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NOTE ON AMENDING ANNEXES II AND III OF THE SPA/BD PROTOCOL

In the framework of a sustainable development approach, this document will be available only in electronic format during the meeting

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GENERAL CONTEXT

The adopting, in 1995, of the new Protocol on Specially Protected Areas and Biological Diversity (SPA /BD Protocol) was followed, in 1996, by the adopting of annexes to the said Protocol, in particular Annex II on the list of endangered or threatened species and Annex III on the list of species whose exploitation is regulated; these Annexes include respectively 104 and 28 species of marine Mediterranean flora and fauna.

At their Fifteenth Ordinary Meeting (Almeria, January 2008), the Contracting Parties to the Barcelona Convention adopted a format for revising these Annexes and asked RAC/SPA to assess the status of the species appearing therein, in order to suggest amendments to be submitted at RAC/SPA's Ninth Meeting of Focal Points (UNEP-MAP, 2008). The suggestions aimed at taking account of changes that had occurred in the naming of certain species (taxonomic modifications) after they had been put onto one or the other Annex, and also proposing the listing of new species.

The Contracting Parties, at their Sixteenth Ordinary Meeting (Marrakech, November 2009), adopted the amending of Annexes II and III, allowing species of flora, birds and fishes to be added and bringing up to 158 the number of species listed in Annex II and up to 43 the number of species listed in Annex III (UNEP-MAP, 2009). Moreover, during the debates on this item, RAC/SPA was asked to pursue its activities over the biennium in order to determine whether concern about certain genera (e.g. Rhinobatos, Squatina) or species of fish, in particular (e.g. *Isurus oxyrinchus, Lamna nasus, Leucoraja circularis, Leucoraja melitensis, Thunnus thynnus, Sphyrna lewini, Sphyrna mokarran, Sphyrna zigaena*) was justified and required that they appear in Annex II. Lastly, in the context of the Marrakech Declaration, the Contracting Parties stressed the need to enhance collaboration with the regional organisations (e.g. the General Fisheries Commission for the Mediterranean-GFCM, the Convention on International Trade in Endangered Species of Wild Fauna and Flora-CITES) in order to better protect the most threatened Mediterranean species and their habitats (UNEP-MAP, 2009).

In the light of this it thus seemed useful to take stock of the initiatives that have been carried on by international and regional partners to help those species appearing in Annex III to the SPA/BD Protocol.

SPECIES OF ANNEX III TAKEN INTO ACCOUNT IN THE CONTEXT OF OTHER INTERNATIONAL CONVENTIONS

A certain number of species appearing in Annex III to the SPA/BD Protocol are now mentioned, with a view to conservation, in the context of other international conventions (Table 1).

All the species of sponges, cnidarians, crustaceans, echinoderms and nine species of fishes that are listed in Annex III to the SPA/BD Protocol appear in the Berne Convention's Annex III of Mediterranean protected fauna; the Berne Convention addresses the conservation of the wildlife and the natural environment of Europe. The species *Corallium rubrum* also appears in Annex V to the European Habitats Directive as a species of Community interest the sampling and exploitation of which in the wild are likely to be the subject of management measures (Table 1).

Similarly, three species of shark that are listed in Annex III to the SPA/BD Protocol appear in Annex II to the Bonn Convention, a Convention that addresses the conservation of migratory species of wild fauna, and Annex II to the Memorandum of Agreement for the conservation of migratory sharks, in force since 1 March 2010 (Table 1).

Finally, since 2009 CITES, a Convention addressing the international trade in endangered species of wild fauna and flora, has imposed regulation of the trade in the eel *Anguilla anguilla*, requiring every exporting country to set up an eel management plan, enabling it to show for every section of the distribution area the state of this part of the population, the current rules that govern its catch and its environment.

Several proposals for amending CITES Annexes I and II on species in Annex III to the SPA/BD Protocol were examined at the last Meeting of Contracting Parties to CITES (Doha, 13-15 March 2010). In particular this involved the listing in Annex I of the Atlantic bluefin tuna (*Thunnus thynnus*) and in Annex II of the shark species *Carcharhinus plumbeus, Lamna nasus*, *Sphyrna lewini, Sphyrna mokarran, Sphyrna zygaeana, Squalus acanthias*, and of all the species of the Corallidae family including *Corallium rubrum*. Unfortunately all these suggestions were rejected.

Moreover, the United Nations Convention on the Law of the Sea (UNCLS) provides a framework for the conservation and management of fishing and other uses of the sea that includes the proviso that fishing countries are obliged to collaborate to ensure the conservation of ‘species of big migratory fishes’ as defined in Annex I to the Convention, both in their exclusive economic zones and in international waters, through the appropriate international organisations (UNCLS, Article 64).

Table 1. Species listed in Annex III (SPA/BD Protocol) taken into account by other international conventions. Berne Convention, X Ann. III: species listed in Annex III of Mediterranean protected fauna; Bonn Convention, X Ann. II: species listed in Annex II and appearing in the Memorandum of Agreement for the conservation of migratory sharks; CITES, X – Ann. II: species whose trade has been regulated since March 2009; UNCLS, X – Ann. I: species listed in Annex I of big migrators

Taxonomic group / species	Berne Convention	Bonn Convention	CITES	UNCLS
Porifera				
Hippospongia communis (Lamarck, 1813)	X – ann III			
Spongia (Spongia) lamella (Schulze, 1872) (synon. *Spongia agaricina*)	X – ann III			
Spongia (Spongia) officinalis adriatica (Schmidt, 1862)	X – ann III			
Spongia (Spongia) officinalis officinalis (Linnaeus, 1759)	X – ann III			
Spongia (Spongia) zimocca (Schmidt, 1862)	X – ann III			
Cnidaria				
Antipathes sp. Plur.	X – ann III			
Corallium rubrum (Linnaeus, 1758)	X – ann III			
Crustacea				
Homarus gammarus (Linnaeus, 1758)	X – ann III			
Maja squinado (Herbst, 1788)	X – ann III			
Palinurus elephas (Fabricius, 1787)	X – ann III			
Scyllarides latus (Latreille, 1803)	X – ann III			
Scyllarus arctus (Linnaeus, 1758)	X – ann III			
Scyllarus pygmaeus (Bate, 1888)	X – ann III			
Echinodermata				
Paracentrotus lividus (Lamarck, 1816)	X – ann III			
Pisces				
Alopias vulpinus (Bonnaterre, 1788)				X – ann I
Alosa alosa (Linnaeus, 1758)	X – ann III			
Alosa fallax (Lacépède, 1803)	X – ann III			
Anguilla anguilla (Linnaeus, 1758)			X – ann II	
Carcharhinus plumbeus (Nardo, 1827)				X – ann I
Epinephelus marginatus (Lowe, 1834)	X – ann III			
Isurus oxyrinchus (Rafinesque, 1810)	X – ann III	X – ann II		X – ann I
Lamna nasus (Bonnaterre, 1788)	X – ann III	X – ann II		X – ann I
Lampetra fluviatilis (Linnaeus, 1758)	X – ann III			
Petromyzon marinus Linnaeus, 1758	X – ann III			
Prionace glauca (Linnaeus, 1758)	X – ann III			X – ann I
Sphyrna lewini (Griffith & Smith, 1834)				X – ann I
Sphyrna mokarran (Rüppell, 1837)				X – ann I
Sphyrna zygaena (Linnaeus, 1758)				X – ann I
Squalus acanthias (Linnaeus, 1758)		X - ann II		
Thunnus thynnus (Linnaeus, 1758)				X – ann I
Umbrina cirrosa (Linnaeus, 1758)	X – ann III			
Xiphias gladius (Linnaeus, 1758)				X – ann I

There are thus ten species in Annex III to the SPA/BD Protocol (Table 1) that are concerned by the United Nations Agreement on the conservation and management of Straddling Stocks and Migrators, adopted in 1995.

SPECIES OF ANNEX III TAKEN INTO ACCOUNT BY OTHER REGIONAL BODIES

1. Activities of the International Union for the Conservation of Nature

The International Union for the Conservation of Nature (IUCN) has for decades now regularly assessed the conservation status of vertebrate species, of some invertebrate groups and of plants at world level (e.g. Red Book). Recently, as part of its activities, IUCN Mediterranean has made a regional assessment of certain groups including fishes that are native to the Mediterranean (Table 2, Abdul Malak *et al*., 2011).

It thus appears that generally speaking the situation of elasmobranch species is more problematic at regional level than at world level, with 40% of species threatened as against only 17% at world level, making the Mediterranean one of the most dangerous seas for cartilaginous fishes (Abdul Malak *et al*., 2011). If we just look at the 19 elasmobranch species in Annex III to the SPA/BD Protocol, 15 have the status of threatened species in the IUCN sense of the term (four are critically endangered, six endangered, and five vulnerable). Similarly, it must be stressed that as regards the other four species, the available data is insufficient to allow us to assess their risk of extinction, which does not mean that they are not threatened. As for the eight species of bony fishes in Annex III, only three have been the subject of regional assessment and two have the status of threatened species in the IUCN sense of the term (*Epinephelus marginatus* and *Thunnus thynnus*; Abdul Malak *et al*., 2011).

2. Activities of the General Fisheries Commission for the Mediterranean

At its 44th session (Athens, 12-17 April 2010; FAO-GFCM, 2010), the GFCM approved the work programme for the 2010 intersession period. This anticipated several activities related to species in Annex III to the SPA/BD Protocol, in particular:

- gathering information on stocks of *Anguilla anguilla*
- Implementing the work programme on elasmobranch species suggested by the Advisory Scientific Committee (ASC).

Table 2. IUCN (Red List) assessment of the conservation status of species whose exploitation is regulated (Annex III to the SPA/BD Protocol). World assessment (IUCN 2010); regional assessment (Abdul Malak *et al*., 2011). *: species not taken into account within a regional assessment; **: species not assessed at world level

Taxonomic group / species	World assessment	Regional ssessment
Pisces		
Alopias vulpinus (Bonnaterre, 1788)	Vulnerable	Vulnerable
Alosa alosa (Linnaeus, 1758)/	Not very worrying	*
Alosa fallax (Lacépède, 1803)/	Not very worrying	*
Anguilla anguilla (Linnaeus, 1758)/	Critically endangered	*
Carcharhinus plumbeus (Nardo, 1827)	Vulnerable	Endangered
Centrophorus granulosus (Bloch & Schneider, 1801)	Vulnerable	Vulnerable
Epinephelus marginatus (Lowe, 1834)	Endangered	Endangered
Galeorhinus galeus (Linnaeus, 1758)	Vulnerable	Insufficient data
Heptranchias perlo (Bonnaterre, 1788)	Quasi-threatened	Vulnerable
Isurus oxyrinchus (Rafinesque, 1810)	Vulnerable	Critically endangered
Lamna nasus (Bonnaterre, 1788)	Vulnerable	Critically endangered
Lampetra fluviatilis (Linnaeus, 1758)	Not very worrying	*
Leucoraja circularis (Couch, 1838)	Vulnerable	Critically endangered
Leucoraja melitensis (Clark, 1926)	Critically endangered	Critically endangered
Mustelus asterias (Cloquet, 1821)	Not very worrying	Endangered
Mustelus mustelus (Linnaeus, 1758)	Vulnerable	Endangered
Mustelus punctulatus (Risso, 1826)	Insufficient data	Insufficient data
Petromyzon marinus Linnaeus, 1758/	Not very worrying	*
Prionace glauca (Linnaeus, 1758)	Quasi-threatened	Vulnerable
Rhinobatos cemiculus E. Geoffroy (Saint-Hilaire, 1817)	Endangered	Endangered
Rhinobatos rhinobatos (Linnaeus, 1758)	Endangered	Endangered
Sciaena umbra (Linnaeus, 1758)	**	Vulnerable
Sphyrna lewini (Griffith & Smith, 1834)	Endangered	Insufficient data
Sphyrna mokarran (Rüppell, 1837)	Endangered	Insufficient data

Sphyrna zygaena (Linnaeus, 1758)	Vulnerable	Vulnerable
Squalus acanthias (Linnaeus, 1758)	Vulnerable	Endangered
Thunnus thynnus (Linnaeus, 1758)	Insufficient data	Endangered
Umbrina cirrosa (Linnaeus, 1758)	**	Vulnerable
Xiphias gladius (Linnaeus, 1758)	Insufficient data	Not very worrying

- launching a work programme to enhance knowledge and assess the state of red coral in the Mediterranean, beginning by organising a workshop to examine the available data on the biology of this species, fisheries, existing regulations and plans on red coral in the region.

