round distribution of highly mobile species. On the other hand, cetaceans may be good subjects for space-based protection because they are particularly vulnerable to anthropogenic threats, and as such are good focal species for their ecosystem. Ways exist of minimising problematic aspects connected with the use of MPAs to protect cetaceans, while enhancing the positive side of such practice. Perhaps the best answer to the main critique to the use of MPAs to protect cetaceans, i.e. that cetacean populations are too mobile and have too large a total range to be encompassed by a single protected area, would be to establish a network of protected areas, which will protect at least the main portions of their critical habitat.

The guidelines mainly consist of two parts, which correspond to the two phases of the process: (a) selection and creation of MPAs, and (b) management of MPAs. Creating MPAs is a complex process that normally involves, in sequence: (a) the definition of goals of the prospective MPA, based on the existing knowledge of the presence of cetaceans in the area and of the existence of threats to their survival; (b) the rationale for the proposal, where the case is made for the establishment of an MPA as an effective tool to counteract the known threats to cetaceans and thus to ensure the populations' favourable status; (c) the compilation of all the pertinent bibliographic information (published as well as "grey" literature and user knowledge derived from interviews, etc.); (d) the collection of updated scientific information through dedicated research targeting the species of concern, human activities in the area, and the existence, types and distribution of threats; (e) the analysis of data to identify the existence of critical habitats within the considered area, or sites where the target species concentrate for specific activities or purposes; (f) the drafting of a science-based MPA proposal, inclusive of maps to support decisions on conservation priorities based on links among areas important to cetacean populations, ecological processes and human activities, to be presented for consideration by the competent authorities and by all the stakeholders; and (g) the beginning of a consultation phase involving the building of consensus through awareness campaigns, stakeholder participation, socio-economic analysis and, wherever necessary, conflict resolution.

While proposals may be prepared by any individual or organisation, the responsibility for formally establishing MPAs rests with the competent authorities. Proposals may be brought to the attention of the authorities by anybody; however the process may be greatly facilitated by channelling proposals through recognised regional bodies such as the RAC/SPA and ACCOBAMS. Each Mediterranean riparian nation may independently assess needs and opportunities for establishing cetacean MPAs within its remits, in order to grant as quickly as possible legal protection to those sites that have already been identified in areas under its jurisdiction as being particularly important for cetaceans. While that happens, however, an attempt to initiate such a process in an organised, region-wide fashion was recently made, and is presented here.

Management of an MPA for cetaceans does not sensibly differ from managing any other type of MPA. Excellent summaries exist explaining how MPAs are managed, and the basic management principles equally apply to protected areas for cetaceans. The section of this report dedicated to management therefore contains only a summary of the main elements of MPA management practice, with a special reference to their relevance to cetacean conservation. In particular, the need is emphasized for: (a) a management body and management plan; (b) the definition of clear management objectives; (c) periodic management reviews to assess whether objectives are met; (d) management training; and (e) consensus building and maintenance.

With one exception (the Pelagos Sanctuary), all the MPAs existing in the Mediterranean have been exclusively or primarily established to protect coastal waters only or primarily. As a consequence, most existing Mediterranean MPAs contain habitat of coastal cetaceans. Such areas, which are already protected by the existing law, may in the future become useful components of regional networks of MPAs designed to protect particular cetacean species. Managers of existing Mediterranean MPAs should be encouraged to conduct or promote research to determine whether the areas under their remit contain cetacean habitats. In the affirmative case, appropriate cetacean conservation measures should be included in the area's management plan. Furthermore, two-way communication should be established between single MPA management bodies and region-wide conservation organisations such as the RAC/SPA, and ACCOBAMS in particular for cetacean conservation measures, to facilitate the network growth, share experiences, and obtain assistance in matters such as capacity building, problem solving and sharing of resources.

2. Introduction

Within the framework of the development of Special Protected Areas, the Contracting Parties to the Barcelona Convention had recommended, during their 14th Ordinary Meeting in Portoroz, Slovenia (2005), to promote the creation of protected marine and coastal areas specifically for Mediterranean cetaceans. This decision was based on the collaboration with ACCOBAMS, and referred in particular to the implementation of ACCOBAMS Resolution 2.14 (Palma de Majorca 2004) on protected areas and cetacean conservation, mandating the Agreement's Scientific Committee to draft criteria for the selection of such areas.

In this connection, the Secretariat of ACCOBAMS and RAC/SPA jointly decided to offer support to the relevant national authorities in the Mediterranean region and in the ACCOBAMS area in order to:

- Extend, if necessary, the concept of cetaceans protection to the already existing protected areas;
- Identify sites, including the high seas, containing important cetaceans habitats in the Agreement; and
- Implement all measures needed for cetacean protection.

Following the elaboration of the ACCOBAMS programme of work on marine protected areas [1], which consists of i) criteria for the selection of Specially Protected Areas, ii) a special format for proposals for such areas and iii) information on sites that contain important cetacean habitat in the Agreement area, RAC/SPA decided to contribute to this programme by elaborating "Guidelines on needs for the establishment and management of MPAs for cetaceans", to be presented during the next meeting of the SPA Focal Points.

These guidelines are meant to:

- Take into account the criteria of selection of Specially Protected Areas elaborated by ACCOBAMS and discussed by the ACCOBAMS Scientific Committee during its 4th Meeting, Monaco 5-8 November 2006;
- Provide basic information and training material to support MPA managers in the process of establishing and/or managing MPAs containing cetacean habitat;
- Suggest concrete actions to promote the long-term conservation of cetaceans in the existing or future MPAs;
- Provide support to all those concerned with the policy and practice of marine and coastal protected areas for cetaceans, including practitioners, decision-makers at the various levels of government, NGOs, academics, and international agencies.

For best results in achieving the goal of conserving Mediterranean cetacean populations through habitat protection, a few initial recommendations and considerations are offered here.

First, several international and regional organisations exist which are concerned with the task of protecting the region's marine biodiversity – and cetaceans in particular – through the establishment of protected areas[2]. These include, among others, UNEP MAP's RAC/SPA, ACCOBAMS, the Bern Convention and the European Commission. Of these, ACCOBAMS is the sole Agreement which focuses exclusively on cetaceans, and advocates the creation of MPAS for cetacean conservation, including in the high seas (ACCOBAMS Agreement, Annex 2, Art. 3). This considered,

1 The ACCOBAMS programme of work on marine protected areas, as presented during its Fourth Scientific Committee Meeting (Monaco, 5-8 November 2006), appears on Document UNEP(DEPI)/MEDWG.308/Inf.11.

