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Eighth Meeting of National Focal Points for SPAs

Palermo (Italy), 6-9 June 2007

**REPORT OF THE EIGHTH MEETING OF NATIONAL FOCAL
POINTS FOR SPAs**

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Introduction

1. At their Fourteenth Ordinary Meeting (Portoroz, November 2005), the Contracting Parties to the Barcelona Convention invited the Regional Activity Centre for Specially Protected Areas (RAC/SPA) to hold the Eighth Meeting of National Focal Points for SPAs in 2007.
2. This Meeting took place in the Grand Hotel Wagner, Palermo (Italy) from 6-9 June 2007, with the support of the Italian Government.

Participation

3. The Meeting was attended by representatives of the following Contracting Parties: Bosnia and Herzegovina, Croatia, Cyprus, Egypt, European Community, France, Greece, Israel, Italy, Libyan Arab Jamahiriya, Malta, Monaco, Morocco, Slovenia, Spain, Tunisia and Turkey. Montenegro attended the meeting as observer.
4. The Coordinating Unit for the Mediterranean Action Plan (UNEP/MEDU), REMPEC, and RAC/INFO were also represented.
5. The following institutions and organizations were represented by observers: UNEP/CMS/ACCOBAMS, RAMOGE, IUCN Centre for Mediterranean Cooperation, Friends of the Mediterranean, ICRAM, Marevivo, MEDASSET, MedMarAvis, MedPAN, MIO-ECSDE, Miramare Marine Reserve, Seagrass 2000, Shoreline, Stazione Zoologica di Napoli, Tethys Research Institute, WWF European Policy Programme – Branch Office and WWF France.
6. RAC/SPA acted as the Secretariat for the Meeting.
7. The list of participants is contained in Annex I to this report.

Agenda Item 1: Opening of the Meeting

8. Mr. Abderrahmen GANNOUN, Director of RAC/SPA, welcomed the participants and thanked the Italian authorities and RAC/INFO for their assistance in organizing the meeting. After outlining the main agenda items, he stressed the importance of the task that awaited the participants, emphasizing that they were called upon to work together in examining and monitoring trends in the biological situation in the Mediterranean with the overriding aim of ensuring the more effective enforcement of the Protocol.
9. Mr. Paul MIFSUD, Coordinator of the Mediterranean Action Plan (UNEP/MAP), said that the present meeting had a central function in a very heavy programme of action that included the framing of strategic directions and the elaboration of legal instruments and monitoring and control mechanisms with a view to preparing the next meeting of the Contracting Parties. Underlining that what mattered was not the number but the substance of the recommendations formulated, he called on all participants to focus their deliberations on specific, practical and quantifiable objectives so as to define a precise framework for future activities.
10. Mr. Giulio RELINI, representing the host country, welcomed all the participants to Palermo. He was also pleased to note a renewal of RAC/SPA's activities and of the energies

evidenced by a wealth of proposals, which would obviously require choices to be made.

Agenda Item 2: Rules and regulations

11. The rules of procedure adopted for the meetings and conferences of the Contracting Parties to the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution and its protocols (UNEP/IG.43/6, Annex XI) applied *mutatis mutandis* to the current Meeting.

Agenda Item 3: Election of Officers

12. After informal consultations, the Meeting unanimously elected the following officers:

Chairperson: Mr. Giulio RELINI (Italy)

Vice-Chairpersons: Ms. Myroula HADJICHRISTOFOROU (Cyprus)
Mr. Abdallah EL MASTOUR (Morocco)

Rapporteur: Mr. Robert TURK (Slovenia)

Agenda Item 4: Adoption of the agenda and organization of work

13. The Meeting adopted the provisional agenda contained in document UNEP(DEPI)/MED WG.308/1 Rev.1. The agenda is attached as Annex II to the present report.
14. The Meeting approved the organization of work proposed by the Secretariat, as contained in the annotated provisional agenda of the Meeting (document UNEP(DEPI)/MED WG.308/2 Rev.1).

Agenda Item 5: State of implementation of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean

a) Parties' reports on the implementation at national level of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD)

15. The Secretariat introduced document UNEP(DEPI)/MED WG.308/3, "Summary of National Reports on the Implementation of the Protocol on Specially Protected Areas and Biological Diversity in the Mediterranean for the Period March 2005 to March 2007"; containing a synthesis of the reports submitted by RAC/SPA's National Focal Points. The reports were prepared using the format adopted to that end by the Thirteenth Meeting of Contracting Parties (Catania, November 2003).
16. The participants were invited to give their opinion on the state of implementation of the SPA/BD Protocol, and the National Focal Points were also invited to give additional information or to update the working document UNEP(DEPI)/MED WG.308/3 - it being understood that the updated, amended document would be placed on RAC/SPA's web site (<http://www.rac-spa.org>).
17. Several representatives, while underlining the quality of the work of the Secretariat, wished to see a number of factual errors corrected.

b) Report on the progress made in RAC/SPA's activities

18. The Director of RAC/SPA summarized the Centre's activities since the last Meeting of National Focal Points, with reference to Document UNEP(DEPI)/MED WG.308/4 (Progress Report on RAC/SPA's Activities). The main focus had been on: greater integration of SAP BIO in its work, increased coordination with partner organizations, and enhanced efforts for the conservation of species in danger. He indicated that the Centre's Strategy had been centred on developing a medium and long-term vision, better targeting of its fields of action and enhanced efficiency of its interventions. As for the implementation of the Protocol, the Centre's activities included: improved coordination with other international conventions and processes; evaluations of and proposals on national action plans concerning endangered species; and the integration of SAP BIO as a strategic regional programme. Efforts were being made to concentrate technical activities in accordance with the criteria of visibility and replicability, to work for improved scientific monitoring of the state of marine and coastal biodiversity, and to strengthen information policy and the evaluation function.
19. A number of participants expressed their satisfaction at the work of RAC/SPA and stressed the need for closer coordination with the European Commission to ensure effective integration of common concerns regarding Specially Protected Areas and the conservation of biodiversity. Reference was made in that connection to the possibilities that existed for enhanced interaction with other conventions and processes involving the Mediterranean region, such as the African-Eurasian Waterbird Agreement (AEWA) and the Bern, Bonn, OSPAR and Bucharest conventions.
20. The importance of subregional cooperation was stressed, with particular reference to improved understanding of the migratory routes of certain species. The Secretariat said that it would address the topic of subregional projects at a later stage of the meeting, while underlining that prior assessment was essential for their successful implementation.

c) Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region (SAP BIO)

21. Referring to document UNEP(DEPI)/MED WG.308/4, the Secretariat reported on implementation of the Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region (SAP BIO), with particular reference to relations with partner organizations, the lack of GEF funding for the project proposal to GEF on MPAs and the relaunching of the SAP BIO Advisory Committee. In response to an observation by the Chairman, it was stated that there had been no essential change in the shape and objectives of the Programme, despite the fact that funding from the GEF had not so far materialized.
22. The meeting heard presentations from representatives of partner organisations forming part of the Advisory Committee – ACCOBAMS, IUCN and the WWF MedPO and MedPAN project – on their respective SAP BIO objective-linked activities. The latter were covered in document UNEP(DEPI)/MED WG.308/Inf.3 (State of Implementation of the Strategic Action Programme by the Institutions that are Members of SAP BIO Advisory Committee). A representative having noted the lack of information about activities undertaken by certain partner organizations, the Secretariat said that relevant information would be included in a forthcoming updated document, whenever this information reach the Centre.
23. The Secretariat presented a proposal for the coming stages of SAP BIO, as defined in document UNEP(DEPI)/MED WG.308/5 (Draft outline for SAP BIO operational plan for the 2008-2009 biennium). The Secretariat mentioned that despite of the lengthy implementation delay regarding the key action reflected in the Operational Plan, no funding had been allocated by the Parties in previous years to achieve them.

24. It was remarked that RAC/SPA would need additional funding and human reinforcements to undertake such activities, which were additional to the already routinely overcharged of workload.
25. In the debate that followed, stress was placed on the need to seek new sources of funding and define new synergies and new directions, including the ecosystem approach. One participant wondered whether the possibilities of funding by the EU had been fully explored, in view of the priority it accorded to environmental questions. The EU representative urged the importance of retaining the SAP strategy, while gearing it more closely to the requirements of funding sources.
26. One participant argued the need to organise meetings with donors to determine in advance the kind of projects that might win their support. Another stressed the importance employing the services a fund-raising specialist as a prerequisite for an effective strategy in that domain.
27. The Secretariat thanked the participants for their inputs, which would be integrated into the operational plan document. It stressed the role that Focal Points and Member States should themselves play in ensuring adequate funding for SAP BIO activities.

d) Common criteria provided for by the Protocol

28. The Secretariat recalled that Article 16 of the Protocol provides for the Parties adopting the following common criteria to facilitate its implementation:
 - Common criteria for the choice of protected marine and coastal areas that could be included in the SPAMI List
 - Common criteria for the inclusion of additional species in the Annexes.
29. Since the first common criteria had already been adopted by the Parties, RAC/SPA was asked to elaborate common criteria for the inclusion of species in Annex II and III to the Protocol. In this context, the Secretariat presented the Draft Common Criteria for Amending Annex II and III of the SPA/BD Protocol (Document UNEP(DEPI)/MED WG.308/13).
30. The Secretariat reminded participants of the general principles of the exercise and proposed procedures for the submission of proposals for the inclusion or removal of species. He also proposed a form for inclusions that had been tested on a number of species.
31. With regard to procedure, it was suggested that although proposals for modifying lists were the prerogative of Parties, there was a need to place greater emphasis on the role of RAC/SPA as initiator and coordinator.
32. The meeting approved the draft criteria appearing as Annex VI and invited RAC/SPA to submit them for adoption by the Contracting Parties at their next ordinary meeting.

Agenda Item 6: Developing Marine and Coastal Specially Protected Areas

a) Activities concerning Specially Protected Areas

33. The Secretariat, with reference to the pertinent sections of Document UNEP(DEPI)/MED WG.308/4, presented the activities undertaken by RAC/SPA since the Seventh Meeting of National Focal Points for SPAs (Seville, May 2005) to boost the setting up and managing of marine and coastal protected areas. Efforts had focused on the actualization of data, with particular emphasis on collecting the information necessary for establishing a harmonized database; assistance to countries in selecting, establishing and managing SPAs; and

support for the MedPAN network.

34. Introducing document UNEP(DEPI)/MED WG.308/8, the Secretariat said that the Draft Guidelines for Creating and Managing Protected Marine Areas for Cetaceans had been produced based in the ACCOBAMS Programme for MPAs and covered the selection and creation and management of specially protected areas. They were intended in particular: (i) to take into account the criteria for selection of SPAs elaborated by ACCOBAMS ; (ii) to provide basic information and training material to support MPA managers in the process of establishing and/or managing MPAs; (iii) to suggest concrete actions to promote the long-term conservation of cetaceans in the existing or future MPAs; and (iv) to provide support to all those concerned with the policy and practice of marine and coastal protected areas for cetaceans.
35. Presenting the Draft Guidelines for Monitoring and Managing Marine and Coastal Protected Areas of Importance for Birds (UNEP(DEPI)/MED WG.308/10), the Secretariat said that the two aspects covered by the document - monitoring threatened populations of marine and coastal bird species and managing marine and coastal protected areas of importance for birds – were indispensable for ensuring the long-term conservation of bird species in the Mediterranean.
36. In the ensuing discussion, a representative enquired as to the status of the ACCOBAMS work plan contained in document UNEP(DEPI)/MED WG.308/Inf.11, which needs some further consultation. It was said in reply that the text was a working document intended to be revised in coordination with the ACCOBAMS Focal Points. Concerning document UNEP (DEPI)/MED WG.Inf.10, another representative found the guidelines too summary and not sufficiently relevant to particular countries. In reply, the Secretariat pointed out that guidelines were intended to be brief and that the specific situations of countries were covered in a number of other documents. The meeting adopted the guidelines on MPAs for Cetaceans (Annex VII to this report) and an amended version of the guidelines for birds (Annex VIII to this report).

b) Inclusion of new SPA sites in the SPAMI List

37. Under this new sub-item introduced at the request of Italy, it was agreed that four strategically placed sites should be considered for inclusion in the SPAMI List. The four sites are : Miramare, Plemmirio, Tavolara-Punta Coda Cavallo and Torreguacetto. However, the meeting requested that the documentation presented be reviewed by RAC/SPA before forwarding of the application to the Contracting Parties.
38. In this context, the EU representative indicated the interest of the European Commission to support a project to identify sites in areas out of national jurisdictions and to prepare the relevant information for their consideration by the Barcelona Convention.

c) Assessing SPAMIs

39. The Secretariat introduced document UNEP(DEPI)/MED WG.308/6 concerning the “Proposed Evaluation Approach for the SPAMI List” prepared by IUCN at the request of RAC/SPA. It noted that the proposal provided for an ordinary evaluation procedure every six years coupled with an extraordinary procedure for revision where necessary, together with a probationary period of six years maximum.
40. The representative of IUCN, the body responsible for evaluating the proposal to identify its strengths and weaknesses, presented the conclusions of a team of independent experts based on existing documentation (including the proposal and the evaluation form accompanying it) and on field inquiries carried out in two volunteer SPAMI sites in Spain and in Italy.

41. The positive aspects included the existence of a probationary period of six years and the fact that the evaluation exercises were carried out by independent and multidisciplinary teams, with site visits.
42. On the other hand, the absence of mandatory criteria and uncertainty as to the primary objectives of SPAMI sites were to be regretted. In addition, some mandatory criteria were ambiguous and no allowance was made to review supporting documents such as monitoring reports.
43. Consequently, IUCN made a series of recommendations including: reviewing and clarifying the criteria and obligations relating to the SPAMI sites; harmonising the criteria set out in the form with Annex I of the Protocol and refining them by the inclusion of a series of questions, and, finally, defining and clarifying the main objectives of the exercise.
44. From the practical standpoint, the experts considered that a single visit to the site was not sufficient and that in any case the form should be completed before the visit on the basis of the available documentation. It would also be appropriate to carry out a preliminary evaluation before visiting the site. Finally, one at least of those responsible for the protected area concerned should be familiar with the legal framework of the area. As to the evaluation team, it should include at least one member with a command of the language spoken in the country visited. To have the maximum information necessary, the relevant Inter-Governmental organisations may be consulted.
45. In the discussion that followed, certain participants questioned the appropriateness of a minimum period of six years. In that connection, one representative warned against a too rigorous interpretation of the texts: there was a need to strike a balance between the different criteria and to make the accompanying measures more flexible. After all, the purpose of the exercise was to ensure the maintenance of the SPAMI and not to eliminate them.
46. The Director of RAC/SPA reminded participants that the Contracting Parties at their last meeting had on the contrary advocated a very rigorous approach to the selection of SPAMIs and to ensure monitoring and evaluation. He recalled moreover that, with the exception of two projects under consideration, all the SPAMI sites were situated in the western part of the Mediterranean basin.
47. Based on the recommendations and conclusion of the document prepared by IUCN, and the outcomes on its debates on the subject, the meeting adopted the procedures and format for evaluating SPAMIs appearing in Annex IX of this document. The document will be submitted to the next meeting of the Contracting Parties.

Agenda Item 7: Implementing the Action Plans adopted in the MAP context

1. Action Plan for the management of the Mediterranean monk seal

48. The Secretariat presented a summary of the activities concerning the preservation of the Mediterranean monk seal with reference to the relevant sections of document UNEP(DEPI)/MED WG.308/4, it emphasized that efforts had focused on improving knowledge, training, raising public awareness, and collaboration among countries.
49. In accordance with the Portoroz Ministerial Declaration, RAC/SPA had convened an international conference in Turkey to gather information on successful examples of monk seal protection and promote synergies and cooperation for the protection of the species at

several levels including International Conventions such as Bern and Bonn Conventions.

50. One delegate pointed out the need of RAC/SPA to take into consideration the last updated scientific information regarding the species.
51. Conscious of the seriousness of the problems faced by this endangered species, the participants agreed on the need to bring together all the parties concerned in a follow-up committee to relaunch initiatives in that domain and to frame a common programme with the participation of all the countries concerned.
52. The Libyan representative urged RAC/SPA to continue its efforts to implement this Action Plan, in parallel with the establishment of the coordinating committee.

2. Action Plan for the conservation of cetaceans in the Mediterranean Sea

53. The Secretariat presented activities for the conservation of cetaceans in the Mediterranean Sea, implemented under the work programme developed jointly with ACCOBAMS, as detailed in section IV.3 of document UNEP(DEPI)/MED WG.308/4.
54. The ACCOBAMS representative thanked the RAC/SPA for their activities undertaken regarding this subject; she added that five Mediterranean countries were not Parties to the ACCOBAMS, so any activity carried out related to the cetacean conservation in these countries constituted a link between the two organisations.
55. One delegate pointed out that the present situation of MEDACES database did not fulfil its objectives due to the lack of database feeding. In this context, a number of participants called on the Focal Points to ensure that national expertise and experience were placed at the disposal of the MEDACES database. The Chairman, supported by other participants, underlined the difficulties faced by Focal Points in prevailing upon institutions/individuals - in most cases not state-funded - to make information available.
56. Reference was made by several participants to the problem of the fishery-cetacean interaction. The representative of ACCOBAMS provided information on a number of relevant projects and activities that were in the process of being implemented with the support of Italy, in particular.

3. Action Plan for the conservation of cartilaginous fishes (chondrichthyans) in the Mediterranean Sea

57. Activities for the conservation of cartilaginous fishes (chondrichthyans) in the Mediterranean Sea, as described in section IV.5 of document UNEP(DEPI)/MED WG.308/4, were presented by the Secretariat. Stress was placed on the lack of relevant information from national sources, and participants were informed that draft standard forms for monitoring commercial landings and discards of cartilaginous fish and recording data on endangered and protected species, made available for use by countries not possessing their own model, were contained in document UNEP(DEPI)/MED WG.308/Inf.8.
58. Participants were agreed on the difficulty and costliness of obtaining data on the subject. The problems included the absence of systematic monitoring, lack of taxonomic and other forms of expertise, limited financial resources, marked differences between countries in terms of fishing activities and practices, and the challenge of ensuring that environmental concerns were properly taken into account by the government departments responsible for fisheries.
59. A variety of approaches were suggested for ameliorating the situation relating to the

conservation of sharks in particular. Those included increased training in species taxonomy, improved survey and monitoring methods developing knowledge on critical sites, research on the prevention of by-catches, public awareness campaigns (with particular reference to the consumption of threatened species), and greater synergy with relevant regional and international bodies such as FAO and GFCM.

60. Among other observations, attention was drawn to the opportunities afforded by the development of the Mediterranean International Trawling Surveys (MEDITS) and to the initiatives related to the data management. At least two databases were highlighted for cartilaginous fishes: SIRENO and MEDLEM. One participant related his experience in successfully representing to his country the economic benefits in terms of tourist revenues accruing from preservation of the shark population. Another reported increasing awareness among fishermen in his country of species conservation measures, consequent upon the marked reduction of shark landings. A potential interest of the pharmaceutical industry in stock preservation was also mentioned.
61. In response, the Secretariat called on Focal Points to make available all relevant suggestions and experience for improving the effectiveness of measures under the Action Plan. It was itself in permanent contact to that end with FAO and a variety of other bodies such as the GFCM. An activity to tackle by-catch had been integrated in the fisheries sub-component in the GEF Project proposal by FAO-GFCM in collaboration with RAC/SPA.

4. Action Plan for the conservation of Mediterranean marine turtles

62. The Secretariat summarized the activities undertaken within the framework of the Action Plan; These concerned the maintenance of populations, data collection and assistance to countries with particular regard to tagging methods, training assistance in the monitoring of nesting sites and satellite tracking for identification of migration routes and also for rescue and rehabilitation techniques.
63. Despite the resources and efforts deployed, it had to be recognized that the activities undertaken placed the emphasis on land areas rather than marine sites. In that connection, a training module had been devised for fishermen to reduce by-catches and provision had been made for training to strengthen capacities in conservation and rehabilitation techniques. A complete guide had been produced in several languages for the general public and a third conference on marine turtles was in preparation.
64. The Secretariat introduced the document UNEP(DEPI)/MED WG.308/7 containing the revised version of the Action Plan for the conservation of Mediterranean marine turtles. It drew the attention of the participants to the new timetable, of priority measures, and pointed out that while the philosophy of the plan of action had changed, the previous recommendations remained valid.
65. The representative of Tunisia reported that his country had established, with the help of RAC/SPA and Italy, a rescue centre for injured turtles. However, it was obviously preferable to place the emphasis on preventive measures, which implied an integrated management of coastal zones to attenuate the consequences of human encroachment on nesting areas. He advocated that the zoning of protected areas should also take into account nesting areas.
66. The representative of Spain reported the information that the University of Murcia has developed for RAC/SPA, a database on the veterinary treatments applied within the framework of the rescue centres.
67. The Meeting approved with amendments the draft Action Plan for the conservation of Mediterranean marine turtles (Annex X to this report) for adoption by the Contracting

Parties at their next meeting.

5. Action Plan for the conservation of bird species listed in Annex II to the Protocol on Specially Protected Areas and Biological Diversity in the Mediterranean

68. The Secretariat noted that since the adoption of the Action Plan in 2003 several initiatives had been successfully undertaken: (i) organisation of the first symposium on the ecology of bird species listed in Annex II to the Protocol in collaboration with SEO/Birdlife and MedMarAvis; (ii) establishment of a directory of experts and organizations concerned by bird conservation; (iii) creation of a regional network for population monitoring, establishment of the guidelines presented in document UNEP(DEPI)/MED WG.308/10; (iv) preparation of a report on the progress of the implementation of the Action Plan and (v) the proposal of a new implementation timetable (Annex XI).
69. The representative of Libya reported that his country has taken advantage of this Action Plan to fill gaps on this subject and will organize next summer a field mission to ring a local colony of lesser crested terns, with the support of RAC/SPA.

6. Action Plan for the conservation of marine vegetation in the Mediterranean Sea, with a presentation of the future Work Programme on the coralligenous appearing in document UNEP(DEPI)/MED WG.308/9 (Proposal for a Work Programme to Protect the Mediterranean Coralligenous and Other Calcareous Bioconcretions)

70. The Secretariat reported on the measures taken under the Action Plan since March 2005, beginning with the implementation of a project, extending over three years (2006-2008), for the inventory, mapping and monitoring of *Posidonia* meadows and involving Algeria, Libya, Turkey and Tunisia, with financial support from the Total Corporate Foundation for Biodiversity and the Sea.
71. The third Mediterranean Symposium on Marine Vegetation was organised in Marseilles from 27 to 29 Mars with the assistance of the Provence-Alpes-Côte d'Azur (PACA) Region and the Seagrass 2000 Association. It was attended by 160 scientists and gave rise to some sixty papers now available on CD and on the RAC/SPA web site.
72. The representative of Tunisia like other speakers, in particular the representative of Seagrass 2000, wondered about the best way of managing banquettes of *Posidonia* that were accumulated on tourist beaches. Those banquettes are a habitat for microfauna and, in some cases, a bird nesting site. So considering this, studies and plans should be developed in order to properly address the issue.
73. The Director of RAC/SPA expressed his warm thanks to all the countries as well as to NGOs that had helped in the implementation of RAC/SPA's various action plans. He stressed the exceptional event constituted by the substantial financing of the project for mapping *Posidonia* meadows by a private Foundation. The trend needed to be reinforced by turning to account the readiness of certain groups sensitive to the problems of the environment.
74. Following its presentation by the Secretariat, the Proposal for a Work Programme to Protect the Mediterranean Coralligenous and Other Calcareous Bioconcretions (UNEP(DEPI)/MED WG.308/9) was praised by a number of participants. It was decided following an extended discussion to recommend:(i) including within the Programme not only the typical coralligenous bottoms and maerl beds, but also those communities devoid of calcareous algae but dominated by macroinvertebrates (e.g. gorgonians, sponges,

bryozoans) that thrive in the continental shelf, and (ii) establishing a specific Action Plan for the Coralligenous, distinct from the Marine Vegetation Action Plan (Annex XII).

7. Action Plan concerning species introductions and invasive species in the Mediterranean Sea

75. Introducing this item, the Secretariat presented documents UNEP(DEPI)/MED WG.308/11 (Draft Guidelines for Controlling the Vectors of Introduction into the Mediterranean of Non-Indigenous Species and Invasive Marine Species) and UNEP(DEPI)/MED WG.308/12 (Draft Guide for Risk Analysis Assessing the Impacts of the Introduction of Non-indigenous Species). These tools had been finalized at the workshop held in Rome in December 2005 in collaboration with ICRAM. The scientists attending this workshop also formulated a number of recommendations with a view to creating an open and accessible database on non-native species.
76. RAC/SPA and REMPEC had participated in consultations that had led to the elaboration of a five-year project (2007-2011) submitted to GEF under the second phase of the GloBallast programme (GEF/UNDP/IMO).
77. The Director of REMPEC informed the participants about the second phase of the GloBallast programme and stated that REMPEC and RAC/SPA would act as coordination unit for the Mediterranean.
78. The Secretariat presented the conclusions of the evaluation of the implementation of the Action Plan (UNEP(DEPI)/MED WG.308/Inf.9) and the new timetable (Annex XV of the present report).
79. The discussion focused on the vectors of introduction of non-native species in the Mediterranean and on the need to study the behaviour of those species, which presupposed the launching of regional and national training programmes.
80. Other topics were mentioned, such as in port ship hull cleaning and the serious disturbances to the marine environment caused by the introduction of species through aquaculture. The meeting adopted the "Guidelines for Controlling the Vectors of Introduction into the Mediterranean of Non-Indigenous Species and Invasive Marine Species" (Annex XIII to this report) and the "Guide for Risk Analysis Assessing the Impacts of the Introduction of Non-indigenous Species" (Annex XIV to this report).

Agenda Item 8: Crosscutting activities

81. The Secretariat presented RAC/SPA's crossover activities, referring to the relevant sections of document UNEP(DEPI)/MED WG.308/4, which concerned two essential aspects:
 - capacity building and training relating to SPAs and to the conservation of biodiversity
 - the processing and management of data relating to biodiversity.
82. Concerning the first point, many activities had been undertaken with a view to building national capacities in SPA management and species conservation, whether in the form of training organized and/or financed by RAC/SPA or training provided in the course of field missions.
83. In terms of data management, RAC/SPA's efforts had been directed primarily to establishing the Mediterranean Clearing House Mechanism on Marine and Coastal Biological Diversity and on support to countries. In the context of such assistance, RAC/SPA had supported the creation of national clearing houses, the participation of two

managers (Tunisia and Morocco) in a training course organized in Brussels in October 2006 as part of a programme developed by the European Environment Agency.

Mediterranean Initiative on Taxonomy

84. The Secretariat introduced the item on the Mediterranean Initiative on Taxonomy as described in section VI.4 of document UNEP(DEPI)/MED WG.308/4. On the basis of a questionnaire circulated to national and international institutions, a database on taxonomical guidebooks, training and reference collections on Mediterranean marine flora and fauna was being compiled and would be made available to Mediterranean countries and concerned institutions and experts with a view to reviving marine taxonomy and the implementation of national and regional strategies on the subject. The situation of reference collections of Mediterranean marine species was also being assessed.
85. Participants stressed the importance of making the best use of accumulated effort including private collections. Thought should also be given to acquiring the services of someone professionally equipped to assess and compile the references in question. The Secretariat assured representatives of its ongoing efforts to contact and synergize with institutions and individuals able to contribute to the taxonomy initiative.

Agenda Item 9: RAC/SPA's programme and budget for 2008-2009

86. The Secretariat presented RAC/SPA's programme of activities and the proposed budget for 2008-2009, referring to document UNEP(DEPI)/MED WG.308/4 Rev.1.
87. Several speakers considered inappropriate to integrate SAP BIO in the draft budget under the section "Conservation of species and sites" and expressed the need to preserve a specific budget line, given that it was a considerable item of expenditure, which the Centre could only partially finance from its own resources. Others added that the Programme on Biodiversity constituted the backbone and the *raison d'être* of the Centre. A clarification was provided by the Secretariat, whereby SAP BIO remained part of the section "Conservation of species and sites" with the inclusion of an additional column for external funding sources as indicated in Annex V.
88. On this subject, the representative of the European Union made it clear that the EU did not intend to take the place of the GEF as an external funding source for the activities of RAC/SPA and SAP BIO. However, the EU could consider funding individual projects, with well defined outcomes and activities.

Agenda Item 10: Any other matters

Presentation on the ecosystem approach

89. A representative of the Coordinating Unit, Mr Gabrielides, informed the meeting about the interest of the ecosystem approach and ways of taking it into account in future regional actions. As he explains, the CoP decided, in Portoroz in 2005, to carry out a project aimed at exploring the signification of the ecosystem approach in the Mediterranean Sea context and its introduction into future MAP actions and programmes. The European Commission has financially contributed to supporting the meetings of (i) a group of experts that prepared an initial document and (ii) a group of government designated experts that finalised the document that will be presented to the next CoP.

- The Ecosystem approach is a system aimed at facilitating the adoption of environmental policies that are integrated, that do not cover not only individual environmental problems, and that allows considering human being as a part of the environment.
 - The definition of the Ecosystem Approach that has been elaborated by the group of experts is in line with the recent developments within international fora. The further utilisation of this approach within the Convention is not entailing a revolution: it is possible to start its application within the current legal framework.
 - This approach has nevertheless its own methodology which requires that several steps are made: definition of a vision and strategic goals, establishment of environmental objectives and setting operational targets which will guide the actions and policies. All that should be accompanied by the corresponding enlargement of the knowledge base about the Mediterranean Sea and its environmental problems as well as the pressures being exerted on it.
 - It is widely recognised that the approach has to be implemented at the most adequate scale: the regional one. This would imply considering some managerial units within the Mediterranean Sea that would be defined taking into account not only biogeographical and oceanographic conditions, but also socioeconomic and political ones.
 - MEDU intends to propose to the CoP a number of additional activities seeking to progressively introduce this approach into MAP policies and programmes. This introduction will require in any case better integration between the activities of different MAP RACs.
90. The Chairman and a number of participants took the floor to comment on the presentation. The importance and the difficulties of this new approach were recognised, as well as the need to ensure that the Convention is kept in line with new evolutions in the field of environmental policy.
91. The representative from EU recognise that the European Commission had been largely inspired by the works carried out by others (e.g. the Convention on Biological Diversity) to prepare its proposal for a Marine Strategy. This approach, holistic and integrated, should bear more fruit for the environmental policies; it was important to apply it without delay, in a spirit of experimentation.
92. The Chairman agreed and the representative of the Coordinating Unit said that it was the role of the Focal Points to spread the message.

Agenda item 11: Adoption of the report of the Meeting

93. The Meeting adopted the present report on its work, and its annexes (including the meeting recommendations appearing in Annex IV) on Saturday, 9 June 2007, on the basis of the draft report.

Agenda item 12: Closure of the Meeting

94. After the customary exchange of courtesies, the Meeting was closed on Saturday, 9 June 2007 at 1.00 p.m.

ANNEX I
ANNEXE I

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LISTE DES PARTICIPANTS

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ANNEX II

Agenda of the meeting

Agenda item 1 - Opening of the Meeting

Agenda item 2 - Rules of Procedure

Agenda item 3 - Election of Officers

Agenda item 4 - Adoption of the Agenda and organisation of work

Agenda item 5 - Status of implementation of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean

Agenda item 6 - Development of marine and coastal protected areas

Agenda item 7 - Implementation of the Action Plans adopted within MAP

Agenda item 8 - Cross-cutting issues

Agenda item 9 - Programme-Budget of RAC/SPA for 2008-2009

Agenda item 10 - Any other matters

Agenda item 11 - Adoption of the Report of the Meeting

Agenda item 12 - Closure of the Meeting

ANNEX III

List of Documents

Working Documents

UNEP(DEPI)/MED WG.308/1	Provisional agenda
UNEP(DEPI)/MED WG.308/2	Provisional annotated agenda
UNEP(DEPI)/MED WG.308/3	Summary of National Reports on Implementation of the Protocol on Specially Protected Areas and Biological Diversity in the Mediterranean for the Period March 2005 to March 2007
UNEP(DEPI)/MED WG.308/4	Progress Report on RAC/SPA's Activities
UNEP(DEPI)/MED WG.308/5	Draft outline for SAP BIO operational plan for the 2008-2009 biennium
UNEP(DEPI)/MED WG.308/6	Assessment of the proposed UNEP RAC/SPA Evaluation Approach for the SPAMI List
UNEP(DEPI)/MED WG.308/7	Draft Action plan for the conservation of Mediterranean marine turtles
UNEP(DEPI)/MED WG.308/8	Draft Guidelines for the Establishment and Management of Marine Protected Areas for Cetaceans
UNEP(DEPI)/MED WG.308/9	Proposal of a Work Programme on Protecting the Coralligenous and other Calcareous Bio-Concretions in the Mediterranean
UNEP(DEPI)/MED WG.308/10	Draft Guidelines for management and monitoring threatened population of marine and coastal bird species and their important areas in the Mediterranean
UNEP(DEPI)/MED WG.308/11	Draft Guide for risk analysis assessing the impacts of the introduction of non-indigenous species
UNEP(DEPI)/MED WG.308/12	Draft Guidelines for controlling the vectors of introduction into the Mediterranean of non-indigenous species and invasive marine species
UNEP(DEPI)/MED WG.308/13	Draft Common Criteria for amending Annexes II and III of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean
UNEP(DEPI)/MED WG.308/14	Report of the Eighth Meeting of National Focal Points for SPAs

Information documents

UNEP(DEPI)/MED WG.308/Inf.1	Provisional List of participants
UNEP(DEPI)/MED WG.308/Inf.2	Provisional List of documents
UNEP(DEPI)/MED WG.308/Inf.3	SAP BIO implementation status by regional institutions members of its Advisory Committee

UNEP(DEPI)/MED WG.308/Inf.4	Report of the Conference on monk seal conservation, Antalya (Turkey), 17-19 September 2006
UNEP(DEPI)/MED WG.308/Inf.5	Report on the evaluation of the implementation of the action plan for the conservation of Mediterranean marine turtles
UNEP(DEPI)/MED WG.308/Inf.6	Guidelines for impact assessment on seagrass meadows
UNEP(DEPI)/MED WG.308/Inf.7	Progress report on the implementation of the Action Plan for the Conservation of Bird species listed in Annex II of SPA/BD Protocol since its adoption in 2003
UNEP(DEPI)/MED WG.308/Inf.8	Draft Standards forms for monitoring commercial landings and discards of cartilaginous fish and recording data on rarely observed, endangered and protected species
UNEP(DEPI)/MED WG.308/Inf.9	Report on the evaluation of the implementation of the action plan concerning species introductions and invasive species in the Mediterranean sea
UNEP(DEPI)/MED WG.308/Inf.10	Enhancing the efficacy of the Regional Activity Centre for Specially Protected Areas in the Mediterranean
UNEP(DEPI)/MED WG.308/Inf.11	The ACCOBAMS programme of work on Marine Protected Areas (MPAs)
UNEP(DEPI)/MED WG.308/Inf.12	Example of species sheet for amending of Annexes II and III to the SPA/BD protocol
UNEP(DEPI)/MED WG.308/Inf.13	Dissemination of information and information tools
UNEP(DEPI)/MED WG.308/Inf.14	Progress report of the Mediterranean database of cetacean strandings (MEDACES)
UNEP(DEPI)/MEDWG.291/5	Report of the first meeting of the advisory committee of the Strategic Action Programme for the conservation of Biological diversity (SAP BIO) in the Mediterranean region
UNEP(DEPI)/MED WG.292/4	Report of the first meeting of the national correspondents of the Strategic Action Programme for the conservation of Biological diversity (SAP BIO) in the Mediterranean region
UNEP(DEPI)/MED WG.309/5	Report of the second meeting of the advisory committee of the Strategic Action Programme for the conservation of Biological diversity (SAP BIO) in the Mediterranean region
UNEP(DEPI)/MED WG.292/Inf.5	Assessment of financial sources and networking partners for coastal marine protected areas in the Mediterranean
UNEP(DEPI)/MED WG.309/Inf.5	Mediterranean countries' needs for legal, policy and institutional reforms to strengthen the management of existing marine protected areas

Reference documents

UNEP(DEC)/MED IG.6/7	Final act of the Conference of Plenipotentiaries on the amendments to the Convention for the protection of the Mediterranean sea against pollution, to the Protocol for the prevention of pollution of the Mediterranean sea by dumping from ships and aircraft and on the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean
	Final act of the meeting of Plenipotentiaries on the Annexes to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean
UNEP(DEPI)/MED IG.16/13	Report of the Fourteenth Ordinary Meeting of the Contracting parties to the Convention for the protection of the marine environment and the coastal region of the Mediterranean and its protocols
UNEP(DEC)/MED WG.262/12	Report of the Seventh Meeting of National Focal Points for SPAs
UNEP-MAP-RAC/SPA	Strategic Action Programme for the Conservation of Biological diversity (SAP BIO) in the Mediterranean region. Tunis 2003

ANNEX IV
RECOMMENDATIONS

RECOMMENDATIONS

I. Inventorying, mapping and monitoring marine and coastal biodiversity

Recommendations to the Contracting Parties

I.P.1- Continue inventorying sensitive species and habitats, using the tools developed in the MAP context.

Recommendations to the Secretariat (RAC/SPA)

I.S.1- Elaborate and improve tools for developing the inventorying and mapping of key habitats for Conservation.

II. Protecting habitats of species and sensitive sites

Recommendations to the Contracting Parties

II.P.2- Adopt Criteria for amending Annexes II and III of the SPA/BD Protocol.

II.P.3- Adopt the SPAMI Assessment Procedure.

II.P.4- Collaborate to create High Seas SPAMIs, embracing appropriately sensitive habitats beyond national jurisdiction, as well as multiparty SPAMIs including high seas areas, in collaboration with pertinent institutions.

II.P.5- Favour the development of projects to be implemented by countries unified by thematic and/or sub-geographical fields, and possibly merging within them complementary actions on species included in current regional Action Plans, so as to further apply the Ecosystem approach also to MAP species-focused plans (monk seals, cetaceans, turtles, birds, etc.) in collaboration with the relevant organisations.

II.P.6- Bear in mind guidelines for the conservation of threatened species when creating and/or managing SPAs

II.P.7- Adopt updated Action Plans concerning threatened species and the Action Plan for the Protection of the Coralligenous and other Calcareous Bio-concretions in the Mediterranean, and implement activities within the time limits set out in their implementation timetables.

Recommendations to the Secretariat (RAC/SPA)

II.S.2- Evaluate the status of the species listed in Annexes II and III of the SPA/BD Protocol, in view of submitting an amended version of them to the Sixteenth Meeting of Contracting Parties.

II.S.3- Promote the creation of high seas SPAMIs, embracing appropriately sensitive habitats beyond national jurisdiction, as well as of multiparty SPAMIs including high seas areas, in collaboration with pertinent institutions.

II.S.4- Implement the project for the creation and management of protected areas, developed through the GEF PDF-B project, adapted to the funds made available, in collaboration with pertinent partners (FAO-GFCM, WWF-MedPO, ACCOBAMS, etc.). Enlarge the project to the other Contracting Parties and support initiatives aiming at setting up a representative network of MPAs.

II.S.5- Work to implement the activities provided for by the Action Plans concerning threatened species, within the time limits set out in their implementation timetables, and strengthen the implementation of the Action Plan on the monk seal, identifying main activities to be carried out.

III. Assessing and mitigating the impacts of threats to biodiversity

Recommendations to the Contracting Parties

III.P.8- Work to reduce the impacts of fishing on sensitive habitats and threatened species, in collaboration with the pertinent institutions, and improve and implement *ad hoc* regulatory measures.

III.P.9- Adopt the updated Action Plan concerning species introductions

III.P.10- Bear in mind the Guide for risk analysis assessing the impacts of introduction of non-indigenous species; the Guidelines for controlling the vectors of introduction of non-indigenous species; and those on impact assessment on marine meadows, when elaborating national plans to protect marine biodiversity.

Recommendations to the Secretariat (RAC/SPA)

III.S.6- Collaborate with the pertinent institutions to reduce fishing impacts on sensitive habitats and threatened species.

III.S.7- Assess the impact of climate change in the context of the activities of the working group on the sustainable use of biodiversity.

III.S.8- Collaborate with REMPEC to assess the risks of sensitive habitats and/or MPAs being accidentally polluted and on implementing the GloBallast Partnerships Project (IMO-GEF-UNDP).

III.S.9- Work to implement the Action Plan concerning species introductions, within the time limits set out in its implementation timetable, initiating a warning system on invasive non-indigenous species by collecting, compiling and circulating data.

III.S.10- Collaborate with RAC/PAP in implementing the CAMPs planned for the biennium.

VI. Developing research to supplement knowledge and fill in gaps on biodiversity

Recommendations to the Contracting Parties

IV.P.11- Implement taxonomist training programmes to increase the number of specialists.

Recommendations to the Secretariat (RAC/SPA)

IV.S.11- Enhance scientific watch and facilitate access to scientific information, particularly on taxonomy.

IV.S.12- Identify indicators of ecological health and of efficacy of management measures to start up biodiversity assessment procedures.

VII. Training, coordination and technical assistance

Recommendations to the Contracting Parties

V.P.12- Support and participate in the Mediterranean Clearing-House Mechanism on marine and coastal biological diversity.

V.P.13- Adopt the mandate for the National Correspondents appointed to the implementation phase of SAP BIO.

V.P.14- Take note of the SAP BIO operational plan, and participate in implementing it with the necessary human and financial means, in collaboration with the partner institutions, promoting the integration of priority activities identified within the SAP BIO programme within the country's environmental priorities.

Recommendations to the Secretariat (RAC/SPA)

V.S.13- Continue developing the Mediterranean Clearing-House Mechanism on marine and coastal biological diversity and take the necessary steps to facilitate optimal use of its web portal.

V.S.14- Help the countries build capacity on the scientific and technical aspects of biodiversity conservation.

V.S.15- Develop and implement the Operational Plan to boost the implementation of SAP BIO, in collaboration with partner institutions.

ANNEX V

1. Background information

1.1 SAP BIO, the Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region

1. The Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region (SAP BIO) (Ref. 6) is the result of a long process of consultations during the 2001-2002 period, including the CPs to the Barcelona Convention and a large number of international and/or regional organisations, the preparatory activities assisted by GEF. The SAP BIO provides a logical base for the conservation of the Mediterranean marine and coastal biodiversity, within the framework of sustainable use and through the implementation of the revised SPA/Biodiversity Protocol, adopted in 1995. SAP BIO includes principles, approaches, measures, targets, timetables and priorities for action, as well as a priority list for intervention and investments ("Investment Portfolio"). The SAP BIO issues are analysed and actions identified at national (N) and regional (R) levels.

2. SAP BIO includes 30 Regional Priority Actions (RPAs), 58 NAPs (with five more added after inclusion of Montenegro), and an Investment Portfolio counting for 247 actions, the total investments needed estimated at the end of 2003 at 154,5 mil \$. NAPs in the Portfolio were costed at pre-feasibility level or as estimates, but not prioritised. The RPAs were estimated or costed with break-down, and prioritised.