The Commission also approved three recommendations made by the International Commission for the Conservation of Atlantic Tunas (ICCAT) concerning the management of fisheries of swordfish and bluefin tuna and of certain shark species, associated with tuna fishing in the area coming under the GFCM (GFCM, 2010). ICCAT is the intergovernmental fisheries organisation in charge of conservation of tuna and tunnies in the Atlantic Ocean and in the adjacent seas. At its annual session, ICCAT adopts laws and management measures that bind, as Contracting Parties, the Mediterranean countries that fish and breed bluefin tuna. This legislation is then adopted by the GFCM.

The recommendation on the swordfish (*Xiphias gladius*) aims at:

- banning its catch between 1 October and 30 November of each year and assessing the efficacity of this measure
- providing yearly data on catch (size, age) and the fishing effort
- every year, communicating a list of the fishing ships that were given permission to carry out pelagic *palangrier* fishing for big pelagic migratory species in the Mediterranean during the preceding year
- on the basis of information received, the Standing Committee for Research and Statistics (SCRS) will submit an updated assessment of the state of the stock (data brought up to date from 2009). It will assess the effects of the close season and will give an opinion on possible spatio-temporal closures as well as other possible technical measures (techniques of rigging, size and shape of hooks), aiming at reducing by-catch of juvenile swordfish by pelagic *palangrier* fisheries. It will also make an assessment of the fishing capacity and possibly indicate the minimum catch size in order to get high production that is compatible with the selectivity of the fishing gear.

On the basis of this scientific opinion, ICCAT must by late 2010 decide on a more exhaustive long-term management programme for swordfish (identifying close seasons for specific zones, reference level for the fishing effort and technical measures for all the pelagic *palangrier* fisheries that catch swordfish as a target or by-catch species; GFCM, 2010).

As for bluefin tuna (*Thunnus thynnus*), it was decided (GFCM, 2010) that:

- the total admissible catch for Eastern Atlantic and Mediterranean bluefin tuna must be set in 2010 at 13,500 tonnes
- the Commission must establish a 3-year restoration programme for 2011-2013 in order to attain BPME by 2022 inclusive, with a probability of at least 60%, on the basis of the SCRS opinion (matrix of the Kobe II strategy reflecting bluefin tuna restoration scenarios)
- if the SCRS's assessment of stocks detects a grave threat of fishery crash, the Commission must suspend all bluefin tuna fisheries in 2011. The Contracting Parties and the cooperating non-contracting fishery entities (CPC) must step up research activities so that SCRS can present recommendations on the conservation and management measures that are needed to start the fisheries up again
- seine fishing for bluefin must be banned in the Eastern Atlantic and Mediterranean from 15 June to 15 May
- the arrangement that permits the fishing period to be extended for up to 5 days in bad weather must be annulled
- every CPC must reduce its fishing capacity to guarantee that the discrepancy between its fishing capacity and its fishing capacity proportional to its allotted quota in 2011, 2012 and 2013 is reduced by:
    a) at least 50% in 2011
    b) 20% in 2012
    c) 5% in 2013
- management programmes on the fishing capacity for the remaining period must be submitted every year for approval by the Commission
- for every CPC, the number of joint fishing operations between CPCs from 2010 on must be limited to the 2007, 2008 or 2009 level, and before the start of the fishing season, each CPC will inform the ICCAT Secretariat of the number of its joint fishing operations. The Commission must examine and rule on each CPC's application before the start of the 2010 fishing season

- the Commission must decide on the provisional suspension or the reduction of the quota for the CPC that is declared to be in default of application according to the importance of the established non-application.

Lastly, the recommendation on thresher sharks (GFCM, 2010) partially concerns the species *Alopias vulpinus* because, as well as the measures related to big-eyed fox-sharks (*Alopias superciliosus*), the recommendation mentions that:

- the Contracting Parties and cooperating non-contracting fishing entities (CPCs) must make vigorous attempts to guarantee that ships flying their flag do not undertake any fishery targeting thresher sharks of the genus Alopias spp.
- the CPCs must seek the collection and submission of data on Alopias spp, in compliance with ICCAT's requirements in the matter of data declaration
- lastly, the CPCs must, as far as is possible, implement programmes of research on thresher sharks of the species Alopias spp, in order to identify potential nursery areas and envisage, according to the case, spatio-temporal or other closures.

To carry out this work programme, adopted for the intersession period, correctly, three workshops were organised on respectively the European eel (GFCM, 2011), the elasmobranchs of the Mediterranean and Black Sea (GFCM, 2011a), and the Mediterranean red coral (GFCM, 2011b). The various elements related to the three workshops' conclusions and recommendations were discussed at the last meeting of the Advisory Scientific Committee (ASC) held in Marseilles in February 2011 (GFCM, 2011c).

The workshop on the European eel, held in Tunis on 23 and 24 September 2010, produced a statement on the situation of eel stocks. It concluded that the poor way in which the species were being exploited required rational management of shared resources. The participants stressed that as well as fishing, other human-origin factors (introduced viruses and parasites, organic, especially PCBs, and inorganic pollutants – such as cadmium, and obstacles in the way of migration) played a decisive part in the crash of stocks. To correct this, the workshop recommended that (regional and national) management plans be crafted that would take into account all the human-origin and environmental pressures (GFCM, 2011).

At its meeting, the ASC approved the following recommendations:

- gathering and synthesizing information on biological parameters per habitat and on regulations per country (fishing and conservation of habitats) in coordination with existing projects (e.g. LaMed Project)
- collating and analysing the main information useful for the Eel Management Plans as described in the document presented at the workshop (GFCM, 2011), and handing on the raw data to the GFCM Secretariat
- starting on setting up a network of Mediterranean experts on eel fishing in collaboration with the work group on Eel Management of the International Council for the Scientific Exploration of the Mediterranean (ICSM) and of the European Advisory Commission for Fisheries and Aquaculture in Internal Waters (ICSM/EACFSI).

As part of implementing the work programme on elasmobranchs, an inter-country experts' workshop was held in Sfax (Tunisia) from 20 to 22 September 2010, with the participation of RAC/SPA. The workshop's main results (GFCM, 2011a) showed that so far few studies have been done on endangered species or priority species in the GFCM sense of the term [1]. Elasmobranchs are particularly vulnerable to non-target catch and the FAO's catch data does not usually integrate the results of such by-catch. There are some simple techniques that can reduce such by-catch (already being applied in the wider world) that could easily be used in the Mediterranean. It also seems particularly important to protect nursery areas.

At its meeting (GFCM, 2011c), the ASC agreed that it was pertinent to ensure the close monitoring of the catch (target or by-catch) of all those elasmobranchs that have to remain identifiable, at least until the first sale. To this effect, the ASC approved the proposal to prevent heads being cut off, fins removed, skinning, and the carcasses of animals being unloaded in the various ports, in order to permit them to be identified. It also highlighted the Importance of continuing to make inventories of by-catch of elasmobranchs. The European Union delegate said that the GFCM should make an effort to pay more attention to the

[1] Priority species: species of interest for the GFCM, based on the volume of landing and the economic importance of the species. Only 7 species in Annex III are given this listing, according to the list produced in 2006 *(Palinurus elephas, Anguilla anguilla, Isurus oxyrinchus, Lamna nasus, Prionace glauca, Thunnus thynnus* and *Xiphias gladius*).

sustainable use and conservation of elasmobranch species, in compliance with its mandate and in close coordination with the Barcelona Convention. RAC/SPA's representative reminded

participants that after the amending of the Annexes to the SPA/BD Protocol, especially the adding of elasmobranch species, the institutions that were concerned with fishing should respect the conservation (Annex II) or regulations related to the suitable use of these species (Annex III). Lastly, the ASC recommended that a provisional assessment be made of populations of *Leucoraja melitensis*.

A workshop made responsible for looking into the available information on the biology, fishing and regulating of red coral in the Mediterranean was held in Alghero (Italy) on 16 and 17 September 2010, with RAC/SPA participating (GFCM, 2011b). This workshop revealed that even if the statistics are imprecise, a drop in the harvest of coral of over 50% was recorded over the period 2006-2008 compared to 1978-1980, these figures not taking into account illegal fishing practises. It is clear that the future of the red coral, and the economic activities deriving from it, are the responsibility of the fishery managers and that it is imperative that management plans and measures be set up.

At its meeting (GFCM, 2011c), the ASC approved recommendations aiming at:

- banning the use of new technologies, like remote-controlled gear, for exploiting colonies in shallower areas (<50 m) except when there is sufficient scientific proof to dispense with this measure
- setting up a quota system based on number of permits.

It was also stressed that there was enough proof as to the colonies' weak, or very weak, interconnectedness, even when they are relatively close to each other, to recommend management that is adapted to the local context.

The Sub-Committee noted, however, that additional research was needed before adopting a minimum size for the exploiting of red coral. In the light of what had been said, the delegates expressed their agreement about crafting a common regional management plan and organising a second workshop on the subject in 2011.

The ASC encouraged the acquisition of scientific knowledge on the red coral and invited institutes in the member countries to set up cooperative joint research projects, and approved the suggestion of crafting in the medium term a regional programme of research on the red coral.

CONCLUSIONS AND SUGGESTIONS FOR RECOMMENDATIONS

An examination of the above elements reveals that with the exception of the Berne Convention, few conventions are interested in taxonomic groups other than vertebrates (Table 1). Similarly, we are forced to note that the assessments done by the IUCN paid little attention to invertebrates, and that when they did it was mainly terrestrial or freshwater species that were targeted (Cuttelod *et al*., 2008).

It thus seems desirable to envisage that invertebrate species be better taken into account. In the light of the multiplicity of species present, and the scarcity of knowledge available for many of these, the first focus should be on taxonomic groups that are commercially exploited, insofar as this pressure can bring about a drastic drop in populations, and within these groups special attention should be paid to species that are endemic to the Mediterranean, insofar as damage at regional level could result in the extinction of a species at planetary level.

Availability of an assessment of populations at regional level (e.g. the IUCN's Red List) appears to be decisive from the perspective of management and, in particular, for prioritizing actions to be undertaken. Continuing with these assessments is thus to be encouraged, especially for endemic species.