2 According to the Convention on Biological Diversity (CBD), "Marine and coastal protected area' means any defined area within or adjacent to the marine environment, together with its overlaying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings."

inter-institutional coordination and cooperation should be accorded a very high priority to optimise effectiveness and resources, and avoid duplication of effort and overlap.

Second, activities related to cetacean habitat protection may be viewed as the responsibility of both regional organisations and national authorities. While both can (and should) cooperate to launch a coherent and coordinated process for identifying sites of special interest for cetaceans, with the view of granting them protection status that will give them long-term protection, the responsibility for the establishment of protected areas within territorial waters ultimately rests with the coastal States. However, considering that large amounts of Mediterranean high seas may be contemplated for protection (given the pelagic nature of many of the region's cetacean species), and further considering that the ultimate goal of this whole effort should be of setting up a network of MPAs that will best serve the purpose of achieving and maintaining a favourable conservation status for cetaceans in the region, international cooperation is essential to the process. For this reason, although these guidelines are particularly aimed at supporting the work of the national authorities concerned with cetacean conservation (both at the level of government administrations and research institutions), they are also conceived as a support to inter-governmental and non-governmental organisations, and Secretariats of relevant international treaties and conventions.

Third, these guidelines refer principally to the Mediterranean region because this is the area of RAC/SPA competence; however, they can easily be extended to the wider geographic range of ACCOBAMS, which includes the Black Sea and the Contiguous Atlantic Area.

Finally, establishing a network of MPAs dedicated to cetacean conservation in the region will likely help reduce the rate of degradation and loss of cetacean habitats, thus helping countries in the region to reach the CBD's 2010 targets, i.e.: *"achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth"*. In this spirit, in 2006 the Secretariats of RAC/SPA and ACCOBAMS jointly invited the Mediterranean countries to create specially protected areas for cetacean conservation in the framework of the 2010 targets.

2.1. Are MPAs appropriate to protect cetaceans?

Whether MPAs are appropriate tools for the conservation of cetaceans has been the subject of considerable debate. A brief analysis of the controversy may help in reinforcing the concept that before establishing protected areas for cetaceans, careful consideration should be given to whether such areas are likely to achieve the intended goals. It is important to keep in mind that establishing MPAs is a lengthy, laborious and costly process, and that easier and faster means of achieving protection for cetacean populations may be available in some cases.

Elements against designating protected areas for cetaceans include:

- Cetaceans are highly mobile animals. Optimal design of a protected area intended to conserve a given population would need to encompass that population's entire year-round distribution. While it may be possible to accomplish such a design for some resident or non-migratory species, the ranges of most cetacean populations are often be too large for this to be practicable (Reeves 2000).
- Current procedures for MPA establishment advocate an ecosystem-level approach as opposed to a species-level approach (Agardy,1994). Large marine megafauna is often targeted by conservation efforts under the impetus of public affection towards charismatic species rather than on the basis of solid theoretical foundations (Hooker and Gerber 2004).

On the other hand, there are positive elements to consider:

- Cetaceans are particularly vulnerable to anthropogenic threats, and as such are good focal species for their ecosystem (Hooker *et al*. 1999).

- Often, more is known about cetaceans, among the most charismatic marine species, than about most other components of a given pelagic ecosystem (Hooker *et al*. 1999). Thus, designing an MPA to protect a cetacean species or species assemblage could help to effectively protect not only cetaceans, but also other species living under their umbrella. Hooker *et al*. (2002) calculated the energetic requirements of top level predators (i.e., beaked whales) in the Gully (a coastal area with a deep underwater canyon off the northwest Atlantic Canadian shore), and used this to infer the probable structure of the whole ecosystem. Such an ecosystem approach, involving a thorough assessment of the nature and scale of the trophic interactions involved in a marine conservation area, is a desirable trait of rigorous conservation planning (Hooker *et al.* 2002).

Ways exist of minimising problematic aspects connected with the use of MPAs to protect cetaceans, while enhancing the positive side of such practice. For instance, when only a portion of a cetacean population's range can be included within a protected area, there is obvious merit in selecting and designing MPAs in habitats that bear special importance for the species to be protected (Fig. 1), such as key breeding or feeding areas (e.g., grey whales, *Eschrichtius robustus*, in Mexican lagoons or humpback whales, *Megaptera novaeangliae*, in Hawaii) (Reeves 2000).

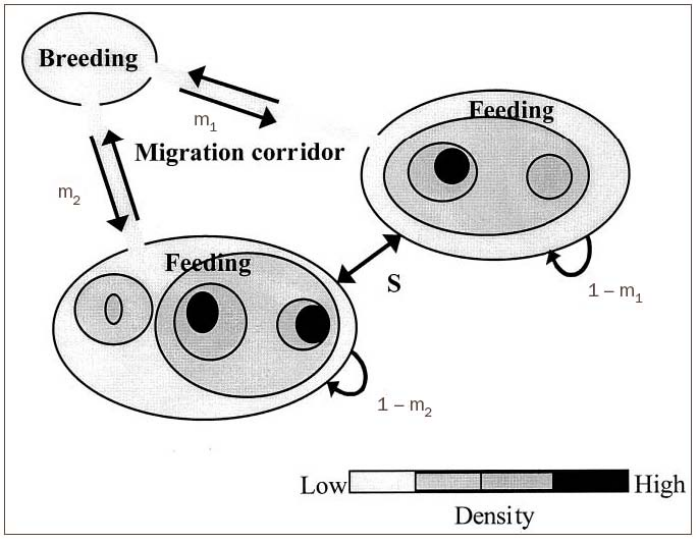


Fig. 1. Life stages of some marine predators are separated into discrete feeding and breeding areas, with migrations between them. Reserves can be placed in feeding, breeding or migratory habitats. Abbreviations: M, migration rate (m_1 and m_2 indicate different rates for migration to each feeding area); S, mixing between feeding areas (from Hooker and Gerber 2004).

Identifying and designating significant cetacean breeding areas may be rather straightforward, whereas the equally crucial need of identifying essential feeding areas can present enormous challenges to protected area design, especially for marine mammals that depend on pelagic food webs (Reeves 2000). Hyrenbach *et al.* (2000) addressed this challenge by identifying three types of open-ocean "hotspots" – i.e. significant feeding areas for top predators such as cetaceans - defined according to their dynamics and predictability in space and time: (a) static systems determined by topographic features, such as reefs, shelf breaks, submarine canyons, seamounts, and the lee shores of islands; (b) persistent hydrographic features, such as currents and frontal systems; and (c) ephemeral habitats shaped by wind- or current-driven upwelling and eddies. Static systems are relatively stable hotspots that can be mapped, and are the easiest to define and manage. Persistent hydrographic features are more challenging because they are not stationary, thus either requiring that a very large area be placed under protection, or that the boundaries be flexible. Ephemeral habitats are the most challenging, and will require a rather futuristic MPA design based on real-time monitoring of ocean conditions using remote-sensing technology (Hyrenbach *et al.* 2000, Reeves 2000).