3. The SAP BIO Provisions for follow up envisaged: (i) start of implementation of NAPs and Regional priority actions; (ii) establishment/adaptation of related institutional arrangements (N, R); (iii) establishment of relevant co-operation (N, R); (iv) provisions for financial support (N, R); (v) refining and prioritising of N, and refining of R Investment Portfolios; (vi) formulation and adoption of SAP BIO Operational R, N Programmes; (vii) inclusion of Operational programmes into national plans; (viii) provision of assistance to countries; and (ix) launching implementation. It was assumed that these Provisions might be met in a 2-years period after the adoption of SAP BIO, i.e. during the 2004-05 biennium.

4. SAP BIO was adopted by the 13th OMCPs, in Catania, November 2003 (Ref. 2). The respective OMCPs recommendations envisaged: a Launching Conference by the end of 2004; funding to be looked for through GEF, with noted interest of France through FFEM. The Secretariat was requested to carry out the Provisions for follow up concerning: (i) the Preparatory phase, (ii) launching of SAP BIO, and (iii) identification of mechanisms for financing and implementation. But, no funds were allocated in the 2004-2005 budget for SAP BIO preparatory/launching phase.

5. During 2004 started the preparatory activities for the SAP BIO component of the Regional UNEP/GEF/SP-MED-LME project (Ref. 17, further on: the Regional Project).

6. The 14th OMCPs, held in Portoroz in November 2005 (Ref. 4), noted: (i) that the SAP BIO relevant recommendations were not matched by corresponding budgetary allocations, and (ii) a renewed impetus needed to be given to efforts with GEF, with recommendations on SAP BIO to be more forceful. The Meeting requested SPA/RAC to: (i) further integrate SAP BIO into its programme of activities, (ii) prepare project proposals and seek funding for its implementation exploring possibilities with external donors, (iii) seek funding through GEF support, (iv) continue co-operation for the implementation of SAP BIO with relevant organisations, agencies and institutions, and (v) to strengthen co-operation with PAP/RAC and REMPEC in order to carry out integrated projects for the protection of ecosystems against pollution and for promotion of the marine biodiversity. The 2006-2007 budget approved 44.000 Euro in 2006 and 40.000 in 2007 for the implementation of SAP BIO sub-component in the frame of the Regional Project, and to support countries in the implementation of NAPs.

7. The 1st Meeting of the SAP BIO Advisory Committee (Ref. 8), Tunis, April 19, 2006, reviewed the SAP BIO progress from its adoption in 2003. The Meeting noted that although many of activities agreed are ready for implementation, modest progress was made due to absence of funds. The need was stressed to reinforce SAP BIO within the Regional Project by: development of a network of MPAs; support to strengthening the existing MPAs; and support for establishment of new ones. ToRs for and reactivation of the Committee were discussed and agreed upon, and a Meeting of National Correspondents, requested to be convened, to discuss the next steps for implementation of SAP BIO.

8. The Committee meeting discussed the document "Stakeholders analysis on potential partners and financial sources for the SAP BIO GEF PDF B Project", taking note of following important findings:

- (i) chronic under-funding and unpredictable fluctuations of funding MPAs,
- (ii) a marked sub-regional disparity in allocation of funds, in EU countries 43 \$/ha/y, in non-EU ones 4,5 \$/ha/y, in N. African ones 1,0 \$/ha/y, while MPAs are needing 60-1.000 \$/ha/y; the need for strong policy actions on funding MPAs was emphasised,
- (iii) PAs in many developing countries seem not to be a national priority and therefore depend on international aid and nature funds, estimates indicate that only 10% of the needs is secured
- (iv) as possible international funding sources: EU: LIFE, SMAP, INTERREG; GEF; ODA Agencies, debts swap for nature; were identified,
- (v) possibilities for funding MPAs: from fisheries policies, Natura 2000; tourism and recreation as funding sources; concessions, for recreational diving in particular;
- (vi) finally, a Plan B is recommended as needed for funding: natural resource subsidies, payment for ecosystem services, market related sources (enhance fees, concessions ...); partnership with economic and social sector, contribution from private companies ...
- (vii) the networks of interest: ecological networks, SPA, SPAMI, MAB Biosphere Network, EU Natura 2000, Emerald Network; need for/opportunities of synergies/optimisation emphasised.

9. The same Meeting discussed also the document "Regional Programme to implement SAP BIO related to creating new MPAs - draft ideas" (Ref. 15). The document elaborated possible actions within the context of the Regional Project, to support launching and sustain MPAs, focusing at sustainability, replicability and capacity building:

- (i) enhancing institutional and legal aspects,
- (ii) strengthening technical capacity by: selecting and networking MPAs; planning/zoning; managing; monitoring; and ensuring research and education,
- (iii) enhancing financial and economic aspects, and
- (iv) enhancing social and cultural aspects: partnership, communicating, adapting.

10. During the 2005-06 period, the SAP BIO component of the Regional Project was elaborated (Ref. 18). The whole Regional FP Brief was presented to UNEP/GEF for reviewing and adoption, see details in Chapter 1.2. further on. Immediately before the II. Meeting of SAP BIO Advisory Committee, MAP and SPA/RAC were informed that the MPAs sub-component cannot be funded by GEF within the Regional Project.

11. The 2nd Meeting of SAP BIO Advisory Committee, held in Tunis, on 1 March, 2007 (Ref. 10). reviewed the process of launching the implementation of SAP BIO. Following recommendations of the 15th OMCPs, the Meeting discussed:

- (i) the composition and ToRs for its membership for the 2006-07 and 2008-09 mandates (adopted for 2006-07, to be adjusted for the 2008-09 biennium);
- (ii) hitherto progress on implementation of SAP BIO by RAC/SPA, at national (Algeria, Libya, Montenegro, Tunis), regional levels, and member organisations; a Questionnaire to be sent to member organisations to check their progress on SAP BIO);
- (iii) progress and problems related to the MPAs component of the Regional Project, (progress: the SAP BIO component prepared and included in the GEF Regional FP Brief; problems, announced the MPAs sub-component not to be funded by GEF - alternative options were considered, further

discussions to be held with MEDU and GEF PDF B Project Manager)

(iv) integration of SAP BIO in the RAC/SPA programme for the 2008-2009 biennium (recommendations: need for implementation indicators to assess the SAP BIO process; to incite countries; to focus on homogeneous sub-regional areas and on capacity building inside regional sub-units, need for effective project demonstration activities, targeted at recipient communities within or adjacent to MPAs boundaries or buffer zones, with chances of success and replicability; to include other regional organisations; to prepare a Joint Operational Plan to be presented to the forthcoming Meeting of NFPs for SPAs; to prepare a meeting of donors,...).

1.2. Overview of the UNEP/GEF/SP-MED-LME project

(full title: "Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem - Regional Component: Implementation of Agreed Actions for the protection of the environmental resources of the Mediterranean Sea and its coastal areas", briefly: Regional Project, Ref. 17)

12. As mentioned in point 5. above, preparatory activities for the Regional Project started in 2004. The initial SPA/RAC-WWF document on identification and development of SAP BIO actions was prepared by the end of 2004. Following generally recognised need to increase the number and strengthen the management of MPAs, the SAP BIO component was focussed at MPAs as the first sub-component, fisheries as the second one.

13. During 2005, "Mediterranean Strategy to implement the SAP BIO related to MPAs", was prepared by SPA/RAC, WWF MED PO and FAO (Ref. 15). The Strategy aimed at: (i) strengthening of the legal framework for MPAs, (ii) strengthening of the MPA Network at regional level, and (iii) creation of new MPAs. After the 1st Meeting of the reactivated SAP BIO Advisory Committee, the Meeting of National SAP BIO Correspondents was convened in Alicante on 12-13. May 2006. The Alicante Meeting defined and provisionally adopted the mandate for National Correspondents during the implementation phase of SAP BIO. Two working meetings of SPA/RAC, WWF MED-PO, GFCM and FAO followed in June 2006 in FAO Rome, finalising the SAP BIO component of the Regional FP Brief.

14. The comprehensive full Regional Project, the SAP BIO component included, was developed during 2005 and in early 2006 and presented as UNEP/GEF/SP-MED-LME Project Brief, version August 2006. After the reviewing procedure, a second, revised and amended version was finalised in March 2007, to be presented to the GEF Council at its June 2007 Meeting.

15. The beneficiaries of the Regional Project are 12 CPs as GEF eligible ones: Albania, Algeria, Bosnia Herzegovina, Croatia, Egypt, Lebanon, Libya, Morocco, Montenegro, Syria, Tunisia and Turkey, plus the Palestinian Authority.

16. In August 2006 FP Brief version, the SAP BIO activities were structured under Component 2, with two sub-components:

Sub-component 2.1. "Conservation of Biological Diversity: Implementation of SAP-BIO and Related NAPs related to the development of the Mediterranean MPAs Network" (GEF contribution 3,292.500\$), envisaged the implementation of 6 activities: (i) Establishment of co-ordination mechanisms for regional MPA management, (ii) identification and planning of new MPAs, (iii) Improved management of MPAs, (iv) establishment of a regional MPA network monitoring capacity, (v) ensuring financial sustainability of R, N MPA networks, and (vi) improving the legal governance frameworks for MPAs, and

Sub-component 2.2. "Sustainable use of Fisheries Resources through Development and Application of Ecosystem-based Management Approaches" (GEF contribution 687.500 \$) envisaged 3 activities: (i) establishment of the Ecosystem Approach at R and sub-R levels, (ii) reduction of by-catch of regionally important species, and (iii) identification and addressing unsustainable fishing practices at regionally representative MPA sites.

(In the March 2007 version of the FP Brief the SAP BIO related sub-component is included as Sub-Component 3.1, with no changes in the six elaborated activities)

17. Funding commitments made by beneficiary countries accounted at 0,25 mil \$ each for five years (except Albania committing 0,1 mil. \$), totalling for 2,1 mil. \$, all in-kind. The RAC/SPA contribution amounts at 0,6 mil. \$ in cash and in-kind. From donors side, the French engagement for biodiversity is recorded as 1,8 mil. \$ and the Spanish one might reach 3 mil. \$..

18. Due to changes of GEF programming policies and practice, during the reviewing process and constraints the SAP/BIO component faced owing to RAF issues, the biodiversity/MPAs sub-component had to be excluded from GEF funding. Therefore, following options were considered by the 2nd Meeting of the Advisory Committee: (i) to submit the sub-component to GEF separately, (ii) to submit it included, but not requesting GEF reviewing and funding, the co-funding raised to be kept for MPAs, (iii) to submit it included, asking funding from IW or other GEF FAs, and (iv) to submit the full Regional Project to the November 2007 GEF Council.

19. A letter by SPA/RAC Director was mailed on March 2. 2007. to UNEPMAP Co-ordinator. The GEF PDF B PM replied confirming that the whole Regional Component will be submitted to the forthcoming June GEF Council, but that the MPAs sub-component will not be subject to review and approval. Suggestion was made Option (ii) in point 18. to be followed, i.e., to wait for RAF; the co-funding raised by SPA/RAC and WWF to be allocated to the MPA sub-component.

20. Subsequent contacts with donors:

(updated information to be included by SPA/RAC, upon contacts made, after the 8th Meeting of NFPs for SPAs)

2. Progress on SAP BIO after its adoption

2.1. Progress during the 2003-2005 period.

21. After the adoption of SAP BIO in 2003, initial activities concerning SAP BIO were hindered by the fact that no budgetary allocations were made for its start, although regular SPA/RAC activities related to SPAs and BD specific APs were in fact contributing to it. The key efforts aimed at the preparatory actions to define and formulate the SAP BIO component of the Regional Project. In 2005 the "Mediterranean Strategy to implement the SAP BIO related to MPAs", was prepared (see paragraph 11. above).

22. Due lack of funds and focusing on SAP BIO activities of the Regional Project, activities related to Provisions for SAP BIO follow up (see point 3. above) could not be implemented.

23. The 7th Meeting of RAC/SPA FPs, held on 31 May - 3 June 2005 in Seville (Ref. 7), summarising the progress of activities related to SAP BIO registered: (i) the prepared National Report and NAPs of Montenegro, to be incorporated in SAP BIO, (ii) attendance at the Stocktaking meeting for the Regional Project, in October 2004, (iii) preparation of the SAP BIO component of the Regional project, (iv) as new lines of work recommended for integration in SAP BIO: the Programme on coralligenous and the Programme of sustainable use of marine and coastal biodiversity. Finally, the Meeting proposed funds within a specific BL to be approved for the SAP BIO.

24. The SAP BIO related recommendations of the 14th OMCPs, are presented in paragraph 6 above.

2.2. Progress during the 2006-2007 period

25. The preparation of the Regional project SAP BIO component, as in the preceding period, was the key SAP BIO related activity. The meeting of SAP BIO National Correspondents was convened in May 2006, to discuss SAP BIO Implementation, and several meetings of the GEF biodiversity project partners took place to finalise it (see paragraph 13 above).

26. Implementation of individual SAP BIO NAPs. Support to develop the following activities was provided:

a. Algeria:

- NAP for setting up a programme to collect data on the Monk seal: a field mission in the western coast of Algeria, to identify eventual critical monk seal habitats.
- NAP for setting up a network for monitoring of *Posidonia oceanica* meadows: a 3-year Project elaborated on inventorying, mapping and monitoring of *Posidonia* meadows in four southern Mediterranean countries (Algeria, Libya, Tunisia and Turkey).

b. Libya:

- NAP on proposed new marine and coastal protected areas and national parks: to identify sites of conservation interest and set up a mid-term programme for establishing a representative network of MPAs, a field mission was carried out in 2006 on Farwa Lagoon and Gara Island, the proposals finalised by end 2006. Proposals for two islands in the Gulf of Sirte and the Ain Al Ghazala lagoon in preparation.
- NAP for the conservation of marine and coastal birds: a field mission in Ghara and Elba Islands and Benghazi Lake in 2006, to identify the existing colonies of *Sterna bengalensis*. A second survey and census carried out in 2007, to identify endangered and threatened bird species, birds density and diversity, and raise people's awareness.
- NAP for the conservation of marine turtles and their habitats: a nesting sites monitoring was undertaken in Sirte.

c. Montenegro:

- NAP on inventory and mapping of sensitive areas: agreement to support initial actions
- NAP for the identification of new PAs needing appropriate status of protection: catalysing actions for the creation of Katici island MPA, to start in 2007.

d. Tunisia:

- NAP for a pilot monitoring of *Posidonia* meadows, as part of the four countries' project mentioned under Algeria.

e. Transversal support:

- seminar cycle "Expertise on Project Cycle Approach and LF" to support NAPs funds raising by countries was organised (intended for spring 2007 but so far suspended),
- fisheries, 3 fisheries restricted areas set up in IWs, to be further promoted as MPAs.

27. Activities relevant to SAP BIO, implemented by other institutions members of the Advisory Committee, are presented in the document UNEP(DEC)/MED WG.308 Inf.3, "Implementation status by Regional Institutions Members of the Advisory Committee". A Summary of members' activities is presented as Annex III of the present document (to be added after the FP meeting upon additional contributions by further Advisory Committee members or their partners).

3. The actual problems and challenges

28. The key issues, relevant for the actual situation might be summarised as follows:

- SAP BIO is a complex, multi-faceted and long-term oriented strategic programme, requesting a comprehensive approach, heavy investments with sustainability of funding and inventive approach to donors, full involvement of national and regional bodies, capacity for

implementation, careful and adaptive programming and phasing, involvement of and harmonisation with a large number of partners and stakeholders. Therefore, detailed Provisions for follow up were elaborated for its preparation and launching (see para. 3)

- Due to reasons predominantly outside SPA/RAC influence, the SAP BIO Provisions for follow up were not yet implemented.
- Integration of SAP BIO activities in the regular SPA/RAC programme. Such integration, in addition to the programming and implementation aspects, presupposes adequate funding by the SPA/RAC budget. This was met partially in the 2006-07 budget, funds focused at the MPAs sub-component of the Regional project. So far, a certain progress towards implementing SAP BIO has been achieved as part of regular SPA/RAC programme through activities: (i) within the seven adopted MAP RAPs, (ii) assistance to countries, and (iii) transversal themes. But, despite recommendations of two OMCPs, the hitherto integration of SAP BIO activities into regular SPA/RAC programme should be assessed as weak.
- Integration/harmonisation with other relevant bodies. Other relevant bodies and institutions contributed provided a significant contribution with collateral or directly or indirectly supporting activities but independently planned and implemented. Therefore, the synergies achieved were weaker than those possible, although chances for a certain harmonisation with external activities were provided by the reactivation of the SAP BIO Advisory Committee. The problem was identified by the 2nd Committee Meeting, calling for a Joint Operational Programme. The present initiative on sharing responsibilities among Committee members institutions might greatly contribute further on to the integration and/or harmonisation of activities, increasing thus their efficiency, cost-effectiveness and synergies.
- The analysis summarised in paragraph 8. above, emphasised some key issues and problems, related to MPAs. Interpreted at the SAP BIO level as a whole, these problems might read: (i) SAP BIO not yet being recognised as national priority, (ii) chronic under-funding and unpredictable fluctuations for funding, and (iii) marked sub-regional disparity in allocation of funds - all confirming the heavy dependency of SAP BIO implementation on international funding and donors.
- The approach to donors and funding should be considered as one of immediate key issues, as well as for the long-term period. High donors commitments for SAP BIO component of the Regional Project might be a good experience. Future actions, due to the complexity of SAP BIO imply somewhat different, targeted approaches, aiming at long-term partnership with individual donors.
- Reviewing SAP BIO. As a comprehensive and long-term strategic document adopted by the CPs, SAP BIO does not need presently any official revision, but a realistic and flexible approach to funding, planning and implementation. Nevertheless, this issue is to be considered due to the elapsed time after SAP BIO adoption in 2003 and start of the Preparatory Phase in 2009). Change of some priorities, if needed, might be adopted within operational planning (f. ex. in R priorities, to upgrade priority of impacts of climate change). In addition, the preparation of an updated analysis might be envisaged (cf. the SAP MED OD and the revision in 2005 of the MED TBDA, Ref. 1 and 1a).
- The key activity during the 2004-2007 period was the elaboration of the SAP BIO MPAs sub-component of the Regional Project. Its recent exclusion from GEF funding requires reconsideration of operational plans and re-confirmation of donors commitments under new conditions. Its late announcement opens quite insurmountable problems concerning a timely presentation of an adapted programme, firstly to the 8th Meeting of NFPs for SPAs, and to the 15th OMCPs later on. It seems justifiable to envisage keeping the implementation of the MPAs sub-component within the Regional Project, funded exclusively by donors and MAP/SPA-RAC contributions, as well as of the beneficiary countries, adapting the programme as appropriate. A second option, implying lower funding, would be the implementation of selected pilot actions, promising tangible results within a reasonable period; to open doors for subsequent funding of the remaining component programme.
- The present SPA/RAC capacity for implementation of SAP BIO. With the Operational plan for the 2008-09 biennium adopted, the full involvement of only one staff person (presently the SAP BIO Programme Officer) will not suffice for its implementation. The same is far more valid

for Phase I. Therefore, the staffing needs for the subsequent implementation periods should be subject of analysis in 2009, to identify measures to be adopted.

- Institutional arrangements at regional level. The present arrangements, recently operationally improved (Operational Programme, sharing of responsibilities, ToRs of the Advisory Committee and membership revised, mandate of National Correspondents revised) might meet the needs for the Preparatory 2008-09 phase. What is needed is the establishment of a small *ad hoc* working group, to assist SPA/RAC to implement actions envisaged till the 15th OMCPs, as well during the Preparatory phase. Finally, additional staffing for SAP/BIO should be considered as needed.
- Institutional arrangements at national level. As envisaged by the SAP BIO Provisions for follow up, these arrangements have to be defined during the Preparatory Phase, assistance to countries to be provided by SPA/RAC.
- Approach to funding. The 2008-09 Operational Plan must be supported with a clear and realistic approach to funding. The possible funding sources presently are: (i) the unspent SAP BIO funds for 2007, if any, (ii) the regular SPA/RAC budget for the 2008-09 biennium, (iii) donors funds, approved for LME MPAs sub-component, and (iv), those hopefully to be secured by Donors Conference. In addition the value of contribution of SPA/RAC Regional AP and transversal actions, as well as of those implemented by other partners within their regular programmes and budgets should be taken into account. Here it should be taken into account that only a limited part of funds from donors support will be operational in 2009, due to budgetary reasons and practices. Therefore, despite the limited framework of the SPA/RAC budget, most of the activities planned the biennium have to be secured from It, while activities to be hopefully supported by donors have to be understood as tentative, pending donors commitments and their operational availability.

29. The analysis presented in the preceding points leads to key priorities to be considered when programming the SAP BIO activities for the next biennium:

- a. Integration of SAP BIO activities in the regular SPA/RAC programme, the SPA/RAC budget to provide funds for actions to be implemented prior hopeful donors contributions
- b. Implementation of Provisions for follow up
- c. Funding related activities, the Donor's Conference, including the preparatory activities
- d. Preparation of the (i) Outline for the SAP BIO Umbrella Operational Programme, and (ii) SAP BIO Umbrella Operational Programme, with phasing, to contain a detailed programme for the I. Operational Phase and the general lines for the subsequent ones
- e. Detailed elaboration of selected demo actions supported by donors and implementation of respective preparatory activities, to secure their start early in 2010.

30. Due to still open questions the following procedure has been envisaged :

- a. Meeting of NFPs for SPAs to discuss and evaluate this document as a draft Outline and provide recommendations for its revision and/or amending, if needed and as appropriate,
- b. During the period after the Meeting of NFPs till the OMCPs, SPA/RAC to perform immediate actions presented in Chapter 4. below, and
- c. in accordance with results of (a) and (b) above, SPA/RAC to finalise this Outline including the SAP BIO Operational Plan and budget and present it to the meeting of MAP NFPs and the 15th OMCPs.

4. Actions to be implemented between the Meeting of NFPs for SPAs and the OMCPs

31. In line with paragraph 30 above, the following actions should be performed by RAC/SPA after the Meeting of NFPs till the meeting of MAP NFPs and the 15th OMCPs:

- a. intensify discussions with donors committed for the MPAs sub-component of the Regional Project and clarify their commitments within the new situation (RAC/SPA to be assisted by MED Unit and the GEF PDF B Project Manager),

- b. define status, timetable and modalities of implementing the MPA sub-component,
- c. initiate activities to define sharing of responsibilities among Advisory Committee member institutions,
- d. undertake initiatives to identify possibilities for external funding of immediate actions in 2008, if any,
- e. in line with the results of the above activities update/finalise the Outline, the 2008-09 SAP BIO Operational Plan and budget in particular, to be presented to the MAP NFPs and the 15th OMCPs.
- f. Due to tight deadlines and multi-sectoral/multidisciplinary nature of actions to be implemented, a small ad hoc working group to assist RAC/SPA to implement activities under c. d. and e. above, should be immediately established.

5. Tentative SAP BIO Operational Plan for the 2008-09 biennium

32. In line with the SAP BIO Provisions for follow up and priorities proposed in paragraph 29, the SAP BIO 2008-09 Operational Plan should envisage:

- a. To review SAP BIO: refining concepts, policies, R priorities and refine the Investment Portfolio, if needed and as appropriate
- b. Countries to update, prioritise NAPs and NAs; refine and prioritise N Investment Portfolios
- c. Donors and Donors Conference: to contact potential donors, elaborate targeted proposals, obtain Donors declarations of interest, prepare and convene Donors Conference
- d. Prepare and adopt the Outline for the SAP BIO "Umbrella" Operational Programme for the 2010 -2025 period, including the IPP
- e. Countries to prepare N SAP BIO Strategies and Programmes, SPA/RAC to assist
- f. Prepare, adopt SAP BIO "Umbrella" Operational Programme for the 2010-25 period
- g. Countries to define national SAP BIO arrangements for Operational Phases
- h. Regional SAP BIO arrangements to be defined for the Operational Phases
- i. The MPAs sub-component to start implementation, accordingly with the framework to be agreed upon and funds provided
- j. Meetings of the SAP BIO Advisory Committee and of the SAP BIO National Correspondents to be convened
- k. Reporting, monitoring and evaluation
- l. To design and prepare implementation of sub-regional actions and NAPs having obtained commitments for donors support, securing thus their start early in 2010

6. Justification and annotation of planned actions

Justification and short annotation for each of the actions proposed are presented below.

33. Reviewing and refining SAP BIO. The action is needed as prerequisite for subsequent actions, in particular for donors related ones, and for NAs and N Operational Programmes. Responsibility: of SPA/RAC, a small ad hoc group to assist. Outcomes: a short analytical document, recommendations to upgrade or amend details, to be used for operational programming. Adoption process: Outcome to be presented to responsible bodies for consideration, if needed to be presented to the 16th OMCPs for adoption as Addendum to SAP BIO. In addition to involvement of the SPA/RAC staff, costing will be part of expenses of the ad hoc group, if established, to be envisaged within the SPA/RAC budget.

34. Updating, prioritising NAPs and National actions, refining and prioritising National Investment Portfolios. The action is also a prerequisite for subsequent actions, in particular for donors related ones, and preparation of Operational Programmes. Highest national priorities to be included in proposals for donors and included in documents for the Donors Conference. Refining of Investment Portfolios: to reduce fragmentation; define: time scale and grouping, phasing,

prioritising, implementability aspects, funding strategies. Responsibility of relevant national institutions, initial action and assistance to be provided by SPA/RAC. Outcomes: updated national documents, "fiches" for high priority actions, inputs to SAP BIO Addendum, if prepared. Expenses, to be covered by national sources, assistance by SPA/RAC budget.

35. Donors and Donors Conference. The action implies: (i) defining approaches and strategy; identifying priority issues/actions to be proposed for support; (ii) identifying potential partners, targeting/liasing them with actions of their interest, providing in advance, if possible, non-obliging expressions of interest; (iii) preparing and convening the Conference. Involvement and support of highest SPA/RAC/MAP levels is needed. The funds hopefully approved by donors might be operational in the post-Conference next fiscal year only, therefore the Conference should be convened in the second quarter of 2008, a more realistic timing is the third quarter of 2008. Outcomes: SAP BIO priorities for potential support defined, donors/potential partners identified and contacted, Conference documents prepared, Conference implemented, actions funded to be included in Operational Plan and Umbrella Programme. Costs, in addition to involvement of the SPA/RAC staff, will be related to displacements, consultations meetings and as part of expenses of the ad hoc group. The expenses of the Donors Conference should be covered by donors support, otherwise have to be envisaged within the SPA/RAC budget.

36. Outline for the SAP BIO "Umbrella" Operational Programme. A preliminary document, to include updated inputs related to refining of SAP BIO, revised and/or refined national documents and results of Donors Conference, needed as precursor to the Umbrella Programme. The document should be reviewed by the SAP BIO Advisory Committee and the Meeting of National Correspondents, to be used as input for drafting the Umbrella Programme. Outcome: the Outline and accompanying documents, if any. Costs, in addition to involvement of the SPA/RAC staff, will be part of expenses of the ad hoc group, to be envisaged within the SPA/RAC budget. Expenses of the Meetings of the Advisory Committee and of the National Correspondents have to be provided within the SPA/RAC budget.

37. National SAP BIO Strategies and Programmes. These documents have to be the basis for concerted national short- and long-term plans and actions, integrated into national planning and funding systems. The documents have to be harmonised with and up to a certain level integrated into the Umbrella Operational Programme. As inputs for their drafting the Outline for the Umbrella Programme has to be used. N Programmes should define: actions, phasing, responsibilities, funding, prerequisites, deadlines and reporting/monitoring/evaluation. In addition, N Strategies should focus on sustainability by applying economic instruments and or other regular sources, and on defining and establishing provisions for implementation of NAs. N Strategies should also provide inputs for establishment of National institutional arrangements, see point 39 below. SPA/RAC assistance to countries will be needed, a guiding document to be prepared by SPA/RAC staff, missions and a meeting, probably. Expenses, in addition to involvement of the SPA/RAC staff, will relate to the missions and one Instructive Meeting, to be

envisaged within the SPA/RAC budget. Alternative or additional option would be to include a comprehensive programme of this action in proposals for donors support, and adapt its implementation to funds secured.

38. SAP BIO "Umbrella" Operational Programme. SAP BIO as a long-term operation needs a comprehensive, realistic and flexible programme structured in phases, each phase elaborated at respective planning level. Integration of elements of National Programmes, and of a number of regional issues are needed. Among others the Umbrella Programme should include:

- identification/definition of opportunities and needs for involvement of other MAP components,
- the regional funding strategy, identification of potential sources/partners, sustainability
- international co-operation and harmonisation
- grouping of NAPs of countries eligible for international funding, to be proposed as grouped thematic or sub-regional projects

- regional participatory strategy and actions
- phasing, operational/orientative timetables and costing estimates
- phasing: I. Phase: priority actions to be implemented in 2010-2011 and 2012-2013 biennia, II. Phase: the 2014-2020 period, III. Phase: the 2021-2025 period.
- measures and actions related to co-ordination, harmonisation and management,
- the Interactive Participatory Programme,
- the resulting institutional arrangements, and
- progress reporting, monitoring and evaluation.

The Umbrella Programme should be drafted by the ad hoc group (upon revised and amended Outline), assisted by RAC SPA as appropriate, and finalised by SPA/RAC. Outputs: the draft and the final version of the SAP BIO Umbrella Operational Programme. Revision of draft by the SAP BIO Advisory Committee, the Meeting of National Correspondents, and Meeting of NFPs for SPAs, adoption of the final version by the 2009 OMCPs.

39. National SAP BIO arrangements. Actual N SAP BIO arrangements, while efficient during SAP BIO formulation and adoption, proved as not adequate for launching and implementing the envisaged N actions. Nevertheless, for the Preparatory Phase (i.e. the 2008-09 biennium), the existing arrangements should be kept, to be upgraded for the Operational Phases. Although a certain general approach is recommended, country specific arrangements for upgrading are needed. The action for 2008-09 should include: (i) a draft proposal by SPA/RAC, based on analysis of hitherto experiences and opinions/specific proposals by countries (Questionnaire), (ii) review by the respective meetings (Advisory Committee, National Correspondents, NFPs), (iii) adoption of the final proposal by the 2009 OMCPs. Costs: in addition to regular costs of the SPA/RAC staff, part of costs of the ad hoc group, if established.

40. Regional SAP BIO arrangements. At regional level, mandate/ToRs for the Advisory Committee and National Correspondents should be analysed and adapted to experiences after the revisions made in 2007. Such analysis most probably will not find the need for new, additional regional institutional arrangements, but is important to plan it to keep coherence with a proper adaptive management. Harmonisation with other MAP Centres and programmes should be analysed and adequate arrangements recommended, if found needed and as appropriate. Finally, the SPA/RAC capacity for implementing the Operational Phases of SAP BIO should be analysed and all feasible ways for upgrading the SAP BIO implementation by the MAP system proposed. Other elements and procedure are same as for the N arrangements.

41. Starting the implementation of the MPAs sub-component. This action will be planned in accordance with the framework and funding still to be agreed upon (information and text will be updated by SPA/RAC for the Meeting of MAP NFPs). Implementing pilot and/or other actions, as part of MPAs project or eventual High Seas project or separate individual actions, pending results of initiatives ongoing and those to be undertaken.

42. Design of and preparatory activities for early implementation in 2010 of sub-regional actions and NAPs having obtained commitments for donors support. The action is indispensable in order to avoid risks resulting from further loss of time in case of further delays of implementation of activities having got the donors support. In addition planning the action and providing initial SPA/RAC funds for this activity will be a proof of determined intentions of SPA/RAC-MAP concerning the start of implementation of SAP BIO, and at the same time a counterpart contribution to much larger donors funds, all incentives for raising Donors interest and securing their involvement. The action will be implemented by SPA/RAC, assisted by the ad hoc group, and by committed donors. Each individual design will have to be approved by respective donor(s) and included in the SPA/RAC - SAP BIO Operational Plan for the 2010-11 biennium.

43. Reporting, monitoring and evaluation

- a. **Reporting:** Periodicity- probably half yearly. Reports by: (i). ad hoc group, if established, (ii) by SPA/RAC staff-expert responsible, by staff-expert responsible for MPAs, if operational. The related mailing list will be defined by SPA/RAC. In addition: two-way communication with stakeholders should be established and maintained, half-yearly press releases and/or conferences, to be envisaged.
- b. Monitoring and evaluation: (i) as part of regular respective SPA/RAC activities, (ii) by the SAP BIO Advisory Committee, (iii) by the National Correspondents, (iv) by the Meeting of NFPs. Monitoring and evaluation by listed bodies will be made through meetings envisaged by the regular programme. Others meetings, if needed, would require additional funding.

44. Implementing the SAP BIO Interactive Participatory Programme, to include also: awareness raising; involvement of NGOs and stakeholders and relevant capacity building. After the Meeting of NFPs, the Interactive Participatory Programme will be elaborated by the RAC staff, assisted by the ad hoc group of experts, to be included in the SAP BIO Operational Plan for the 2008-09 biennium.

45. Optional: Joint Operational Programme. Preparation of such a Joint Programme has been recommended by the 2nd Meeting of the Advisory Committee (see paragraph 11. above). Its purpose would be to harmonise, co-ordinate and integrate up to a realistically possible level the programmatic orientation and plans of the institutions members of the Advisory Committee, contributing thus to increased synergies, efficiency and cost-effectiveness of the SAP BIO implementation. As inputs for such a Joint Programme, agreement on sharing responsibilities and the Outline for the Umbrella Operational Programme would be used. The draft proposal should be prepared by the SPA/RAC staff, if needed assisted by the ad hoc group, or by Committee members or their representatives. Such a draft should be reviewed by the meeting of the Advisory Group, and finalised afterwards, to serve as input for Operational Programmes and planning, as well as the basis for monitoring and evaluation by the Committee. The costs, in addition to involvement of the SPA/RAC staff should be covered by member institutions, the involvement of the ad hoc group, if any as part of the respective hoc group expenses, to be envisaged within the SPA/RAC budget. Note: this activity should be considered as optional, some aspects concerning adoption and legal status of such document to be cleared.

7. Funding/planning strategy

46. Due to presently some of the funding problems still open, the funding and planning strategy for the 2008-09 biennium has to be conceived in a flexible way, capable for and subject to revision and/or updating, pending provision of funds and their operational availability. As presented in Chapter 3. above (see in particular in paragraph 28. the 3rd, 6th and 12th bullet, the possible funding sources presently are: (i) the regular SPA/RAC budget for the 2008-09 biennium, including the remaining SAP BIO funds for 2007 if any and re-allocable, (ii) donors funds, approved for LME MPAs sub-component, (iii) funds to be secured by Donors Conference. In addition, (iv) the value of contribution of SPA/RAC Regional Action Plans and of transversal actions, as well as (v) value of external actions contributing to SAP BIO, implemented by other partners within their regular programmes and budgets should be presented as evaluated contributions.

47. Despite the limited framework of the SPA/RAC budget, some of the planned activities, primarily priorities as well as the prerequisites for the Donors Conference have to be secured from the SPA/RAC budget for 2008-09 biennium. Would the donors funding for MPAs not be confirmed, selected pilot and promotional actions should be included in the proposals for funding for the Donors Conference. The same should be applied for other high priorities whose funding will not be secured from MTF sources. The support to countries for preparation and assistance while implementing selected SAP BIO national or sub-regional actions should be matched by beneficiaries' counterpart contribution. Finally, all priorities not supported by reliable and confirmed sources for 2008-09 and 2010-11 periods will have to be planned within SAP BIO "Umbrella" Operational Programme for implementation in the subsequent Implementation Phases.

8. Budget and timetable proposal for the SAP BIO 2008-09 Operational Plan

48. The budget for the implementation of SAP BIO actions in the 2008-09 biennium, as elaborated in Chapters 5 and 6, is presented in the Table shown in Annex II. In order to provide for a comprehensive but transparent presentation, actions are grouped in accordance with funding sources and actions' type:

- I. Group: Actions funded through the regular SPA/RAC budget
- II. Group: Actions related to the SAP BIO MPAs sub-component, to be hopefully funded by donors previously committed within the Regional GEF LME project (see Chapter 1.2, paragraphs 16-18)
- III. Group: Actions to be funded by donors, as result of the Donors Conference to be convened probably in third quarter of 2008, programme proposal to be defined early in 2008, the final programme and budget to be defined after the Conference
- IV and V Groups: estimated values of SPA/RAC transversal and Regional Action Plans contribution to SAP/BIO, as well as of those implemented by partners
- V. Group: estimated values of SAP BIO related reporting, monitoring and evaluation

49. Due to open questions still present, the difference of nature and quality of various Groups of actions and respective figures is obvious:

Group I. is the proposed programme and budget for SAP BIO. Its approval within proposed costing would fully satisfy the requests of the 13th and 14th OMCPs for integration of SAP BIO into regular SPA/RAC programme. Moreover this would guarantee the implementation of the SAP BIO Provisions for follow up, i.e. of the SAP BIO Preparatory phase. Finally its approval is the prerequisite for preparing the Donors Conference, inciting donors support and involvement, and providing indispensable actions immediately after the Conference, prior operational availability of donors funds.

Groups II. and III.: actions and figures will be defined pending donors commitments, and the resulting definition of status and timing, separately for MPAs and Proposals for Donors Conference.

Groups IV. and VI.: figures estimated by SPA/RAC might be considered as realistic evaluations after budgetary discussion at the 8th FP meeting, making parts of regular SPA/RAC budget, i.e. not to be understood as requests for additional funds.

Group V.: evaluation of external activities will be made after the 2008 Meeting of SAP BIO Advisory Committee.

9. Responsibilities, institutional and implementation arrangements

50. Institutional arrangements for the Preparatory phase (2008-09 biennium) in principle will follow the actual organisational structure. Arrangements for the I. Implementation Phase (2010-2014) will be analysed, discussed and approved as part of the SAP BIO Umbrella Operational Programme, in line with the respective funds secured and the resulting programme.

51. Accordingly, for the Preparatory Phase the following arrangements and responsibilities should be applied:

- MAP/MED Unit in the role corresponding to SAP BIO Implementing Agency (IA)
- SPA/RAC in the role of SAP BIO Executing Institution/Agency
- MAP partners: other Centres and Programmes, in particular PAP/RAC, REMPEC and MED POL
- Other MAP partners, co-financiers and beneficiaries: the CPs

- External partners: as appropriate, presently institutions/bodies members of the SAP BIO Advisory Committee, future members, if any,
- Specific partners: other UN bodies and Agencies, other donors, as appropriate (f. ex. GEF, EU programmes, etc.) on a case by case basis.

52. The mandate and responsibility for overseeing and guidance will be

- SPA/RAC within its regular mandate
- the reactivated SAP BIO Advisory Committee with the mandate / TORs updated in 2007
- the SAP BIO National Correspondents with the mandate updated in 2007
- the NFPs for SPAs, the MAP FPs, and the OMCPs within their regular mandates.

Concerning Donors, early in 2008, as part of preparatory activities for the Donors Conference, upon consultations with potential ones, the status/role of Donors within institutional arrangements will be defined. Various alternatives might be taken into consideration: (i) donors to be included in the Advisory Committee, or (ii) a Donors SAP BIO Steering Committee to be established, or (iii) other, if proposed by Donors and/or if appropriate.

Concerning individual CPs, as envisaged by the SAP BIO Provisions for follow up, the establishment of country specific arrangements has been recommended. Therefore specific approaches and solutions should be sought for and applied. Some forms of National SAP BIO Steering Committees or Advisory Boards might be considered, to be chaired by a high level national responsible, activities to be supported by the responsible Ministry and/or donors; membership to include: representatives of responsible national Ministries/Agencies, of reputed institutes and/or institutions, donors, as well as reputed professionals/scientists. For operational details, see paragraph 39 above.

53. The SPA/RAC and MEDU/MAP implementation arrangements for SAP BIO will function following in principle the present organisational structure. The SPA/RAC capacity for SAP BIO to be gradually strengthened in accordance with the expanded and intensified Plans / Programmes. As presented in paragraph 28, 8th bullet, firstly the SAP BIO Programme Officer, the only professional staff member presently responsible for SAP BIO, should be relieved of all operational duties other than SAP BIO. Secondly, an Assistant SAP BIO Programme Officer should be engaged early in 2008 as permanent staff or as a mid-term secondee the relevant expenses supported by donor(s). The implementation arrangements and respective organisational structure for the I. Implementation Phase will be analysed in 2009 and included in the SAP BIO Umbrella Operational Programme. In addition, the SPA/RAC structure responsible for SAP BIO will be assisted by international experts, ad hoc groups or teams, to provide for the needed multi-sectoral and multi-disciplinary coverage, harmonisation and integration.

10. Reporting, Monitoring and Evaluation.

10.1. Reporting

54. Regular reporting will be implemented as follows, see also paragraph 43:

- a. periodicity - half yearly,
- b. by: ad hoc group(s), by SPA/RAC staff-expert responsible, by responsible for implementation of MPAs if operational,
- c. mailing list to be established by SPA/RAC,
- d. in addition: two-way communication with stakeholders, half-yearly press release, press conferences, 1 page summary for high level decision makers.

Formats and reporting details and instructions will be defined by SPA/RAC

10.2 Monitoring and evaluation

55. Monitoring and evaluation will be implemented taking into account: (i) the LFA presented as Annex I., (ii) specific instructions in case of actions implemented within external projects, or (iii) on a case by case basis for specific cases. The process will be implemented as follows, see also paragraph 43:

- a. within regular SPA/RAC monitoring and evaluation activities
- b. by the SAP BIO Advisory Committee, at meetings in 2008 (one), and in 2009 (one)
- c. by the ad hoc group(s)
- d. by the National Correspondents.

Formats and relevant details and instructions will be defined by SPA/RAC.