As regards the species *Corallium rubrum*, even if it is difficult to get precise knowledge about the status of the species insofar as i) the available statistics are tainted with imprecision (GFCM, 2011b), and ii) no assessment has been made by IUCN in this field, it is obvious that because of its biology (sessile species, slow growth, late sexual maturity, fecundity that increases with the size of the colonies, extreme longevity and limited potential for dispersal), the species is particularly vulnerable to over-fishing (CITES, 2010a). The fact that the species appears in Annex III to the SPA/BD Protocol, and the fact that it is included as part of the Action Plan on the conservation of the coralligenous and other Mediterranean bioconstructions adopted by the Contracting Parties in 2008 (UNEP-MAP-RAC/SPA, 2008), is encouraging for its conservation. However, it is desirable that cooperation between RAC/SPA and the GFCM be enhanced in this field, so that measures related to its exploitation can be validated by fishery institutions (e.g. restricted exploitation in shallow areas, harvest quota or gear type permitted, minimum harvest size) and a regional management plan be

introduced. Moreover, it would be desirable that the mapping and monitoring activities identified in the Action Plan on the conservation of the coralligenous and other Mediterranean bioconstructions should be put into effect for this major species of coralligenous assemblages. Lastly, it would be interesting to see how creating and managing Specially Protected Areas dedicated to it, or developing coral-farming, could represent a response that is suited to sustainable management of this species.

As for fish species, we note that some have experienced a multiplication of (international and/or regional) initiatives. We should:

- support these initiatives and encourage further consultation between the concerned organisations
- help to implement these, and
- assess their impact in terms of conservation of the target species.

Regarding their conservation status (critically endangered), the species in Annex III to the SPA/BD Protocol to be given priority consideration are: *Anguilla anguilla, Isurus oxyrinchus, Lamna nasus, Leucoraja circularis* and *Leucoraja melitensis*

- As concerns the eel (*Anguilla anguilla*), listing the species in Annex II to the CITES, plus the recommendations validated in the context of the ASC meeting (GFCM, 2011c), are things whose effective medium-term impact on populations should be monitored and assessed. Similarly, strict measures of control must be introduced to ban the catch of immature individuals (e.g. juvenile and fry stages)
- As concerns the blue porbeagle (*Isurus oxyrinchus*), this is one of the GFCM's priority species, although its rate of production is low, with less than 10 tonnes a year (Bradai *et al*., 2010). Trawling activities, pelagic *palangrier* fishing, driftnets, fixed mesh nets and line fishing are at the origin of by-catch, which can be important for this species and is not accounted for in fishing statistics. The distribution of sizeable frequencies of by-catch by tuna and swordfish fisheries shows that such catch basically concerns juveniles (Bradai *et al*., 2010). Thus it seems that, because of the rareness of the species in the Mediterranean, catch does not constitute a perennial fishing activity but is likely to worsen the species' already critical situation. It therefore would seem desirable to request once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 1)

- As for the common porbeagle (*Lamna nasus*), this is also one of the GFCM's priority species, whose production rate is low, with less than 10 tonnes a year (Bradai *et al*., 2010), and which is particularly vulnerable to over-fishing. The species is caught either intentionally or unintentionally as part of the *palangrier* fisheries for tuna and swordfish out at sea. The species has practically disappeared from the Mediterranean fish records (CITES, 2010b) and is considered as rare or even absent (Ferretti *et al*., 2008 in CITES, 2010b). As for the preceding species, it appears desirable to request once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 2)
- As for the circular ray (*Leucoraja circularis*), the species is now only rarely seen in the northern Mediterranean. Its distribution area seems to have become significantly smaller outside the Balearic Islands, where it remains fairly common. The species is seen as by-catch of demersal trawls and steps must be taken to protect the remaining populations effectively. Thus it seems desirable to request once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 3)
- Lastly, for the Maltese ray (*Leucoraja melitensis*), the species has become extremely rare and is only found in the Strait of Sicily and around Malta, a sector usually subjected to intense trawling activity. Insofar as it is one of the 4 species of ray that are endemic to the Mediterranean, it thus seems vital that targeted research be done with the other regional partners to identify and protect the nursery areas and to request once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 4).

Three species of fishes in Annex III (*Epinephelus marginatus, Rhinobatos cerniculus* and *Rhinobatos rhinobatos*) appear to be endangered at regional level and also at world level.

- As concerns the dusky grouper (*Epinephelus marginatus*), it is over-fishing practises that seem to be responsible for the population reductions and its listing as an endangered species (Abdul Malak *et al*., 2011). This species has late maturity and forms groups during the spawning period, making it very vulnerable to over-fishing. Moreover, we only possess fragmentary data on a regional scale, making it impossible to get a precise assessment of the status of this species. As a result of measures taken to ban catch along the French and Monacan coasts since 1993, an improvement in the state of the populations has been recorded in these sectors (Cottalorda and Francour, 2007; Ganteaume and Francour, 2007 in Abdul Malak *et al*., 2011). And several studies have confirmed the key role played by the Marine Protected Areas in conserving grouper

populations (see detail in Francour and Gratiot, 2007). It thus appears desirable to improve knowledge about unloading of catch and catch per unit of fishery effort, in order to get a better picture of the state of the populations at regional level and see if it would be a good idea to generalise the ban on catch to the entire Mediterranean basin. Moreover, we should encourage taking these species into account in MPAs (including sites that favour the establishing of the species and setting up non-sampling areas on sites frequented by the species).

- As for the ray shark and common guitar ray (*Rhinobatos cerniculus* and *Rhinobatos rhinobatos*), although these remain fairly much present in the south of the Mediterranean basin (Bradai *et al*., 2010), they have not been observed in trawl motoring drives (MEDITS) from the Sea of Alboran to the Aegean Sea (IUCN, 2010), leaving us to suppose severe declines in their populations. The species is caught for its fins and as by-catch by commercial bottom trawl fisheries that target cephalopods, crustaceans and coastal teleosts. It thus appears desirable to suggest once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 5).

For the other species considered to be endangered at regional level (*Carcharhinus plumbeus, Mustelus asterias, Mustelus mustelus, Squalus acanthias* and *Thunnus thynnus*), some are already subject to specific measures at world and/or regional level (e.g. UNCLS, ICCAT, Bonn Convention, GFCM), at Community level (e.g. the European Community's Action Plan for the conservation and management of sharks, 2009), and even at national level (e.g. specific management measures applied in Malta to the species: *Alopias vulpinus, Carcharhinus brevipinna, Carcharhinus limbatus*, *Carcharhinus plumbeus, Carcharias taurus, Galeorhinus galeus, Hexanchus griseus, Isurus oxyrinchus, Lamna nasus, Leucoraja melitensis, Prionace glauca, Pristis pristis, Rostroraja alba, Squatina squatina* – Environment Protection Act/Flora, Fauna and Natural Habitats Regulations 311/2006), in Bradai *et al*., 2010). We should thus work with the pertinent organisations so that catch restriction measures (quotas, catch season, permitted gear) be effectively applied and that the impact of these measures be regularly assessed in order to check their efficacity and to enhance them if needed, even to later suggest their being listed in Annex II to the SPA/BD Protocol.

Lastly, four species of fishes in Annex III (*Galeorhinus galeus, Mustelus punctulatus, Sphyrna lewini* and *Sphyrna mokarran*, have not been assessed and are thus listed under the heading 'insufficient data'. Among these, the two hammerhead shark species *Sphyrna lewini* and *Sphyrna mokarran*, have the status of endangered species at world level. Their being listed under the heading 'insufficient data' is probably linked to their very great rareness in the Mediterranean, which would confirm the critical state of the populations. It thus appears desirable to suggest once again that the species be listed in Annex II to the SPA/BD Protocol (Annex 6).

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ANNEX 1

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 : *(Indicate here the Party(s) introducing the amendment proposal)*	Species concerned: *Isurus oxyrinchus* Rafinesque, 1810 Amendment proposed : ■ Inclusion in Annex II ☐ Inclusion in Annex III ☐ Removal from Annex II ■ Removal from Annex III

Taxonomy Class : Chondrichthyes Order : Lamniformes Family: Lamnidae Genus and Species : *Isurus oxyrinchus* Known Synonym(s) : Common name (English and French): EN - Shortfin mako; FR - Taupe bleue	Inclusion in other Conventions : *(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention.)* CMS Appendix II Bern Convention Appendix III IUCN Red List status: Global: Vulnerable A2abd+3bd+4abd Mediterranean: Critically Endangered A2acd+3cd+4acd

Justification for the proposal :

Records show that shortfin mako has declined dramatically in the Mediterranean Sea, virtually disappearing from records in some areas. Declines of up to 99% since the mid 20th Century have been estimated in Lamnid sharks (*L. nasus* and *Isurus oxyrinchus*) in the northwestern Mediterranean Sea through meta-analysis of fisheries and survey records and sightings. As a result, the species is assessed as Critically Endangered regionally in the Mediterranean Sea. Unsustainable catch in fisheries is the main threat to this highly migratory, large pelagic shark. Its epipelagic nature exposes it to a variety of fisheries, particularly pelagic longlines, drifting or set gill nets and hook-and-line fisheries wherever it occurs. Shortfin mako may be too rare now in the region to constitute a direct fisheries target. This species is listed on Annex III of the Barcelona convention and UNEP MAP RAC/SPA (2003) noted that management programmes for sustainable fisheries should be developed and implemented for it. However, because *I. oxyrinchus* is now so rare in the Mediterranean, any catches are likely to be unsustainable and therefore an Annex II listing is proposed to protect the remaining small regional population.

Biological data The shortfin mako reaches a maximum size of about 4 m (Compagno 2001). Initial age and growth studies in the western North Atlantic suggested that two pairs of growth bands are laid down each year in their vertebral centra, at least in young shortfin makos (Pratt and Casey 1983). However, recent evidence using marginal increment analysis in Mexico (Ribot-Carballal *et al.* 2005) and bomb radiocarbon (Campana *et al.* 2002, Ardizzone *et al.* 2006) indicates that the alternative hypothesis (one pair of growth bands per year; Cailliet *et al.* 1983) is valid. Age at maturity has been determined recently in several populations, including New Zealand (7-9 years for males, and 19-21 years for females Bishop *et al.* (2006)), the western North Atlantic (8 years for males, and 18 years for females (Natanson *et al.* 2006)) and the North Pacific (6 years for males, and 16 years for females (Semba *et al.* 2009)). Longevity has been estimated as 29-32 years (Bishop *et al.* 2006, Natanson *et al.* 2006). There is a large difference in size at sexual maturity between the sexes and spatial segregation of the sexes has also been observed (Mucientes *et al.* 2009), suggesting that regionally-focused fishing may have disproportionate effects on the sexes. The shortfin mako is ovoviviparous and oophagous, but what little is known of its reproductive cycle indicates the gestation period is 15-18 months, with a three year reproductive cycle (Mollet *et al.* 2000). Litter size is 4-25 pups (possibly up to 30, mostly 10-18), which are about 60-70 cm long at birth (Garrick 1967, Compagno 2001), although the species has recently been shown to be less productive than previously believed (Cortes *et al.* 2010). There are comparatively few records of pregnant females. Among 26 shark species, the shortfin mako has an intrinsic rebound potential (a measure of its ability to recover from exploitation) in the mid-range (Smith *et al.* 1998); among 12 pelagic shark species, shortfin makos have the second-lowest level of productivity (Cortés *et al.* 2010). The annual rate of population increase is estimated at 0.018 yr^{-1} (Cortés *et al* 2010) calculated a finite rate of increase (lambda) of 1.141 (1.098 to 1.181 95% CI, r = 0.13) and the average reproductive age as 10.1 (9.2 to 11.1 95% CI) years. Removal of shortfin mako, a top marine predator, may have significant and complex effects on the marine ecosystem (Stevens *et al.* 2000; Baum and Worm 2009).