Finally, perhaps the best answer to the main critique to the use of MPAs to protect cetaceans, i.e. that cetaceans may have too large a range to be encompassed by a single protected area, could be provided by the establishment of a network of protected areas (see next section).

2.2. Networks of MPAs vs. single MPAs

IUCN's World Commission on Protected Areas (WCPA) - Marine defines a network of MPAs as "an organised collection of individual MPAs operating co-operatively and synergistically, at various spatial scales and with a range of protection levels, to fulfil ecological aims more effectively and comprehensively than individual sites could alone" (WCPA/IUCN 2006). More specifically, a network is generally thought of in a geographical and physical sense, as a group that has 'connectivity' between the components, and in some cases a physical connection (Wells 2006).

Several authors (e.g., Kelleher and Kenchington 1992, Kelleher *et al*. 1995, Salm *et al*. 2000, Roberts *et al*. 2003a and b) have listed the various conservation benefits of MPA networks over single MPAs. The following (Wells, 2006) are particularly significant as far as cetaceans are concerned:

- Helping to maintain the natural range of species;
- Ensuring protection of unique, endemic, rare and threatened species spread over a fragmented habitat;
- Ensuring adequate mixing of the gene pool to maintain natural genetic characteristics of the population;
- Ensuring protection of ecological processes essential for ecosystem functioning e.g. breeding and feeding habitats, and large-scale processes such as gene flow, genetic variation and connectivity;
- Ensuring that the ecosystem-based approach to management is followed and that adequate attention is paid to ecological functions and processes.

There are additional benefits if national systems are linked into regional systems (Wells 2006):

- Ensuring the protection of an ecosystem or species that cannot be adequately protected in one country – e.g. species that migrate;
- Ensuring that transboundary protected areas are given adequate attention;
- Sharing effective conservation approaches across similar sites;
- Developing collaboration between neighbouring countries to address common challenges and issues;
- Building capacity by sharing lessons learned, new technologies and management strategies, and by increasing access to relevant information.

Reeves (2000) mentions MPA networks that have become, or are on their way to becoming, unified systems providing population-level protection to marine mammals. The coherence and continuity of these networks, however, derive from their near-shore, essentially linear conformation. Mentioned networks include the trilateral Wadden Sea Conservation Area in western Europe, consisting of "an almost unbroken stretch of nature reserves and national parks" in the south-eastern part of the North Sea, and benefiting a local harbour seal (*Phoca vitulina*) population, and a series of protected areas along the west coast of Florida, deliberately planned with the goal of providing comprehensive protection to the habitat of the regional manatee (*Trichechus manatus*) population. Once completed, this network would limit coastal development in and near the core of the regional manatee population's range, while enhancing the effectiveness of boat speed regulations and the general ban on the "taking" of manatees (Reeves 2000).

A corollary to the use of MPA networks to protect highly mobile species such as cetaceans concerns the establishment of "conservation corridors" to allow faunal exchanges between protected

areas. The utility to cetaceans of corridors, however, will depend on whether they are likely to use them (Reeves 2000), i.e. if they can be designed to connect MPAs that protect separate critical habitats (e.g., breeding and feeding grounds) of the same population. For example, in the hypothetical case in which an area is identified and protected where Mediterranean fin whales travel to breed from their Ligurian Sea feeding grounds, ensuring adequate protection to the corridor connecting the two areas may be a significant conservation measure. Corridors in the marine environment, and particularly in the pelagic realm, may be intrinsically more difficult to design and manage than corridors linking land or freshwater protected areas (Reeves 2000). However, protection through corridors in the sea may not necessarily be analogous to its terrestrial equivalent. It can be conceived that marine protected sites be linked by “virtual corridors” based on conservation measures specifically addressing problems affecting the concerned species in transit, or the quality of their transiting habitat (T. Agardy, pers. comm.).

In conclusion, the process of organising single MPAs into networks – recently advocated by the world’s nations at the World Summit on Sustainable Development (Johannesburg, 2002), and later by the Convention of Biological Diversity – appears as particularly relevant for the protection of marine migrating species such as cetaceans, and is recommended as a desirable output of a regional cooperative conservation effort.

3. Selection and creation of MPAs

Creating MPAs is a complex process that normally involves, in sequence:

(a) The definition of goals of the prospective MPA, based on the existing knowledge of the presence of cetaceans in the area and of the existence of threats to their survival;
(b) The rationale for the proposal, where the case is made for the establishment of an MPA as the most effective tool to counteract the known threats to cetaceans and thus to ensure the conservation of the population(s)' favourable status;
(c) The compilation of all the pertinent bibliographic information (published as well as "grey" literature);
(d) The collection of updated scientific information through dedicated research targeting the species of concern, human activities in the area, and the existence, types and distribution of threats;
(e) The analysis of data to identify the existence of critical habitats within the considered area, or sites where the target species concentrate for specific activities or purposes;
(f) The drafting of an ecology-based MPA proposal, inclusive of maps to support decisions on conservation priorities based on links among cetacean populations, ecological processes and human activities, to be presented for consideration by the competent authorities and by all the stakeholders;
(g) The beginning of a consultation phase involving the building of consensus through awareness campaigns, stakeholder participation, socio-economic analysis and, wherever necessary, conflict solution.

The present document concentrates on the ecological aspects of the MPA creation phase (**a-f** above) and on the management aspects of the phase which is subsequent to formal MPA declaration by the competent authorities. However, in spite of its cursory treatment in these guidelines, which are predominantly science-based, it is important to bear in mind that the last point listed above (**g**, i.e. consensus building and socio-economic concerns) is of fundamental importance for the success of the process. Decades of world-wide negative and frustrating experiences have taught the clear lesson that a bottom-up process of MPA establishment is greatly desirable for best and durable results.

3.1 Definition of goals

Hooker and Gerber (2004) list the main goals that MPAs may have: conservation of biodiversity (minimizing extinction risk), protection of vulnerable species, ecosystem protection, reestablishment of ecosystem integrity, segregating uses to avoid users conflicts, and enhancement of the size and productivity of harvested fish or invertebrate populations to help support fisheries outside the reserve. In the case of an MPA established to conserve cetaceans, the latter goal (fish stock enhancement) may have the double benefit of favouring both human and non-human predators. Each MPA may have just one of the above goals, or may also have a combination of them, as they are not mutually exclusive. For example, even though the focus of a protected area may be on higher predators, multispecies or multipurpose reserves are also acceptable if conservation of higher predators is compatible with, for example, fishery enhancement (or vice versa). Fishery no-take zones are often the most effective tool for marine conservation (Pauly *et al.* 2002). In many cases fishery reserves and fishery no-take zones, established primarily for fishery management purposes, can be envisaged to achieve the double benefit of helping to rebuild depleted fish stocks and allow the recovery of predators which have been negatively affected by their prey's depletion (Bearzi *et al.* 2006). In other circumstances, establishing reserves targeting primarily charismatic megafauna such as cetaceans can have positive cascading, or "umbrella" effects on many other species (for a discussion of umbrella species see Simberloff 1998).