Annex I. Logical Framework Analysis

ANNEX I. SAP/BIO Tentative Operational Plan for the 2008-09 biennium**Logical Framework Analysis**

Objective(s)	Activity(ies)	Output(s)	Actors (A), Partners (P)	Achievement indicators	Assumptions(Asm) Risks (Rs)
To provide sound updated inputs for Outline of Umbrella Programme, and for Donors Conference	1. Reviewing/refining Regional SAP BIO priorities and Regional Investment Portfolio	refined SAP BIO R priorities, RAPs, and R Investment Portfolio, deliverable as document	A: SPA/RAC, ad hoc group, AdvComm., NatCorr, NFPs for SPAs	Timely preparation, and approval by supervisors	Asm: Biennial Progr./ Budget approved; good quality; harmonisation Rs: late preparation, poor harmonisation with external actions, unrealistic costing estimates
To provide updated and prioritised inputs for: Outline for SAP BIO Umbrella Programme, N SAPs, Donors Conference	2. Updating NAPs and refining and prioritising National Investment Portfolios	Updated, prioritised and refined NAPs, and N Inv. Portfolios, deliverable as document	A: Nat. bodies, assisted by SPA/RAC	Timely preparation, approval by national bodies, integration into national plans	Ass: Biennial Progr./ Budget approved; N SAPBIO arrangements operational; N R funds provided Rs: : late delivery, unrealistic costing
To provide input for Donors Conference and basis for drafting SAP BIO Umbrella Programme.	3. Preparing Outline for SAP BIO Umbrella Operational Programme	Outline, deliverable as document	A: SPA/RAC, ad hoc group, AdvComm., NatCorr. P: Potential Donors	Timely preparation, approval by supervisors; inciting and successful as input for D Conference	Ass: Biennial Progr./ Budget approved Rs: late delivery, unrealistic planning - weak D response
To: prepare quality documents for Donors Conference; identify and sensitise Donors; provide for their declarations of interest	4. Preparing documents for Donors Conference; consultations, displacements included	Donors Conference documents; proposals for sub-regional and national APs to be proposed for funding; declarations of interest	A: SPA/RAC, ad hoc group, AdvComm. P: Potential, identified Donors	Timely preparation, approval by supervisors; inciting and successful as input for Donors Conference	Ass: Biennial Progr./ Budget approved, activities 1-3 implemented timely ans well Rs: late delivery, unrealistic planning -

Objective(s)	Activity(ies)	Output(s)	Actors (A), Partners (P)	Achievement indicators	Assumptions(Asm) Risks (Rs)
To: present proposals for Donors support for SAP BIO programmes / actions, commit Donors. <u>One of key objectives of Preparatory Phase</u>	5. Donors Conference	Conference Report and documents, Donors commitments the resulting supported programme	RA: SPA/RAC, ad hoc group, AdvComm., NA: NatCorr P: Potential Donors	No. of Ds participated, commitments undertaken, No. of actions to be supported, total of funds committed	weak Ds response Asm: Biennial Progr./ Budget approved, activities 1-4 timely and well prepared Rs: Activity 4 poorly or lately implemented, weak Ds response
To create Strategic National documents to guide implementation of National SAP BIO Programmes	6. Preparing N SAP BIO Strategic Action Plans	N SAP BIO SAPs (dd)	A: National bodies, assisted by SPA/RAC P: Potential Donors	SAPs timely prepared and approved by National bodies No of CPs having prepared National SAPs	Asm: nat. SAP BIO arrangements operational, SPA/RAC to provide ass. to countries, respective R, N funds approved Rs: Asm not met timely or met partially, or nor met at all
To provide: supervision, monitoring, harmonisation, advice, recommendations and approval of planned / implemented activities	7. Meetings of: - SAP BIO Advisory Committee (2 in 2008, 1 in 2009) - SAP BIO National Correspondents (1 in 2008, 1 in 2009)	Meeting Reports and Reference documents (dd)	A: SPA/RAC, Adv. Comm, N. Corr P: Potential and committed Donors	Planned meetings held timely and successfully	Asm: Biennial Progr./ Budget approved, inputs timely and well prepared Rs: late implementation of meetings, poor quality of ref. docs., weak Ds involvement and support
To prepare and adopt a comprehensive medium and long-term programme for implementation of SAP BIO <u>One of key objectives of</u>	8. Preparing and adopting the SAP BIO Umbrella Operational Programme for the 2010-2025 period	The SAP BIO Umbrella Operational Programme for the 2010-2025 period	A: SPA/RAC, ad hoc group, AdvComm., NatCorr., NFPs for SPAs, other MAP Centres and Programmes P: Involved Donors	Document to be approved by the 16th OMCPs; sustainability and all prerequisites for early implementation of the I.Phase to be secured	Asm: Activities 1-7 as prerequisites timely implemented, quality inputs prepared Rs: poor quality of inputs, questionable sustainability, weak

<u>Preparatory Phase</u>					
Objective(s)	Activity(ies)	Output(s)	Actors (A), Partners (P)	Achievement indicators	Assumptions(Asm) Risks (Rs)
To design selected sub-R and N actions supported by donors commitments, and implement respective preparatory activities to provide for their start early in the I. Implementation Phase	9. Design/preparing implementation of selected sub-regional actions, and / or of selected NAPs, and or other actions to be funded by donors	Selected/supported Sub-R actions and National actions designed, the needed respective preparatory activities implemented	RA: SPA/RAC R expert teams; AdvComm, NatCorr, NA: National bodies and expert teams P: committed Donors	Outputs and preparatory activities presented in 2009 to the 16th OMCPs and approved	Asm:Biennial Progr./ Budget approved; N SAP BIO arrangements operational, donors funds committed, SPA/RAC assisted teams and countries as needed Rs: Assumptns. not met
To: prepare analysis, and provide timely for strengthened operational capacity adequate to enlarged programme and new needs	10. Analysis of and strengthening the SPA/RAC capacity for SAP BIO	Analysis prepared, measures adopted and implemented, capacity strengthened, No. of staff increased	A: SPA/RAC P: Donors, in case of secondement	Analysis approved; measures implemented; No. of staff timely increased	Asm: Approved by Biennial Programme / Budget; or secondement secured by donors contribution Rs: staff involved in non - SAP BIO activities; assumpts not met
To: - identify areas for MPAs, - establish new MPAs, - strengthen MPAs management, - establish MPAs Med Network	11. Implementation of the GEF-MPAs sub-component (pending definition of sub-component support, status and programme)	Pending: - reconfirmation of donors commitments; - definition of sub-component status and programme; - GEF project approved and operational (if MPAs included)	A:MEDUnit, SPA/RAC, UNEP, GEF P: Donors committed for MPAs sub-component	pending resolving prerequisites, definition of status, programme and support	Asm: Ds commitment reconfirmed, status within or outside GEF project defined, GEF project operational, or prerequisites for separately implem. of the sub-component met Rs: assumpts not met
To provide means and conditions for successful implementation of activities 1-11	12. Progress of implementation of the Operational Plan: reporting, monitoring, evaluation	Reports, recommendations; Problems identified, resolved; Implementation successful / improved	A: SPA/RAC, ad hoc groups, Adv. Comm., Nat. Corr. NFPs for SPAs	Reports timely presented, problems identified, measures proved as adequate, evaluation positive, implem. improved	Asm: Flow of inform. / reporting / evaluation timely and adequate; proposed measures realistic and applicable Rs: assumpts not met.

Annex II. Estimated Budget

ACTIVITIES/ PLANNED ACTIONS	EXPECTED OUTPUTS	INITIATIVES/ ACTORS (A) PARTNERS (P)	BUDGET, Euros					
			2008			2009		
			MTF	EC	Ext	MTF	EC	Ext
<u>I. SAPBIO THROUGH SPA/RAC BUDGET</u>								
1. Reviewing R SAPBIO priorities, refining R Inv. Portfolio.	Reviewed R priorities, refined R Inv. Portf.	A: SPA/RAC, ad hoc group, AdvComm., NatCorr, NFPs for SPAs	7 000					
2. Updating NAPs and refining and prioritising National Investment Portfolios	Updated NAPs; Refined and prioritised National Investment Portfolios	A: Nat. bodies, assisted by SPA/RAC			40 000			
3. Preparing Outline for SAP BIO Umbrella Operational Programme	Outline prepared as input for Donors Conference and draft SAP Bio Umbrella Operational Programme	A: SPA/RAC, ad hoc group, AdvComm, NatCorr. P: Donors (Ds)	7 000		8 000			
4. Preparing documents for Donors Conference; consultations, displacements included	Missions; contacts; proposals of N and sub-reg. pilot actions; Donors declarations of interest	A: SPA/RAC, ad hoc group, AdvComm. P: Potential Donors (Ds) ,	20 000					
5. Donors Conference, implementation	Conference Report and documents (deliverables), Ds commitments and a supported programme	RA: SPA/RAC, ad hoc group, AdvComm., NA: NatCorr P: Potential Ds	10 000		50 000			

ACTIVITIES/ Planned Actions	EXPECTED OUTPUTS	INITIATIVES/ ACTORS (A) PARTNERS (P)	BUDGET Euros					
			2008			2009		
			MTF	EC	Ext	MTF	EC	Ext
6. SAP BIO National SAPs	Nat. SAP BIO SAPs, SPA/RAC assistance to countries	A: Nat. bodies, assisted by SPA/RAC P: Potential Ds						15 000 +**
7. Meetings of SAP BIO Advisory Committee (2 in 2008, 1 in 2009)	Meetings reports and Reference documents	A: SPA/RAC, Adv. Comm, P: potential / committed Ds	16 000			3 000		5 000
8. Meetings of SAP BIO National Correspondents (1 in 2008, 1 in 2009) .	Meetings reports and Reference documents	A: SPA/RAC, NatCorr P: potential / committed Ds	10 000					10 000
9. SAP BIO Umbrella Operational Programme for 2010-2025	Programme drafted, finalised and adopted	A: SPA/RAC, ad hoc group, AdvComm, NatCorr, NFPs, MAP RACs- Progrs, Ds						20 000

ACTIVITIES/ Planned Actions	EXPECTED OUTPUTS	INITIATIVES/ ACTORS (A) PARTNERS (P)	BUDGET Euros					
			2008			2009		
			MTF	EC	Ext	MTF	EC	Ext
10. Design/preparation of selected sub-RAPs and NAPs and preparatory activities for actions to be funded by donors	Sub-RAPs (Posbl. themes: Inventory & cartography. Climate change, Indicators, Aliens, Fish Reserves) and NAPs formulated; assistance to countries provided to start implement. in early 2010	A: RAC staff, P: partial co-funding				17 000		**
11. SAPBIO Participatory programme	Biennial and long term Participatory Programmes	A:RAC staff, stakeholders, P: Donors	****	****	****	****		****
SAPBIO LAUNCHING ACTIVITIES THROUGH SPA / RAC BUDGET, <u>TOTAL</u>			70 000		98 000	20 000		50 000 + **** * as se-condee
12. Strengthening SPA/RAC capacity for implementation of SAP BIO	One permanent or seconding SAP BIO Assistant Programme Officer	SPA/RAC	22 000			23 000		Alternati ve * as se- condee

* pending results of contacts with donors, to be defined by SPA/RAC before meeting of MAP NFPs, and included in the proposal for the 15th OMCPs

** in accordance with results of Donors Conference and of donated funds available in 2009, or

*** using revolving fund, if applicable,

**** from regular programmes and budgets, estimates of contributed values to be included in brackets, not additional request from budget

ACTIVITIES/ PLANNED ACTIONS	EXPECTED OUTPUTS	INITIATIVES/ ACTORS (A) PARTNERS (P)	BUDGET, Euros					
			2008			2009		
			MTF	EC	Ext	MTF	EC	Ext
II. Reg. GEF Project, MPAs sub-component	Implementation of the Regional GEF Project - MPAs sub-component Coordination and implementation of the project	A: SPA/RAC, MEDU, GEF P: French and Spanish donors, other donors	60 000		*	60 000		*
III. Actions funded by donors, as result of Donors Conference	to be defined early in 2008							** ***
IV. SPA/RAC RegAPs or transversal SPA/RAC activities	to be listed by SPA/RAC	A: SPA/RAC, national inst./ authorities	****			****		
V. External activities implemented by partners (adv. Comm. members)	to be included by SPA/RAC, upon questionnaires and next meeting of Adv. Comm.	A: members of Adv. Comm., others			****			****
VI. Reporting, monitoring, evaluation	regular and ad hoc reports	A: SPA/RAC, NFPs, Adv. Comm., P: Dons, other partners	****			****		****

* pending results of contacts with donors, to be defined by SPA/RAC before meeting of MAP NFPs, and included in the proposal for the 15th OMCPs

** in accordance with results of Donors Conference and of donated funds available in 2009, or

*** using revolving fund, if applicable,

**** from regular programmes and budgets, estimates of contributed values to be included in brackets, not additional request from budget

**Annex III. Summary of answers to Questionnaires on SAP BIO
implementation by Advisory Committee members**

(to be prepared by SPA/RAC after the 8th meeting of FPs for SPAs)

Annex IV. List of Reference documents

Annex IV.

List of Reference documents

References related to SAP BIO:

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ANNEX VI

Draft Common criteria for amending Annexes II and III of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean

**Draft Common Criteria for amending Annexes II and III of the
Protocol concerning Specially Protected Areas and Biological
Diversity in the Mediterranean**

The Contracting Parties to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean.

Considering that the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean provides for the adoption of common criteria for the inclusion of additional species in the annexes;

Taking into account the recommendation of their 14th Ordinary Meeting (Portoroz, Slovenia, 8-11 November 2005) that approved the principle of amending the lists of species included in Annexes II and III of the “SPA & Biodiversity” Protocol on the basis of criteria to be established;

Aware of the need to ensure that the lists of species appearing in Annexes II and III of the Protocol develop taking into account both the evolution of the conservation status of species and the emergence of new scientific data;

Stressing the importance of ensuring harmonisation between Annexes II and III of the “SPA & Biodiversity” Protocol and the relevant annexes of other international and/or regional conventions and agreements pertaining to the preservation of species;

Stressing further that if the conservation status of a species is deemed unlikely to ensure its survival, the lack of scientific certainty should not be invoked as a reason for postponing its inclusion in one of the two Annexes (II or III) of the Protocol.

Recognizing the important role played by some specialised organisations in monitoring and assessing the conservation status of species;

Have agreed as follows:

General principles

1. The present criteria will apply to the evaluation of proposals for:

- inclusion of new species in Annexes II and III of the Protocol;
- removing species from these annexes;
- transferring species from one of the said lists to the other;
- modifying the names of species, as a result of changes occurred in taxonomy

2. No limit is set either on the total number of species included in Annexes II and III of the Protocol, nor on the number of species that an individual Party can propose for inclusion in these annexes. However, Parties agree that species will be selected on a scientific basis and will be included in the Annexes based on their conservation status; they will therefore have to conform to the conditions laid out in the Protocol and to one or several of the following criteria.

3. The IUCN Red List¹ categories and criteria developed for assessing the conservation status of species are used by most international conventions. It is recommended that they be used for

¹ (a) IUCN 2001. IUCN red list Categories and criteria. Version 3.1. Species Survival Commission, Gland.
(b) IUCN 2003. Guidelines for the Application of IUCN red list Criteria on the regional level. Version 3.0 Species Survival Commission. Gland. The two documents can be downloaded from: http://www.redlist.org/info/categories_criteria.html.

assessing the status of species when examining proposals for amending Annexes II and III of the Protocol.

4. A species that is threatened outside the Mediterranean region and is known to be occasionally or marginally present in the Mediterranean may be considered for inclusion in the Annexes to the Protocol unless it is a potential invasive species.

5. The criteria listed below do not figure either in order of importance or of priority.

Common Criteria to be applied in evaluating proposals for inclusion of species in Annex II of the Protocol.

1. A species can be included in Annex II to the Protocol if, on the basis of reliable scientific data, it is demonstrated that :
 - the species is in decline with a substantial reduction in its numbers (observed, estimated, inferred or suspected); or that
 - important reductions (including fragmentation) of its habitats have been observed in the Mediterranean or that
 - the species or its Mediterranean population figures on the IUCN red list as critically endangered, endangered or vulnerable or appears in the IUCN-ACCOBAMS cetacean Red List.
2. Habitat building species and those at the basis of important biological formations for the Mediterranean may be included in Annex II of the Protocol if important regressions of the said habitats or of the areas covered by the said formations have been observed, inferred or suspected over the last 10 years.
3. A species endemic to a country, or a group of countries, may be included in Annex II of the Protocol at the proposal of the country, or of the group of countries in question.
4. The inclusion of a species in Annex II of the Protocol may be decided if it proves necessary to the adequate implementation of conservation measures advocated for a species already included in the said annex.

Common Criteria to be applied in evaluating proposals for the inclusion of species in Annex III of the Protocol. .

5. A species may be included in Annex III of the Protocol if:
 - statistical data show a regression of more than 50% of landings over the past 5 years; or
 - unless its exploitation is regulated, it is likely to fall into the category of endangered or threatened species as defined by the Protocol.
6. A species may be included in Annex III of the Protocol if the techniques used to exploit it are destructive to biological formations or habitats listed on the reference list of habitats of conservation interest adopted within the MAP framework.

Common Criteria to be applied in evaluating proposals for removing species from Annexes II and III of the Protocol.

7. A species may be removed from Annexes II or III of the Protocol if reliable data, especially better available scientific data, indicate that the reasons that led to its initial inclusion no longer exist.
8. However, removal can only be considered if the said species runs no risk, in the short or medium term, of finding itself in the condition that originally warranted its inclusion in the said annexes.

Procedure to be followed in amending Annexes II and III of the Protocol.

- (a) The Parties submitting proposals for inclusion of species or their removal from an Annex will submit a proposal to the Regional Activity Centre for Specially Protected Areas, in conformity with the attached model, at least 90 days before the Meeting of Focal Points for SPAs. The proposal must be submitted either in English or in French;
- (b) The Centre will immediately forward the proposal, in its original version, to the other Parties and to the MAP Coordinator;
- (c) The proposal will be submitted to the meeting of Focal Points for SPAs, which will proceed to evaluate it in the light of the above common criteria. To this end, RAC/SPA will proceed to the translation of the original version so that the proposal may be sent to the Focal Points for SPAs and to the relevant international organisations in English and in French at least a month before the Focal Points meeting;
- (d) The proposal accompanied by the recommendation from the Focal Points for SPAs meeting will be submitted to the Contracting Parties for decision. The possible amendment to the annexes must be conducted in conformity with the provisions of article 16 of the Protocol.

This procedure is in line with the provisions of the Protocol concerning the amendments of Annexes.

Furthermore, the Contracting Parties, may instruct RAC/SPA to undertake evaluation exercises about the status of species with the view of proposing amendments to Annex II and or Annex III to the Protocol.

Form for proposing amendments to Annex II and Annex III to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean.

Proposed by : <i>(Indicate here the Party(s) introducing the amendment proposal)</i>	Species concerned: <hr/> Amendment proposed : <ul style="list-style-type: none"> <input type="checkbox"/> Inclusion in Annex II <input type="checkbox"/> Inclusion in Annex III <input type="checkbox"/> Removal from Annex II <input type="checkbox"/> Removal from Annex III
Taxonomy Class : Order : Family: Genus and Species : Known Synonym(s) : Common name (English and French):	Inclusion in other Conventions : <i>(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention .)</i> IUCN Red List status of species IUCN-ACCOBAMS cetacean Red List.
Justification for the proposal : 	
Biological data Brief description of the species: Distribution (current and historical) Population estimate and trends: Habitat(s) :	

Threats

Existing and potential threats:

Exploitation:

Proposed protection or regulation measures

Bibliographical references

ANNEX VII

DRAFT GUIDELINES FOR THE ESTABLISHMENT AND MANAGEMENT OF MARINE PROTECTED AREAS FOR CETACEANS

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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 areas². 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 con-

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."

ervation, including in the high seas (ACCOBAMS Agreement, Annex 2, Art. 3). This considered, 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:

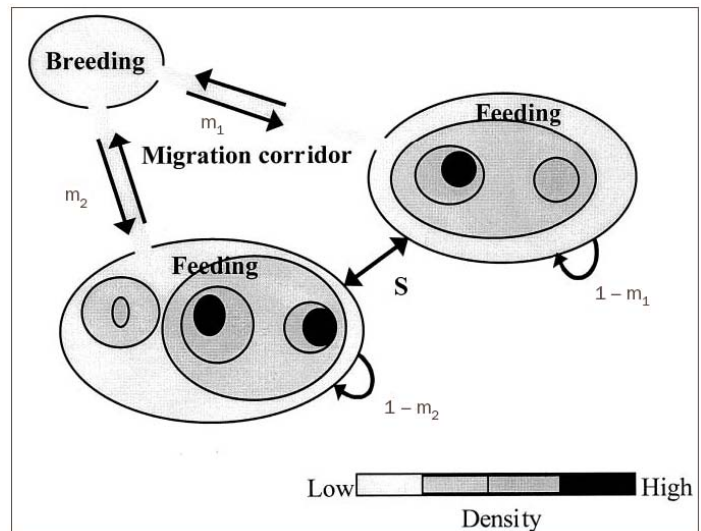
- Cetaceans are highly mobile animals. Optimal design of a protected area intended to conserve a given population would need to encompass that population's entire year-round distribution. While it may be possible to accomplish such a design for some resident or non-migratory species, the ranges of most 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). Criteria³ 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 activities⁴ 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.

^{3,4}(see page 3, Document UNEP(DEPI)/MEDWG.308/Inf.11)

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.

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-variables 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 north-

ern 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

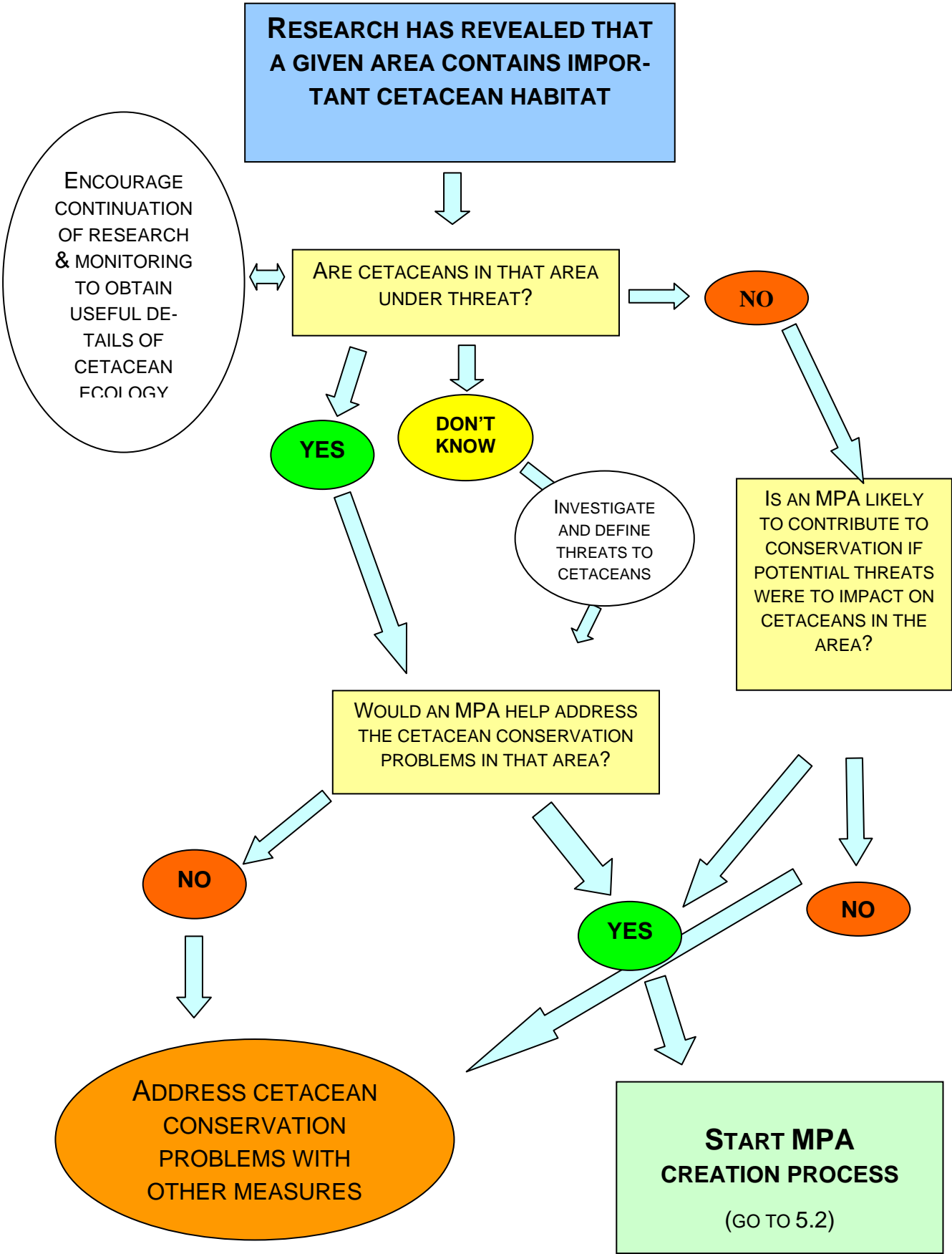
With the notable exception of the Pelagos Sanctuary, all the MPAs existing in the Mediterranean have been established to protect coastal waters (Mabile and Pianté 2005). As a consequence, most existing Mediterranean MPAs may only contain habitat of coastal cetaceans, such as common bottlenose dolphins (*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.

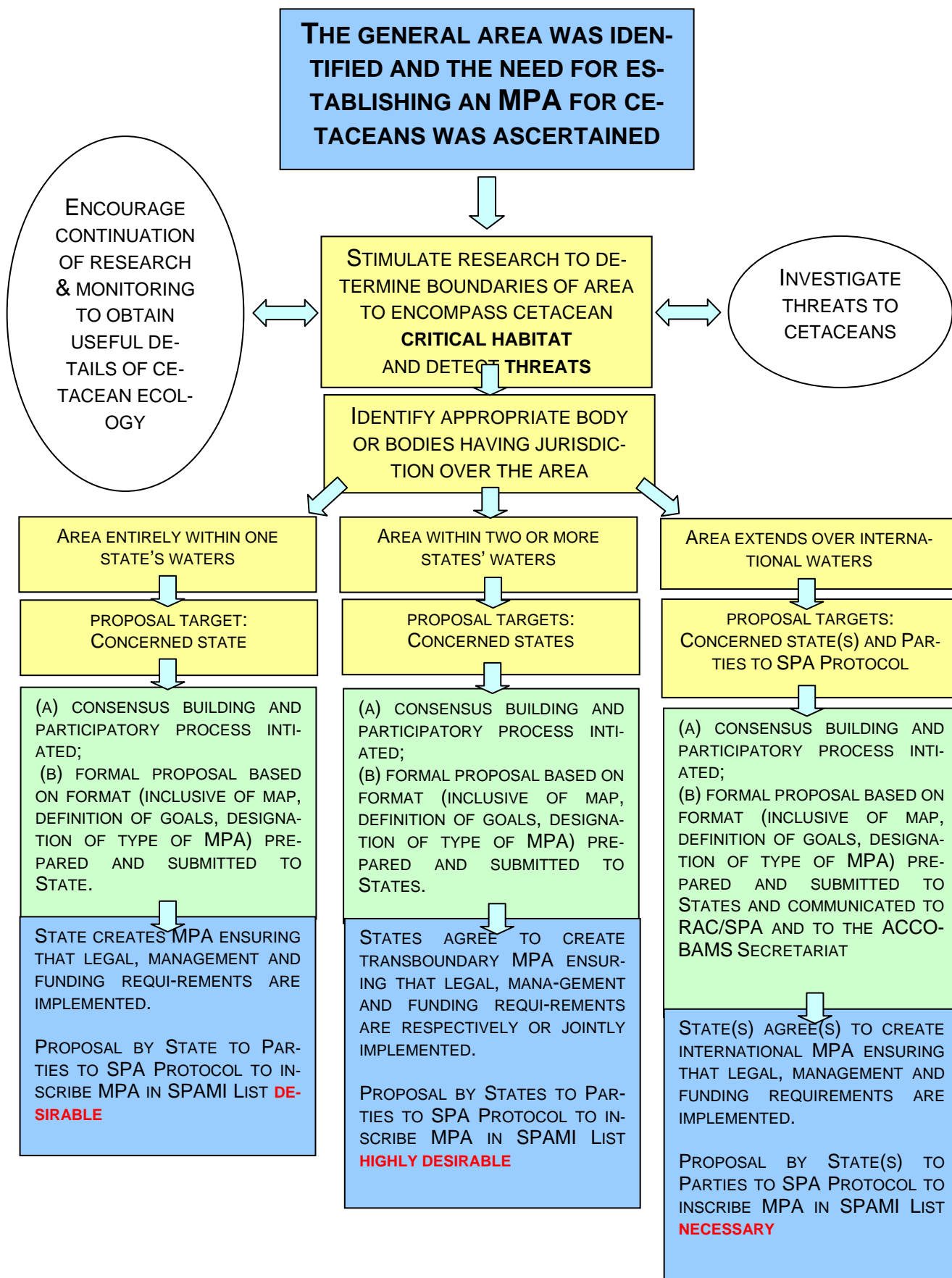
5. Practical support to the guidelines

- 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-operation/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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ANNEX VIII

**DRAFT GUIDELINES FOR MANAGEMENT AND MONITORING
THREATENED POPULATION OF MARINE AND COASTAL BIRD
SPECIES AND THEIR IMPORTANT AREAS IN THE
MEDITERRANEAN.**

INTRODUCTION

In 2003 the Regional Activity Centre for Specially protected Areas (RACSPA) published an Action Plan for the conservation of bird species listed in Annex II of the protocol SPA and biological diversity. This action plan forms a logical base for decision-making at the regional level and provides a setting for detailed planning and implementation at the national level. Its main objective is to maintain and/or restore the population levels of bird species found in the SPA Protocol's Annex II to a favourable conservation status, to stop the decline of any species and to increase the populations to acceptable levels to ensure their long-term conservation. The bird species, which figure in Annex II, are listed in the following Table (Table1). This gives a brief overview of their current status in the Mediterranean.

Table 1: Overview of the current status of bird species listed in annex II of the SPA /BD Protocol

Annex II species	Current Status
<p>Cory's Shearwater <i>Calonectris diomedea</i></p>	<p>Nominate race <i>Calonectris d. diomedea</i> is restricted to the Mediterranean. Breeds in sea-cliffs, and on rocky islands and islets. Population estimated at less than 76,000 pairs, but surveys in the eastern part of the Mediterranean and in the Adriatic are lacking.</p>
<p>Yelkouan Shearwater <i>Puffinus yelkouan</i> (<i>P. Yelkouan</i> was considered as polytypic with <i>P. y. mauretanicus</i> as a subspecies. Recently it has been split into two monotypic species <i>P. yelkouan</i> and <i>P. mauretanicus</i>).</p>	<p>Restricted to the Tyrrhenian, Adriatic and Aegean Seas. Breeds on rocky islands and islets. Population 13,000 – 33,000 pairs. Some pairs may breed along the North African coast. Surveys in the eastern part of the Mediterranean and in the Adriatic are lacking.</p>
<p>Balearic Shearwater <i>Puffinus mauretanicus</i> (<i>P. yelkouan</i> and <i>P. mauretanicus</i> are listed as one species in Annex II)</p>	<p>Endemic to the Balearic Islands. Population ca. 3,300 pairs. Breeds on rocky islands and islets.</p>
<p>European Storm Petrel <i>Hydrobates pelagicus</i> (Mediterranean race – <i>melitensis</i>)</p>	<p>Pelagic species breeding in small to very large colonies mainly on islets and in caves along the coast. Subspecies <i>melitensis</i> is endemic to the Mediterranean. Important breeding colonies are found in Malta, Sardinia and Sicily. Breeding surveys are totally lacking for the Adriatic and eastern Mediterranean. Population in the surveyed colonies estimated at less than 16,000 pairs.</p>
<p>Shag <i>Phalacrocorax aristotelis</i> (Mediterranean – <i>desmarestii</i>)</p>	<p>Subspecies <i>desmarestii</i> endemic to western Mediterranean (Balearic Islands, Corsica and Sardinia), and the Adriatic, Aegean and Black Seas, breeding along the coast on rocky islands and islets. Mediterranean population less than 10,000 pairs.</p>
<p>Pygmy Cormorant <i>Phalacrocorax pygmeus</i></p>	<p>Main Mediterranean breeding populations in Serbia Montenegro (2,400 - 2,800 pairs), Greece (1,250 - 1,310 pairs), and Turkey (1,300 – 1,800 pairs), with some pairs in Albania, Israel and Italy (up to 150 pairs). Restricted to lowland freshwater and brackish habitats. In winter frequents coastal lagoons, deltas, rivers and riparian forests.</p>
<p>White Pelican <i>Pelecanus onocrotalus</i></p>	<p>Mediterranean populations breed in Turkey (180-420 pairs) and Greece (50-100 pairs). Nests on the</p>

	ground in large reed beds, bare earth or rocky islands, in isolation from mainland.
<p>Dalmatian Pelican <i>Pelecanus crispus</i></p>	<p>Mediterranean populations breed mainly in Albania (19 pairs), Greece (500-550 pairs) and Turkey (220-250). Breeds on inland and coastal wetlands. Nests on floating islands of reeds and on bare ground on islands, isolated from mainland. Up to about 3,500 birds may winter in Albania, Greece, Syria and Turkey.</p>
<p>Greater Flamingo <i>Phoenicopterus roseus</i> (This is listed as <i>Phoenicopterus ruber</i> in Annex II. The Greater Flamingo was formerly regarded as a subspecies <i>Phoenicopterus ruber roseus</i> but recently it is being treated as a separate species <i>P. roseus</i>.)</p>	<p>Mediterranean populations breed in localised sites in suitable wetlands, mainly in Spain (23,000 pairs), France (15,300 pairs) and Turkey (15,000 – 16,000 pairs), as well as in Tunisia and Italy. Breeding is irregular with numbers fluctuating from one season to another. Substantial numbers also occur in winter in Greece (5,8000 – 11,2000 birds) and Cyprus (5,000 – 15,000 birds – in some years 4-40 pairs are known to breed). Mediterranean population seems to be separated from Asiatic populations, with minimal exchange and overlap in Libya and Egypt.</p>
<p>Osprey <i>Pandion haliaetus</i></p>	<p>A cosmopolitan species, which is vulnerable in several regions. in the last fifteen years less than 70 pairs have been known to breed regularly in the Mediterranean (Balearic Islands, Corsica, Morocco and Algeria). Some local small populations have disappeared from other islands (e.g. Ibiza, Sicily & Sardinia).</p>
<p>Eleonora's Falcon <i>Falco eleonora</i></p>	<p>Breeds in colonies along the coast of the mainland or on rocky islands, which are often uninhabited. The total world population is about 6200 pairs. Almost all the entire population breeds on rocky Mediterranean islands. The Aegean islands and Crete hold about 70% of the whole population, but other substantial colonies are also found in Spain and Italy.</p>
<p>Slender-billed Curlew <i>Numenius tenuirostris</i></p>	<p>Once common in the Mediterranean region, now extremely rare in the Western Palearctic. Migrates from Siberia across eastern and southern Europe to winter in North Africa. On passage, occurs in a wide range of habitats: salt marshes, salt pans, brackish lagoons, dry fishponds, steppe and freshwater marshes.</p>
<p>Audouin's Gull <i>Larus audouinii</i></p>	<p>Endemic to the Mediterranean, breeding in coastal areas and on islands (population 18,000-19,000 pairs). Main breeding populations occur in Spain (17,000).</p>
<p>Little Tern <i>Sternula albifrons</i> (listed as <i>Sterna albifrons</i> in Annex II)</p>	<p>Mediterranean population (may reach 20,000 pairs) mainly along southern coastline and western basin. Quantitative data from the eastern Adriatic and eastern Mediterranean countries are lacking. Breeds in rivers and deltas, estuaries, lagoons and salinas.</p>
<p>Sandwich Tern <i>Sterna sandvicensis</i></p>	<p>Mediterranean population of up to 10,000 pairs. Nests in colonies mainly in river deltas and estuaries, on sandbanks and in salinas. Also</p>

	migrates from elsewhere into the Mediterranean for wintering.
Lesser-crested Tern <i>Sterna bengalensis</i>	Small localised population of endemic subspecies <i>Sterna bengalensis emigrata</i> (less than 4,000 pairs) breeds on two Libyan offshore islands. Breeding occasionally in France, Greece, Italy and Spain

The Action Plan highlights the threats faced by these bird species, mainly oil pollution, depletion of food resources, non-sustainable forms of tourism, disturbance, direct persecution and hunting, loss and degradation of habitat, particularly wetlands, and introduction of alien species. The following Table (Table 2) gives a summary overview of current threats.

Table 2: Summary overview of threats to annex II bird species.

Annex II Species	Recognised Threats
Cory's Shearwater <i>Calonectris diomedea</i>	Introduced mammals, (e.g. <i>Rattus</i> sp., which affect breeding success; illegal hunting; taking of eggs and chicks; mortality from bycatch; development close to colonies and disturbance, and possibly oil spills and chemical pollution of the sea.
Yelkouan Shearwater <i>Puffinus yelkouan</i>	Lack of food resources; lack of protection of breeding colonies; predation by <i>Rattus</i> sp, Yellow-legged Gulls <i>Larus michahellis</i> , and possibly feral cats; disturbance; collection for food (at least until 1970s); some mortality from bycatch; and possibly oil spills and chemical pollution of the sea.
Balearic Shearwater <i>Puffinus mauretanicus</i>	Lack of food resources; predation by introduced mammals; some mortality from bycatch; possibly pollution.
European (Mediterranean) Storm-petrel <i>Hydrobates pelagicus melitensis</i>	Loss of habitat; disturbance; predation by <i>Rattus</i> sp. and Yellow-legged Gull <i>Larus michahellis</i> ; possibly oil spills and chemical pollution of the sea.
Shag <i>Phalacrocorax aristotelis desmarestii</i>	Human disturbance; oil pollution; habitat loss; mortality from bycatch; Seine net fishing and long-line hauling close to colonies and moulting areas.
Pygmy Cormorant <i>Phalacrocorax pygmeus</i>	Degradation and loss of wetland habitat; persecution by fishermen; disturbance and hunting; destruction of breeding colonies.
White Pelican <i>Pelecanus onocrotalus</i>	Habitat loss and destruction; depletion of fish stocks; persecution and disturbance; pollution, flooding; disease; collision with electric power-lines.

<p>Dalmatian Pelican <i>Pelecanus crispus</i></p>	<p>Wetland drainage resulting in a sharp decline of available breeding sites; hunting; collisions with electric wires; persecution due to competition with commercial fisheries; and also some contamination by pesticides and heavy metal residues.</p>
<p>Greater Flamingo <i>Phoenicopterus roseus</i></p>	<p>Urban development; habitat loss for tourism development; disturbance; hunting.</p>
<p>Osprey <i>Pandion haliaetus</i></p>	<p>Habitat destruction and disturbance at breeding sites related to tourism. Some mortality also from illegal poaching and electrocution also occur.</p>
<p>Eleonora's Falcon <i>Falco eleonora</i></p>	<p>Predation by cats and rats; human disturbance in colonies; habitat degradation; taking of eggs and young; hunting.</p>
<p>Slender-billed Curlew <i>Numenius tenuirostris</i></p>	<p>Habitat loss in passage and wintering areas. Other factors unknown.</p>
<p>Audouin's Gull <i>Larus audouinii</i></p>	<p>Habitat alterations at breeding sites; changes in fishing practices and competition mainly with the Yellow-legged Gull <i>Larus michahellis</i>; egg collection and human persecution and disturbance. The depletion of food resources and chemical pollution and spills as threats and limiting factors are not properly known.</p>
<p>Little Tern <i>Sternula albifrons</i></p>	<p>Habitat loss; disturbance; predation; colony destruction.</p>
<p>Sandwich Tern <i>Sterna sandvicensis</i></p>	<p>Coastal development; disturbance by humans and animals; predation.</p>
<p>Lesser-crested Tern <i>Sterna bengalensis</i></p>	<p>Occasional disturbance by fishermen; probably predation by Yellow-legged Gull <i>Larus michahellis</i>; and possibly oil pollution and toxic chemicals.</p>

The Action Plan also underlines the fact that there are still many gaps in our knowledge concerning coastal and pelagic birds and their habitats in the Mediterranean, particularly seabird movements and their distribution at sea. Very little mapping, if any, of breeding, feeding, moulting and wintering areas of pelagic birds in the Mediterranean have been carried out. Due to this gap in our knowledge any project to manage their marine and coastal sites as well as to monitor their populations will be somewhat handicapped from its onset.

The monitoring and management of protected areas of coastal and marine important bird areas are indispensable in ensuring the long-term conservation of these bird species. One of the main actions to achieve the objectives of the Action Plan is the elaboration of a set of guidelines for monitoring the populations of these species and for the development of management plans for the coastal areas where they breed.

The objectives of this document are therefore the elaboration of such guidelines. Monitoring is generally one of the main activities envisaged in a management plan of an area and thus the guidelines are being presented hereunder in two sets in the following order:

- a) Guidelines for management plan for coastal and marine important areas to birds (nesting, moulting, breeding, feeding, wintering) and/or marine and coastal protected areas; and
- b) Guidelines for monitoring threatened population of marine and coastal bird species in the Mediterranean.

GUIDELINES FOR MANAGEMENT PLAN FOR COASTAL AND MARINE IMPORTANT AREAS TO BIRDS AND/OR MARINE AND COASTAL PROTECTED AREAS

Introduction

A management plan is the means by which a set of defined goals and objectives are reached. It may, or may not be a legal document but it must be capable of being understood by those whose duty is to implement it, and by those whose actions it seeks to control. Management plans may differ depending on the goals and objectives. A management plan could be a small-scale site-specific one. It could simply be aimed at eradicating an alien species from a particular area. Or it could be a large scale integrated one aimed at an entire ecosystem. It could address various problems and threats threatening the whole ecology of a site, or the population of one or more vulnerable species. It could include the restoration of a degraded site into its former ecological importance.

The first step in any management planning process is to define the goals and objectives of a management plan; in this case a management plan for a coastal and marine area that supports a colony, or colonies, of breeding birds. (All the species in Annex II are colonial nesters except for *Pandion haliaeetus* and *Numenius tenuirostris*, the latter being a very rare winter visitor). Ideally a small group of people should be in charge of the process. They should form a steering committee and identify a project coordinator. The planning process should include public awareness and participation on its agenda, as well as the use of the media.

In the early stages there are some basic questions, which need to be answered:

- a) What are the main issues that need to be addressed?
- b) What is the geographic range that the plan will cover?
- c) What existing information is available?
- d) What are the gaps in the information required?
- e) Are there enough resources (human and financial) to produce the plan? (Is hiring a consultant a necessity?)
- f) How is the consultation process going to be organised?
- g) What are the important commitments that should be obtained from the official side?

In the early stages of planning and management one should not be discouraged if there is a lack of sophisticated data. A realistic, competent plan can be developed on the basis of very simple descriptions of the physical, biological and socio-economic characters of an area. Each management plan may have to address problems, which are not encountered in other plans. But management plans generally have a similar format even if they have to address different problems.

A management plan should:

- a) introduce and define its purpose and scope with a clear statement of the goals and objectives;
- b) define the area, giving a geographic description of its setting and accessibility;
- c) focus on the resources found in the area; in this case the birds listed in Annex II;
- d) include and describe other resources found in the area;
- e) identify, describe and present, within a historical and legal context, any uses of the area, whether social or economical;
- f) highlight threats and conflicts;
- g) declare how the plan will deal with all the known threats to achieve its objectives;
- h) describe monitoring, research, surveillance, enforcement, interpretation and education, and restoration programmes.

All the above actions necessitate an orderly and efficient administration. The administration may have to face and solve several constraints, has to ensure adequate monitoring as well as an evaluation of the plan's implementation. It has to apply the plan in a flexible manner to adapt it to deal with changed circumstances in a way, which would improve the management of the site, and review the plan after a pre-determined period of years (usually four to five years).

The following Table (Table 3) is an example of a management plan, which can be applied for any area supporting the species found in Annex II and for which these guidelines are earmarked.