Brief description of the species A large, fast shark with a dark blue back, white underside and a long pointed snout.

Distribution (current and historical) Widespread in temperate and tropical waters of all oceans from about 50°N (up to 60°N in the Northeast Atlantic) to 50°S. Highly migratory species, which makes occasional inshore movements (Compagno 2001). In the Mediterranean Sea, highest abundance is reported in the western basin and mako are rarely reported in eastern waters (Aegean Sea and Sea of Marmara). Recent investigations suggest that the western basin is a nursery area for this species (Buencuerpo *et al.* 1998). Juvenile makos (several months old) have also been reported in the Western Ligurian Sea as bycatch of the swordfish longline fishery (Orsi Relini and Garibaldi 2002). In the Eastern Adriatic Sea, shortfin makos were reported as common a century ago (Katuri 1893 and Kosic 1903), whereas recent publications consider it to be rare (Milišić 1994, Jardas 1996). Soldo and Jardas (2002) report that there have been no records of shortfin mako in the Eastern Adriatic since 1972. Shortfin makos have not been reported from the Black Sea.

Population estimate and trends Shortfin mako were once considered common throughout the Mediterranean Sea, but evidence from different areas of the region suggests that dramatic declines have occurred. “Tonnarella” (tuna-trap) catches in the Ligurian Sea from 1950 to the 1970s show a rapid decline and eventual disappearance of the shortfin mako (Boero and Carli 1979). Landings data from Maltese waters for 1979-2001 (data from the Maltese fishery department) show a decline although fishing pressure had not changed. While historically described as common in the Eastern Adriatic (end of 19th / beginning of 20th century), shortfin

mako have not been recorded there since 1972 (Soldo and Jardas 2002). Since 1998, there have been few records of mako sharks from the central and eastern Mediterranean (A. Soldo pers. comm.). Of 1405 shortfin makos caught by Spanish longline vessels targeting swordfish in the Western Mediterranean, from 1997-1999, all individuals were juveniles, suggesting that overfishing may have caused a decline in the average size/age of this species in the Mediterranean (de la Serna *et al.* 2002). Ferretti *et al.* (2008) used records dating back to the early 19th and mid-20th century to reconstruct long term population trends of large predatory sharks in the northwestern Mediterranean Sea. They estimated that biomass and abundance of lamnid sharks (*I. oxyrinchus* and *L. nasus)* had declined by up to 99%, using nine time series of abundance indices from commercial and recreational fishery landings, scientific surveys, and sighting records. This species' Critically Endangered status with the IUCN reflects a combination of the above factors: large declines in some areas, absence of records from others, and captures of juveniles in the likely nursery area (Cailliet *et al.* 2004).

Habitat(s) Shortfin mako is oceanic, occurring from the surface to at least 500m depth and is widespread in temperate and tropical waters. It is occasionally found close inshore where the continental shelf is narrow. It is not normally found in waters below 16°C (Compagno 2001)

Threats

Existing and potential threats Unsustainable catch in fisheries is the major threat to this species in the Mediterranean Sea. Shortfin mako is caught by pelagic longlines, drifting or set gill nets and in hook-and-line fisheries wherever it occurs. This species has a long generation period, making it highly vulnerable to over-exploitation and population depletion. It is possible that the western Mediterranean basin is a nursery area from the eastern Central Atlantic population, which is affected by the swordfish longline fishery off the western coast of Africa and the Iberian peninsula. Simpfendorfer *et al.* (2008) assessed shortfin mako as being among the species at highest risk of over-exploitation in their study of the pelagic sharks taken in Atlantic longline fisheries, based on three metrics. Mortality for this species in longline fisheries has been estimated to be very high; of 11 pelagic shark species assessed, post-capture mortality was highest for shortfin makos, with a 92% probability of death after capture (Cortes *et al.* 2010).

Exploitation Shortfin mako sharks are highly valued for their meat and fins and therefore catch is often retained and fully utilised. In general, it has been suggested that shortfin makos may be one of the most overfished pelagic sharks in the Mediterranean (Megalofonou *et al.* 2005). Reports of bycatch in "tonnarella" in the Ligurian Sea from 1950 until the 1970s show a rapid decline and eventual disappearance of the shortfin mako (INP 2000). Recent investigations of shortfin mako bycatch from the swordfish longline fishery in the western basin show that catches from this fishery consist almost exclusively of juveniles. Even though driftnetting is banned in Mediterranean waters, this practise has continued illegally (WWF 2005). The Moroccan swordfish driftnet fleet in the Alboran Sea operates year round, resulting in high annual effort levels (Tudela *et al.* 2005). Even though sharks are a secondary target or bycatch of this fishery, some boats deploy driftnets 1–2 miles from the coast where the chance of capturing pelagic sharks is higher. The catch rate for shortfin mako is nearly three times higher in boats actively fishing for sharks (from 0.6 to 1.9 N/fishing operation and 0.06 to 0.14 catch per km net). Both annual catches and mean weights of shortfin mako have fallen as a result of fishing mortality in the Moroccan driftnet fishery, illustrating the likely impact of this illegal fishery on stocks in the Alboran Sea and adjacent Atlantic (Tudela *et al.* 2005). Megalofonou *et al.* (2005) reported 321 specimens caught as bycatch in tuna and swordfish fisheries in the Mediterranean Sea. Of those, 268 specimens were caught in the Alboran Sea, 42 in the Balearic Islands area, 3 in the Catalonian Sea, while only 8 specimens were caught in the central and eastern Mediterranean area, eg. Levantine basin. Furthermore, most of the specimens caught were juveniles, with only a few large specimens from Levantine basin. Of 595 specimens caught in southern Spanish waters, all were immature juveniles (Buencuerpo *et al.* 1998). Official data from ICCAT show shortfin mako catches in the Mediterranean by longliners from three nations: Cyprus (2006-2009; average 0.9 T/yr), Spain (1997-2009; average 2.6 T/yr), and Portugal (1998, 2000, 2001, 2003, 2005, 2006; average 4.6 T/yr). The longest of these time series, for Spain, shows declining catches over a 13-year period. Recreational fishing of shortfin makos has also been reported in the Mediterranean, although there are no official data (A. Soldo pers. comm.).

Proposed protection or regulation measures

Uplist from Annex III to Annex II. Mandatory reporting and live release of bycatch.

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ANNEX 2

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 : *(Indicate here the Party(s) introducing the amendment proposal)*	Species concerned: *Lamna nasus* (Bonnaterre, 1788)
	Amendment proposed : ■ Inclusion in Annex II ☐ Inclusion in Annex III ☐ Removal from Annex II ■ Removal from Annex III

Taxonomy Class : Chondrichthyes Order : Lamniformes Family: Lamnidae Genus and Species : *Lamna nasus* Known Synonym(s) : Common name (English and French): EN – Porbeagle; FR - Requin-taupe commun	Inclusion in other Conventions : *(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention.)* CMS Appendix III Bern Convention Appendix III
	IUCN Red List status: Global: Vulnerable A2bd +3d+4bd Mediterranean: Critically Endangered A2bd

Justification for the proposal :

Lamna nasus has virtually disappeared from Mediterranean records. Declines of up to 99% since the mid 20th Century have been estimated in Lamnid sharks (*L. nasus* and *Isurus oxyrinchus*) in the northwestern Mediterranean Sea through meta-analysis of fisheries and survey records and sightings. As a result, the Mediterranean population is listed as Critically Endangered on the IUCN Red List of Threatened Species. Unsustainable catch in fisheries is the main threat to this large pelagic shark. Its epipelagic nature exposes it to a variety of fisheries, particularly longlines, and also seines, gill nets, drift nets, pelagic and bottom trawls and handlines. *Lamna nasus* may be too rare now in the region to constitute a direct fisheries target. This species is listed on Annex III of the Barcelona Convention and UNEP MAP RAC/SPA (2003) noted that management programmes for sustainable fisheries should be developed and implemented for it. However, because *L. nasus* is now so rare in the Mediterranean, any catches, including incidental catches, are likely to be unsustainable and therefore an Annex II listing is proposed to protect the remaining small regional population.

Biological data The porbeagle is a relatively slow growing species, which reaches a maximum reported size of 355cm TL (Francis *et al.* 2008). Porbeagles are relatively late maturing: males mature at about 8 years of age (and 195cm TL) and females mature at 12-16 years (and about 245cm TL (in the North Atlantic (Jensen *et al.* 2002; Francis *et al.* 2008). Reproduction is oophagous with litters of 1-5 pups (average four) produced, which are 68-78cm TL at birth (Compagno 1984, Gauld 1989, DFO 2001a, Francis and Stevens 2000, Francis *et al.* 2008). Aasen (1963) estimated that the gestation period was about eight months in the North Atlantic and that individual females breed each year. However, Shann (1923) found two distinct size groups of embryos present in the December-February period and suggested that gestation may last 18-24 months. Gauld (1989) noted that there may be a resting period between parturition and fertilisation. Francis and Stevens (2000), Jensen *et al.* (2002) and Francis *et al.* (2008) estimate an 8-9 month gestation period. Birth occurs in spring off Europe. Natanson *et al.* (2002) and Campana *et al.* (2002) examined age and growth in the North West Atlantic population and reported a maximum age of 26 years, much shorter than estimated longevity in an unfinished population, which may be as high as 46 years (Natanson *et al.* 2002). Ages at 50% maturity for North Atlantic males and females are 8 and 13 years, respectively (Jensen *et al.* 2002). Populations appear to be segregated by size and by sex (Compagno 2002), and have little exchange of individuals with adjacent populations (Stevens *et al.* 2006). The annual rate of population increase is estimated at 0.048 (Cortés *et al.* 2010). Removal of porbeagles, a top marine predator, may have significant and complex effects on the marine ecosystem (Stevens *et al.* 2000; Baum and Worm 2009).

Brief description of the species Large, stout, dark grey shark with a white underside.

Distribution (current and historical) The porbeagle shark is wide-ranging, found in temperate and cold-temperate waters worldwide. Records indicate that it is rare or very rare throughout the Mediterranean (see Storai *et al.* 2005). Little information is available on any changes in the geographic range of *Lamna nasus*, but this species now appears to be scarce, if not absent, in areas where it was formerly commonly reported (e.g. in the Western Mediterranean, Alen Soldo *in litt.* 2003). Comparison of recent data with historical records suggests a strong reduction in the geographical distribution of porbeagles in the Mediterranean, with the current population restricted mainly to the central Mediterranean sea around the Italian peninsula (Ferretti *et al.* 2008).