Considering the high mobility of most cetacean species, unless the proposed MPA is very large, it may be difficult for a single MPA to attain the stated goals (see section 2.1 for a discussion). This problem, however, may be overcome through the establishment of a network of MPAs, covering the most significant portions of a population's critical habitat (see section 2.2).

When defining the goals of a prospective MPA for cetaceans, careful consideration should be given to the potential of the initiative for raising awareness about cetaceans and their habitat needs, or raise political will to protect cetaceans. Often, and particularly in their early life stages, MPAs may be seen as meaningless "paper parks" as far as the effective protection that they afford to cetaceans is concerned; in spite of this, however, they may serve the important role of allowing the public and decision makers to ground their conservation ethic in a sense of place. In such circumstances, tying cetacean conservation to specific sites may be a good conservation strategy, and the selection of these sites may have less to do with cetacean ecology than with the site's awareness raising potential (T. Agardy, pers. comm.).

Once the goals of a prospective MPA are set, these will constitute the guidelines for the definition of the objectives in the management phase, whenever the MPA will have been established (see section 4.1).

3.2 Rationale for proposals

The discovery of an area with a particularly rich cetacean fauna is often the first step in the mental process of deciding whether a special area should be designated to protect it. Research may reveal the existence of previously unknown sites having special importance for cetaceans, either because these contain critical habitats, or because negative interactions between cetacean and human activities are reported to occur and constitute threats or potential threats to cetaceans.

Cetacean critical habitat was defined as *a place or area regularly used by a cetacean group, population or species to perform tasks essential for survival and equilibrium maintenance* (Hoyt, 2005). Criteria[3] to identify sites containing cetacean critical habitat may include:

- Areas used by cetaceans for feeding, breeding, calving, nursing and social behaviour;
- Migration routes and corridors and related resting areas;
- Areas where there are seasonal concentrations of cetacean species;
- Areas of importance to cetacean prey;
- Natural processes that support continued productivity of cetacean foraging species (upwellings, fronts, etc.);
- Topographic structures favourable for enhancing foraging opportunities for cetacean species (canyons, seamounts).

These criteria can be applied for the identification of sites containing cetacean critical habitats, in need of protection due to the occurrence of significant interactions between cetaceans and human activities [4] where:

- Conflicts between cetaceans and fishing activities have been reported;
- Significant or frequent bycatch of cetaceans is reported;
- Intensive whale watching or other marine tourism activities occur;
- Navigation presents a potential threat to cetaceans;
- pollution runoff, outflow or other marine dumping occur;
- Military exercises are known to routinely occur.

In every one of the above cases, one has to consider very carefully whether the threat can be the focus of regulatory action that is generic, or whether MPA creation would provide added value.

[3,4](see page 3, Document UNEP(DEPI)/MEDWG.308/Inf.11)

Theoretically the acquired knowledge on the importance of a given area for cetaceans will not warrant per se the establishment of an MPA, which will be necessary in presence of existing threats to cetaceans. However, MPAs may also be desirable to stave off potential threats, which may presumably occur in the future as a consequence of the predictable expansion of impacting activities. In practice, this will extend the potential usefulness of MPAs to protect cetaceans virtually to all known cetacean critical habitats in the Mediterranean.

Protecting cetaceans from anthropogenic threats may be achieved in a number of different ways, and MPAs are just one of the many available tools. Given that establishing an MPA is an elaborate and labour-intensive process, it is important that a proposal for the creation of an MPA to protect cetaceans be buttressed by a solid rationale. This should include a description of the current, suspected or anticipated threats to cetaceans in the area, and a discussion of how the establishment of an MPA may enable the implementation of measures and regulations apt to mitigate or eliminate such threats.

Hooker and Gerber (2004) classify threats to marine predators, in particular to cetaceans, by subdividing them into “direct threats”, “indirect threats”, and “global effects”. The first are those that cause mortality, and include fishery bycatch, direct takes, ship strikes and military sonar. Indirect threats are those which cause accumulating harm over longer time scales rather than immediate death, and include overexploitation of lower trophic levels and habitat degradation (i.e., acoustic and chemical pollution, marine debris, disturbance and physical habitat destruction). Global effects, such as climate change, will have consequences for marine predators and their ecosystems (Hooker and Gerber 2004).

Based on circumstances, the establishment of an MPA will address the different types of threats with different levels of effectiveness. Threats such as entanglement in fishing nets, ecosystem changes caused by competition for prey resources through fisheries, as well as mortality from direct takes and from military sonar, can all be effectively addressed by protection regimes enacted through MPA establishment, whereas wide-ranging impacts such as airborne toxic pollution, the diffusion in the environment of plastics and other debris, and climate change will require mitigation at a wider, even global level.

3.3. A science-based proposal

The next step in the process of the establishment of an MPA will be to prepare a formal proposal. Such proposal will be based on the compilation and analysis of the necessary scientific information, and will contain the key points of a conservation plan, a general definition of the goals of the MPA, and what will be the most appropriate type of MPA designation.

In this respect it is important to resist the temptation of insisting that a “definitive” research programme be carried out on the cetacean fauna of the area prior to the establishment of the protected area. The required knowledge may be collected relatively rapidly, thus avoiding excessive commitment of financial and human resources, and time. An overly detailed data requirement should be avoided at this stage if there is a risk that the inevitable delays in implementation will compromise the outcome.

The information needed for a proposal is conceptually simple, basically consisting of baseline data on: (a) the distribution and abundance of the concerned species, (b) the type and intensity of human activities in the area likely to affect cetaceans, and (c) the known or likely impacts of such activities on these mammals. Such information should make it possible to evaluate the conservation benefits of the proposed MPA for the cetacean population(s) of concern, as well as to determine the area’s required size and boundaries. Often the marshalling of more sophisticated information (e.g. on population identity and structure, abundance, habitat use, distribution and dynamics), can be postponed to a later phase and be the responsibility of the MPA management body.

The first task to be performed will obviously consist in the collection of the existing knowledge on the three subjects listed above (cetacean ecology, human activities, and threats) from all the available sources, including published papers, "grey" literature, and local knowledge.