Table 3: Example of Management Plan Format

Format & Contents	Notes
TITLE PAGE	<p>This should include:</p> <ul style="list-style-type: none"> • the name of the site to be managed and its status; • the words - MANAGEMENT PLAN; • the name of the institution, organisation or any other agency responsible for implementing the plan; • the preparation date of the plan; and • the expected date for the management plan's review.
EXECUTIVE SUMMARY	<p>This should cover the fundamental issues and necessary decisions. Decision makers do not always have time to go through all the details of a management plan and such a summary is therefore essential to have immediately after the title page. The summary should include briefly:</p> <ul style="list-style-type: none"> • the reasons underpinning the plan; • its timeframe; • any special preparatory conditions (including the legislative basis and authority for plan development); • the main items of the plan; • an estimated budget; and
CONTENTS PAGE	<p>This should list all the headings of the plan against the appropriate page numbers. Sub-headings should also be included to make it user-friendlier.</p>
OBJECTIVES FOR MANAGEMENT	<p>The goals and objectives for management are stated in this section. They should reflect the rationale underpinning the protection and management of the area.</p>
RESOURCE DESCRIPTION	<p>This section should provide information on the following topics:</p> <ul style="list-style-type: none"> • Name of area, exact location and size; • Define the physical features of the site regarding the ecology of the species (eg. Climate (precipitation, temperature, and winds), Geographic and habitat classification; Geology; Hydrology, etc). • Plant life. This should include at least a description of the dominant plant communities. A species list of plants identified in the area should be listed in an appendix. • Fauna (other than birds) – a brief overview of species having interaction with the bird species concerned. • Conservation status at different levels. • Nature of threats (concerning both species and site); <ul style="list-style-type: none"> ○ History with a summary account of any human involvement in the area;

	<ul style="list-style-type: none"> ○ Current human use and development; ○ Risk of pollution; Etc. • Avifauna – a detailed overview of the bird life of the area (for the purpose of this document we have to assume that the main module are the birds which are listed in Annex II of the protocol concerning specially protected areas and biological diversity in the Mediterranean. See Table 1.) One may here emphasise the requirements of the species which is addressed by the management plan as well as the interactions with other species.
DESCRIPTION OF MANAGEMENT ISSUES	A detailed overview of threats (see Table 2) and possible management conflicts should be presented in this section. One should also include some information on any historic or current conflicts between uses or user groups.
MANAGEMENT POLICIES	<p>This section should</p> <ul style="list-style-type: none"> a) address the threats and conflicts and recommends solutions while reiterating clearly the goals and objectives. b) describe any programme of surveillance (e.g. assessing movement of people or any vessels and aircraft within or close to the area). c) describe a monitoring and research programme particularly of the species for which the area is being managed (see “Guidelines for monitoring threatened population of marine and coastal bird species in the Mediterranean” in this document). A detailed and time-framed monitoring programme could also be presented as an appendix. d) set timeframes for programmes and how these will be used to review the management plan. e) describe cooperation programs with educational institutions, associations and community groups to promote protection, public understanding, and wise use. f) outline any necessary enforcement arrangements to detect apparent offences and to apprehend and prosecute offenders (but it must be emphasised that education should be the main management tool to eliminate offences).
MAINTENANCE & ADMINISTRATION.	<p>This section should present</p> <ul style="list-style-type: none"> a) the budget (anticipating costs to seek the necessary funds). b) staffing needs (including consultants and volunteers).
INFORMATION SOURCES	A list of government agencies, non-government organisations, individuals, consultants, etc. who provided Information regarding the area used in the management plan.
REFERENCES	This should include a list of publications and reports used to compile the management plan.

<p>APPENDICES</p>	<p>These may include:</p> <ul style="list-style-type: none">• flora list;• fauna list;• maps;• photographs;• figures;• tables;• time-framed monitoring programmes.
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GUIDELINES FOR MONITORING THREATENED POPULATION OF MARINE AND COASTAL BIRD SPECIES IN THE MEDITERRANEAN

Natural resource monitoring is the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress towards meeting a management objective. The regular monitoring of selected species can identify changes, if any, in population numbers, but it can also perceive changes in the threats or detect any possible new threats. Reliable information on changes in population levels and on the causes of those changes is therefore vital and presents the timely opportunity to apply the necessary management activities to overturn or prevent negative trends.

These guidelines are aimed at the fifteen (now considered to be sixteen) species listed in Annex II of the protocol SPA and biological diversity, and may be applied to them accordingly. Except for the Slender-billed Curlew *Numenius tenuirostris*, all the species breed in the Mediterranean, and all of them, with the exception of *Pandion haliaeetus*, breed in colonies.

The size of a population can be effectively used as a tool to measure the well being of a species and therefore it is imperative to monitor the population of threatened marine and coastal bird species in the Mediterranean. In those areas where some form of "stock-taking" has already been undertaken, this can be used as a benchmark for a monitoring programme, which in a period of a few years will help to identify any positive or negative trend of a population, assuming that the same methods to collect data are used (An example of Annual colony register is given in annex I).

In any "stock-taking" exercise, particularly in the poorly known bird areas, one has to start by answering simple questions:

Do any of the Annex II species occur here?

- When do they occur?
- In what numbers do they occur?

It is surprising the amount of important information that can be gathered by answering such simple questions. Colonies of breeding birds, which can be fairly easy to locate and count (such as gulls and terns), do not pose much of a problem to monitor. But species, such as shearwaters and petrels, which breed on remote and inaccessible areas, present a different story. It is understandable that with a number of the species found in Annex II, such as *Hydrobates pelagicus* and *Puffinus* sp, even their detection may be difficult, let alone monitoring them. Thus, in most cases, answering the above simple questions may entail a lot of preparation, hard work and some experience.

The numbers of birds may be affected by a variety of factors including threats (see table 3). But they may also fluctuate through a natural process. It is therefore imperative that one takes this in consideration when monitoring the numbers of a population so that the natural fluctuations are not confused with the human-induced ones, whether it is pollution, direct persecution, introduction of alien species, or other similar threats.

One has also to ascertain that any changes detected by monitoring are actually occurring in nature and not simply a result of different measurements taken by different people or in slightly different ways. It is therefore useful to develop and implement a detailed and exacting *modus operandi* as part of any monitoring program, whether a short-term or a long-term one.

The development of a monitoring programme should consist of a framework, which includes:

- a) the goals and objectives;
- b) information on subject to be monitored;
- c) a sampling strategy and design;
- d) a clear method of data collection and handling.
- e) reporting.

Information about the natural history of the species involved is crucial in tailoring the methods to suit the situation. It is essential that those participating in any monitoring programme be well versed in the species' ecology and conservation. The success of any bird monitoring or research project hinges on the standard of the observers collecting the data.

Physical monitoring activities (such as counting, checking nest-sites, collecting biological data, etc) should be carried out preferably in good weather conditions. Heavy winds and rain for example, apart from providing difficult conditions to work in, may affect the quality of the data collected.

Modern technologies such as satellite tracking and geo-referenced data loggers, at least for the larger species, allow direct sampling at sea of the most used migratory and/or feeding routes, as well as very relevant information of the bird's behaviour. Identifying the breeding and non-breeding offshore areas constitutes a great challenge that can only be solved by using an integrated mixture of current technologies, albeit still rather expensive. Using individually tracked birds is an essential tool to identify feeding, moulting and or dispersing areas for some of the species dealt with here.

Data should be recorded on field forms, which should be standard to ensure compatibility of data taken between participants and on different dates of a monitoring program. Using maps and diagrams is an efficient way to record data, apart from helping in keeping track of locations of birds and nest sites.

As we are dealing mainly with colonial nesting birds it would be essential to compile a register for each colony. A register should include:

- a) A description of the study area and the breeding colony (colony name, location, status, description of habitat, any historical facts and counts, counting problems, percentage of the colony that can be properly investigated);
- b) Dates of visits;
- c) Counting methods used;
- d) Counts and data collected (number of individual birds on land, apparently occupied territories, apparently occupied nests, and notes on behaviour);
- e) Other relevant information.

Counts of birds in a colony should be carried out at least once during the breeding season. However if counts are repeated at different times during the breeding season better estimates of the breeding population in a particular colony can be achieved. Visiting the site before the fledging period is essential to investigate the breeding success rate within a colony. During counting, investigating nest sites, marking birds, taking biometrics, and other data collecting activities, one has to make sure to minimise disturbance as much as possible.

Capturing and marking under accepted protocols can abet the counting of birds and the estimation of population size. Marked individual birds assist in estimating population size, but also calculating survival rates, measuring dispersal and other movements and measuring the reproductive rate success of individual birds.

Counting methods may vary according to the species. Several methods are available for the gulls and terns (in this case the Audouin's Gull *Larus audouinii* and the three tern species *Sternula albifrons*, *Sterna sandvicensis* and *Sterna bengalensis*). One can physically count the apparently occupied nest-sites, or estimate nest-sites by using line transects or quadrats. "Flushing" counts can also be carried out in isolated locations, particularly on small islands. Birds are rapidly counted when they fly up in the colony, and then the number of pairs are estimated. Rough estimates can also be made by aerial counts when flying over colonies. Aerial photography assists to have more accurate estimates.

Monitoring shearwaters (*Calonectris diomedea*, *Puffinus yelkouan* and *Puffinus mauretanicus*) in the Mediterranean is not an easy task, particularly in those areas where they breed in cliff faces. In most colonies only a small percentage of a colony can be monitored if one requires counting apparently occupied burrows. Burrow-nesting species should be counted by sampling procedures. Droppings, and

other tracks and signs can determine presence and/or occupancy. An endoscope can be very useful, and very often the birds also respond to a tape-playback of their calls. This method of monitoring is best carried out during the egg-incubating period.

Monitoring rafts at dusk when they assemble waiting to visit the colony can also give results. This is best carried out before the egg-laying period, otherwise you may have also the non-breeders. One has to be careful in those situations where you may have breeding and non-breeding birds in the same study area. Experienced observers will be able to determine in situ, due to the birds' behaviour, which birds are breeders and which are not.

Capturing for marking and recapturing is vital for long-term monitoring of shearwaters. The same method of capture and recapture can be used for the European (Mediterranean) Storm-petrel *Hydrobates pelagicus melitensis*, which is even more difficult to detect, let alone count directly.

The "look-see" method is commonly used to assess the breeding populations of raptors. Low density and specialised nesting habitat in remote and inaccessible pose problems to monitoring a species such as the Osprey *Pandion haliaeetus*, particularly in the Mediterranean where it nests only on rocks or cliffs overlooking the sea. Initial monitoring efforts may include (a) locating and mapping nest-sites; and (b) checking number of nesting attempts, number of successful nesting, and number of fledged young.

With regards to the Slender-billed Curlew *Numenius tenuirostris* very little monitoring can be carried out due to the fact that it is now a very rare visitor in winter. But it is essential that one should keep a look out for the species when carrying out ornithological surveys of water birds wintering in the wetlands of the Mediterranean, particularly in those areas where the species has been recorded in recent years. Any sighting should be immediately reported to international bodies concerned with endangered bird species, particularly BirdLife International.

Due to their size and/or behaviour, the other species of the Annex are easier to locate although they may pose different problems when carrying out the actual monitoring at their breeding colonies. It is not the scope of these guidelines to go into the details for each species as the general guidelines for monitoring included here may be applied to all the species.

Although monitoring of species can be generally carried out all year round, for the purpose of the Action Plan's requirements, one should focus on the species during the breeding period. However for those species in this list, which also winter in the Mediterranean, and particularly the Pelican species (*P. onocrotalus* and *P. crispus*), it is also vital to monitor the wintering numbers. Monitoring the number of wintering birds in mid winter, preferably by counting birds at roosting sites, will give the desired results.

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Annex I : ANNUAL COLONY REGISTER

SPECIES: _____

Colony Name..... **Locality**..... **Year**.....

visit no.	date	Individual birds	occupied nests	estimated breeding pairs		weather	methods used	recorder
				min	Max			
1								
2								
3								
4								
5								
6								
7								
8								
9								

visit no.	date	general observations and remarks
1		
2		
3		
4		
5		
6		
7		

8		
9		

Annual Colony Register: Data sheet for counting colonial nesting birds covering a number of visits to a colony. One sheet per species within colony under observation.

ANNEX IX

Proposed procedure for the revision of the areas included in the SPAMI List

Proposed procedure for the revision of the areas included in the SPAMI List

The Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (hereafter the 'Protocol') came into force in 1999. Annex I of the Protocol lists mandatory criteria for eligibility for inclusion within the SPAMI list.

The purpose of this procedure is to evaluate SPAMI sites in order to examine whether they meet the Protocol's criteria (Annex I).

1. Ordinary review

1. The ordinary review procedure consists in two different sources of information about the status of SPAMIs:

- a) A Periodic Review, following the Format proposed herein after, entrusted every six years to a mixed national/independent Technical Advisory Commission; and
- b) The biannual National Reports from the NFP/SPA, serving as an early warning.

a) Periodic Review

2. A regular in depth review of the SPAMIs shall take place every six years, counting from the date of the inclusion of the site in the SPAMI List. Following the Format proposed ahead, this Periodic Review will assess the degree of conformity with the criteria defined in the Protocol. The Format concerns the existing threats, regulations, management, protection measures, resources, means, knowledge, cooperation and networking. Stakeholders should agree to the proposed sub-questions in the format before they are used in the evaluation. The Technical Advisory Commission (TAC) / evaluation team should receive the completed Format for Periodic Review and supporting documentation prior to the site visit.

3. The Periodic Review would be entrusted to a mixed TAC integrated by:

- The NFP/SPA concerned and/or the person responsible for the SPAMI management;
- A national expert on the particular biology and ecology of the area;
- Two independent experts, who would have all the necessary qualifications among scientific rigor, regional experience in protected area management, independence and impartiality, and should not be national of the country in which the review is carried out.
- At least one member of the evaluation team involved in the country visit must have a working knowledge of the language of that country (should not assume the PA staff can speak English, although this would be desirable).
- The evaluation team should receive key SPAMI documents and prescriptive list of threats prior to the field site visit.
- The evaluation team should make a preliminary assessment of SPAMI compliance based on the documents prior to the site visit.

4. To cover the costs of such Technical Advisory Commission a SPAMI Fund could be established, possibly allocating resources from the ordinary MAP budget, plus voluntary contributions from the States or other donor agencies. Expenses incurred by the experts during this visit shall be met by this Fund, as to ensure the appraisal is completely objective.

5. The Periodic Review will be based in an official format, for which a proposal is presented at the end of this document. The PA manager completes the *Format for Periodic Review* prior to the site visit by the evaluation team and that his/her responses to the sub-questions

are crossed reference to supporting documentation. The completed format should be endorsed by signature from all the members of the Technical Advisory Commission. However, the format includes a final field in which each member can add his /her own comments, if deemed necessary.

6. The results of the review shall be forwarded to the Centre, to be surveyed and presented in the next NFP/SPA biannual Meeting for endorsement. In the case of a negative recommendation (see Format) the NFP/SPA will recommend the Meeting of the Parties to include the SPAMI in a period of provisional nature.

b) National Reports

7. According to Art. 21.2. in the Protocol, the Parties must, at the earliest opportunity, communicate any situation that might endanger the ecosystems of specially protected areas or the survival of protected species to the other Parties, to the States that might be affected, and to the RAC/SPA. Article 23 states the three basic items that the reports from the Parties should consider.

8. As an early warning procedure, it is proposed that the existing National Report formats include three additional questions in Section 15, concerning the mandatory criteria of Annex I to the Protocol. This would be a simple means to allow a frequent review highlighting any relevant changes in the initial conditions within the SPAMI. Section 15 of the National Report format may be completed as follows:

15. SPAMI list:

- a) Any relevant modification in the status of populations of protected species (according to Annex II of the Protocol) inside the SPAMI, in the status of its habitats or any adverse changes or potential changes in the functioning of its ecosystems (following Article 8.2.)
- b) Any modification in the management plan officially adopted, in the legal and institutional framework or in the management and protection measures (following Article 7.2.a).
- c) Any modification in the management body, in its powers and means or in its human resources (following Annex I D.6.)

9. A significantly adverse change in any of the six items in the biannual National Report shall be presented at the NFP/SPA Meeting and –should the seriousness of the threat to the SPAMI recommend it- a decision by the NFPs would be taken on whether to inform the Meeting of the Parties, and/or require early support from other Parties or from the Centre, in taking any possible measures to solve the detected deficiencies. The assignment of an Extraordinary review, in order to objectively establish the sources and seriousness of the problem, is one of these possible measures.

10. In case of an ecological catastrophe, serious adverse event or emergency anytime within a SPAMI, the NFP may wish to request the Centre, anytime within the biannual period between two successive NFP Meetings, to proceed with an Extraordinary Review of the SPAMI as detailed ahead.

2. Extraordinary review

11. The Parties must be immediately informed of any important threat affecting the SPAMIs and of any relevant change in their legal, management or ecological status. The sources of

this information may be any of the following:

- a) A Periodic Review report declaring that the SPAMI presents severe deficiencies about which the Technical Advisory Commission recommends to take action (see para.3).
- b) A biannual National Report recognizing relevant modifications in any of the questions already mentioned for point 15 (see para.8.).
- c) A request from the NFP to the Centre anytime within the two years between two NFP Meetings, based on a serious emergency, change or event in the SPAMI (see para.10).
- d) External sources (partner organizations, other international or national NGOs, or other interested bodies) (see para.12).

12. In the latter case d), should there be a threat or serious damage to the area, and subject to the approval of the government concerned, and also on case c) upon extraordinary request from the Party concerned, the Executive Secretary may appoint an independent expert to assess, in the company of a representative of RAC/SPA, the reality and seriousness of the threat to the SPAMI objectives, in which case it would recommend the NFP/MAP to proceed with a detailed appraisal in accordance to the procedures laid down in this proposal.

13. In any of the cases a) b) c) or d), should the adverse situation prove a real threat to the SPAMI objectives, the NFP/MAP may recommend the Meeting of the Parties to request the responsible authorities to take any appropriate corrective measures, while the SPAMI would enter into a provisional period of three years in which the necessary recommendations and measures must be taken and implemented.

3. The period of provisional nature

14. A SPAMI would enter the period of provisional nature either

- a) After an ordinary -or an extraordinary- review recommends it, or
- b) It has been provisionally accepted as a new SPAMI in the List without fully complying with all the necessary criteria.

15. In fact, candidate sites to the SPAMI List, for which the selection criteria required under the Protocol are not completely but close to be met, pending the provision of assistance to the country concerned (V Meeting of the NFPs, para. 97) should also fall into this provisional period. The aim would be *“to stimulate Mediterranean solidarity and cooperation, and to encourage countries to identify and nominate relevant areas while awaiting assistance to finalize dossier”* (para.94).

16. A SPAMI can stay within the period of provisional nature for a maximum of six years. The Party concerned must inform in the next NFPs Meeting, within 2 years time, about the identification and launching of the adequate corrective measures.

17. SPAMIs in this provisional period, when the Party concerned asks for it, shall constitute a priority for cooperation and sponsorship from:

- a) Other Parties;
- b) Other SPAMIs, particularly those with a Diploma;
- c) Any tools specifically established for the case, such as expert commissions or the support from a SPAMI Fund.

18. Before the end of the six year period, an Extraordinary Review will be developed. Two options are envisioned for this review:

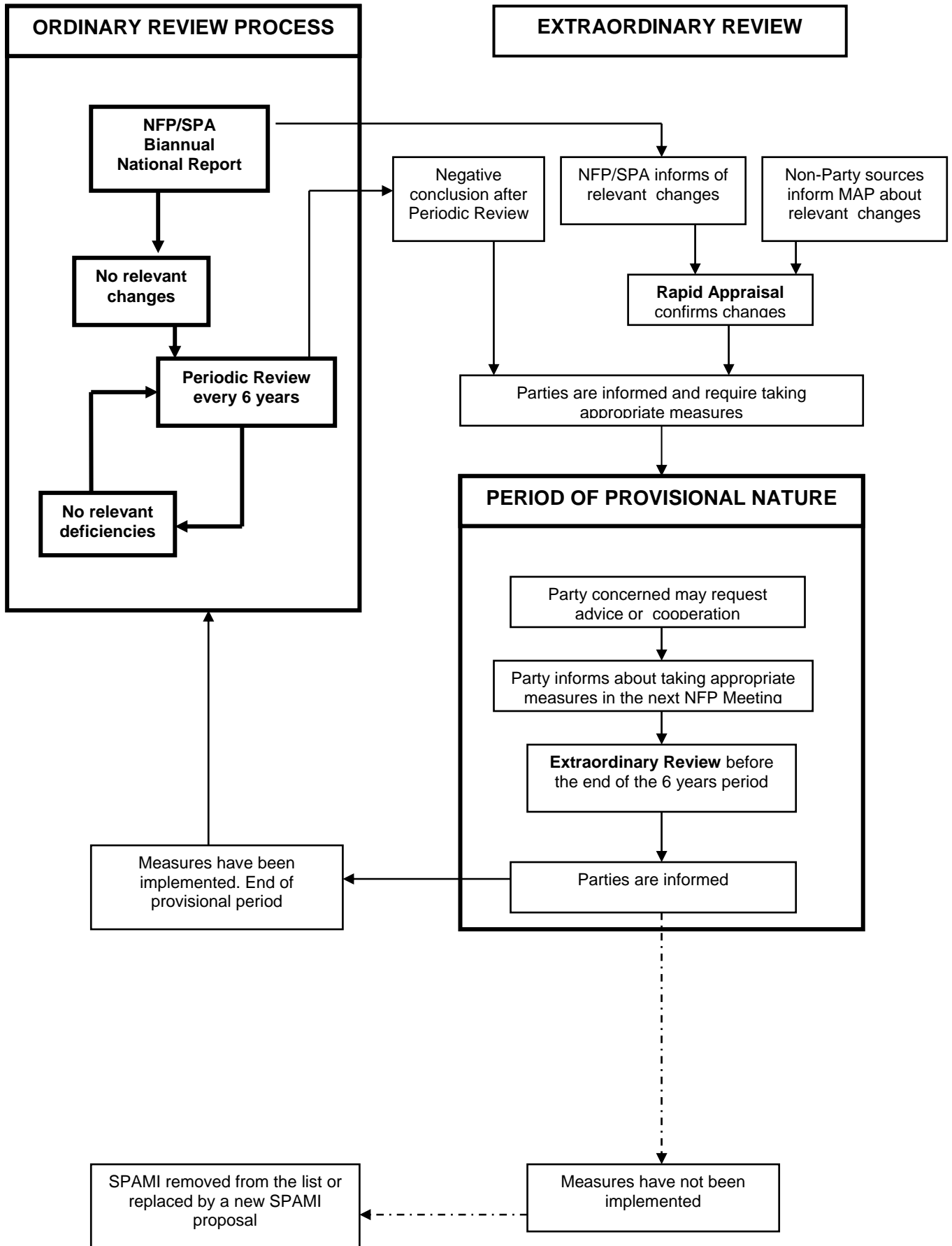
- Following the same procedure as for the Ordinary Review, or
- A rapid assessment (e.g. 2 days) entrusted to a simplified mission from the national SPAMI manager and an independent non-national expert

The results of this appraisal will be transmitted through the Centre to the next NFP/SPA Meeting.

19. If the Extraordinary Review concludes that the recommended measures were implemented and the legal, protection or ecological status has improved during the six years period (see Scoring and Resolution in the Format ahead), the SPAMI will leave the period of provisional nature and enter again into the regular review process.

20. Should the Extraordinary Review conclude that the damage is irremediable or that the necessary measures have not been implemented within the provisional period, the Parties may suggest the State concerned to remove the SPAMI from the List, considering -as established in Art.10 to the Protocol- that important reasons for doing so still remain. For this part of the procedure, a choice should be done between two options:

- a) The Party concerned would be invited to compensate the loss of a SPAMI with another site proposed within the same country. The final decision would rest in the Party concerned; or
- b) As provisionally set by the VI Meeting of the NFP/SPA (2003) in the "Draft Criteria and Procedures for Awarding the Mediterranean Diploma for SPAMIs" (Art.10.4), the decision for withdrawal *"shall be taken by the Meeting of the Parties by a two-thirds majority of the votes cast. It shall be notified by means of a resolution, and the reasons for such a decision shall be transmitted to the government concerned and the authorities responsible for managing the area"*.



4. Format for the Periodic Review

4.1. Objectives

21. The purpose of the Format is to assess in a way as objective and homogeneous as possible, the degree of conformity that the sites included in the SPAMI list keep with the criteria provided in the Protocol, and to appraise the evolution of the SPAMIs by comparing the results obtained through consecutive reviews.

22. The Format shall be completed every six years by the Technical Advisory Commission (see para. 3 in previous Section).

23. The resulting completed format shall be signed by all the members of the Technical Commission. At the end of the format there is a blank space in which the individual members, if deemed necessary, may add his/her own comments.

4.2. Criteria set in the Protocol

24. The proposed Format responds to the pertinent Articles in the Protocol and Annex, and keeps a cross coherence and constant reference with the document "*Annotated Format for the presentation reports for the areas proposed for inclusion in the SPAMI List*" (UNEP(DEC)/MED WG.172/3). At the end of each question, a reference is given to the corresponding part in the Annotated Format (AF) in order to facilitate the search of the information.

25. Following the Protocol, two kinds of criteria have been considered in the Format:

Section I: Characteristics/features that the site must necessarily comply to be included in the SPAMI List. These features are specified in Article 8 of the Protocol, and in the Common Criteria of the Annex I. For these selected 9 features, a yes/no answer is requested.

Section II: Characteristics/ features considered as a value-added for the SPAMIs (according to B.4. in Annex I and Articles 6 and 7 in the Protocol). These features receive 0-3 values. Their accumulative scoring provides an indication of the global performance of the SPAMI, permits comparative assessments with previous situations, and identifies thematic fields of strength and weaknesses allowing to objective recommendations.

4.3. TAC Conclusion

26. At the end of the format, the Technical Advisory Commission (TAC) will draw a Conclusion of consensus, signed by all of its members, including, if necessary, recommendations for improvement.

27. This Conclusion shall be forwarded through the RAC/SPA to the NFPs ordinary Meetings. The Meeting will decide whether the SPAMI remains in the ordinary review process or is considered for incorporation into the extraordinary review procedure.

**SECTION I: CRITERIA WHICH ARE MANDATORY FOR THE INCLUSION
OF AN AREA IN THE SPAMI LIST**

(Art. 8.2. of the Protocol and General Principles and C and D of Annex I)

In each question, crossed references to the Annotated Format (AF) are given.

1. CONSERVATION STATUS

1.1. Does the SPAMI fulfill one of the criteria related to Mediterranean interest as presented in Protocol's Annex I section B paragraph 2 ?strictly maintain the status of populations of its protected species (those in Annex II to the Protocol), the status of its habitats and no adverse significant changes in the functioning of its ecosystems? (Article 8.2.) (See 3.4. and 4 in the AF)

Y	N
---	---

If "no", indicate the reasons that have motivated the deficiencies, their relative seriousness and, if possible, the date in which they are expected to be overcome.

1.2 If "yes", are the objectives set out in the original SPAMI application for designation actively pursued ?

Y	N
---	---

2. LEGAL STATUS

2.1. Does the area maintain or has improved its legal protection status from the date of the previous report? (A-e and C-2, Annex I) See 7.1.2 in the AF

Y	N
---	---

2.2. Does the legal declaration of this area consider the conservation of natural values as the primary objective? (A-a and D1 in Annex I) See 7.1.3 in the AF

Y	N
---	---

2.3. Are competencies and responsibilities clearly defined in the texts governing the area? (D4 in Annex I) See 7.4.3 in the AF

Y	N
---	---

2.4. Are external influences/threats been taken into account in the legal framework of the SPAMI Does the legal text clearly establish coordination means between land and sea authorities ? (D4 in Annex I, Art.7.4. in the Protocol) . In case there is no sea within the SPAMI, this question would be non-applicant. See 7.4.3. in the AF

Y	N
---	---

Indicate measures that have been adopted to address these influences/threats case of any “no” answer, indicate the reasons that have motivated the deficiencies and the date in which they are expected to be overcome.

3. MANAGEMENT METHODS (General principles « D » in Annex 1)

3.1. Does the area have the same or an improved management body/authority as when the SPAMI was established and/or last evaluated ? Existence of a management body with sufficient powers (Art. 7.2.d, 7.2.f). D6 in Annex I: *To be included in the SPAMI List, a protected area must have a management body, endowed with sufficient powers as well as means and human resources to prevent and / or control activities likely to be contrary to the aims of the protected area* See 8.1. in the AF

Y	N
---	---

3.2. Is the management plan in force ? Has the management plan been officially adopted? (D7 in Annex I) See 8.2.1, 8.2.2. in the AF

Y	N
---	---

3.3. Does the management plan address the requirements set out in article 7 of the Protocol and Section 8.2.3 of the Annotated format ?

Y	N
---	---

More details useful for the evaluation of the management plan are addressed in question 7.1 of this questionnaire. In case of any “no” answer, indicate the reasons that have motivated the deficiencies and the date in which they are expected to be overcome.

4. AVAILABILITY OF RESOURCES AND INFORMATION

4.1. Is there basic equipment, human and financial resources ensured to the management body?

Y	N
---	---

(Art. 7.2.d, 7.2.f). D6 in Annex I: *To be included in the SPAMI List, a protected area must have a management body, endowed with sufficient powers as well as means and human resources to prevent and / or control activities likely to be contrary to the aims of the protected area*) See 9.1, 9.2. in the AF

4.2.. Does the area have a monitoring program?

Y	N
---	---

(D8 in Annex I: *The program should include the identification and monitoring of a certain number of significant parameters for the area in question, in order to allow the assessment of the state and evolution of the area, as well as the effectiveness of protection and management measures implemented, so that they may be adapted if need be..* See 9.3.3. in the AF

If yes, what are the monitoring parameters and the management objectives being addressed by these parameters ?

4.3 Is there a feedback mechanism that establishes an explicit link between the monitoring results and the management objectives, and which allows adaptation of protection and management measures ?

Y	N
---	---

In case of any "no" answer, indicate the reasons that have motivated the deficiencies, their relative seriousness, and the date in which they are expected to be overcome.

**SECTION II: FEATURES PROVIDING A VALUE-ADDED
TO THE AREA**

(Section B4 of the Annex I, and other obligatory for a SPA (Arts. 6 and 7 of the Protocol))

5. THREATS AND SURROUNDING CONTEXT

5.1 Assess the level of threats within the site to the ecological, biological, aesthetic and cultural values of the area (B4.a of the Annex I)

See 5.1., consider also 3.5.2.b, 6.3 & 6.4. in the AF

In particular: (0 means “no threats”; 3 means “very serious threats”):

Unregulated exploitation of natural resources
(e.g. sand mining, water, timber, living resources)
See 5.1.1. in the AF

0	1	2	3
---	---	---	---

Serious threats to habitats and species
(e.g. disturbance, desiccation, pollution, poaching, introduced alien species) See 5.1.2. in the AF

0	1	2	3
---	---	---	---

Increase of human presence
(e.g. tourism, boats, building, immigration...) See 5.1.3. in AF

0	1	2	3
---	---	---	---

Historic and current conflicts
(between users or user groups) See 5.1.4., 6.2. in the AF

0	1	2	3
---	---	---	---

(0 = no threats; 3 = very high level of threats)

Please include a prescriptive list of threats that are of concern and are evaluated individually

5.2 Assess the level of external threats to the ecological, biological, aesthetic and cultural values of the area (B4.a of the Annex I) See 5.2. in the AF

(0 = no threats ; 3 = very high level of threats)

0	1	2	3
---	---	---	---

Please include a prescriptive list of external threats that are of concern and are evaluated individually. **In particular:**

Pollution problems from external sources (including solid waste and those affecting waters up-current) See 5.2.1. in the AF

Significant impacts on landscapes and on cultural values See 5.2.2

Expected development of threats upon the surrounding area See 6.1. in the AF

5.3. Is there an integrated coastal management plan or land-use laws in the area limiting or surrounding the SPAMI? (B4.e in the Annex I) See 5.2.3.

Y	N
---	---

5.4. Does the management plan for the SPAMI have influence over the governance of the surrounding area ?.
(D5-d in Annex I)
See 7.4.4. in the AF

Y	N
---	---

6. REGULATIONS

6.1. Assess the degree of legal regulations See 7.4.2. in the AF

In particular, within the national framework:

a) Regulations concerning the strengthening of the application of the other Protocols to the Barcelona Convention, particularly dumping, passage of ships and modification of the soil (Art. 6b, 6c, 6e in the Protocol, D5-a in the Annex I)

Y	N
---	---

b) Regulations on the introduction of any species not indigenous to the specially protected area in question, or of any genetically modified species, (Art. 6 d in the Protocol, D5-b in the Annex I)

Y	N
---	---

c) Regulations concerning the Environmental Impact Assessment for the activities and projects that could significantly affect the protected areas (Art. 17 in the Protocol)

Y	N
---	---

In particular, within the SPAMI framework:

d) Regulations for fishing, hunting, taking of animals and harvesting of plants or their destruction, as well as trade with animals, parts of animals, plants, parts of plants, which originate in the area (Art. 6 g in the Protocol, D5-c in the Annex I)

Y	N
---	---

7. MANAGEMENT

7.1. Assess the degree of detail of the management plan

(e.g. zoning, regulations for each zone, competencies and responsibilities, governing bodies, management programs as protection, natural resource management, tourism, public use, education, research, monitoring, maintenance, services and concessions....) See 8.2.3. in the AF

SCORE: 0 = No Mgmt.Plan / 1= Weak / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

7.2. Assess to what extent is land ownership well determined

(undetermined land tenure regimes and registrations are a common source of conflicts in most protected areas world-wide) See 7.3. in the AF

SCORE: 0 = Undetermined / 1= Weak / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

7.3. Is there a body representing the public, professional and non-governmental sector and the scientific community linked to the management body? (B4b, B4c of the Annex I) See 8.1.2. & 8.1.3

Y	N
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7.4. Assess the quality of the involvement by the public, and particularly of local communities, in the planning and management of the area (B4.b of the Annex I)

(e.g. adequate planning involves local stakeholders and accommodates within appropriate management regimes a spectrum of possible multiple uses and regulated human activities, within the primary objective of conservation of marine and coastal environments)

See 8.1.4. in the AF

SCORE: 0 = No involvement / 1= Low / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

7.5. Is the management plan binding for other national/local administrations with competencies in the area?

See 8.2.2 in the AF

Y	N
---	---

8. PROTECTION MEASURES

8.1. Assess the degree of enforcement of the protection measures

In particular:

Are the area boundaries adequately marked on land and, if applicable, adequately marked on the sea? <u>See 8.3.1. in the AF</u>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Is there any collaboration from other authorities in the protection and surveillance of the area and, if applicable, is there a coastguard service contributing to the marine protection ? <u>See 8.3.2. 8.3.3. in AF</u>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Are third party agencies also empowered to enforce regulations relating to the SPAMI protective measures ?	<input type="checkbox"/> Y	<input type="checkbox"/> N
Are there adequate penalties and powers for effective enforcement of regulations and is the field staff empowered to impose sanctions? <u>See 8.3.4. in the AF</u>	<input type="checkbox"/> Y	<input type="checkbox"/> N
Has the area established a contingency plan to face accidental pollution or other serious emergencies? (Art. 7.3. in the Protocol, recom. 13 th Parties Meeting)	<input type="checkbox"/> Y	<input type="checkbox"/> N

9.HUMAN RESOURCES

9.1. Adequacy of the human resources available to the management body (Art.7.2-f in the Protocol, D6 in Annex I) (e.g. enough number of employees to ensure adequate management and protection of the area) See 9.1.1. in the AF

Is there a permanent field administrator of the area?
See 9.1.2. in the AF

<input type="checkbox"/> Y	<input type="checkbox"/> N
----------------------------	----------------------------

Are there other permanent staff in the field?
 (e.g. technicians, wardens, guides, ...) See 9.1.2. in the AF

<input type="checkbox"/> Y	<input type="checkbox"/> N
----------------------------	----------------------------

9.2. Asses the adequacy of the training level of available staff (Art.7.2-f in the Protocol, D6 in Annex I) (e.g. enough training level to ensure protection of the area) See 9.1.2. in the AF

<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
----------------------------	----------------------------	----------------------------	----------------------------

SCORE training level: 0 = Very Insufficient / 1= Low / 2 = Adequate / 3= Excellent

10. FINANCIAL AND MATERIAL MEANS

10.1. Assess the degree of adequacy of the financial means (Sufficient resources for the development and implementation of the management plan, including e.g. interpretation, education, training, research, surveillance and enforcement of regulations) See 9.2.1. in the AF

SCORE: 0 = Very Insufficient / 1= Low / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

10.2. Assess the basic infrastructure (Art.7.2-f in the Protocol)

Administrative premises in the site, visitors' facilities (reception centre, trails, signs...), specific information, education and awareness materials

SCORE: 0 = Very Insufficient / 1= Low / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

10.3. Assess the equipment. *Guard posts and signs on the main accesses, means to respond to emergencies, marine and terrestrial vehicles, radio and communications equipment.* See 9.2.3. in the AF

SCORE: 0 = Very Insufficient / 1= Low / 2 = Adequate / 3= Excellent

0	1	2	3
---	---	---	---

11. INFORMATION AND KNOWLEDGE

11.1. Assess the extent of knowledge about the area and its surrounding zones. (D3 of the Annex I)(*considering at least specific maps, habitat distribution, species inventories, and socio-economical factors*)
See 9.3.1. in the AF

SCORE: 0 = Very Insufficient / 1= Low / 2= Adequate / 3= Excellent

0	1	2	3
---	---	---	---

11.2. Assess the adequacy of the program for data collection and the monitoring program See 9.3.2. in the AF

SCORE: 0 = Inexistent / 1= Insufficient / 2= Adequate / 3= Excellent

0	1	2	3
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12. COOPERATION AND NETWORKING

12.1. Are other national or international organizations collaborating with human or financial resources? (*e.g. researchers, experts, volunteers..*)

See 9.1.3. in the AF

SCORE: 0 = No / 1= Weakly / 2 = Satisfactory / 3= Excellent

0	1	2	3
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12.2. Assess the level of cooperation and exchange with other SPAMIs (especially in other nations) (Art. 8, Art. 21.1, Art. 22.1., Art. 22.3, A.d in Annex I)

SCORE: 0 = No / 1= Insufficient / 2= Adequate / 3= Excellent

0	1	2	3
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COMMENTS by the Technical Advisory Commission

CONCLUSION

RECOMMENDATIONS

SIGNATURES

National Focal Point

Independent Experts

SPAMI Manager(s)

(ADDITIONAL PAGES MAY BE ADDED FOR EACH MEMBER'S COMMENTS)

ANNEX X
Draft Action Plan for the conservation
of Mediterranean marine turtles

I. INTRODUCTION

1. The Parties to the Barcelona Convention included among their priority targets for the period 1985-1995 the protection of Mediterranean marine turtles (Genoa Declaration, September 1985). To this purpose and as a response to growing international concern about the status of Mediterranean marine turtles, which encounter various threats, including mortality in fishing gear and loss of vital habitats on land (nesting beaches), they adopted in 1989 the Action Plan for the Conservation of Mediterranean Marine Turtles. In 1996, the Parties confirmed their commitment to the conservation of marine turtles by including the 5 species of marine turtle recorded for the Mediterranean in the List of Endangered and Threatened Species annexed to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 1995). The Protocol calls on the Parties to continue to cooperate in implementing the Action Plans already adopted.

2. The Action Plan for the Conservation of Marine Turtles was revised in 1998-1999 and the revised Action Plan was adopted at the 11th Meeting of the Contracting Parties to the Barcelona Convention in Malta, in October 1999. Following the request of the Contracting Parties to the Barcelona Convention (Portoroz, 2005), RAC/SPA has prepared the present update of the Action Plan for the Conservation of Marine Turtles in the Mediterranean. **The draft Action Plan was presented, discussed and approved by the Eighth Meeting of Focal Points for SPAs in Palermo, Italy, 6-9 June 2007.**

3. Two species of turtle nest in the Mediterranean, the Loggerhead turtle (*Caretta caretta*) and the Green turtle (*Chelonia mydas*). The Leatherback turtle (*Dermochelys coriacea*) is recorded fairly regularly in this sea, while the other two species (*Eretmochelys imbricata*, *Lepidochelys kempii*) are very rarely encountered. Loggerhead turtles also enter the Mediterranean from the Atlantic as juveniles in their oceanic stage and return to the Atlantic.

4. Marine turtles are reptiles and reptiles evolved on land. Though they have adapted well to living in the sea, their ties to their ancestors, leads them back to land to lay their eggs and reproduce. The intensive exploitation of turtles during much of last century has led to a virtual collapse of the turtle populations in the Mediterranean. Relatively new threats such as incidental catches and mortality in fishing gear and loss of nesting habitats face the remaining populations. The conservation of turtles, as a result of their biology, needs to address threats and issues both on land and in the sea. Marine turtles are long living reptiles and the recovery of populations is therefore a long process. Their reproduction on land poses threats to them, but it also provides opportunities, in a practical way, to help the species recover, for example by reducing predation. Good knowledge of their biology and needs is essential if this opportunity is to be used properly. Turtles do not nest every year and significant fluctuations from year to year in nesting activity are common, especially in green turtles. As a consequence long term data are needed in studying populations and in drawing conclusions.

5. The wider issues of biodiversity conservation need to be taken into consideration in conserving any species, such as sea turtles. Threatened species are components of an ecosystem and the interdependence of the implementation of the various RAC/SPA Action Plans for endangered species and biodiversity conservation is stressed here.

6. There is clear evidence of important negative impacts on the populations of Mediterranean marine turtles by human activities. The most serious current threats/effects to turtles are:

- deterioration of the critical habitats for the life cycle of marine turtles, such as nesting, feeding and wintering areas, and key migration passages
- direct impacts on turtle populations of incidental capture in fisheries, intentional killing, consumption, egg exploitation and boat strikes
- pollution, which can have impacts on both habitats and species

7. Knowledge of the genetic stocks, status, biology and behaviour of marine turtles is increasing rapidly in the Mediterranean and though gaps still exist, sufficient information is available for conservation purposes. This information has been used in updating and improving the provisions of the present MAP Action Plan for the Conservation of the Mediterranean Marine Turtles¹. Sufficient information is also available in most cases to draw up National Action Plans for the conservation of marine turtles.

8. Information from various sources has been taken into account in this Action Plan. Effective protection and management of nesting areas, practical measures to reduce turtle by-catches, as well as the management of feeding grounds, based on scientific information, are some of the key elements that can help to ensure the survival and the recovery of populations of marine turtles. These elements have been paid due attention. Scientific information on population dynamics, tagging, biology, physiology, public awareness etc have also been given due attention in this plan.

9. The effective and sustainable protection of the Mediterranean marine turtles implies management of the Mediterranean as a whole, taking into account the ecosystem approach, and should take advantage of the actions of all the concerned stakeholders and be carried out in cooperation with organisations, programmes and plans, at the supranational and national level such as the Mediterranean Action Plan (MAP); Fisheries Management Plans (FAO/GFCM); the Marine Turtle Specialist Group (IUCN/SSC); International Commission for the Conservation of Atlantic Tunas (ICCAT); International Commission for the Scientific Exploration of the Mediterranean Sea (ICSEM); relevant NGOs, Research institutions, Universities etc.

10. This Action Plan outlines objectives, priorities, and implementation measures in different fields as well as their coordination. The different components of the Action Plan are mutually reinforcing and may act synergistically.

11. The progress in implementing the Action Plan will be reviewed at each meeting of the National Focal Points for SPAs, on the basis of national reports and of reports by RAC/SPA on the regional aspects of the Action Plan. The Action Plan will be assessed and revised and updated as necessary, every five years, unless the SPA Focal Point Meetings deem otherwise.