Population estimate and trends *Lamna nasus* has virtually disappeared from Mediterranean records. In the North Tyrrhenian and Ligurian Seas, Serena and Vacchi (1997) reported only 15 specimens of porbeagle during a few decades of observation. Soldo and Jardas (2002) reported only nine records of this species in the Eastern Adriatic from the end of the 19th century until 2000. Recently two new records were reported there (A. Soldo, unpublished data). Several records indicate a possible nursery area in the Central Mediterranean. Two newborn porbeagles were caught as bycatch of the swordfish longline fishery in the Western Ligurian Sea (Orsi Relini and Garibaldi 2002). A young porbeagle, considered to be very recently born, was reported in the central Adriatic Sea (Orsi Relini and Garibaldi 2002). A young specimen was also caught in the central Adriatic during big-game fishing, and was suggested to be between 1-17 months of age, on the basis of its length (Marconi and De Maddalena 2001). During research of bycatch in the western Mediterranean swordfish longline fishery, no porbeagles were caught (De La Serna *et al.* 2002). Only 15 specimens were caught during research conducted in 1998-2000 on bycatch of sharks in large pelagic fisheries: catches were reported only in the southern Adriatic and Ionian Seas, mainly by driftnets (Megalofonou *et al.* 2000). Anecdotal reports from fishers and traders in Italy suggest that porbeagles have greatly declined in Italian waters (Storai *et al.* 2005). Official FAO statistics show that the only landings of porbeagles in the Mediterrra-

Nean were reported in 1996 by Malta – 1t (FAO 2002). Ferretti *et al.* (2008) used records dating back to the early 19th and mid 20th century to reconstruct long term population trends of large predatory sharks in the northwestern Mediterranean Sea. They estimated that abundance and biomass of lamnid sharks (*I. oxyrinchus* and *L. nasus)* had declined by up to 99%, using nine time series of abundance indices from commercial and recreational fishery landings, scientific surveys, and sighting records. The dramatic rate of decline from what were already low densities at the beginning of time series used in this study suggests that the persistence of porbeagles in the Mediterranean is precarious (Ferretti *et al.* 2008).

Habitat(s) The porbeagle shark is a wide-ranging coastal and oceanic species found in temperate and cold temperate waters worldwide (1o–18oC, 0–370m). It is more common on continental shelves, but is also found far from land and occasionally close inshore (Compagno 2002).

Threats

Existing and potential threats The main threat to porbeagle sharks is unsustainable catch in fisheries, which has driven significant and ongoing population declines. Porbeagles are caught in many gear types – particularly longlines, but also gill nets, seines, drift nets, pelagic and bottom trawls and handlines. Post-capture mortality in longlines is estimated at 53% (Cortés *et al.* 2010). The low reproductive capacity and high commercial value of both mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion. Simpfendorfer *et al.* (2008) assessed porbeagles as having a moderately high level of risk of over-exploitation in their study of the pelagic sharks taken in Atlantic longline fisheries, based on three metrics. Further, limited exchange with adjacent populations (Stevens *et al.* 2006) means that the reduced Mediterranean porbeagle population is unlikely to rebuild through input from the Northeast Atlantic (a population which is also depleted and considered Critically Endangered by the IUCN) (Stevens *et al.* 2006).

Exploitation Porbeagles have long been intensely fished commercially and exploited for human consumption in the Mediterranean (Compagno 2002; Dulvy *et al.* 2008), and ongoing exploitation of the depleted Mediterranean population presents a serious threat. They are a valuable bycatch or secondary target of many fisheries, particularly longline fisheries, also gill nets, driftnets, pelagic and bottom trawls, and handlines (Stevens *et al.* 2005). Bonfil (1994) estimated that in 1989, the Spanish longline swordfish fishery caught 50 T of porbeagle in the Mediterranean and Atlantic. More recently, ICCAT data of reported catches show porbeagles caught by Mediterranean longliners from two nations: Malta (1994-2005, 2007-2009; average 0.46 T/year) and Italy (2004, 2005, and 2008; average 1.37 T/yr) (ICCAT 2010). A study of by-catch in the Maltese tuna longline fishery in 2008 found that porbeagles represented 1.2% of the total catch by weight (Burgess *et al.* 2010). Spanish fisheries statistics show decreasing reported catches of porbeagles in the Mediterranean, from 0.7 T in 2001 to 0.14 T in 2008 (MARM 2011). The high value of porbeagle shark meat means that most 'bycatch' is exploited and the species' fins also enter the shark fin trade. Porbeagles are also popular as recreational species (big game fishing) in some areas of Mediterranean.

Proposed protection or regulation measures

Uplist from Annex III to Annex II to protect the remaining Critically Endangered population.

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ANNEX 3

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 : *(Indicate here the Party(s) introducing the amendment proposal)*	Species concerned: *Leucoraja circularis* (Couch, 1838)
	Amendment proposed : ■ Inclusion in Annex II ☐ Inclusion in Annex III ☐ Removal from Annex II ■ Removal from Annex III

Taxonomy Class : Chondrichthyes Order : Rajiformes Family: Rajidae Genus and Species : *Leucoraja circularis* Known Synonym(s) : *Raja circularis* (Couch 1838) Common name (English and French): EN – Sandy skate or ray; FR – Raie circulaire	Inclusion in other Conventions : *(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention.)* IUCN Red List status: Global: Vulnerable A2bcd+A3bcd+A4bcd Mediterranean: Critically Endangered (A2bcd+3bcd+4bcd)

Justification for the proposal :

This relatively large skate is thought to have undergone significant declines in the Mediterranean Sea, to the point where it is now only rarely observed in the northern Mediterranean. It appears to be locally common off Mallorca, Spain, however. Its area of occurrence and depth range appear to have contracted significantly, with evidence of local extirpation in the Gulf of Lions and the Adriatic Sea. Like other large skates, its life history characteristics render it vulnerable to depletion. All size classes, even eggs, are catchable in demersal trawls. This species is taken as bycatch in demersal multi-species trawl fisheries and measures are needed to protect the remaining population. UNEP MAP RAC/SPA (2003) noted that management programmes for sustainable fisheries catch should be developed and implemented for *Leucoraja* spp. This species' already heightened threatened status in this region, combined with its vulnerable life history characteristic (i.e., large body size and large size at maturity) indicate that strict protection is needed under Annex II.

Biological data Reproduction is oviparous. Eggcases measure 90 x 50mm (Stehmann and Bürkel 1984). The spawning period is undefined (Bauchot 1987, Notarbartolo di Sciara and Bianchi 1998). Males mature at 70-80cm in the Mediterranean (N. Ungaro pers.comm.) and the maximum recorded size is 120cm (Serena 2005). Age at maturity, longevity, size at birth, reproductive age, gestation time, reproductive periodicity, fecundity, rate of population increase and natural mortality are unknown.

Brief description of the species Large, dark brown or red brown to sandy coloured skate with a slender tail and a short, pointed snout.

Distribution (current and historical) This species occurs in the Northeast Atlantic, Eastern Central Atlantic and Mediterranean Sea. In the Mediterranean Sea, it occurs in the western basin, to Libya and Greece (Mytilineou *et al.* 2005), and is absent from the Black Sea. Countries of occurrence include: Albania, Algeria, Croatia, France, Italy, Greece, Montenegro, Morocco, Slovenia, Spain and Turkey (Stehmann and Bürkel 1984, Bauchot 1987, Notarbartolo di Sciara and Bianchi 1998, Serena 2005). This species may now only be found in the western area of the Mediterranean (particularly in the Italian Ionian Sea (Consalvo *et al.* 2009)), pointing to a substantial reduction in area of occurrence (Baino *et al.* 2001).

Population estimate and trends The occurrence of *Leucoraja circularis* in the Mediterranean Sea appears to have decreased significantly in the last 50 years. This species was recorded in only 12 of 6336 hauls conducted between 1994-1999 at depths of 10-800m as part of the MEDITS scientific trawl survey programme of the northern Mediterranean (Baino *et al.* 2001). *L. circularis* was present in both shelf and slope trawl surveys of the Gulf of Lions in 1957-1960 but is now absent from more recent comparable surveys. Between 1957-1960, the sandy ray was captured in >10% of hauls in shelf surveys and in approximately 17% of hauls in slope surveys; between 1966-1995 it was not recorded at all from 1,295 hauls in eight trawl surveys (Aldebert 1997). It is now considered to be locally extinct in the area (Dulvy *et al.* 2003). Local extinction also appears to have occurred in the Adriatic Sea, where sandy rays were caught in trawl surveys in 1948, but were not recorded in similar surveys during 1998 (Jukic-Peladic *et al.* 2001). In the south Ligurian and north Tyrrhenian Seas, this species can be considered rare based on capture rates, from 1985 to 2005 only 10 specimens were caught (352-566 m of depth) (Serena *et al.* 2005). In the waters of Tunisia, it is also considered locally rare, with only 11 specimens recorded caught from 1971-2007, and all but one of these caught prior to 1982 (Mnasri *et al.* 2009). Recent observations in Mallorca suggest that the species is more common in this area, at least locally, with 19 specimens recorded at a single landing site (Palma port) between January and March 2009 (G. Morey and O. Navarro pers. comm.).

Habitat(s) Like other skates, this species is benthic. It occurs in offshore shelf waters and on upper slopes, in waters of 50-800m depth (Ungaro *et al.* 2008). Traditionally, it was thought to be found mainly around 100m depth on sandy and muddy bottoms, though it has been suggested that its depth range has significantly contracted and it is now more abundant in deeper waters. For example, within the Mediterranean, *L. circularis* was previously found on shelf and slope bottoms between 70-275m (mainly at around 100m), but now it is found in deeper waters between 500-800m (Baino *et al.* 2001).

Threats

Existing and potential threats The main threat to this species is unsustainable bycatch in fisheries in the Mediterranean. Although little is known of the life history of this species, like other large skates, it most likely has slow growth and low fecundity. This, combined with its large size, even for juveniles, make this species especially vulnerable to fishing exploitation (Brander 1981, Walker and Hislop 1998, Dulvy *et al.* 2000, Dulvy and Reynolds 2002). All size classes and life-stages are taken in fishing nets, even the eggs (which are often found in the trawl cod-end, Ragonese *et al.* 2003), because the legal mesh size used in much of the Mediterranean is ~20 mm. The depth range of this species (50 m-800 m) lies entirely within the range of intensive demersal fisheries in the Mediterranean. Therefore it will not be protected by the ban on bottom trawling below depths of 1000 m in the Mediterranean, adopted by the General Fisheries Commission for the Mediterranean (GFCM) in February 2005. Benthic trawl effort has increased both numerically and in technological terms in the shelf and slope area of the Mediterranean over the last 50 years. For example, the Gulf of Lions area was initially exploited by small-scale benthic trawl fisheries comprising 27 small low powered boats with a total nominal horse power of 2,700 hp; more recently effort has increased to a total of 19,940 hp (1974-1987). Since then half of the fishing effort has been displaced to targeting small pelagic fish (Aldebert 1997). The Adriatic Sea is subject to trawling mainly by Italian, Croatian, Slovenian, and Albanian fleets, however, no landings data are available (Jukic-Peladic *et al.* 2001).

Exploitation This species is of local fishery importance in the Mediterranean Sea (Serena 2005). The sandy ray is captured as bycatch of multi-species trawl fisheries and offshore bottom longlines in the Mediterranean. All size classes and life-stages are taken in fishing nets, even the eggs (which are often found in the trawl cod-end, Ragonese *et al.* 2003), because the legal mesh size used in much of the Mediterranean is ~20 mm. No official data on sandy ray catches in the Mediterranean are available.