If up-to-date sighting data do not exist for the area, or are too scarce and anecdotal, these will need to be collected through dedicated surveys. Data generated through such surveys, including presence/absence of animals and group sizes, should be related to search effort and to environmental co-variates to assist in the formulation of the proposal. Spreading search effort throughout the year as well as across years to account for seasonal and year-to-year differences and fluctuations in the animals' ecology is optimal. However some judgment is needed to decide whether a more rapid assessment performed, for example, during summer (when weather conditions are more favourable) is sufficient to make a credible case for the creation of an MPA, leaving it to the management body to secure more detailed knowledge on the population ecology of the concerned species.

The information thus assembled can then be analysed in several ways to support the preparation of an MPA proposal. One technique, which may be likened to the so-called "Delphi method", involves for the scientists engaging in the search for a group position through an iterative process in which the different opinions (e.g., concerning the MPA area and boundaries, or the protection measures likely to be implemented) are compared and progressively harmonised.

A more rigorous approach, the use of which, when feasible, was recently recommended by the Scientific Committee of ACCOBAMS, involves the application of spatial modelling techniques to identify important cetacean habitats and generate data-based MPA proposals and maps. A. Cañadas *et al.* described two types of spatial modelling which may be applied to support the establishment of MPAs for cetaceans: *habitat use modelling* and *density surface modelling* (A. Cañadas *et al.* 2005; A. Cañadas *et al.* 2006; A. Cañadas and P.S Hammond, 2006). The former uses "habitat categories" defined by different types of covariates (oceanographic, topographic, anthropogenic, etc.), to help explain variations in cetacean distribution and predict either areas that are important for target species or factors that are affecting their presence, distribution and density. The latter involves a combination of habitat use modelling with line transect sampling to estimate abundance of populations from surveys that have not been designed to achieve equal coverage probability. The habitat preferences of the studied population can then be illustrated using surface maps of density. Although the authors warn that, when using density surface modelling, and spatial modelling in general, careful attention must be paid to a number of requirements, assumptions and limitations (A. Cañadas *et al.* 2005; A. Cañadas *et al.* 2006; A. Cañadas and P.S Hammond, 2006), when data are available the use of spatial modelling is certainly a powerful method for describing cetacean habitats and strengthen MPA proposals.

A complicating factor when designing MPAs for highly mobile or migratory species such as cetaceans intervenes when the populations to be protected cue on highly dynamic or ephemeral environmental features, such as fronts, upwellings, eddies or currents (Hyrenbach *et al.* 2000; see also Anon. 2007 for a recent discussion of this subject). In such cases the creation of "dynamic MPAs" has been recommended by some authors. Dynamic MPAs are designed to change their location and size as they track a specific habitat feature associated with species movement or concentration. It has been argued that resource managers currently dispose of the technology to map oceanic habitats (e.g., surface temperature isotherms identifying the position of fronts) to communicate this information to vessels at sea, and to monitor and enforce spatially-explicit management measures in real-time (Anon. 2007; D. Hyrenbach pers. comm.). Examples exist of dynamic management measures which suggest that real-time ocean management is possible (e.g., time-area closures to avoid sea turtle bycatch off the South-eastern U.S., triggered by warm-water conditions in the tropical Pacific Ocean; a mandatory ship reporting system used to avoid ship-strikes of northern right whales off Massachusetts). Other experts, recognising the daunting management and legal implications of dynamic MPAs, suggest instead to set aside for conservation purposes very large and well-selected fixed areas, based around significant ecosystem features and biomass

such as spawning or breeding zones (where predators are highly vulnerable to fisheries), or hot-spots areas of high pelagic biodiversity (Anon. 2007).

3.4. Format for proposals

A format which may be used to formulate proposals for the establishment of MPAs for cetaceans in the ACCOBAMS area, prepared in accordance to Resolution 2.14 of the Second Meeting of the Contracting Parties to ACCOBAMS (adapted from the existing format for the proposal of SPAMIs in the context of the Barcelona Convention), was adopted by the Agreement's Scientific Committee (see Appendix 2 (page 20), Document UNEP(DEPI)/MEDWG.308/Inf.11), and will be submitted to the Parties to ACCOBAMS In October 2007. The format provides for information to be supplied on the identification of the area, and includes a description of the site, a list of the reasons why the site is important for cetaceans, a list of threats to cetaceans, information on human presence and activities, on the protection regime proposed, on proposed management measures and on relevant institutional arrangements.

In addition to its obvious practical aim of ensuring that proposals are standardised, the format is a very useful checklist of the types of information that need to be collected to make a proposal complete, and thus constitutes a handy support to organising thoughts and bits of information needed in the process. As such, it is here recommended that the format be considered an integral part of these guidelines.

3.5. The process of establishing MPAs

While proposals may be prepared by any individual or organisation, the responsibility for formally establishing MPAs rests with the competent authorities. Proposals may be brought to the attention of the authorities by anybody; however the process may be greatly facilitated by channelling proposals through recognised regional bodies such as the RAC/SPA and ACCOBAMS. Such international organisations, as well as IUCN MED (Malaga), and IUCN's World Commission for Protected Areas (WCPA – Marine), will provide expert support to nations wishing to establish MPAs for cetaceans.

If an MPA is proposed entirely within the territorial and internal waters of a nation, it will have to be established under the general domestic legislation of that nation, which covers both the substantial and institutional aspects of the matter (Scovazzi 1999). Once established, the concerned nation may decide whether the MPA could also be proposed as part of a wider protected areas network, such as the SPAMI network provided for by the SPA Protocol to the Barcelona Convention, the Natura 2000 network (if the nation is an European Union Member State), the Emerald network of the Council of Europe, or UNESCO's World Heritage Convention Sites. The impetus for inscribing one's MPA within an international network may derive from the nation's political will of promoting international cooperation for the protection of what is considered by that nation as common natural heritage.