¹ As understanding the status of sea turtles is fundamental to their conservation, the present Action Plan takes into account the Marine Turtle Specialist Group status assessment of the three species concerned in the Mediterranean Sea. For *Dermochelys coriacea* this it can be found at: http://www.iucn-mtsg.org/red_list/regional/Dermochelys_MTSG_Mediterranean_Assessment.pdf
For *Chelonia mydas* and *Caretta caretta*, the draft Regional Assessments are expected to be ready by the end of June 2007. For *Chelonia mydas* the global red-list assessment can be found at: http://www.iucn-mtsg.org/red_list/cm/MTSG_Chelonia_mydas_Assessment_April-2004.pdf

II. OBJECTIVES

12. The objective of this Action Plan is the recovery of the populations of *Caretta caretta* and *Chelonia mydas* in the Mediterranean (with priority accorded to *Chelonia mydas*, wherever appropriate) through:

- Appropriate protection, conservation and management of marine turtle habitats, including nesting, feeding and wintering areas and key migration passages.
- Improvement of the scientific knowledge by research and monitoring.

III. PRIORITIES

13. Acknowledging the progress achieved over the past years and the proliferation of projects, activities and actions in many countries in the region, it is considered an overarching priority action to continue and enhance such ongoing projects and activities related to marine turtle conservation, research and monitoring. The following priorities have been identified for each component of this Action Plan:

III.1. Protection and management of the species and their habitats:

- Development, implementation and enforcement of legislation;
- Protection and effective management of nesting areas (including the adjacent sea);
- Protection and management of feeding, wintering and mating areas and key migration passages;
- Minimization of incidental catches and elimination of intentional killings.
- Restoration of degraded nesting beaches

III.2. Research and monitoring:

Knowledge needs to be improved in the following topics:

- Identification of mating, feeding and wintering areas and key migration passages;
- Identification of new nesting areas;
- Biology of the species, in particular aspects related to life cycles, population dynamics and population trends and genetics;
- Assessment of fisheries interactions and associated mortalities, including modification of fishing gear and related socioeconomic issues;
- Assessment and improvement of nesting beach management techniques;
- Data collection through stranding networks;
- Assessment of population trends through long term monitoring programmes, both on nesting beaches and at sea.
- Impact of climate change.

III.3. Public awareness and education:

For the implementation of this action plan, public support is needed. Information and education campaigns on relevant turtle conservation issues should target groups such as:

- Local residents and visitors to nesting areas;
- Fishermen and other stakeholders;
- Tourists and tourism-related organizations;
- Schoolchildren and teachers;
- Decision makers at national, regional and local levels.
- Appropriate training/education of stakeholders can be given (e.g., to fishermen and tourism workers)

III.4. Capacity building/Training

Training of managers and other staff of protected areas in conservation and management techniques and of scientists, researchers and other staff in conservation, research and monitoring in the priority issues covered by the Action Plan

III.5. Coordination:

Promote and enhance cooperation and coordination among the Contracting Parties, as well as cooperation and networking among the relevant organisations and experts in the region. Priority should be given to the regular assessment of the progress in the implementation of this Action Plan.

IV. IMPLEMENTATION MEASURES

14. The implementation of the measures recommended in this Action Plan will only be possible with the appropriate support by the Parties and by competent international organizations, particularly as regards the provision of adequate financial support, through national and regional funding programmes and through support for applications to donors for projects. Much progress has been achieved over the past years, with the proliferation of projects, programmes, activities and actions in many countries around the Mediterranean. The implementation of such ongoing activities related to marine turtle conservation, research and monitoring is expected to benefit from the provisions of this Action Plan.

IV.1. Protection and Management

15. With regard to protection and management, the following measures are recommended:

a Legislation

16. The Contracting Parties that have not yet extended legal protection to marine turtles should do so as soon as possible,

17. Each Contracting Party should develop and implement as soon as possible the necessary legislation for the protection, conservation and/or management of areas important for marine turtles, such as nesting (including the adjacent sea), feeding, wintering and mating areas and key migration passages.

18. In pursuing the above the Contracting Parties should take into account the provisions of the relevant international conventions and supranational legislation as well as the RAC/SPA "Guidelines to Design Legislation and Regulations Relative to the Conservation and Management of Marine Turtles Populations and their Habitats"

b Protection and Management of Habitats

19. Integrated management plans should be elaborated and implemented for terrestrial and marine areas critical for nesting, feeding, wintering and mating, as well as key migration passages.

20. Measures and management rules aimed at protecting critical habitats, on land and at sea, should be developed and implemented. In the case of nesting areas, such measures should cover issues such as public access, use of vehicles and horse riding, use of artificial lights, nautical activities, minimization of predation, inundation, disturbance during nesting,

disturbance in adjacent waters, etc. In the case of marine areas such measures should address boat traffic and fishing.

Training of the staff involved in protection and management activities is a prerequisite to good management.

21. Restoration to natural conditions of degraded nesting beaches.

c Minimisation of Incidental Catches and Elimination of Intentional Killings

22. A reduction of incidental catches and mortality can be achieved by:

- Applying appropriate regulations concerning fishing depth, season, gear, etc, especially in areas with a high concentration of turtles;
- The modification of fishing gear, methods and strategies proven to be effective, and as appropriate, their introduction in fisheries legislation and fishing practices;
- Education/training of fishermen to correctly haul, handle, release and record incidentally caught turtles. Use of appropriate methods are described inter alia in the RAC/SPA publication "sea turtle handling guidebook for fishermen"

23. Deliberate killing and exploitation of marine turtles can be eliminated by:

- Applying and enforcing appropriate legislation;
- Carrying out campaigns among fishermen in order to urge them to release marine turtles caught incidentally and to participate in the information networks on turtles (report sightings of turtles, of tags, participation in tagging programmes, etc.);
- Carrying out campaigns for fishermen and local populations to facilitate the implementation of legislation to ban the exploitation/consumption and trade/use of all products derived from marine turtles.
- The above will help also in reducing mutilations and killing of turtles due to ignorance and/or prejudice.

d Other Measures to Minimise Mortality

24. The setting up and proper operation of Rescue Centres and First Aid Stations is suggested as an additional means to minimise individual turtle mortality. Rescue Centres may also play an important role for the conservation of the populations by contributing to activities such as awareness, education, and data collection. The use of the RAC/SPA "Guidelines to Improve the Involvement of Marine Rescue Centres for Marine Turtles" is recommended. Training of the staff involved is necessary. In addition, a Mediterranean-wide rescue network should be set up, to assist the exchange of knowledge and experience among those who work with turtles in facing difficulties. The network should include already existing rescue centres and promote the establishment of new rescue centres in countries, which are currently lacking adequate structures.

IV.2. Scientific Research and Monitoring

25. The development of research and monitoring programmes and the exchange of information, should focus on the priority fields for the conservation of marine turtle populations, by using various methods, such as beach surveys and monitoring of nesting beaches - especially long term monitoring, tagging (keeping in mind the provisions of the RAC/SPA tagging guidelines), data logging, satellite telemetry, Geographic Information Systems (GIS), genetics, on-board observers and modelling.

a Scientific Research

For research these should cover inter alia the following (not in order of priority):

- Identification of mating, feeding and wintering areas and key migration passages;
- Identification of new nesting areas;
- Biology of the species, in particular aspects related to life cycles, population dynamics and population trends and genetics;
- The assessment of turtle by-catch and respective mortality rates from different fishing gear, including small scale and artisanal fisheries;
- Data on the effects of gear modifications (new hooks etc) and fishing strategies should be collected to evaluate the effects of these on turtle mortality and catch rates as well as the effects on other species;
- The socioeconomic effects of the implementation of turtle conservation measures that can impact fisheries need to be evaluated;
- Development of management techniques for nesting beaches and foraging areas;
- Impact of climate change on marine turtles;

b Monitoring

For monitoring, programmes should cover inter alia the following (not in order of priority):

- Encourage long term monitoring programmes for important nesting beaches. All Contracting Parties that have nesting beaches should encourage the uninterrupted and standardized monitoring of their nesting beaches. Where such programmes do not exist, the Parties should set up such programmes or encourage them. Surveys of nesting beaches of lesser importance and of scattered nesting need also to be undertaken occasionally if possible, so that a more complete picture of populations can be formed.
- Encourage long term monitoring programmes for important foraging areas. All Contracting Parties that have foraging areas should encourage their uninterrupted monitoring. Where such programmes do not exist the Parties should encourage or help establish such programmes.
- For monitoring of populations a standardised collection of data on nesting beaches should be aimed at. This should be supplemented by onboard observation programmes to gather precise data on species biology and fisheries induced mortality;
- Data collection through existing or new stranding networks;

26. For some Contracting Parties there is still little information on turtle nesting beaches and size of breeding populations. These Parties should undertake urgently more comprehensive surveys and encourage the setting up of long term monitoring programmes.

IV.3. Public Awareness And Education

27. Public-awareness programmes, including appropriate multiple information tools (special documentary information material, electronic media etc), should be developed for fishermen, local residents, tourists and tourism-related organizations, to help reduce the mortality rates of marine turtles, to induce respect for nesting, feeding and wintering and mating areas, and to promote the reporting of any useful information concerning sea turtles. Appropriate training/education of stakeholders can be given (e.g., to fishermen, tourism workers)

28. Information campaigns directed at local authorities, residents, teachers, visitors, fishermen, decision makers at local, regional and national levels and other stakeholders, are urgently needed in order to enlist their participation in the efforts for the conservation of marine turtles and for their support for conservation measures.

IV.4. Capacity Building/Training

29. Existing training programmes should be continued, particularly for those Parties that need more expertise and/or experts with specialized knowledge of marine turtles, and for managers and other staff of protected areas, in the conservation and management techniques needed (these include inter alia beach management, tagging and monitoring). Also training programmes in the setting up and operation of Rescue Centres should be continued. Training programmes to be elaborated for other fields, as needed, especially where fisheries managers are concerned.

IV.5. National Action Plan

30. Contracting Parties should establish National Action Plans for the conservation of marine turtles.

31. National Action Plans should address the current factors causing loss or decline of turtle population and their habitats, suggest appropriate subjects for legislation, give priority to the protection and management of coastal and marine areas, the regulation of fishing practices and ensure continued research and monitoring of populations and habitats. The lists of Recommended Actions at National Level, appended to the 1999 Action Plan for the Conservation of Marine Turtles in the Mediterranean, may be taken into consideration, as, when and where appropriate, in preparing National Action Plans.

IV.6. Regional Coordination Structure

32. It is necessary to develop cooperation and exchange of information among the Contracting Parties for the implementation of the Action Plan and to improve the coordination of activities within the region.

33. RAC/SPA is considered to be the most appropriate existing mechanism for this coordination. The implementation of the Action Plan may be carried out, in cooperation with other bodies concerned, through establishing MoUs, as necessary.

34. The major function of the coordinating mechanism with regard to marine turtles would be to:

- Assess the progress achieved in implementing this Action Plan. RAC/SPA will request at regular intervals, not exceeding two years, update reports from the Parties and, on the basis of these ongoing national reports and of its own assessment of the progress in the regional component of this Action Plan, prepare reports to be submitted to the SPA National Focal Point meetings, which will make follow-up suggestions to the Contracting Parties.
- Collect and evaluate the data at Mediterranean level
- Prepare inventories of networks of protected areas for marine turtles in the Mediterranean and facilitate the operation of such networks and of networks on such issues as marine turtle habitats, ecology, conservation etc
- Prepare a timetable of activities and financing proposals for the Contracting Parties' meetings;
- Contribute to the dissemination and exchange of information;
- Assist and/or organize expert meetings on specific topics regarding marine turtles

- Continue to support the organisation of the Mediterranean Marine Turtle Conferences
- Assist and/or organise, training courses and support and catalyse the participation of appropriate scientists and other staff in such courses.

35. Complementary work carried out by other international bodies and NGOs aiming at the same objectives should be encouraged, promoting coordination and preventing possible overlapping.

36. Coordinate the activities needed for the revision/updating of this Action Plan every six years, or earlier, if this is deemed necessary by the SPA National Focal Point meetings, or on the basis of important new information becoming available.

37. An inventory of marine turtle critical habitats, including key migrations passages, in the Mediterranean, should be prepared urgently by RAC/SPA, and should be regularly reviewed in the light of increased knowledge.

IV.7. Participation

38. Any interested international and/or national organisation is invited to participate in actions necessary for the implementation of this Action Plan

39. Links with other bodies responsible for Action Plans dealing with one or more species of marine turtles should be made, to strengthen co-operation and avoid duplication of work.

40. The co-ordination structure shall set up a mechanism for regular dialogue between the participating organisations and where necessary, organise meetings to this effect.

IV.8. "Action Plan Partners"

41. To encourage and reward contributions to the work of applying the Action Plan, the Contracting Parties may at their ordinary meetings grant the title of "Action Plan Partner" to any organisation (governmental, nongovernmental, economic, etc.) that has to its credit concrete actions likely to help the conservation of marine turtles. Conditions for the awarding of the Partner title shall be adopted by the Contracting Parties following advice given by the meeting of National Focal Points for SPA.

V. ANNEX I - IMPLEMENTATION TIMETABLE

ACTION	Deadline/period/ periodicity	By Whom
A. PROTECTION AND MANAGEMENT		
A.1 Legislation		
a. Protection of turtles – general species protection	As soon as possible	Parties
b. Enforce legislation to eliminate deliberate killing	As soon as possible	Parties
c. Habitat protection and management (nesting, mating, feeding, wintering and key migration passages)	As soon as possible	Parties
A.2 Protection and Management of habitats		
a. Elaborate guidelines for the management of protected areas including key habitats	1 year after adoption	RAC/SPA
b. Setting up and implementing management plans	2 years after adoption	Parties
d. Restoration of damaged nesting habitats	3 years after adoption	Parties
A.3 Minimisation of incidental Catches		
a. Fishing regulations (depth, season, gear) in key areas	3 years after adoption	Parties
b. Modification of gear, methods and strategies	4 years after adoption	RAC/SPA, Partners & Parties
A.4 Other Measures to Minimise individual Mortality		
a. Setting up and/or improving operation of Rescue Centres	Ongoing	Parties
B. SCIENTIFIC RESEARCH AND MONITORING		
B.1 Scientific Research		
a. Identification of new mating, feeding and wintering areas and key migration passages;	Ongoing	Parties
b. Elaboration and execution of cooperative research projects of regional importance aimed at assessing the interaction between turtles and fisheries	As soon as possible	RAC/SPA, Partners & Parties
c. Tagging and genetic analysis (as appropriate)	As needed or requested	RAC/SPA and Parties
d. Facilitate the networking between managed and monitored nesting sites, aiming at the exchange of information and experience	As needed	RAC/SPA
B.2. Monitoring		
a. Guidelines for long-term monitoring programmes for nesting beaches and standardisation of monitoring methods	1 year from adoption	Parties
b. Setting up and/or improving long-term monitoring programmes for nesting beaches, feeding and wintering areas	Ongoing	Parties

B.2. Monitoring		
c. Elaboration of protocol for data collection on stranding	2 years from adoption	RAC/SPA
d. Setting up stranding networks	3 years	Parties
e. Standardization of methodologies to estimate demographic parameters for population dynamics analysis, such as population modelling.	4 years from adoption	RAC/SPA
C. PUBLIC AWARENESS AND EDUCATION		
Public awareness and Information campaigns in particular for fishermen and local populations	As needed	Parties and/or RAC/SPA
D. CAPACITY BUILDING		
Training courses	As needed	RAC/SPA
E. NATIONAL ACTION PLANS		
Elaboration of National Action Plans	As soon as possible	Parties
F. COORDINATION		
a. Assessment of progress in the Implementation of the Action Plan	Every two years	RAC/SPA and Parties
Cooperation in organising the Mediterranean Conferences on marine turtles	Every three year	RAC/SPA
Updating the Action Plan on Marine Turtles	Five years from adoption	RAC/SPA

Note: The deadlines mentioned are not intended in any way to postpone or delay the drafting and/or the implementation of legislation or management plans or of monitoring programmes etc, that already exist and/or are ongoing.

VI. ANNEXE II - RECOMMENDATIONS AND GUIDELINES ON TAGGING IN THE MEDITERRANEAN

VI.1. General Recommendations:

- It is stressed to all prospective tagging projects that **tagging is not a conservation measure** and that it is not an alternative to conservation. All it can do, at best, is to help get information on which to base conservation policy and actions
- Encourage enforcement, at national level, of permitting legislation for tagging. This is to ascertain that **aimless tagging** does not take place and that tagging teams/persons or organizations have well thought out plans and aims and adequate training for what they are intending to do
- There is a need for **training courses** in planning and undertaking tagging projects and/or support in training in the field (with the provision of experts), particularly for new projects
- There is a need for **support** for tagging, with equipment, materials etc for projects that are qualified for such work (having undertaken adequate planning, training etc)
- Tagging equipment should if possible be provided after a request and the tags provided should carry the **return address** of the project or country
- There is a need in the countries for **advice and guidelines**, given inter alia through RAC/SPA and its website www.rac-spa.org, on tagging issues, providing links to key websites such as www.seaturtle.org and its **Tag Finder** site, as well as to the **ACCSTR Sea Turtle Tag Inventory** www.accstr.ufl.edu, encouraging visitors to register their tag series in this database. Duplication of effort will be avoided this way
- Tagging is not to be taken lightly and minimum guidelines are needed to ensure the wellbeing of turtles (the basic **Guidelines to minimize damage/disturbance to turtles by tagging** were drafted by the relevant RAC/SPA WG - see below)
- The development of simple practical materials (stickers etc) for **awareness** campaigns for fishermen and other stakeholders (e.g., coastal communities) will be useful.
- A **Regional Inventory of Tagging Projects** is needed and is in fact a priority issue. This should be updated as new information becomes available and should be available on line. (A **questionnaire** was drafted by the working group and was submitted to the participants of the workshop for completion. It is available from RAC/SPA for anybody who wishes to be included in the Inventory).

VI.2. Guidelines to minimize disturbance/damage to turtles by tagging

Metal tags

- Do not use Style 1005-49 metal tags (National Band and Tag Company (NBTC) USA)
- Use size 681C (National Band and Tag Company (NBTC) USA) - for turtles over 30 cm CCL (i.e., do not tag turtles smaller than 30cm CCL)
- Do not use tags in juvenile turtles in such a way as to constrict the growth of the flipper

Plastic tags

- Do not use Jumbo tags (Jumbotag - Dalton supplies Ltd, UK) for turtles smaller than 50cm CCL
- Do not use Rototags (Rototag - Dalton supplies Ltd, UK) for turtles smaller than 30 cm CCL

Pit tags

- Do not use PIT tags (Passive Integrated Transponder tags) in turtles smaller than 30 cm CCL
- If you use PIT tags, then apply them under the scales or between the digits, in the muscle, on the front left flipper.

General

- Do not use tagging methods proven to be unsatisfactory
- Do not tag a turtle on her way up the beach or during egg-laying. Tag after the egg chamber is covered or if the turtle is on her way back to the sea.
- Do not turn turtles over for tagging

NOTE: Though explicit mention is made in the Guidelines above of specific trade names (Dalton and National Band and Tag Company), the guidelines are applicable to similar tags (material, size etc) made by other manufacturers. Specific mention was made of these manufacturers and tags, as these are the tags most commonly used for tagging turtles and are hence well known.

ANNEX XI

**DRAFT IMPLEMENTATION CALENDAR OF THE ACTION
PLAN FOR THE CONSERVATION OF BIRD SPECIES
LISTED IN ANNEX II TO THE SPA/BD PROTOCOL**

Action	Deadline	By Whom
1. Development guidelines to assist countries in their efforts to afford adequate legislative protection to endangered species	By year 2008	RAC/SPA
2. Protect legally all bird species in Annex II.	By year 2008	Contracting Parties
3. Adding new species to Annex II ¹	By year 2009	Contracting Parties and RAC/SPA
4. Public awareness and Information campaigns	Starting from Year 2008	RAC/SPA , Partners and Parties
5. Organise specific training courses and workshops in coordination with international and/or national NGOs.	Starting from Year 2008	RAC/SPA and Contracting Parties
6. Pursue the setting up of a regional network for monitoring populations and distribution of Mediterranean threatened bird species, in co-ordination with other organisations.	By year 2011	RAC/SPA & Partners
7. Pursue and enforce research programmes to fill gaps in knowledge of threatened species.	By year 2008	Contracting Parties
8. Pursue the Establishment of National Action Plans for the conservation of endangered and threatened bird species in the Mediterranean.	By year 2012	Contracting Parties
9. Identification and mapping of areas important for birds on land and at sea -(of breeding, feeding, moulting and wintering areas)	By year 2012	Contracting Parties
10. Legal establishment protected areas with adequate management plans at breeding sites.	By year 2012	Contracting Parties
11. Preparation of a report on progress in the implementation of this Action Plan.	By year 2013	RAC/SPA

¹ The implementation procedure of this action will be started once the common criteria for the modification of the Annexes II and III of the SPA/BD Protocol, presented as document UNEP(DEPI)/MED WG.308/13, is being adopted by the fifteenth Contracting Parties Meeting.

ANNEXE XII

Draft Action Plan on Protecting the Coralligenous and other Calcareous Bio-Concretions in the Mediterranean

Draft Action Plan on Protecting the Coralligenous and other Calcareous Bio-Concretions in the Mediterranean

Foreword

An adhoc meeting, organized in Tabarka by RAC-SPA took place during 6th and 7th May 2006 with the aim to propose the guidelines for a Work Programme on the Protection of coralligenous assemblages and other calcareous Mediterranean biotic frameworks. In this document, the content of the Work Programme is developed.

Experts in Tabarka decided not to include bathyal assemblages of white corals, but they considered that it was worthy to include calcareous frameworks from shallow (or even littoral) waters such as the *Dendropoma petraeum* rims or the *Lithophyllum byssoides* rims. Nevertheless, not the project of the Work Programme nor the work made in Tabarka, reflected this intention, as coralligenous assemblages monopolized all the attention. Moreover, it is very difficult to make a common programme devoted to protect habitats or assemblages that (1) thrive in completely different environments, (2) have absolutely different species composition, (3) display different dynamics and (4) are subjected to completely different stressors, even if they are morphologically similar. Therefore, here we will focus exclusively on coralligenous assemblages. Moreover calcareous assemblages such as *Dendropoma petraeum* rims and *Lithophyllum byssoides* "trottoirs" are already included in the Action Plan for the Conservation of the Marine Vegetation and do not need further attention. Deep-water *Cystoseira* species, even if they have also been sometimes included or considered as special facies of coralligenous assemblages, they are also taken into account by the Marine Vegetation Action Plan, and thus will not be considered here again. Maërl beds are in a very different situation, as they are calcareous formations, that even if they lack of a real calcareous framework, carbonate production is their main constitutive characteristic. Moreover, they are not usually considered in the Marine Vegetation Action Plan and, at least in the Mediterranean, they thrive in the same places where coralligenous assemblages are found. Therefore, even if this Work Programme is mainly devoted to the conservation of coralligenous assemblages, maërl beds will be included, not as a special facies of the coralligenous, but as carbonate environments also developing in dim light conditions and meriting almost the same conservation measures and management than coralligenous frameworks.

In this programme of work, the coralligenous is considered as a typical Mediterranean underwater seascape comprising coralline algal frameworks that grow in dim light conditions and in relatively calm waters (Ballesteros, 2006). Mediterranean maërl beds should be considered as sedimentary bottoms covered by a carpet of free-living calcareous algae (Corallinales or Peyssonneliaceae) also developing in dim light conditions.

Current situation of coralligenous assemblages

Current knowledge

Although there is a general knowledge on the composition and distribution of coralligenous assemblages and maërl beds there are several lacks. Regarding the distribution, coralligenous buildups seem to be common all around the Mediterranean coasts, even in the easternmost coasts (Bitar and Ramos, pers. comm.). However this is the picture at a large scale (in the order of hundreds of km) but what is really important is to know the distribution of coralligenous buildups at much smaller scales, which is important for an appropriate management of these structures. Regarding the composition of coralligenous and maërl assemblages, most of the information is based on data obtained in the northwestern Mediterranean, with also some data collected in southern Italy and the Alboran Sea. Therefore the available lists of species, as well as the main engineering species, are known from these areas, and they cannot be considered to be constant in the rest of the Mediterranean. However, nothing is known for sure.

In order to gather all the scientific information available, the first step of this Work Programme would be to make a list of references dealing with coralligenous assemblages and maërl beds, with indication of the topics they cover (e.g. biodiversity and taxonomy, descriptive ecology, functional ecology, composition, environmental factors, cartography, conservation, disturbances).

Distribution

One of the major gaps concerning the current state of knowledge of the coralligenous habitat and maërl beds is the absence of cartographical data. Some cartographical data have been published on given locations, such as the Banyuls sur Mer area (capes l'Abeille and Oullestreil), Medes Islands, Tabarca or Port-Cros. Geographical as well as depth distributional data are essential in order to know the real extent of these assemblages in the Mediterranean Sea as well as to implement appropriate management measures to guarantee their conservation. In order to improve this situation the following actions are proposed:

- To compile all existing information at all levels and scales on the distribution of coralligenous assemblages and maërl beds. Besides easily available (published) information on the distribution of these assemblages in some MPAs (e.g. Gili & Ros, 1987; Belsher *et al.*, 2005; Ramos, 1985; Garcia Carrascosa, 1987; Templado and Calvo, 2002, 2006), other unpublished reports gather a lot of information. Collaboration of MPAs managers is needed. Contacts with main marine agencies (e.g. IFREMER, IEO, ICRAM), universities and marine science research institutes are also suggested, as they have a lot of unpublished information regarding the distribution of coastal benthic communities. In Mediterranean countries lacking long-tradition marine science institutes, collaboration with fishermen and divers (professional/sport) can probably be the only information source.
- Punctual field missions have to be envisaged in potential places to host extensive and mostly unknown coralligenous assemblages and maërl beds. Eastern Mediterranean should be extensively scanned.

Composition

Coralligenous concretions are the result of the building activities of algal and animal builders and the physical as well as biological eroding processes. The final result is a very complex structure composed of several microhabitats. Environmental factors (i.e., light, water movement and sedimentation rates) can vary by orders of magnitude in parts of the same concretion situated very close to each other. This great environmental heterogeneity allows several different assemblages to coexist in a reduced space. Assemblages situated in open waters (from horizontal to almost vertical surfaces) can be easily distinguished from those situated in overhangs and cavities.

Algae usually dominate in horizontal to sub-horizontal surfaces although their abundance decreases with decreasing irradiance. Two main algal communities have been distinguished in the western Mediterranean: an assemblage dominated by *Halimeda tuna* and *Mesophyllum alternans* (*Lithophyllo-Halimedetum tunae*), thriving in relatively high light levels, and an assemblage dominated by encrusting corallines (*Lithophyllum frondosum*, *L. cabiochae*, *Neogoniolithon mamillosum*) and *Peyssonnelia rosa-marina* (*Rodriguezelletum strafforello*), and receiving low light levels. Animal assemblages can greatly differ according to light levels reaching the coralligenous outcrop but also according to current intensity, sedimentation rates and geographical areas. In the richest, relatively more eutrophic zones, with rather constant and low water temperature, gorgonians usually dominate the community, but they are completely absent or rare in the more oligotrophic or low-current areas with rather high or seasonally variable temperature, being replaced by poriferans, bryozoans or ascidians.

Maërl beds are also very diverse. Even if corallines are the main constituents (*Spongites fruticulosus*, *Lithothamnion corallioides*, *Phymatolithon calcareum*, *Lithothamnion valens*, *Lithothamnion minervae*, *Lithophyllum racemus*, *Lithophyllum frondosum*, and others), *Peyssonnelia* species (mainly *Peyssonnelia rosa-marina*) can also be very important. The cover of erect algae depends on each particular site, displaying

several facies (*Osmundaria volubilis*, *Phyllophora crispa*, Kallymeniales, *Laminaria rodriguezii*). Ascidians can also constitute facies and, in some cases, gorgonians and/or bryozoans can be relatively abundant.

The group of experts in Tabarka suggested using the Reference List of Habitat types appearing in the Standard Data Entry Form (SDF) for National Inventories when looking for the composition of coralligenous assemblages.

The suggestion when describing the composition of the coralligenous assemblages or the maërl beds would be to make these descriptions as accurate as possible, introducing the names of the main species of algae involved in the construction of the algal framework or being the dominant species in the maërl beds, together with the erect algae and invertebrates that are more conspicuous. Probably, the best way to do it would be listing the species in situ by trained biologists, quantified following the Braun-Blanquet (1979) methodology (Cebrian & Ballesteros, 2004). Alternatively, the algal assemblage can be identified considering the two main associations described for the coralligenous assemblages, which are the *Lithophyllo-Halimedetum tunae* and the *Rodriguezelletum straforelloii*, and the names of the most prominent sponges, cnidarians or bryozoans. In maërl beds, description is also possible naming the main maërl species and erect algae, as well as the main macroinvertebrates.

Main algal builders to be distinguished are:

- *Mesophyllum alternans*
- *Mesophyllum expansum*
- *Lithophyllum frondosum* (= *L. stictaeforme*)
- *Lithophyllum cabiochae*
- *Neogoniolithon mamillosum*
- *Peyssonnelia rosa-marina*
- *Lithothamnion philippii*
- *Spongites fruticulosus*
- *Lithothamnion corallioides*
- *Lithothamnion valens*
- *Lithothamnion minervae*
- *Lithophyllum racemus*
- *Phymatolithon calcareum*

Main algae and invertebrates that can make facies are, at least, in the western Mediterranean:

Algae:

- *Halimeda tuna*
- *Flabellia petiolata*
- *Laminaria rodriguezii*
- *Phyllariopsis brevipes*
- Laminar Red Algae

Invertebrates:

- *Spongia agaricina*
- *Axinella polypoides*
- *Hexadella racovitzai*
- *Aplysina cavernicola*
- *Agelas oroides*
- Massive sponges (*Faciospongia* spp., *Cacospongia* spp., Ircinidae, Geodididae)
- *Spirastrella cunctatrix*
- *Eunicella cavolinii*

- *Eunicella singularis*
- *Paramuricea clavata*
- *Alcyonium acaule*
- *Corallium rubrum*
- *Leptopsammia pruvoti*
- *Parazoanthus axinellae*
- Large bryozoans (*Hornera frondiculata*, *Pentapora fascialis*)
- Encrusting bryozoans (*Schizomavella* spp., *Parasmittina* spp.)
- Big ascidians

Other facies can also be found.

Data collection and inventories

Specific inventories

The coralligenous habitat includes several assemblages due to its great heterogeneity. There is a small-scale variation in environmental factors throughout the coralligenous outcrops that determine different micro-habitats containing different species. In the surface of coralligenous outcrops, coralline algae usually dominate, together with a variable amount of erect algae and of suspension-feeders. Holes and cavities within the coralligenous structure sustain complex communities without algae and dominated by suspension-feeders. Small crevices and interstices are inhabited by a diverse endofauna, while many vagile species swarm everywhere, thriving also in the small patches of sediment retained by the framework. One of the consequences of this great environmental heterogeneity is the presence of a high biodiversity and a wide array of organisms in each coralligenous outcrop.

Maërl beds are considerably less complex than coralligenous outcrops although they have some epiflora and epifauna that are more related to plants and animals usually found in rocky substrata, but also they harbour typically invertebrates from sedimentary bottoms.

A considerable amount of research has been done on the biodiversity hosted by coralligenous frameworks. Ballesteros (2006) estimates a preliminary account of up to 1666 species at the scale of the Mediterranean Sea that have been reported from these frameworks. However these estimates are far from real and it is, thus, necessary to make a reference list of species that are found in coralligenous outcrops. It is also necessary to evaluate the total number of species of some relatively well known locations, as well as the level of species similarity between these locations in order to have an idea of the amount of large scale variability. The same kind of work has to be done for maërl beds.

There are several ways to proceed in order to obtain this list. We propose the following way:

- To make preliminary lists (global and local scales) considering data obtained after consulting the available literature.
- To circulate the resulting lists amongst specialists of each taxonomic group, who may increase the lists according to the more specific taxonomic literature and his own expertise.
- To compile all the information giving the final species lists.

These lists should contain other interesting information such as:

- Precedence of the citation/citations (bibliography/taxonomist) to check the original source.
- Geographical area.
- Abundance (e.g. very abundant, abundant, common, rare, accidental).
- Fidelity to coralligenous outcrops (e.g. exclusive characteristics, elective characteristics, preferential characteristics, indifferent, accidental) (see Pérès & Picard, 1964; Cormaci *et al.*, 2004).

Another interesting issue is the collection of new data. Several methodologies have been used in sampling rocky benthic systems and maërl beds (e.g. Bianchi *et al.*, 2004) and all of them present advantages and disadvantages. Moreover, suitability of each sampling method depends on the purposes of the study and on the taxonomic group considered.

As no sampling methodology can be universally accepted, when making new inventories it is recommended to:

- Use quantitative or semi-quantitative surveys instead of qualitative surveys wherever possible.
- Clearly state the sampling and quantification methodology, including the period of the year, in order that it could be repeated in the future by independent teams for further comparison of data.
- Samples have to be geographically positioned in the most accurate way.
- Sampling has to be representative. Therefore, sampling areas should be larger than minimal sampling areas. It has to be noted that different taxonomic groups must be sampled using completely different representative areas.

Sites of particular interest

The coralligenous and maërl being communities thriving in deep waters it is impossible to have an appropriate cover of all the sites. Thus, it is recommended that inventories and monitoring be performed in sites of particular interest. These sites have to be selected according to previous information on the extension and ecological quality of coralligenous and maërl communities. Amongst the criteria to be used in this selection, it is recommended the following ones:

- Existence of previous information on coralligenous assemblages or maërl beds at the site or, if there is no available information at all, sea bottom geomorphological features suitable for the development of coralligenous frameworks and/or rhodolites.
- Representativity of the coralligenous assemblages/maërl beds at a wide geographical area, whenever it is possible, according to present knowledge.
- Existence of control and/or management of anthropic activities at the site. In this sense, marine protected areas are suitable places to be selected.
- Especially healthy coralligenous and maërl communities are worth to be selected as reference points.
- Coralligenous communities and maërl beds under clearly recognisable direct or indirect anthropogenic disturbances are worth to be selected in order to assess the impact of these disturbances.

Specialized Institutions and researchers

A data base including specialists working in the coralligenous/maërl environments should be obtained. Every specialist should be identified by:

Fields of knowledge:

- Taxonomy, with indication of the group/groups of expertise
- Environmental factors
- Descriptive ecology
- Functional ecology
- Conservation
- Cartography
- Management

Monitoring activities

Even if changes in coralligenous/maërl communities proceed very slowly (Garrabou *et al.*, 2002), at least in the absence of punctual catastrophic disturbances, the study of their dynamics in the long term is of great interest to explain their formation and to foresee their evolution, both naturally or when affected by a disturbance. Thus, monitoring is necessary to understand long-term dynamics and changes in the communities as well as the success in the implementation of management measures.

Types of monitoring

Monitoring should be addressed to answer questions concerning (1) the changes through time in the composition of coralligenous/maërl assemblages, (2) the viability of the populations of plants and animals thriving in these assemblages per se or (3) subjected to natural or anthropogenic disturbances, or (4) the selection of species that can be used as bioindicators. Every type of monitoring needs different methodological approaches.

Monitoring methods

Monitoring methodologies change according to the objectives of each study. A comprehensive summary can be found in Bianchi et al. (2004). Several important limitations are however present when working in coralligenous/maërl assemblages due to the usual deep water environment where diving is performed: time restrictions are severe due to long decompression times and diver performance outstandingly decrease due to nitrogen narcosis (Tetzaff & Thorsen, 2005; Germonpre, 2006). Another problem is the high small scale heterogeneity of coralligenous outcrops which implies a large sampling area to be representative (Ballesteros, 2006). Also, the high medium to large scale heterogeneity makes it difficult comparison among sites. However, the low dynamics of coralligenous assemblages (Garrabou *et al.*, 2002) allow sampling periodicity to be low in long-term studies.

For practical purposes, and when describing assemblages, semi-quantitative evaluations are the most rapid methodology usually providing enough information for a rough characterisation of the assemblages. Coverages or abundances can be easily estimated by indices in a scale of 3 to 6 values. We recommend the use of phytosociological indices (Braun Blanquet, 1979; Cormaci *et al.*, 2004), which can be adequately transformed and used in further statistical ordination analysis.

However, monitoring usually needs the collection of precise quantitative data (e.g. densities, sizes, coverages). Both destructive and non-destructive methodologies are usually used. Destructive methodologies imply the collection of all organisms in an area by scraping a determined surface with a hammer and a chisel, sometimes with the help of a suction sampler (Boudouresque, 1971). This technique, feasible for punctual comparisons, offers excellent results for the flora and sedentary fauna. However it has the drawback of being destructive and, thus, it is not desirable for long term periodical monitorings. Two main methodologies are currently used in non destructive monitoring: photographic sampling and quadrats. Both of them do not require the removal of organisms and, as such, they are very suitable for long-term monitoring.

Photographic procedures consist in the photographic sampling of a defined area, previously delimited in periodical monitorings. Macro-lenses can be used to cover small areas (i.e. 400 cm²) and wide-angle lenses are better used to cover areas of up to 1 m². However, with the introduction of digital cameras, with zoom lenses and auto-focusing, cover areas can be easily changed, even underwater. The use of external strobes greatly increases image quality. Photographs allow the estimation of species densities and abundances (cover) which can also be used to obtain data on community structure. Photographs repeated at regular time intervals in fixed sites allow the collection of information on population dynamics and demography of fauna and flora (Garrabou, 1998, 1999; Garrabou & Ballesteros, 2000; Garrabou & Zabala, 2001). Photography also allows the collection of a great number of samples (photographs) in a reduced period of time, excelling in the ratio between obtained information and diving time. The decrease in diver performance with depth due to nitrogen narcosis and the resulting lack of accuracy of measures is also greatly avoided. However, an important drawback in photography is that whilst it performs very well in 2D organisms and structures, its application in 3D organisms (e.g. gorgonians, some sponges and bryozoans) is far much complicated and usually lacks of enough accuracy.

Quadrats, situated along a transect or haphazardly sampled, are largely used in benthos studies, both in benthic surveys and monitorings. In coralligenous assemblages they have been mainly used to estimate demographic parameters and to study the short and long term changes in gorgonian populations (e.g.

Harmelin & Marinopoulos, 1994; Coma *et al.*, 2004; Linares *et al.*, 2005; Linares *et al.*, in press). Quadrats can be portable or can be permanent and fixed in the sea bottom by lines, following a transect. The size of the quadrat changes according to the objectives of the monitoring. Half to one square meter frames are recommended to monitor abundant large-sized organisms growing in coralligenous assemblages. Permanent quadrats are very useful to study the demography of the main species and the dynamics of the entire community, whilst non permanent quadrats are useful to study changes in sizes or abundances of one to several species. Quantification can easily be performed by individual counting (density measurements) in entire quadrats (e.g. Coma *et al.*, 2006). Quadrats can be subdivided into grids of smaller quadrats and this allows divers to estimate abundances in percentage cover (e.g. Fraschetti *et al.*, 2001), or frequency evaluations (number of sub-quadrats where a species is present; e.g. Sala & Ballesteros, 1997).

Monitoring of individuals/colonies is easily performed when a site is selected, all individuals mapped and/or tagged and identified by a numbered code to facilitate its re-identification (e.g. Ballesteros, 1991; Linares *et al.*, 2005). These permanent sites can be partitioned in quadrats of 10x10 to 50x50 cm (according to the size and distribution of monitored individuals) to facilitate mapping. The corners of each quadrat can be marked using PVC screws or steel climbing parabolas fixed to the substratum by putty (e.g. Linares *et al.*, 2005).

Monitoring of some environmental variables is also needed if we want to relate changes in the coralligenous/maërl assemblages with disturbances. Amongst the most important variables to be monitored are: water temperature, sedimentation rates, nutrient concentration in seawater, particulate organic matter and water transparency.

A specific workshop should be carried out including most specialists currently working in the monitoring of coralligenous/maërl assemblages. Even if it is difficult amongst scientists to propose common standard methods for monitoring, it is always useful to make this kind of workshops in order to know which are the methodologies that are being used and try to adopt techniques that at least can be compared or intercalibrated. Main targets of this workshop should be devoted to methodologies addressed to:

- Large scale comparison of assemblages.
- Medium to long-term changes in assemblage composition and species abundances.
- Monitoring of engineering species (corallines, main algal stands, gorgonians, engineering bryozoans, main sponges).
- Monitoring of vagile species (fish, decapods, gastropods).
- Growth and erosion rates in coralligenous/maërl assemblages.
- Impact of main disturbances affecting coralligenous/maërl assemblages (trawling, mortality events, degradation by waste water, diving activities, invasive species, artisanal fishing, silting).

Research activities

Taxonomy

Coralligenous/maërl assemblages probably are two of the most important hot-spots of species diversity in the Mediterranean, together with *Posidonia oceanica* meadows (Ballesteros, 2006 ; BIOMAERL team, 2003). In comparison to the large amount of literature devoted to the study of *Posidonia oceanica* meadows, studies devoted to strengthen the knowledge of coralligenous/maërl biodiversity are very scarce. Therefore, due to the rich fauna, high heterogeneity at all scales, and complex structure of coralligenous/maërl assemblages, together with the paucity of studies dealing with coralligenous/maërl biodiversity, it can be assumed that at least coralligenous assemblages harbour more species than any other Mediterranean community. The check-list proposed in the second chapter of this Work Programme will probably mention all the species found to date in coralligenous/maërl communities. However research in taxonomy is also needed as a large amount of taxonomic groups absolutely lack not only of a comprehensive study but almost any study dealing with species which can be found in coralligenous outcrops or maërl beds.

Taking into account the current knowledge of biodiversity in coralligenous/maërl communities (Ballesteros, 2006), the following taxonomic groups need an important investment in research:

- Copepods
- Cumaceans
- Isopods
- Molluscs
- Mysids
- Nematods
- Nemertean
- Ostracods
- Phyllocarids
- Polychaeta
- Pycnogonids
- Tanaidaceans

Further research in other groups is also acknowledged as it will surely provide new reports of species for coralligenous outcrops and maërl beds.

Long term evolution

Processes taking place in coralligenous communities usually proceed very slowly (Garrabou *et al.*, 2002). Functioning of outstanding and key species also show low growth rates and low population dynamics (see review in Ballesteros, 2006). Therefore, even if some of the patterns and processes that have been described so far occur in short time periods (*e.g.* mortality events; Cerrano *et al.*, 2000; Garrabou *et al.*, 2001), evolution of coralligenous can only be understood from a long-term perspective. Maërl beds are even less known as there are no comprehensive revisions in this subject regarding Mediterranean rhodolits.

Monitored sites are recommended to be visited once a year. Even if seasonality in coralligenous/maërl communities is not as important as it is in shallower environments (Ballesteros, 2006), the monitoring is recommended to be always performed at the same period of the year in order to facilitate comparisons between years and sites. Summer and the beginning of autumn (July-October) is the best time period to undertake the surveys because diving in deep waters is more secure.

Sites should be selected according to (1) their representativeness at a large geographical scale, (2) their accessibility and (3) the logistical facilities that may contribute to guarantee the monitoring. Selection of reference sites are crucial to monitoring specifically addressed to determine the response of assemblages to particular disturbances.

The monitoring should be designed to be as simple as possible. No standard methods have been proposed and no environmental or ecological quality indexes have been established. A specific methodology for long term studies devoted to look for the evolution of coralligenous/maërl communities can be suggested in the workshop to be conducted for monitoring activities.