Proposed protection or regulation measures

Uplist from Annex III to Annex II and implementation of strict legal protection through national legislation and GFCM.

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ANNEX 4

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 :

(Indicate here the Party(s) introducing the amendment proposal)

Species concerned: *Leucoraja melitensis* (Clark, 1926)

Amendment proposed :

- ■ Inclusion in Annex II
- ☐ Inclusion in Annex III
- ☐ Removal from Annex II
- ■ Removal from Annex III

Taxonomy

Class : Chondrichthyes

Order : Rajiformes

Family: Rajidae

Genus and Species : *Leucoraja melitensis*

Known Synonym(s) : *Raja* (*Leucoraja*) *melitensis* (Clark 1926)

Common name (English and French): EN - Maltese Skate or Ray; FR - Raie de Malte

Inclusion in other Conventions :

(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention.)

IUCN Red List status:

Global (Mediterranean endemic): Critically Endangered A2bcd+3bcd+4bcd

Justification for the proposal :

This Mediterranean endemic skate is considered to be under imminent threat of extinction. It has undergone significant range contraction in this region, most likely as a result of incidental fishing pressure. All size classes are vulnerable to accidental catch in trawl, trammel and gillnet fisheries, due to the small mesh size of the nets used in the region. It is now rare or absent from areas where it was formerly common and its range now appears to be restricted to the Sicilian channel. As a result, *Leucoraja melitensis* was listed as Critically Endangered on the IUCN Red List of Threatened Species in 2006. The species' remaining range is subject to intense trawling activity and therefore legal protection and possibly protected areas will be essential to conserve the current, small population.

Biological data The species reaches a maximum reported size of ~50cm total length (TL) and both sexes have an average size at maturity of 40cm TL (Bauchot 1987, Notarbartolo and Bianchi 1998, Stehmann and Burkel 1984). Breeding occurs throughout the year; however, ovulating females have been observed mainly in spring and autumn (Stehmann and Burkel 1984, Serena 2005) and produce 10–56 eggs/year (Bauchot 1987). Specimens recorded in the Strait of Sicily between 1985-2001 ranged in size from 9-42cm TL. Age at maturity, longevity, size at birth, reproductive age, gestation time, fecundity, rate of population increase and mortality are not known.

Brief description of the species A small-bodied skate, with sporadic markings on the dorsal side, including a distinct eyespot on each wing.

Distribution (current and historical) *L. melitensis* is endemic to the southwestern and south central Mediterranean. Historically, this species was restricted to a relatively narrow area of this region, where it was moderately common off Tunisia, common around Malta and rare off Algeria and Italy (Stehmann and Burkel 1984, Bauchot 1987, Serena 2005). It has also been reported from the Aegean Sea off Greece (Bertrand *et al.* 2000). *L. melitensis* was also reportedly present, historically, in the Gulf of Lions, Ligurian Sea (Aldebert 1997), although it was not recorded during trawl surveys in this area carried out from 1992-1995 (Aldebert 1997). It is possible that it during earlier surveys in the Gulf of Lions, catches were actually of *L. naevus*, which is widespread in the western Mediterranean. *L. melitensis*' current range appears to be restricted to the Sicilian channel (Ragonese *et al.* 2003). It is now rare off Malta (Schembri *et al.* 2003) and rare or absent off Tunisia (Bradai 2000).

Population estimate and trends This species was common to moderately common in areas from which it is now absent or rare (Malta, Tunisia, possibly Gulf of Lions, France) (Stehmann and Burkel 1984, Schembri *et al.* 2003, Bradai 2000, Aldebert 1997). International MEDITS trawl surveys from 1994-1999 (Baino *et al.* 2001, Bertrand *et al.* 2000) recorded this species in only 20 out of 6,336 hauls (in the western central Mediterranean, the coasts of Tyrrhenia, Corsica, Sardinia and Sicily), suggesting that the remaining population is now small and restricted to a small area of its former range.

Habitat(s) Found on sandy and sandy-muddy substrates. While the species has been recorded from depths of a few metres to 800m, it is more commonly found between 400-800m.

Threats

Existing and potential threats This species is considered to be under imminent threat of extinction, due to a combination of its very restricted range, and ongoing incidental fishing pressure (Cavanagh and Gibson 2007). It was previously found over a relatively restricted area (approximately one-quarter of the total area of the Mediterranean), in depths where trawl fisheries operate (Ungaro *et al.* 2006). Benthic trawling effort over the continental shelf and slope area has increased both with respect to numerical (effort) and technological advances over the last 50 years in the Mediterranean Sea. This species is only rarely present in fish markets; however, it is believed that while only the large individuals are landed for consumption, most size classes are likely to be taken as bycatch in fishing nets because the legal mesh size used in much of the Mediterranean region is small, at ~20mm diameter. In the remainder of this species' range within the Mediterranean (the Sicilian channel around Malta), its depth distribution coincides with that of intensive trawling activity. The strait of Sicily is the most intensely exploited region of the Italian coast, with the most fishing vessels in operation, compared to other areas of the basin.

Exploitation This species is taken as bycatch of demersal trawl, gillnet and bottom longline fisheries (Bauchot 1987), although it may be too small to be taken regularly by the latter gear. Historically, it was taken in these fisheries off Tunisia (Bauchot 1987) and other areas of its former range. The remainder of this species' range (the Sicilian channel around Malta) is intensely exploited, largely by Italian multipurpose artisanal vessels using bottom longlines, gill-nets, trammel nets and trawls (trawl vessels constitute 11% of the fleet) (Relini *et al.* 2000). Skates are taken as bycatch and mainly discarded by these fisheries (Ragonese *et al.* 2003), although nothing is known of post-discard survival. Tunisian and Maltese vessels also operate in this area, although these fleets are not thought to exert the same pressure as the Italian fleet. Official catch data for this species are not available.

Proposed protection or regulation measures

Uplist from Annex III to Annex II and implementation of strict legal protection through national legislation and GFCM as a matter of acute urgency. Identification and protection of spawning grounds.

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ANNEX 5

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 : *(Indicate here the Party(s) introducing the amendment proposal)*	Species concerned: *Rhinobatos* spp (*Rhinobatos cemiculus* E. Geoffroy Saint-Hilaire, 1817 ; *Rhinobatos rhinobatos* Linnaeus, 1758)
	Amendment proposed : ■ Inclusion in Annex II ☐ Inclusion in Annex III ☐ Removal from Annex II ■ Removal from Annex III

Taxonomy Class : Chondrichthyes Order : Rajiformes Family: Rhinobatidae Genus and Species : *Rhinobatos* spp*: Rhinobatos cemiculus, Rhinobatos rhinobatos* Known Synonym(s) : Common name (English and French): En - Blackchin guitarfish, Common guitarfish; Fr – Raie requin, Raie-guitare commune	Inclusion in other Conventions : *(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention.)* IUCN Red List status: Global: Endangered A4cd Mediterranean: Endangered A4cd

Justification for the proposal :

Rhinobatos spp. have undergone severe declines in abundance and area of occupancy in the Mediterranean Sea, to the point of probable local extinction in some areas. Both were once common in the northern Mediterranean, but were absent from MEDITS trawl surveys between 1994-1999, have disappeared from landings, and appear to have been extirpated in the northern Mediterranean. In contrast, *Rhinobatos* spp. are still regularly landed off Tunisia (~200T per year), mainly in the Gulf of Gabes, where they are taken as bycatch year-round and targeted during May-July by a small coastal net fleet. However, the high proportion of juveniles in these catches suggests that this population may also be overfished. The primary threat to these species is unsustainable catch in fisheries, although their inshore distribution makes them particularly vulnerable to human impacts on coastal habitats, including degradation of their shallow water nursery grounds. UNEP MAP RAC/SPA (2003) noted that there was an urgent need to assess the threatened status of *Rhinobatos* spp. Both guitarfish species have been assessed as Endangered globally and regionally in the Mediterranean Sea on the IUCN Red List of Threatened Species.

Biological data Like most elasmobranches, both *Rhinobatos* spp. are relatively large-bodied, slow-growing, long-lived, and have low fecundity. They reproduce by aplacental viviparity, producing 4-6 pups per litter. Gestation lasts 4-6 months in *R. cemiculus* and 6 months in *R. rhinobatos*; both species reproduce once or twice a year.

Data for *R. rhinobatos*: Whitehead *et al.* (1984) reported that *R. rhinobatos* reaches a maximum size of 100cm total length (TL) and Capapé *et al.* (1996) and Enajjar *et al.* (2008) reported maximum lengths of 162cm TL and 120cm TL, respectively, in the Gulf of Gabes, southern Mediterranean. Enajjar *et al.* (2008) and Enajjar (2009) recently studied the reproductive biology of this species in the Gulf of Gabes. They report that females and males reach maturity at 79cm TL and 70cm TL, respectively. Gestation lasts 10-12 months and parturition takes place from the end of summer to the beginning of autumn. Size at birth is 25-29cm TL (Enajjar *et al.* 2008). Fecundity averages about 5 pups per year in this area. Başusta *et al.* (2008) studied the age and growth of this species off Turkey in the northeastern Mediterranean. Male and females ranged in age from 1-15 and 1-24 years, respectively. Total length ranged from 42 to 147 cm for females and 39 to 124 cm for males. In waters off Alexandria, Abdel-Aziz *et al.* (1993) reported that females matured at 87 cm, and reached a maximum size of 181 cm, while males matured at 70 cm, and reached a maximum of 172 cm length.

Data for *R. cemiculus*: Whitehead *et al.* (1984) reported that *R. cemiculus* reaches a maximum size of 180cm, and Capapé *et al.* (1996) reported 230cm TL in the Gulf of Gabes, southern Mediterranean. An important nursery area has been identified along the Lebanon coasts (F. Serena pers. comm.). Enajjar (2009) recently studied the reproductive biology of this species in the Gulf of Gabes. Males and females reach maximum sizes of 166cm TL and 205cm TL, respectively. Males are mature at 112cm TL and females at 139cm TL. Fecundity averages about 6 pups per year in this area. In Tunisia, average length of fully developed fetuses is 40 cm (Capapé and Zaouali 1994).

Brief description of the species Brown back with a white underside, with elongated body, flattened head and trunk and wings, distinctive of guitarfish.

Distribution (current and historical) Both species occur in the Eastern Atlantic and Mediterranean Sea; *R. rhinobatos* occurs from the southern Bay of Biscay, and *R. cemiculus* from northern Portugal, ranging south to Angola. Historically, both species occurred throughout the Mediterranean Sea, but nowadays they are absent or rare throughout much of the northern Mediterranean and may have been extirpated there (Capapé 1989, Whitehead *et al.* 1984, Quignard and Capapé 1971, Fredj and Maurin 1987, Doderlein 1884, Baino *et al.* 2001, Relini and Piccinetti 1991, G. Morey pers. comm.). Both species are absent from the Black Sea (Serena 2005).