Considering the pelagic habits of most cetacean species found in the Mediterranean Sea, important portions of their critical habitat will be located beyond the 12 nautical mile-wide territorial waters of any nation, i.e. in the Mediterranean high seas. This will cause most prospective MPAs for cetaceans in the region to be located in waters beyond national jurisdiction. It should be remembered that the existence of high seas in the Mediterranean is likely to be a transient condition, given that nations have the possibility of declaring their Exclusive Economic Zones (EEZs) up to 200 nautical miles from their coasts. The day in which all Mediterranean coastal nations will have declared their EEZs, the high seas will disappear from the Mediterranean. Until that happens, however, nations will still have the possibility of declaring an MPA resting entirely or in part in international waters by requesting its inscription in the List of SPAMIs of the Barcelona Convention's SPA Protocol. Once an MPA is adopted as a SPAMI by a Meeting of the Contracting Parties to the Barcelona Convention, its regulations will be binding not only for the citizens of the nation(s) which

has (have) proposed it, but also for the citizens of all the nations which are party to the SPA Protocol. A classic precedent of such process was provided by the Pelagos Sanctuary for Mediterranean marine mammals, which consists largely of international waters. The Pelagos Sanctuary was established in 1999 by a treaty among France, Italy and Monaco, and adopted as a SPAMI in 2001 in recognition of its Mediterranean importance (Notarbartolo di Sciara *et al.* in press). It should also be noted that France and Italy have created ecological protection zones which may have an impact on high seas protection measures outside of their territorial waters. In addition to the Pelagos Sanctuary, other important high seas areas are likely to be identified in the future (e.g., the Alborán Sea proposed in 2005 by Cañadas *et al.*). The cetacean populations survey planned in the ACCOBAMS context over the entire span of the Mediterranean and Black Seas may help facilitate the identification of such additional pelagic areas.

3.6. Possible candidate sites for the ACCOBAMS Area

Each Mediterranean riparian nation may independently assess needs and opportunities for establishing cetacean MPAs within its remits, in order to grant as quickly as possible legal protection to those sites that have already been identified in areas under its jurisdiction as being particularly important for cetaceans. While that happens, however, an attempt to initiate such a process in an organised, region-wide fashion was made during the 4th Meeting of the Scientific Committee of ACCOBAMS (November 2006, A map by Lesley Frampton, courtesy of Erich Hoyt © WDCS 2007, appears in Appendix 4 (page 5), Document UNEP(DEPI)/MEDWG.308/Inf.11).

An initial list (by no means complete) of more than 80 potential candidate sites for cetacean protection is contained in the Appendix 3 (pages 32-67), Document UNEP(DEPI)/MEDWG.308/Inf.11, where the following information is provided for each site: concerned country; concerned cetacean species; additional features (e.g., other protected species found on site); size of cetacean population thought to be using the area; known threats to cetaceans in the area; known problems caused to humans by cetaceans (e.g., net depredation); current protection status; list of researchers, NGOs, local groups active in the area; and relevant references.

A desirable outcome of the effort, currently planned, to survey the ACCOBAMS area to generate data on cetacean ecology in the region will consist of the provision of elements for the identification of hotspots and critical habitats to be considered for space-based protection. Unfortunately, the formal declaration of protected areas in all such sites may take an extremely long time due to the legal implications and requirements connected with such processes, both in national waters and in the high seas. To address the issue it may be worth considering the alternative possibility that the entire ACCOBAMS area be treated as a protected area for cetaceans (which it in fact is, with the exception of the territorial waters of the few riparian states that are still not Party to the Agreement). An ACCOBAMS-based region-wide MPA might then be made to contain “special zones of protection” in those sites where critical habitat of particular cetacean populations have been identified, and where special protective measures should be implemented to protect these populations. On the one hand, special zones could be merely considered the outcome of a zoning process within the wider ACCOBAMS protected area - a standard management procedure in MPAs – thus possibly benefiting from a fast-track institutional process. On the other hand, it is important that these special zones will benefit from a rigorous protective regime just like any more “traditional” MPA; to this effect, a management structure and planning will have to be implemented.

4. Management of MPAs

4.1. Management needs

Management of an MPA for cetaceans does not sensibly differ from managing any MPA. Excellent summaries detailing the management of MPAs exist (e.g., Kelleher 1999, Salm *et al.* 2000), and the basic management principles listed there will equally apply to special protected areas for cetaceans. This section will therefore only contain a summary of the main elements of MPA management practice, with a special reference to their relevance to cetacean conservation. In particular, the need is here emphasized for: (i) a management body and management plan; (ii) the definition of clear management objectives; (iii) periodic management reviews to assess whether objectives are met; (iv) management training; and (v) consensus building and maintenance.

i. Management plan and management body

An MPA without a management plan is like a ship without a rudder (Reeves 2000). Without an appropriate management plan enforced, the MPA will remain a "paper park" which will only serve to make decision makers look good without any real conservation effect. Even with a management plan, a protected area will be ineffective unless a director is empowered to implement it, i.e. with the necessary legal authority, sufficient financial resources, and adequate staff to proceed with implementation (Reeves 2000). A management plan should be developed with adequate funding arrangements in place to support its implementation in its entirety.

Furthermore, management of an MPA must be assured sufficient stability and longevity to be able to perform its stated tasks within a reasonable minimum amount of time (e.g., a five-year term). Too often in the Mediterranean region MPA management is tightly linked to the vagaries of local political equilibria; when these change, very likely the entire MPA management is changed as well, thus crippling the overall effectiveness of the MPA through intolerable instability, and undermining its very reason for existence. Plan development should be independent of political pressure to ensure that complex issues are adequately dealt with and that a disorganized approach to integrated management is avoided. A strong recommendation should be made to Mediterranean nations wishing to protect cetaceans through the establishment of MPAs to ensure that their relevant legislation is adapted, if necessary, to account for the needed management stability.

The management plan will, among other things, detail the measures enacted to reach the objectives. These include:

- Zoning, to separate highly protected no-entry sites containing cetacean critical habitat from human-use sites where activities such as whale watching, tourism, moderate fishing and vessel traffic may occur in a regulated fashion;
- Regulations and mitigating measures to maintain potentially harmful human activities (e.g., fishing, vessel traffic, military exercises) within acceptable levels;
- Research activities to generate knowledge susceptible to allow management adaptiveness and increase management effectiveness;
- Enforcement and compliance monitoring to ensure that rules are respected and measures are correctly implemented;
- Monitoring of the status and trends of the target populations and relevant human activities as a feedback mechanism to the management plan, to ensure that the proposed mitigation measures are working as expected;
- Monitoring and periodic review to ensure that the stated objectives are being met (see iii);
- Development of risk assessment techniques to take cumulative impact into account and identify emergent risks;
- Promotion of fair decision-making and conflict resolution concerning access to ocean resources within the protected areas;

- Administration, financing and fund-raising;
- Implementation of education and awareness programmes.

ii. Definition of objectives

Effective management of an MPA is founded on the articulation of clear and quantifiable objectives (SMART: specific, measurable, attainable, reachable, and timely) to attain the institutional goals, and the implementation of a monitoring system to assess whether these objectives are being met (see iii). A significant challenge to the effective management of MPAs dedicated to the protection of top predators such as cetaceans is the need for a framework to guide and assess effectiveness in the context of broader ecosystem-level objectives, which seek to extend conservation benefits from the protected species and their habitats to marine trophic webs and ecosystem-wide processes. Ecosystem-level management requires a clear rationale and a firm knowledge base.