Functioning

Special care is to be taken for the study of the functioning of particular associations and species. Specifically, long-lived plants and animals that usually are the engineering species of the coralligenous or the most abundant calcareous algae in maërl beds, need a detailed knowledge of their growth, demographic patterns, vulnerability to disturbances and recovery capacities. RAC-SPA should encourage these studies. Kinds of studies that merit specific attention are:

- Environmental factors and biological processes that determine specific composition and structure of coralligenous/maërl communities.
- Age determination and growth history of coralligenous concretions and maërl rhodolits.

- Growth requirements carbonate production rates, erosion rates, competence studies in corallines and *Peyssonnelia rosa-marina*. Effects of sewage and silting on these processes.
- Importance of excavating sponges, bivalves and annelids to the bioerosion of the coralligenous/maërl rhodolits. Differences between currently growing and subfossil coralligenous outcrops. Effects of sewage and silting in bioerosion rates.
- Effects of invasive algal species in coralligenous outcrops and maërl beds: changes in biodiversity, functional structure and long term dynamics of populations and communities.
- Growth rates, ecophysiological features of structurally important soft algae: *Peyssonnelia* spp., *Flabellia petiolata*, *Halimeda tuna*, *Phyllariopsis brevipes*, *Laminaria rodriguezii*, *Osmundaria volubilis*, *Phyllophora crispa*.
- Contribution of bryozoans to coralligenous outcrops. Growth rates and carbonate production.
- Population dynamics of gorgonians and alcyonarians (*Paramuricea clavata*, *Corallium rubrum*, *Eunicella cavolinii*, *Alcyonium acaule* and others). Factors triggering mortality events. Species-specific responses and adaptations to stress and disturbances.
- Growth and population dynamics of specially relevant massive sponges (e.g. *Axinella polypoides*, *Axinella verrucosa*, *Spongia agaricina*, *Spongia officinalis*). Factors triggering mortality events.
- Growth and population dynamics of specially relevant massive ascidians (e.g. *Halocynthia papillosa*, *Pseudodistoma cyrnusense*, *Phallusia fumigata*, *Microcosmus* spp., *Aplidium* spp.). Factors triggering mortality events.
- Dispersion of species/populations and genetic fluxes between populations at the Mediterranean basin level.
- Development of physiological markers providing information about population health in response to different kinds of disturbances.

Conservation activities

Major Threats

Major threats affecting coralligenous/maërl communities roughly coincide with threats affecting Mediterranean marine biodiversity and are listed in the Strategic Action Programme for the Conservation of Biological Diversity (SAP BIO). However, due to its special habitat and features, not all the threats listed in the SAP BIO affect coralligenous/maërl communities, but some of them are specially relevant. It follows a brief description of the main threats.

Trawling

Trawling is probably the most destructive impact currently affecting coralligenous communities. Trawling is also completely destructive in maërl beds, being the main cause of maërl disappearance in large Mediterranean areas. The action of trawling gear over coralligenous/maërl assemblages leads to the death of most engineering, dominant and builder species, completely changing the environmental conditions of the coralligenous microhabitats and from the maërl environment. As most of these species are particularly long-lived, have low recruitment and complex demographic patterns, destruction of the coralligenous/maërl structure is critical as their recovery will probably take several decades or even centuries. Trawling has also a great impact on target species that, although not as vulnerable as most suspension feeders, they also suffer from this indiscriminate method of fishing. Finally, even the performance of trawling close to coralligenous outcrops or maërl beds affects negatively to algal growth and suspension-feeding due to an increase in turbidity and sedimentation.

Artisanal and recreational fishing

Certain fishes, mainly elasmobranchs, are severely decimated by artisanal fishing practices when fishing pressure is outstanding. This is the case, for example, of several small sharks such as *Scyliorhinus stellaris*, *Mustelus* spp. or *Squalus* spp. In several places, other species such as groupers and lobsters need the implementation of adequate fishery management. Special care has to be taken with the commercial exploitation of red coral (*Corallium rubrum*), whose stocks have strongly declined in most areas. Adequate

management of this extremely valuable and long-lived species is necessary. It is also important to remember that trammel nets and even nylon threads can exert an important impact on gorgonians and other erect species (e.g. *Laminaria rodriguezii*, *Axinella* spp., *Hornera frondiculata*) (Tunesi *et al.*, 1991).

Anchoring

Anchoring has a very severe impact in coralligenous concretions, as most of the engineering organisms are very fragile and are easily detached or broken by anchors and chains. Coralligenous concretions of frequently visited sites by recreational fishing or diving activities are degraded by the destructive potential of anchors.

Invasive species

There is an absolute lack of knowledge on the effects that lessepsian species have on coralligenous/maërl communities in the Eastern Mediterranean. Currently, at least three algal species are threatening coralligenous/maërl communities in the Western Mediterranean: *Womersleyella setacea*, *Acrothamnion preissii*, *Caulerpa racemosa* v. *cylindracea* and *Caulerpa taxifolia*. All of them are only invasive in relatively shallow water coralligenous outcrops and maërl beds (<60 meters), where irradiance levels are sufficient to permit their growth. However, they are especially dangerous, because they completely cover the basal stratum of encrusting corallines and increase sedimentation rates which lead to a total shut down of coralligenous growth or the survival of rhodolits.

Global warming

Anomalous high water temperatures seem to trigger large scale mortalities of several suspension feeders growing in coralligenous assemblages (Cerrano *et al.*, 2000; Pérez *et al.*, 2000). Thus, it is expected that if the current pattern of global warming continues, it will surely affect more frequently the populations of gorgonians and sponges thriving in coralligenous communities situated above the summer level of the thermocline, leading to their eventual total demise.

Waste water discharges

Waste waters profoundly affect the structure of coralligenous communities by inhibiting coralline algal growth, increasing bioerosion rates, decreasing species richness and densities of the largest individuals of the epifauna, eliminating some taxonomical groups and increasing the abundance of highly tolerant species (Hong, 1980, 1982; Cormaci *et al.*, 1985; Ballesteros, 2006). Although no information is available on the impact of eutrophication in Mediterranean maërl beds, the effects must be similar to those reported for coralligenous concretions.

Aquaculture

Although there are no studies on the impact of aquaculture facilities situated over or at the proximity of coralligenous outcrops, nor maërl beds, their effects should match those produced by waste water dumping.

Changes in land use and coastal infrastructure construction and urbanization

Most anthropogenic changes in coastal areas or at their vicinity involve an increase in water turbidity and/or sediment removal that affect coralligenous/maërl communities.

Recreational activities (excluding fishing)

Uncontrolled or over-frequentation of divers in coralligenous communities has been described to produce an important effect over certain large or fragile suspension feeders inhabiting coralligenous communities (Sala *et al.*, 1996; Garrabou *et al.*, 1998; Coma *et al.*, 2004; Linares, 2006).

Mucilaginous and filamentous algal aggregates

Blooms of mucilaginous and filamentous algal aggregates can cause severe damage over erect suspension feeders (mainly gorgonians). These blooms are still not well understood but they are apparently caused by eutrophication.

Legislation and regulations

Coralligenous/maërl assemblages should be granted legal protection at the same level as *Posidonia oceanica* meadows. A first step would be the inclusion of coralligenous concretions and maërl beds as a priority natural habitat type in the EU Habitats Directive (92/43/EEC), which would enable EEC countries to undertake surveillance of the conservation status of coralligenous/maërl assemblages and also to set an ecological network of areas of conservation (LICs/ZECs) hosting coralligenous/maërl assemblages, which would ensure their conservation or restoration at a favourable conservation status. Although *Phymatolithon calcareum* and *Lithothamnion corallioides* are present in the Annex V of the Habitats Directive and as such they should be provided by management measures in case of exploitation (which is never the case in the Mediterranean), there is no specific protection for maërl beds. Similar actions should be encouraged in non-EEC countries through the existing tools of the Barcelona Convention.

Regarding again European countries, recently (21 December 2006), it was published a Council Regulation (EC) No 1967/2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94 which states that “**Fishing trawl nets, dredges, shore seines or similar nets above coralligenous habitats and maërl beds shall be prohibited**” (Article 4.2) and that this prohibition “**shall apply to all Natura 2006 sites, all special protected areas and all specially protected areas of Mediterranean interest (SPAMI) which have been designated for the purpose of the conservation of these habitats under either Directive 92/43/EEC or Decision 1999/800/EEC**” (Article 4.4).

National legislation for the protection of coralligenous assemblages is recommended to be promulgated as soon as possible.

Engineering and endangered species developing in coralligenous assemblages should get legal protection in order to control and, if necessary, to prohibit any type of destruction or disturbance of these species. Appropriate, scientifically-based, management plans have to be implemented for the exploitation of natural resources (e.g. fish, crustaceans, red coral, commercial sponges).

Anthropogenic activities being performed in or at the vicinity of coralligenous/maërl assemblages should be regulated in order to decrease the level of impact compatible with the sustainability of the assemblages and their populations. Specific measures aimed at protecting the coralligenous/maërl environments might include the following (Ballesteros, 2006):

- Waste water dumping should be banned over coralligenous/maërl bottoms, and in their vicinity.
- Trawling must be completely prohibited in areas with maërl beds and coralligenous outcrops and in their vicinity, the aim being to avoid not only the physical damage caused by trawling over coralligenous/maërl assemblages but also the indirect effects due to increased turbidity and silting.
- Any other anthropogenic activity involving an increase in water turbidity and/or sediment removal (e.g. coastline modification, beach regeneration, dredging, aquaculture projects) should be avoided in the vicinity of coralligenous outcrops or maërl beds.
- Correct management of traditional and recreational fisheries must be implemented in order to prevent stock depletion of target fish and invertebrates. Fishing nets have to be avoided in places with populations of long-lived erect invertebrates (e.g. gorgonians, some sponges) and algae (e.g. *Laminaria rodriguezii*).
- The impact of diving must be compatible with the normal functioning and conservation of the coralligenous environment and their species.
- The enactment of suitable legislation concerning the introduction of alien species is urgently needed.

Guidelines for the assessment of environmental impact on coralligenous/maërl assemblages will have to be elaborated.

Creation of Marine Protected Areas

Most present Mediterranean MPAs are devoted to protect *Posidonia oceanica* meadows and other shallow water assemblages, in such a way that the percentage of coralligenous/maërl habitat currently protected in the Mediterranean is extremely low. Thus, it is necessary to establish marine protected areas (MPA) in order to protect representative coralligenous/maërl assemblages by applying the protection and management measures recommended by Articles 6 and 7 of the SPA/BD protocol. In fact, MPAs have to be established taking into account the seascape diversity and trying to include places with several relevant assemblages, as has been already applied in the creation and zonation of some MPAs (Villa *et al.*, 2002; Di Nora *et al.*, 2007).

Countries have to identify and cartography as soon as possible sea bottoms covered by coralligenous outcrops and maërl beds in order to design a network of MPAs that enables the protection of coralligenous/maërl assemblages.

Seamounts situated far away from the coastline deserve special attention due to its isolated geographical position and, usually, lack of knowledge. In particular the following areas are of regional (Mediterranean) interest:

- Alboran Sea (Spain, Morocco)
- North and West coasts of Eivissa (Spain)
- North Minorca and the Channel between Minorca and Mallorca (Spain)
- Banc Emile Baudot, south of Cabrera (Spain)
- Banks from South East Iberian Peninsula: from Palos to San Antonio Cape (Spain)
- Marseilles region (France)
- Western coast of Corsica (France)
- Northwestern coast of Sardinia (Italy)
- Straits of Messina (Italy)
- Isole Eoli and Ustica (Italy)
- Isole Pelagie (Italy)
- Sicily Channel (Italy)
- Puglia coast (Italy)
- Hallouf Bank (Tunisia)
- Algerian coast (Algeria)
- Kykladhes Islands (Greece)

Those Mediterranean MPAs which contain coralligenous/maërl assemblages and for which management and monitoring plans have not yet been developed and implemented, must be provided with such plans as soon as possible.

Coordination of this Work Programme with other tools and initiatives

The Standard Data Form (SDF), developed by RAC SPA, can be used to identify potentially good sites for the establishment of MPAs devoted to protect coralligenous/maërl assemblages.

However the SDF is not appropriate to be used in the monitoring of coralligenous/maërl assemblages since it has been designed for the inventory of sites and habitats but not for an accurate assessment of multi-species population densities and their evolution. Annex B (habitat types) from the SDF should be slightly modified in the point IV.3.1 (Coralligenous biocenosis), according to current knowledge. Species appearing in Annex C

should be slightly enlarged in order to include several engineering coralligenous species according to the adopted criteria for amendments of the Annexes (II & III) of the Protocol SPA-BD.

This Work Programme for the Conservation of Coralligenous and maërl assemblages should be included in the Action Plan for the Conservation of Marine Vegetation (VAP). Even if the VAP concerns plant dominated assemblages, it doesn't exclude animal assemblages and most of the priorities at national and regional levels as well as some of the objectives are nearly the same.

MPAs classified as SPAMIs and containing coralligenous/maërl assemblages inside their protected areas should develop management and protection plans to ensure their conservation.

Timetable

Taking into consideration all the observations stated above, the following actions can be considered:

Action	Time	who
Definition of what assemblages are to be included in this Work Programme: Coralligenous frameworks and maërl beds or circalittoral rocky bottom communities?	As soon as possible	RAC/SPA & Partners
To provide a check list of all the species that are able to thrive in coralligenous/maërl communities using published literature, unpublished reports and expert assessment. Species names (with authorities), citations, geo-referenced localities, abundances, and habitat features have to be included. This check-list has to be designed as a data base with an incorporated GIS.	1 year from adoption	RAC/SPA & Partners
To create a website as a part of the Mediterranean CHM on marine & coastal biodiversity to help in the taxonomical identification of the main species thriving in coralligenous/maërl assemblages, including : A bibliographic data base with all the information concerning coralligenous/maërl assemblages with indication of the topics they cover (e.g. biodiversity and taxonomy, descriptive ecology, functional ecology, composition, environmental factors, cartography, conservation, disturbances). A Data Base on coralligenous/maërl assemblages. Directory of <ul style="list-style-type: none"> • Taxonomists that could provide information on species thriving in coralligenous/maërl assemblages. • Scientists currently working in the coralligenous/maërl environment. • Research institution 	Ongoing	RAC/SPA
To propose standard methodologies for the inventory and monitoring of coralligenous/maërl communities and their main species.	2 years from adoption	RAC/SPA & Partners
To support and/or encourage field missions devoted to increase the knowledge on the distribution, cartography and biodiversity of coralligenous/maërl assemblages. Special attention is to be paid in the Eastern Mediterranean and North of Africa.	Ongoing	RAC/SPA & Contracting Parties
To provide a geo-referenced list of all the sites known to harbour coralligenous/maërl communities, with indication of depth intervals and (if possible) coralligenous/maërl facies or more conspicuous species.	2 years from adoption	RAC/SPA
To propose the creation of MPAs in areas harbouring well developed coralligenous outcrops or maërl beds.	3 years from adoption	Contracting Parties
Organisation of a periodical Workshop devoted to coralligenous concretions and maërl beds (back to back with the symposium on marine vegetation)	Each 3 years	RAC/SPA
Organisation of practical training workshops in order to acquire good taxonomical skills and to learn monitoring methodologies.	As needed	RAC/SPA
To support and/or encourage taxonomic work to be made in some specially unknown groups.	Ongoing	RAC/SPA & Contracting Parties
To support and/or encourage scientific studies devoted to increase the knowledge on the functioning of coralligenous outcrops/maërl beds.	Ongoing	RAC/SPA & Contracting Parties
To promote the conservation of coralligenous/maërl assemblages	Ongoing	Contracting Parties
To foster the conservation of coralligenous/maërl assemblages situated in international waters (e.g. Alboran Sea, Sicily Channel).	4 years from adoption	RAC/SPA & Parties

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ANNEX XIII

DRAFT GUIDELINES FOR CONTROLLING THE VECTORS OF INTRODUCTION INTO THE MEDITERRANEAN OF NON-INDIGENOUS SPECIES AND INVASIVE MARINE SPECIES

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Draft Guidelines for controlling the vectors of introduction into the Mediterranean of non-indigenous species and invasive marine species

INTRODUCTION

The Mediterranean is susceptible to biological invasions because of its emplacement between the Atlantic, Pontic and Erythrean regions, busy maritime traffic, and lagoons and bays that are crowded with fish and shell-fish farms. However, the greatest influx of invaders resulted from the opening of the Suez Canal in 1869 that allowed entry of Indo-Pacific and Erythrean biota. Alien macrophytes, invertebrates and fish are found in many coastal habitats in the Mediterranean. Some invaders have outcompeted or replaced native species locally, some are considered pests or cause nuisance, whereas other invaders are of commercial value. The rate of marine biotic invasions has increased in recent decades; collectively they have significant ecological and economic impacts in the Mediterranean.

The Mediterranean has fewer species than the subtropical eastern Atlantic. This faunal impoverishment has been attributed to the sea's comparatively recent recolonisation after the Messinian crisis, to pleistocenic climatic fluctuations and to its comparative oligotrophy. It has been suggested that the high temperature and salinity prevailing in the southeastern Mediterranean made it unsuitable for many Atlantic-Mediterranean species. The present-day Mediterranean fauna is not truly representative of the water temperature, since the tropical Atlantic species are mostly barred and their niche is only partially occupied, with many of the taxa present presumably at the limit of their ecological tolerance, leaving parts of the Mediterranean vulnerable to invasion. Consequently, when thermophilic species arrived, there were few ecological obstacles to prevent their successful implantation. An increase of the seawater temperature would allow tropical invasive species to gain a distinct advantage over the native fauna.

Shipping is considered the largest single vector for the movement of alien marine species across the globe and has been implicated in the dispersal of numerous neritic organisms, from protists and macrophytes to fish. Though in the Mediterranean, vessel-transported aliens lag behind the Erythrean invasion in the number of species introduced, it is of great significance. Following the opening of the Suez Canal in 1869, the Mediterranean regained its prominence as a hub of commercial shipping, and ever more so since the development of the Middle Eastern oil fields, and the ascendance of the southeast Asian economies. It is estimated that about 220,000 vessels of more than 100 tons cross the Mediterranean annually, carrying 30% of the international sea borne trade volume, and 20% of the petroleum. With some 2000 merchant ships plying the Mediterranean at all times, transfer of biota stemming from the regular operation of ships, is significant.

It is seldom possible to ascertain the precise means of transmission, as some organisms may be conceivably transported by several vectors, yet it is assumed that

port and port-proximate aliens are primarily dispersed by shipping. The transport on the hulls of ships of boring, fouling, creviculous or adherent species is certainly the most ancient vector of aquatic species introduction. Fouling generally concerns small-sized sedentary, burrow-dwelling or clinging species, though large species whose life history includes an appropriate life stage may be disseminated as well. Ballast (formerly solid, but for the past 130 years aqueous) is usually taken into dedicated ballast tanks or into empty cargo holds when offloading cargo, and discharged when loading cargo or bunkering (fuelling). Ballast water therefore consists mostly of port or near port waters. Water and sediment carried in ballast tanks, even after voyages of several weeks' duration, have been found to contain many viable organisms. Since the volume of ballast water may be as much as a third of the vessel's deadweight tonnage, it engenders considerable anxiety as a vector of introduction.

The Mediterranean Sea, a hub of commercial shipping lines and encircled by major ports, is susceptible to ship-borne aliens, whether they occur in fouling communities or in ballast. The global maritime trade connections of Mediterranean ports sustain a large-scale dispersal process of both inbound and outbound biota. Shipping is also an important vector for secondary introduction - the dispersal of an alien beyond its primary location of introduction. The widely invasive algae *Sargassum muticum*, *Caulerpa taxifolia* and *Caulerpa cylindracea* spread across the Mediterranean by ships, fishing boats and recreational craft. Trade patterns ensure that the Mediterranean exports biota as well as imports: The Indo-West Pacific portunid crab *Charybdis hellerii*, an alien present in the eastern Mediterranean since the 1920s, was collected in 1987 in Cuba, and in rapid succession in Venezuela, Colombia, Florida, and Brazil. Transport in ballast tanks is the most probable mode of dispersal since the crab's arrival corresponds with increased coal shipping from Port Drummond, Colombia, to Israel. The presence of two Erythrean aliens, *Alepes djedaba* and *Stephanolepis diaspros*, identified along with four other fish species in a survey of biota in floodable cargo holds and dedicated ballast tanks arriving in Baltimore, U.S.A., from Israel, attest that this is a major pathway for transoceanic dispersal. The movement of ballast water also provides opportunities for the transfer of microorganisms, including pathogens, which exceed concentrations of other taxonomic groups by several orders of magnitudes. Of special concern are possible human pathogens such as the bacteria *Vibrio cholerae* 01 and 0139, agents of human cholera. *Vibrio cholerae* is endemic in the Mediterranean and indeed, a survey of plankton arriving in ballast water in Chesapeake Bay, USA, from the Mediterranean revealed viable *Vibrio* bacteria. The risk of invasion of a new strain is of grave concern given the proximity of some ports to aquaculture facilities and to bathing shores. The increase in shipping-related invasions was noted in a recent series of Atlases that summarized the extant knowledge on 'Exotic species in the Mediterranean' (www.ciesm.org/atlas/). The increase may be attributed to the increase in shipping volume throughout the region, changing trade patterns that result in new shipping routes, improved water quality in port environments, augmented opportunities for overlap with other introduction vectors, and rising awareness and research effort.

Since ballast-mediated bioinvasions into freshwater, estuarine and marine habitats have caused significant economic losses in the past two decades, the International

Maritime Organization (IMO) and the shipping industry have concentrated their attention on ways to address that issue. In February 2004 the new International Convention on the Control and Management of Ship's Ballast Water and Sediments was adopted by a Diplomatic Conference. This Convention, a significant environmental achievement, provides a uniform international instrument to regulate ballast water management, though to be effective, the parties to the Convention have to implement it through appropriate national legislation and enforcement. Like an earlier IMO resolution (A.868(20), November 1997) it relies on Ballast Water Exchange (BWE, the replacement of coastal water with open ocean water) to reduce the risk of inoculation. Hull fouling, an important vector in the Mediterranean for the dispersal of both macrophytes and invertebrates, was held in check since the 1970s by the widespread use of biocidal antifouling paints. However, the adoption of an IMO Convention prohibiting the application of TBT-based antifouling paints as of January 2003, may lead to an increase in fouled hulls, and consequently, hull-transferred biota. On the other hand, the abolition of these TBT-based antifouling is necessary, regarding the resulting environment pollution problems.

The Barcelona Convention (1976) and its relevant protocols, initially aimed at reducing pollution, has been updated with the adoption of new protocols. The Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD), that had been adopted in 1995 and came into force in 1999, invites the Contracting Parties to "*take all appropriate measures to regulate the intentional or accidental introduction of non-indigenous species*" (Article 13). In 2003 the United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP) adopted an "Action Plan concerning species introductions and invasive species in the Mediterranean Sea". Action plan paragraph 7 recognizes that shipping is a major vector of introduction into the Mediterranean Sea. Paragraph 23 of the Action Plan strongly recommended that "*Given the importance of shipping-mediated introductions of non-indigenous species in to the Mediterranean, ... a regional project be developed to overcome gaps for the Mediterranean countries, and strengthen the capacities of the countries to reduce the transfer of aquatic organisms via ships' ballast water and sediments and hull fouling*".

Market-driven demands for alien fish and shellfish are on the rise with the increasing affluence of Mediterranean countries. This, coupled with the crisis in wild fisheries, has created a surge in development of marine aquaculture (mariculture) farming along the shores of the Mediterranean in the last twenty years. Production of shellfish has increased from 461,000 T in 1992 to 626,080 T in 2001, and two commercially-important shellfish, alien to the Mediterranean, *Crassostrea gigas* and *Ruditapes philippinarum*, were intentionally introduced to the Mediterranean in the 1960s and 1970s, respectively. Though most of the species used in cage farming in the Mediterranean are native to the sea (seabream, seabass, mullets), aquaculture operations are susceptible to stock loss and concern over possible deleterious genetic impact of escaped or released cultured stock. This impact on wild populations has been growing in recent years.

Transport and transplantation of commercially important alien oysters has resulted in numerous unintentional introductions of pathogens, parasites and pest species. Oyster farms have served as gateways into Mediterranean coastal waters for these

alien camp-followers. A plethora of algae were introduced with oyster stock from East Asia: *Laminaria japonica*, *Sargassum muticum*, *Undaria pinnatifida* have thus been imported into the Mediterranean through negligence. The slipper limpet, *Crepidula fornicata*, an invasive mollusc on the European Atlantic coast and the North Sea is also assumed to have been introduced with oyster farming. Two oyster-parasites, *Mytilicola orientalis* and *Myicola ostreae*, arrived with their host, but are able to settle on other host species in the Mediterranean.

The past decade saw the introduction of European Union and national regulations aiming to control the deliberate importation of aliens and to limit their dispersal. However, mariculture policies, administration and legislation are very diverse with a lack of specific aquaculture policy in most areas, a lack of a centralized administrative framework, and overlapping between authorities. Legislation on introduction and transfers of alien species exists in some countries. In practice the administrative measures to control alien species introductions are still rudimentary and an effective policy of prevention is hardly enforced. Key industry groups, governmental bodies, and even local environmental groups have a poor appreciation of the magnitude of the problem. As a consequence, too often, responses are insufficient, late and ineffective.

Preventing alien species introductions is a task which needs scientific, administrative and political coordination at the regional level. It is in this context that **RAC/SPA** has identified the problem of alien species as one of its major initiatives at the **regional level**. The proposed guidelines draw on and incorporate relevant parts of the most advanced guidelines and codes of practice for the prevention of biodiversity loss caused by alien invasive species.

The proposed guidelines address four substantive concerns of the alien species issues: enhancing knowledge and research efforts; improving understanding and awareness; strengthening the management response; providing appropriate legal and institutional mechanisms. The **goal** of these guidelines is to **prevent further loss of biological diversity due to the deleterious effects of the intentional and unintentional introductions of alien invasive species, while encouraging environmentally-sound and responsible use of the Mediterranean marine environment**. The intention is to assist the Contracting Parties to the Barcelona Convention in implementing the SPA/BD Protocol (Barcelona, 1995) that calls on them to take "... all appropriate measures to regulate the intentional or non-intentional introduction of non-indigenous or genetically modified species into the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species" (Article 13).

I. BALLAST WATERS

1. INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

It is estimated that about 220,000 vessels of more than 100 GRT (Gross Register Tonnage) cross the Mediterranean annually, carrying 30% of the international sea borne trade volume, and 20% of the petroleum (Galil, 2006). With some 2000 merchant ships plying the Mediterranean at all times, the risk of ballast-transported alien species is significant.

In February 2004 the International Maritime Organization (IMO) adopted the International Convention for the control and management of ships' ballast water and sediments. The Convention will enter into force one year after its ratification by at least 30 Parties to IMO controlling at least 35% of the world fleet by tonnage. So far the only Mediterranean countries that ratified it were Spain and Syria.

Once the Convention is ratified, ships will have to meet ballast water management standards that include ballast water exchange standards and performance standards, as specified in the Convention, to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ballast water and sediments. The performance standards will come into force (subject to ratification) between 2009 and 2016, depending on the size (i.e. ballast water capacity) and construction of the ship. Until those standards come into force the Convention recommends that regional management strategies based on oceanic Ballast Water Exchange (BWE) are developed.

The main objective of the Action Plan concerning species introductions and invasive species in the Mediterranean Sea is *"to promote the development of coordinated measures and efforts throughout the Mediterranean region in order to prevent, control and monitor the effects of species introduction"*. It was determined that among the actions required to attain the objectives of the Action Plan at the regional level *"A workshop made up of experienced Mediterranean scientists should convene ... that examines the different vectors of non-indigenous species introduction and propose possible control measures for their prevention."* (Paragraph 21). One of the aims of this workshop is to advise RAC/SPA concerning regional control measurements including *"Guidelines for controlling the vectors of introduction into the Mediterranean of non-indigenous species and invasive marine species"*.

It is thus incumbent on us to review the existing scientific research with respect to ballast-transported alien organisms in the Mediterranean, and provide RAC/SPA with recommendations on the following relevant priority issues for the Mediterranean region:

2. BALLAST WATER EXCHANGE IN THE MEDITERRANEAN REGION

Open ocean exchange of ballast water is at present the single widely-practiced procedure relied upon by management to reduce the risk of ballast-mediated bioinvasions. Indeed, it is widely recognized that the BWE standard is appropriate in the **interim** as a management measure. The premise for advocating BWE is that it replaces the entrained coastal species with oceanic plankton species that are ill adapted for survival in near-shore environments. Moreover, where harbours are riverine or estuarine, the osmotic stress of salinity change following BWE is perceived to act as a biocide.

The International Convention decrees (Regulation D-1) that “*ships performing Ballast Water Exchange in accordance with this regulation shall do so with an efficiency of at least 95 percent volumetric exchange of Ballast Water.*” “*For ships exchanging Ballast Water by the pumping-through method, pumping through three times the volume of each Ballast Water tank shall be considered to meet the standard described in paragraph 1. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 percent volumetric exchange is met*”.

It is stated (Regulation B-4) that “*A ship conducting Ballast Water exchange ... shall: whenever possible, conduct such Ballast Water exchange at least 200 nautical miles from the nearest land and in water at least 200 meters in depth*”. In cases where the ship is unable to do so, exchange shall be conducted “*as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth*”.

In areas where the distance from the nearest land or the depth does not meet the parameters, “*the port state may designate areas, in consultation with adjacent or other States, as appropriate, where a ship may conduct Ballast Water exchange*” (Reg. B-4.2). The designation of BWE Areas represents an issue underlining the need for regional cooperation and must take into account the guidelines on designation of areas for ballast water exchange (G14).

Nearly the entire Mediterranean lies within 200 nm distance to the nearest shore and much of the internal traffic and most shipping lanes pass within the 50 nm limit.

PROBLEM: Finding areas within the Mediterranean where a ship may conduct BWE given the time and route constraints, yet ensure sufficient dilution while avoiding secondary introduction risk.

RESPONSE: Risk assessment studies – and data on shipping and ballasting patterns, biological surveys and monitoring.

3. INTRA-MEDITERRANEAN VOYAGES

Regulation A-4 concerning Exemptions from the Regulations states: “A Party or Parties, in water under their jurisdiction, may grant exemptions to any requirements....”, but an exemption will be granted only if based on “Guidelines on risk assessment”, and only if it does “.. not impair or damage the environment, human health, property or resources of adjacent or other states”. IMO currently works towards completion of the risk assessment guideline (G7).

PROBLEM: Are intra-Mediterranean voyages inherently “harmless” (because alien species once settled in one part of the sea, are able to spread through natural means, as well as through other anthropogenic vectors) and therefore should be exempt?

RESPONSE: Risk assessment studies – and data on shipping and ballasting patterns, biological surveys and monitoring.

4. REGIONAL EARLY WARNING SYSTEMS

Regulation C-2 that deals with “Warnings Concerning Ballast Water Uptake in Certain Areas and related Flag State Measures” encourages Port States to warn mariners of areas where ships should not uptake ballast water due to outbreaks of harmful aquatic organisms and pathogens. This assumes regional monitoring and communication.

PROBLEM: No regional early warning system exists.

RESPONSE: Port and port-proximate biological surveys and monitoring, combined with a common information system.

5. RECOMMENDATIONS

Taking into account the regional geography, biodiversity, shipping patterns within the Mediterranean and those entering and exiting the sea, it is a given that cooperation within the Mediterranean Sea region is crucial for minimizing the risk of ballast-transported introductions of alien species. Therefore, it is recommended that the RAC-SPA Action Plan encourage the Contracting Parties to sign and ratify the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004, to ensure rapid and harmonized implementation of the Convention and of guidelines developed thereto, and, insofar as it means permit, assist the Contracting Parties in implementing the actions required at the national level, in cooperation with REMPEC and IMO.

Priority at the regional level should be given to establishing the research capacity and financial resources needed for:

- collecting reliable data concerning maritime traffic and ballast water uptake and discharge.
- carrying out biotic baseline surveys for alien species and harmful aquatic organisms and pathogens in major ports using harmonized methodologies.
- gathering information for the identification of potential BWE areas, monitoring and reviewing of designated BWE areas, taking note of the relevant IMO guideline.
- carrying out harmonized risk assessment studies for major ports using appropriate methodologies, taking note of the relevant IMO guideline.
- assessing risk caused by vessel movement within the Mediterranean and from without the Sea.
- Conducting vector-based risk assessment, species-based risk assessment in combination with a pathway-based risk assessment.
- establishing a common regional information 'clearing house' linking data obtained from the traffic and ballast water studies, from the ports' risk assessment studies and the biotic surveys, and forming an early warning system flagging outbreaks of harmful aquatic organisms and pathogens.

II. HULL FOULING

1. BACKGROUND

As with ballast water, species transports with hull fouling is an important vector for species invasions – regionally possibly the dominating introduction vector. When addressing hull fouling, it should be noted that this vector does not refer to sessile organisms only, but also that many mobile species have been transported on ship hulls. Further, fouling organisms are also transported on surfaces inside vessels, e.g. in-tank fouling and fouling in the ships cooling circuit.

Vessels unprotected by anti-fouling paints may gather up to 150 kg of fouling per square metre in less than six months while being at sea. On a very large oil carrier with 40,000 square metres underwater surface, this may total to 6,000 tonnes of fouling. A small amount of fouling may already increase of fuel consumption of up to 40% or more due to the increased resistance to movement. A clean ship can sail faster and with less energy and effective antifouling systems also increase the interdocking time period of the vessel thereby reducing the operational costs. Consequently, the shipping industry developed antifouling systems driven by financial interest.

Compared to the attempts to manage other species introduction vectors, such as ballast water and species imports for aquaculture purposes, little has been done in Europe to manage hull fouling. It is in this context that RAC/SPA has identified the problem of alien species as one of its major initiatives. In the Mediterranean Sea, hull fouling is the prime species introduction vector in shipping which needs to be addressed – at best on a regional approach.

Several initiatives to address hull fouling and biological invasions are currently developing – many of those, focus on unwanted impacts caused by the biocide component of the antifouling paint – rather than aim to reduce the introduction of non-indigenous species, which certainly is a much appreciated "side-effect" when applying antifouling systems. Concern was also expressed that non-organotin vessel paints may not be as effective in preventing organism fouling and may therefore increase the number of species being moved unintentionally with ships. As a result the species invasion rate may increase. It should be noted that newly designed antifouling systems are believed to be as effective as organotin-based paints. Long-term application tests are currently underway. Biocide-free paints, such as silicone-based paints, have also been tested.

The International Maritime Organization (IMO), the United Nations body which deals with shipping, adopted a Convention on Anti fouling Systems (see below). This Convention was prompted by the unwanted impact of harmful organotins, e.g. Tributyl-tin (TBT), previously in use as toxic component of antifouling paints. These compounds slowly "leach" into the sea water, killing barnacles and other marine life that have attached to the ship. But studies have shown that these compounds persist in the water, harming the environment and possibly entering the food chain. One of

the most effective anti-fouling paints, developed in the 1960s, contains the organotin TBT, which has been proven to cause deformations in oysters and sex changes (imposex) in whelks – thereby threatening marine biodiversity, as reported e.g. from certain European coastal waters.

The harmful environmental effects of organotin compounds were recognized by IMO in 1989. In 1990 IMO's Marine Environment Protection Committee (MEPC) adopted a resolution which recommended that Governments adopt measures to eliminate the use of anti-fouling paints containing TBT on non-aluminium hulled vessels of less than 25 metres in length and to eliminate the use of anti-fouling paints with a leaching rate of more than 4 µg of TBT per day. The 1990 IMO Resolution is now completed with a mandatory instrument. In November 1999, IMO adopted an Assembly resolution that called on the MEPC to develop an instrument, legally binding throughout the world, to address the harmful effects of anti-fouling systems used on ships.

1.1 *The IMO Convention on the Control of Harmful Antifouling Systems on Ships*

The international Convention on the Control of Harmful Antifouling Systems on Ships (AFS Convention) was adopted on 2001. The convention will enter into force 12 months after 25 States representing 25% of the world's merchant shipping tonnage have ratified it¹. However, the Convention did not enter into force yet.

By 2008, ships either:

- (a) shall not bear such compounds on their hulls or external parts or surfaces; or
- (b) shall bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.

This Convention applies to ships of all types and sizes (including fixed and floating platforms, floating storage units (FSUs), and Floating Production Storage and Offtake units (FPSOs).

1.2 *European Commission*

As an interim measure before the IMO Convention on antifouling systems enters into force, an EC regulation (782/2003) on the prohibition of organotin compounds on ships was introduced in 2003. There were concerns with the dates prescribed in the IMO Convention and the Commission has issued an interpretation of the regulation.

The regulation:

- bans the application of TBT antifouling paints on all ships flying flags of EU states from 1/1/2003
- bans the presence of TBT antifouling paints on all ships in EU ports by 1/1/2008 (sealer coats accepted)
- requires surveys and certification for EU flagged vessels coated after 1/1/2003 and for foreign flag vessels when the AFS Convention enters into force

¹ As per March 31, 2007 23 IMO member states with a gross tonnage of 17.06% of the world's fleet ratified the Convention.

When the IMO AFS Convention comes into force, member states may take action against foreign flag vessels in their ports to which TBT antifouling paints were applied after 1/1/2003, if allowed under their National laws.

1.3 National regulations

Various countries, including some European countries, have issued national regulations on antifouling systems. Most of these refer to the registration of antifouling paints which contain biocides.

USA

Since 2001 a comprehensive Ballast Water and Hull Fouling Management Program for the State of Hawaii is under development. Management options/requirements considered to prevent new organisms from being introduced include periodic cleaning of the underwater surfaces, and effective and environmentally friendly coatings. There are three main components to allow for a useful hull fouling management programme (Scott Godwin, pers. comm.):

- Pro-active measures, i.e. monitoring programmes, risk assessment, awareness raising, education
- Re-active measures, i.e. rapid response programme
- Post-event measures, i.e. management plan

AUSTRALIA

Another comprehensive instrument entitled "National Protocol to Regulate Hull Fouling Organisms" is currently under development in Australia with the aim to reduce the introduction of non-indigenous species via hull fouling. Australia believes that the IMO Convention addresses larger vessels in a sufficient manner. This Australian initiative focuses on smaller ships, i.e. for internationally plying vessels less than 25 meters and apprehended vessels.

2. GOALS AND OBJECTIVES

The goal of this document is to avoid a further change in Mediterranean biological diversity caused by biological invasions. The guideline also intends to assist the Contracting Parties to the Barcelona Convention in implementing the SPA/BD Protocol (Barcelona, 1995) that calls on them to take "all appropriate measures to regulate the intentional or non-intentional introduction of non-indigenous or genetically modified species into the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species" (Article 13).

The guideline have a general objective to minimise the number of unintentional species introductions associated with hull fouling, to achieve this, seven (see below) specific objectives are targeted.

1. To encourage necessary research and the development and sharing of an adequate knowledge base to address the problems of hull fouling mediated introductions of alien species in the Mediterranean.

2. To increase awareness of hull fouling as a major introduction vector.
3. To technically assist and advise the Mediterranean coastal States, if requested, to ratify the IMO AFS Convention.
4. To encourage the development and implementation of control efforts, such as hull cleaning measures.
5. To encourage the development of a framework for national legislation and regional cooperation to regulate the introduction of hull fouling mediated species introductions, their eradication and control.
6. To design a lead agency, which would have a central responsibility within the government for coordinating the national response to the above issues.
7. To form a national taskforce to develop and implement the proposed guidelines. This national taskforce may be cross-sectoral and multidisciplinary.

This guideline addresses three substantive concerns of the alien species problem:

- enhancing knowledge and research efforts;
- improving understanding and awareness; and
- providing appropriate prevention measures.

Each of the following sections include possible actions for consideration of RAC/SPA and others. It should be noted that these actions may be combined with recommendations resulting from other management approaches aiming to reduce alien species introductions, such as ballast water mediated species introductions and/or species imports for mariculture purposes.

3. KNOWLEDGE AND RESEARCH

An essential element in the campaigns against alien invasive species is the effective and timely collection of information and sharing of data. Sometimes information which may alert management agencies to the potential dangers of new introductions is unknown. Frequently, however, useful information is not widely shared or available in an appropriate format for many countries to take prompt action, assuming they have the resources, necessary infrastructure, commitment and trained staff to do so.

Recommended Actions

1. Develop an adequate knowledge base (including, but not limited to the dimension of the hull fouling situation, evaluation of potential control options) as a primary requirement to address the problems of hull fouling mediated introductions, and to make this easily available through an Internet-based database.

2. Develop, review and update a list of known alien invasive species which are likely to become dispersed in the hull fouling of ships and whose introduction into the Mediterranean Sea should be avoided.

3. Encourage research initiatives on prevention measures, such as biocide-free antifouling paints or hull cleaning measures.

4. AWARENESS

Improved public awareness based on scientific information is fundamental to prevent or reduce the risk of species introductions with hull fouling, this is also importance in smaller vessels such as motor yachts and sailing boats. However, an education programme alone is unlikely to achieve the desired objective of minimising the risks posed by hull fouling.

It should also be addressed in the awareness programme that fouling organisms are transported on surfaces inside vessels (e.g. in-tank fouling and fouling in the ships cooling circuit).

Recommended Actions

1. Identify the specific interests and roles of relevant stakeholders, sectors and communities with respect to hull fouling mediated species invasions. The general public, especially (recreational) boat owners, are an important target group.

2. Port and marina operators are key target groups for information/education efforts leading to an increased awareness and understanding of the issues, their role in prevention and possible solutions.

3. Dockyard and ship scrapyards operators also belong to the key target group. Organisms removed from ship hulls while in dock should not be dumped in the sea, but should be discharged on land.

4. Include communication strategies in the planning phase of all prevention and control programmes. By ensuring that effective consultation takes place with all affected stakeholders, many issues may be resolved or accommodated in advance.

5. PREVENTION AND CONTROL

Preventing the introduction of alien species is the cheapest, most effective option, i.e. prevention is better than cure. Since the impacts of alien species are unpredictable, the precautionary principle should apply. Further, once introduced and established eradication efforts to eliminate a species from the marine environment are very costly and for many species this may prove impossible.

Recommended Actions

1. Encourage industry and stakeholders to develop guidelines and codes of conduct to reduce hull fouling of vessels and so to minimise species invasions.
2. Develop dissemination programmes for such guidelines to all stakeholders.
3. Evaluate the applicability of existing international hull cleaning and management measures (monitoring and control).

6. ROLE FOR RAC/SPA

Effective response measurements depend on national and regional legislation which provide for preventive as well as remedial action, establishing clear accountabilities and operational mandates.

Cooperation between countries is essential to prevent or minimize risks from introductions of potential or proven alien invasive species. Such cooperation is to be based on the responsibility that countries have to ensure that activities within their jurisdiction or control do not damage the marine environment of other countries or the Mediterranean Sea.

It may further be considered to follow the currently emerging hull fouling guidelines (e.g. in Australia, U.S.A.) and, once completed, to evaluate these guidelines for application in the Mediterranean Sea.