Population estimate and trends There has been a marked decline in the abundance and extent of occurrence of both species in the Mediterranean Sea. *R. rhinobatos* and *R. cemiculus* were historically common in the northern Mediterranean. For example, Doderlein (1884) reported their daily presence in the Palermo fish market. However, they have disappeared from bottom trawl surveys, from the Alboran to Aegean Sea within the MEDITS international programme and from landings in Mazzara del Vallo, Sicily (M. Vacchi pers. comm.). They appear to have been extirpated from this area (Relini and Piccinetti 1991). In the Balearic Islands, both species were considered typical inhabitants of unvegetated sandy bottoms (De Buen 1935). Older fishermen reported their relative frequency during the first half of the 20th century, but nowadays they seem to be extirpated from the area (G. Morey pers. obs). Given that the two species are demersal, occurring over shelf bottoms at maximum depths of about 100m, their connection with extra-Balearic populations is probably very low. Granier (1964) reported that *R. rhinobatos* was commonly landed in the southern coast of the Mediterranean Sea but that by

that time, it had become scarce on the northern coast (Granier 1964). Nowadays, both *Rhinobatos* species in the Mediterranean are common off Tunisia, mainly in the Gulf of Gabes, where they are regularly landed as bycatch of trawl fisheries year-round and targeted during May-July by traditional nets (Enjjar *et al.* 2008, M.N. Bradaï pers. comm. 2009). Landings data for recent years show a steady trend, with ~200t of Rhinobatos spp landed per year. Landings in this area are characterised by a high proportion of immature fish (Notarbartolo di Sciara *et al.* 2007).

Habitat(s) Guitarfish are benthic, living over sandy, muddy, shell and occasionally macro-algal covered substrates. They inhabit shallow water on the continental shelf; *R. cemiculus* occurs to depths of 100m, whilst *R. rhinobatos* occurs from the intertidal zone to 180m depth.

Threats

Existing and potential threats The primary threat to guitarfish in the Mediterranean Sea is unsustainable catch in fisheries. The limiting life-history characteristics and inshore habitat of these guitarfish make them particularly vulnerable to population depletion over much of their ranges. Pregnant females and adult males congregate in inshore waters for mating and parturition, where they are exposed to coastal fisheries; such fishing pressure has been heavy, for example, in Iskenderun Bay (Turkey) (Başusta *et al.* 2008). Habitat degradation may also impact these species' shallow inshore nursery grounds. Low levels of interconnectivity between geographical subpopulations make these species vulnerable to localised declines and mean that recolonisation may be very slow. Given their vulnerable life histories and inshore distribution, the observed population declines in the Northern Mediterranean are very likely to be repeated throughout the remainder of these species' ranges (ICES 2010); such severe declines have also occurred in other guitarfish species globally (Fowler *et al.* 2005). The lack of data about guitarfish populations and impacts of fishing and habitat loss represents a further threat to the persistence of these species.

Exploitation These species are taken as bycatch of a variety of fishing gears, including trawls, trammel nets, and gill nets. They are easily captured in coastal artisanal fisheries. No information is available about directed fishing for guitarfish in the Mediterranean Sea, but they are known to be targeted for their high-value fins in other areas (e.g. Western Africa). These species are easily caught by trawls, such as the Egyptian commercial trawl fishery off the coast of Alexandria. In Turkey, *R. rhinobatos* has been exploited by trawlers since 1990, and is sold by kebab restaurants along the Aegean and Mediterranean coasts (Çek *et al.* 2009). Occasional catches have also been reported by fishers in Malta, although it could not be confirmed whether individuals caught were *R. cemiculus*, *R. rhinobatos*, or both species (Schembri *et al.* 2003). In the Gulf of Gabes, Tunisia, *R. rhinobatos* and *R. cemiculus* are landed as bycatch of trawl fisheries year-round. They are also targeted during May-July using traditional nets by a small coastal fleet (maximum of ten boats). This fleet generally targets other chondrichthyan species, such as *Carcharhinus plumbeus* and *Mustelus* spp. (M.N. Bradaï pers. comm. 2009). Regular catches of ~200t of *Rhinobatos* spp per year have been recorded for the last six years in this fishery. In addition, official data from the FAO show Mediterranean catches of these species in recent years by Albania, Greece, Libya, and Palestine, averaging a total of 65 T/year for the last ten years (FAO 2011). No official landings data are available from other countries that are also likely to capture these species in the Mediterranean (including Lebanon, Turkey, Syria, and nations along the North African coast) (ICES 2010).

Proposed protection or regulation measures

Uplist from Annex III to Annex II and strict protection in coastal waters by Parties to the Barcelona Convention. In addition, development of fisheries research programmes and a management plan under GFCM, on the basis that these species are still regularly taken in Tunisian waters.

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ANNEX 6

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 : *(Indicate here the Party(s) introducing the amendment proposal)*	Species concerned: *Galeorhinus galeus* (Linnaeus, 1758) Amendment proposed : ■ Inclusion in Annex II ☐ Inclusion in Annex III ☐ Removal from Annex II ■ Removal from Annex III
Taxonomy Class : Chondrichthyes Order : Carcharhiniformes Family: Triakidae Genus and Species : *Galeorhinus galeus* Known Synonym(s) : Common name (English and French): EN - Tope, FR - Cagnot	Inclusion in other Conventions : *(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention .)* IUCN Red List status: Global: Vulnerable A2bd+3d+4bd Mediterranean: Vulnerable A2bd

Justification for the proposal :

Survey and fisheries data suggest that *Galeorhinus galeus* has declined significantly in the Mediterranean Sea and it is now only rarely seen as bycatch. Overfishing from incidental catch, together with habitat degradation caused by intensive bottom trawling are considered the main factors that have produced the decline of the Mediterranean stock. UNEP MAP RAC/SPA (2003) noted that management programmes for sustainable fisheries catch should be developed and implemented for this species but that has not happened along many years since then.

Biological data The life history parameters of *G. galeus* varies between regions. The maximum size recorded in the Mediterranean is ~200cm total length (female) (Capape and Mellinger 1998), larger than in some other regions. Differences are also apparent in the size at maturity in different regions. Size at maturity ranges between 120-135cm for males and 134-140cm for females in various regions (Olsen 1954, Capape and Mellinger 1988, Peres and Vooren 1991, Freer 1992). Reproduction is a placental viviparity with average litters of 20–35 pups, with as few as 6 and as many as 52 observed with an average of 35 in the Eastern North Pacific (Ripley 1946, Ebert 2003)) produced in spring or early summer after a gestation period of ~12 months; the young vary in length at birth between 26–40cm, depending on the region. The litter size increases in larger females. Females appear to breed every year in the Mediterranean. These animals are very long-lived and are estimated to live for up to 60 years, although estimates vary (from around 22 years to around 40 years to up to 60 years) with region and ageing methods used. In Australia, tags have been returned from animals at liberty for more than 40 years. Age at maturity is 8–10 for males and 10–15 for females (Olsen 1954, Peres and Vooren 1991, Freer 1992, Walker 1999, Ebert 2003). The annual rate of population increase has been estimated by Cortés (2002) at 1.077 (95% C.I. 1.037 to 1.128) and the natural mortality by Smith *et al.* (1998) at 0.113.

Brief description of the species Slender, long-nosed shark, with a grey dorsal surface and white below, and oval shaped eyes.

Distribution (current and historical) Widespread in temperate waters. Occurs throughout the whole Mediterranean Sea, but absent from the Black Sea (Serena 2005).

Population estimate and trends Declines have occurred in the Mediterranean Sea, and it is now only rarely seen as by catch. It was once common in coastal waters of the Mediterranean. It had high catch rates in fish traps but analyses of these catch series showed a sharp decline even at the beginning of the twentieth century. Ferretti *et al.* (2005) estimated a decline of 99.97%o in 25 years. This could be representative of the decline the species experienced in coastal waters at the beginning of the century. It was caught in bottom long line surveys in the Tuscan Archipelago (Mancini, 1922) and Adriatic Sea (Kirinčić and Lepetić, 1955), but there is no record of this species from trawl surveys in the last 30 years from the same areas. *Galeorhinus galeus* appears sporadically in scientific surveys and in places where fishing exploitation is relatively low. It seems more abundant in the west Ionian Sea and Aegean Sea. Analysis of MEDITS trawl survey data from 1994-1999 shows a very low frequency of occurrence for *G. galeus* in the Mediterranean (only 5 positive of 6336 hauls or 0.05%), although it should be noted that trawling is a minor threat to this species and numbers in trawl surveys would not be expected to be high. Off Italy, Relini *et al.* (2000) reported the capture of *G. galeus* in only one of the 11 zones studied as part of the Italian national project (9,281 hauls in total, around the Italian coast, from 1985-1998), although data on biomass for this species were not provided. Tuna trap data from the Northern Tyrrhenian Sea from 1898 to 1992 shows a dramatic decrease in the abundance of *G. galeus* catches (80 individuals between 1898-1905; only eight for the 1906-1913 period and zero from 1914-1922) (Vacchi *et al.* 2002). These data can be interpreted as an indication of early depletion of the population, at least in shallow waters in this area. This could also have occurred in other Mediterranean areas, where similar fisheries operated historically. Data from the Medits survey for the Adriatic Sea were compared with those from the Hvar survey, carried out in 1948 (Jukic-Peladic 2001). Although no data on individual species biomass are reported, *G. galeus* appeared in the 1948 survey, but not in the Medits survey. Data on elasmobranch landings from the long-line fleet at the Palma de Mallorca (Balearic Islands) central fish auction wharf reported only one specimen in 1996 (B. Reviriego pers.comm.), six in 1999 (G. Morey pers.comm.) and recent regular visits have reported no further specimens. In addition, *G. galeus* was not reported in the official landing statistics, since it did not appear in the 1999-2001 period, thus exacerbating the difficulty of monitoring the population. For the Spanish long-line fleet off the Levantine coast, operating mainly in the Alboran Sea and around the Balearic Islands, the observed catch rate (as by catch) of *G. galeus* is about five specimens per ship and year (D. Macías pers.comm.) In Tunisian waters, where fishing pressure is lower than off the northern Mediterranean coasts, the species is considered to be very rare (Bradai 2000).

Habitat(s) Most abundant in cold to warm temperate continental seas, from the surfline and very shallow water to well offshore (Compagno in prep). The species is primarily found near the bottom but ranges through the water column even into the pelagic zone. A coastal-pelagic shark of temperate continental and insular waters, often found well offshore (but not oceanic) as well as at the surfline, in shallow bays, and in submarine canyons. Found at depths of 2 to 471m (Compagno in prep). The species appears to have fairly discrete pupping and nursery areas, which are often in shallow, protected bays and estuaries (Olsen 1954).

Threats

Existing and potential threats Overfishing from incidental catch, together with habitat degradation caused by intensive bottom trawling are considered the main suspected factors that have produced the decline of the Mediterranean stock. Stock collapses (declines of >80%) documented in the Northeast Pacific, Southwest Atlantic and Australia demonstrate the extreme vulnerability of this species to fisheries exploitation (Walker *et al.* 2006).

Exploitation Although no direct fisheries for *G. galeus* exist in the Mediterranean, it was traditionally caught as bycatch in gillnets and trammel nets in the Northern Adriatic Sea, also as bycatch of semi-industrial (Adriatic Sea and Sicily) and artisanal fisheries in pelagic and demersal nets, deep longlines, drift lines and troll lines (Fisher *et al.* 1987). A small directed gillnet fishery targeting *Mustelus spp.* and *Squalus spp.* operated off the Balearic Islands in the past which reported catches of *G. galeus*. In recent times, only bottom trawl and longline fisheries have reported continuous bycatch of *G. galeus*, and such reports are very rare nowadays. The development of the bottom trawl fisheries in the Mediterranean over the first half of the 20th century in the northern range, and during the latter half in the southern range, is considered as one of the principal factors responsible of the decline of many demersal elasmobranch species. The meat of this species is retailed in European markets, from catches in the Northeast Atlantic and (formerly) Mediterranean and from imports. Its fins and liver oil are also utilised.