iii. Are the management objectives met? Monitoring and indicators

A fundamental step in the management process involves the monitoring and periodic review of activities to assess whether the objectives are being met. A practical way of achieving this result is to devise specific management indicators. Pomeroy *et al.* (2004) provide an excellent review of the MPA management evaluation process, including the development and application of indicators (subdivided into biophysical, socio-economic and governance indicators). Given the complexity involved in selecting appropriate indicators, planning and conducting the evaluation, and consequently adapting further management actions, it is strongly recommended that the entire MPA management evaluation process be the subject of specific training (see next section).

iv. Training of managers

Managing MPAs is a complex endeavour in itself, made more complex by the particular ecological needs of top marine predators in the case of MPAs specifically created to protect cetaceans. Considering that managed MPAs in the Mediterranean are a relatively recent phenomenon, a solid professional tradition of protected area management is still lacking in most places. With the recent increase in MPA popularity within Mediterranean riparian nations, an organised effort for MPA management training and capacity building has become increasingly needed. In particular, training should address: (a) management practices in general; (b) management evaluation procedures (see iii above); and (c) general knowledge of Mediterranean marine ecology, with a special emphasis on top predators (e.g., cetacean population and conservation biology) in the case of managers and management staff dedicated to cetacean MPAs.

Specifically, it is recommended that a training module on cetacean MPA planning and management be prepared, and national and regional training sessions be organised with the support of expert organisations such as ACCOBAMS, the RAC/SPA, IUCN MED (Malaga), IUCN's World Commission for Protected Areas (WCPA – Marine), and MEDPAN.

v. Consensus building and maintenance

Although these guidelines are focused mostly on the ecological aspects of cetacean MPA establishment and management, it is important to stress that the creation and maintenance of consensus and public favour is fundamental to the success of an MPA. A cooperative environment may be best achieved through the enrolment of governmental, intergovernmental and non-governmental organisations in the process as much as feasible.

4.2. Cetacean conservation in existing MPAs

With the notable exception of the Pelagos Sanctuary, all the MPAs existing in the Mediterranean have been established to protect coastal waters (Mabile and Piante 2005). As a consequence, most existing Mediterranean MPAs may only contain habitat of coastal cetaceans, such as common bottlenose dolphins (*Tursiops truncatus*), short-beaked common dolphins (*Delphinus delphis*), and harbour porpoises (*Phocoena phocoena*). Such areas, which are already protected by the existing law, may in the future become useful components of regional networks of MPAs designed to protect the above cetacean species.

Managers of existing Mediterranean MPAs should be encouraged to conduct or promote research to determine whether the areas under their remit contain important cetacean habitats. In the affirmative case, appropriate cetacean conservation measures should be included in the area's management plan. Furthermore, two-way communication should be established between single MPA management bodies and region-wide conservation organisations such as the RAC/SPA and ACCOBAMS, to facilitate the network growth, share experiences, and obtain assistance in matters such as capacity building, problem solving and sharing of resources.

5. Practical support to the guidelines

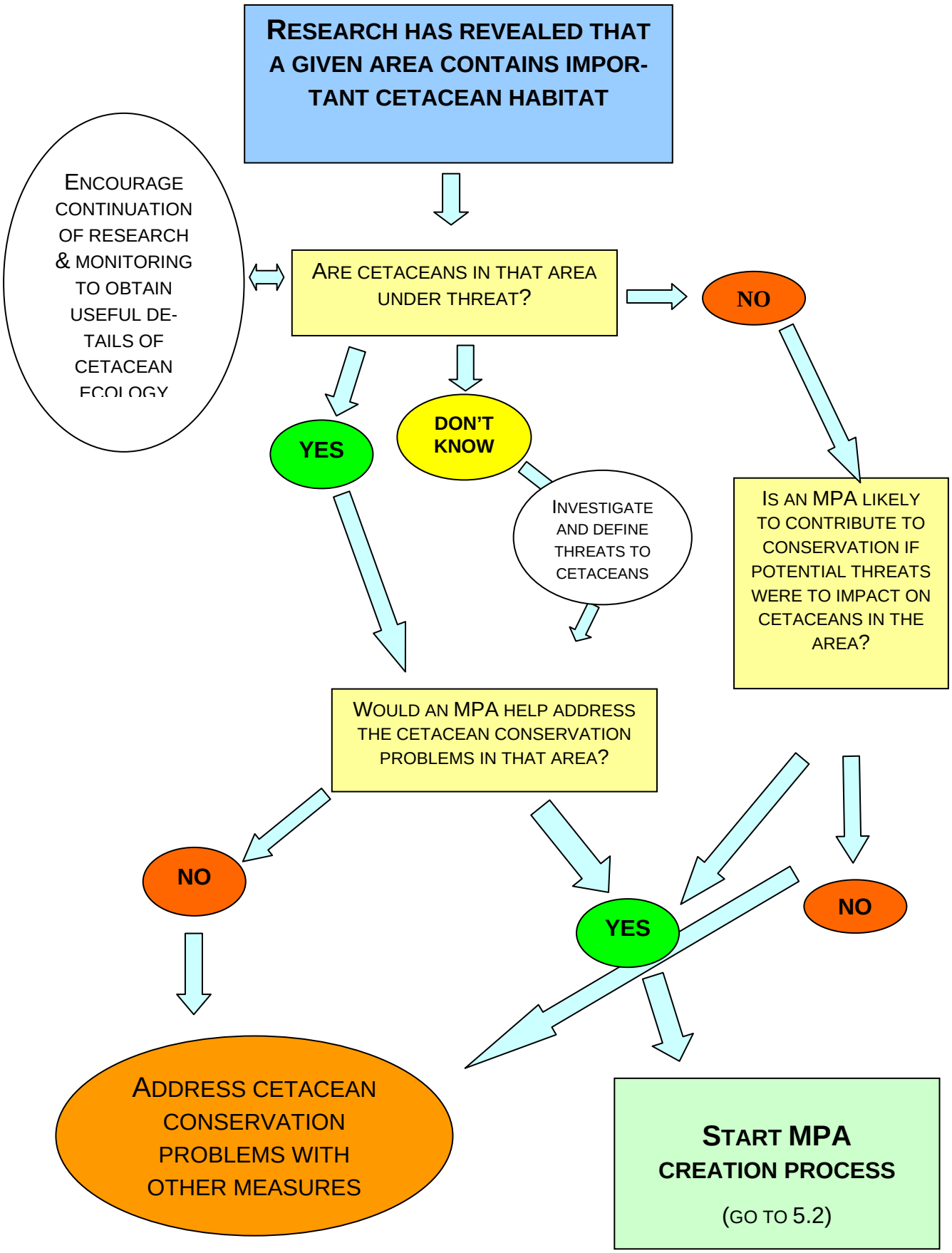
5.1. Is the establishment of an MPA an appropriate conservation measure for protecting a given cetacean population?