6.1 Regional level

1. Evaluate the need for bilateral or multilateral approaches including the consideration to adapt existing multi-country efforts, with respect to the prevention or control of hull fouling mediated alien species introductions.
2. Recommend cooperative action to prevent potential alien invasive species from spreading across borders; recommend coordination with REMPEC when relevant.
3. Provide assistance and technology transfer as well as capacity building related to hull fouling and its management techniques and control options.
4. Exchange findings with neighbouring and other countries and bodies as appropriate.

6.2 National level

1. Recommend the ratification of the IMO AFS Convention.
2. Encourage the development of national strategies and plans for responding to actual or potential threats from alien invasive species introduced in the hull fouling of vessels, within the context of national strategies and plans for the conservation of biodiversity and the sustainable use of its components. These strategies may include

- Routine vessel monitoring to document the risk of species invasions in hull fouling.
 - Identification of vessels which likely carry high risk species in their hull fouling (risk assessment).
 - Identify ports which receive a large number of "critical" vessels.
 - Evaluate hull treatment methods for "critical" vessels.
 - Make all dockyards and scrapyards operators aware that organisms removed from ship hulls should be collected and discharged safely on land.
 - Strongly encourage marina operators to apply the proposed guidelines
3. Ensure that appropriate national legislation is in place, and provides for the necessary control, as well as the necessary administrative powers to respond rapidly to emergency situations.
4. Encourage the development of adequate National knowledge base (including, but not limited to the dimension of the hull fouling situation, evaluation of potential control options).
5. Encourage the exchange of findings with neighbouring and other countries and bodies as appropriate.

III. AQUACULTURE²

1. BACKGROUND

Market-driven demands for exotic fish and shellfish are on the rise with the increasing affluence of Mediterranean countries. This, coupled with the crisis in wild fisheries, has created a surge in development of marine aquaculture (mariculture) farming along the shores of the Mediterranean in the last twenty years. Production of shellfish has increased from 461,000 T in 1992 to 626,080 T in 2001 (Basurco & Lovatelli, 2004), and two commercially-important shellfish, alien to the Mediterranean, *Crassostrea gigas* and *Ruditapes philippinarum*, were intentionally introduced to the Mediterranean in the 1960s and 1970s, respectively. Though most of the species used in cage farming in the Mediterranean are native to the sea (seabream, seabass, mullets), aquaculture operations are susceptible to stock loss and concern over possible deleterious genetic impact of escaped or released cultured stock. This impact on wild populations has been growing in recent years (UNEP/MAP/MED POL, 2004).

The impacts of invasive marine alien species are immense, insidious, and usually irreversible. The impacts may stem from cultured alien species that become established in the wild, from mixing of cultured and wild population of a Mediterranean native species, and from the unintentional introduction of organisms associated with the intentional cultured species. Quarantine practices, developed to guard against diseases and pests, are often inadequate and insufficient safeguards against species that threaten Mediterranean biodiversity. Factors like urbanization, environmental pollution, eutrophication and habitat degradation commonly associated with intensive fish and shellfish farming can provide conditions that favour alien species. Many alien species are opportunistic species, which benefit from the reduced competition that follows habitat degradation. Climate change is also a significant factor assisting the spread and establishment of alien species.

The past decade saw the introduction of European Union and national regulations aiming to control the deliberate importation of aliens and to limit their dispersal. However, mariculture policies, administration and legislation are very diverse with a lack of specific aquaculture policy in most areas, a lack of a centralized administrative framework, and overlapping between authorities (e.g. involvement of 11 ministries in some countries). Legislation on introduction and transfers of alien species exists in some countries. In practice the administrative measures to control alien species introductions are still rudimentary and an effective policy of prevention is hardly enforced.

Mediterranean countries have not developed comprehensive legal and institutional systems that are capable of responding effectively to the introduction of alien species for use in mariculture. Key industry groups, governmental bodies, and even local environmental groups have a poor appreciation of the magnitude of the problem. As

² Cultured marine organisms for human consumption and ornamental purposes.

a consequence, too often, responses are insufficient, late and ineffective. Preventing alien species introductions is a task, which needs scientific, administrative and political coordination at the regional level. It is in this context that RAC/SPA has identified the problem of alien species as one of its major initiatives at the regional level.

The proposed guidelines draw on and incorporate relevant parts of the IUCN Guidelines for the prevention of biodiversity loss caused by alien invasive species, the ICES Code of Practice on Introduction and Transfer of Marine Organisms 2004, the U.S.A. National Aquatic Invasive Species Act of 2005, the Canadian National Code on Introductions and Transfers of Aquatic Organisms, 2003, and follow the FAO Code of Conduct on Responsible Fisheries (CCRF, Art. 9.1.1, 1995) – “*States should promote responsible development and management of aquaculture, including an advance evaluation of the effects of aquaculture development on the **genetic diversity and ecosystem integrity**, based on the best scientific knowledge*”.

2. GOALS AND OBJECTIVES

Growth of mariculture in the Mediterranean is compatible with sustainable management of the marine ecosystem – but only if public policy and technology encourage sound practices. The goal of these guidelines is to prevent further loss of biological diversity due to the deleterious effects of the intentional and unintentional introductions of alien invasive species, while encouraging environmentally sound and responsible use of the Mediterranean marine environment for mariculture. The intention is to assist the Contracting Parties to the Barcelona Convention in implementing the SPA/BD Protocol (Barcelona, 1995) that calls on them to take “... all appropriate measures to regulate the intentional or non-intentional introduction of non-indigenous or genetically modified species into the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species” (Article 13).

The proposed guidelines are concerned with preventing further change of biological diversity caused by cultured marine alien species intentionally introduced into the Mediterranean, or moved between different areas in the Mediterranean, as well as the loss of genetic diversity through interaction with conspecific cultured stocks. They do not address the issue of genetically modified organisms (GMOs), although many of the issues and principles stated here could apply.

The proposed guidelines address four substantive concerns of the alien species issues: enhancing knowledge and research efforts; improving understanding and awareness; strengthening the management response; providing appropriate legal and institutional mechanisms.

The objectives of these guidelines are:

1. To encourage the necessary research and development and sharing of an adequate knowledge to address the issues of mariculture of alien species introduced or translocated (open sea and land base, containment), and the genetic and other

risks from escaped or released cultured stock conspecific with native populations in the Mediterranean.

2. To increase among all stakeholders public awareness of mariculture-introduced or translocated alien species as a major issue affecting native biodiversity in the Mediterranean.

3. To minimize unauthorised introductions of alien species.

4. To minimise unintentional introductions (non target species, including but not limited to disease agents and parasites).

5. To reduce loss of genetic diversity due to interactions with escaped or released cultured conspecifics (i.e. *Sparus aurata*).

6. To ensure that intentional introductions are properly evaluated in advance (i.e. risk assessment), with full regard to potential impacts on biodiversity, and that unauthorized importation and introduction of alien species are fully prohibited.

7. To encourage the development and implementation of eradication and control programmes for alien invasive species and for accidentally-released cultured stock, in case earlier measures fail.

8. To encourage the development of a framework for national legislation and regional cooperation to regulate the introduction of mariculture-introduced alien species and cultured conspecifics, the eradication and control of mariculture-introduced invasive species, and accidentally-released cultured stocks.

9. To designate a lead agency which would have a central responsibility within the government for coordinating the national response to the above issues.

10. To form a national taskforce to develop and implement the proposed guidelines. This national taskforce may be cross-sectoral and multidisciplinary.

3. KNOWLEDGE AND RESEARCH

An essential element in the campaign against alien invasive species is the effective and timely collection of information and information-sharing. Sometimes information that could alert management agencies to the potential dangers of new introductions is lacking. Frequently, however, useful information is not widely shared or available in an appropriate format for many countries to take prompt action, assuming they have the resources, necessary infrastructure, commitment and trained staff.

Recommended Actions

1. Develop an adequate knowledge base, balancing scientific rigor with practicability, timeliness, and breadth of sampling activities, as a primary requirement to address the problems of mariculture-introduced alien species, and make it easily accessible through a global database (or linked databases). Identify existing databases that may meet these criteria. In addition, establish a database of species on trial for commercial use and those used for experimental/scientific purposes
2. Develop a reviewed and regularly updated "Black List" of introduced or translocated cultured alien invasive species, that is easily accessible to all interested parties.
3. Develop a database of genetic profiles of hatchery broodstock of species currently cultured in the Mediterranean, in order to enable tracking of hatchery-bred stock in the wild (released or escaped).
4. Encourage research initiatives on the ecology of the invasion process; impacts of global climate change on alien invasive species; ecological and economic losses and costs associated with mariculture introductions; natural population structure of species at risk from genetic and other interactions with cultured stock, as well as procedures and methods for eradication and control.

4. AWARENESS

Strengthen public awareness based on scientific information is fundamental to prevent and/or reduce the risk of unintentional or unauthorised introductions, and to establish evaluation and authorisation procedures for proposed intentional introductions.

Recommended Actions

1. Identify the specific interests and roles of relevant stakeholders and communities with respect to mariculture-introduced alien species and conspecific stock issues, and target them with easily accessible and accurate information and recommended actions.
2. Make use of existing instruments and, if necessary, foster new ones.
3. Mariculture operators are key target groups for information/education efforts leading to better awareness and understanding of the issues, concerning their role in prevention, monitoring and addressing possible solutions.
4. Build communication strategies into the planning phases of all prevention, eradication and control programmes. By ensuring that effective, transparent consultation takes place with all relevant stakeholders, most issues may be resolved or accommodated in advance.

5. PREVENTION

Preventing the unintentional introduction of alien species, or the release of cultured conspecific stock, is the cheapest and most effective measure to control them. Since the impacts of alien species are unpredictable, any planned intentional introductions and efforts to identify and prevent unintentional introductions should be based on the precautionary principle. Intentional introductions should be prevented if experience elsewhere indicates that the probable result will adversely impact biodiversity.

Intentional introductions of alien species or cultured stock should only take place with authorisation from the relevant authority. Authorisation should require comprehensive evaluations (ecosystem, species, genome) and consultation with neighbouring states as marine biological introductions create transboundary issues.

5.1 *Intentional Introductions - Recommended Actions*

1. Encourage the establishment of appropriate institutional mechanisms as part of national legislative reforms on introduction of cultured alien species.
2. Establish guidelines for Minimum Information Requirements (MIR) for the screening process which includes risk assessment. The MIR should include the purpose and objectives of the introduction, the stage(s) in the life cycle proposed for introduction, the native range, the donor location, and the target area(s) of release. The MIR should also include a review of the biology and ecology of the species (physical, chemical, and biological requirements for reproduction and growth, and natural and non-natural and human-mediated dispersal mechanisms) and information on the receiving environment. The MIR should include a thorough review of the ecological, genetic, and disease impacts and relationships of the proposed introduction in its natural range and donor location; the expected ecological, genetic, and disease impacts in the proposed release area, as well as vectors for further spread (see for example the ICES Code of Practice on Introduction and Transfer of Marine Organisms 2004, www.ices.dk).
3. Carry out a screening process before coming to a decision on introducing an alien species, requiring the intending importer to provide the burden of proof that a proposed introduction will not adversely affect biodiversity within the country of introduction, or another country to which the species may be spread by human-mediated or natural means. Where relevant, require that specific experimental trials be conducted in donor and recipient countries as part of the assessment process. Ensure that the evaluation process allows for the likely environmental impacts, risks, standardized costs and benefits analyses (direct and indirect, monetary and non-monetary), and alternatives, to have been identified and assessed. These will apply, when appropriate, also to subsequent importation of alien species that may occur after completion of the initial introduction process.

4. The organisms of each authorized introduction should be used to establish a broodstock in quarantined facilities (i.e. containment). Only progeny of the authorized quarantined broodstock may be transferred into the natural environment, after an environmental impact assessment, and/or risk assessment indicates minimal or no impact.
5. Impose appropriate monitoring conditions on the introduction of alien species, or species conspecific with Mediterranean wild populations.
6. Endeavour to ensure the ability to take rapid and effective action to eradicate or control, in the event that an unauthorised or accidental introduction occurs, or that an authorised introduction unexpectedly or accidentally results in a potential threat of bioinvasion.
7. Include consultation with neighbouring and other countries potentially affected in the evaluation process.
8. Subject mariculture operations utilizing alien species or cultured species conspecific with Mediterranean, wild populations to appropriate levels of monitoring, control and reporting with an explicit agreement as to the roles and responsibilities (including financial) in the event of an introduction.

5.2 Unintentional Introductions - Recommended Actions

1. Develop guidelines and codes of conduct to minimise or eliminate unintentional introductions of species occurring in association with the target species, including pathogens, disease agents, parasites, and other organisms. Periodically review guidelines to ensure up-to-date information is available.
2. As for intentional introduction, subject mariculture operations utilizing alien species or cultured species conspecific with Mediterranean wild populations to appropriate levels of monitoring, control and reporting with an explicit agreement as to the roles and responsibilities (including financial) in the event of an introduction.

6. ERADICATION AND CONTROL

When prevention fails, steps to mitigate adverse impacts of an alien invasive species include eradication, containment and control. *Eradication* aims to completely remove the alien invasive species. *Control* aims for the long term reduction in abundance or density of the alien invasive species, either with the view to ultimate eradication or reducing the impact to an acceptable level. Controlling an established population of a marine alien species in the wild is difficult. A special case of control is *containment*, where the aim is to limit the spread of the alien invasive species and to contain its presence within defined geographical boundaries.

Early detection of potential or known alien invasive species, together with the capacity to take rapid action, is the key to successful and cost-effective eradications.

Appropriate measures against intentionally or unintentionally introduced alien invasive species should be provided for in any legislation. Reporting of new incursions to relevant authorities should be mandatory. Give priority to eradication at sites where a new alien invasion has occurred and is not yet well established, provided risk analysis determined the species poses a risk and is easily eradicable.

6.1 *Eradication - Recommended Actions*

1. Ensure eradication methods utilized have no long-term effects on non-target and/or native species. Some incidental loss to non-target species may be an inevitable cost of the eradication measure and should be balanced against the long-term benefits to native species.
2. Develop a rapid response toolkit for the Mediterranean that includes an emergency response flow chart of required steps to be taken when an unauthorized introduction is detected.

6.2 *Control - Recommended Actions*

1. Increase the exchange of information between scientists, managers and policy makers concerning alien invasive species and control methods. As techniques are continuously changing and improving it is important to disseminate information.
2. Construct a standardized control strategy for the Mediterranean that includes identifying and agreeing to the prime target species, areas for control, methodology and timing. The strategy may apply to parts of, or to a whole country, or a region. Such strategies should be publicly available, be open for public input, and be regularly reviewed and updated.
3. Consider containment as an appropriate strategy when eradication is not feasible, but only where the range of the alien invasive is limited and containment within defined boundaries is possible. Regular monitoring outside the containment boundaries is essential, with quick action to eradicate any new outbreaks.

7. ROLE FOR RAC/SPA

To be effective, the prevention, early detection, control, and rapid response to mariculture introduced invasive species should be coordinated regionally.

Effective response measures depend on national and regional legislation that provides for preventive as well as remedial action, establishing clear accountabilities and operational mandates.

Cooperation between countries is essential to prevent or minimize risks from introductions of potential or proven alien invasive species utilized or translocated for mariculture. Such cooperation is to be based on the responsibility that countries have to ensure that activities within their jurisdiction or control do not damage the marine environment of other countries of the Mediterranean Sea.

7.1 Regional level

1. Consider the desirability, or as the case may be, necessity, of developing agreements, on a bilateral or multilateral basis, or adapting existing ones, with respect to the prevention or control of introductions of alien species introduced or translocated by mariculture.
2. Consider the desirability of cooperative action to prevent potential alien invasive species from spreading across borders, including agreements to share information, through, for example, information alerts, as well as to consult and develop rapid responses in the event of transboundary issues.
3. Develop an adequate regional knowledge base concerning mariculture-introduced alien species (released into the wild), and make it easily accessible through a global database (or linked databases).
4. Develop the regional knowledge base (including, but not limited to distribution, biology, invasive characteristics, impacts and control options) of cultured marine alien species currently in containment in the Mediterranean.
5. Provide assistance and enhance technology transfer, as well as capacity building, related to risk assessment and invasive species management techniques.

7.2 National level

1. Encourage the development of national strategies and plans for responding to actual or potential threats from alien invasive species introduced or translocated by mariculture, within the context of national strategies and plans for the conservation of biodiversity and the sustainable use of its components.
2. Ensure that appropriate national legislation is in place, and provides for the necessary controls of intentional and prevention of unintentional introductions of alien species or of those translocated by mariculture. The necessary administrative powers to respond rapidly to emergency situations should be provided as well.
3. Endeavour to ensure that funding exists to develop an adequate knowledge base (including, but not limited to distribution, biology, invasive characteristics, impacts and control options). Ensure that this knowledge base is readily available to scientists, managers and mariculture facility operators.
4. Encourage the development of national databases of mariculture-introduced alien species.

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ANNEX XIV

**DRAFT GUIDE FOR RISK ANALYSIS ASSESSING
THE IMPACTS OF THE INTRODUCTION
OF NON-INDIGENOUS SPECIES**

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Draft Guide for risk analysis assessing the impacts of the introduction of non-indigenous species

1.0 Introduction

Our ability to manage the variety of human induced stresses in the marine environment is hampered by limited resources, a lack of fundamental knowledge and the absence of appropriate tools. This is particularly true when faced with alien species. Because of this lack of resource and data, **risk assessment** (RA) is frequently used by decision makers and management to direct actions with regards to alien.

This proposed draft guide to risk analysis draws upon information from published papers (Hewitt *et al.* 2006; Campbell and Gallagher, 2007; Campbell and Hewitt *in prep*), Australian, New Zealand, and Chilean government guidelines (Kahn *et al.* 1999; Anon 2005; Campbell 2005a, b, c; Hewitt and Campbell 2005), the ICES Code of Practice for the Introduction and Transfers of Marine Organisms (2004), and the draft IMO Guideline (G7).

In simple terms, risk assessment is used to determine the likelihood that an event may occur and what the consequences of such an event will be. Risk analysis is a component of a risk framework that identifies and assesses the risk. A risk management framework operates by establishing the context (i.e., alien species in a region; **hazard analysis**); identifying the risk, hazards and effects (i.e., impacts on **core values**); assessing the risks (analyse and evaluate the risks); and treating the risk(s) (i.e., if warranted; **incursion response activity, mitigation**) (e.g., Australian Risk Management Guidelines; Standards Australia 2000, 2004). A measure of risk is derived by multiplying likelihood by consequence. This process is summarised in Figure 1. Hazard analysis determines the actions, events, substances, environmental conditions, or species that could result in an undesired event. Alien species, vectors or transport pathways are all examples of hazards.

Before undertaking a risk analysis the risk endpoint must be determined. Endpoint selection will determine what type of null hypothesis is tested during the risk analysis. With alien species risk assessments, the endpoint's tend to be either: a) quarantine related – where the species has arrived and therefore barrier control has been breached resulting in a quarantine failure; or b) impact driven – where the risk assessment examines the effect/impact/harm the alien species will have as the basis of decision making. If a barrier control stance is taken, then all alien species consequences are classified as “significant” and the likelihood must be determined to derive risk. The ballast water convention approaches alien marine species from a quarantine stance, which tends to blanket all alien species as causing significant consequences when in reality this may not be the case if assessed against all core values. If the assessment is impact driven, then both the likelihood of arrival and the impact of the arrival (consequence) must be determined to derive risk. An impact approach is typically followed when determining if an incursion and its likely spread can or should be eradicated or managed. If a species is seen as causing negligible to low risk then it is likely to be monitored but no further action taken.

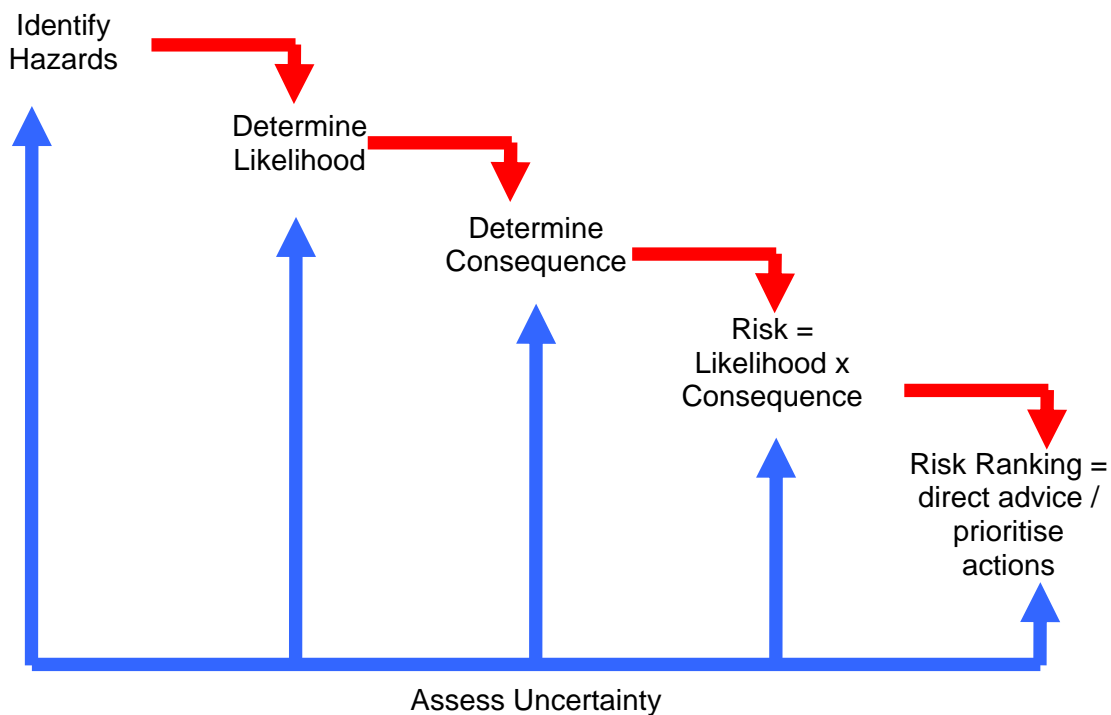


Figure 1. Risk process

To aid management in prioritising action in relation to an alien species import request or alien species incursion, the real and perceived impacts this species will have is examined against the regional core values (environment, economic, social, and cultural) in the import/incursion region and other potential regions that may be capable of sustaining the alien species. Using core values, places management action into a context of being able to objectively assess alien species across environmental and socio-political issues. The core values are:

- **Environment** – everything from the biological to physical characteristics of an ecosystem being assessed, excluding extractive (economic) use and aesthetic value. Examples include floral and faunal biodiversity, habitat, rare, endangered and protected species and marine protected areas.
- **Economics** – components within an ecosystem that provide a current or potential economic gain or loss. Examples include the infrastructure associated with ports, marinas and shipping channels, moorings and allocated mariculture and fisheries areas.
- **Social** – the values placed on a location in relation to human use for pleasure, aesthetic, generational values. This value may also include human health. Examples include tourism, family outings, learning and aesthetics.
- **Cultural** – those aspects of the marine environment that represent an iconic or spiritual value, including those that create a sense of local, regional or national identity.

Each core value consists of a variety of different subcomponents that will differ both spatially and temporally. A risk assessment can occur at the level of the core value or at the level of the core-value subcomponents. A risk analysis of the impact an alien species may have on the four core values can be determined through a six step process, as outlined in Figure 1:

Step 1: Identify Hazard(s)

Identify the species (species RA), vector (species or vector RA), transport mechanism (species or vector RA), or node (pathway RA, environmental matching) that poses the risk. These hazards may act synergistically and hence more than one type of risk of assessment may be applicable to the hazard. Several methods have been used to identify the potential hazards in preparation for qualitative or quantitative evaluations of risk. These include the collation of expert 'heuristics' (via a Delphi process), the use of hazard and operability analyses and the use of fault tree analyses.

Step 2: Determine Likelihood

Likelihood is typically described as the probability of an event (impact or incursion) occurring, ranging from rare events to likely or frequent events. Table 1 illustrates the matrix used to determine likelihood. If the event is an intentional introduction then derivations of likelihood is straightforward. If the event is unintentional then likelihood is determined based on best available information. For example, if the alien species already exists within a **bioprovince** then it is likely that it can exist within all areas of that bioprovince.

Table 1. Likelihood.

Descriptor	Description	Percentage
Rare	Event will only occur in exceptional circumstances	<5%
Unlikely	Event could occur but not expected	25%
Possible	Event could occur	50%
Likely	Event will probably occur in most circumstances	75%
Almost Certain	Event is expected to occur in most circumstances	>95%

Step 3: Determine Consequence (degree of impact/change an alien species will have)

Consequence measures the impact an alien species may have on the regional core values. Consequence can be derived by measuring the change in value from a pre- and post impacted system. Consequence matrices (examples are provided in Appendix A) are used to assess the change because each core value may react differently to change. For example, a 10% change (down turn) in the economy may have catastrophic impacts upon the impacted industry, region or country (E. Gonzalez pers. comm.). Yet, a 10% alteration in biodiversity may not be discernible from fluctuations in natural variation (e.g., Harwood and Stokes 2003). Therefore, it is important to assess change against consequence matrices that are specifically developed for each core value. The consequence matrices provide multiple examples of varying levels of impact (change), not all of which are required for that level to be considered relevant. Although monetary units are often used to measure change in value (because they are easily understood and facilitate comparison) this does not have to be the unit of measure; semi-quantitative categorical ranking (low, medium, high value) is also possible.

Step 4: Determine Risk

A measure of risk is derived by multiplying likelihood by consequence. A risk matrix is used to determine the level of risk (Table 2). Thus, for example, if the likelihood of a *Mytilopsis sallei* (black striped mussel) incursion within the Mediterranean is rare, and the consequence of such an incursion is major, then the level of risk is moderate.

The use of a risk measure is an established and valid method to represent risk posed by alien species (e.g., Kahn et al. 1999; Hewitt and Hayes 2003). A risk assessment is

incomplete unless a measure of risk is calculated. Standard methods for calculating risk exist and are typically used (e.g., Fletcher *et al.* 2001; Aven 2003).

Table 2. Risk Matrix. N = negligible; L = low, M = moderate; H = high; E = extreme

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Significant
Rare	N	L	L	M	M
Unlikely	N	L	M	H	H
Possible	N	L	H	H	E
Likely	N	M	H	E	E
Almost certain	N	M	E	E	E

Step 5: Determine Risk Ranking

Once a level of risk is determined management (including scientific) recommendations can be made. Recommendations may include taking no action, halting imports, use of quarantine, implementation of vector cleaning (hull fouling), use of biocontrol etc. Risk ranking should assess analysis of social and political needs, resulting in pragmatic action(s) being developed. National and international obligations play an important part in this step.

Step 6: Assess Uncertainty

This step occurs throughout the risk assessment process. Regardless of the method used, evaluations will have uncertainty surrounding the outcomes. This can be due either to measurement error or real variability in the assessment. Uncertainty exists because there is natural and stochastic variation in our environments that are difficult to capture, and humans have an incomplete understanding of the biological, physical and anthropogenic systems. This is understandable as ecosystems are highly complex and interconnected varying both spatially and temporally. It is often impossible to predict ecosystem dynamics (see Burgman *et al.* 1993; Harwood and Stokes 2003). Uncertainty also occurs when regarding acceptance criteria – what is an acceptable level of risk? Acceptable level of risk needs to be determined on a regional or country basis and will invariably draw upon high value regions, species and activities that need to be protected both temporally and spatially.

When attempting to determine impacts upon an ecosystem two approaches are often used. Both approaches identify aspects that make up an ecosystem and then assess impacts to these aspects. The first approach uses quantitative analysis to identify the direct impacts either through empirical or manipulative experiments. This approach provides accurate data yet it has serious weaknesses: it would take multiple years, cost several million dollars and the ethical limitations associated with the use of alien species for manipulative experiments may result in limited power to discern impact. Uncertainty within this approach can be tackled through HAZOP analysis, monitoring and sensitivity analyses to improve knowledge (e.g., Hayes and Hewitt 1998).

The second approach is to determine the value of a core value and the change in value when impacted by an alien species in a semi-quantitative fashion by exploring stakeholder and expert opinions and beliefs (**Delphi approach**). Delphic evaluations attempt to differentiate these uncertainty sources by increasing the sample size from which opinions are derived (number of experts), identifying *to the best of the assessor's ability* the best experts, and by using multiple questions to examine consistency in opinions. Different participants will have different levels of understanding, knowledge and perceptions; therefore how they value

a core value and how they assess impact will vary. To capture this, the range of likelihood and/or consequence as perceived by the focus group participants is presented, with the variability used to represent uncertainty. A narrow range of views illustrates less uncertainty, while a greater range represents more uncertainty.

2.0 Types of Risk Assessment

The following pages identify and provide an overview of existing risk assessment approaches, outlining explicit research needs for each risk assessment type. Examples of where these types of risk assessment are being successfully applied on an international and regional basis are provided. There are three approaches outlined:

- **Species level risk assessments** that may be applied to intentional and unintentional introductions or translocations to help identify high risk alien species;
- **Vector based risk assessments** that allow for the differentiation within a vector of high risk items (e.g. vessels, pieces of gear, farms) or activities to aid management outcomes; and
- **Pathway level risk assessments** that allow for a cross comparison between different vectors or between different “**nodes**” such as ports and marinas.

2.1 Species Level Risk Assessment

Risk assessment can be applied to a variety of circumstances such as species level risk assessment for intentional introductions, or post-hoc analyses after an incursion (unintentional) has been detected (e.g., Organism Impact Assessments, Import Health Standards, ICES Code of Practice).

To undertake a species risk assessment the following information is vital:

- **propagule pressure**: that is the amount of biological material arriving into a specific location (e.g. country, state, region, port);
- the number of sites of release for the species;
- the number of introduction events; and
- to a lesser extent, the environmental tolerances of a species native distribution compared to the region being assessed (e.g., Mediterranean or node).

2.1.1 Examples

The ICES Code of Practice for the Introduction and Transfers of Marine Organisms (2004) is an example of a procedural methodology that incorporates the risk assessment and decision making process for intentional introductions. The ICES Code evaluates on the basis of individual planned species movements, with the intent to identify whether the target species is likely to cause harm, and whether any associated species living in, on, or with the target are likely to cause harm, including parasites, disease agents, and human pathogens. The ICES Code is a useful tool for intentional introductions.

Three common methods employed to assess a species risk in both intentional and unintentional situations the development of Import Health Standards (for intentional importation of species) and Organism Impact Assessments (OIA; for post-hoc assessments of incursions; Campbell 2005a), and the development of a next pest list (Hewitt and Hayes 2001; Hayes and Sliwa 2003).

Next Pest Lists: Identification of species of concern is a difficult and often controversial task. Nonetheless, several countries have adopted a target species approach to marine biosecurity (eg Australia, New Zealand). This approach generates target species that are “black-listed” and hence are unable to be imported into a country (through import health standards) unless an exemption is granted, or the species are identified as “unwanted organisms”.

Development of next species lists rely on evaluating species against set-criteria. The criteria provide an explicit, transparent and non-discriminatory method for evaluating and

identifying potential species hazards. One possible set of criteria (based on hull fouling and ballast water) are:

- The species has been reported in a shipping vector or has a ship-mediated history; AND
- The vector still exists; AND
- The species has been responsible for environmental and/or economic harms; AND
- The species is introduced to [country/region] or present in [country/region] but subject to official control (i.e., listed, restricted or otherwise legislated by an authorised national authority) (Hewitt and Hayes 2001).

Organism Impact Assessments: An organism impact assessment (OIA) evaluates species risk using an endpoint of impact: does or will the introduction of the species cause an impact on the core values (environment, economic, social, cultural). OIA's are used to evaluate unintentional incursions of alien species (e.g., Campbell 2005a). This method uses heuristic knowledge drawn from the literature and from expert panels/technical advisory groups and is similar to a 'relative risk assessment' (see Roberts et al. 2002). If there is a paucity of published, empirical scientific data on the impacts of a particular alien species a Delphi approach is adopted. The delphic approach utilises a number of focus groups from different regions, with focus group membership drawn from a range of stakeholder interest, thus representing a wide range of community perceptions. A delphic approach creates a statistical population of beliefs that captures a wide range of community opinions with the central tendency (average) being the perceived risk. Thus, the focus groups aim to assess perceived value of a recipient area and then assess the perceived impacts to this value if an alien species incursion occurs in that region. The data collected from these focus groups is then analysed and a risk assessment of the alien species impact on the four core values is determined. The OIA is undertaken in a five-six step process:

- Identify the Hazard
 - Identify Core Value Subcomponents: Each core value consists of a number of subcomponents that are broad ranging and will differ with perceptions between stakeholders. Subcomponents will also vary spatially (from region to region) and temporally (through time). Examples of core value subcomponents for the environment include habitat, protected species, biodiversity etc; for economics port infrastructure, marinas and shipping channels, fisheries; for social human health, tourism, aesthetics; and cultural spirituality, local, regional, national identity, iconic landmarks. Because of the variation in subcomponents, it is important to update risk assessments regularly.
 - Value Identified Subcomponents: Using contingent valuing, a dollar value or a semi-quantitative categorical ranking (low, medium, high value) associated with each core value and/or its subcomponents are assigned. Appendix B provides a brief description of valuation and its assertion; focussing on contingent valuation methods (CVM).
- Determine Likelihood: Likelihood is typically described as the probability of an event occurring, ranging from rare events to likely or frequent events.
- Determine Consequence (degree of impact the alien species will have on each subcomponent): Consequence, measures the impact the alien species may have on the core values. It is assessed by determining the change in the value of a recipient region with the alien species (see example in Appendix C), then measuring this change against a number of consequence matrices. Thus, consequence is derived by measuring the change in value from a pre- to a post

impacted system. The consequence matrices provide multiple examples of varying levels of impact, not all of which are required for that level to be considered relevant. Consequences can be assessed in dollar values or by a semi-quantitative categorical ranking (see Appendix B).

- Determine Risk: A measure of risk is then derived by multiplying likelihood by consequence (Table 2).
- Assess Uncertainty: Regardless of the method used, evaluations will have uncertainty surrounding the outcomes. This can be due to measurement error or real variability in the assessment. Delphic evaluations attempt to differentiate these uncertainty sources by increasing the sample size from which opinions are derived (number of experts), identifying *to the best of the assessor's ability* the best experts, and by using multiple questions to examine consistency in opinions. Different participants will have different levels of understanding, knowledge and perceptions, therefore how they value a core value (or subcomponents) and how they assess impact will vary. To capture this, the range of likelihood and/or consequence as perceived by the focus group participants is presented, with the variability used to represent uncertainty. A narrow range of views illustrates less uncertainty, while a greater range represents more uncertainty.

To a certain extent an OIA is subjective and imprecise; however it does have strong inherent advantages such as: the ability to produce a result when empirical data is insufficient or lacking; stakeholder input across a range of regions leading to high stakeholder understanding and buy-in; transparency and education (data on alien species and effects is provided to stakeholders); and stakeholder participation by providing perceived risk.

Import Health Standards (IHS): IHS's are legislative procedural documents that are established to ensure that internationally agreed standard of quarantine and scientific evaluation are met to reduce the unwarranted restrictions of trade when importing goods. In this context, an Import Health Standard (IHS) is used to assess risk associated with intentional introductions of species (Anon 2005). Because the species being imported is intentional, then the likelihood is assessed as 'almost likely', with the consequences of such an incursion being assessed. IHS are similar to the ICES Code of Practice, combining both risk assessment and the decision making process for intentional introductions.

When a request for an importation of a species (native and alien) is received, it initiates a series of steps that lead to both risk analyses and risk assessment being undertaken. The risk assessment end point is to assess what impact this species will have on the core values of the recipient region. Most IHS assessments are species-specific; assessing the individual species and its possible associated species, however some are vector based (see later). For example, a request to import adult oysters for aquaculture purposes would involve a risk analysis of the oyster species itself, and risk analyses of all possible epi- and endo-biont associated species known from the donor region. This would then involve overlaying the risk analysis outcomes with social, economic and cultural imperatives to provide a risk assessment. Both positive and negative impacts are assessed in the risk assessment process. Typically, low to negligible risk species are granted approval for importation, with moderate to extreme risk species being rejected. However, moderate to extreme risk species can be granted importation approval (though exemption) if quarantine/containment standards are applied, met, monitored and reported upon.

The outcome of the IHS and its associated analyses is a list of species ('white' list) that is appended to the IHS document. The white list contains negligible to low risk species that

have been assessed and approved for importation. Once added to the white list a species is granted future importation approval, which allows the rigour of the risk analysis, risk assessment and importation process to be bypassed. Hence, the white list becomes the first reference point for an IHS analysis when new import/export requests are made: allowing decision makers to short-circuit the process and grant exemptions without undergoing the full IHS process. To be effective the IHS document and its associated white list of exempted species need to be regularly re-evaluated, especially when new information becomes available. Two examples of IHS documents are the *Australian Import Risk Analysis for Live Ornamental Finfish* (Kahn et al. 1999) and the *New Zealand Import Health Standard for the Importation Into New Zealand of Ornamental Fish and Marine Invertebrates from All Countries* (Anon 2005).

2.2 Vector Based Risk Assessment

Vector based risk assessments identify which shipments or potential incursions are more risky than others (e.g., ballast water risk assessment undertaken in Australia). There are a large number of vectors that are known to be responsible for the transfer of marine alien species. Typically, the examples of ballast water and associated sediments, hull fouling and mariculture (aquaculture) have been concentrated upon.

The most widely established vector based risk assessments have been applied to the management of ballast water and sediments. These assessments have been performed by a number of countries and organisations, and have been based on two primary types of assessment: **environmental matching** where two environments are compared for similarity (or dissimilarity) across a range of environmental variables believed to have ecological significance; and **species based assessments** where a chain-of-events model is used to determine the likelihood of a species arriving and establishing in the receiving environment. Both types of vector based risk assessments can be applied at varying geographic scales, such as at the bioprovince (such as the Mediterranean) down to smaller regions (eg nation, state, marine protected area).

Environmental matching typically evaluates similarity in a statistical sense, with no biological determinant of the cut-off between similar and dissimilar. Similarly, the selection of environmental parameters for evaluation is rarely based on species' requirements for survival, but instead are readily accessible environmental characteristics of the **donor** and **recipient regions**. As a result, while environmental matching assessments have a reduced data requirement, they typically result in less conservative outcomes with greater likelihood of Type I error (finding a difference where none exists resulting in an erroneous low risk).

In contrast, species based risk assessments rely on detailed knowledge of the species' distributions, reproductive periodicity, physiological constraints and environmental preferences. Species level risk assessments have a high data requirement, and typically result in overly conservative outcomes with greater likelihood of Type II error (finding no difference where one exists resulting in an erroneous high risk).

The International Convention on the Management and Control of Ships Ballast Water and Sediments has identified a Risk Assessment Guideline (G7) that will underpin the ability of a State to grant exemptions from the obligations of the Convention. The current formulation of G7 (to be debated at MEPC 55) develops a framework in which both environmental matching and species based assessments are used.

Environmental matching risk assessments should be used only in circumstances where the environments are at biological extremes, such as between wholly freshwater and wholly marine environments. In these circumstances, those species that can survive at both

extremes (such as **catadromous** and **anadromous** species) should be individually assessed.

In contrast, species based assessments should only be used within a single bioprovince (such as the Mediterranean) where the assumption that the majority of native species are shared. In these circumstances, the unknown species can be assumed to be native reducing the number of species assessments required. For donor ports, alien species known to cause harm should be assessed for the ability to establish and cause harm in the recipient port (and adjacent localities). Harm should be assessed according to specific impact on core values and resources. Species based assessments need to be reviewed regularly because newly available information may alter the risk analysis outcomes.

2.2.1 Examples

The development of import health standards (IHS) such as the New Zealand Import Health Standard for the Importation of Ballast Water (Biosecurity New Zealand), and the Chilean Aquaculture Species Import Process are examples of risk analyses that evaluate vector risks.

Import Health Standards: As previously stated; IHS's are legislative procedural documents that are established to ensure that internationally agreed standard of quarantine and scientific evaluation are met to reduce the unwarranted restrictions of trade. They combine both risk assessment and the decision making process to assess intentional introductions (like the ICES Code of Practice). They work by investigating the validity and risk posed by all requests to import a species (and its possible associated species) or a vector. When undertaking an IHS style assessments the likelihood of the species or vector arriving is considered to be 'almost certain', with the consequence (impact) of the species or vector being investigated. Typically, IHS applies to species however there are specific IHS's that apply to vectors. These vectors include ballast water, fishing equipment, marine rock (including live rock from the aquarium trade), imported recreational vessels, ropes and anchors. Vector based IHS's are used for regulatory purposes and when the consequence has been demonstrated. They provide action to mitigate the likelihood by providing information such as where ballast water exchange can occur, quarantine, cleaning and dumping standards, etc. Such IHS's follow the same procedures as stated previously with the exception that the emphasis of the analysis is placed on the vector itself, not upon a species. A current example of a vector IHS is the ballast water exchange at sea requirement.

Aquaculture Species Import Model: Mariculture and aquaculture are growing global industries that are attempting to address the problem of expanding populations and decreasing fish stocks. A number of regions have decided that food security can be improved by utilising alien marine species to either: a) aid in providing food to the regions population, or b) aid in providing an export product that is highly valued elsewhere and therefore marketable. Both of these reasons have merit, with the ethical use of alien marine species needing to be considered against the social and economic security that such a use may provide. Few models exist that specifically target alien species importation for aquaculture/mariculture purposes. The following model is one that has been adopted in Chile, South America, and has operated reasonably successfully (Campbell 2005b; Campbell and Hewitt 2005; Hewitt *et al.* 2006).

The model is initiated when a request to import a non-indigenous species or non-indigenous genome occurs. The request is made using standardised templates, thus allowing a transparent assessment process. At a minimum, the request should include information that allows the decision makers to determine:

- Species:
 - The species and associated species involved in the request;

- Known impacts of the target species has had elsewhere, if any;
- What the species will be used for;
- Can a local species be used instead;
- Will this species require the importation of a specific food source that is also alien (e.g., certain abalone grow better with *Macrocystis* sp as a food source);
- Export Facilities:
 - Where is the importation from (bioprovince, water temperature, salinity, disease information);
 - Certification and quarantine procedures followed by the exporting region;
 - How the importation will occur (specify whether it is importation of larvae, eggs, juveniles, adults; what measures will be taken to reduce fouling of adults; what practices are used to detect disease);
 - Are the imported stock from wild stocks, mariculture/aquaculture facilities;
 - Are the imported stock genetically modified or been fed with genetically modified food source;
- Import Facility:
 - Who is making the request (person, company, local, regional, national, international);
 - The containment and quarantine procedures that will be followed (if these need to be established, how will they be peer reviewed);
 - Does the facility meet regional/national/international certification;
 - Information about the recipient aquaculture facility (is it an open or closed facility; filtration systems used; does translocation of species between facilities occur);
 - Is there any likely release of material into the marine environment;
 - What emergency containment procedures exist;
 - What contingencies exist for disease outbreak containment within the facility;
 - Are there any requirements for the transfer of species between facilities within the country (e.g., establishing a brood stock facility);
 - The proximity of the facility to high value areas, specifically those protected by national or international obligations;
- Monitoring
 - What type of environmental health monitoring will be established;
 - What type of environmental monitoring will occur;
 - What is the frequency of monitoring;
 - Is the monitoring peer reviewed and provided to a statutory body for assessment; and
 - What provisions (contingency measures) exist if an accidental release of the alien species occurs.