Proposed protection or regulation measures

Uplist from Annex III to Annex II. Mandatory reporting and live release of bycatch. ID and protection of nursery grounds.

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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 :

(Indicate here the Party(s) introducing the amendment proposal)

Species concerned: *Sphyrna* spp: *Sphyrna zygaena* (Linnaeus 1758),.*Sphyrna lewini* (Griffith & Smith, 1834). *Sphyrna mokarran* (Rüppell, 1837)

Amendment proposed :

- ■ Inclusion in Annex II
- ☐ Inclusion in Annex III
- ☐ Removal from Annex II
- ■ Removal from Annex III

Taxonomy

Class : Chondrichthyes

Order : Carcharhiniformes

Family: Sphyrnidae

Genus and Species : *Sphyrna zygaena, Sphyrna lewini, Sphyrna mokarran*

Known Synonym(s) :

Common name (English and French): EN – Smooth Hammerhead; FR - Requin-marteau commun

Inclusion in other Conventions :

(Specify here if the species is included on the species list of other relevant conventions, in particular: CITES, CMS, ACCOBAMS, Bern Convention .)

IUCN Red List status of species

Global:

S. zygaena: Vulnerable A2bd+3bd+4bd

S. lewini: Endangered A2bd+4bd

S. mokarran: Endangered A2bd+4bd

Justification for the proposal :

Sphyrna spp. are estimated to have declined by up to 99% over 107 years in the northwestern Mediterranean Sea. *Sphyrna zygaena* is the main species of hammerhead shark reported from the Mediterranean, but there are also very sporadic records of *S. lewini* and a single record of *S. mokarran* from the region. Unsustainable catch in fisheries is the main threat to these large semipelagic sharks. Their epipelagic nature exposes them to a variety of fisheries, particularly longlines and gillnets, as bycatch in tuna and swordfish fisheries. They are also highly valued in the global shark fin trade. UNEP MAP RAC/SPA (2003) noted that there was an urgent need to assess the threatened status of *Sphyrna* spp. in the region. The available trend data suggest that the species meet the IUCN Red List criteria for Critically Endangered, regionally, in the Mediterranean Sea. Given the evidence for significant, rapid declines in *Sphyrna* spp., continued high fishing pressure and problems with accurate identification to species level, need of inclusion of the entire genus in Annex II is warranted.

Biological data Published biological data on *S. zygaena* are limited. Compagno (1984, in prep) reported that the species reaches a maximum size of 370-400cm total length (TL). Stevens (1984) reported that off the east coast of Australia males mature at about 250–260cm TL and females at about 265cm TL. Castro and Mejuto (1995) reported gravid females between 220 and 255cm fork length, but gave no relationship between fork and total length. Bass *et al.* (1975) reported a female *S. zygaena* from South Africa that appeared to have recently mated in February and another female caught in November that contained full-term embryos. Stevens (1984) reported that off the east coast of Australia parturition occurs between January and March, with ovulation at about the same time. The gestation period off eastern Australia appears to be 10–11 months. Castro and Mejuto (1995) reported 21 gravid females with a mean litter size of 33.5 from the waters of western Africa. Off eastern Australia Stevens (1975) reported litter sizes between 20–49 (mean 32). The sex ratio of embryos is 1:1 (Stevens 1984, Castro and Mejuto 1995). Compagno (1984, in prep) gave the size at birth as 50–61cm. Smale (1991) reported juveniles with open umbilical scars from South Africa at sizes between 59 and 63cm. Possible pupping grounds and nursery areas for this species include the northern Gulf of California and shallow coastal waters off southern Brazil and Uruguay (Vooren 1997, 1999, Vooren and Klippel 2005, Dono *et al.* in prep). Although maximum age has yet to be determined for this species, it is thought that the lifespan of the smooth hammerhead may be 20 years or longer (FLMNH 2008). Further information is required on the biology and life-history parameters of this species. Removal of hammerhead sharks, top marine predators, may have significant and complex effects on the marine ecosystem (Stevens *et al.* 2000; Baum and Worm 2009).

Brief description of the species Large hammerhead shark, olive-grey back with a white underside and pectoral fin tips that are dusky coloured below.

Distribution (current and historical) *Sphyrna zygaena* is found in temperate and tropical seas, with a wider range than other members of its family (Compagno in prep). The full extent of this species' range in tropical waters may be incompletely known at present, due to probable confusion with the more abundant *S. lewini* (Compagno in prep). The smooth hammerhead appears to be less common in the central Mediterranean, in comparison to the western regions of this sea. Records from the Mediterranean indicate that *S. zygaena* was present, at least historically, in the Adriatic, Tyrrhenian, Ligurian, and Alboran Seas (Megalofonou *et al.* 2000; Feretti *et al.* 2008). *Sphyrna mokarran* is very rare, with only a single specimen recorded in the Mediterranean in Camogli, Ligurian Sea, Western Mediterranean (Boero and Carli, 1977 *in* Bradai *et al.*, 2010), introduced probably via Gibraltar.

Population estimate and trends Specific data on *Sphyrna zygaena* populations are generally unavailable in many areas, because catches of hammerhead sharks are often grouped to include several *Sphyrna* species. In the central Mediterranean Sea, there are few recent records of *Sphyrna* species. A total of 16 records of *S. zygaena* were collected in the eastern Adriatic from the 19th century to the 1950s, including reported catches were distributed throughout whole of the eastern coast. A higher number of records were reported during the 19th century in comparison to the 20th century (10 vs. 6, respectively) and the species has not been reported in this area since 1956 (Soldo and Jardas 2002). Although it occurs in open waters of southern Adriatic, it is only caught very rarely (Bello 1999). Megalofonou *et al.* (2000) only recorded four specimens during their survey of shark bycatches and discards in Mediterranean large pelagic fisheries in 1998-1999 (one in the Adriatic, two in the Ionian Sea and one in Spanish Mediterranean waters). There were only 13 records of *S. zygaena* in the Northern Tyrrhenian and Ligurian Seas from the 1960s-1995 and there are no reports of this species during the last five years (F. Serena pers. comm.). Ferretti *et al.* (2008) compiled nine time series of abundance indices from commercial and recreational fishery landings, scientific surveys and sighting records, to reconstruct long-term population trends of large sharks in the northwestern Mediterranean Sea. Of the taxa for which there were enough data to investigate, hammerhead sharks (*Sphyrna* spp.) declined the fastest; they appeared to disappear from coastal waters after 1963 and catches declined consistently in pelagic waters in the early 1980s in all sectors. Meta-analysis showed an average instantaneous rate of decline of -0.17 Mediterranean Sea since 1986.

Habitat(s) *Sphyrna zygaena* is a coastal-pelagic and semi-oceanic shark, occurring from shallow inshore waters over continental and insular shelves to depths of at least 20m and probably deeper, offshore (Compagno in prep., Compagno *et al.* 2005). The nursery habitat of this species is smooth sandy substrate in shallow waters, down to depths of 10m (Casper *et al.* 2005).

(CI 95%: –0.34, –0.003; time range 178 years) in abundance and –0.36 (CI 95%: –0.56, -0.1–6; time range: 107 years) in biomass, which translated into an estimated species decline of >99.99% in both cases. Walker *et al.* (2005) also report that the species has virtually disappeared from the central-southern Mediterranean Sea since 1986.

Habitat(s) *Sphyrna zygaena* is a coastal-pelagic and semi-oceanic shark, occurring from shallow inshore waters over continental and insular shelves to depths of at least 20m and probably deeper, offshore (Compagno in prep., Compagno *et al.* 2005). The nursery habitat of this species is smooth sandy substrate in shallow waters, down to depths of 10m (Casper *et al.* 2005).

Threats

Existing and potential threats Unsustainable catch in fisheries is the greatest threat to *Sphyrna zygaena*. It is caught in multiple types of fishing gear, including pelagic handlines, longlines, gillnets, purse-seines, and pelagic and bottom trawls (Bonfil 1994, Compagno in prep, Maguire *et al.* 2006). Observed population collapse of hammerhead sharks occurred after the expansion of pelagic fisheries in the Mediterranean (Ferretti *et al.* 2008) – these fisheries are ongoing. Catches in pelagic fisheries appear to be dominated by larger individuals, while inshore shelf fisheries more commonly catch juveniles (Casper *et al.* 2005). Post-capture mortality of hammerhead sharks by longline vessels is relatively high, estimated at 85% for *S. zygaena* and 83% for *S. lewini* (Cortés *et al.* 2010). Hammerhead sharks represent one of the main species exploited for the global shark fin trade (Clarke *et al.* 2006a), with fins traded from an estimated 1.3-2.7 million individuals each year (Clarke *et al.* 2006a, b). The high commercial value of its fins, combined with its low reproductive capacity, makes this species highly vulnerable to over-exploitation and population depletion. Habitat degradation may also impact the three species' shallow inshore nursery grounds.

Exploitation In the Northeast Atlantic and Mediterranean Sea, *S. zygaena* is mainly caught by longlines and gillnets, as bycatch in tuna and swordfish fisheries. Despite a ban on driftnetting in Mediterranean waters, this practice continues illegally (WWF 2005). A recent study of the Moroccan driftnet fleet operating in the Alboran Sea (southwest Mediterranean) and around the Strait of Gibraltar by Tudela *et al.* (2005) indicates that pelagic fishing pressure in this area is beyond the reproductive capacity of several other semi-oceanic shark species that were previously caught with *S. zygaena* (such as *Alopias vulpinus*). Buencuerpo *et al.* (1998) report the highest catches of *S. zygaena* in the Spanish swordfish fishery from the western African coasts and near the Strait of Gibraltar. All three species have been reportedly caught as by-catch within the Italian large pelagic fishery, although a short-term programme of longline vessel monitoring in 1991 noted the capture of only one individual of *S. zygaena* (Di Natale 1998). De la Serna *et al.* (2002) reported only 8 specimens of *S. zygaena* (0.05%) in a total 17759 sharks caught during a survey of Spanish Mediterranean Fisheries from 1997-1999. This is significantly lower when compared to results of the same fishery along the west African coast and Iberian peninsula (where 757 specimens in period July 1991–July 1992 were caught). Only *S. zygaena* and *S. lewini* are reported as individual species in the Food and Agriculture Organisation (FAO) fisheries statistics, however, hammerhead catches are often grouped one category, *Sphyrna* species. The grouping of these species makes identifying actual catches of *S. zygaena* difficult. FAO data for the Mediterranean include reported catches of *S. zygaena* for only one nation, Albania, in the Ionian Sea (2 T in 2004, and 7 T in 2006). EU data also show reported catches of 1 T of *S. zygaena* by Portugal, in 2005 (Eurostat 2011), while Spanish fisheries statistics indicate reported Mediterranean catches of 722 kg in 1997 (unspecified hammerhead species), and 36 kg and 2 kg of *S. zygaena* in 2004 and 2006, respectively (MARM 2011).

Proposed protection or regulation measures

Uplist from Annex III to Annex II. Mandatory reporting and live release of bycatch.

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