5.2. What steps need to be undertaken to establish an MPA?

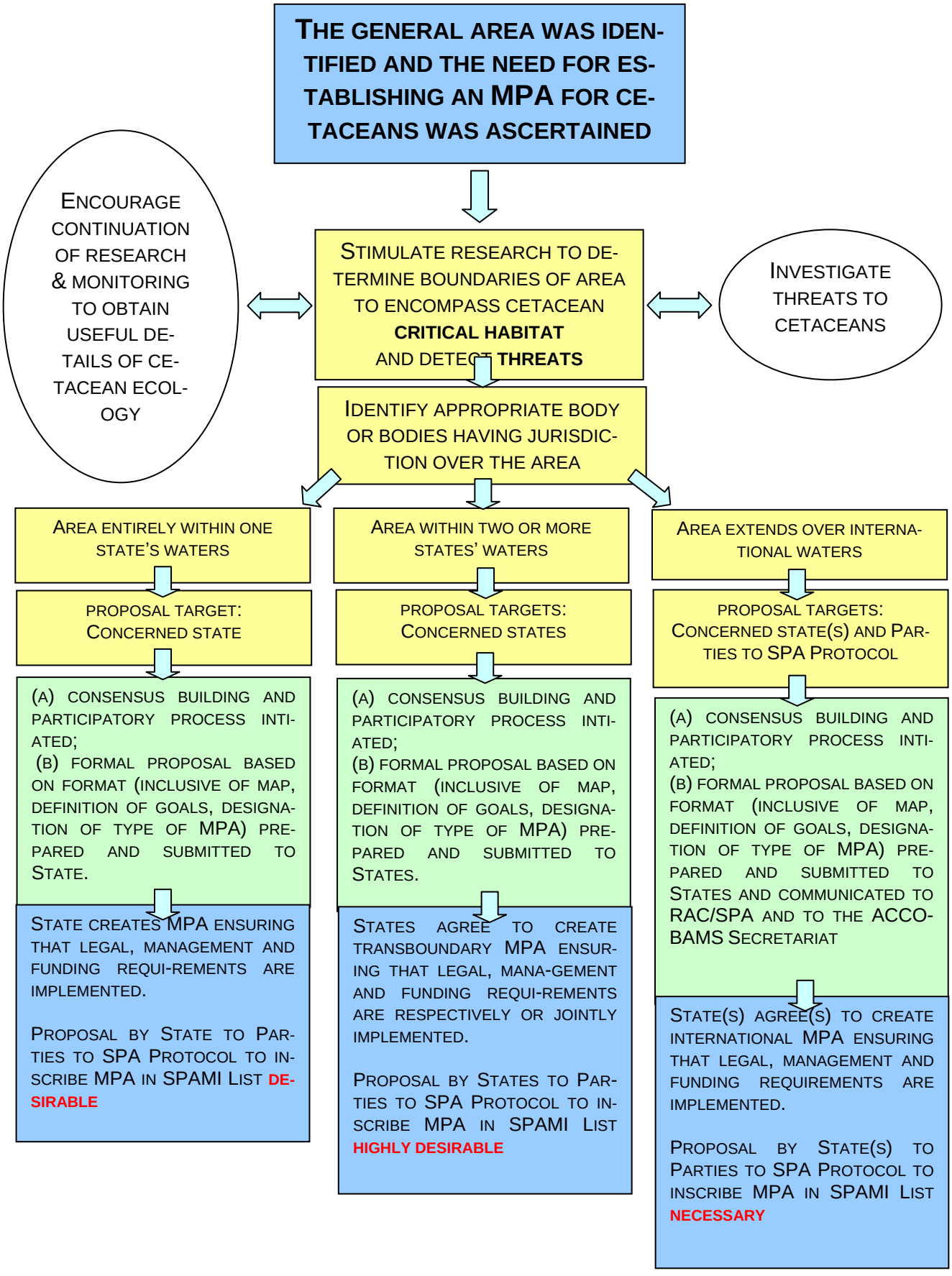
5.3. Once the MPA is established, what management actions does it need to work properly?

5.4. Additional resources helpful in the proper management of an MPA.

5.1. Is the establishment of an MPA an appropriate measure for conserving a given cetacean population?



5.2 What steps need to be undertaken to establish an MPA?



5.3 Once the MPA is established, what management actions does it need to work properly?

- A management body, with a director empowered by the necessary legal authority, sufficient financial resources, and adequate staff to proceed with implementation;
- The definition of clear management objectives to attain the goals that were set when the area was established;
- A management plan detailing ways to reach the objectives;
- Periodic reviews to assess whether objectives are met;
- Management training;
- Consensus building.

5.4. Additional resources helpful for the proper establishment and management of cetacean MPAs

The following is an initial list of resources that can be used in support to the process of establishing and managing MPAs for cetaceans:

- Supporting organisations:
  - Regional Activity Centre/Specially Protected Areas, Tunis
    http://www.rac-spa.org/
  - ACCOBAMS
    http://www.accobams.org/
  - Convention on Migratory Species (parent convention to ACCOBAMS)
    http://www.cms.int/
  - Other Conventions and Regional Organisations:
    - Bern Convention
      http://www.coe.int/t/e/cultural_co-operaetion/environment/nature_and_biological_diversity/Nature_protection/
    - Convention on Biological Diversity
      http://www.biodiv.org/default.shtml
    - European Commission – Environment DG
      http://ec.europa.eu/environment/index_en.htm
  - CIESM – the Mediterranean Science Commission
    http://www.ciesm.org/
  - IUCN's World Commission on Protected Areas (WCPA – Marine)
    http://www.iucn.org/themes/wcpa/biome/marine/marineprogramme.html
  - IUCN's Centre for Mediterranean Cooperation (Malaga)
    http://iucn.org/places/medoffice/en/index.html
  - MEDPAN – the Network of Managers of Marine Protected Areas in the Mediterranean
    http://www.medpan.org/?language=en
  - Major advocacy NGOs concerned with cetaceans and with the conservation of the marine environment. These include, among others:
    - Whale and Dolphin Conservation Society
    - WWF Mediterranean Programme Office
    - Oceana
    - International Fund for Animal Welfare
- Expert individuals and organisations: an initial list is contained in Appendix 1 (pages 9-19) Document UNEP(DEPI)/MEDWG.308/Inf.11.
- A specialised library on cetaceans and on MPAs (for useful start-ups on this, see http://www.accobams.org/2006.php/pages/show/93 and http://www.cetaceanhabitat.org/).

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