It is the role of the decision makers to undertake a risk analysis and risk assessment. To be efficacious the risk process needs to define what impacts are unacceptable, what methods will be used for the risk assessments, set an acceptable level of risk, establish a scientific overview and review committee and develop contingency/action plans or guidelines to deal with the accidental release of a non-indigenous species (Figure 2). The core values (and/or the subcomponents) that the decision makers are attempting to protect and manage must be identified a priori. This can occur through a simple evaluation of national and international obligations (e.g., CBD), or it can be as complex as evaluations of individual subcomponents of the core values. In order to have a consistent process it's ideal to identify the core values a priori, instead of identifying core values with each solicitation.

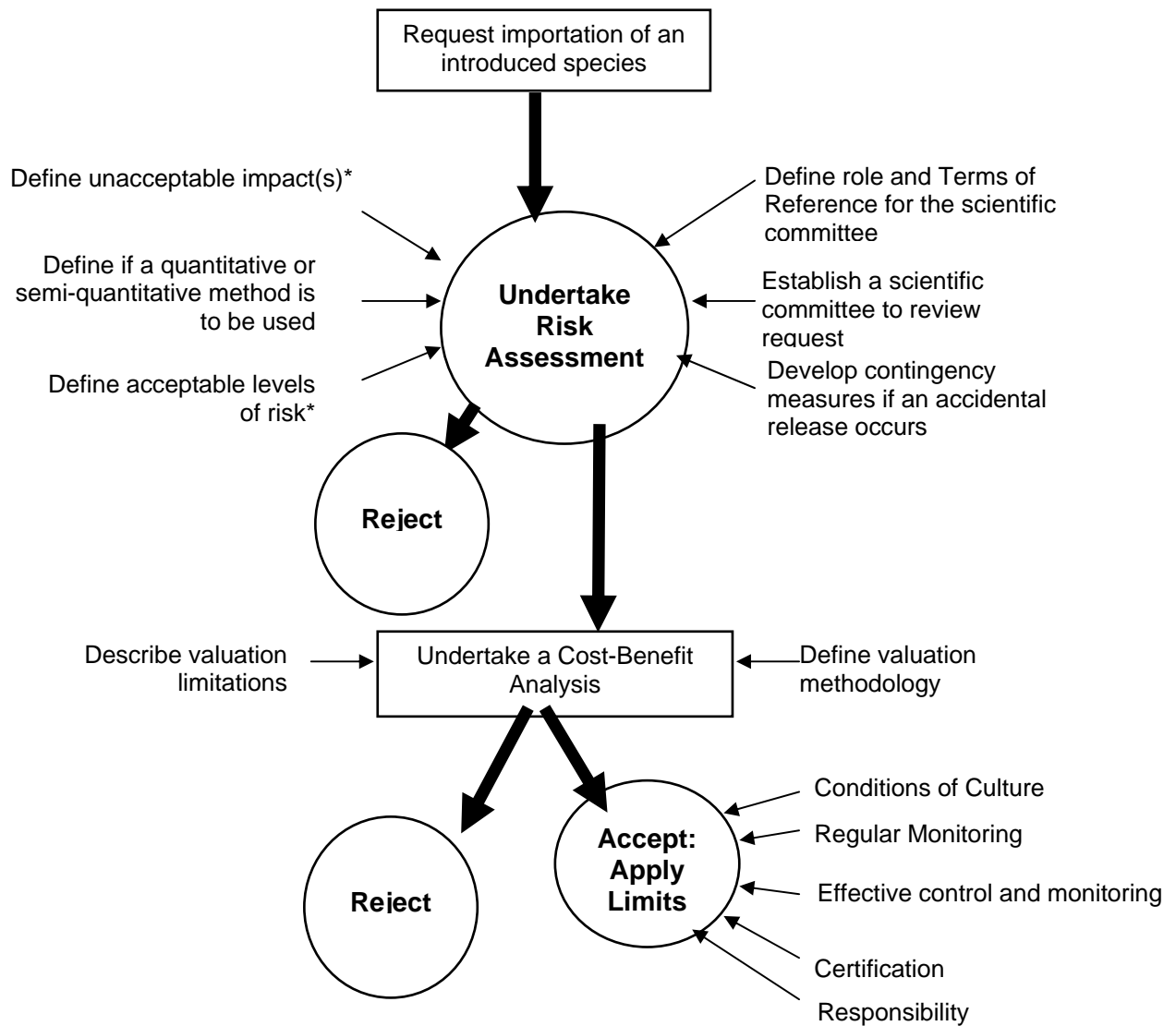


Figure 2. Conceptual risk framework for importation of non-indigenous species for aquaculture purposes (modified from A. Brown, pers. comm.) denotes actions that can occur *a priori* to the risk assessment.

In some instances, it may be necessary to conduct experimental trials with a species to determine its ability to survive, grow and be controlled in certain conditions. To ensure that all relevant data is included in the risk assessment, the risk assessment process is delayed until all experimental trial phase results are completed and assessed. Typically, trials are conducted in the donor country (risk minimisation) but if stringent quarantine procedures are stipulated and enforced, then trials can occur in the recipient country. Trials within a recipient country are never conducted in an open or semi-open environment; all materials associated with the trials (including the test species) need to be sterilised to render them harmless before disposal and there is no disposal of materials into marine or estuarine environments.

Once the risk assessment is complete the decision maker is able to determine if an application is rejected or moves into the second phase of the model. Applications that are rejected are provided with feedback, allowing for modifications and potential reapplication. If

risk is considered negligible to low then a cost-benefit is performed. A cost-benefit analysis will determine the net benefits of a non-indigenous species to the ecosystem, economy, socially and culturally, and assess the costs associated with the non-indigenous species incursion (e.g., destruction of infrastructure, loss of jobs, loss of industry, loss of marine resources, extinction of species, etc). To ensure a consistent approach across all solicitations the valuation methodology and limitations must be stated *a priori* to the cost-benefit analysis. Based on the outcomes of the cost-benefit analysis a decision is made whether to reject the request for import or accept the request. Acceptance requires caveats to be stated and complied with, such as defining and regulating the conditions of culture; regulating how the species are imported (larvae/eggs, juveniles, adults); development and enforcement of regular monitoring using scientifically based methods; establishment of effective control and monitoring programs; establishment of a certification program for importers; and defined lines of responsibility to ensure transparency and to reduce potential confusion of roles should accidental release occur.

Microalgae Import Decision Tree Model: A second model that can be used in conjunction with IHS procedures is a decision-tree that leads the decision maker through a series of questions with “if/then” statements to direct actions regarding whether to approve an importation of microalgae (native, and non-indigenous species) (Campbell 2004). By answering a series of simple yes/no questions the decision-tree progress through the process indicating where importation should be rejected, approved with stipulations or approved without stipulations. The model can be qualitative, semi-quantitative or quantitative and is driven by the data input. As with IHS procedures, likelihood is almost certain since the species is being imported. Each step is assessed against a risk mitigation context (such as a management procedure) with the endpoint derived by the questions asked at each step in the process. Decision tree models invariably consider specific national and international obligations. In New Zealand, an 8-step model was developed for the importation of microalgae typically used for laboratory purposes (colour standards) and aquaculture feed that is released directly into the marine environment (Campbell 2004). Such models are readily adaptable to other countries or regions, such as the Mediterranean, and taxa (such as fish and invertebrates).

One strength of the decision tree model is the ability to incorporate multi-level analyses that deal with alien species and genetically modified organisms. A further strength is that this model combines biological and social information, as well as legal obligations, into clear instructions for decision makers.

Other Research: Further research that will feed into vector risk analyses include assessing fisheries activities and the risk these activities pose via either entraining or translocating “pest” species (N. Parker, pers. comm.). Such studies provide hazard information (e.g., vector movements by fishery, vessel type, time, origin, destination) that feeds into the development of guidelines. It is envisaged that education about the problem of translocation via fishing and aquaculture methods, coupled with consultation will be required for the guidelines to be truly effective. Domestic or regional shipping as a vector should also be investigated, with the aim that best practice guidelines are developed that provide preventative advice for recreational vessel owners to avoid translocating marine pest species.

2.3 Pathway Risk Assessment

Pathway risk assessments assess species and vectors and their intersection/overlaps (e.g., Australia, New Zealand system being developed, GloBallast assessment). Typically, this method concentrates on nodes such as ports or marina’s and examines which nodes are more likely to receive a new organisms. This is determined by analysis of the number of

trading regions the node is exposed to, the amount of ballast water, hull fouling, mariculture received, and the number of vessel visits.

2.3.1 Examples

Hull Fouling and Pathways: To fully capture the risk associated with hull fouling (or other vectors) requires robust, empirically derived data. The following example from New Zealand illustrates how a pathway analysis can be used to determine risk. Currently in New Zealand, a 3-year study is underway to determine the realised risk associated with hull fouling (via vector and pathway analyses). This research is readily applicable to the Mediterranean. This research examines the extent of fouling and fouling species identity on the hulls of arriving international vessels. Categories of vessels being examined are: fishing, passenger, merchant, slow-moving barges, oil platforms, and recreational vessels. The research investigates seasonal trends (winter, summer, spring and autumn) in vessel fouling for each vessel type, associated trade routes and target source/donor regions (IUCN bioregions) based on *a priori* analyses of previous shipping (merchant and recreational) and customs data. This type of research is data and effort intensive but surprisingly inexpensive (NZ\$<3 million) considering the detailed data that is generated and the multiplicity of this data's uses.

This type of research collects information that allows realised risk to be assessed and hence the realised hazard (ship type and/or pathway) to be detected within all ports and marinas dealing with international vessels within a country/regions waters. This in turn greatly improves the ability of decision makers in the development of alien marine species guidelines and standards.

Nodal Analysis: Nodal analyses aim to examine the strength of different vectors (hull fouling – commercial and recreational, ballast water, and aquaculture) into specific nodes (such as ports, marinas, protected areas etc). The nodal analysis investigates donor/recipient interactions and likely flow-on-effects. This type of analysis is currently being undertaken in Australia.

Single Vector Pathway Analysis: One component of Globallast risk assessment is a pathway analysis. In this instance, the GloBallast risk assessment concentrates on a single vector, examining the relative strength of ballast water between various source ports and receiving ports. These analyses were implemented for the six GloBallast ports in Brazil, China, India, Iran, South Africa and the Ukraine. They provide a simplified analysis of risk posed by ballast water in six ports and are coupled with the GloBallast environmental matching exercise to aid in the recommendation of management strategies for ballast water management between ports.

3.0 Definitions

Term	Definition
Anadromous species	Species that spawn in freshwater environments but spend at least part of their adult life in a marine environment
Bioprovince	A large natural region defined by physiographic and biologic characteristics within which the animal and plant species show a high degree of similarity. There are no sharp and absolute boundaries but rather more or less clearly expressed transition zones. Boundaries between biological provinces overlap
Catadromous species	Species that spawn in marine environments but spend at least part of their adult life in a freshwater environment
Core Value	Biosecurity aims to deliver management outcomes to four important components of society: environment, economics, social and cultural
Delphi(c) Approach	The use of formalised groups to seek advice or to extract heuristic and experiential information. Group membership may be general (general public) or technical (i.e., scientists, decision makers, conservationists). This approach is typically used when empirical data is lacking in the published literature however a problem needs to be addressed and therefore 'experts' are called upon to provide advice, this advice can then be assessed against the core values, or the advice may pertain to valuation of core values
Donor Port/Region	Port or location where the alien species is taken onboard or vector originates from
Environmental Matching	The comparison of environmental similarity between two regions (donor and recipient regions) as a surrogate measure of bioinvasion risk
Hazard Analysis	Determining the actions or events that could result in an undesired event, or identifying a substances or species propensity for risk
HAZOP Analysis	Computer program that examines uncertainty in risk analysis
Incursion	The detection of an alien species in a region
Mitigation	The action to alleviate or compensate for impacts caused by an event (e.g., eradication of an introduced species). Often occurs as a Risk Management action.
Node	Port, marina, marine protected area, PSSA etc
Pathway RA	Identified species and vectors and their intersection/overlaps
Precautionary Approach (Principle)	"preventative action must be taken when there is reason to believe that harm is likely to be caused, even when there is no conclusive evidence to link cause with effect" (Eduljee 2000)
Propagule Pressure	Number of individuals released
Recipient Port/Region	Port or location where the alien species is released onboard or vector terminates travel
Risk Assessment	The means to determine the likelihood of an undesired event occurring and the consequences of such events
Species Based Assessment	Provides information about the particular risk of a nominated species
Species Risk Assessment	Identifies which species are more risky than others
Uncertainty	Confidence associated with risk assessment and/or data
Vector	Any living or non-living carrier that transports living organisms intentionally or unintentionally
Vector Risk Assessment	Identifies which shipments or potential incursions are more risky than others

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Appendix A: Generic Example of Consequence Matrices for Alien Species (from Campbell 2005a, 2005b; Hewitt and Campbell 2005)

The generic consequence matrices are identical for all alien species. Tailoring to individual alien species or regions occurs by altering the percentage values and recovery times through a process of expert advice/consultation.

Table A1. Consequence matrix: Environment - Biodiversity

Level	Descriptor	Biodiversity Impacts
1	Insignificant	<ul style="list-style-type: none"> Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction is minimal (<10%) compared to loss from other human-mediated activities. Reductions in species richness and composition are not readily detectable (<10% variation). If the alien species was removed, recovery is expected in days; no change in species richness or composition.
2	Minor	<ul style="list-style-type: none"> Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction is <20% compared to loss from other human-mediated activities. Reductions in species richness and composition are not readily detectable (<20%). Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction and area of alien species impact is small compared to known areas of distribution (<20%) If the alien species was removed, recovery is expected in days to months; no loss of species (non-commercial species, non-habitat forming species and unprotected species) populations; no local extinctions.
3	Moderate	<ul style="list-style-type: none"> Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction is <30% compared to loss from other human-mediated activities. Reductions in species richness and composition are <30%. Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction and area of alien species impact is moderate compared to known area of distribution (<30%) If the alien species was removed, recovery is expected in less than a year; loss of at least one species (non-commercial species, non-habitat forming species and unprotected species) or populations; local extinction events.
4	Major	<ul style="list-style-type: none"> Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction is <70% compared to loss from other human-mediated activities. Reductions in species richness and composition are <70%. Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction and area of alien species impact is small compared to known area of distribution (<70%); likely to cause local extinction. If the alien species was removed, recovery is expected in less than a decade; loss several species (non-commercial species, non-habitat forming species and unprotected species) or populations; multiple local extinction events; one regional extinction.
5	Significant	<ul style="list-style-type: none"> Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction is >70% compared to loss from other human-mediated activities; Reductions in species richness and composition are >70%. Biodiversity (non-commercial species, non-habitat forming species and unprotected species) reduction and area of alien species impact is small compared to known area of distribution (>70%); likely to cause local extinction. If the alien species was removed, recovery is not expected; loss of multiple species of populations of non-commercial species, non-habitat forming species and unprotected species causing significant local extinctions; global extinction of at least one species.

Table A2. Consequence matrix: Environment - Habitat

Level	Descriptor	Habitat Impact
1	Insignificant	<ul style="list-style-type: none"> No significant changes to habitat types observed; populations of habitat forming species are not affected (<1% change); alien species impacts affecting <1% of area of each habitat type. Changes in habitat not measurable against background variability; recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> Localised affects on habitat in <10% of total habitat area; measurable changes to habitat types, new habitat type observed; <10% reduction in population abundances of habitat forming species. If the alien species was removed, recovery is expected in days to months; no loss of habitat-forming species populations.
3	Moderate	<ul style="list-style-type: none"> <30% of habitat area affected/removed; moderate changes to habitat types, new habitat type(s) observed, possible loss of habitat type; <30% reduction in population abundances of habitat forming species. If the alien species was removed, recovery is expected in less than 1 year; no loss of habitat-forming species.
4	Major	<ul style="list-style-type: none"> <70% of habitat area affected/removed; major changes to habitat types, new habitat types observed, loss of most pre-existing habitat types; <70% reduction in population abundances of habitat forming species; local extinction of at least one habitat forming species. If the alien species was removed, recovery is expected in less than a decade; loss of habitat types and habitat-forming species; local extinction events.
5	Significant	<ul style="list-style-type: none"> >70% of habitat area affected/removed; significant changes to habitat types, no pre-existing habitat types existing; >70% reduction in population abundances of habitat forming species; local extinction of more than one habitat forming species, global extinction of one habitat forming species If the alien species was removed, recovery is not expected; loss of multiple habitat types and habitat forming species populations causing significant local extinction; global extinction of at least one species.

Table A3. Consequence matrix: Environment - Protected Species

Level	Descriptor	Protected Species Impact
1	Insignificant	<ul style="list-style-type: none"> No protected species affected due to alien species; impacts on behaviour not detectable. In the absence of further impact, recovery is expected in days; no loss of protected species individuals.
2	Minor	<ul style="list-style-type: none"> Protected species reduction due to alien species impacts is <1% compared to total human-mediated reduction. Reductions in protected species population abundances are <1%. If the alien species was removed, recovery is expected in days to months; no loss of non-target species populations.
3	Moderate	<ul style="list-style-type: none"> Protected species reduction due to alien species impacts is <10% compared to total human-mediated reduction. Reductions in non-target species population abundances are <10%. If the alien species was removed, recovery is expected in less than a year; no loss of non-target species populations; potential loss of genetic diversity.
4	Major	<ul style="list-style-type: none"> Protected species reduction due to alien species impacts is <20% compared to total human-mediated reduction. Reductions in protected species population abundances are <20%. If the alien species was removed, recovery is expected in less than a decade; loss of protected species populations causing local extinction; measurable loss of genetic diversity.
5	Significant	<ul style="list-style-type: none"> Protected species reduction due to alien species impacts is >20% compared total human-mediated reduction; Reductions in protected species population abundances are significant >20%. If the alien species was removed, recovery is not expected; loss of protected species populations causing global extinction; local extinction of multiple protected species; significant loss of genetic diversity of multiple protected species.

Table A4. Consequence matrix: Environment - Trophic Interactions

Level	Descriptor	Trophic Interactions Impact
1	Insignificant	<ul style="list-style-type: none"> No significant changes trophic level species composition observed; no change in relative abundance of trophic levels (based on biomass). Changes in trophic interactions not measurable against background variability; recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> Minor changes (<10%) in relative abundance of trophic levels (based on biomass); <10% reduction of population abundances for top predator species. If the alien species was removed, recovery is expected in days to months; no loss of keystone species populations.
3	Moderate	<ul style="list-style-type: none"> Measurable changes (<30%) in relative abundance of trophic levels (based on biomass); <30% reduction of population abundances for top predator species. If the alien species was removed, recovery is expected in less than a year; loss of keystone species populations; no loss of primary producer populations.
4	Major	<ul style="list-style-type: none"> Major changes (<70%) in relative abundance of trophic levels (based on biomass); <70% reduction of population abundances for top predator species; <30% reduction of population abundances for primary producer species. If the alien species was removed, recovery is expected in less than a decade; loss of keystone species populations; changes in trophic levels; loss of primary producer populations; local extinction events.
5	Significant	<ul style="list-style-type: none"> >70% change in relative abundance of trophic levels (based on biomass); >70% reduction of population abundances for top predator species; >30% reduction of population abundances for primary producer species. If the alien species was removed, recovery is not expected; loss of trophic levels; potential trophic cascades resulting in significant changes to ecosystem structure, alteration of biodiversity patterns and changes to ecosystem function; significant local extinctions.

Table A5. Consequence matrix: Economic - Tourism

Level	Descriptor	Tourism Impacts
1	Insignificant	<ul style="list-style-type: none"> • Reduction in national income from tourism shows no discernible change. • No discernable change in strength of tourism activities. • If the alien species was removed, recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> • Reduction in national income from tourism is <1%. • Reduction of strength in individual tourism activities is <1%. • Tourism is reduced to 99% of its original area (spatial context) within <i>[insert country/region/port name]</i>. • If the alien species was removed, recovery is expected in days to months, no loss of any tourism industry.
3	Moderate	<ul style="list-style-type: none"> • Reduction in national income from tourism is 1-5%. • Reduction of strength in individual tourism activities is 1-5%; • Tourism is reduced to less than 95% of its original area (spatial context) within <i>[insert country/region/port name]</i>; • If the alien species was removed, recovery is expected in years with the loss of at least one tourism activities.
4	Major	<ul style="list-style-type: none"> • Reduction in national income from tourism is 5-10% • Reduction of strength in individual tourism activities is 5-10%; • Tourism is reduced to less than 90% of its original area (spatial context) within <i>[insert country/region/port name]</i>; • If the alien species was removed, recovery is expected in decades with the loss of at least one tourism activities.
5	Significant	<ul style="list-style-type: none"> • Reduction in national income from tourism is >10% • Reduction of strength in individual tourism activities is >10%; • Tourism is reduced to less than 90% of its original area (spatial context) within the <i>[insert country/region/port name]</i>; • If the alien species was removed, recovery is not expected with the loss of multiple tourism activities.

Table A6. Consequence matrix: Economic - Fishing

Level	Descriptor	Fishing Impacts
1	Insignificant	<ul style="list-style-type: none"> • Reduction in national income from fishing shows no discernible change • Reduction in commercial species abundance shows no discernible change • No discernible change in quality of product • No discernible change in strength of fishing sectors • No discernible change in costs of harvesting product (incl. costs of handling, damage to gear or research to mitigate impact) • If the alien species was removed, recovery is expected in days
2	Minor	<ul style="list-style-type: none"> • Reduction in national income from fishing is <1% • Reduction in commercial species abundance is <1% compared to loss from other human mediated activities • Fishing is reduced to less than 99% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction to quality of product <1% • Increased costs of harvesting product (incl. costs of handling, damage to gear or research to mitigate impact) <1% • If the alien species was removed, recovery is expected in days to months, no loss of any fishing region
3	Moderate	<ul style="list-style-type: none"> • Reduction in national income from fishing is 1-5% • Reduction in commercial species abundance is 1-5% compared to loss from other human mediated activities • Fishing is reduced to less than 85% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction to quality of product 1-5% • Increased costs of harvesting product (incl. costs of handling, damage to gear or research to mitigate impact) 1-5% • If the alien species was removed, recovery is expected in less than a year and loss of at least one fishing region
4	Major	<ul style="list-style-type: none"> • Reduction in national income from fishing is 5-10% • Reduction in commercial species abundance is 5-10% compared to loss from other human mediated activities • Fishing is reduced to less than 90% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction to quality of product 5-10% • Increased costs of harvesting product (incl. costs of handling, damage to gear or research to mitigate impact) 5-10% • If the alien species was removed, recovery is expected in less than a decade and loss of at least two fishing regions
5	Significant	<ul style="list-style-type: none"> • Reduction in national income from fishing is >10% • Reduction in commercial species abundance is >10% compared to loss from other human mediated activities • Fishing is reduced to less than 90% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction to quality of product >10% • Increased costs of harvesting product (incl. costs of handling, damage to gear or research to mitigate impact) >10% • If the alien species was removed, recovery is not expected and loss of a number of fishing regions

Table A7. Consequence matrix: Economic - Aquaculture

Level	Descriptor	Aquaculture Impacts
1	Insignificant	<ul style="list-style-type: none"> • Reduction in national income from aquaculture shows no discernible change • No discernible change in quality of product. • No discernible change in strength of aquaculture sectors • No discernible change in costs of harvesting product (incl. handling costs, cost of damage to gear or research costs to mitigate impacts) • No discernible change in ability to sustain and expand aquaculture activities (incl. access to spat and/or opportunities expand and develop new and existing farms) • If the alien species was removed, recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> • Reduction in national income from aquaculture is <1% • Aquaculture is reduced to less than 99% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction in quality of product <1% • Increase in costs of harvesting product (incl. handling costs, cost of damage to gear or research costs to mitigate impact) <1% • Reduction in ability to sustain and expand aquaculture activities (incl. access to past and/or opportunities expand and develop new and existing farms) <1% • If the alien species was removed, recovery is expected in days to months, no loss of any aquaculture region
3	Moderate	<ul style="list-style-type: none"> • Reduction in national income from aquaculture is 1-5% • Aquaculture is reduced to less than 95% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction in quality of product 1-5% • Increase in costs of harvesting product (incl. handling costs, cost of damage to gear or research costs to mitigate impact) 1-5% • Reduction in ability to sustain and expand aquaculture activities (incl. access to past and/or opportunities expand and develop new and existing farms) 1-5% • If the alien species was removed, recovery is expected in less than 1 year and loss of at least one aquaculture region
4	Major	<ul style="list-style-type: none"> • Reduction in national income from aquaculture is 5-10% • Aquaculture is reduced to less than 90% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction in quality of product 5-10% • Increase in costs of harvesting product (incl. handling costs, cost of damage to gear or research costs to mitigate impact) 5-10% • Reduction in ability to sustain and expand aquaculture activities (incl. access to past and/or opportunities expand and develop new and existing farms) 5-10% • If the alien species was removed, recovery is expected in less than a decade and loss of less than two aquaculture regions
5	Significant	<ul style="list-style-type: none"> • Reduction in national income from aquaculture is >10% • Aquaculture is reduced to less than 90% of its original area (spatial context) within <i>[insert country/region/port name]</i> • Reduction in quality of product >10% • Increase in costs of harvesting product (incl. handling costs, cost of damage to gear or research costs to mitigate impact) >10% • Reduction in ability to sustain and expand aquaculture activities (incl. access to past and/or opportunities expand and develop new and existing farms) >10% • If the alien species was removed, recovery is not expected and loss of a number of aquaculture regions

Table A8. Consequence matrix: Economic - Vessel / Moorings

Level	Descriptor	Vessel / Moorings Impacts
1	Insignificant	<ul style="list-style-type: none"> Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <1% of annual cleaning costs Increased costs associated with requirements to clean mooring sites are <1% of annual cleaning costs Increased costs associated with increased maintenance on vessels and moorings as a result of fouling are <1% of annual cleaning costs Lost business opportunities as a result of cleaning requirements / movement restrictions (incl. inability to access domestic / overseas ports) are <1% annual business turnover
2	Minor	<ul style="list-style-type: none"> Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <10% of annual cleaning costs Increased costs associated with requirements to clean mooring sites are <10% of annual cleaning costs Increased costs associated with increased maintenance on vessels and moorings as a result of fouling are <10% of annual cleaning costs Lost business opportunities as a result of cleaning requirements / movement restrictions (incl. inability to access domestic / overseas ports) are <10% annual business turnover
3	Moderate	<ul style="list-style-type: none"> Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <20% of annual cleaning costs Increased costs associated with requirements to clean mooring sites are <20% of annual cleaning costs Increased costs associated with increased maintenance on vessels and moorings as a result of fouling are <20% of annual cleaning costs Lost business opportunities as a result of cleaning requirements / movement restrictions (incl. inability to access domestic / overseas ports) are <20% annual business turnover
4	Major	<ul style="list-style-type: none"> Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <40% of annual cleaning costs Increased costs associated with requirements to clean mooring sites are <40% of annual cleaning costs Increased costs associated with increased maintenance on vessels and moorings as a result of fouling are <40% of annual cleaning costs Lost business opportunities as a result of cleaning requirements / movement restrictions (incl. inability to access domestic / overseas ports) are <40% annual business turnover
5	Significant	<ul style="list-style-type: none"> Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are >40% of annual cleaning costs Increased costs associated with requirements to clean mooring sites are >40% of annual cleaning costs Increased costs associated with increased maintenance on vessels and moorings as a result of fouling are >40% of annual cleaning costs Lost business opportunities as a result of cleaning requirements / movement restrictions (incl. inability to access domestic / overseas ports) are >40% annual business turnover

Table A9. Consequence matrix: Social - Aesthetics / Diving

Level	Descriptor	Aesthetics / Diving Impacts
1	Insignificant	<ul style="list-style-type: none"> • Reduction in the quality of the diving experience, in terms of access, visibility and safety, is <1% • Reduction in the quality of the diving experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <1% • If the alien species was removed, recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> • Reduction in the quality of the diving experience, in terms of access, visibility and safety, is <10% • Reduction in the quality of the diving experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <10% • Diving is reduced to less than 90% of its original area (spatial context) • If the alien species was removed, recovery is expected in weeks to months.
3	Moderate	<ul style="list-style-type: none"> • Reduction in the quality of the diving experience, in terms of access, visibility and safety, is <20% • Reduction in the quality of the diving experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <20% • Diving is reduced to less than 80% of its original area (spatial context) • If the alien species was removed, recovery is expected in less than a year.
4	Major	<ul style="list-style-type: none"> • Reduction in the quality of the diving experience, in terms of access, visibility and safety, is <40% • Reduction in the quality of the diving experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <40% • Diving is reduced to less than 70% of its original area (spatial context) • If the alien species was removed, recovery is expected in less than a decade.
5	Significant	<ul style="list-style-type: none"> • Reduction in the quality of the diving experience, in terms of access, visibility and safety, is >40% • Reduction in the quality of the diving experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is >40% • Diving is reduced to less than 60% of its original area (spatial context) • If the alien species was removed, recovery is not expected.

Table A10. Consequence matrix: Social - Vessel / Access

Level	Descriptor	Vessel / Access Impacts
1	Insignificant	<ul style="list-style-type: none"> • Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <1% of annual cleaning costs • Reduction in recreational enjoyment as a result of movement restrictions (incl. inability to access domestic / overseas ports) is <1% • Increased costs associated with increased maintenance on vessels / vectors as a result of fouling are <1% of annual cleaning costs
2	Minor	<ul style="list-style-type: none"> • Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <10% of annual cleaning costs • Reduction in recreational enjoyment as a result of movement restrictions (incl. inability to access domestic / overseas ports) is <10% • Increased costs associated with increased maintenance on vessels / vectors as a result of fouling are <10% of annual cleaning costs
3	Moderate	<ul style="list-style-type: none"> • Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <20% of annual cleaning costs • Reduction in recreational enjoyment as a result of movement restrictions (incl. inability to access domestic / overseas ports) is <20% • Increased costs associated with increased maintenance on vessels / vectors as a result of fouling are <20% of annual cleaning costs
4	Major	<ul style="list-style-type: none"> • Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are <40% of annual cleaning costs • Reduction in recreational enjoyment as a result of movement restrictions (incl. inability to access domestic / overseas ports) is <40% • Increased costs associated with increased maintenance on vessels / vectors as a result of fouling are <40% of annual cleaning costs
5	Significant	<ul style="list-style-type: none"> • Increased costs associated with requirements to clean vessels / vectors before moving from one location to another are >40% of annual cleaning costs • Reduction in recreational enjoyment as a result of movement restrictions (incl. inability to access domestic / overseas ports) is >40% • Increased costs associated with increased maintenance on vessels / vectors as a result of fouling are minimal (>40% of annual cleaning costs)

Table A11. Consequence matrix: Social - Recreational Harvest

Level	Descriptor	Recreational Harvest Impacts
1	Insignificant	<ul style="list-style-type: none"> Reduction in the quality of the recreational harvest experience, in terms of access, visibility and safety, shows no discernible change Reduction in the quality of the recreational harvest experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, shows no discernible change If the alien species was removed, recovery is expected in days.
2	Minor	<ul style="list-style-type: none"> Reduction in the quality of the recreational harvest experience, in terms of access, visibility and safety, is <10% Reduction in the quality of the recreational harvest experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <10% Recreational harvest is reduced to less than 90% of its original area (spatial context) If the alien species was removed, recovery is expected in weeks to months.
3	Moderate	<ul style="list-style-type: none"> Reduction in the quality of the recreational harvest experience, in terms of access, visibility and safety, is <20% Reduction in the quality of the recreational harvest experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <20% Recreational harvest is reduced to less than 80% of its original area (spatial context) If the alien species was removed, recovery is expected in less than a year.
4	Major	<ul style="list-style-type: none"> Reduction in the quality of the recreational harvest experience, in terms of access, visibility and safety, is <40% Reduction in the quality of the recreational harvest experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is <40% Recreational harvest is reduced to less than 70% of its original area (spatial context) If the alien species was removed, recovery is expected in less than a decade.
5	Significant	<ul style="list-style-type: none"> Reduction in the quality of the recreational harvest experience, in terms of access, visibility and safety, is >40% resulting the area no longer being utilised Reduction in the quality of the recreational harvest experience, in terms of naturalness of the surrounding habitat and the diversity of organisms, is >40% Recreational harvest is reduced to less than 60% of its original area (spatial context) If the alien species was removed, recovery is not expected.

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Appendix B: Organism Impact Assessment (OIA) – Valuation (modified from Campbell 2005c; Campbell and Hewitt *in prep*)

What is valuation?

When undertaking an organism impact assessment valuation must occur. In this instance we define value as the monetary worth/ marketable price, or scale of usefulness/importance we place on an ecosystem, its services and benefits. We assess value at the level of the environment, the economy, socially and culturally (the four core values). Each core value consists of a suite of subcomponents. For example, in a freshwater/estuarine port, the environmental core value may consist of rare and endangered species, biodiversity, and water chemistry, whilst the economic value may include the infrastructure, tourism occurring in the port and commercial fishing. The numerous subcomponents to each core value will differ from region to region (spatial), through time (temporal) and between how individuals perceive an area. Because of these shifting spatial, temporal and perceived values, and coupled with the diversity of ecosystems, services and benefits, valuation is difficult to assess. To overcome this, economic theorists have developed a number of methods that enable differing ecosystems to be valued. Although monetary units are often used as they are easily understood and facilitate comparison this does not have to be the unit of measure. For example a value continuum can be implemented that assesses value based on a rate or scale of usefulness or importance (Figure B1).

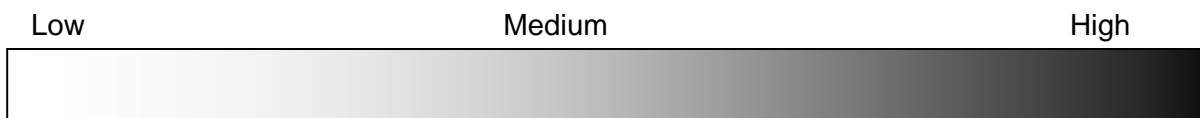


Figure B1. The value continuum concept. Value(s) increases or decreases along the continuum, with terms such as low, medium and high being used to classify where on the continuum the real and/or perceived value lies.

Valuation of the core values can be positive/realised (what is, what was, what will be) or normative (what ought to be). Positive valuation is based on data and facts, with normative valuation aiming to determine the optimal level of impact. Normative approaches involve value judgment and are hence, are open to variation and debate. Typically, environmental, social and cultural core values are assessed from a normative perspective because they contain subcomponents that are difficult to place a dollar value against.

To date, ecosystem value (including its goods and services) has typically relied on economic tools to assess how they are used (see Total Economic Value [TEV]; Figure B2). These tools attempt to simplify how we view the world and its assets by categorising them into use and non-use values. Use values are further divided into direct use, indirect use, and option (Figure B2). Direct use value refers to ecosystem goods and services that are used directly by human beings. These values are most often enjoyed by people visiting or residing in the ecosystem itself. Indirect use value is derived from ecosystem services that provide benefits outside the ecosystem itself (e.g., carbon sequestering by mangroves). Option values are derived from preserving the option to use in the future ecosystem goods and services that may not be used at present, either by oneself (option) or by others/heirs (bequest). Non-use values are existence values and typically refer to the enjoyment people may experience simply by knowing that a resource exists even if they never expect to use that resource directly themselves.

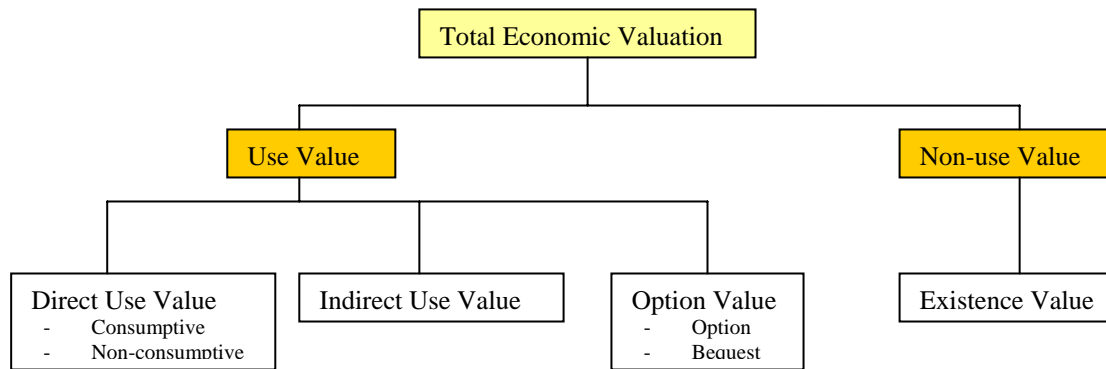


Figure B2. Total Economic Value (TEV) conceptual framework (from Pagioli et al. 2004).

Assessment of value uses various methods such as revealed preference methods (travel costs, hedonic pricing, replacement cost, production function etc) and stated preference methods (contingent valuation, choice modelling). The use of benefits transfer also exists as a valuation technique. Pagioli et al. (2004) provide an excellent summary of valuation techniques, their approach, application, data requirements and limitations.

Within New Zealand, Organism Impact Assessments have typically used contingent- and where possible, market valuation techniques. These methods are commonly used in terrestrial and freshwater research evaluations (e.g., Braden and Kolstad 1991; Tietenberg 1992; Brown and Moran 1993; Barbier 1994; Barbier and Aylward 1996; Bishop 1998; Reid 2001; Emerton and Bos 2004) and to a lesser extent in marine systems (Norse 1993). Contingent Valuation Methods (CVM) work by asking focus group participants their beliefs as to the value of a specified service, or their willingness to pay to preserve this specified service. It is applicable to all ecosystem services and benefits, but is typically used for non-use values (see Gilpin 2000; Chee 2004; Pagioli et al. 2004). There are shortcomings to this method: strategic behaviour, protest answers, response bias and respondents ignoring incomes constraints (Daimond and Hausman 1994; Chee 2004). It's important to ensure that respondents don't express a general preference for environmental spending in their answers (known as embedding effect; Kahneman and Knetsch 1992). Typically these problems are overcome by ensuring that:

- i. Personal interviews are held, not telephone calls or mail-outs;
- ii. Surveys are designed in a yes-no referendum style format or directed in such a way that open-ended questions are avoided;
- iii. Participants are given detailed information on the resource in question and on protection measures they are 'voting' on. This information should include threats to the resource, scientific evaluation or its ecological importance and possible outcomes of protection measures;
- iv. Income effects are carefully explained to ensure that participants understood that they were to express their willingness to pay to protect the resource in question, not the environment generally; and
- v. Subsidiary questions are asked to ensure that the participants understood the question posed.

There are many potential sources of bias in responses with guidelines existing to ensure reliable application of CVM. Thus, the assessor (workshop chair/convener) has a high burden of proof to satisfy before results can be seen as meaningful.

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Appendix C: Organism Impact Assessment – Deriving Value and Consequence (modified from Campbell 2005c)

Table C1. Summary of three regional focus groups perceptions of value of core values prior to an alien species is introduced. Average value is indicated in parentheses. Ranges represent the variability (uncertainty) in perceptions. Priceless denotes a value equivalent to \$1billion. Cultural values were assessed on a scale of importance. hh denotes the dollar value a household is willing to pay to prevent/mitigate an alien species problem.

Core Value	Perceived Value Range (average ± SD)		
	Region 1	Region 2	Region 3
Environment	\$10/hh* - \$5,000/hh (\$730/hh ± 1, 170)	\$10 million – priceless (\$195 million ± 350 million)	\$32 million – priceless (\$120 million ± 380 million)
Economic	\$100,000 - \$370 million (\$70 million ± 95 million)	\$0 – priceless (\$225 million ± 320 million)	\$10 million – priceless (\$270 million ± 280 million)
Social	\$1/hh – priceless (\$100 million/hh ± 310 million)	\$2 million – priceless (\$120 million ± 290 million)	\$1 million – priceless (\$915 million ± 195 million)
Cultural	Very low to very high (65.6)	Moderate to very high (75)	Moderate – very high (93)

Table C2. Summary of three regional focus groups perceptions of change in value following on from an alien species incursion. Average percent perceived change is indicated in parentheses, which are averages of the core value subcomponent groupings. Cultural values were assessed on a scale of importance.

Core Value	Range of Perceived Change in Value (%)		
	Region 1	Region 2	Region 3
Environment	90-100 (95%)	0-100 (45%)	10-95 (45%)
Economic	0-100 (33%)	10-100 (78%)	1-100 (49%)
Social	0-60 (24%)	0-40 (16%)	20-100 (72%)
Cultural	Very small to moderate (22%)	Small to large (48%)	Very small to very large (33%)

Table C3. Summary of three regional focus groups perceptions of impact (consequence) following on from an alien species incursion. Consequence is derived from the consequence matrices (Appendix A), where the percent change is assessed against the percent descriptor in the consequence matrices.

Core Value	Perceived Consequence		
	Region 1	Region 2	Region 3
Environment	Significant	Major	Major
Economic	Significant	Significant	Significant
Social	Major	Moderate	Significant
Cultural	Major	Significant	Major

References

Campbell, M. L. 2005c. Organism impact assessment (OIA) for potential impacts of *Didymosphenia geminata*. All Ocean Ecology Client Report 2005-02 prepared for Biosecurity New Zealand, Wellington.

ANNEX XV

DRAFT IMPLEMENTATION TIMETABLE FOR THE ACTION PLAN CONCERNING SPECIES INTRODUCTIONS AND INVASIVE SPECIES IN THE MEDITERRANEAN SEA

**DRAFT IMPLEMENTATION TIMETABLE FOR THE ACTION PLAN CONCERNING SPECIES
INTRODUCTIONS AND INVASIVE SPECIES IN THE MEDITERRANEAN SEA**

Action	Deadline	Responsible
1. Preparation of National Reports (paragraph 15)	2008	Contracting Parties
2. Setting up a mechanism to promote and coordinate the actions listed in paragraph 18	2008	Contracting Parties
3. Inventorying introduction vectors (paragraph 18)	2008	Contracting Parties
4. Establishing a directory of relevant specialists and organisations (see paragraph 18)	2008	Contracting Parties
5. Elaborating education and awareness material (paragraph 25)	2008	RAC/SPA
6. Developing programmes to raise the awareness of the general public and target groups, including decision-makers, concerning the risks associated with species introduction (paragraph 18)	2009	Contracting Parties
7. Setting up a group of experts who will be responsible for assessing suggestions for introduction, and analysing risks and possible consequences (paragraph 18)	2009	Contracting Parties
8. Compiling an inventory of introduced species. Identifying and inventorying public and private actors whose activity could introduce marine non-indigenous species (paragraph 18)	2009	Contracting Parties
9. Setting up the Regional Mechanism for collecting, compiling and circulating information on invasive non-indigenous species (paragraph 22)	2009	RAC/SPA
10. Launching the procedures for enacting or strengthening national legislation governing the control of non-indigenous species introduction (paragraph 17)	2010	Contracting Parties
11. Developing programmes for data collection and monitoring (paragraph 16)	2011	Contracting Parties
12. Strengthening and where necessary setting up systems to control the intentional import and export of non-indigenous marine species (paragraph 18)	2011	Contracting Parties
13. Developing and implementing risk-assessment techniques (paragraph 18)	2012	Contracting Parties
14. Elaborating the National Plans (paragraph 19)	2012	Contracting Parties

